

SCIENCE K TO 7

Integrated Resource Package 2005

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This Integrated Resource Package (IRP) provides basic information teachers will require in order to implement Science K to 7. This document supersedes the *Science Kindergarten to Grade 7 Integrated Resource Package 1995*.

This IRP has been modified from the 1995 version in the following ways:

- fewer topics and thus fewer prescribed learning outcomes per grade level
- separation of the prescribed learning outcomes for Kindergarten, Grade 1, Grade 2, and Grade 3
- integration of science processes through all grades
- addition of Key Elements and Achievement Indicators
- improved support for planning and assessment
- alignment with the Pan-Canadian Common Framework of Science Learning Outcomes, 1997 (Council of Ministers of Education, Canada, <http://cmec.ca/science/framework/>)
- integration of Aboriginal content in the prescribed learning outcomes
- integration of Information and Communication Technology in the prescribed learning outcomes.

A variety of resources were used in the development of this IRP:

- British Columbia Science Kindergarten to Grade 7 IRP (1995)
- Pan-Canadian Common Framework of Science Learning Outcomes (1997), Council of Ministers of Education, Canada (<http://cmec.ca/science/framework/>)
- Science Curriculum Review Report (2001) <http://www.bced.gov.bc.ca/branches/pser/whatsnew.htm#scrr>
- Provincial science curricula
 - APEF (Atlantic Provinces Education Foundation)
 - Ontario
 - Manitoba
 - Alberta
- *Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education*, 3rd Edition (2000), Kendall, J. S. & Marzano, R.J. (<http://www.mcrel.org/standards-benchmarks>)
- *Atlas of Science Literacy* (2001), American Association for the Advancement of Science, Project 2061, National Science Teachers Association, Washington DC
- *Designs for Science Literacy* (2000), American Association for the Advancement of Science, Project 2061, National Science Teachers Association, Washington DC

- *Elementary Science Reference Cards*, David Penner, Gilbert Smith. BCTF Lesson Aide (1987)
- *Science K to 7 & Multi-graded Classrooms: A Supplement to the Science K to 7 Curriculum* (1997), Year A. Susan Martin, BCTF Lesson Aide.
- *Science K to 7 & Multi-Graded Classrooms – A Supplement to the Science K to 7 Curriculum* (1997), Year B. Susan Martin, BCTF Lesson Aide
- *Shared Learnings* (1998), Aboriginal Education Initiative, British Columbia Ministry of Education

The information contained in this document is also available on the Internet at <http://www.bced.gov.bc.ca/irp/irp.htm>

The following paragraphs provide brief descriptions of the components of the IRP.

INTRODUCTION TO SCIENCE K TO 7

The Introduction provides general information about Science K to 7, including special features and requirements. It also provides a rationale for teaching Science K to 7 in BC schools, and specific considerations for program delivery.

This section also contains more specific information about the curriculum to guide educators in planning their program. Included are:

- a graphic overview of the course content
- curriculum organizers (and suborganizers as appropriate) – groupings for prescribed learning outcomes that share a common focus
- suggested timeframe for each curriculum organizer

PRESCRIBED LEARNING OUTCOMES

This section contains the prescribed learning outcomes, which are content standards for the provincial education system; they are the prescribed curriculum. They set out the required attitudes, skills, and knowledge – what students are expected to know and be able to do – for each subject and grade. Learning outcomes are clearly stated and expressed in measurable terms. All learning outcomes complete the stem, “It is expected that students will” In this section, prescribed learning outcomes are presented both by organizer and by grade.

STUDENT ACHIEVEMENT

This section restates the prescribed learning outcomes, along with information about classroom assessment and measuring student achievement, including sets of specific achievement indicators for each prescribed learning outcome. Achievement indicators are statements that describe what students should be able to do in order to demonstrate that they fully meet the curriculum expectations for the subject and grade level. Achievement indicators are not mandatory; they are provided to assist teachers in assessing how well their students achieve the prescribed learning outcomes.

This section further includes key elements, which provide guidance for teachers regarding the expected depth and breadth of the prescribed learning outcomes, including vocabulary, knowledge, and skills and attitudes.

CLASSROOM ASSESSMENT MODEL

This section contains a series of classroom units that address clusters of learning outcomes organized by topic or theme. The units have been developed

by BC teachers, and are provided to support classroom assessment. These units are suggestions only – teachers may use or modify the units to assist them as they plan for the implementation of this curriculum.

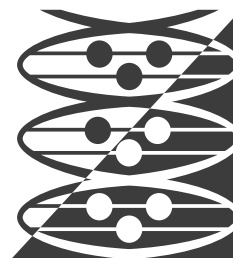
Each unit includes the prescribed learning outcomes, suggested achievement indicators, key elements, a suggested timeframe, a sequence of suggested instruction and assessment activities, recommended learning resources, selected relevant web sites, and sample assessment instruments.

LEARNING RESOURCES

This section contains general information on learning resources, and provides the titles, descriptions, and ordering information for the recommended learning resources in the Science K to 7 Grade Collection.

GLOSSARY

The glossary defines terms used in this Integrated Resource Package.



INTRODUCTION

Science K to 7

This IRP sets out the provincially prescribed curriculum for science Kindergarten to grade 7. The development of this IRP has been guided by the principles of learning:

- Learning requires the active participation of the student.
- People learn in a variety of ways and at different rates.
- Learning is both an individual and a group process.

In addition to these three principles, this document recognizes that British Columbia's schools include young people of varied backgrounds, interests, abilities, and needs. Wherever appropriate for this curriculum, ways to meet these needs and to ensure equity and access for all learners have been integrated as much as possible into the learning outcomes, achievement indicators, instructional activities, and assessment activities.

CURRICULUM OVERVIEW

Rationale

The British Columbia Ministry of Education supports the statement that advancements in science and technology play a significant role in everyday life.

British Columbia also subscribes to the vision that all Canadian students, regardless of gender or cultural background, should have opportunities to develop scientific literacy.

Scientific literacy is an evolving combination of the science-related attitudes, skills, and knowledge students need to:

- develop inquiry, problem-solving, and decision-making abilities as citizens
- become lifelong learners
- maintain a sense of wonder about the world around them.

Diverse experiences in a Science program will provide students with many opportunities to understand their interrelationships among science, technology, and society that will affect their personal lives, their careers, and their future.

Goals for Scientific Literacy

These goals are in alignment with the four foundational statements from the Pan-Canadian Science Framework (Council of Ministers of Education, Canada, 1997) that delineate the four critical aspects of students' scientific literacy.

GOAL 1: Science, technology, society, and the environment (STSE)

Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.

GOAL 2: Skills

Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions.

GOAL 3: Knowledge

Students will construct knowledge and understandings of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge.

GOAL 4: Attitudes

Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.

CURRICULUM ORGANIZERS

A curriculum organizer consists of a set of prescribed learning outcomes that share a common focus. The prescribed learning outcomes for Science K to 7 are grouped under the following curriculum organizers and suborganizers

- Processes of Science
- Life Science
- Physical Science
- Earth and Space Science

Processes of Science

Science, as a process, starts with students learning skills such as observing, classifying, predicting, inferring, and hypothesizing. It also includes scientific reasoning, critical thinking, and decision making. The combination of these skills within the science curriculum content enables students to develop their understanding of science. While these skills are not unique to science, they are important in the application of science to new situations.

There is no universal list of scientific process skills. Those identified in this curriculum are not intended to be a linear scope and sequence; instead, they suggest multiple ways in which learning science can be explored. At each grade level, two processes are introduced and then reinforced with the curriculum content in the subsequent grades; but teachers are expected to involve all of the skills their students are capable of using.

Teachers will know when the process skills are developmentally appropriate for their students. While this IRP has highlighted specific process skills for each grade, other skills could be actively developed and extended with students after the initial skills are introduced.

Process skills are best learned in hands-on activities where students engage in a problem-solving task while doing science. The hands-on model of learning science allows students to construct meaningful connections within the brain. In young children, process skills can be found in the natural practice of manipulating materials while asking questions and being curious. The names of the skills can be used and reinforced by teachers as students use and learn to apply these skills to science activities. The science process names will become familiar to students, enabling them to use the correct vocabulary when they explain their involvement in science and technology inquiries.

Life Science

This is the study of the diversity, continuity, interactions, and balance among organisms and their environments. By using the skills, processes, and attitudes of science, students extend their understanding of the living world and their place within it.

Physical Science

This is the study of matter and energy, and their interactions. By using the skills, processes, and attitudes of science, students build a foundation for their understanding of the physical world.

Earth and Space Science

This is the study of the universe and the structure of the Earth. By using the skills, processes, and attitudes of science, students develop an understanding of the forces, processes, and dynamic life-supporting qualities of the Earth.

ABORIGINAL CONTENT IN THE SCIENCE CURRICULUM

The science curriculum guide integrates prescribed learning outcomes within a classroom model that includes instructional strategies, assessment tools and models that can help teachers provide all students with an understanding and appreciation of Aboriginal science. Integration of authentic Aboriginal content into the K to 7 science curriculum with the support of Aboriginal people will help promote understanding of BC's Aboriginal peoples among *all* students.

The incorporating of Aboriginal science with western science can provide a meaningful context for Aboriginal students and enhance the learning experience for all students. The inclusion of Aboriginal examples of science and technologies can make the subject more authentic, exciting, relevant and interesting for *all* students.

Numerous difficulties arise when trying to incorporate indigenous knowledge and world views into the western science classroom. The participants of the Ministry of Education Aboriginal Science meetings therefore suggest a model involving a parallel process, where Aboriginal and Western understandings exist separately, yet side-by-side and in partnership with one another. Each side is enriched by the contrasting perspective that the other brings to any discussion. Aboriginal peoples are calling for this type of relationship with Canadian schools in a

variety of settings (e.g., Ministry documents, science textbooks and curriculum materials, and teaching methods).

Traditional Ecological Knowledge and Wisdom (TEKW) is defined as the study of systems of knowledge developed by a given culture. It brings the concept of wisdom to our discussion of science and technology. TEKW tends to be holistic, viewing the world as an interconnected whole where humans are not regarded as more important than nature. It is a subset of traditional science, and is considered a branch of biological and ecological science. This knowledge with its characteristic respect for sustaining community and environment offers proven conceptual approaches which are becoming increasingly important to all BC residents.

Examples of TEKW science may be accessed through living elders and specialists of various kinds or found in the literature of TEKW, anthropology, ethnology, ecology, biology, botany, ethnobiology, medicine, horticulture, agriculture, astronomy, geology, climatology, architecture, navigation, nautical science, engineering, and mathematics.

Recognition of the importance of incorporating TEKW into environmental planning is evident in science-based reports and agreements in Canada and internationally. The Brundtland Commission report, *Our Common Future* (World Commission on Environment and Development, 1987), drew our attention to the contributions of traditional knowledge. In British Columbia, the report of the scientific panel for sustainable forest practices in Clayoquot Sound emphasizes TEKW and the importance of including indigenous knowledge in planning and managing traditional territories. The recognition of TEKW globally is explicitly addressed in international agreements including the Convention on Biological Diversity, Agenda 21, and UNCED '92, or the Earth Summit at Rio de Janeiro.

ORGANIZING FOR INSTRUCTION AND ASSESSMENT

Suggested Time Frame

The Kindergarten to Grade 12 Education Plan (1994) outlines the required areas of study for the primary and intermediate years and, as appropriate, indicates the recommended time allotments for each area of learning. In the primary years, teachers determine the time allotments for each required area of study

and may choose to combine various curricula to enable students to integrate ideas and see applications of knowledge. Teachers are encouraged to exercise professional judgment when interpreting the suggested instructional time allotments provided here and in the Classroom Model units.

In grades 4 to 7, a minimum of 30% (285 hours/year, slightly more than 7 hours/week) of the total time in school is recommended for the study of science, mathematics, and technology. (see below).

The following chart shows the suggested estimated instructional time to deliver the prescribed learning outcomes for each Science curriculum organizer, Grade 1 to Grade 7. At the Kindergarten level, the suggested time is 50% of the amount outlined below for each organizer. These estimations have been provided as suggestions only; when delivering the prescribed curriculum, teachers will adjust the instructional time as necessary.

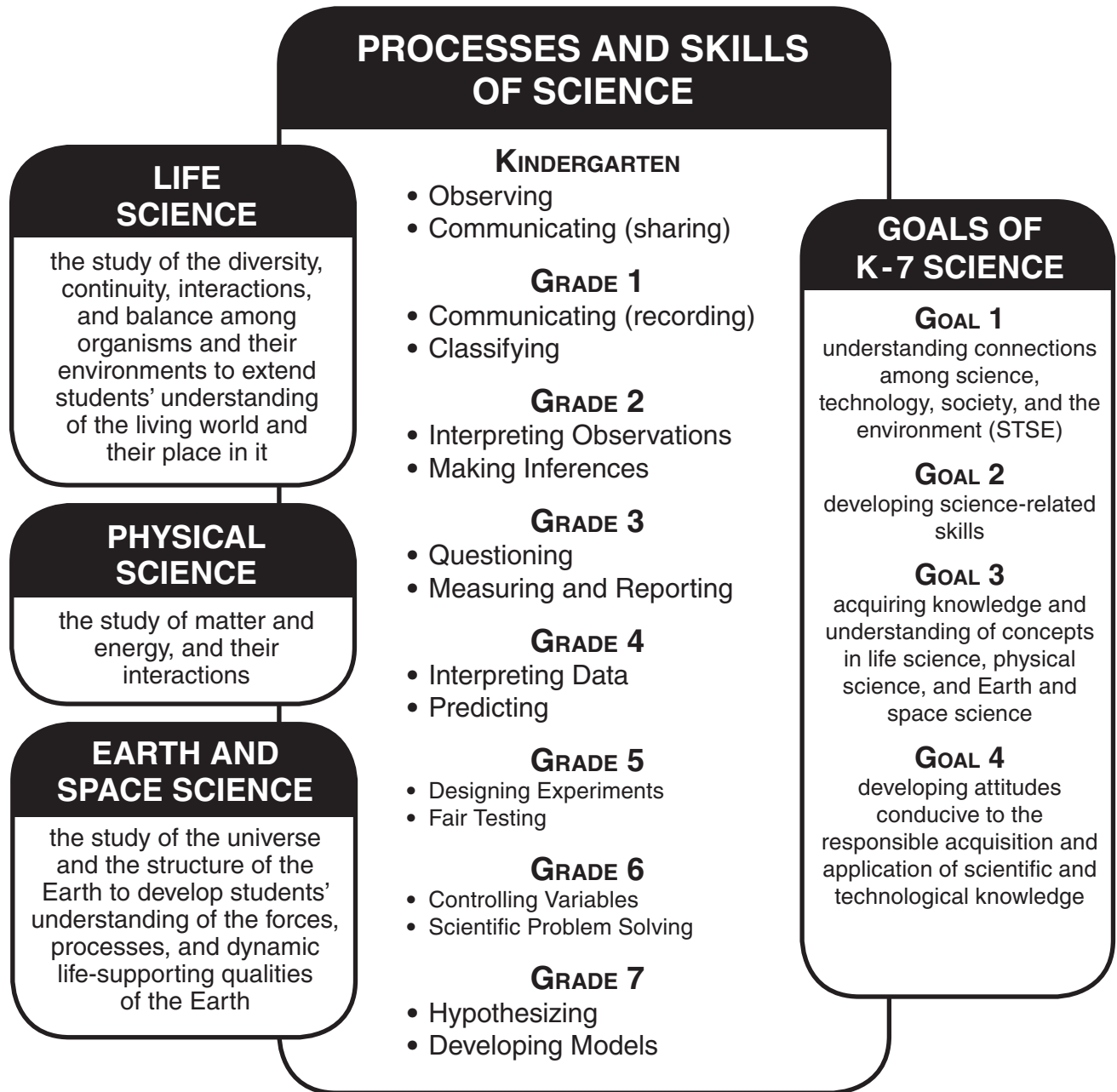
Curriculum Organizer	Suggested Time
Applications of Science	integrated with other organizers
Life Science	25-30 hours
Physical Science	25-30 hours
Earth and Space Science	25-30 hours

These estimated time allotments represent the amount of instructional time that has been recommended to meet the prescribed learning outcomes within each curriculum organizer. When delivering the prescribed curriculum, teachers may freely adjust the instructional time to meet their students' diverse needs. These estimated instructional times have been recommended by the IRP writers to assist their colleagues; they are suggestions only.

SCIENCE K TO 7: TOPICS AT A GLANCE

	Processes and Skills of Science	Life Science	Physical Science	Earth and Space Science
Kindergarten	<ul style="list-style-type: none"> • Observing • Communicating (sharing) 	Characteristics of Living Things	Properties of Objects and Materials	Surroundings
Grade 1	<ul style="list-style-type: none"> • Communicating (recording) • Classifying 	Needs of Living Things	Force and Motion	Daily and Seasonal Changes
Grade 2	<ul style="list-style-type: none"> • Interpreting Observations • Making Inferences 	Animal Growth and Changes	Properties of Matter	Air, Water, and Soil
Grade 3	<ul style="list-style-type: none"> • Questioning • Measuring and Reporting 	Plant Growth and Changes	Materials and Structures	Stars and Planets
Grade 4	<ul style="list-style-type: none"> • Interpreting Data • Predicting 	Habitats and Communities	Light and Sound	Weather
Grade 5	<ul style="list-style-type: none"> • Designing Experiments • Fair Testing 	Human Body	Forces and Simple Machines	Renewable and Non-Renewable Resources
Grade 6	<ul style="list-style-type: none"> • Controlling Variables • Scientific Problem Solving 	Diversity of Life	Electricity	Exploration of Extreme Environments
Grade 7	<ul style="list-style-type: none"> • Hypothesizing • Developing Models 	Ecosystems	Chemistry	Earth's Crust

GETTING THE MOST OUT OF THIS IRP



LIFE SCIENCE
the study of the diversity, continuity, interactions, and balance among organisms and their environments to extend students' understanding of the living world and their place in it

PHYSICAL SCIENCE
the study of matter and energy, and their interactions

EARTH AND SPACE SCIENCE
the study of the universe and the structure of the Earth to develop students' understanding of the forces, processes, and dynamic life-supporting qualities of the Earth

- KINDERGARTEN
- Observing
 - Communicating (sharing)
- GRADE 1
- Communicating (recording)
 - Classifying
- GRADE 2
- Interpreting Observations
 - Making Inferences
- GRADE 3
- Questioning
 - Measuring and Reporting
- GRADE 4
- Interpreting Data
 - Predicting
- GRADE 5
- Designing Experiments
 - Fair Testing
- GRADE 6
- Controlling Variables
 - Scientific Problem Solving
- GRADE 7
- Hypothesizing
 - Developing Models

GOALS OF K-7 SCIENCE

GOAL 1

understanding connections among science, technology, society, and the environment (STSE)

GOAL 2

developing science-related skills

GOAL 3

acquiring knowledge and understanding of concepts in life science, physical science, and Earth and space science

GOAL 4

developing attitudes conducive to the responsible acquisition and application of scientific and technological knowledge

CONSIDERATIONS FOR PROGRAM DELIVERY

This section of the IRP contains additional information to help educators develop their school practices and plan their program delivery to meet the needs of all learners. Included in this section is information about:

- addressing local needs
- involving parents and guardians
- course requirements respecting beliefs
- establishing a positive classroom climate
- safety in the Science K to 7 classroom
- confidentiality
- inclusion, accessibility, and equity
- working with the school and community
- working with the Aboriginal community
- information and communications technology
- copyright.

Addressing Local Needs

The Science K to 7 curriculum includes opportunities for individual teacher and student choice in the exploration of topics to meet certain learning outcomes. This flexibility allows educators to plan their programs to meet the particular requirements of their students and to respond to local needs. It may be appropriate to allow for student input when selecting current and relevant topics.

Where specific topics have been included in the learning outcomes, the intent is for all students to have an opportunity to address these important issues. The inclusion of these topics is not intended to exclude any additional issues that may also be relevant for individual school communities.

Involving Parents and Guardians

The family is the primary educator in the development of students' attitudes and values. The school plays a supportive role by focussing on the prescribed learning outcomes in the Science K to 7 curriculum. Parents and guardians can support, enrich, and extend the curriculum at home.

It is highly recommended that schools inform parents and guardians about the Science K to 7 curriculum, and teachers (along with school and district administrators) may use various strategies to do so:

- Inform parents/guardians and students, via a course outline at the beginning of the course, of the prescribed learning outcomes for the course.
- Respond to parent and guardian requests to discuss course unit plans, learning resources, etc.

Course Requirements Respecting Beliefs

For many students and teachers, the study of some science concepts may lead to issues and questions that go beyond the immediate scope of curriculum (e.g., science is used to meet many industrial requirements, but industrial decision makers must consider factors other than scientific feasibility before adopting a particular process). The technological application of science in areas such as genetic engineering, human reproduction, and medical technology raises questions of ethics and values. Because these social questions arise, in part, from capabilities that science makes possible, they should be addressed. It must be made clear to students, however, that science only provides the background for what is hoped will be informed personal and social decisions. Teachers must handle these questions objectively and with sensitivity.

Reconciling scientific discoveries (for example, in genetic engineering) and religious faith poses a particular challenge for some students. While respecting the personal beliefs of students, teachers should be careful to distinguish between knowledge based on the application of scientific methods, and religious teachings and associated beliefs such as creationism, theory of divine creation, or intelligent-design theory.

Establishing a Positive Classroom Climate

Teachers are responsible for setting and promoting a classroom climate in which students feel comfortable learning about and discussing topics in Science K to 7. The following are some guidelines that may help educators establish and promote a positive classroom climate.

- Allow class members sufficient time and opportunities to become comfortable with each other before engaging in group discussion. It is important that the classroom climate encourage students to relate to one another in positive, respectful, and supportive ways. Be prepared to facilitate any potentially controversial discussions.
- Establish clear ground rules for class discussions that demonstrate respect for privacy, for diversity, and for the expression of differing viewpoints.
- Become familiar with:
 - relevant legislation (e.g., Human Rights Code; Child, Family and Community Services Act)
 - relevant initiatives (e.g., Safe, Caring and Orderly Schools: A Guide and Diversity in BC Schools: A Framework)
 - provincial and district policies and protocols concerning topics such as disclosure related to child abuse, and protection of privacy.

Further information about these policies and initiatives is available online:

BC Handbook for Action on Child Abuse and Neglect
http://www.mcf.gov.bc.ca/child_protection/pdf/handbook_action_child_abuse.pdf

Safe, Caring and Orderly Schools
<http://www.bced.gov.bc.ca/sco/>

Diversity in BC Schools: A Framework
http://www.bced.gov.bc.ca/diversity/diversity_framework.pdf

Human Rights Code
http://www.qp.gov.bc.ca/statreg/stat/H/96210_01.htm

Child, Family and Community Services Act
http://www.qp.gov.bc.ca/statreg/stat/C/96046_01.htm

Activities and discussion related to some of the topics in Science K to 7 may evoke an emotional response from individual students. Inform an administrator or counsellor when any concern arises, and ensure students know where to go for help and support.

Ensure that any external groups or organizations making a presentation to students have met the district's guidelines for presenting. There should be a direct relationship between the content of the presentation and the prescribed learning outcomes. Review any materials they may use, especially handouts, for appropriateness.

Safety in the Science Kindergarten to Grade 7 Classroom

Science education is an activity-based process that provides an exciting method of teaching and learning. However, experiments and demonstrations may involve inherent risks for both the teacher and the student.

Safety guidelines must be discussed with students. These safety guidelines must support and encourage the investigative approach generally and laboratory instruction specifically, while at the same time promoting safety in the classroom and laboratory. Encouraging a positive safety attitude

is a responsibility shared among the board, school administrators, teachers, and students in every school district. The co-operation of all these groups helps develop a strong safety consciousness both inside and outside our schools.

Teachers are reminded especially of the potential risks associated with activities that involve extraction and analysis of human fluids or tissue. Before attempting these activities, they should consult the ministry's Science Safety Manual on the use of human tissue and fluid in science classrooms.

Another important aspect of in-school safety is the Workplace Hazardous Materials Information System (WHMIS). Through labelling, material safety data sheets, and education and training, WHMIS is designed to ensure that those using hazardous materials have sufficient information to handle them safely. Each school district should have an individual trained in WHMIS who can work with teachers to establish safe, well-ventilated classroom and laboratory working conditions.

To assist teachers in providing a safe science-learning environment, the Ministry of Education publishes the Science Safety Resource Manual, which has been distributed to every school. This resource is available online at <http://www.bced.gov.bc.ca/irp/resdocs/scisafety.htm>.

Confidentiality

The Freedom of Information and Protection of Privacy Act (FOIPPA) applies to students, to school district employees, and to all curricula. Teachers, administrators, and district staff should consider the following:

- Be aware of district and school guidelines regarding the provisions of FOIPPA and how it applies to all courses, including Science K to 7.
- Inform students of their rights under FOIPPA, especially the right to have access to their own personal information in their school records.
- Do not use students' Personal Education Numbers (PEN) on any assignments that students wish to keep confidential.
- Minimize the type and amount of personal information collected and ensure that it is used only for relevant purposes.
- Inform students that they will be the only ones recording personal information about themselves unless they have consented to teachers collecting that information from other people, including parents.

- Inform students why they are being asked to provide any personal information in the context of the Science K to 7 curriculum.
- Ensure that any information used in assessing students' progress is up-to-date, accurate, and complete.
- Inform students they can request that the school correct or annotate any of their personal information kept in records at the school.
- Be aware that parents' rights to have access to their children's personal information are limited to that which pertains to their child's progress. Ensure students are aware that their parents may have access to the work they create as part of the course.

For more information about confidentiality, refer to http://www.msers.gov.bc.ca/FOI_POP/index.htm

Inclusion, Equity, and Accessibility for All Learners

British Columbia's schools include young people of varied backgrounds, interests, and abilities. The Kindergarten to grade 12 school system is committed to meeting the needs of all students. When selecting specific topics, activities, and resources to support the implementation of Science K to 7, teachers are encouraged to ensure that these choices support inclusion, equity, and accessibility for all students. In particular, teachers should ensure that classroom instruction, assessment, and resources reflect sensitivity to diversity and incorporate positive role portrayals, relevant issues, and themes such as inclusion, respect, and acceptance.

Government policy supports the principles of integration and inclusion of students who have English as a second language and of students with special needs. Most of the suggested assessment activities in this IRP can be used with all students, including those with special and/or ESL needs. Some strategies may require adaptations to ensure that those with special and/or ESL needs can successfully achieve the prescribed learning outcomes. Modifications can be made to the prescribed learning outcomes for students with Individual Education Plans.

For more information about resources and support for students with special needs, refer to <http://www.bced.gov.bc.ca/specialed/>

For more information about resources and support for ESL students, refer to <http://www.bced.gov.bc.ca/esl/>

Working with the School and Community

This curriculum addresses a wide range of skills and understandings that students are developing in other areas of their lives. It is important to recognize that learning related to this curriculum extends beyond the science classroom.

School and district-wide programs — such as active schools, workplace safety, work experience, anti-bullying, and alcohol and drug education — support and extend learning in Science K to 7. Community organizations may also support the curriculum with locally developed learning resources, guest speakers, workshops, and field studies. Teachers may wish to draw on the expertise of these community organizations and members.

Working with the Aboriginal Community

The Ministry of Education is dedicated to ensuring that the cultures and contributions of Aboriginal peoples in BC are reflected in all provincial curricula. To address these topics in the classroom in a way that is accurate and that respectfully reflects Aboriginal concepts of teaching and learning, teachers are strongly encouraged to seek the advice and support of local Aboriginal communities. As Aboriginal communities are diverse in terms of language, culture, and available resources, each community will have its own unique protocol to gain support for integration of local knowledge and expertise. To begin discussion of possible instructional and assessment activities, teachers should first contact Aboriginal education co-ordinators, teachers, support workers, and counsellors in their district who will be able to facilitate the identification of local resources and contacts such as Elders, chiefs, tribal or band councils, Aboriginal cultural centres, Aboriginal Friendship Centres, and Métis or Inuit organizations.

In addition, teachers may wish to consult the various Ministry of Education publications available, including the "Planning Your Program" section of the resource, *Shared Learnings* (1998). This resource was developed to help all teachers provide students with

knowledge of, and opportunities to share experiences with, Aboriginal peoples in BC.

For more information about these documents, consult the Aboriginal Education web site: <http://www.bced.gov.bc.ca/abed/welcome.htm>

Information and Communications Technology

The study of information and communications technology is increasingly important in our society. Students need to be able to acquire and analyse information, to reason and communicate, to make informed decisions, and to understand and use information and communications technology for a variety of purposes. Development of these skills is important for students in their education, their future careers, and their everyday lives.

Literacy in the area of information and communications technology can be defined as the ability to obtain and share knowledge through investigation, study, instruction, or transmission of information by means of media technology. Becoming literate in this area involves finding, gathering, assessing, and communicating information using electronic means, as well as developing the knowledge and skills to use and solve problems effectively with the technology. Literacy also involves a critical examination and understanding of the ethical and social issues related to the use of information and communications technology. When planning for instruction and assessment in Science K to 7, teachers should provide opportunities for students to develop literacy in relation to information and communications technology sources, and to reflect critically on the role of these technologies in society.

Copyright and Responsibility

Copyright is the legal protection of literary, dramatic, artistic, and musical works; sound recordings; performances; and communications signals. Copyright provides creators with the legal right to be paid for their work and the right to say how their work is to be used. There are some exceptions in the law (i.e., specific things permitted) for schools but these are very limited, such as copying for private study or research. The copyright law determines how resources can be used in the classroom and by students at home.

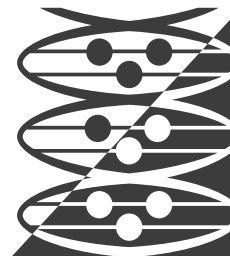
In order to respect copyright it is necessary to understand the law. It is unlawful to do the following, unless permission has been given by a copyright owner:

- photocopy copyrighted material to avoid purchasing the original resource for any reason
- photocopy or perform copyrighted material beyond a very small part—in some cases the copyright law considers it “fair” to copy whole works, such as an article in a journal or a photograph, for purposes of research and private study, criticism, and review
- show videotaped television or radio programs to students in the classroom unless these are cleared for copyright for educational use (there are exceptions such as for news and news commentary taped within one year of broadcast that by law have record-keeping requirements—see the web site at the end of this section for more details)
- photocopy print music, workbooks, instructional materials, instruction manuals, teacher guides, and commercially available tests and examinations
- show videotapes at schools that are not cleared for public performance
- perform music or do performances of copyrighted material for entertainment (i.e., for purposes other than a specific educational objective)
- copy work from the Internet without an express message that the work can be copied.

Permission from or on behalf of the copyright owner must be given in writing. Permission may also be given to copy or use all or some portion of copyrighted work through a licence or agreement. Many creators, publishers, and producers have formed groups or “collectives” to negotiate royalty payments and copying conditions for educational institutions. It is important to know what licences are in place and how these affect the activities schools are involved in. Some licenses may also have royalty payments that are determined by the quantity of photocopying or the length of performances. In these cases, it is important to assess the educational value and merits of copying or performing certain works to protect the school’s financial exposure (i.e., only copy or use that portion that is absolutely necessary to meet an educational objective).

It is important for education professionals, parents, and students to respect the value of original thinking and the importance of not plagiarizing the work of others. The works of others should not be used without their permission.

For more information about copyright, refer to: <http://cmec.ca/copyright/indexe.stm>



PRESCRIBED LEARNING OUTCOMES

Science K to 7

Prescribed learning outcomes are content standards for the provincial education system; they are the prescribed curriculum. They set out the required attitudes, skills, and knowledge—what students are expected to know and be able to do—by the end of the specified subject and grade. Learning outcomes are clearly stated and expressed in measurable and observable terms.

Schools have the responsibility to ensure that all prescribed learning outcomes in this curriculum are met; however, schools have flexibility in determining how delivery of the curriculum can best take place.

It is expected that student achievement will vary in relation to the learning outcomes. Evaluation, reporting, and student placement with respect to these outcomes are dependent on the professional judgment and experience of teachers, guided by provincial policy.

Prescribed learning outcomes for Science K to 7 are presented by grade and by curriculum organizer and suborganizer; however, this arrangement is not intended to imply a required instructional sequence.

Wording of Prescribed Learning Outcomes

All learning outcomes complete the stem, “It is expected that students will”

When used in a prescribed learning outcome, the word “including” indicates that any ensuing item **must be addressed**. Lists of items introduced by the word “including” represent a set of minimum requirements associated with the general requirement set out by the outcome. The lists are not necessarily exhaustive, however, and teachers may choose to address additional items that also fall under the general requirement set out by the outcome.

Conversely, the abbreviation “e.g.,” (for example) in a prescribed learning outcome indicates that the ensuing items are provided for illustrative purposes or clarification, and are **not requirements that must be addressed**. Presented in parentheses, the list of items introduced by “e.g.,” is neither exhaustive

nor prescriptive, nor is it put forward in any special order of importance or priority. Teachers are free to substitute items of their own choosing that they feel best address the intent of the learning outcome.

Domains of Learning

Prescribed learning outcomes in BC curricula identify required learning in relation to one or more of the three domains of learning: cognitive, psychomotor, and affective. The following definitions of the three domains are based on Bloom’s taxonomy (*Taxonomy of Educational Objectives*, Bloom et al., 1956).

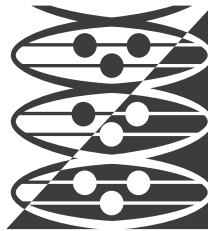
The **cognitive domain** deals with the recall or recognition of knowledge and the development of intellectual abilities. The cognitive domain can be further specified as including three cognitive levels: knowledge, understanding and application, and higher mental processes. These levels are determined by the verb used in the learning outcome, and illustrate how student learning develops over time.

- *Knowledge* includes those behaviours that emphasize the recognition or recall of ideas, material, or phenomena.
- *Understanding and application* represents a comprehension of the literal message contained in a communication, and the ability to apply an appropriate theory, principle, idea, or method to a new situation.
- *Higher mental processes* include analysis, synthesis, and evaluation. The higher mental processes level subsumes both the knowledge and the understanding and application levels.

The **affective domain** concerns attitudes, beliefs, and the spectrum of values and value systems.

The **psychomotor domain** includes those aspects of learning associated with movement and skill demonstration, and integrates the cognitive and affective consequences with physical performances.

Domains of learning and cognitive levels also form the basis of the Assessment Overview Tables provided for each grade in the Classroom Assessment Model.



PRESCRIBED LEARNING OUTCOMES

By Curriculum Organizer

PROCESSES OF SCIENCE

<p>Kindergarten</p> <ul style="list-style-type: none"> • use the five senses to make observations • share with others information obtained by observing
<p>Grade 1</p> <ul style="list-style-type: none"> • communicate their observations, experiences, and thinking in a variety of ways (e.g., verbally, pictorially, graphically) • classify objects, events, and organisms
<p>Grade 2</p> <ul style="list-style-type: none"> • use their senses to interpret observations • infer the probable outcome of an event or behaviour based on observations
<p>Grade 3</p> <ul style="list-style-type: none"> • ask questions that foster investigations and explorations relevant to the content • measure objects and events
<p>Grade 4</p> <ul style="list-style-type: none"> • make predictions, supported by reasons and relevant to the content • use data from investigations to recognize patterns and relationships and reach conclusions
<p>Grade 5</p> <ul style="list-style-type: none"> • identify variables that can be changed in an experiment • evaluate the fairness of a given experiment • describe the steps in designing an experiment
<p>Grade 6</p> <ul style="list-style-type: none"> • manipulate and control a number of variables in an experiment • apply solutions to a technical problem (e.g., malfunctioning electrical circuit)
<p>Grade 7</p> <ul style="list-style-type: none"> • test a hypothesis by planning and conducting an experiment that controls for two or more variables • create models that help to explain scientific concepts and hypotheses

LIFE SCIENCE

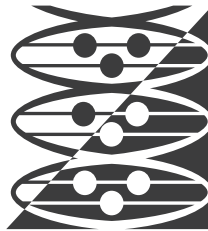
<p>Kindergarten</p> <ul style="list-style-type: none"> • describe features of local plants and animals (e.g., colour, shape, size, texture) • compare local plants • compare common animals
<p>Grade 1</p> <ul style="list-style-type: none"> • classify living and non-living things • describe the basic needs of local plants and animals (e.g., food, water, light) • describe how the basic needs of plants and animals are met in their environment
<p>Grade 2</p> <ul style="list-style-type: none"> • classify familiar animals according to similarities and differences in appearance, behaviour, and life cycles • describe some changes that affect animals (e.g., hibernation, migration, decline in population) • describe how animals are important in the lives Aboriginal peoples in BC • describe ways in which animals are important to other living things and the environment
<p>Grade 3</p> <ul style="list-style-type: none"> • compare familiar plants according to similarities and differences in appearance and life cycles • describe ways in which plants are important to other living things and the environment • describe how plants are harvested and used throughout the seasons
<p>Grade 4</p> <ul style="list-style-type: none"> • compare the structures and behaviours of local animals and plants in different habitats and communities • analyse simple food chains • demonstrate awareness of the Aboriginal concept of respect for the environment • determine how personal choices and actions have environmental consequences
<p>Grade 5</p> <ul style="list-style-type: none"> • describe the basic structure and functions of the human respiratory, digestive, circulatory, skeletal, muscular, and nervous systems • explain how the different body systems are interconnected
<p>Grade 6</p> <ul style="list-style-type: none"> • demonstrate the appropriate use of tools to examine living things that cannot be seen with the naked eye • analyse how different organisms adapt to their environments • distinguish between life forms as single or multi-celled organisms and belonging to one of five kingdoms: Plantae, Animalia, Monera, Protista, Fungi
<p>Grade 7</p> <ul style="list-style-type: none"> • analyse the roles of organisms as part of interconnected food webs, populations, communities, and ecosystems • assess survival needs and interactions between organisms and the environment • assess the requirements for sustaining healthy local ecosystems • evaluate human impacts on local ecosystems

PHYSICAL SCIENCE

<p>Kindergarten</p> <ul style="list-style-type: none"> • describe properties of materials, including colour, shape, texture, size, and weight • identify materials that make up familiar objects • describe ways to rethink, refuse, reduce, reuse, and recycle
<p>Grade 1</p> <ul style="list-style-type: none"> • demonstrate how force can be applied to move an object • compare the effect of friction on the movement of an object over a variety of surfaces • demonstrate and describe the effects of magnets on different materials
<p>Grade 2</p> <ul style="list-style-type: none"> • identify the properties of solids, liquids, and gases • investigate changes to the properties of matter when it is heated or cooled • investigate the interactions of liquids and solids
<p>Grade 3</p> <ul style="list-style-type: none"> • describe shapes that are part of natural and human-built structures (e.g., domes, arches, pyramids) • compare the effects of different materials, shapes, and forces on the strength and stability of different structures • conduct investigations into ways to improve the strength and stability of structures
<p>Grade 4</p> <ul style="list-style-type: none"> • identify sources of light and sound • explain properties of light (e.g., travels in a straight path, can be reflected) • explain properties of sound (e.g., travels in waves, travels in all directions)
<p>Grade 5</p> <ul style="list-style-type: none"> • demonstrate how various forces can affect the movement of objects • demonstrate mechanical advantage of simple machines, including lever, wedge, pulley, ramp, screw, and wheel • design a compound machine • describe applications of simple and compound machines used in daily life in BC communities
<p>Grade 6</p> <ul style="list-style-type: none"> • evaluate various methods for producing small electrical charges • test a variety of electrical pathways using direct current circuits • demonstrate that electricity can be transformed into light, heat, sound, motion, and magnetic effects • differentiate between renewable and non-renewable methods of producing electrical energy
<p>Grade 7</p> <ul style="list-style-type: none"> • conduct investigations into properties of matter • classify substances as elements, compounds, and mixtures • measure substances and solutions according to pH, solubility, and concentration

EARTH AND SPACE SCIENCE

<p>Kindergarten</p> <ul style="list-style-type: none"> • demonstrate the ability to observe their surroundings • describe features of their immediate environment
<p>Grade 1</p> <ul style="list-style-type: none"> • describe changes that occur in daily and seasonal cycles and their effects on living things • describe activities of Aboriginal peoples in BC in each seasonal cycle
<p>Grade 2</p> <ul style="list-style-type: none"> • describe physical properties of air, water, and soil • distinguish ways in which air, water, and soil interact • explain why air, water, and soil are important for living things
<p>Grade 3</p> <ul style="list-style-type: none"> • describe characteristics and movements of objects in our solar system • compare familiar constellations in seasonal skies • demonstrate awareness of the special significance of celestial objects for Aboriginal peoples
<p>Grade 4</p> <ul style="list-style-type: none"> • measure weather in terms of temperature, precipitation, cloud cover, wind speed and direction • analyse impacts of weather on living and non-living things
<p>Grade 5</p> <ul style="list-style-type: none"> • analyse how BC’s living and non-living resources are used • identify methods of extracting or harvesting and processing BC’s resources • analyse how the Aboriginal concept of interconnectedness of the environment is reflected in responsibility for and caretaking of resources • describe potential environmental impacts of using BC’s living and non-living resources
<p>Grade 6</p> <ul style="list-style-type: none"> • explain obstacles unique to exploration of a specific extreme environment • assess technologies used for extreme environments • describe contributions of Canadians to exploration technologies
<p>Grade 7</p> <ul style="list-style-type: none"> • compare the characteristics of the Earth’s core, mantle, and crust, and describe the formation of rocks • analyse the dynamics of tectonic plate movement and landmass formation • explain how the Earth’s surface changes over time



PRESCRIBED LEARNING OUTCOMES

By Grade

KINDERGARTEN

Processes and Skills of Science

It is expected that students will:

- use the five senses to make observations
- share with others information obtained by observing

Life Science: Characteristics of Living Things

It is expected that students will:

- describe features of local plants and animals (e.g., colour, shape, size, texture)
- compare local plants
- compare common animals

Physical Science: Properties of Objects and Materials

It is expected that students will:

- describe properties of materials, including colour, shape, texture, size, and weight
- identify materials that make up familiar objects
- describe ways to rethink, refuse, reduce, reuse, and recycle

Earth and Space Science: Surroundings

It is expected that students will:

- demonstrate the ability to observe their surroundings
- describe features of their immediate environment

GRADE 1***Processes and Skills of Science***

It is expected that students will:

- communicate their observations, experiences, and thinking in a variety of ways (e.g., verbally, pictorially, graphically)
- classify objects, events, and organisms

Life Science: Needs of Living Things

It is expected that students will:

- classify living and non-living things
- describe the basic needs of local plants and animals (e.g., food, water, light)
- describe how the basic needs of plants and animals are met in their environment

Physical Science: Force and Motion

It is expected that students will:

- demonstrate how force can be applied to move an object
- compare the effect of friction on the movement of an object over a variety of surfaces
- demonstrate and describe the effects of magnets on different materials

Earth and Space Science: Daily and Seasonal Changes

It is expected that students will:

- describe changes that occur in daily and seasonal cycles and their effects on living things
- describe activities of Aboriginal peoples in BC in each seasonal cycle

GRADE 2

Processes and Skills of Science

It is expected that students will:

- use their senses to interpret observations
- infer the probable outcome of an event or behaviour based on observations

Life Science: Animal Growth and Changes

It is expected that students will:

- classify familiar animals according to similarities and differences in appearance, behaviour, and life cycles
- describe some changes that affect animals (e.g., hibernation, migration, decline in population)
- describe how animals are important in the lives of Aboriginal peoples in BC
- describe ways in which animals are important to other living things and the environment

Physical Science: Properties of Matter

It is expected that students will:

- identify the properties of solids, liquids, and gases
- investigate changes to the properties of matter when it is heated or cooled
- investigate the interactions of liquids and solids

Earth and Space Science: Air, Water, and Soil

It is expected that students will:

- describe physical properties of air, water, and soil
- distinguish ways in which air, water, and soil interact
- explain why air, water, and soil are important for living things

GRADE 3

Processes and Skills of Science

It is expected that students will:

- ask questions that foster investigations and explorations relevant to the content
- measure objects and events

Life Science: Plant Growth and Change

It is expected that students will:

- compare familiar plants according to similarities and differences in appearance and life cycles
- describe ways in which plants are important to other living things and the environment
- describe how plants are harvested and used throughout the seasons

Physical Science: Materials and Structures

It is expected that students will:

- describe shapes that are part of natural and human-built structures (e.g., domes, arches, pyramids)
- compare the effects of different materials, shapes, and forces on the strength and stability of different structures
- conduct investigations into ways to improve the strength and stability of structures

Earth and Space Science: Stars and Planets

It is expected that students will:

- describe characteristics and movements of objects in our solar system
- compare familiar constellations in seasonal skies
- demonstrate awareness of the special significance of celestial objects for Aboriginal peoples

GRADE 4

Processes and Skills of Science

It is expected that students will:

- make predictions, supported by reasons and relevant to the content
- use data from investigations to recognize patterns and relationships and reach conclusions

Life Science: Habitats and Communities

It is expected that students will:

- compare the structures and behaviours of local animals and plants in different habitats and communities
- analyse simple food chains
- demonstrate awareness of the Aboriginal concept of respect for the environment
- determine how personal choices and actions have environmental consequences

Physical Science: Sound and Light

It is expected that students will:

- identify sources of light and sound
- explain properties of light (e.g., travels in a straight path, can be reflected)
- explain properties of sound (e.g., travels in waves, travels in all directions)

Earth and Space Science: Weather

It is expected that students will:

- measure weather in terms of temperature, precipitation, cloud cover, wind speed and direction
- analyse impacts of weather on living and non-living things

GRADE 5

Processes and Skills of Science

It is expected that students will:

- identify variables that can be changed in an experiment
- evaluate the fairness of a given experiment
- describe the steps in designing an experiment

Life Science: Human Body

It is expected that students will:

- describe the basic structure and functions of the human respiratory, digestive, circulatory, skeletal, muscular, and nervous systems
- explain how the different body systems are interconnected

Physical Science: Forces and Simple Machines

It is expected that students will:

- demonstrate how various forces can affect the movement of objects
- demonstrate mechanical advantage of simple machines, including lever, wedge, pulley, ramp, screw, and wheel
- design a compound machine
- describe applications of simple and compound machines used in daily life in BC communities

Earth and Space Science: Renewable and Non-Renewable Resources

It is expected that students will:

- analyse how BC's living and non-living resources are used
- identify methods of extracting or harvesting and processing BC's resources
- analyse how the Aboriginal concept of interconnectedness of the environment is reflected in responsibility for and caretaking of resources
- describe potential environmental impacts of using BC's living and non-living resources

GRADE 6

Processes and Skills of Science

It is expected that students will:

- manipulate and control a number of variables in an experiment
- apply solutions to a technical problem (e.g., malfunctioning electrical circuit)

Life Science: Diversity of Life

It is expected that students will:

- demonstrate the appropriate use of tools to examine living things that cannot be seen with the naked eye
- analyse how different organisms adapt to their environments
- distinguish between life forms as single or multi-celled organisms and belonging to one of five kingdoms: Plantae, Animalia, Monera, Protista, Fungi

Physical Science: Electricity

It is expected that students will:

- evaluate various methods for producing small electrical charges
- test a variety of electrical pathways using direct current circuits
- demonstrate that electricity can be transformed into light, heat, sound, motion, and magnetic effects
- differentiate between renewable and non-renewable methods of producing electrical energy

Earth and Space Science: Exploration of Extreme Environments

It is expected that students will:

- explain obstacles unique to exploration of a specific extreme environment
- assess technologies used for extreme environments
- describe contributions of Canadians to exploration technologies

GRADE 7

Processes and Skills of Science

It is expected that students will:

- test a hypothesis by planning and conducting an experiment that controls for two or more variables
- create models that help to explain scientific concepts and hypotheses

Life Science: Ecosystems

It is expected that students will:

- analyse the roles of organisms as part of interconnected food webs, populations, communities, and ecosystems
- assess survival needs and interactions between organisms and the environment
- assess the requirements for sustaining healthy local ecosystems
- evaluate human impacts on local ecosystems

Physical Science: Chemistry

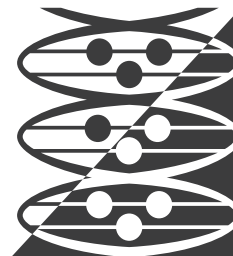
It is expected that students will:

- conduct investigations into properties of matter
- classify substances as elements, compounds, and mixtures
- measure substances and solutions according to pH, solubility, and concentration

Earth and Space Science: Earth's Crust

It is expected that students will:

- compare the characteristics of the Earth's core, mantle, and crust, and describe the formation of rocks
- analyse the dynamics of tectonic plate movement and landmass formation
- explain how the Earth's surface changes over time



STUDENT ACHIEVEMENT

Science K to 7

This section of the IRP contains information about classroom assessment and student achievement, including specific achievement indicators to assist teachers in assessing student achievement in relation to each prescribed learning outcome. Also included in this section are key elements—descriptions of content that help determine the intended depth and breadth of prescribed learning outcomes.

CLASSROOM ASSESSMENT AND EVALUATION

Assessment is the systematic gathering of information about what students know, are able to do, and are working toward. Assessment evidence can be collected using a wide variety of methods, such as:

- observation
- student self-assessments and peer assessments
- quizzes and tests (written, oral, practical)
- samples of student work
- projects
- oral and written reports
- journals and learning logs
- performance reviews
- portfolio assessments.

Student performance is based on the information collected through assessment activities. Teachers use their insight, knowledge about learning, and experience with students, along with the specific criteria they establish, to make judgments about student performance in relation to prescribed learning outcomes.

There are three major types of assessment that can be used in conjunction with each other to support student achievement.

- **Assessment for** learning is assessment for purposes of greater learning achievement.
- **Assessment as** learning is assessment as a process of developing and supporting students' active participation in their own learning.
- **Assessment of** learning is assessment for purposes of providing evidence of achievement for reporting.

Assessment for Learning

Classroom assessment for learning provides ways to engage and encourage students to become involved in their own day-to-day assessment—to acquire the skills of thoughtful self-assessment and to promote their own achievement.

This type of assessment serves to answer the following questions:

- What do students need to learn to be successful?
- What does the evidence of this learning look like?

Assessment for learning is criterion-referenced, in which a student's achievement is compared to established criteria rather than to the performance of other students. Criteria are based on prescribed learning outcomes, as well as on suggested achievement indicators or other learning expectations.

Students benefit most when assessment feedback is provided on a regular, ongoing basis. When assessment is seen as an opportunity to promote learning rather than as a final judgment, it shows students their strengths and suggests how they can develop further. Students can use this information to redirect their efforts, make plans, communicate with others (e.g., peers, teachers, parents) about their growth, and set future learning goals.

Assessment for learning also provides an opportunity for teachers to review what their students are learning and what areas need further attention. This information can be used to inform teaching and create a direct link between assessment and instruction. Using assessment as a way of obtaining feedback on instruction supports student achievement by informing teacher planning and classroom practice.

Assessment as Learning

Assessment as learning actively involves students in their own learning processes. With support and guidance from their teacher, students take responsibility for their own learning, constructing meaning for themselves. Through a process of continuous self-assessment, students develop the ability to take stock of what they have already learned, determine what they have not yet learned, and decide how they can best improve their own achievement.

Although assessment as learning is student-driven, teachers can play a key role in facilitating how this assessment takes place. By providing regular opportunities for reflection and self-assessment, teachers can help students develop, practise, and become comfortable with critical analysis of their own learning.

Assessment of Learning

Assessment of learning can be addressed through summative assessment, including large-scale assessments and teacher assessments. These summative assessments can occur at the end of the year or at periodic stages in the instructional process.

Large-scale assessments, such as Foundation Skills Assessment (FSA) and Graduation Program exams, gather information on student performance

throughout the province and provide information for the development and revision of curriculum. These assessments are used to make judgments about

students' achievement in relation to provincial and national standards. There is no large-scale provincial assessment for science K to 7.

Assessment <i>for</i> Learning	Assessment <i>as</i> Learning	Assessment <i>of</i> Learning
<p>Formative assessment <i>ongoing in the classroom</i></p> <ul style="list-style-type: none"> • teacher assessment, student self-assessment, and/or student peer assessment • criterion-referenced – criteria based on prescribed learning outcomes identified in the provincial curriculum, reflecting performance in relation to a specific learning task • involves both teacher and student in a process of continual reflection and review about progress • teachers adjust their plans and engage in corrective teaching in response to formative assessment <p>Examples include</p> <ul style="list-style-type: none"> • portfolios • student-teacher conferences • performances and presentations • charts, webs, mind maps 	<p>Formative assessment <i>ongoing in the classroom</i></p> <ul style="list-style-type: none"> • self-assessment • provides students with information on their own achievement and prompts them to consider how they can continue to improve their learning • student-determined criteria based on previous learning and personal learning goals • students use assessment information to make adaptations to their learning process and to develop new understandings <p>Examples include</p> <ul style="list-style-type: none"> • 3- or 4- column performance standards • rubrics • student-developed scoring guides describing various levels of achievement 	<p>Summative assessment <i>occurs at end of year or at key stages</i></p> <ul style="list-style-type: none"> • teacher assessment • may be either criterion-referenced (based on prescribed learning outcomes) or norm-referenced (comparing student achievement to that of others) • information on student performance can be shared with parents/guardians, school and district staff, and other education professionals (e.g., for the purposes of curriculum development) • used to make judgments about students' performance in relation to provincial standards <p>Examples include</p> <ul style="list-style-type: none"> • multiple choice tests • oral tests • short answer questions and essays • true/false quizzes

Criterion-Referenced Assessment and Evaluation

In criterion-referenced evaluation, a student's performance is compared to established criteria rather than to the performance of other students. Evaluation in relation to prescribed curriculum requires that criteria be established based on the learning outcomes.

Criteria are the basis for evaluating student progress. They identify, in specific terms, the critical aspects of

a performance or a product that indicate how well the student is meeting the prescribed learning outcomes. For example, weighted criteria, rating scales, or scoring guides (reference sets) are ways that student performance can be evaluated using criteria.

Wherever possible, students should be involved in setting the assessment criteria. This helps students develop an understanding of what high-quality work or performance looks like.

Criterion-referenced assessment and evaluation may involve these steps:

- Step 1** Identify the prescribed learning outcomes and suggested achievement indicators (as articulated in this IRP) that will be used as the basis for assessment.
- Step 2** Establish criteria. When appropriate, involve students in establishing criteria.
- Step 3** Plan learning activities that will help students gain the attitudes, skills, or knowledge outlined in the criteria.
- Step 4** Prior to the learning activity, inform students of the criteria against which their work will be evaluated.
- Step 5** Provide examples of the desired levels of performance.
- Step 6** Conduct the learning activities.
- Step 7** Use appropriate assessment instruments (e.g., rating scale, checklist, scoring guide) and methods (e.g., observation, collection, self-assessment) based on the particular assignment and student.
- Step 8** Review the assessment data and evaluate each student's level of performance or quality of work in relation to criteria.
- Step 9** Where appropriate, provide feedback and/or a letter grade to indicate how well the criteria are met.
- Step 10** Communicate the results of the assessment and evaluation to students and parents/guardians.

KEY ELEMENTS

Key elements provide an overview of content in each curriculum organizer. They can be used to determine the expected depth and breadth of the prescribed learning outcomes.

Note that some topics appear at multiple grade levels in order to emphasize their importance and to allow for developmental learning.

ACHIEVEMENT INDICATORS

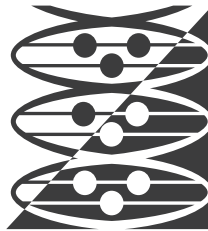
To support teachers in assessing provincially prescribed curricula, this IRP includes sets of achievement indicators in relation to each learning outcome.

Achievement indicators define the specific level of attitudes demonstrated, skills applied, or knowledge acquired by the student in relation to a corresponding prescribed learning outcome. They describe what evidence a teacher might look for to determine whether or not the student has fully met the intent

of the learning outcome. In some cases, achievement indicators may also include suggestions as to the type of task that would provide evidence of having met the learning outcome (e.g., a constructed response such as a list, comparison, analysis, or chart; a product created and presented such as a report, drama presentation, poster, letter, or model; a particular skill demonstrated such as interpreting data).

Achievement indicators are not mandatory; they are suggestions only, provided to assist teachers in assessing how well their students achieve the prescribed learning outcomes. Teachers are encouraged to modify and expand on these suggestions as required to address local needs.

The following pages contain the suggested achievement indicators corresponding to each prescribed learning outcome for the Science K to 7 curriculum. The achievement indicators are arranged by curriculum organizer and suborganizer for each grade; however, this order is not intended to imply a required sequence of instruction and assessment.



STUDENT ACHIEVEMENT

Kindergarten

KINDERGARTEN: PROCESSES OF SCIENCE

Key Elements: Processes of Science

Estimated Time: integrate with other curriculum organizers

Observing

Observing involves using one or more of the five senses (seeing, hearing, feeling, tasting, smelling) to gather information. When students recount their sensations and reactions to objects, events, or living things, these observations can be collected and revisited, and connections to learning can be made.

Communicating (Sharing)

Communicating involves showing, telling, creating, sharing, receiving, and/or giving information that has been obtained by observing. Communication also involves presenting or receiving information clearly and accurately, in an organized manner, and in a variety of possible ways (e.g., pictorially, graphically, mathematically, oral and written reports).

KINDERGARTEN PROCESSES OF SCIENCE

Prescribed Learning Outcomes	Suggested Achievement Indicators
<i>It is expected that students will:</i>	<i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i> <i>Students who have fully met the prescribed learning outcome are able to:</i>
<ul style="list-style-type: none"> use the five senses to make observations 	<ul style="list-style-type: none"> <input type="checkbox"/> describe what they observe (e.g., student says, “I see...I hear...It feels...It tastes...It smells...) <input type="checkbox"/> identify, with guidance, the properties of an object (e.g., colour, shape, texture, hardness) <input type="checkbox"/> recognize which body part would be used to gather specific sensory information (e.g., “to find out if a ball is soft, I would use my hand; to find out if it is red, I would use my eyes”)
<ul style="list-style-type: none"> share with others information obtained by observing 	<ul style="list-style-type: none"> <input type="checkbox"/> orally communicate observations using learned vocabulary <input type="checkbox"/> work collaboratively with others while sharing (e.g., listening, encouraging each other, sharing observations) <input type="checkbox"/> draw features of items observed (e.g., two different plants growing in the schoolyard)

Processes and Skills of Science

Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
<ul style="list-style-type: none"> Observing Communicating (sharing) 	<ul style="list-style-type: none"> Communicating (recording) Classifying 	<ul style="list-style-type: none"> Interpreting Observations Making Inferences 	<ul style="list-style-type: none"> Questioning Measuring and Reporting 	<ul style="list-style-type: none"> Interpreting Data Predicting 	<ul style="list-style-type: none"> Designing Experiments Fair Testing 	<ul style="list-style-type: none"> Controlling Variables Scientific Problem Solving 	<ul style="list-style-type: none"> Hypothesizing Developing Models

KINDERGARTEN LIFE SCIENCE: CHARACTERISTICS OF LIVING THINGS**Key Elements: Life Science**

Estimated Time: 10 – 15 hours

By the end of Kindergarten, students will have observed various features of plants and animals in the local environment.

Characteristics of Living Things

The study of living things begins with observing the characteristics of a variety of life forms in the local natural community. Students use their senses to observe appearances/identifiable features, behaviour, similarities and differences of local plants and common animals. Students may communicate their knowledge, skills, and attitude through discussion, questioning, drawings, collections, and play.

Vocabulary

same, different, see, hear, feel, taste, smell, colour, plant, animal

Knowledge

- living things have features that can be observed
- living things have characteristics by which they can be described and distinguished from non-living things
- living things (e.g., plants, animals) can be grouped according to their similarities and differences

Skills and Attitudes

- observe the specific characteristics of living things
- communicate verbally, pictorially, and graphically
- work with others while exploring and investigating living things
- show interest in and curiosity about living things
- demonstrate respect for living things

KINDERGARTEN LIFE SCIENCE: CHARACTERISTICS OF LIVING THINGS

Prescribed Learning Outcomes	Suggested Achievement Indicators
<i>It is expected that students will:</i>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • describe features of local plants and animals (e.g., colour, shape, size, texture) 	<ul style="list-style-type: none"> <input type="checkbox"/> list a variety of features (e.g., colour and size) of local plants and animals <input type="checkbox"/> illustrate local plants and animals in a variety of ways (e.g., painting, collages, sculptures)
<ul style="list-style-type: none"> • compare local plants 	<ul style="list-style-type: none"> <input type="checkbox"/> describe similar and different features (e.g., colour, shape, size, texture) of two local plants <input type="checkbox"/> group plants on the basis of their features
<ul style="list-style-type: none"> • compare common animals 	<ul style="list-style-type: none"> <input type="checkbox"/> describe similar and different features (e.g., size, outer surface such as feathers, skin, scales) of common animals <input type="checkbox"/> sort and classify a variety of animals (e.g., wild animals and pets)

KINDERGARTEN PHYSICAL SCIENCE: PROPERTIES OF OBJECTS AND MATERIALS

Key Elements: Physical Science

Estimated Time: 10 – 15 hours

By the end of Kindergarten, students will have observed and identified physical properties of objects and materials.

Properties of Objects and Materials

The study of non-living things begins with observing the characteristics of objects and materials and provides a basis for future understanding of the physical world. Through play, observation, manipulation, and classification of a variety of common objects and materials, students identify the properties of these objects and reflect on their similarities and differences and how they may be used. Students may communicate their knowledge of the properties of objects and materials by drawing pictures, creating displays, and conducting investigations.

Vocabulary

words to describe shape, size, texture, and colour (e.g., shiny, dull, hard, soft, round, large, small, thick, thin, rough), recycle, reuse, reduce, refuse, rethink, heavy, light, smooth

Knowledge

- objects are made of different materials
- materials have different observable physical properties (e.g., colour, shape, texture, size) that can be defined, compared, and recorded
- the selection of materials depends on the purpose of the object

Skills and Attitudes

- communicate verbally, pictorially, and graphically
- observe the characteristics of objects and materials
- work with others while exploring and investigating objects and materials
- show interest in and curiosity about objects and materials

KINDERGARTEN PHYSICAL SCIENCE: PROPERTIES OF OBJECTS AND MATERIALS

Prescribed Learning Outcomes	Suggested Achievement Indicators
<i>It is expected that students will:</i>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • describe properties of materials, including colour, shape, texture, size, and weight 	<ul style="list-style-type: none"> <input type="checkbox"/> accurately sort materials by colour, size, shape, texture, and mass (weight) <input type="checkbox"/> identify, illustrate, and label materials in terms of properties (e.g., soft/hard; smooth/rough)
<ul style="list-style-type: none"> • identify materials that make up familiar objects 	<ul style="list-style-type: none"> <input type="checkbox"/> list materials (e.g., wood, plastic, metal, paper) used to construct at least three familiar classroom items such as desks, garbage cans, and books
<ul style="list-style-type: none"> • describe ways to rethink, refuse, reduce, reuse, and recycle 	<ul style="list-style-type: none"> <input type="checkbox"/> identify three items that can be recycled (e.g., paper, plastic, glass) <input type="checkbox"/> with teacher support, illustrate (e.g., draw a large mural) ways in which a classroom recycling centre can be used

KINDERGARTEN EARTH AND SPACE SCIENCE: SURROUNDINGS

Key Elements: Earth and Space Science

Estimated Time: 10 – 15 hours

By the end of Kindergarten, students will have shared their observations about their immediate environment.

Surroundings

The study of the natural environment begins with observing features of Earth and its atmosphere. Through investigation and observation, students describe characteristics of rocks, soil, water, and weather conditions in the community. Students may communicate their knowledge of their surroundings through discussion, questioning, drawings, collections, and play.

Vocabulary

sunny, cloudy, rainy, snowy, foggy, cold, warm, hot, weather, observe, descriptive words for water and trees

Knowledge

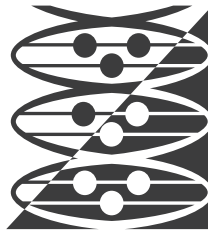
- the surface of the Earth is covered with rocks, soil, and water
- rocks, soil, and water have observable properties
- weather conditions in the atmosphere can be observed using the senses

Skills and Attitudes

- observe the characteristics of rocks, soil, water, and weather conditions
- communicate verbally, pictorially, and graphically
- work with others while exploring and investigating surroundings
- show interest in and curiosity about surroundings
- show respect for surroundings

KINDERGARTEN EARTH AND SPACE SCIENCE: SURROUNDINGS

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • demonstrate the ability to observe their surroundings 	<ul style="list-style-type: none"> <input type="checkbox"/> ask specific questions related to their immediate environment (e.g., Where did the rain water go?) <input type="checkbox"/> accurately describe and illustrate two or more features of their surroundings (e.g., texture of soil, weather conditions)
<ul style="list-style-type: none"> • describe features of their immediate environment 	<ul style="list-style-type: none"> <input type="checkbox"/> tell about features they observe (e.g., “I found a long, thin leaf or a round, shiny rock.”) <input type="checkbox"/> with peer support, identify specific changes in their immediate environment (e.g., changes in weather observed over a one-week period)



STUDENT ACHIEVEMENT

Grade 1

GRADE 1: PROCESSES OF SCIENCE

Key Elements: Processes of Science

Estimated Time: integrate with other curriculum organizers.

Communicating (recording)

Communicating at this grade involves beginning to collect information using the senses and appropriate tools, and thinking and sharing ideas about experiences. It also involves suggesting possible explanations so that others can compare ideas (collaboration). Sharing experiences can generate questions for further investigations; it also encourages discussion about how scientists find answers. Listening and writing information clearly and accurately, in an organized manner and in a variety of ways (e.g., pictorially, graphically, mathematically, orally and through written reports), is just beginning to occur.

Classifying

When classifying objects, events, or gathered information, students arrange attributes into two or more characteristic features. (At a simple level, this involves sorting, matching, grouping, and naming objects.) Once these recognizable characteristics are identified, other arrangements of the data can be made to show order and amounts. Classifying may be based on length, mass (using weight), capacity (volume), quantity, and positional order. Placing events into a series (shortest to longest, highest to shortest) results in a sequence of events (seriation)

GRADE 1 PROCESSES OF SCIENCE

Prescribed Learning Outcomes	Suggested Achievement Indicators
<i>It is expected that students will:</i>	<i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i> <i>Students who have fully met the prescribed learning outcome are able to:</i>
<ul style="list-style-type: none"> communicate their observations, experiences, and thinking in a variety of ways (e.g., verbally, pictorially, graphically) 	<ul style="list-style-type: none"> <input type="checkbox"/> describe findings using appropriate vocabulary <input type="checkbox"/> with teacher support, clearly organize and record observations using graphs, pictures, symbols, and/or words
<ul style="list-style-type: none"> classify objects, events, and organisms 	<ul style="list-style-type: none"> <input type="checkbox"/> identify similarities and differences among objects, events, and organisms <input type="checkbox"/> group various objects, events, and organisms according to given criteria (e.g., objects: materials and textures; events: frequency and duration; organisms: common features and structure)

Processes and Skills of Science

Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
<ul style="list-style-type: none"> Observing Communicating (sharing) 	<ul style="list-style-type: none"> Communicating (recording) Classifying 	<ul style="list-style-type: none"> Interpreting Observations Making Inferences 	<ul style="list-style-type: none"> Questioning Measuring and Reporting 	<ul style="list-style-type: none"> Interpreting Data Predicting 	<ul style="list-style-type: none"> Designing Experiments Fair Testing 	<ul style="list-style-type: none"> Controlling Variables Scientific Problem Solving 	<ul style="list-style-type: none"> Hypothesizing Developing Models

GRADE 1 LIFE SCIENCE: NEEDS OF LIVING THINGS**Key Elements: Life Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have differentiated between living and non-living things and described the needs of plants and animals.

Needs of Living Things

Through this study, students become aware that all living things, including themselves, have needs. Students observe and classify (sort by attributes) a variety of plants and animals. They discover that the needs of organisms are often similar, but that the particular needs of individual organisms may be unique. The study of the needs of living things provides an opportunity for students to begin to discover the many different forms life takes.

Vocabulary

animal, plant, needs, food, sunlight, water, air, shelter

Knowledge

- living things have characteristics by which they can be described and distinguished from non-living things
- needs of living things include food, water, and air
- living things use a variety of strategies to meet their needs

Skills and Attitudes

- observe and sort local plants and animals by their characteristics
- communicate verbally, pictorially, graphically, and in written form
- show respect for living things

GRADE 1 LIFE SCIENCE: NEEDS OF LIVING THINGS

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • classify living and non-living things 	<ul style="list-style-type: none"> <input type="checkbox"/> identify the differences between living and non-living things <input type="checkbox"/> accurately group living things according to common characteristics
<ul style="list-style-type: none"> • describe the basic needs of local plants and animals (e.g., food, water, light) 	<ul style="list-style-type: none"> <input type="checkbox"/> with teacher support, select and observe appropriate local plants and animals <input type="checkbox"/> accurately list the basic needs (e.g., water, food, and light) of the selected plants and animals
<ul style="list-style-type: none"> • describe how the basic needs of plants and animals are met in their environment 	<ul style="list-style-type: none"> <input type="checkbox"/> illustrate in detail how the structure of a plant helps meet its needs (e.g., function of roots, leaves) <input type="checkbox"/> illustrate in detail how animals meet their needs (e.g., types of homes and habitats, ability to adapt to changes in temperature, ways of gathering food, ways of protecting themselves from danger) in a given environment

GRADE 1 PHYSICAL SCIENCE: FORCE AND MOTION

Key Elements: Physical Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have developed an understanding of how invisible forces can change the motion of objects.

Force and Motion

The study of force and motion begins with an exploration of ways objects can be moved and the factors affecting that movement, such as shape, surface, and mass. Students manipulate a variety of objects to explore forces and motion in terms such as pushing, pulling, throwing, dropping, and rolling. Through investigation, students begin to develop an understanding of force and motion as they apply to toys, playground equipment, and transportation.

Vocabulary

push/pull, surface, rough, smooth, heavy, light, slope, wheel, roll, slide, lift, swing, bounce, gravity, magnet, attract, repel

Knowledge

- forces can cause changes in the motion of objects
- magnetic forces can pull or push some objects
- gravity is the force of the Earth pulling on an object
- objects can exert forces on other objects
- friction is a force that applies to how objects make contact or touch
- shape, size, and mass of an object can affect its movement
- surface features such as texture and slope affect motion
- rolling, sliding, falling, swinging, and bouncing are types of motion
- speed can be described using words such as fast, faster, slow, slower
- distance travelled can be measured
- unbalanced forces 'change' motion, balanced forces 'maintain' motion
- not moving is Zero motion (no motion is a type of motion)
- motion can be described by how 'fast' and in which 'direction' objects are going
- speed shows how fast something is going

Skills and Attitudes

- observe the effects of forces on objects (balanced or unbalanced)
- describe types of motion
- investigate force and movement using toys or playground equipment
- record observations and results of investigations using graphs, pictures, symbols, and words
- use classroom materials responsibly and safely

GRADE 1 PHYSICAL SCIENCE: FORCE AND MOTION

Prescribed Learning Outcomes	Suggested Achievement Indicators
<i>It is expected that students will:</i>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • demonstrate how force can be applied to move an object 	<ul style="list-style-type: none"> <input type="checkbox"/> show how forces (e.g., push/pull) can change the motion or movement of an object <input type="checkbox"/> describe four ways in which objects can move on a surface (e.g., backward/forward; upward/downward) <input type="checkbox"/> classify objects by the way they move (e.g., spin, swing, bounce, slide, roll)
<ul style="list-style-type: none"> • compare the effect of friction on the movement of an object over a variety of surfaces 	<ul style="list-style-type: none"> <input type="checkbox"/> describe the observed effects of friction on the motion of objects when travelling across different surfaces <input type="checkbox"/> with teacher support, demonstrate the effects of changing the surface of an inclined plane on the downward motion of an object, and the effort needed to push or pull an object upward
<ul style="list-style-type: none"> • demonstrate and describe the effects of magnets on different materials 	<ul style="list-style-type: none"> <input type="checkbox"/> identify various objects that are attracted by magnets (e.g., coins and paperclips) and materials that can be magnetized (e.g., iron) <input type="checkbox"/> with teacher support, determine the orientation of the poles of a magnet <input type="checkbox"/> show that opposite poles attract and like poles repel

GRADE 1 EARTH AND SPACE SCIENCE: DAILY AND SEASONAL CHANGES**Key Elements: Earth and Space Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have demonstrated understanding of changes that occur in daily and seasonal cycles and their effects on living things.

Daily and Seasonal Changes

This study focuses on weather and seasonal changes and their effects on plants, animals, and human activity. Students discover patterns of weather change during a year by recording daily weather information. Through observation and investigation, students learn that predictable changes occur in daily and seasonal cycles.

Vocabulary

day time, night time, morning, afternoon, evening, days of the week, seasons, spring, fall, summer, winter, today, yesterday, tomorrow, months of year, heat, cold, snowy, rainy, cloudy, stormy, sun, light, shadow

Knowledge

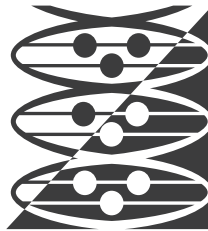
- the daily weather may include changes in temperature, wind, cloud, and precipitation
- weather patterns change predictably according to the seasons
- weather and seasonal changes affect plants and animals
- the cycle of day and night occurs predictably according to the seasons
- changes in the length of day and night occur predictably according to the seasons
- daily and seasonal changes affect human activities
- Aboriginal peoples in BC have a variety of seasonal activities

Skills and Attitudes

- observe and record daily and seasonal changes
- record observations and results of investigations using graphs, pictures, symbols, and words
- use classroom materials responsibly and safely

GRADE 1 EARTH AND SPACE SCIENCE: DAILY AND SEASONAL CHANGES

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • describe changes that occur in daily and seasonal cycles and their effects on living things 	<ul style="list-style-type: none"> <input type="checkbox"/> describe the effects of weather on living things (e.g., migration of birds; leisure activities) <input type="checkbox"/> accurately sort pictures or objects that pertain to daily and seasonal changes (e.g., new plant growth, snow melting, leaves falling, bears hibernating) <input type="checkbox"/> illustrate and record changes that occur throughout the seasons (e.g., flowers blooming, snow melting, leaves falling, lakes freezing) <input type="checkbox"/> with teacher support, identify daily weather conditions and seasonal patterns (e.g., how people or animals prepare for weather conditions)
<ul style="list-style-type: none"> • describe activities of Aboriginal peoples in BC in each seasonal cycle 	<ul style="list-style-type: none"> <input type="checkbox"/> give several examples that show how activities of Aboriginal peoples differ according to seasonal cycles and regions (e.g., differences between activities in the Interior/coast; north/south) <input type="checkbox"/> prepare a detailed list of local Aboriginal activities in the <ul style="list-style-type: none"> - fall (e.g., berry picking, freezing, and drying; equipment readied for hunting season; firewood stacked) - winter (e.g., sports activities, feasts, potlatches) - spring (e.g., planting) - summer (e.g., picnics, baking bannock, preparing fishing nets)



STUDENT ACHIEVEMENT

Grade 2

GRADE 2: PROCESSES OF SCIENCE**Key Elements: Processes of Science**

Estimated Time: integrate with other curriculum organizers

Interpreting Observations

After using the senses directly and indirectly to gather information, students look for ways to exchange meaningful summaries of the collected experiences they are learning to call ‘scientific observations’. This involves explaining the significance of their observations and drawing general conclusions about interconnections (e.g., small animals eat small seeds). Explaining the importance of these interactions requires students to describe the observed changes according to actions, patterns, and relationships. Students at a skilful level analyse results by looking for a pattern or making associations about events of which they have previously learned. Many of these interpreting skills include: searching for patterns, thinking, forecasting actions, estimating, finding relations, sorting objects, identifying similarities and differences and summarizing facts.

Making Inferences

Along with learning to make observations and examine “facts,” students are learning to make inferences (consciously draw informal conclusions about something they have not yet seen, on the basis of previous experience, familiar-looking evidence, and reasoning). To do this well, it helps if students learn the differences between predicting, guessing, and restating facts. With prompting, students can begin to provide reasons or evidence to support their guesses or predictions. As well, students develop their ability to make inferences if they are encouraged to draw informal conclusions based on good observations and previous experience.

GRADE 2 PROCESSES OF SCIENCE

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • use their senses to interpret observations 	<ul style="list-style-type: none"> <input type="checkbox"/> observe, record, and make sensory comparisons <input type="checkbox"/> provide comprehensive explanations based on observations made or facts learned (e.g., “The best shape for a boat is...”) <input type="checkbox"/> draw specific conclusions based on observations (e.g., water is being wasted – protect our water)
<ul style="list-style-type: none"> • infer the probable outcome of an event or behaviour based on observations 	<ul style="list-style-type: none"> <input type="checkbox"/> with teacher support, observe and accurately record a specific process (e.g., a plant developing from a seed) <input type="checkbox"/> predict several likely recurrences not yet observed in other, similar situations (e.g., after seeing how a plant develops from a seed, recognize that the same type of development can be expected from other, different plant seeds)

Processes and Skills of Science							
Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
<ul style="list-style-type: none"> • Observing • Communicating (sharing) 	<ul style="list-style-type: none"> • Communicating (recording) • Classifying 	<ul style="list-style-type: none"> • Interpreting Observations • Making Inferences 	<ul style="list-style-type: none"> • Questioning • Measuring and Reporting 	<ul style="list-style-type: none"> • Interpreting Data • Predicting 	<ul style="list-style-type: none"> • Designing Experiments • Fair Testing 	<ul style="list-style-type: none"> • Controlling Variables • Scientific Problem Solving 	<ul style="list-style-type: none"> • Hypothesizing • Developing Models

GRADE 2 LIFE SCIENCE: ANIMAL GROWTH AND CHANGES**Key Elements: Life Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have understood animal life cycles and why animals are important to other living things.

Animal Growth and Changes

The study of animal life cycles and interactions begins with a focus on animal growth and change. Through a study of animals in a variety of environments and seasons, students describe characteristics, behaviours, needs, and life cycles. Students begin to understand the interactions of animals with each other, the environment, and humans.

Vocabulary

young, adult, life cycle, behaviour, appearance, food, predator, prey, enemies, environment, male, female, characteristics, insect, bird, mammal, reptile, amphibian, fish, hibernate, migrate

Knowledge

- different kinds of animals have different life cycles (e.g., bird, insect, mammal)
- animals' characteristics (e.g., skin covering) help them adapt to the conditions in their environment
- animals have behaviours such as hibernation and migration
- animals' behaviours help them adapt to seasonal conditions in their environment
- animals are important in the lives of Aboriginal peoples

Skills and Attitudes

- observe and record the life cycles of a variety of animals
- predict and infer the stages in the life cycles of related animals
- make inferences about an animal's environment from its characteristics
- use facts and observations to draw conclusions about animal populations

GRADE 2 LIFE SCIENCE: ANIMAL GROWTH AND CHANGES

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • classify familiar animals according to similarities and differences in appearance, behaviour, and life cycles 	<ul style="list-style-type: none"> <input type="checkbox"/> describe and illustrate in detail the appearance and behaviour of familiar animals <input type="checkbox"/> identify and compare similarities and differences between animals <input type="checkbox"/> compare and illustrate different types of animal life cycles
<ul style="list-style-type: none"> • describe some changes that affect animals (e.g., hibernation, migration, decline in population) 	<ul style="list-style-type: none"> <input type="checkbox"/> accurately list a group of animals that hibernate, migrate, or change coat to respond to the conditions encountered in the different seasons <input type="checkbox"/> identify the effects of a decline in a specific animal population (e.g., species extinction)
<ul style="list-style-type: none"> • describe how animals are important in the lives of Aboriginal peoples in BC 	<ul style="list-style-type: none"> <input type="checkbox"/> identify from historical sources how animals were part of the lives of Aboriginal peoples (e.g., bear: fur for warmth during the winter; grease for cooking and personal care; bones for tools) <input type="checkbox"/> illustrate in detail how animals help to meet the needs of local Aboriginal peoples (e.g., seal oil and meat on the West Coast; eagle feathers in ceremonies)
<ul style="list-style-type: none"> • describe ways in which animals are important to other living things and the environment 	<ul style="list-style-type: none"> <input type="checkbox"/> make a comprehensive food web of items that can be obtained from a particular animal (e.g., leather, meat, milk) <input type="checkbox"/> identify things that are essential for the survival of an animal (e.g., water, food, shelter) <input type="checkbox"/> with teacher support, illustrate ways in which animals contribute to the environment (e.g., interdependence of food chains; nutrients for soil)

GRADE 2 PHYSICAL SCIENCE: PROPERTIES OF MATTER**Key Elements: Physical Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have recognized states of matter and investigated how liquids and solids interact.

Properties of Matter

The study of properties of matter begins with an exploration of common objects. Students discover the similarities and differences in the properties of materials and, through a series of activities and experiments, determine the three states of matter: solid, liquid, and gas. Further investigations explore how matter can be changed through mixing, dissolving, heating, cooling, or freezing.

Vocabulary

solid, liquid, gas, vapour, dissolve, float, sink, temperature, freeze, melt, evaporate, condense, boil, heat, cool, pressure

Knowledge

- water is the only substance that exists naturally on Earth in three states, which change from one to another depending on heat loss or gain
- changes of state are reversible
- solids stay the same shape, are visible, and can be felt (are usually hard)
- liquids flow and form shapes (i.e., take the shape of their container and can be poured), can be visible or invisible, and can usually be felt
- gases expand or contract to change shape, and are generally invisible, but can be felt when they are moving and pushing
- solids, liquids, and gases all have mass
- the volume of liquids does not change with the shape of the container
- solids can sink or float in liquids depending on density and shape
- liquids can float on top of other liquids
- gases “float” on top of liquids (bubbles rise) because they are less dense or “lighter”
- all gases are less dense than water

Skills and Attitudes

- demonstrate curiosity
- conduct simple experiments safely
- observe and record observations
- draw inferences about the real world from observations, demonstrations, and experiments

GRADE 2 PHYSICAL SCIENCE: PROPERTIES OF MATTER

Prescribed Learning Outcomes	Suggested Achievement Indicators
<i>It is expected that students will:</i>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • identify the properties of solids, liquids, and gases 	<ul style="list-style-type: none"> <input type="checkbox"/> observe and accurately list the properties of each state of matter (e.g., solid: stays the same shape, visible, you can feel it ; liquid: changes shape, fills and stays in the bottom of a container, may be visible or invisible; gas: changes shape, can escape from a container, generally invisible)
<ul style="list-style-type: none"> • investigate changes to the properties of matter when it is heated or cooled 	<ul style="list-style-type: none"> <input type="checkbox"/> conduct experiments on the properties of water (e.g., freezing, melting, evaporation) <input type="checkbox"/> observe and accurately record changes during experiments describe in detail the results of their observations and investigations <input type="checkbox"/> interpret their observations and answer specific questions (e.g., Will cold water freeze faster than hot water?)
<ul style="list-style-type: none"> • investigate the interactions of liquids and solids 	<ul style="list-style-type: none"> <input type="checkbox"/> conduct experiments on the interactions of liquids and solids (e.g., sink, float, or dissolve) <input type="checkbox"/> observe and accurately record changes during experiments <input type="checkbox"/> describe in detail the results of their observations and investigations <input type="checkbox"/> interpret their observations and answer specific questions (e.g., Will solids sink, float, or dissolve in a liquid?)

GRADE 2 EARTH AND SPACE SCIENCE: AIR, WATER, AND SOIL**Key Elements: Earth and Space Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have described the interactions of air, water, and soil, and their importance for living things.

Air, Water, and Soil

This study focuses on the properties of air, water, and soil. Students investigate and describe characteristics of air and water in their daily lives, and learn about the water cycle and processes of evaporation and condensation. By examining soil in a variety of locations, students describe its components and uses. Students also learn that air, water, and soil are important to living things.

Vocabulary

evaporation, condensation, precipitation, dry, wet, clay, sand, evaporate, condense, freeze, rain, snow, air, water, soil, conservation, pollution, float, glide, wind, water cycle

Knowledge

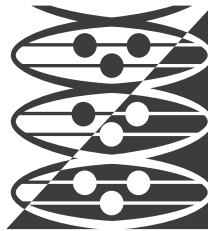
- soils are composed of small particles of rock (sand and clay) and humus
- soils contain nutrients necessary for plants to grow
- soils have differing capacity to hold water depending on composition
- soil can be moved (eroded) by the action of wind, liquid water, and ice
- water cycles through precipitation, evaporation, and condensation
- the rate of evaporation of water from soils is determined by factors such as temperature, surface area, and wind speed
- evaporated water is a gas that becomes part of the air
- the evaporated water carried in air condenses into liquid water when the air is cooled
- air has mass and can push on things when it moves
- living things depend on water, air, and soil (either directly or indirectly)

Skills and Attitudes

- use magnifying devices
- compare the characteristics of soil samples
- record and interpret the results of investigations
- explain the events in the water cycle in order
- infer the effects of erosion, drought, and flood on living things
- recognize the value of conserving clean air and water and healthy soil

GRADE 2 EARTH AND SPACE SCIENCE: AIR, WATER, AND SOIL

Prescribed Learning Outcomes	Suggested Achievement Indicators
<i>It is expected that students will:</i>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • describe physical properties of air, water, and soil 	<ul style="list-style-type: none"> <input type="checkbox"/> list the properties of air (e.g., expands or contracts; generally invisible) and water (e.g., changes state, shaped by container) <input type="checkbox"/> identify the main components of soil (e.g., sand, rocks, clay)
<ul style="list-style-type: none"> • distinguish ways in which air, water, and soil interact 	<ul style="list-style-type: none"> <input type="checkbox"/> illustrate and accurately label the parts of the water cycle <input type="checkbox"/> define and describe the processes of evaporation, condensation, and erosion
<ul style="list-style-type: none"> • explain why air, water, and soil are important for living things 	<ul style="list-style-type: none"> <input type="checkbox"/> with teacher support, create a micro environmental system, infer possible consequences of changes in that ecosystem <input type="checkbox"/> describe in detail how living things depend on air, water, and/or soil



STUDENT ACHIEVEMENT

Grade 3

GRADE 3: PROCESSES OF SCIENCE**Key Elements: Processes of Science**

Estimated Time: integrate with other curriculum organizers

Questioning

Raising good questions requires looking at an object or event in thoughtful ways. As they develop and learn new perceptions, students ask a variety of useful and necessary questions (e.g., I wonder... or... What causes...? How does...?). Learning to ask questions is a fundamental scientific skill, as not every question can be tested in science. How students learn to ask good science questions starts with distinguishing between what is certain and can be proven to be true, and what is uncertain and cannot yet be explored. Students begin by identifying simple science-related questions that can be tested, discussed, and answered. Allowing a variety of questions helps guide further observations and suggests explorations for students' curiosity and wonder.

Measuring and Reporting

Simple measurement requires the use of basic tools such as rulers, clocks, beakers, thermometers, and scales. The process of measuring involves comparing something to standard and non-standard units. These units are arranged on a scale that extends from least to most (e.g., coldest-hottest, shortest-tallest, lightest-heaviest). Previous skills of classifying, sorting, interpreting, and recording are used to quantify objects and amounts. When the appropriate forms and units of measure are understood, students can make precise measurements using different tools. In this way, objects can be compared with other objects using the standard units (length, mass, time, temperature, volume, etc.). Reporting what was measured and recorded is a careful science skill requiring precision and exactness. Reporting this type of data is done in many ways, but always done diligently.

GRADE 3 PROCESSES OF SCIENCE

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> ask questions that foster investigations and explorations relevant to the content 	<ul style="list-style-type: none"> ask a question specific to the content elements (e.g., “I wonder...?”; “What causes...?”; “What do I need to use to...?”; “How is ____ the same as ____?”) ask questions that demonstrate a range of thinking skills (e.g., “What happens if ____?”; “Can you find a way to ____?”; How is ____ both good and bad for ____ [the environment]?”; “What reason do you have for ____?”)
<ul style="list-style-type: none"> measure objects and events 	<ul style="list-style-type: none"> correctly use standard or non-standard units where appropriate (e.g., hand spans or metre stick) to develop quantitative descriptions place objects/observations on appropriate scales (e.g., lightest to heaviest; shortest to longest; weakest to strongest; closest to farthest) accurately record observations using charts and diagrams (e.g., Venn diagrams, compare/contrast charts) and use standardized formats (e.g., Know, Want-to-Know, Did, Learned) to report results of measurements apply appropriate scales for several events (e.g., day, night; seasons)

Processes and Skills of Science							
Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
<ul style="list-style-type: none"> Observing Communicating (sharing) 	<ul style="list-style-type: none"> Communicating (recording) Classifying 	<ul style="list-style-type: none"> Interpreting Observations Making Inferences 	<ul style="list-style-type: none"> Questioning Measuring and Reporting 	<ul style="list-style-type: none"> Interpreting Data Predicting 	<ul style="list-style-type: none"> Designing Experiments Fair Testing 	<ul style="list-style-type: none"> Controlling Variables Scientific Problem Solving 	<ul style="list-style-type: none"> Hypothesizing Developing Models

GRADE 3 LIFE SCIENCE: PLANT GROWTH AND CHANGES**Key Elements: Life Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have understood plant life cycles and why plants are important to other living things.

Plant Growth and Changes

The study of plants focuses on their characteristics, needs, and growth patterns. Through investigation and experimentation with a variety of plants, students determine the needs, structures, and adaptations of plants. Observing, measuring, and recording growth gives students the opportunity to understand the life cycle and different ways that plants can reproduce. Students also investigate plant uses, harvesting methods, and other relationships of plants to other living things.

Vocabulary

food, energy, root, stem, leaf, flower, pollen, seed, fruit, adaptation, life cycle, garden, harvest

Knowledge

- plants can reproduce in different ways (sexually from seed, or asexually from cuttings, bulbs, or tubers)
- the basic parts of plants include roots, stems, and leaves, which are adapted to the conditions in their environment
- plants carry on a variety of life processes
- plants need light, water, air, and nutrients to grow
- plants' characteristics change throughout their life cycle

Skills and Attitudes

- make inferences about a plant's environment from its characteristics
- demonstrate a sense of responsibility and caring for plants and for the environment

GRADE 3 LIFE SCIENCE: PLANT GROWTH AND CHANGES

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • compare familiar plants according to similarities and differences in appearance and life cycles 	<ul style="list-style-type: none"> <input type="checkbox"/> classify several types of familiar plants and explain the sorting method, with teacher support <input type="checkbox"/> accurately illustrate the life cycle of a flowering plant <input type="checkbox"/> identify characteristics that remain constant and those that change throughout the life cycle of a flowering plant <input type="checkbox"/> conduct experiments to compare conditions needed for healthy plant growth (e.g., water, light, soil)
<ul style="list-style-type: none"> • describe ways in which plants are important to other living things and the environment 	<ul style="list-style-type: none"> <input type="checkbox"/> identify the needs of common plants and animals, and provide a detailed description as to how they meet those needs <input type="checkbox"/> illustrate ways that plants and animals depend on each other, using drawings, graphs, charts, and/or Venn diagrams <input type="checkbox"/> prepare a detailed report on ways plants are important to the environment, giving examples
<ul style="list-style-type: none"> • describe how plants are harvested and used throughout the seasons 	<ul style="list-style-type: none"> <input type="checkbox"/> identify and illustrate different methods of harvesting (e.g., mechanized, by hand) <input type="checkbox"/> research and report on how BC Aboriginal peoples use plants for food, medicine, and products

GRADE 3 PHYSICAL SCIENCE: MATERIALS AND STRUCTURES

Key Elements: Physical Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have examined the shapes of various structures and tested the materials for those structures.

Materials and Structures

The study of materials and structures begins with the examination of the shape, components, and function of natural and human-built structures. Students investigate and experience the design process as they select and use materials suitable to the task at hand, manipulate and test materials, and build structures. Students discover that the strength and other characteristics of structures they build are linked to the properties of the materials they use, and to the particular way the materials are configured and joined.

Vocabulary

strength, balance, structure, materials, force, gravity, tension, compression, flexible, dome, arch, triangle, pyramid, cylinder, load, fasteners, design, construction

Knowledge

- a structure is any supporting framework that is built to hold a load or enclose a ‘space’
- geometric shapes and forms are concepts used to understand and describe natural and human-built structures
- structures are built to withstand the loads and forces acting on them without breaking.
- forces on structures can push, pull, stretch, squeeze, and bend the structure to move
- flexible structures allow some forces to move the structure without breaking
- stable structures are able to support greater loads
- strength and stability can also be achieved by adding width and mass, and by layering materials
- braces hold two or more structures together
- stability of a structure is related to its **design** (height, width, and base) and to its **construction** (materials and fasteners); buildings that are short and wide are usually more stable than objects that are tall and narrow
- folding, bending, or bracing can strengthen materials
- most stable structures contain triangle arrangements of the construction materials
- fasteners are used to join materials together

Skills and Attitudes

- recognize geometric shapes and forms
- demonstrate curiosity
- use problem-solving strategies in building simple structures
- use simple tools safely and carefully to build structures
- accept failures as part of engineering discovery
- question, measure, and report procedures and results

GRADE 3 PHYSICAL SCIENCE: MATERIALS AND STRUCTURES

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • describe shapes that are part of natural and human-built structures (e.g., domes, arches, pyramids) 	<ul style="list-style-type: none"> <input type="checkbox"/> identify domes, triangles, arches, pyramids, cylinders in natural and human-built structures <input type="checkbox"/> illustrate local structures using detailed diagrams and accurately sort their characteristics (e.g., shapes, components)
<ul style="list-style-type: none"> • compare the effects of different materials, shapes, and forces on the strength and stability of different structures 	<ul style="list-style-type: none"> <input type="checkbox"/> describe and demonstrate construction techniques (e.g., joint construction, strengthening, and stabilizing) using given materials <input type="checkbox"/> conduct a variety of experiments to test and compare the strength of different structures (e.g., arches, domes, and triangles) <input type="checkbox"/> accurately measure and report the effects of various forces (e.g., compression, tension, load) on different structures
<ul style="list-style-type: none"> • conduct investigations into ways to improve the strength and stability of structures 	<ul style="list-style-type: none"> <input type="checkbox"/> identify several techniques for improving strength and stability (e.g., reinforcing, bundling, and bracing) <input type="checkbox"/> describe and apply a variety of material-strengthening techniques and methods to improve the design and stability of a given structure (e.g., build a bridge or tower that supports a given load)

GRADE 3 EARTH AND SPACE SCIENCE: STARS AND PLANETS**Key Elements: Earth and Space Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have understood various components of the solar system and explained the significance of celestial objects for Aboriginal peoples.

Stars and Planets

This study focuses on the characteristics of stars and planets. Students describe the physical characteristics and components of the solar system: the Sun, planets, moons, comets, asteroids, and meteors. They observe and explain how the relative positions of the Earth, Moon, and the Sun are responsible for the moon phases, eclipses, tides and phenomena such as the cycle of day and night and the yearly cycle of the seasons. They observe and identify familiar patterns of stars and constellations. Students also explore the significance of celestial objects to indigenous peoples.

Vocabulary

seasonal cycle, day/night, sun, star, planet, meteor, comet, orbit, moon, axis, rotate, solar system, Milky Way, galaxy, constellation

Knowledge

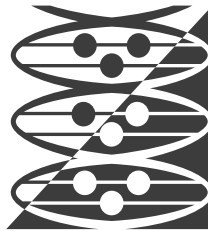
- stars are made of burning gases
- the Sun is a star
- other stars are in the sky all the time, but are invisible because the Sun is too bright during the day
- the energy from the Sun is essential for life on Earth (either directly or indirectly)
- planets do not make their own light, but reflect light
- planets revolve around a star
- moons revolve around planets
- comets, asteroids, and meteors are smaller bodies also revolving around stars
- the cycle of day and night is a result of the Earth's rotation about its axis
- the Earth revolves around the Sun once a year
- constellations are groups of stars (humans have imagined pictures and names for these groups)
- the position of these constellations appears to change over the year because our planet travels in a very large orbit around the Sun
- celestial objects have a special significance to Aboriginal peoples

Skills and Attitudes

- demonstrate curiosity about space
- maintain an astronomy journal
- identify patterns based on recorded observations
- identify questions based on recorded data
- distinguish between scientific and cultural information

GRADE 3 EARTH AND SPACE SCIENCE: STARS AND PLANETS

Prescribed Learning Outcomes	Suggested Achievement Indicators
<i>It is expected that students will:</i>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • describe characteristics and movements of objects in our solar system 	<ul style="list-style-type: none"> <input type="checkbox"/> prepare a detailed report on the unique features (e.g., location, size, temperature, appearance, length of day) of the planets, asteroids, comets, the Sun, and moon <input type="checkbox"/> illustrate the solar system (the Sun, nine planets, moons, asteroids, comets, and meteors) using accurate drawings, diagrams, collages, models, electronic presentations, and/or group role play <input type="checkbox"/> complete a detailed model, with explanations, showing that the Sun is the centre of the solar system, and that it is the source of energy for the Earth
<ul style="list-style-type: none"> • compare familiar constellations in seasonal skies 	<ul style="list-style-type: none"> <input type="checkbox"/> identify and accurately label the name of constellations on a constellation map <input type="checkbox"/> create a chart that records how constellations change position in the sky at different times of the year
<ul style="list-style-type: none"> • demonstrate awareness of the special significance of celestial objects for Aboriginal peoples 	<ul style="list-style-type: none"> <input type="checkbox"/> generate specific questions in response to an Aboriginal story focusing on celestial objects (e.g., stars, moon, planets, comets, eclipses) and illustrate answers using detailed drawings <input type="checkbox"/> write their own stories, complete with picture, on a celestial object (e.g., how the moon came to be; why the sun is so hot)



STUDENT ACHIEVEMENT

Grade 4

GRADE 4: PROCESSES OF SCIENCE**Key Elements: Processes of Science**

Estimated Time: integrate with other curriculum organizers

Interpreting Data

Interpreting data is a critical-thinking process used by scientific researchers to review the data gathered in the course of an investigation. Scientists explain the data to others and communicate a reasonable explanation about the trends and relationships they see. They also point out any inconsistencies they believe the evidence holds. For the data to be fully analysed in meaningful ways it requires prior scientific knowledge, mathematics, graphing techniques, and clear communication skills. At this stage, it is an extension of the process skills learned earlier – interpreting observations and making inferences (Grade 2). Interpreting data involves identifying patterns, thinking about missing data (errors), questioning if the data fits the estimates, finding one-to-one relations, sorting objects into useful arrangements, explaining the similarities and differences in the data, and summarizing what the facts and data might mean.

Predicting

Predicting involves making an objective guess about a future event, based upon what has been observed in the past and what might be expected to happen. Scientists always test whether their predictions might be correct or not. (Often, mathematics and graphing can be used to *extrapolate* into the future). Predictions should not involve guessing wildly, but should be based on prior knowledge and prior observations. These prior activities often produce questions that engage scientific curiosity. To make predictions that help them explore and test their observations, students must pay close attention to patterns and order within the previous data. They must also rely on all their previously acquired process skills such as measuring, inferring, and questioning to compare their expectations with the observed results. Good predictions seek to logically anticipate how future events might occur. Making a prediction, and determining how to test it with the right question constitute the beginning point for designing later experiments.

GRADE 4 PROCESSES OF SCIENCE

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • make predictions, supported by reasons and relevant to the content 	<ul style="list-style-type: none"> <input type="checkbox"/> carefully observe a pattern of events (e.g., changes in vibration, pitch, weather patterns) <input type="checkbox"/> make initial predictions and refine them, based on test results (e.g., path light travels)
<ul style="list-style-type: none"> • use data from investigations to recognize patterns and relationships and reach conclusions 	<ul style="list-style-type: none"> <input type="checkbox"/> gather and correctly organize comprehensive data (e.g., weather charts) <input type="checkbox"/> accurately interpret what a given graph shows, using detailed examples

Processes and Skills of Science							
Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
<ul style="list-style-type: none"> • Observing • Communicating (sharing) 	<ul style="list-style-type: none"> • Communicating (recording) • Classifying 	<ul style="list-style-type: none"> • Interpreting Observations • Making Inferences 	<ul style="list-style-type: none"> • Questioning • Measuring and Reporting 	<ul style="list-style-type: none"> • Interpreting Data • Predicting 	<ul style="list-style-type: none"> • Designing Experiments • Fair Testing 	<ul style="list-style-type: none"> • Controlling Variables • Scientific Problem Solving 	<ul style="list-style-type: none"> • Hypothesizing • Developing Models

GRADE 4 LIFE SCIENCE: HABITATS AND COMMUNITIES**Key Elements: Life Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have understood the structure and interactions of local ecosystems and shown respect for the environment.

Habitats and Communities

The study of habits and communities focuses on how organisms are adapted to an environment and interact with other living and non-living things. Students research or investigate organisms in two or more different habitats and identify which adaptations help organisms survive. The diversity and interactions of the living and non-living things in different habitats and communities can be compared. Students also develop an understanding of food chains. The relationship between humans and their environment is examined with particular emphasis on the relationship that Aboriginal peoples have with the environment.

Vocabulary

habitat, adaptation, population, community, food chain, food web, organism, producer, consumer, herbivore, omnivore, carnivore, predator, prey, scavenger, conservation, threatened, endangered, extinct

Knowledge

- living things find in particular environments the items and conditions that they need to grow and survive
- living things interact with each other in many ways and may depend on each other for food and shelter
- changes in habitat can affect the survival of an individual organism or an entire species
- food chains play an important role in population changes
- human choices and actions have a big impact on the environment

Skills and Attitudes

- observe animals and plants sharing a habitat (e.g., terrarium, aquarium)
- record observations and investigations using a variety of mediums such as journals, words, charts, and graphs
- infer why particular organisms, animals, and plants are able to share a habitat
- predict the effect of a change in the environment to the habitat and the organisms living there
- demonstrate respect for Aboriginal peoples
- demonstrate respect for living things and environments and a commitment for their care

GRADE 4 LIFE SCIENCE: HABITATS AND COMMUNITIES

Prescribed Learning Outcomes	Suggested Achievement Indicators
<i>It is expected that students will:</i>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> compare the structures and behaviours of local animals and plants in different habitats and communities 	<ul style="list-style-type: none"> <input type="checkbox"/> explain in detail why organisms are found in specific local habitats, based on their structures and behaviours <input type="checkbox"/> identify the structural adaptations of two or more organisms <input type="checkbox"/> with teacher support, infer and justify what communities might interact in a particular environment
<ul style="list-style-type: none"> analyse simple food chains 	<ul style="list-style-type: none"> <input type="checkbox"/> construct and explain the elements of a simple food chain <input type="checkbox"/> interpret population changes from data in one- or two-factor graphs (e.g., rabbit only; rabbit/coyote)
<ul style="list-style-type: none"> demonstrate awareness of the Aboriginal concept of respect for the environment 	<ul style="list-style-type: none"> <input type="checkbox"/> describe in detail how to show respect for the environment (e.g., clean up school yard, recycle, weed garden) <input type="checkbox"/> create accurate, detailed drawings to illustrate stories that demonstrate the relationship Aboriginal peoples have with the land, water, animals, plants, and sky (e.g., respect for water, earth)
<ul style="list-style-type: none"> determine how personal choices and actions have environmental consequences 	<ul style="list-style-type: none"> <input type="checkbox"/> document the steps involved in supporting actions that positively affect the school environment (such as those involved in a garbage-less lunch campaign), using detailed checklists, group projects <input type="checkbox"/> prepare and illustrate a simple, local habitat improvement plan that shows which plants and animals benefit from the plan

GRADE 4 PHYSICAL SCIENCE: LIGHT AND SOUND**Key Elements: Physical Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have described sources and investigated the properties of sound and light.

Light and Sound

Students become familiar with the properties of natural and artificial light by observing how light interacts with various objects in the environment. Through investigations, they gain understanding of light sources. Students discover that light travels in a straight path, and the type of material it strikes determines whether it is absorbed, reflected, or refracted. They also learn that forms of light are either visible or non-visible.

Students explore the properties of sound by discovering how sounds are made, how they change, and how sound travels. Through experimentation with a variety of objects, they discover how different materials transmit, reflect and absorb sound. They produce sounds and control frequency and pitch in the sound made.

Vocabulary

Light - reflect, refract, absorb, transmit, natural, artificial, light beam, transparent, translucent, opaque, spectrum

Sound - vibration, vocal cords, pitch, frequency, loudness, sound waves, reflect, absorb, transmit, echo

Knowledge

- light carries energy
- brighter light carries more energy
- forms of light can be either visible or invisible
- natural and artificial light have measurable properties (e.g., colour, wavelength, brightness)
- light can travel in a straight path (rays)
- light rays change direction (bend, refract) as they pass from one medium to another
- materials may transmit, absorb, or reflect light sound carries energy
- loud sounds carry more energy
- forms of sound can be either audible and inaudible
- sound is caused by vibrations in a medium
- sound can travel through many substances (e.g., air, water, metal)
- the shaking (oscillation) of objects is called vibrating
- vibrations are measured in the number of oscillations per time (called the frequency)
- higher (faster) the frequency corresponds to higher pitch sounds
- lower (slower) the frequency corresponds to lower pitch sounds
- materials may transmit, reflect, or absorb sound (an echo is reflected sound)
- sound travels through gas, liquid, and solids

Skills and Attitudes

- use appropriate vocabulary to describe observations, explorations, and experiments
- predict the results of light and sound experiments
- compile and interpret data to record and present results using tally charts, tables, and graphs
- communicate the procedures and results of investigations by using oral presentations, written notes and descriptions, drawings, and diagrams
- handle a variety of materials safely

GRADE 4 PHYSICAL SCIENCE: LIGHT AND SOUND

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • identify sources of light and sound 	<ul style="list-style-type: none"> <input type="checkbox"/> accurately sort various sources of light within their environment as natural or artificial <input type="checkbox"/> relate vibrations to the production of sound (e.g., the human voice relies on the vibrations of vocal cords)
<ul style="list-style-type: none"> • explain properties of light (e.g., travels in a straight path, can be reflected) 	<ul style="list-style-type: none"> <input type="checkbox"/> predict, demonstrate, and report on how light travels in a straight path and through different materials (e.g., reflects, refracts; is transparent, translucent, opaque) <input type="checkbox"/> with teacher support, conduct an experiment to demonstrate how white light can be separated into colours
<ul style="list-style-type: none"> • explain properties of sound (e.g., travels in waves, travels in all directions) 	<ul style="list-style-type: none"> <input type="checkbox"/> demonstrate and report on how various materials will absorb, reflect, or transmit sound <input type="checkbox"/> predict and record changes in vibration and pitch (e.g., by using a ruler) and describe the relationship between pitch and vibration

GRADE 4 EARTH AND SPACE SCIENCE: WEATHER**Key Elements: Earth and Space Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have observed and measured weather conditions and analysed their impact on living and non-living things.

Weather

An important part of the study of weather is gaining understanding of the properties of air, its movement, and its ability to hold water. Students study various aspects of weather such as temperature, wind speed, precipitation, air pressure, and clouds, and begin to recognize the role these aspects play in weather systems. Students use appropriate tools and instruments to complete investigations. They investigate basic components of weather through observations, predictions, hypotheses, measurements, and recording data. Students examine the impact of weather on living and non-living things.

Vocabulary

temperature, wind speed, wind direction, water cycle, cloud, evaporation, condensation, precipitation, erosion, barometer, anemometer, thermometer, rain gauge, weather vane

Knowledge

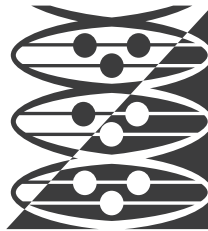
- the surface of the planet Earth is surrounded by a blanket of air called the atmosphere
- most of the Earth's surface is covered by water and circulates through the water cycle
- the Earth's surface is heated by energy from the Sun
- weather conditions that can be observed and/or measured include temperature, wind speed, wind direction, precipitation, air pressure, and cloud formations
- weather conditions affect living things (e.g., growth, behaviour, food, shelter)
- weather conditions (e.g., erosion) affect non-living things

Skills and Attitudes

- observe weather conditions and record using graphs, tables, and charts
- interpret data from recorded observations
- predict weather conditions
- construct simple instruments

GRADE 4 EARTH AND SPACE SCIENCE: WEATHER

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • measure weather in terms of temperature, precipitation, cloud cover, wind speed and direction 	<ul style="list-style-type: none"> <input type="checkbox"/> systematically chart daily temperatures using a thermometer <input type="checkbox"/> design, build and test a simple rain gauge, weather vane, and anemometer <input type="checkbox"/> identify, chart, and illustrate daily cloud cover <input type="checkbox"/> make a detailed local weather report based on collected data
<ul style="list-style-type: none"> • analyse impacts of weather on living and non-living things 	<ul style="list-style-type: none"> <input type="checkbox"/> predict and report on how freezing and thawing affect a variety of materials (e.g., water and soil) <input type="checkbox"/> accurately predict and test various materials for water resistance and insulation from cold (e.g., slow down the rate of a melting ice cube) <input type="checkbox"/> research and create a comprehensive report on the effects of erosion, drought, or other local weather impacts (e.g., sand table rivers, effects of run-off)



STUDENT ACHIEVEMENT

Grade 5

GRADE 5: PROCESSES OF SCIENCE**Key Elements: Processes of Science**

Estimated Time: integrate with other curriculum organizers

Fair Testing

Before students undertake complex experiments, it is necessary that they learn to conduct a fair test of a single variable. For a test to be considered fair, all the experimental actions involved must be equally applied. All the conditions must be consistent and standardized. Standardizing the various conditions concerned with the test will allow only the intended influences to be observed. In practice, this means identical procedures must be uniformly performed while one variable is changed at a time. Accurate fair testing involves isolating variables, eliminating bias, repeating the results, and closely scrutinizing the intended question. The credibility of the experimental test is then judged in order to determine what really changed and why. Questions for test rigour include

- Is the experiment free of biased observations?
- Have all the variables been isolated?
- Did the experiment involve only one variable?
- Were the experimental results expected?
- Can other people repeat the experiments and get similar results?

Often, students can study a simple test and state how it might be unfair; but the ability to specify how a test is fair and how it ensures all outcomes have been equally determined is more difficult. At advanced levels of learning, fair testing includes controlled experiments with more than one variable and determining the independent and dependent variables. Later when designing experiments, students learn to check for bias, remove any chance influences, look for experimental errors, and determine whether the experimental question can be properly addressed before they start their investigations.

Designing Experiments

Designing experiments involves devising scientific investigations to test a prediction. The easiest means of checking a prediction is to ask a specific question that will confirm the predicted ideas. An experiment is a set of steps prepared or laid out to test a single question. It usually involves deciding how to conduct the investigation so the cause-and-effect properties are tested and directly measured. To ensure fair testing, all the experimental actions involved must be equally applied (planning and designing an experiment requires careful attention to these experimental actions). There are three main stages to most scientific investigations: ***purpose, procedures, results***. Designing an experiment includes setting up the experimental problem, identifying the variables to be tested, planning for needed equipment, using inference to predict possible outcomes, and devising a set of tests to be carried out on all the outcomes. Once the experimental design is completed, advanced students at this level may choose to execute the procedure stage carefully and communicate the results to their peers.

GRADE 5 PROCESSES OF SCIENCE

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • identify variables that can be changed in an experiment 	<ul style="list-style-type: none"> <input type="checkbox"/> accurately list variables that can be changed in a given experiment (e.g., the amount, material, duration) <input type="checkbox"/> outline an experiment where factors can be determined (e.g., toy car rally)
<ul style="list-style-type: none"> • evaluate the fairness of a given experiment 	<ul style="list-style-type: none"> <input type="checkbox"/> accurately list variables in a given experiment that can be tested (e.g., running shoe tread) <input type="checkbox"/> create a comprehensive report on the fairness of a given experiment
<ul style="list-style-type: none"> • describe the steps in designing an experiment 	<ul style="list-style-type: none"> <input type="checkbox"/> identify several of the components in an experiment (e.g., PURPOSE: develop an experimental prediction, write a testable question, identify the variables, plan setup and equipment, predict possible outcomes, devise a set of tests PROCEDURE: conduct the investigation as planned, then collect the results. RESULTS: analyse the data and communicate the final conclusions) <input type="checkbox"/> with teacher support, prepare an experimental plan that shows all the necessary components

Processes and Skills of Science							
Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
<ul style="list-style-type: none"> • Observing • Communicating (sharing) 	<ul style="list-style-type: none"> • Communicating (recording) • Classifying 	<ul style="list-style-type: none"> • Interpreting Observations • Making Inferences 	<ul style="list-style-type: none"> • Questioning • Measuring and Reporting 	<ul style="list-style-type: none"> • Interpreting Data • Predicting 	<ul style="list-style-type: none"> • Designing Experiments • Fair Testing 	<ul style="list-style-type: none"> • Controlling Variables • Scientific Problem Solving 	<ul style="list-style-type: none"> • Hypothesizing • Developing Models

GRADE 5 LIFE SCIENCE: HUMAN BODY**Key Elements: Life Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have recognized how the main systems of the human body work together.

Human Body

The study of the human body is a general overview of the structures and functions of the basic body systems, with particular emphasis on the study of the function of four organs: the heart, the lungs, the brain, and the skin. Through research and investigation of some easily observable and measurable indicators of body functions, students discover ways that our bodies' systems work together.

Vocabulary

cells, organs, heart, blood vessels, veins, arteries, trachea, lungs, esophagus, stomach, intestines, liver, kidney, bladder, colon, brain, spinal cord, nerves, blood cells, nerve cells, bones, cartilage, ligaments, muscles, tendons, skin, sense organs, membrane, digestion, nutrient, oxygen, carbon dioxide, pulse, reflex

Knowledge

- body organs interact with each other to ensure survival in the environment
- the respiratory system consists of the nose, mouth, trachea, and the lungs
- the circulatory system consists of the heart, arteries, veins, capillaries, and blood
- the function of the circulatory system is to transport oxygen, carbon dioxide, nutrients, waste products, water, and messenger chemicals to and from cells in the body via the blood
- the skeletal system consists of bones, cartilage, and ligaments
- the function of the skeletal system is to provide protection and structure, and to enable movement
- the muscular system is composed of muscles and tendons
- the function of the muscular system is to enable locomotion and the function of the some other body systems (e.g., circulatory, digestive, skin)
- the digestive system includes the teeth, mouth, esophagus, stomach, small intestine, liver, (pancreas), and large intestine
- the function of the digestive system is to extract nutrients and water from the food we eat so that it can be carried to all the cells of the body
- the excretory system consists of the kidneys and bladder
- the function of the excretory system is to eliminate soluble waste chemicals and regulate the amount of water in the body
- the nervous system consists of the brain, the spinal cord, nerves, and sensory organs
- the function of the nervous system is to allow us to sense and react to our environment and to control the other systems in the body

Skills and Attitudes

- use measurement tools
- design and carry out experiments on the functions of body systems and record results
- draw conclusions about the function and interactions of body systems

GRADE 5 LIFE SCIENCE: HUMAN BODY

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • describe the basic structure and functions of the human respiratory, digestive, circulatory, skeletal, muscular, and nervous systems 	<ul style="list-style-type: none"> <input type="checkbox"/> identify the organs and their functions in a human body system <input type="checkbox"/> illustrate the human respiratory, digestive, circulatory, skeletal, muscular, and nervous systems <input type="checkbox"/> with teacher support, conduct various experiments to safely measure and record the responses of the various systems (e.g., heart rate, lung capacity, and reaction time)
<ul style="list-style-type: none"> • explain how the different body systems are interconnected 	<ul style="list-style-type: none"> <input type="checkbox"/> generate and answer several questions to investigate how body systems are integrated (e.g., How are the various systems connected to each other? Could one system live without the other systems? If not, why not?) <input type="checkbox"/> demonstrate various ways in which body systems work together, using role plays, posters, and/or 3-D representations

GRADE 5 PHYSICAL SCIENCE: FORCES AND SIMPLE MACHINES**Key Elements: Physical Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have understood the relationship between forces and mechanical advantage in simple machines.

Forces and Simple Machines

In this study, students begin to understand the relationship between effort (applied force) and simple machines. By exploring and experimenting with a variety of objects, students develop understanding of the relationship between the mass and motion of an object and the force needed to change the object's direction, speed, and position. Through hands-on activities, students identify and understand the characteristics and uses of the simple machines. Students describe how the application of machines reduces the applied force required for people to do work. They also design and construct both simple and compound machines with a useful function.

Vocabulary

simple machine, lever, wedge, pulley, ramp, screw, inclined plane, wheel, axle, effort force, force, fulcrum, mass (weight), load, friction, work, compound machine, unbalanced forces, balanced forces, equilibrium

Knowledge

- unbalanced forces 'change' motion, while balanced forces 'maintain' the motion
- a pulling or pushing force can be measured with a spring scale
- friction is a force parallel to a surface that will result when an object makes contact with a surface
- surface texture can be rough, smooth, or slippery depending upon the material that is at the surface
- frictional forces, mass, surface texture, and the slope all can affect the movement of an object down a ramp incline
- simple machines change the effect of how much effort force is applied to the machine to do something useful
- simple machines include lever, wedge, inclined plane, screw, roller, axle, wheel, and pulley
- simple machines don't change the load (mass); they change the amount of effort used to move the same mass
- compound machines are combinations of simple machines (screw and screw-driver, scissors, teeter-totter, ladder-and-slide, shopping cart, wood-axe, door handle, hinge, travois, wheelbarrow, pencil sharpener, hand-drill, push-mower, typewriter, bicycle)

Skills and Attitudes

- observe the effort used to change the direction and motion of objects (balanced and unbalanced forces)
- measure amount of effort force "saved" by using a simple machine
- demonstrate curiosity and show inventiveness
- design an investigation to test and compare simple machines
- ensure fair testing when conducting an experiment
- identify and control variables in an investigation
- communicate in various media to show how simple machines work
- use materials and tools safely

GRADE 5 PHYSICAL SCIENCE: FORCES AND SIMPLE MACHINES

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • demonstrate how various forces can affect the movement of objects 	<ul style="list-style-type: none"> <input type="checkbox"/> accurately describe the effects of increasing and decreasing the amount of force applied to an object (e.g., lifting a wooden block) <input type="checkbox"/> compare the effects of friction on the movement of an object over a variety of surfaces (e.g., sandpaper, rug, smooth wood, chalk dust, gravel) <input type="checkbox"/> with teacher support, design a fair test to see how an object's motion is affected by ramps with different surfaces, slope, length, and initial height
<ul style="list-style-type: none"> • demonstrate mechanical advantage of simple machines, including lever, wedge, pulley, ramp, screw, and wheel 	<ul style="list-style-type: none"> <input type="checkbox"/> identify and classify everyday devices according to the six basic machines (lever, wedge, inclined plane, screw, roller, axle, wheel, and pulley) <input type="checkbox"/> compare the advantages and disadvantages of various simple machines for identical tasks (i.e., choosing the right machine for the right job)
<ul style="list-style-type: none"> • design a compound machine 	<ul style="list-style-type: none"> <input type="checkbox"/> identify the simple machine incorporated into the working parts of compound machines designed for a specific task (e.g., lifting, pulling, and carrying heavy loads) <input type="checkbox"/> proficiently assemble a compound machine, illustrating in detail how it is constructed from a combination of simple machines
<ul style="list-style-type: none"> • describe applications of simple and compound machines used in daily life in BC communities 	<ul style="list-style-type: none"> <input type="checkbox"/> give several examples of some common heavy machines that contain simple machines (e.g., fork-lift, grader, crane, log-loader) <input type="checkbox"/> illustrate in detail how a combination of simple machines can be used to solve various problems in daily life <input type="checkbox"/> describe the various ways in which Aboriginal peoples in BC have used machines to meet basic and artistic needs in their daily lives

GRADE 5 EARTH AND SPACE SCIENCE: RENEWABLE AND NON-RENEWABLE RESOURCES

Key Elements: Earth and Space Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have assessed the environmental considerations associated with the extraction and use of renewable and non-renewable resources.

Renewable and Non-renewable Resources

This study is an introduction to renewable non-renewable resources in British Columbia. Students learn how people harvest or extract, process, and use renewable and non-renewable resources. Students classify living and non-living resources as renewable or non-renewable and investigate effective uses of various resources. They consider issues of resource use from various perspectives and identify ways in which people use resources responsibly.

Vocabulary

The following list will be dependent on local resources:

ecosystem, local environment, water cycle, groundwater, surface runoff, leaching, biodegradable, natural resources, watershed, air-shed, conservation, recycling, extraction, harvesting, renewable, non-renewable, pollution (water/air/soil), equilibrium, resource, raw materials, solar energy, environmental impact

Knowledge

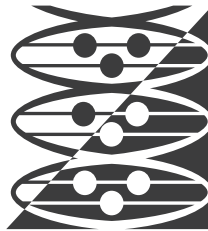
- all resources used by humans, including fuels, metals and building materials, come from the Earth
- many resources take thousands or millions of years to develop and accumulate; as such, they are considered non-renewable resources (e.g., fossil fuels, rocks and minerals)
- some resources are constantly available and are considered to be renewable resources (e.g., hydropower, sun, and wind)

Skills and Attitudes

- analyse data to determine if a resource is renewable or non-renewable
- investigate an environmental resource issue
- identify variables that will determine if a particular locally used resource is renewable
- resources should be used carefully, recycled, and conserved by humans whenever possible
- demonstrate socially responsible actions

GRADE 5 EARTH AND SPACE SCIENCE: RENEWABLE AND NON-RENEWABLE RESOURCES

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • analyse how BC's living and non-living resources are used 	<ul style="list-style-type: none"> <input type="checkbox"/> with teacher support, analyse data and correctly classify BC's resources as renewable or non-renewable (e.g., renewable: salmon; non-renewable: copper) <input type="checkbox"/> explain in detail various ways in which BC's resources are used (i.e., for commercial and/or recreational purposes)
<ul style="list-style-type: none"> • identify methods of extracting or harvesting and processing BC's resources 	<ul style="list-style-type: none"> <input type="checkbox"/> illustrate several examples of resource harvesting or extraction (e.g., salmon, trees, oil, gas, water, copper, coal) <input type="checkbox"/> trace a finished BC resource-based product (e.g., a tin of salmon, cedar basket, oil and gas) to its source
<ul style="list-style-type: none"> • analyse how the Aboriginal concept of interconnectedness of the environment is reflected in responsibility for and caretaking of resources 	<ul style="list-style-type: none"> <input type="checkbox"/> illustrate in detail various ways in which Aboriginal peoples take care of the land and the resources <input type="checkbox"/> explain, citing examples, how and why Aboriginal peoples' unique relationship with the environment demonstrates responsibility for the land and resources
<ul style="list-style-type: none"> • describe potential environmental impacts of using BC's living and non-living resources 	<ul style="list-style-type: none"> <input type="checkbox"/> identify and describe a variety of solutions to address the issue of natural resource management in BC (e.g., conservation of resources through recycling) <input type="checkbox"/> collect relevant data and coherently articulate various points of view on a local resource issue in BC



STUDENT ACHIEVEMENT

Grade 6

GRADE 6: PROCESSES OF SCIENCE**Key Elements: Processes of Science**

Estimated Time: integrate with other curriculum organizers

Controlling Variables

Discovering and then deliberately controlling the conditions that influence the outcome of an experiment are needed to avoid drawing incorrect conclusions from observations. It requires that all factors and influences be identified first and then manipulated in a systematic manner. Students must ensure that only one variable is changed (or tested) at a time. Those variables not changed are called the control. Important conditions to consider while experimenting might include:

- determining equal measures by mass or volume of the test objects
- setting standard conditions for light, temperature, and water
- identifying other variables or factors that could affect the outcome
- limiting or removing those other variables not involved in the study
- following the experimental design by controlling relevant variables
- repeating the experiment many times to yield consistent results
- using the recorded data as evidence of a “cause” relationship.

When assessing students’ understanding and ability to apply controls to the variables, consider how the independence of the variables was restricted. Observe how the procedures followed during the investigation were uniformly applied to all similar components or test items throughout the experiment. By conducting fair tests, the cause and effect is best inferred from the results gathered. Observe how many recorded events were repeated to obtain consistent results before they were accepted.

Problem Solving

The process of scientific problem solving is a critical thinking response to observed experiences in which a science problem is solved. It combines all the activities of asking questions, gathering evidence, designing and proposing solutions, and testing those solutions by making a prototype. This grade level sees the beginning of technical design work, and problems are solved by practical methods. Problem solving includes these stages:

- determine the humans needs involved in the situation (or assigned task)
- identify the task, and observe the key attributes involved
- establish the criteria for use of the prototype (set limits)
- plan creatively a possible set of solutions
- determine the available materials or equipment, and select a course of action
- draw a series of possible solutions for building
- build a prototype or model
- test and evaluate the model according to the criteria
- evaluate the results and redo if necessary
- communicate success to others.

When assessing students’ understanding and ability to apply solutions to a technical problem, consider how well they identify the problem, design possible solutions, construct a product or answer, test and evaluate the results, and communicate success. Students may not initially understand the concepts involved, but as the process continues, consider the extent to which the details are accurately identified and modifications made for a suitable outcome.

GRADE 6 PROCESSES OF SCIENCE

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> manipulate and control a number of variables in an experiment 	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> identify quantities of key factors (e.g., light, water, nutrition, temperature) as relevant variables in a test (e.g., of biological growth) <input type="checkbox"/> suggest and systematically implement controls on variables directly related to the outcome of an experiment (e.g., amount, quality, length) <input type="checkbox"/> explain, with reference to possible consequences, the importance of a consistent and standardized approach to dealing with variables
<ul style="list-style-type: none"> apply solutions to a technical problem (e.g., malfunctioning electrical circuit) 	<ul style="list-style-type: none"> <input type="checkbox"/> make adjustments in technique when immediate results are not obtained (e.g., adjust microscope settings) <input type="checkbox"/> use a persistent and organized approach to determine why a technical product (e.g., an electrical circuit) is not working, and modify it to make it work <input type="checkbox"/> suggest effective and practical ways to modify a technological instrument or tool (vehicles, clothes, food, buildings, wrenches) to permit its function in an extreme environment

Processes and Skills of Science							
Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
<ul style="list-style-type: none"> Observing Communicating (sharing) 	<ul style="list-style-type: none"> Communicating (recording) Classifying 	<ul style="list-style-type: none"> Interpreting Observations Making Inferences 	<ul style="list-style-type: none"> Questioning Measuring and Reporting 	<ul style="list-style-type: none"> Interpreting Data Predicting 	<ul style="list-style-type: none"> Designing Experiments Fair Testing 	<ul style="list-style-type: none"> Controlling Variables Scientific Problem Solving 	<ul style="list-style-type: none"> Hypothesizing Developing Models

GRADE 6 LIFE SCIENCE: DIVERSITY OF LIFE

Key Elements: Life Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have observed and classified various organisms according to their form and function.

Diversity of Life

The study of the diversity of life is an introduction to micro-organisms and biological classification systems. Students use appropriate tools to observe plants, animals, and micro-organisms. Students also use classification systems to group organisms according to features of form and function.

Vocabulary

microscopes, slide, cover slip, magnify, micro-organism, species, kingdom, Plantae, Animalia, Monera, Protista, Fungi, invertebrate, vertebrate, mammals, birds, reptiles, amphibians, fish, classification systems, cell, cell membrane, nucleus, chloroplasts, chlorophyll, colouration, mimicry, camouflage, behaviour

Knowledge

- cells are the basic units of life and carry on all the functions needed for survival
- living things may be unicellular or multicellular
- plant cells differ from animal cells in their structure
- scientists classify organisms into groups according to internal and external features
- scientists traditionally use a five-kingdom system to classify organisms
- the kingdoms are: Animalia, Plantae, Protista, Monera, and Fungi
- each of the kingdoms has its own set of characteristics

Skills and Attitudes

- classify organisms using attributes
- demonstrate the use of a microscope to view a prepared slide
- demonstrate safe practices in investigations
- show respect for all living organisms
- use appropriate tools and techniques to gather, analyse, interpret, and share scientific ideas

GRADE 6 LIFE SCIENCE: DIVERSITY OF LIFE

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • demonstrate the appropriate use of tools to examine living things that cannot be seen with the naked eye 	<ul style="list-style-type: none"> <input type="checkbox"/> correctly use tools such as a magnifying glass or microscope to observe a variety of microscopic organisms <input type="checkbox"/> precisely draw various characteristics of microscopic organisms on the basis of their own observations
<ul style="list-style-type: none"> • analyse how different organisms adapt to their environments 	<ul style="list-style-type: none"> <input type="checkbox"/> identify two or more specific adaptations of various life forms (e.g., colouration or other physical characteristics, mimicry or other behaviour) <input type="checkbox"/> suggest a plausible explanation of how particular adaptations help life forms interact in their environments <input type="checkbox"/> create a detailed report describing the symbiosis between two organisms
<ul style="list-style-type: none"> • distinguish between life forms as single or multi-celled organisms and belonging to one of five kingdoms: Plantae, Animalia, Monera, Protista, Fungi 	<ul style="list-style-type: none"> <input type="checkbox"/> accurately list the characteristics that define all living things, including ability to reproduce, grow, respire, use energy, respond to stimuli <input type="checkbox"/> identify and distinguish Plantae, Animalia, Monera, Protista, and Fungi as kingdoms of life <input type="checkbox"/> correctly sort micro-organisms according to their characteristics, with teacher support (e.g., a descriptive key for Monera, Protista, and Fungi)

GRADE 6 PHYSICAL SCIENCE: ELECTRICITY

Key Elements: Physical Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have gained a basic understanding of electricity.

Electricity

In this study, students gain a basic understanding of how electricity works. They explore the characteristics of static and current electricity. Students discover the characteristics of conductors, insulators, switches, batteries, light bulbs, and electromagnets. Students test, design, construct, and evaluate various combinations of circuits, switches, batteries and bulbs. Students examine the production and transmission of electricity in British Columbia.

Vocabulary

atom, electron, static electricity and current electricity, electrical current, closed and open circuit, conductor, insulator, battery, magnetism, parallel circuit, series circuit, switch, voltage, geothermal, nuclear, tidal, solar, wind power, biomass power, coal, gas, fossil fuels, hydro, hydro-electric dams, renewable, non-renewable, consumption, conservation, electrocution, direct current, bulb, positive, negative, electrical energy

Knowledge

- static electricity is the result of the accumulation of excess charge on an object
- an electron is a negatively charged particle
- the presence of excess electrons produces a net negative charge, and the lack of electrons produces a net positive charge
- unlike electric charges attract, and like charges repel
- electric current is the movement of electrons through a conductor
- conductors permit a flow of electric current, while insulators block the flow of electric current
- chemicals can be used to transfer electrical energy (e.g., dry cell batteries)
- electric currents have magnetic fields
- electricity may flow in series or parallel circuits
- electrical energy can be transferred to produce heat, light, motion, and chemical activity (e.g., inside the standard light bulb is a filament that glows because it gives off heat and light energy); likewise, heat, light, motion, and chemical activity can be transferred to produce electrical energy
- different sources of energy can be transferred to produce electrical energy (e.g., wind, water, steam, solar, tidal, etc.)

Skills and Attitudes

- demonstrate curiosity, creativity, open mindedness, accuracy, precision, persistence, and appreciate their importance as scientific attributes
- manipulate, construct, and test electrical circuits that use batteries
- show increasing confidence as scientific problem solvers by asking questions, solving problems, and making decisions
- demonstrate the safe use of electricity
- demonstrate the safe use and handling of home electrical appliances

GRADE 6 PHYSICAL SCIENCE: ELECTRICITY

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • evaluate various methods for producing small electrical charges 	<ul style="list-style-type: none"> <input type="checkbox"/> identify the charges (like, unlike, or no charge) of pairs of statically charged objects (e.g., charged through rubbing various fibres and solid materials) by systematically and accurately testing their attractions <input type="checkbox"/> describe and distinguish between friction-produced electrical charge (static) and chemically produced electric charge (batteries) <input type="checkbox"/> with teacher support, test and evaluate the effectiveness of various grounding techniques for preventing static charge build-up on objects
<ul style="list-style-type: none"> • test a variety of electrical pathways using direct current circuits 	<ul style="list-style-type: none"> <input type="checkbox"/> proficiently assemble a working electrical circuit with a switch <input type="checkbox"/> correctly explain the solution for fixing an improperly arranged circuit (short-circuit) <input type="checkbox"/> demonstrate the difference between parallel and series circuits when using batteries
<ul style="list-style-type: none"> • demonstrate that electricity can be transformed into light, heat, sound, motion, and magnetic effects 	<ul style="list-style-type: none"> <input type="checkbox"/> create circuits that reliably produce light, heat, sound, motion, and magnetic effects <input type="checkbox"/> transfer electrical energy into multiple other forms of energy (e.g., light, heat, sound, motion energy), safely and reliably <input type="checkbox"/> produce demonstrable magnetic effects using electric current
<ul style="list-style-type: none"> • differentiate between renewable and non-renewable methods of producing electrical energy 	<ul style="list-style-type: none"> <input type="checkbox"/> compile a comprehensive list of various ways in which electricity is produced <input type="checkbox"/> summarize the main advantages and disadvantages of the various methods used to produce the electricity used in our daily lives

GRADE 6 EARTH AND SPACE SCIENCE: EXPLORATION OF EXTREME ENVIRONMENTS

Key Elements: Earth and Space Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have demonstrated how exploration technologies help understand extreme environments and described Canada’s role in researching and developing such technologies.

Exploration of Extreme Environments

The study of extreme environments includes space, polar regions, oceans, deserts, caves, and volcanoes. Through discussions, observations, and research, students define extreme environments and explain obstacles to their exploration. Knowledge of past and present explorations is important in developing a greater understanding of extreme environments. Students may research the history of flight or evaluate either space or ocean exploration. Students discuss Canadian contributions to exploration technologies and consider how future technologies may affect them. In this unit, students demonstrate their knowledge and scientific skills when they design and construct models, prepare research reports, and conduct demonstrations and simulations.

Vocabulary

environment, extreme, technology, exploration, Canadarm, recycling, life-support (other vocabulary will depend on the specific extreme environment chosen by the teacher/class)

Knowledge

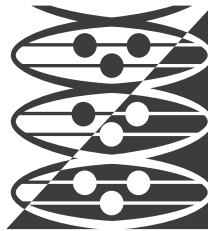
- there are living things naturally inhabiting many extreme environments, but much about them is still unknown
- technologies such as boats, clothing, and space ships have allowed humans to live in environments to which they are not fully adapted
- humans need more complicated technology to survive in and explore more extreme environments, which may have conditions such as high or low temperature or pressure, or the absence of an atmosphere or gravity
- Canadians have contributed to technological advancement in the exploration of extreme environments

Skills and Attitudes

- ask questions and exchange ideas to solve problems related to the exploration of extreme environments
- evaluate information and ideas encountered during investigations of extreme environment
- use appropriate tools to gather, analyse, interpret, and share scientific ideas
- formulate hypotheses
- appreciate the cumulative nature of technological advancement
- explain reasons for an adaptive technology and how it compensates for the extreme condition(s)
- construct models of exploration technologies

GRADE 6 EARTH AND SPACE SCIENCE: EXPLORATION OF EXTREME ENVIRONMENTS

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • explain obstacles unique to exploration of a specific extreme environment 	<ul style="list-style-type: none"> <input type="checkbox"/> identify the salient characteristics of an extreme environment (e.g., space, polar ice, oceans, volcanoes, and the atmosphere—a place that humans do not naturally inhabit but choose to explore) <input type="checkbox"/> give several examples of resources and knowledge that can be obtained from distant explorations <input type="checkbox"/> give several examples of how technology can be used by humans to travel to and explore an unknown environment
<ul style="list-style-type: none"> • assess technologies used for extreme environments 	<ul style="list-style-type: none"> <input type="checkbox"/> identify several types of equipment and methods currently used to explore extreme environments (e.g., scuba, fibre optics, Mars Lander) <input type="checkbox"/> accurately describe the stages of development for a previously created technology (e.g., kites, balloons, planes, rockets, submarines, space suits) <input type="checkbox"/> design a complete model for travelling into a specific extreme environment (e.g., submarines, sonic-aircraft, spaceships) <input type="checkbox"/> coherently defend a position with respect to the ethical considerations involved in the development and use of new technologies (e.g., whether or not to take living samples, or use weapons in space)
<ul style="list-style-type: none"> • describe contributions of Canadians to exploration technologies 	<ul style="list-style-type: none"> <input type="checkbox"/> describe in detail the function of Canadian technologies involved in exploration of extreme environments (e.g., international space station, Canadarm, Newt Suit, satellite telecommunications, robotics, and ocean mapping) <input type="checkbox"/> illustrate with accurate, detailed drawings a range of Aboriginal technologies (e.g., Inuit sleds, Haida ocean canoes, Algonquin/Cree snowshoes)



STUDENT ACHIEVEMENT

Grade 7

GRADE 7: PROCESSES OF SCIENCE

Key Elements: Processes of Science

Estimated Time: integrate with other curriculum organizers

Hypothesizing

Hypothesizing happens when a prediction is made about the causes and results of an event with two variables. The investigation and testing of the event is referred as to a scientific inquiry and includes these actions:

- examine previous predictions
- formulate questions that can be answered by scientific investigations
- suggest possible explanation based upon a number of inferences
- identify the independent and dependent variables
- determine if the key variables can be isolated for testing
- predict cause and effect, and state a testable hypothesis
- determine limits for the controls
- design the experiment
- conduct the experiment and collect data
- analyse the results
- communicate by reporting the result
- repeat and retest if necessary.

When assessing students' understanding and ability to apply hypothesizing and questioning skills, consider how well their experimental design identifies and fairly tests the independent and dependent variables.

Developing Models

Creating physical models and building prototypes is very similar to the design problem-solving steps and includes investigating a question or observations with these actions:

- determine the appropriateness for a model (and scale) that fit the question
- identify the specifics of the problem observed and select possible solutions
- problem solve creatively, and plan a set of procedures
- determine available materials or equipment
- build a prototype or model (drawings help)
- test and evaluate the model
- communicate and present a product
- evaluate the results.

When assessing students' understanding and ability to apply modeling, consider how well the model communicates students' synthesis and understanding of the concepts involved, and consider the extent to which the model is relevant and accurately identifies the key components of the system (validity). Good models should demonstrate the basic principle or phenomenon involved and allow students to represent their understanding according to analogies of the scientific concepts.

GRADE 7 PROCESSES OF SCIENCE

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • test a hypothesis by planning and conducting an experiment that controls for two or more variables 	<ul style="list-style-type: none"> <input type="checkbox"/> supply relevant supporting evidence for hypotheses presented <input type="checkbox"/> develop a testable question that considers the variables involved based on previous inferences <input type="checkbox"/> communicate precisely the question under observation so others can review the plan and procedures <input type="checkbox"/> question the relevance of the hypothesis by checking the control and the accuracy of the testing methods (fair test) <input type="checkbox"/> communicate the results of an experiment, using graphs and charts
<ul style="list-style-type: none"> • create models that help to explain scientific concepts and hypotheses 	<ul style="list-style-type: none"> <input type="checkbox"/> observe a problem situation, and formulate a plan for investigating a solution <input type="checkbox"/> plan in detail all of the steps necessary to build or make a product, and prepare a written outline showing the order of events <input type="checkbox"/> identify key components of the system or process being modelled. <input type="checkbox"/> develop a testable question that considers the variables involved (independent and dependent) <input type="checkbox"/> build a relevant and appropriate model based on the available materials and constraints of the problem <input type="checkbox"/> apply all appropriate safety measures when building a model

Processes and Skills of Science							
Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
<ul style="list-style-type: none"> • Observing • Communicating (sharing) 	<ul style="list-style-type: none"> • Communicating (recording) • Classifying 	<ul style="list-style-type: none"> • Interpreting Observations • Making Inferences 	<ul style="list-style-type: none"> • Questioning • Measuring and Reporting 	<ul style="list-style-type: none"> • Interpreting Data • Predicting 	<ul style="list-style-type: none"> • Designing Experiments • Fair Testing 	<ul style="list-style-type: none"> • Controlling Variables • Scientific Problem Solving 	<ul style="list-style-type: none"> • Hypothesizing • Developing Models

GRADE 7 LIFE SCIENCE: ECOSYSTEMS

Key Elements: Life Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have developed a basic understanding of ecosystem relationships and evaluated human impact on the environment.

Ecosystems

This study is undertaken to achieve a basic understanding of ecosystems in order to make informed, ethical decisions about their conservation. Through observation and investigation of local ecosystems, students describe characteristics, conditions essential for growth, and reproduction of organisms as well as the roles of these organisms. Students analyse human activity in local ecosystems and propose how best to preserve that ecosystem.

Vocabulary

ecosystem, biosphere, organisms, cycle, food chain, food web, photosynthesis, sustainability, stewardship, producer, consumer, decomposer, micro-organisms, niche, population, species, community, biomes, detritivores, herbivores, carnivores, omnivores, predator, prey, habitat

Knowledge

- living things interact with each other and their physical environment
- organisms are influenced by environmental forces, and each organism influences the environment to some extent
- ecosystems are entire systems formed by interactions among the different living and non-living parts of the environment (e.g., forests, deserts)
- non-living physical characteristics of an ecosystem include: soil, landforms, water, sunlight, temperature
- organisms interact with each other and use and recycle chemicals from the environment
- living things need energy to carry out their activities; the flow of energy from one organism to another is part of an energy web
- producers of food such as plants are related to consumers (e.g., animals) and decomposers (e.g., bacteria and fungi) in webs of interdependence called food chains and food webs
- food webs are individual food chains that are linked
- populations are groups of the same kinds of organisms (species) living together because they share common environmental needs
- populations in ecosystems tend to be regulated by predation and competition
- human activity such as logging, farming, fishing, and buildings can impact the living (biotic) and physical (abiotic) components of an ecosystem

Skills and Attitudes

- observe and record the biotic and abiotic components in a local ecosystem
- analyse limiting factors in an ecosystem
- design and conduct a simulation to demonstrate control of one or more variables in an ecosystem
- create models to show large scale ecosystems
- show respect for the environment

GRADE 7 LIFE SCIENCE: ECOSYSTEMS

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • analyse the roles of organisms as part of interconnected food webs, populations, communities, and ecosystems 	<ul style="list-style-type: none"> <input type="checkbox"/> identify populations of organisms in communities and ecosystems according to simplified food webs <input type="checkbox"/> explain how habitats provide basic needs for the organisms living in them (e.g., food, water, light) <input type="checkbox"/> identify factors that are critical for healthy populations and ecosystems, including air and water quality (e.g., acid rain, greenhouse gases, turbidity), and explain their significance
<ul style="list-style-type: none"> • assess survival needs and interactions between organisms and the environment 	<ul style="list-style-type: none"> <input type="checkbox"/> identify interactions between decomposers, producers, and consumers, according to the food pyramid <input type="checkbox"/> describe in detail how decomposers recycle nutrients within ecosystems, and how plants, animals, and decomposers depend on each other (composting) <input type="checkbox"/> explain and provide several examples of how energy is transferred through food webs and food chains within an ecosystem
<ul style="list-style-type: none"> • assess the requirements for sustaining healthy local ecosystems 	<ul style="list-style-type: none"> <input type="checkbox"/> create and justify a description of a suitable environment for a specific organism, taking into account the limiting factors (e.g., food, water, light, living space) <input type="checkbox"/> explain relationships between living (biotic) and non-living (abiotic) things within an ecosystem (e.g., soil, bacteria, plants, animals), with reference to several examples <input type="checkbox"/> evaluate the likely effects of habitat loss for certain species
<ul style="list-style-type: none"> • evaluate human impacts on local ecosystems 	<ul style="list-style-type: none"> <input type="checkbox"/> describe, using examples, how forestry practices affect ecosystems (e.g., riparian zones, fishing, forest debris, beetle kill, controlled burn) <input type="checkbox"/> determine the sources of pollutants, and analyse their effects (e.g., autos and air quality, oil spills and water contamination) <input type="checkbox"/> describe, using examples, how practices of Aboriginal peoples in BC affect environmental sustainability in a specific ecosystem

GRADE 7 PHYSICAL SCIENCE: CHEMISTRY**Key Elements: Physical Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have understood the characteristics of mixtures and solutions, as well as chemical and physical properties of various substances.

Chemistry

In this introduction to chemistry, students develop a greater understanding of matter through various hands-on activities in a “kitchen chemistry” setting. Students use appropriate tools and techniques to understand the characteristics of mixtures and solutions. They gain understanding of the pH scale by testing weak acids or bases. Students are also introduced to the particle model theory and to quantitative and qualitative properties of materials, as well as chemical and physical changes in matter.

Vocabulary

matter, volume, state, solid, liquid, gas, chemical change, physical change, reversible and non-reversible changes, pure substance, element, compound, mixture, solution, suspension, emulsion, solubility, concentration, dilute, saturation, supersaturated, unsaturated, dissolve, pH, acid, acidic, base, basic, neutral, hydrometer

Knowledge

- matter is anything that has mass and volume; it is generally classified as pure substances or mixtures
- the observable properties of matter include colour, texture, state
- the measurable properties of matter include density, melting and freezing points
- changes to matter can be reversible (mixtures and changes of state) and non-reversible (mechanical change such as grinding, chemical change such as cooking)
- matter is made up of tiny particles (particle model theory)
- pure substances are either elements or compounds, and their properties are always the same
- mixtures have two or more kind of particles
- mixtures can be classed as solutions, suspensions, or mechanical mixtures
- mixtures can be separated physically or chemically by removing one of the components (evaporation, crystallization, filtration, dissolving, magnetic separation, flotation)
- suspensions consist of solid pieces scattered throughout the mixture
- solutions are mixtures that appear as a single substance
- pH is the measure of the tendency toward acidic or basic conditions

Skills and Attitudes

- demonstrate curiosity, scepticism, creativity, open-mindedness, accuracy, precision, honesty, and persistence as important scientific attributes
- ask questions and formulate hypotheses that are tentative and testable, and draw conclusions from results
- use appropriate tools and techniques to gather, analyse, interpret, and share information
- recognize that an experiment must be repeated and yield consistent results to be considered scientifically valid
- develop models to represent systems or analogies about matter
- handle chemicals and equipment safely and responsibly

GRADE 7 PHYSICAL SCIENCE: CHEMISTRY

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • conduct investigations into properties of matter 	<ul style="list-style-type: none"> <input type="checkbox"/> identify several qualitative (e.g., colour, texture, state) and quantitative (e.g., density, melting point, freezing point) properties of materials <input type="checkbox"/> accurately measure, record, and present data collected during an experiment involving solutions and mixtures <input type="checkbox"/> describe chemical and physical changes in matter, citing examples
<ul style="list-style-type: none"> • classify substances as elements, compounds, and mixtures 	<ul style="list-style-type: none"> <input type="checkbox"/> accurately sort products found in the home into substances, suspensions, emulsions, mechanical mixtures, and solutions and summarize their similarities and differences <input type="checkbox"/> correctly relate the particle theory to the properties of elements, compounds, and mixtures
<ul style="list-style-type: none"> • measure substances and solutions according to pH, solubility, and concentration 	<ul style="list-style-type: none"> <input type="checkbox"/> describe the effects of a variety of factors (e.g., type of solute, type of solvent, temperature) on solubility <input type="checkbox"/> determine factors (e.g., heat, stirring, surface area) that affect the rate at which substances dissolve <input type="checkbox"/> use test papers with teacher support to carefully analyse various substances and solutions for acidic or basic characteristics (pH scale)

GRADE 7 EARTH AND SPACE SCIENCE: EARTH'S CRUST**Key Elements: Earth and Space Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have demonstrated understanding of the Earth's surface and how it changes over time.

Earth's Crust

The study of the Earth's crust includes an investigation of the Earth's structure, characteristics of the Earth's core, geological processes, rock and mineral formations, and changes in the landscape over time. Students examine theories explaining the Earth's geology and the dynamics of plate tectonics. Through investigation, observation, diagrams, and models, students begin to identify geological features and simulate changes that occur on the Earth's surface and on the ocean floor. Students apply this knowledge to suggest the effect that these features and changes have on people and communities. They identify technologies that are related to the scientific study of these changes.

Vocabulary

crust, mantle, outer core, inner core, weathering, erosion, deposition, fossil, fossil record, geologic time scale, rock cycle, plate tectonics, continental crust, mid-ocean ridge, delta, mountain, valley, volcano, plain, plateau, ocean crust, convergent, divergent, transform plate boundaries, subduction zone, igneous, metamorphic, sedimentary, magma, lava, seismic waves

Knowledge

- the Earth is broadly differentiated into a crust, mantle, and core
- the geosphere refers to the physical Earth; the atmosphere refers to the air; the biosphere refers to life forms; and the hydrosphere refers to water
- mountains, valleys, plains, deserts, rivers, lakes, and oceans are features of the surface of Earth
- the Earth's crust and uppermost mantle are made of large moving sections called tectonic plates
- the features on the surface of the Earth are formed by tectonic activity, particularly at convergent, divergent, or transform fault tectonic plate boundaries and by the processes of wind, water, and ice that wear down surface features over time
- the theory of plate tectonics explains how and why the tectonic plates move and explains why the Earth's surface is continually changing
- stress in the Earth's crust is released in tectonic plate movement and earthquakes
- heat within the Earth is released in volcanic activity
- information about the mantle and core is obtained by recording and charting energy waves from earthquakes and by looking at rocks exposed at the Earth's surface
- earthquakes are common along all tectonic plate boundaries and occur deep in the Earth at subduction zones
- rocks are made of minerals that have unique properties
- minerals are made from pure elements in the Earth
- minerals can be identified by their colour, lustre, hardness, cleavage, crystal structure, and their reaction to certain chemicals
- rocks are classified by how they are formed within the rock cycle and their mineral content
- igneous, sedimentary, and metamorphic rocks can be changed from one form to another
- fossils in sedimentary rocks allow us to interpret ancient environments
- the history of changes in life on Earth are recorded in the fossil record
- the geologic time scale is based on changes in life on Earth

continued next page

Key Elements (continued)

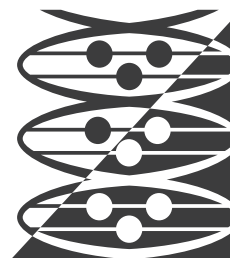
Key Elements: Earth and Space Science

Skills and Attitudes

- use analogies to visualize science concepts
- collect data from research resources and apply to diagrams and graphs
- report on the rock cycle from lab research results and observations
- observe how the positions of earthquakes, volcanoes, and mountain ranges outline the boundaries of tectonic plates
- classify rock collections
- examine and identify commonly found rocks and local geological formations
- use models to predict how earthquake waves travel through the Earth and how this information leads to an understanding of the interior of the Earth
- investigate the use of models to show large scale systems

GRADE 7 EARTH AND SPACE SCIENCE: EARTH'S CRUST

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • compare the characteristics of the Earth's core, mantle, and crust, and describe the formation of rocks 	<ul style="list-style-type: none"> <input type="checkbox"/> accurately list the characteristics of each layer of the Earth <input type="checkbox"/> construct a flow chart to explain in detail the geological processes involved in forming minerals and rocks <input type="checkbox"/> catalogue the properties of rock and mineral samples (e.g., cleavage, colour, crystal habit, fracture, hardness, lustre, and streak) on the basis of a detailed examination
<ul style="list-style-type: none"> • analyse the dynamics of tectonic plate movement and landmass formation 	<ul style="list-style-type: none"> <input type="checkbox"/> explain how earthquakes have helped scientists understand the Earth's structure (e.g., primary and secondary seismic waves) <input type="checkbox"/> detail the effects of earthquakes, volcanoes, and fault boundaries on the Earth's crust <input type="checkbox"/> model tectonic plate movement to show convergent, divergent, and transform plate boundaries
<ul style="list-style-type: none"> • explain how the Earth's surface changes over time 	<ul style="list-style-type: none"> <input type="checkbox"/> explain how scientists use the placement and position of an object to infer the time of events (e.g., superposition) <input type="checkbox"/> illustrate how fossils come to be associated with sedimentary rock <input type="checkbox"/> report on how fossil record is used to identify Millennium changes in the Earth's surfaces



CLASSROOM ASSESSMENT MODEL

Science K to 7

The Classroom Assessment Model outlines a series of assessment units for Science K to 7. These units have been structured by grade level and according to the curriculum organizers

- Life Science
- Physical Science
- Earth and Space Science

Processes of Science are integrated throughout the other three organizers. These units collectively address all of the prescribed learning outcomes for Science K to 7.

This organization is not intended to prescribe a linear means of course delivery. Teachers are encouraged to address the learning outcomes in any order, and to combine and organize the units to meet the needs of their students and to respond to local requirements. Some students with special needs may have learning outcomes set for them that are modified and documented in their Individualized Education Plan (IEP). For more information, see the section on Inclusion, Equity, and Accessibility for All Learners in the Introduction to this IRP.

CONSIDERATIONS FOR INSTRUCTION AND ASSESSMENT IN SCIENCE K TO 7

It is highly recommended that parents and guardians be kept informed about all aspects of Science K to 7. For suggested strategies for involving parents and guardians, refer to the Introduction to this IRP.

Teachers are responsible for setting a positive classroom climate in which students feel comfortable learning about and discussing topics in Science K to 7. Guidelines that may help educators establish a positive climate that is open to free inquiry and respectful of various points of view can be found in the section on Establishing a Positive Classroom Climate in the Introduction to this IRP.

Teachers may also wish to consider the following:

- Involve students in establishing guidelines for group discussion and presentations. Guidelines might include using appropriate listening and speaking skills, respecting students who are reluctant to share personal information in group settings, and agreeing to maintain confidentiality if sharing of personal information occurs.
- Promote critical thinking and open-mindedness, and refrain from taking sides on one point of view.

- Develop and discuss procedures associated with recording and using personal information that may be collected as part of students' work for the purposes of instruction and/or assessment (e.g., why the information is being collected, what the information will be used for, where the information will be kept; who can access it—students, administrators, parents; how safely it will be kept).
- Ensure students are aware that if they disclose personal information that indicates they are at risk for harm, then that information cannot be kept confidential. For more information, see the section on Confidentiality in the Introduction to this IRP.

Classroom Assessment and Evaluation

Teachers should consider using a variety of assessment techniques to assess students' abilities to meet the prescribed learning outcomes. Tools and techniques for assessment in Science K to 7 can include:

- teacher assessment tools such as observation checklists, rating scales, and scoring guides
- self-assessment tools such as checklists, rating scales, and scoring guides
- peer assessment tools such as checklists, rating scales, and scoring guides
- journals or learning logs
- video (to record and critique student demonstration)
- written tests, oral tests (true/false, multiple choice, short answer)
- worksheets
- portfolios
- student-teacher conferences.

Assessment in Science K to 7 can also occur while students are engaged in, and based on the product of, activities such as:

- case studies and simulations
- group and class discussions
- brainstorming, clusters, webs
- research projects
- role plays
- charts and graphs
- posters, collages, models, web sites
- oral and multimedia presentations
- peer teaching
- personal pledges or contracts.

For more information about student assessment, refer to the section on Student Achievement.

Information and Communications Technology

The Science K to 7 curriculum requires students to be able to use and analyse the most current information to make informed decisions on a range of topics. This information is often found on the Internet as well as in other information and communications technology resources. When organizing for instruction and assessment, Science K to 7 teachers should consider how students will best be able to access the relevant technology, and ensure that students are aware of school district policies on Internet and computer use.

Teaching Science in Multi-Grade Classrooms

Teachers often have a multi-grade teaching assignment whereby it is necessary to teach all of the prescribed learning outcomes for the different grade levels in one classroom. Here are some suggestions

- teamwork with colleagues to develop a two-year alternating program with topics unique to the combined classrooms; topics can be designated for Year A (even) and Year B (odd)
- development of topics from commonalities within the prescribed learning outcomes
- selection of topics that would facilitate school planning and cross-grade articulation for students and teachers
- using an approach that integrates learning in other subject areas.

CONTENTS OF THE MODEL***Assessment Overview Table***

The Assessment Overview Table provides teachers with suggestions and guidelines for assessment of each grade of the curriculum. This table identifies the domains of learning and cognitive levels of the learning outcomes, along with a listing of suggested assessment activities and a suggested weight for grading for each curriculum organizer.

Key Elements

This section includes a brief description of the unit, identifying relevant vocabulary, knowledge, skills, and attitudes.

Suggested Timeframe

The suggested time indicates the average number of hours needed to address the prescribed learning outcomes identified in that unit; it does not necessarily indicate the time required to implement the suggested instructional and assessment activities listed.

Prescribed Learning Outcomes and Suggested Achievement Indicators

Each set of prescribed learning outcomes identifies the content standards for that unit. The corresponding achievement indicators provide additional information about the expected level or degree of student performance and can be used as the basis for assessment.

Suggested Planning and Assessment Activities

Planning and assessment activities have been included for each prescribed learning outcome and set of corresponding achievement indicators. Each suggested assessment activity directly corresponds to a particular planning activity as indicated by the order and arrangement of these activities.

A wide variety of planning (instructional) activities has been included to address a variety of learning and teaching styles. The assessment activities describe a variety of tools and methods for gathering evidence of student performance.

These strategies are suggestions only, designed to provide guidance for teachers in planning and carrying out assessment to meet the prescribed learning outcomes.

Recommended Learning Resources

This section lists the Science K to 7 recommended learning resources that relate to the specific learning outcomes in each topic. The resources listed do not necessarily relate to the suggested instruction and assessment. Teachers may choose to use these resources, or they may use other locally approved resources. See the section on Recommended Learning Resources in this IRP for more information.

As new resources are recommended, information will be posted on the ministry web site: http://www.bced.gov.bc.ca/irp_resources/lr/resource/consub.htm

Assessment Instruments

Sample assessment instruments have been included at the end of each unit, and are provided to help teachers determine the extent to which students are meeting the prescribed learning outcomes. These instruments contain criteria specifically keyed to one or more of the suggested assessment activities contained in the unit.

USING THE CLASSROOM ASSESSMENT MODEL

The following two pages illustrate how all the elements of the Classroom Assessment Model relate to each other

CLASSROOM ASSESSMENT MODEL • Grade 1

GRADE 1 EARTH AND SPACE SCIENCE: DAILY AND SEASONAL CHANGES

Key Elements: Earth and Space Science

Estimated Time: 25–30 hours

By the end of the grade, students will have demonstrated understanding of changes that occur in daily and seasonal cycles and their effects on living things.

Daily and Seasonal Changes
This study focuses on weather and seasonal changes and their effects on plants, animals, and human activity. Students discover patterns of weather change during a year by recording daily weather information. Through observation and investigation, students learn that predictable changes occur in daily and seasonal cycles.

Vocabulary
day time, night time, morning, afternoon, evening, days of the week, seasons, spring, fall, summer, winter, today, yesterday, tomorrow, months of year, heat, cold, snowy, rainy, cloudy, stormy, sun, light, shadow

Knowledge

- the daily weather may include changes in temperature, wind, cloud, and precipitation
- weather patterns change predictably according to the seasons
- weather and seasonal changes affect plants and animals
- the cycle of day and night occurs predictably according to the seasons
- changes in the length of day and night occur predictably according to the seasons
- daily and seasonal changes affect human activities
- Aboriginal peoples in BC have a variety of seasonal activities

Skills and Attitudes

- observe and record daily and seasonal changes
- record observations and results of investigations using graphs, pictures, symbols, and words
- use classroom materials responsibly and safely

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Suggested Timeframe

The suggested time indicates the approximate number of hours needed to deliver the prescribed learning outcomes identified in the unit.

Key Elements

Key elements provide an overview of content in each curriculum organizer. They can be used to determine the expected depth and breadth of the prescribed learning outcomes.

Prescribed Learning Outcomes

Prescribed learning outcomes are arranged by suborganizer.

Suggested Achievement Indicators

Each set of suggested achievement indicators corresponds to the prescribed learning outcomes for that suborganizer.

Planning for Assessment

This section is designed to provide guidance for teachers in helping students meet the prescribed learning outcomes.

Suggested Assessment Activities

Each suggested assessment activity directly corresponds to a particular planning activity as indicated by the order and arrangement of these activities.

CLASSROOM ASSESSMENT MODEL • Grade 1

GRADE 1 EARTH AND SPACE SCIENCE: DAILY AND SEASONAL CHANGES

Prescribed Learning Outcomes

It is expected that students will:

- describe changes that occur in daily and seasonal cycles and their effects on living things

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who fully meet the prescribed learning outcome are able to:

- describe the effects of weather on living things (e.g., migration of birds, leisure activities)
- accurately sort pictures or objects that pertain to daily and seasonal changes (e.g., new plant growth, snow melting, leaves falling, bears hibernating)
- illustrate and record changes that occur throughout the seasons (e.g., flowers blooming, snow melting, leaves falling, lakes freezing)
- with teacher support, identify daily weather conditions and seasonal patterns (e.g., how people or animals prepare for weather conditions)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> Keep a class chart to track the weather for a period of time. Each student is responsible for predicting and recording the weather for a specific period. Emphasis is on conditions that can be observed (e.g., cloud cover, precipitation, temperature). Ask the class to agree on a standard set of symbols for recording the weather information. <p>Discuss how weather and seasonal changes affect humans. Ask students to consider foods eaten, feelings, leisure activities, outdoor/indoor activity, health (e.g., colds, flu, sunburn, hay fever, insect bites), clothing, holidays, and feasts.</p> <ul style="list-style-type: none"> Through leaf collecting, picture collages, and word splashes, have students explore characteristics of seasonal changes and day time/night time. Make two large charts on sturdy tag board to use throughout the year as instructional tools and assessment organizer models, one for Seasonal divided into four quadrants, and one for Daily divided in half. 	<ul style="list-style-type: none"> After students have recorded the weather on the class chart, ask each student to present his or her "weather report" to the class. Assess each student's ability to <ul style="list-style-type: none"> observe weather conditions, cloud cover, precipitation, and temperature use appropriate vocabulary. To determine if students can describe how weather affects them, ask them to describe how they would prepare or dress for a specific weather condition. Assess the description based on whether it is realistic and complete for that weather condition. In partners, have students sort and paste pictures/words into a graphic organizer. Note the extent to which students were able to distinguish day and night, and seasonal features.

continued next page

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CLASSROOM ASSESSMENT MODEL • Grade 1

Daily and Seasonal Changes (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> Choose one local deciduous tree to observe throughout the year. Take photos and make a pictorial record of the tree in each season. 	<ul style="list-style-type: none"> Give students a graphic of a circle divided into four quadrants, and have them draw to represent their understanding (e.g., "In Spring, my tree..."). <p>Look for evidence that students have placed the seasons in the correct quadrant and that they have included seasonal characteristics in their drawings.</p>
<ul style="list-style-type: none"> In small groups, have students create seasonal murals or dioramas using pictures, words, and objects from a prepared tub. 	<ul style="list-style-type: none"> When students have created their representations, work together to establish criteria for assessing their work, such as: seasonal murals/dioramas show <ul style="list-style-type: none"> possible weather conditions appropriate clothing recreation activity phases of plant growth animal activity

Recommended Learning Resources


- Discovery Works Modules for B.C. Grade 1 (Weather and Seasons)
- Earth Watch (Pan Canadian Science Place)
- Everyday Life
- Glide Into Winter with Math and Science (AIMS Activities)
- Hands-on Science (Daily and Seasonal Changes)
- Project WET
- Seasons
- Spring Into Math and Science (AIMS Activities)

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Recommended Learning Resources

This section lists the recommended learning resources that relate to the specific learning outcomes in each suborganizer or cluster of learning outcomes. See the section on Learning Resources in this IRP for more information.





CLASSROOM ASSESSMENT MODEL • Grade 1

HOW WE WORKED TOGETHER 

My name is: _____ The date is: _____

Other group members: _____

Our task was: _____

GROUP MEMBERS:	 Not Yet (not yet within expectations)	 Sometimes (meets expectations)	 Yes (fully meets expectations)	 Always (exceeds expectations)
Everyone participated				
We listened to each other				
We encouraged each other (Yeah... Great... I like that idea...)				
We took turns sharing ideas				
The group stayed together				
We accomplished our task				

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Assessment Instruments

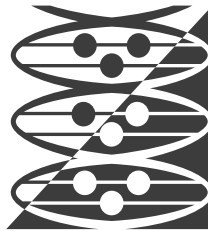
Sample assessment instruments are provided at the end of each unit, and contain criteria specifically keyed to one or more of the suggested assessment activities contained in the unit.

CLASSROOM ASSESSMENT MODEL • Grade 1

NEEDS OF LIVING THINGS

1 - not yet within expectations	2 - meets expectations	3 - fully meets expectations	4 - exceeds expectations
limited understanding of the needs of living things	basic understanding of the needs of living things	good understanding of the needs of living things	solid understanding of the needs of living things
one basic need identified	two basic needs identified	three basic needs identified	four basic needs (food, water, air and shelter) identified
explanation unclear or incomplete	explanation may or may not be clear	clear explanation with consistent examples	clear and complete explanation
confusion with non-living	clear distinction between living and non-living	clear distinction between living and non-living	clear distinction between living and non-living

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CLASSROOM ASSESSMENT MODEL

Kindergarten

ASSESSMENT OVERVIEW TABLE FOR: KINDERGARTEN

The purpose of this table is to provide teachers with suggestions and guidelines for classroom-based formative and summative assessment and grading of Science K to 7.

Curriculum Organizers	Suggested Timeframe	Suggested Assessment Activities	Suggested Weight for Grading	Number of Outcomes	Number of Outcomes by Cognitive Level *		
					K	U & A	HMP
PROCESSES OF SCIENCE	Average # of hours Integrated	Integrated	Integrated	2		2	
LIFE SCIENCE	10-15	<ul style="list-style-type: none"> • drawing • poster • group presentation 	33 1/3 %	3	1	2	
PHYSICAL SCIENCE	10-15	<ul style="list-style-type: none"> • presentation • drawing • group presentation 	33 1/3 %	3	1	1	1
EARTH AND SPACE SCIENCE	10-15	<ul style="list-style-type: none"> • oral summary • group presentation 	33 1/3 %	2		2	
TOTALS	30-45		100 %	10	2	7	1

* The following abbreviations are used to represent the three cognitive levels: K = Knowledge; U & A = Understanding and Application; HMP = Higher Mental Processes

KINDERGARTEN: PROCESSES OF SCIENCE

Key Elements: Processes of Science

Estimated Time: integrate with other curriculum organizers

Observing

Observing involves using one or more of the five senses (seeing, hearing, feeling, tasting, smelling) to gather information. When students recount their sensations and reactions to objects, events, or living things, these observations can be collected and revisited, and connections to learning can be made.

Communicating (Sharing)

Communicating involves showing, telling, creating, sharing, receiving, and/or giving information that has been obtained by observing. Communication also involves presenting or receiving information clearly and accurately, in an organized manner, and in a variety of possible ways (e.g., pictorially, graphically, mathematically, oral and written reports).

Kindergarten Processes of Science

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • use the five senses to make observations 	<ul style="list-style-type: none"> <input type="checkbox"/> describe what they observe (e.g., student says, “I see...I hear...It feels...It tastes...It smells...) <input type="checkbox"/> identify, with guidance, the properties of an object (e.g., colour, shape, texture, hardness) <input type="checkbox"/> recognize which body part would be used to gather specific sensory information (e.g., “to find out if a ball is soft, I would use my hand; to find out if it is red, I would use my eyes”)
<ul style="list-style-type: none"> • share with others information obtained by observing 	<ul style="list-style-type: none"> <input type="checkbox"/> orally communicate observations using learned vocabulary <input type="checkbox"/> work collaboratively with others while sharing (e.g., listening, encouraging each other, sharing observations) <input type="checkbox"/> draw features of items observed (e.g., two different plants growing in the schoolyard)

KINDERGARTEN LIFE SCIENCE: CHARACTERISTICS OF LIVING THINGS**Key Elements: Life Science**

Estimated Time: 10 – 15 hours

By the end of Kindergarten, students will have observed various features of plants and animals in the local environment.

Characteristics of Living Things

The study of living things begins with observing the characteristics of a variety of life forms in the local natural community. Students use their senses to observe appearances/identifiable features, behaviour, similarities and differences of local plants and common animals. Students may communicate their knowledge, skills, and attitude through discussion, questioning, drawings, collections, and play.

Vocabulary

same, different, see, hear, feel, taste, smell, colour, plant, animal

Knowledge

- living things have features that can be observed
- living things have characteristics by which they can be described and distinguished from non-living things
- living things (e.g., plants, animals) can be grouped according to their similarities and differences

Skills and Attitudes

- observe the specific characteristics of living things
- communicate verbally, pictorially, and graphically
- work with others while exploring and investigating living things
- show interest in and curiosity about living things
- demonstrate respect for living things

Kindergarten Life Science: Characteristics of Living Things

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • describe features of local plants and animals (e.g., colour, shape, size, texture) 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> list a variety of features (e.g., colour and size) of local plants and animals <input type="checkbox"/> illustrate local plants and animals in a variety of ways (e.g., painting, collages, sculptures) 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • As a class, take a field trip into the schoolyard and observe different trees. Talk about the parts of the tree and introduce relevant language (e.g., trunk, branch, roots). 	<ul style="list-style-type: none"> • Have students complete a drawing of the features of a particular tree. For assessment purposes, ask them to <ul style="list-style-type: none"> - colour the roots red - colour the trunk brown - colour one of the leaves green - colour one of the branches grey.
<ul style="list-style-type: none"> • Arrange a schedule for students to bring their pets to school (or photo if there is a no-pets policy). The pet owner becomes a “zoologist” who brings appropriate items to care for his or her pet and prepares a short presentation to share with the class (e.g., “Things I know about my pet”). Students observe characteristics of the animals, such as teeth, wings, skin covering, how it breathes, how it eats, how it moves, and how these features help the animal survive. Record students’ observations of each animal’s characteristics in a poster format and take a photo of each visitor. 	<ul style="list-style-type: none"> • Look for evidence that students <ul style="list-style-type: none"> - bring appropriate pet-care items - communicate observations clearly - show respect for their animal - participate in the construction of the class poster.
Recommended Learning Resources	
<ul style="list-style-type: none"> • Are Trees Alive? • Below Zero • Cycle of Life/Recycle Handbook for Educators • Everyday Life • Forests in Focus • My World (Pan Canadian Science Place) (Book 1 – Living Things) • Nature Babies Series • Project WET • Salish Sea • Salmonids in the Classroom 	

Kindergarten Life Science: Characteristics of Living Things

Prescribed Learning Outcomes

It is expected that students will:

- compare local plants

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:

- describe similar and different features (e.g., colour, shape, size, texture) of two local plants
- group plants on the basis of their features

Planning for Assessment

Suggested Assessment Activities

- Set up a plant station in the classroom with a variety of plants on display (e.g., cactus, flowering plant, vegetable, a cutting with roots in a clear container, a small tree). Have students observe plants closely to discover how they are alike or different (e.g., size, colour, number of leaves).

- Students select a favourite plant and draw as many details as possible. In circle time, students communicate to the class why the plant is their favourite, using pictures as a visual aid. Student drawings should reflect the characteristics of the plant, and students can share why it is their favourite.

- Prepare some small cuttings of easily propagated plants (e.g., ivy, geraniums, coleus). Put these in water. Ask students to watch the roots systems develop. Each student puts a bean or other seed into wet paper towel in a transparent container and examines the root system as it develops.

- Through observation and conversation, assess student ability to
 - use appropriate sense to observe
 - compare similarities and differences
 - communicate observations of plants.
 See also the scoring guide provided at the end of this grade (**Assessing Science Observation Skills**) for additional criteria.

- Collect leaves and have students observe
 - colours
 - shapes
 - sizes
 - texture.
 Then create a class chart with descriptions of leaves.

- Have students work in teams of three, with a set of leaves each. One student sorts the leaves, and the others try to identify the sorting rule.

Consider the extent to which students are able to

 - describe the leaf features
 - identify the sorting rules
 - understand and use science language.

Recommended Learning Resources

- Below Zero
- Cycle of Life/Recycle Handbook for Educators
- Everyday Life
- Forests in Focus
- My World (Pan Canadian Science Place) (Book 1 – Living Things)

Kindergarten Life Science: Characteristics of Living Things

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • compare common animals 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> describe similar and different features (e.g., size, outer surface such as feathers, skin, scales) of common animals <input type="checkbox"/> sort and classify a variety of animals (e.g., wild animals and pets) 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Make collections of pictures of local animals (e.g., bear, ant, robin, salmon). For each picture ask students to make a list of descriptive words. 	<ul style="list-style-type: none"> • In teams, have students make up riddles using the words from their list, and ask other teams to answer. When students are collaborating with others, look for evidence that they are able to <ul style="list-style-type: none"> - follow directions and procedures - focus on the main purpose of the task - ask questions and listen for the answers - attend to a partner or member of a group - add to suggestions that others offer - share tasks, equipment, and materials.
<ul style="list-style-type: none"> • Using the picture collection, have students work in pairs. One student takes a picture behind a small screen and describes the features of the animal, and the second student listens and attempts to identify which animal is in the picture. 	<ul style="list-style-type: none"> • Give students two pictures, and have them tell what they see is the same/different about them. Notice the extent to which students <ul style="list-style-type: none"> - focus on the features - use descriptive language to talk about the animals.
<ul style="list-style-type: none"> • Ask students to take on (dramatize) the role of an animal. The class can observe and identify what the features were that helped them figure out what the animal was. (See also the 2nd planning for assessment activity in Life Science.) 	<ul style="list-style-type: none"> • Consider the extent to which students participate, show appropriate audience behaviour, and demonstrate learning about common animal features.
Recommended Learning Resources	
<ul style="list-style-type: none"> • Below Zero • Birds and Animals You Might See • Cycle of Life/Recycle Handbook for Educators • Everyday Life • My World (Pan Canadian Science Place) (Book 1 – Living Things) • Nature Babies Series • Project WET • Salmonids in the Classroom • Sense-Able Science (AIMS Activities) 	

KINDERGARTEN PHYSICAL SCIENCE: PROPERTIES OF OBJECTS AND MATERIALS

Key Elements: Physical Science

Estimated Time: 10 – 15 hours

By the end of Kindergarten, students will have observed and identified physical properties of objects and materials.

Properties of Objects and Materials

The study of non-living things begins with observing the characteristics of objects and materials and provides a basis for future understanding of the physical world. Through play, observation, manipulation, and classification of a variety of common objects and materials, students identify the properties of these objects and reflect on their similarities and differences and how they may be used. Students may communicate their knowledge of the properties of objects and materials by drawing pictures, creating displays, and conducting investigations.

Vocabulary

words to describe shape, size, texture, and colour (e.g., shiny, dull, hard, soft, round, large, small, thick, thin, rough), recycle, reuse, reduce, refuse, rethink, heavy, light, smooth

Knowledge

- objects are made of different materials
- materials have different observable physical properties (e.g., colour, shape, texture, size) that can be defined, compared, and recorded
- the selection of materials depends on the purpose of the object

Skills and Attitudes

- communicate verbally, pictorially, and graphically
- observe the characteristics of objects and materials
- work with others while exploring and investigating objects and materials
- show interest in and curiosity about objects and materials

Kindergarten Physical Science: Properties of Objects and Materials

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> describe properties of materials, including colour, shape, texture, size, and weight 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> accurately sort materials by colour, size, shape, texture, and mass (weight) <input type="checkbox"/> identify, illustrate, and label materials in terms of properties (e.g., soft/hard; smooth/rough) 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> Show students different cubes and have them orally identify the colours. Repeat this activity for shape, size, texture, hardness, and weight. 	<ul style="list-style-type: none"> During a one-on-one conference or in small groups, show students the unifix cubes, etc. Ask them to sort the cubes by colours. Look for evidence that students were able to <ul style="list-style-type: none"> sort correctly name/label the sorted groups use learned scientific vocabulary to describe the characteristics.
<ul style="list-style-type: none"> Have students explore collections of objects, such as buttons and bread tags. Ask them to observe and compare objects on the basis of their properties (e.g., colour, shape, size, texture, hardness, weight). Display for students a collection of items and begin to isolate a set, asking, “What is my rule for sorting?” If no one guesses correctly, add three more items to the set. Continue until the sorting rule is identified. Repeat the activity using different properties for classification. 	<ul style="list-style-type: none"> Provide each student with a collection of objects to sort, encourage them to find as many ways as they can to sort the objects, and help them find a way to record their categories. Students display their objects, present their results, and describe the properties they used to sort (perhaps at circle time). Assess how many properties students were able to identify and use, and how consistently they were able to follow the classification rules they developed.
<ul style="list-style-type: none"> Working in groups, have students explore, describe, and record characteristics of materials using their sensory observations (shiny, dull; rough, smooth; hard, soft; sweet, sour). 	<ul style="list-style-type: none"> Using a feely bag, have students touch items and describe them as smooth/rough, hard/soft, by shape and by weight. Consider the extent to which students <ul style="list-style-type: none"> identify properties use senses to observe use learned vocabulary to describe characteristics.
Recommended Learning Resources	
<ul style="list-style-type: none"> Below Zero Fall Into Math and Science (AIMS Activities) My World (Pan Canadian Science Place) (Book 2 – Things We Use) Project WET Spring Into Math and Science (AIMS Activities) 	

Kindergarten Physical Science: Properties of Objects and Materials

Prescribed Learning Outcomes

It is expected that students will:

- identify materials that make up familiar objects

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:

- list materials (e.g., wood, plastic, metal, paper) used to construct at least three familiar classroom items such as desks, garbage cans, and books

Planning for Assessment

Suggested Assessment Activities

- Bring a collection of objects into the classroom. Sort these into objects that are made of wood, plastic, paper, and metal. Ask students to suggest labels for these to develop a sense of each category.
- Do a walkabout in the classroom. Have students identify the materials needed to create each item pointed out (e.g., this desk is made of ...). Listen to whether or not students use the appropriate learned vocabulary.

- Evaluate how well students sort objects into appropriate categories
 - made of only one material
 - made of a few materials
 - made of many materials.

- Visit a playground to identify what materials are used to build structures.

- Ask students to point out the location of different types of materials (e.g., point to something made of metal).

- Encourage students to bring in items for a “take apart” centre. Items such as old toys, small appliances, telephones, etc. could be included. Have students work with their buddies to safely handle equipment and tools while disassembling the items.

- Set up labelled boxes to sort parts from objects taken apart (e.g., metal, plastic, paper). Look for student ability to use learned vocabulary and apply learned concepts. Observe student ability to name the materials, sort them correctly, and work safely with their buddy.

Recommended Learning Resources

- Fall Into Math and Science (AIMS Activities)
- My World (Pan Canadian Science Place) (Book 2 – Things We Use)
- Project WET
- Spring Into Math and Science (AIMS Activities)

Kindergarten Physical Science: Properties of Objects and Materials**Prescribed Learning Outcomes**

It is expected that students will:

- describe ways to rethink, refuse, reduce, reuse, and recycle

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:

- identify three items that can be recycled (e.g., paper, plastic, glass)
- with teacher support, illustrate (e.g., draw a large mural) ways in which a classroom recycling centre can be used

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Discuss with students how things can be reduced, reused (e.g., using the back side of a piece of paper), and the need to conserve our class supplies. 	<ul style="list-style-type: none"> • Observe whether or not students are <ul style="list-style-type: none"> - conserving classroom supplies - putting waste paper into a reuse basket - checking the reuse basket for paper they might be able to use (e.g., small pieces of coloured paper for art).
<ul style="list-style-type: none"> • Set up a classroom recycling centre for items such as juice boxes. Students can reuse or recycle materials as appropriate. Take students to the school recycling centre to examine its containers. 	<ul style="list-style-type: none"> • Ask students to draw a picture of themselves engaged in a recycling activity. Students can provide a meaningful caption, giving a reason why it is important to recycle, and providing personal meaning for their actions.
<ul style="list-style-type: none"> • Invite a guest speaker to talk to students about how to set up a class worm farm or schoolyard composting bin. (This may link to the activities on dirt in the Earth and Space Science unit.) 	<ul style="list-style-type: none"> • Ensure that students <ul style="list-style-type: none"> - use the compost bin properly - ask appropriate and relevant questions of the speaker - demonstrate curiosity.
<ul style="list-style-type: none"> • Collect a sample of the school/class waste (e.g., paper, lunch scraps, leaves). Place them in a plastic bag all chopped up. Add an equal amount of soil to the waste. Mix and close with a twist tie/elastic. Over the next month, open and stir the contents each day. Ask students to observe the decomposition and keep a record of observations. 	<ul style="list-style-type: none"> • Place the finished compost into a clean egg shell and plant a seed into the soil (the egg shell will nourish the seed). Ask students to observe over several weeks. Students should be able to identify the materials used in the experiment and how they have been reused to make a container and food for the plant.
Recommended Learning Resources <ul style="list-style-type: none"> • My World (Pan Canadian Science Place) (Book 2 – Things We Use) 	

KINDERGARTEN EARTH AND SPACE SCIENCE: SURROUNDINGS**Key Elements: Earth and Space Science**

Estimated Time: 10 – 15 hours

By the end of Kindergarten, students will have shared their observations about their immediate environment.

Surroundings

The study of the natural environment begins with observing features of Earth and its atmosphere. Through investigation and observation, students describe characteristics of rocks, soil, water, and weather conditions in the community. Students may communicate their knowledge of their surroundings through discussion, questioning, drawings, collections, and play.

Vocabulary

sunny, cloudy, rainy, snowy, foggy, cold, warm, hot, weather, observe, descriptive words for water and trees

Knowledge

- the surface of the Earth is covered with rocks, soil, and water
- rocks, soil, and water have observable properties
- weather conditions in the atmosphere can be observed using the senses

Skills and Attitudes

- observe the characteristics of rocks, soil, water, and weather conditions
- communicate verbally, pictorially, and graphically
- work with others while exploring and investigating surroundings
- show interest in and curiosity about surroundings
- show respect for surroundings

Kindergarten Earth and Space Science: Surroundings

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • demonstrate the ability to observe their surroundings 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> ask specific questions related to their immediate environment (e.g., Where did the rain water go?) <input type="checkbox"/> accurately describe and illustrate two or more features of their surroundings (e.g., texture of soil, weather conditions) 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Use a water and sand centre to simulate rain. Encourage students to ask questions based on what they wonder about how the water might behave in different circumstances. Then, have them pour water on sand piles, using a can with one hole; then using a can with multiple holes. 	<ul style="list-style-type: none"> • Observe and note whether students <ul style="list-style-type: none"> - are willing to explore - can focus on the task - can describe changes in the sand, depending on which can was used.
<ul style="list-style-type: none"> • Take a field trip into the schoolyard after a rainy day to examine puddles. Encourage “I wonder...” and “Why...?” questions. Ask students to observe location, size, depth, colour, etc. Have students revisit the puddle to observe how it changes and eventually disappears after each visit. Then have them make entries in a class journal recording what was observed and what students predict might happen next. Similar field trips could be made to note the different characteristics of snow. Students can explore characteristics of water movement by draining puddles, building dams, etc. This could be done both outside and in the water/sand tables in the classroom. 	<ul style="list-style-type: none"> • To assess student field work, consider the extent to which they <ul style="list-style-type: none"> - can describe their observations - demonstrate curiosity - focus on the task - follow safety rules.
Recommended Learning Resources	
<ul style="list-style-type: none"> • The Fabulous Five: Our Senses • Fall Into Math and Science (AIMS Activities) • My World (Pan Canadian Science Place) (Book 3 – Look Everywhere) 	

Kindergarten Earth and Space Science: Surroundings

Prescribed Learning Outcomes

It is expected that students will:

- describe features of their immediate environment

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:

- tell about features they observe (e.g., “I found a long, thin leaf or a round, shiny rock.”)
- with peer support, identify specific changes in their immediate environment (e.g., changes in weather observed over a one-week period)

Planning for Assessment

Suggested Assessment Activities

- Have students collect different soil or rock samples from three to four areas of the schoolyard, and examine the samples using the senses of sight, touch, and smell. Then ask them to describe and chart the characteristics, and talk about the similarities and differences.

- Observe students to determine their ability to
 - use appropriate words to describe characteristics
 - distinguish differences and identify similarities
 - contribute to group work.

- Use hoops or string circles to sort various rocks and soil and discuss common and different characteristics (e.g., this rock is both round and speckled).

- Give students a tub of rocks and ask them to sort these in some way and explain their sorting rules. Ensure that students
 - follow directions
 - provide clear explanations for sorting.

- Have students keep a chart to track the daily weather, comparing one day’s weather to the previous day’s weather.

- Look for evidence that students can
 - read and gain information from the weather chart (e.g., be able to indicate how many sunny days there are in one month; whether there were more cloudy days than sunny days)
 - recall changes in weather patterns
 - stay on task
 - use learned scientific vocabulary.

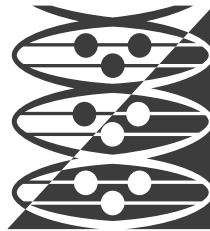
Recommended Learning Resources

- Fall Into Math and Science (AIMS Activities)
- My World (Pan Canadian Science Place) (Book 3 – Look Everywhere)

ASSESSING SCIENCE OBSERVATION SKILLS

Talking with students as they explore and observe details, patterns, sequences of events, and similarities and differences builds on their understanding of science concepts and use of scientific words to explain what they see, touch, smell, touch, and hear.

1. Beginning (not yet within expectations)	2. Developing	3. Confident	4. Extending/ Outstanding (exceeds expectations)
will be able to tell about observations using one or two criteria of their own or provided by the teacher; some of the details may be somewhat fanciful such as, "The plant looks sad." or "The paperclip likes the magnet."	will be able to tell about observation using more than one criterion of their own or provided by the teacher	will be able to tell about observations using a variety of criteria	will be able to tell about their observations in some detail using a variety of criteria
can record observations with a simple line drawing but may not be able to tell anything further about observations	can record simple observations using drawing and can make some interpretations about observations although they may not always be accurate	can begin to show observations in drawings using more detail and some labelling (may need assistance with this)	can include cause and effect thinking, as well as sorting and classifying personal observations
		begins to connect observations to previous experiences and can also begin to make some accurate interpretations	includes this information while recording observations in a more organized fashion, using both drawing and labelling (may need assistance with this)
			makes some accurate interpretations and can begin to pose and discuss questions based on personal observations



CLASSROOM ASSESSMENT MODEL

Grade 1

ASSESSMENT OVERVIEW TABLE FOR: GRADE 1

The purpose of this table is to provide teachers with suggestions and guidelines for classroom-based formative and summative assessment and grading of Science K to 7.

Curriculum Organizers	Suggested Timeframe	Suggested Assessment Activities	Suggested Weight for Grading	Number of Outcomes	Number of Outcomes by Cognitive Level *		
					K	U & A	HMP
	Average # of hours						
PROCESSES OF SCIENCE	Integrated	Integrated	Integrated	2		2	
LIFE SCIENCE	25-30	<ul style="list-style-type: none"> • drawing • portfolio • model • written assignment 	33 1/3 %	3	2	1	
PHYSICAL SCIENCE	25-30	<ul style="list-style-type: none"> • demo • drawing • science log 	33 1/3 %	3		1	2
EARTH AND SPACE SCIENCE	25-30	<ul style="list-style-type: none"> • drawing • oral summary • summative project 	33 1/3 %	2	2		
TOTALS	75-90		100 %	10	4	4	2

* The following abbreviations are used to represent the three cognitive levels: K = Knowledge; U& A = Understanding and Application; HMP = Higher Mental Processes

GRADE 1: PROCESSES OF SCIENCE

Key Elements: Processes of Science

Estimated Time: integrate with other curriculum organizers.

Communicating (recording)

Communicating at this grade involves beginning to collect information using the senses and appropriate tools, and thinking and sharing ideas about experiences. It also involves suggesting possible explanations so that others can compare ideas (collaboration). Sharing experiences can generate questions for further investigations; it also encourages discussion about how scientists find answers. Listening and writing information clearly and accurately, in an organized manner and in a variety of ways (e.g., pictorially, graphically, mathematically, orally and through written reports), is just beginning to occur.

Classifying

When classifying objects, events, or gathered information, students arrange attributes into two or more characteristic features. (At a simple level, this involves sorting, matching, grouping, and naming objects.) Once these recognizable characteristics are identified, other arrangements of the data can be made to show order and amounts. Classifying may be based on length, mass (using weight), capacity (volume), quantity, and positional order. Placing events into a series (shortest to longest, highest to shortest) results in a sequence of events (seriation)

Grade 1 Processes of Science

Prescribed Learning Outcomes	Suggested Achievement Indicators
<i>It is expected that students will:</i>	<i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i> <i>Students who have fully met the prescribed learning outcome are able to:</i>
<ul style="list-style-type: none"> communicate their observations, experiences, and thinking in a variety of ways (e.g., verbally, pictorially, graphically) 	<ul style="list-style-type: none"> <input type="checkbox"/> describe findings using appropriate vocabulary <input type="checkbox"/> with teacher support, clearly organize and record observations using graphs, pictures, symbols, and/or words
<ul style="list-style-type: none"> classify objects, events, and organisms 	<ul style="list-style-type: none"> <input type="checkbox"/> identify similarities and differences among objects, events, and organisms <input type="checkbox"/> group various objects, events, and organisms according to given criteria (e.g., objects: materials and textures; events: frequency and duration; organisms: common features and structure)

GRADE 1 LIFE SCIENCE: NEEDS OF LIVING THINGS**Key Elements: Life Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have differentiated between living and non-living things and described the needs of plants and animals.

Needs of Living Things

Through this study, students become aware that all living things, including themselves, have needs. Students observe and classify (sort by attributes) a variety of plants and animals. They discover that the needs of organisms are often similar, but that the particular needs of individual organisms may be unique. The study of the needs of living things provides an opportunity for students to begin to discover the many different forms life takes.

Vocabulary

animal, plant, needs, food, sunlight, water, air, shelter

Knowledge

- living things have characteristics by which they can be described and distinguished from non-living things
- needs of living things include food, water, and air
- living things use a variety of strategies to meet their needs

Skills and Attitudes

- observe and sort local plants and animals by their characteristics
- communicate verbally, pictorially, graphically, and in written form
- show respect for living things

Grade 1 Life Science: Needs of Living Things

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • classify living and non-living things 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> identify the differences between living and non-living things <input type="checkbox"/> accurately group living things according to common characteristics 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • As a class, identify from illustrations living and non-living things. 	<ul style="list-style-type: none"> • Students can demonstrate their scientific skill and what they know about living things through drawings, oral presentations, portfolios, or collections of their work. They demonstrate their scientific skills and processes as they observe, classify, and collaborate to care for living things. • Assess students' observation and communication skills in various activities by looking for the following <ul style="list-style-type: none"> - use of appropriate senses to observe - observation of similarities and differences - observation of changes - communication of observations through some form of media.
<ul style="list-style-type: none"> • Show pictures of trees, plants, and animals to students; then ask them to list characteristics and put them into groups on a chart. They should name things that belong to each group. 	<ul style="list-style-type: none"> • Give students a number of pictures of animals. Challenge them to sort them in some way (e.g., animals that fly/don't fly, live in water/don't live in water). Then ask them to sort the pictures in another way. Students present their work and describe the properties they used to sort pictures. Look for evidence that students <ul style="list-style-type: none"> - identified ways (rules) of classifying - consistently followed these rules.
<ul style="list-style-type: none"> • Take a walk in a forest or wild area. Ask students to point to non-living things. Have them find evidence of animal life (e.g., tracks, droppings, feathers, nests). 	<ul style="list-style-type: none"> • Prior to the field trip, discuss with students expectations for the trip. During the trip, look for evidence that students <ul style="list-style-type: none"> - demonstrate curiosity - show respect for the environment - are focused on the task - follow safety rules.

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Needs of Living Things (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Ask students to take a walk around their yard/ neighbourhood and look for living and non-living things, making a picture of each item. 	<ul style="list-style-type: none"> • Have students draw and write about one example of each of the living and non-living things they observed while being a “scientist” outside of the classroom. (e.g., “When I was walking, I saw animal tracks.”). Encourage them to include a sentence for their pictures. Evaluate how well students record their observations and describe their findings.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Below Zero • Chickens Aren’t The Only Ones • Cycle of Life/Recycle Handbook for Educators • Everyday Life • Forests in Focus • It’s Alive (Pan Canadian Science Place) • Living or Non-Living? • Nature Babies Series • Once Upon a Seashore • Project WET • Salish Sea • Salmon Forest • Sense-Able Science (AIMS Activities) 	

Grade 1 Life Science: Needs of Living Things

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> describe the basic needs of local plants and animals (e.g., food, water, light) 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> with teacher support, select and observe appropriate local plants and animals <input type="checkbox"/> accurately list the basic needs (e.g., water, food, and light) of the selected plants and animals 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> Discuss with students the basic needs of animals (e.g., water, food, air, and shelter). 	<ul style="list-style-type: none"> Give one student a picture of an animal. Have the others ask “yes” or “no” questions about how the animal meets its needs (e.g., Does it eat grass? Does it live in a tree?) Check to ensure that student answers are appropriate.
<ul style="list-style-type: none"> Invite a local plant specialist (Aboriginal Elder, botanist, herbologist) to make a presentation on local plant species 	<ul style="list-style-type: none"> Given a set of pictures or samples, have students identify which trees and plants grow locally and which belong to other climates. Verify that students <ul style="list-style-type: none"> have a realistic idea of which species are local and which are not identify which trees/plants belong to hot or cold climates use learned vocabulary.
<ul style="list-style-type: none"> Have students observe an anthill in the schoolyard or neighbourhood. Describe activities observed in relation to needs of living things discussed in class. 	<ul style="list-style-type: none"> Ask students to write a journal entry on their observations. Entries could focus on specific activities of the ants (e.g., they move in a line).
<ul style="list-style-type: none"> Put seeds in different media (e.g., dry sand, wet cotton, water, gravel). Observe over a few days and record results. 	<ul style="list-style-type: none"> Students keep a pictorial/word log on the development of each seed over a period of a few days. Look for evidence that they <ul style="list-style-type: none"> describe/illustrate what happens can measure the growth of sprouts, when applicable.
<ul style="list-style-type: none"> Discuss locomotion, and identify which living things use it and the features used for locomotion. 	<ul style="list-style-type: none"> Using recycled materials, design an animal and explain how it moves (e.g., feet, wings, fins) and what structures help with locomotion. When students present their animals to the class, look for evidence that <ul style="list-style-type: none"> features of locomotion have been included students explain how these features help their animal move.

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Needs of Living Things (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • With a magnifier or a low magnification microscope, have students observe a plant, an insect, or a small animal (e.g., caterpillar). Tell them to draw what they see. 	<ul style="list-style-type: none"> • Ensure that student drawings • have labels for parts • have captions indicating what each part does. • To assess student understanding, consider using the sample scoring guide (Needs of Living Things) provided at the end of this grade.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Below Zero • Birds and Animals You Might See • Chickens Aren't The Only Ones • Cycle of Life/Recycle Handbook for Educators • Everyday Life • Forests in Focus • It's Alive (Pan Canadian Science Place) • Kokanee of British Columbia • Living or Non-Living? • Nature Babies Series • Once Upon a Seashore • One Two Tree • Project WET • Salish Sea • Salmon Forest • Salmonids in the Classroom 	

Grade 1 Life Science: Needs of Living Things

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> describe how the basic needs of plants and animals are met in their environment 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> illustrate in detail how the structure of a plant helps meet its needs (e.g., function of roots, leaves) <input type="checkbox"/> illustrate in detail how animals meet their needs (e.g., types of homes and habitats, ability to adapt to changes in temperature, ways of gathering food, ways of protecting themselves from danger) in a given environment 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> Have students observe several types of plants and identify the basic parts. Then provide student pairs with a glass, food colouring, water, and a celery stalk. Have them put a few drops of dye in the cup of water. Then place the celery in the cup and observe what happens. Discuss how the stem carries the nutrients from the soil to the plant's leaves. 	<ul style="list-style-type: none"> Ask students to draw a diagram of the celery before the experiment. After the experiment have students add colour to show what happens with the food dye, and write one sentence describing how the stem helps the plant.
<ul style="list-style-type: none"> Have students pairs identify the basic needs and the care required for pets, indoor plants, and humans. 	<ul style="list-style-type: none"> Ask students to draw themselves caring for pet or /indoor plants. They could write captions explaining what they are doing. Have students complete a self-assessment related to their care of pets. They should address the following <ul style="list-style-type: none"> how I worked with others care I already give my pet/plant care I can give my pet/plant.
<ul style="list-style-type: none"> Have students discuss where animals in the area might live (e.g., city, forest, field, pond). Divide a chart paper into several columns, printing the name of each habitat on top. Have students describe and sort animals found in each habitat. 	<ul style="list-style-type: none"> Decide as a class what one needs to do to develop a model. Then create a shoebox diorama of a habitat of a particular animal with collected materials and art supplies. Ask students to include elements needed for living things to meet their needs. Look for evidence of the following <ul style="list-style-type: none"> natural materials have been included in the model food/water source/habitat are present related elements (e.g., other animals, trees, plants) have been included.

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Needs of Living Things (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Ask students to research an animal of their choice. (It could be a home pet or a study of one from a local farm animal or pet store.) 	<ul style="list-style-type: none"> • Provide students with a variety of ways to represent their study. Consider the extent to which they <ul style="list-style-type: none"> - include as many basic needs as possible - identify how their animal meets its needs - can explain their animal to the class or a partner.
<ul style="list-style-type: none"> • Obtain a list from a government agency (local, provincial, or federal) of a species that may be at risk. If possible bring in a local expert. Discuss with students why this species needs are not being met in the environment. 	<ul style="list-style-type: none"> • Ask students why they selected the animal they did. Listen and observe to determine whether they <ul style="list-style-type: none"> - understand the problems faced by the animal - can suggest ways humans can help the animal survive and prosper.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Are Trees Alive? • Below Zero • Birds and Animals You Might See • Cycle of Life/Recycle Handbook for Educators • Desert Giant – The World of the Saguaro Cactus • Everyday Life • Forests in Focus • It’s Alive (Pan Canadian Science Place) • Kokanee of British Columbia • Living or Non-Living? • Nature Babies Series • One Two Tree • Project WET • Salmon Forest • Salmonids in the Classroom 	

GRADE 1 PHYSICAL SCIENCE: FORCE AND MOTION

Key Elements: Physical Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have developed an understanding of how invisible forces can change the motion of objects.

Force and Motion

The study of force and motion begins with an exploration of ways objects can be moved and the factors affecting that movement, such as shape, surface, and mass. Students manipulate a variety of objects to explore forces and motion in terms such as pushing, pulling, throwing, dropping, and rolling. Through investigation, students begin to develop an understanding of force and motion as they apply to toys, playground equipment, and transportation.

Vocabulary

push/pull, surface, rough, smooth, heavy, light, slope, wheel, roll, slide, lift, swing, bounce, gravity, magnet, attract, repel

Knowledge

- forces can cause changes in the motion of objects
- magnetic forces can pull or push some objects
- gravity is the force of the Earth pulling on an object
- objects can exert forces on other objects
- friction is a force that applies to how objects make contact or touch
- shape, size, and mass of an object can affect its movement
- surface features such as texture and slope affect motion
- rolling, sliding, falling, swinging, and bouncing are types of motion
- speed can be described using words such as fast, faster, slow, slower
- distance travelled can be measured
- unbalanced forces 'change' motion, balanced forces 'maintain' motion
- not moving is Zero motion (no motion is a type of motion)
- motion can be described by how 'fast' and in which 'direction' objects are going
- speed shows how fast something is going

Skills and Attitudes

- observe the effects of forces on objects (balanced or unbalanced)
- describe types of motion
- investigate force and movement using toys or playground equipment
- record observations and results of investigations using graphs, pictures, symbols, and words
- use classroom materials responsibly and safely

Grade 1 Physical Science: Force and Motion

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • demonstrate how force can be applied to move an object 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> show how forces (e.g., push/pull) can change the motion or movement of an object <input type="checkbox"/> describe four ways in which objects can move on a surface (e.g., backward/forward; upward/downward) <input type="checkbox"/> classify objects by the way they move (e.g., spin, swing, bounce, slide, roll) 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • In the classroom or gym, challenge students to change the location of an object and identify the forces used (e.g., push, pull). 	<ul style="list-style-type: none"> • Set up a demonstration and brainstorm with students before and after this activity: “What do you know about how we can move an object? What did you learn today?” Encourage the use of the science language.
<ul style="list-style-type: none"> • Using a variety of toys, have students move objects by applying different forces and describe the movement created. • Have students think-pair-share. One partner moves an object; stops and thinks; then turns to his or her partner, and ask her or him to use the words to describe the direction of motion. 	<ul style="list-style-type: none"> • Observe that students are taking turns and using learned vocabulary to describe the movement <ul style="list-style-type: none"> - “you moved it forward” - “you moved it backward.” Consider using the assessment tool (How We Worked Together) provided at the end of this grade.
<ul style="list-style-type: none"> • Take a field trip around the school and look for objects that move. Have students draw these objects. 	<ul style="list-style-type: none"> • Assess student ability to sort the drawings by the way objects move, including <ul style="list-style-type: none"> - spinning - swinging - bouncing - sliding - rolling - walking - running - throwing.
<ul style="list-style-type: none"> • Invite an Aboriginal Elder to tell a story about transportation. Contact the district Aboriginal Education coordinator or resource teacher for assistance in drawing on the local Aboriginal community. 	<ul style="list-style-type: none"> • Set up problems for students to role play their understanding of how to move large objects (e.g., canoes, totem poles, pieces of dwellings, big game) over long distances. Students should use their bodies and words to indicate forces used and the way objects move.
Recommended Learning Resources	
<ul style="list-style-type: none"> • Everyday Life • Investigations • Let’s Move • Science All Around Me • Shared Learnings: Integrating BC Aboriginal Content K-10 	

Grade 1 Physical Science: Force and Motion

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • compare the effect of friction on the movement of an object over a variety of surfaces 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> describe the observed effects of friction on the motion of objects when travelling across different surfaces <input type="checkbox"/> with teacher support, demonstrate the effects of changing the surface of an inclined plane on the downward motion of an object, and the effort needed to push or pull an object upward 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students feel and touch a variety of surfaces while blindfolded, and use vocabulary to identify and describe what they feel (e.g., rough, smooth). 	<ul style="list-style-type: none"> • Listen for the variety of students' use of appropriate and relevant descriptive language (e.g., rough, smooth).
<ul style="list-style-type: none"> • Encourage students to investigate ways of making a soup can move. As they discover the can needs either a push or a pull, ask them to relate the strength of their push/pull to the way the can moves (e.g., further, faster). • At stations, have students roll their soup cans on different surfaces (e.g., linoleum, sand). Ask how the texture affects movement of the can. Magnifiers can be used to examine the roughness of the surface. 	<ul style="list-style-type: none"> • Have students keep Science Logs. Ensure that they include <ul style="list-style-type: none"> - unit vocabulary - pictures - record of experiments and results - self-assessment. • When assessing students' work, look for evidence that they <ul style="list-style-type: none"> - observe/express various characteristics of objects in motion - follow directions and procedures - ask questions and listen for answers - record results of experiments accurately - use materials appropriately and with care - share tasks, equipment, and materials.
<ul style="list-style-type: none"> • Have students collect different materials to construct a model slide (e.g., shelf with a wooden surface balanced on stack of books). Ask them to <ul style="list-style-type: none"> - predict which materials will make the fastest slide - test predictions - record results - display on a class chart. • Have students experiment with other objects of different mass, shape, etc. 	<ul style="list-style-type: none"> • Record the ongoing progress of students while they are investigating objects and motion. Assess their responses to questions such as <ul style="list-style-type: none"> - How far does the empty container travel? - What materials allow the container to travel farthest? Fastest? • Students themselves should record results in their science logs, as well as complete a self-assessment <ul style="list-style-type: none"> - What I like best about this work is... - What I want to do better next time is...

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Force and Motion (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students work in small groups to investigate how pushes and pulls affect the change in position of objects. Provide students with several different objects such as toy trucks, hockey pucks, shuffleboard rocks, or pull toys. Have students move each object using different amounts of relative force (push it hard, or push it lightly) for each trial. The students measure the distance the object travelled each time (e.g., mark off distances on the floor, count floor tiles) and record their information in a chart. 	<ul style="list-style-type: none"> • Students should be able to answer the following questions: <ul style="list-style-type: none"> - Can you describe the object’s position using your science skills? - How far does the object go? - How might this information be helpful? (curlers need to know how hard to throw a rock depending on the situation; hockey/ringette players need to know where the puck/ring needs to go and how hard to shoot it) • Student science journals should demonstrate their understanding of how the position and motion of objects are changed in relation to measured pushes and pulls.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Everyday Life • Investigations • Let’s Move 	

Grade 1 Physical Science: Force and Motion

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • demonstrate and describe the effects of magnets on different materials 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> identify various objects that are attracted by magnets (e.g., coins and paperclips) and materials that can be magnetized (e.g., iron) <input type="checkbox"/> with teacher support, determine the orientation of the poles of a magnet <input type="checkbox"/> show that opposite poles attract and like poles repel 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students share what they know about magnets <ul style="list-style-type: none"> - have a north and south pole - like poles attract; like poles repel. • Provide students with a variety of items to test materials that are magnetic and non-magnetic. Have teams sort and record which items can be picked up and which cannot. 	<ul style="list-style-type: none"> • Consider the extent to which students <ul style="list-style-type: none"> - use the materials safely - record findings - start to predict whether objects will be magnetic - can reflect on the findings.
<ul style="list-style-type: none"> • Introduce magnetic force (something that is pulled toward the magnet is “attracted”). Have students experiment with magnets and paperclips to observe this force. 	<ul style="list-style-type: none"> • Provide students with questions to focus their experiments and observations, such as: <ul style="list-style-type: none"> - What happens to the paperclips as you move the magnet toward them? - Try different magnets. Do you notice any differences? Look for evidence that students have responded to the questions and reported their findings.
<ul style="list-style-type: none"> • Provide teams of students with bar magnets, paperclips, and iron nails to determine how some things can be magnetized and become temporary magnets. 	<ul style="list-style-type: none"> • Provide students with the following focus questions as follow up to the experiment <ul style="list-style-type: none"> - Are you able to magnetize the paperclips and the nails? - What did you notice? - Did you try other items? Have students observe and record group work, record and explain their learning, and report to the class.

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Force and Motion (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Pass out two bar magnets to each group. Using a plastic ruler as a curb to guide and separate the magnets, have students place one bar magnet parallel and against the ruler, (it will stay in place but be able to slide). Have students put the other bar magnet on the other side of the ruler and then slowly bring one end of that magnet close to the north end of the other. Have them observe and record what happens. They should identify the north and south poles of the bar magnet by writing N or S on tape at the appropriate end. 	<ul style="list-style-type: none"> • Ask students to consider <ul style="list-style-type: none"> - What happens when the two north poles are facing each other? - What happens when the two south poles are facing each other? - What happens when a north and a south pole are facing each other? Observe the extent to which students use appropriate science language to report results and explain their learning (repel/attract, pull/push, force).
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Let's Move • Mostly Magnets (AIMS Activities) • Science All Around Me 	

GRADE 1 EARTH AND SPACE SCIENCE: DAILY AND SEASONAL CHANGES**Key Elements: Earth and Space Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have demonstrated understanding of changes that occur in daily and seasonal cycles and their effects on living things.

Daily and Seasonal Changes

This study focuses on weather and seasonal changes and their effects on plants, animals, and human activity. Students discover patterns of weather change during a year by recording daily weather information. Through observation and investigation, students learn that predictable changes occur in daily and seasonal cycles.

Vocabulary

day time, night time, morning, afternoon, evening, days of the week, seasons, spring, fall, summer, winter, today, yesterday, tomorrow, months of year, heat, cold, snowy, rainy, cloudy, stormy, sun, light, shadow

Knowledge

- the daily weather may include changes in temperature, wind, cloud, and precipitation
- weather patterns change predictably according to the seasons
- weather and seasonal changes affect plants and animals
- the cycle of day and night occurs predictably according to the seasons
- changes in the length of day and night occur predictably according to the seasons
- daily and seasonal changes affect human activities
- Aboriginal peoples in BC have a variety of seasonal activities

Skills and Attitudes

- observe and record daily and seasonal changes
- record observations and results of investigations using graphs, pictures, symbols, and words
- use classroom materials responsibly and safely

Grade 1 Earth and Space Science: Daily and Seasonal Changes

Prescribed Learning Outcomes

It is expected that students will:

- describe changes that occur in daily and seasonal cycles and their effects on living things

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:

- describe the effects of weather on living things (e.g., migration of birds, leisure activities)
- accurately sort pictures or objects that pertain to daily and seasonal changes (e.g., new plant growth, snow melting, leaves falling, bears hibernating)
- illustrate and record changes that occur throughout the seasons (e.g., flowers blooming, snow melting, leaves falling, lakes freezing)
- with teacher support, identify daily weather conditions and seasonal patterns (e.g., how people or animals prepare for weather conditions)

Planning for Assessment

- Keep a class chart to track the weather for a period of time. Each student is responsible for predicting and recording the weather for a specific period. Emphasis is on conditions that can be observed (e.g., cloud cover, precipitation, temperature). Ask the class to agree on a standard set of symbols for recording the weather information.
- Discuss how weather and seasonal changes affect humans. Ask students to consider foods eaten, feelings, leisure activities, outdoor/indoor activity, health, (e.g., colds, flu, sunburn, hay fever, insect bites), clothing holidays, and feasts.

Suggested Assessment Activities

- After students have recorded the weather on the class chart, ask each student to present his or her “weather report” to the class. Assess each student’s ability to
 - observe weather conditions, cloud cover, precipitation, and temperature
 - use appropriate vocabulary.
- To determine if students can describe how weather affects them, ask them to describe how they would prepare or dress for a specific weather condition. Assess the description based on whether it is realistic and complete for that weather condition.

- Through leaf collecting, picture collages, and word splashes, have students explore characteristics of seasonal changes and day time/night time.
- Make two large charts on sturdy tag board to use throughout the year as instructional tools and assessment organizer models, one for Seasonal divided into four quadrants, and one for Daily divided in half.

- In partners, have students sort and paste pictures/ words into a graphic organizer. Note the extent to which students were able to distinguish day and night, and seasonal features.

continued next page

Daily and Seasonal Changes (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> Choose one local deciduous tree to observe throughout the year. Take photos and make a pictorial record of the tree in each season. 	<ul style="list-style-type: none"> Give students a graphic of a circle divided into four quadrants, and have them draw to represent their understanding (e.g., “In Spring, my tree...”). <p>Look for evidence that students have placed the seasons in the correct quadrant and that they have included seasonal characteristics in their drawings.</p>
<ul style="list-style-type: none"> In small groups, have students create seasonal murals or dioramas using pictures, words, and objects from a prepared tub. 	<ul style="list-style-type: none"> When students have created their representations, work together to establish criteria for assessing their work, such as: seasonal murals/dioramas show <ul style="list-style-type: none"> possible weather conditions appropriate clothing recreation activity phases of plant growth animal activity.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> Discovery Works Modules for B.C. Grade 1 (Weather and Seasons) Earth Watch (Pan Canadian Science Place) Everyday Life Glide Into Winter with Math and Science (AIMS Activities) Hands-on Science (Daily and Seasonal Changes) Project WET Seasons Spring Into Math and Science (AIMS Activities) 	

Grade 1 Earth and Space Science: Daily and Seasonal Changes

Prescribed Learning Outcomes

It is expected that students will:

- describe activities of Aboriginal peoples in BC in each seasonal cycle

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for the prescribed learning outcome above. Students who have fully met the prescribed learning outcome are able to:

- give several examples that show how activities of Aboriginal peoples differ according to seasonal cycles and regions (e.g., differences between activities in the Interior/coast; north/south)
- prepare a detailed list of local Aboriginal activities in the
 - fall (e.g., berry picking, freezing, and drying; equipment readied for hunting season; firewood stacked)
 - winter (e.g., sports activities, feasts, potlatches)
 - spring (e.g., planting)
 - summer (e.g., picnics, baking bannock, preparing fishing nets)

Planning for Assessment

- Using books and videos research some seasonal activities undertaken by Aboriginal peoples in different regions of the province. As a class project, have students draw or collect pictures showing these activities and place them on a seasonal provincial map.

Alternatively, sign up for the Abnet list serve to contact Aboriginal people from different regions for information about activities in their areas. Abnet is a forum for open discussion for individuals and groups involved in Aboriginal education in British Columbia.

- Invite an Aboriginal Elder to the class to provide information on local Aboriginal activities during different seasons. Have students prepare relevant questions to ask of the speaker. Contact the district Aboriginal Education coordinator or resource teacher for assistance in drawing on the local Aboriginal community.

Suggested Assessment Activities

- Consider the extent to which students
 - show curiosity about different activities that Aboriginal peoples do in each season
 - can associate an Aboriginal activity with the season in which it takes place.
- Ask students to fill in the spaces of a pre-prepared calendar incorporating information about the seasonal activities of the local First Nation community. Assess students' ability to correctly link the activities and their seasons.

- Discuss with students the expectations for respecting guest speakers, active listening, and asking questions.
- Student questions should
 - show respect for Aboriginal peoples and the environment
 - focus on four seasons
 - elicit new information
 - make connections between the season and the nature of the activity.

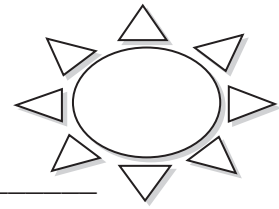
Recommended Learning Resources

- Earth Watch (Pan Canadian Science Place)
- Shared Learnings: Integrating BC Aboriginal Content K-10

NEEDS OF LIVING THINGS

1 - not yet within expectations	2 - meets expectations	3 - fully meets expectations	4 - exceeds expectations
limited understanding of the needs of living things	basic understanding of the needs of living things	good understanding of the needs of living things	solid understanding of the needs of living things
one basic need identified	two basic needs identified	three basic needs identified	four basic needs (food, water, air and shelter) identified
explanation unclear or incomplete	explanation may or may not be clear	clear explanation with consistent examples	clear and complete explanation
confusion with non-living	clear distinction between living and non-living	clear distinction between living and non-living	clear distinction between living and non-living



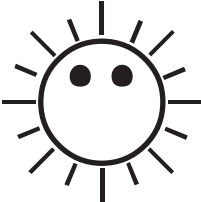

HOW WE WORKED TOGETHER

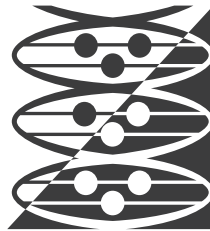


My name is: _____ The date is: _____

Other group members: _____

Our task was: _____

GROUP MEMBERS:	 Not Yet (not yet within expectations)	 Sometimes (meets expectations)	 Yes (fully meets expectations)	 Always (exceeds expectations)
Everyone participated				
We listened to each other				
We encouraged each other (Yeah... Great... I like that idea....)				
We took turns sharing ideas				
The group stayed together				
We accomplished our task				



CLASSROOM ASSESSMENT MODEL

Grade 2

ASSESSMENT OVERVIEW TABLE FOR: GRADE 2

The purpose of this table is to provide teachers with suggestions and guidelines for classroom-based formative and summative assessment and grading of Science K to 7.

Curriculum Organizers	Suggested Timeframe	Suggested Assessment Activities	Suggested Weight for Grading	Number of Outcomes	Number of Outcomes by Cognitive Level *		
					K	U & A	HMP
	Average # of hours						
PROCESSES OF SCIENCE	Integrated	Integrated	Integrated	2	1	1	1
LIFE SCIENCE	25-30	<ul style="list-style-type: none"> • diagram • science log • mind map • mural 	33 $\frac{1}{3}$ %	4	2		
PHYSICAL SCIENCE	25-30	<ul style="list-style-type: none"> • science log • drawing • oral summary 	33 $\frac{1}{3}$ %	3	1		2
EARTH AND SPACE SCIENCE	25-30	<ul style="list-style-type: none"> • work sheet • role play • diagram • drawing • self evaluation 	33 $\frac{1}{3}$ %	3	1	1	1
TOTALS	75-90		100 %	12	4	4	4

* The following abbreviations are used to represent the three cognitive levels: K = Knowledge; U & A = Understanding and Application; HMP = Higher Mental Processes

GRADE 2: PROCESSES OF SCIENCE**Key Elements: Processes of Science**

Estimated Time: integrate with other curriculum organizers

Interpreting Observations

After using the senses directly and indirectly to gather information, students look for ways to exchange meaningful summaries of the collected experiences they are learning to call 'scientific observations'. This involves explaining the significance of their observations and drawing general conclusions about interconnections (e.g., small animals eat small seeds). Explaining the importance of these interactions requires students to describe the observed changes according to actions, patterns, and relationships. Students at a skilful level analyse results by looking for a pattern or making associations about events of which they have previously learned. Many of these interpreting skills include: searching for patterns, thinking, forecasting actions, estimating, finding relations, sorting objects, identifying similarities and differences and summarizing facts.

Making Inferences

Along with learning to make observations and examine "facts," students are learning to make inferences (consciously draw informal conclusions about something they have not yet seen, on the basis of previous experience, familiar-looking evidence, and reasoning). To do this well, it helps if students learn the differences between predicting, guessing, and restating facts. With prompting, students can begin to provide reasons or evidence to support their guesses or predictions. As well, students develop their ability to make inferences if they are encouraged to draw informal conclusions based on good observations and previous experience.

Grade 2 Processes of Science

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • use their senses to interpret observations 	<ul style="list-style-type: none"> <input type="checkbox"/> observe, record, and make sensory comparisons <input type="checkbox"/> provide comprehensive explanations based on observations made or facts learned (e.g., “The best shape for a boat is...”) <input type="checkbox"/> draw specific conclusions based on observations (e.g., water is being wasted—protect our water)
<ul style="list-style-type: none"> • infer the probable outcome of an event or behaviour based on observations 	<ul style="list-style-type: none"> <input type="checkbox"/> with teacher support, observe and accurately record a specific process (e.g., a plant developing from a seed) <input type="checkbox"/> predict several likely recurrences not yet observed in other, similar situations (e.g., after seeing how a plant develops from a seed, recognize that the same type of development can be expected from other, different plant seeds)

GRADE 2 LIFE SCIENCE: ANIMAL GROWTH AND CHANGES

Key Elements: Life Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have understood animal life cycles and why animals are important to other living things.

Animal Growth and Changes

The study of animal life cycles and interactions begins with a focus on animal growth and change. Through a study of animals in a variety of environments and seasons, students describe characteristics, behaviours, needs, and life cycles. Students begin to understand the interactions of animals with each other, the environment, and humans.

Vocabulary

young, adult, life cycle, behaviour, appearance, food, predator, prey, enemies, environment, male, female, characteristics, insect, bird, mammal, reptile, amphibian, fish, hibernate, migrate

Knowledge

- different kinds of animals have different life cycles (e.g., bird, insect, mammal)
- animals' characteristics (e.g., skin covering) help them adapt to the conditions in their environment
- animals have behaviours such as hibernation and migration
- animals' behaviours help them adapt to seasonal conditions in their environment
- animals are important in the lives of Aboriginal peoples

Skills and Attitudes

- observe and record the life cycles of a variety of animals
- predict and infer the stages in the life cycles of related animals
- make inferences about an animal's environment from its characteristics
- use facts and observations to draw conclusions about animal populations

Grade 2 Life Science: Animal Growth and Changes

Prescribed Learning Outcomes

It is expected that students will:

- classify familiar animals according to similarities and differences in appearance, behaviour, and life cycles

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- describe and illustrate in detail the appearance and behaviour of familiar animals
- identify and compare similarities and differences between animals
- compare and illustrate different types of animal life cycles

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Give students a set of pictures of familiar animals and have them classify using student-generated criteria (e.g., colour, size, special features, food choices, habitat movement.). 	<ul style="list-style-type: none"> • Consider the extent to which students <ul style="list-style-type: none"> - classify on the basis of similarities and differences - take account of previous knowledge as well as what they observe from the picture - classify consistently, using a coherent classification scheme - justify their classification choices.
<ul style="list-style-type: none"> • Give students a set of pictures, including mammals, birds, reptiles, amphibians, fish, and insects. Ask them to sort the pictures into categories. 	<ul style="list-style-type: none"> • In teams, have students develop countdown clues that will demonstrate their learning of animal appearance, behaviour and life cycles <ul style="list-style-type: none"> - I am brown. - I live in the forest. - I eat _____. - I am a mammal. - I am a _____.
<ul style="list-style-type: none"> • Show students how to draw and label a life cycle diagram (e.g., a butterfly), using science books, videos, and other resources. Have students work in partners to choose an animal and create a diagram of that animal's lifecycle in a poster or in their science journals. 	<ul style="list-style-type: none"> • Ask students to post their life cycle diagrams around the room and visit each diagram (gallery walk), selecting two cycles to compare. Student comparisons should identify two ways they are alike, and two ways they are different. • Students can assess their own diagrams as follows <ul style="list-style-type: none"> - My diagram is neat. - My diagram is properly labelled, using science words. - It shows all the stages of my animal's life cycle.

continued next page

Animal Growth and Changes (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students observe and record daily the changes of a mealworm, ant, frog, or butterfly lifecycle. 	<ul style="list-style-type: none"> • Students keep a science log about key concepts learned and new questions or thoughts. The log should support students' assessment of their learning by allowing them to reflect on their science activities. Ask students to describe and record events, observations, quotations, and/or diagrams from science activities and to reflect on these. Students could be prompted to think about an activity and comment on their learning by considering: <ul style="list-style-type: none"> - What do I still wonder about? - How is this related to what I already know? - What did I learn this week that I would like to know more about?
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Animals Grow • Below Zero • Birds and Animals You Might See • Chickens Aren't The Only Ones • Critters • Cycle of Life/Recycle Handbook for Educators • Desert Giant – The World of the Saguaro Cactus • Everyday Life • Exploring the Animal Kingdom • Forests in Focus • Hands-on Science (Growth and Changes in Animals) • The Lives of Ants & Bees for Students Series (Ant Bodies, Ant homes & Communities, Bees & Plants) • The Marsh: Nature's Nursery • Meeting Baby Animals • Moths and How They Live • Nature Babies Series • Once Upon a Seashore • Salish Sea • Salmonids in the Classroom • Science & Technology 2 (All About Animals) • Smart-Bear Adventures, Volume 1 	

Grade 2 Life Science: Animal Growth and Changes

Prescribed Learning Outcomes

It is expected that students will:

- describe some changes that affect animals (e.g., hibernation, migration, decline in population)

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- accurately list a group of animals that hibernate, migrate, or change coat to respond to the conditions encountered in the different seasons
- identify the effects of a decline in a specific animal population (e.g., species extinction)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • As a class, brainstorm names of local animals (e.g., bear, salmon, robin, weasel) that hibernate, migrate, and/or change coat (colour, thickness). 	<ul style="list-style-type: none"> • Have students work in cooperative groups, using the library or classroom resources to fill in a chart with labelled columns, “hibernate,” “migrate,” “change coat.” Then ask students to share their findings. In addition to the evaluation of the findings, the criteria for group assessment could include <ul style="list-style-type: none"> - We worked well as a team. - We listened to one another and shared the project tasks. - We were able to share our findings and are proud of our work.
<ul style="list-style-type: none"> • Ask students to investigate to find what animals (e.g., frog marmot, bear, squirrel, snake) do to prepare for hibernation (e.g., store food, seek protection), the time they spend hibernating, and the changes they experience while in hibernation. Then have students write reports that detail their findings and share with the class. 	<ul style="list-style-type: none"> • Students create a mural that represents an ecological community, showing the group of animals that live, hibernate, and/or migrate there. Students should be able to explain why they chose particular plants and animals, and how these animals are able to live there throughout the year.
<ul style="list-style-type: none"> • Use a video or ask a local expert to share information related to the decline of a local animal population. Encourage students to ask appropriate questions and participate in a discussion of the reasons for the decline and its effects. 	<ul style="list-style-type: none"> • Student journal entries on the presentation/discussion should include <ul style="list-style-type: none"> - What I have learned. - What do I still wonder about? - What do I think should /could happen? See also the sample assessment tool (My Science Journal) provided at the end of this grade.

continued next page

*Animal Growth and Changes (continued)***Recommended Learning Resources**

- Animals Grow
- Below Zero
- Cycle of Life/Recycle Handbook for Educators
- Everyday Life
- Exploring the Animal Kingdom
- Forests in Focus
- Hands-on Science (Growth and Changes in Animals)
- Kokanee of British Columbia
- The Marsh: Nature's Nursery
- Meeting Baby Animals
- Moths and How They Live
- Nature Babies Series
- Once Upon a Seashore
- Salish Sea
- Salmonids in the Classroom
- Science & Technology 2 (All About Animals)
- Smart-Bear Adventures, Volume 1

Grade 2 Life Science: Animal Growth and Changes

Prescribed Learning Outcomes

It is expected that students will:

- describe how animals are important in the lives of Aboriginal peoples in BC

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- identify from historical sources how animals were part of the lives of Aboriginal peoples (e.g., bear: fur for warmth during the winter; grease for cooking and personal care; bones for tools)
- illustrate in detail how animals help to meet the needs of local Aboriginal peoples (e.g., seal oil and meat on the West Coast; eagle feathers in ceremonies)

Planning for Assessment

Suggested Assessment Activities

- Using historical sources, artefacts, and legends have students work in partners to create a mind map of pictures and/or words that shows how animals were part of the lives of Aboriginal peoples (e.g., bear: fur for warmth during the winter; grease for cooking and personal care; bones for tools).

- Assess student mind maps, looking for evidence that students
 - described the relationship between animals and Aboriginal peoples
 - identified a variety of animals
 - provided explanations of the importance of the animals cited
 - showed how all parts of the animal were used.

- Invite a local First Nations person to talk about how animals are important to Aboriginal people today. Have students generate questions to ask the speaker in advance of the visit. Contact the district Aboriginal Education coordinator or resource teacher for assistance in drawing on the local Aboriginal community.

- Look for evidence that student questions
 - show sensitivity to Aboriginal peoples
 - are relevant and appropriate.
 Student questions could include
 - Why is the moose an important animal for Aboriginal peoples?
 - What other animals do you use in your area for food or other cultural activities?
 - What other animals do you use in Aboriginal celebrations?
 - What other uses are there for animals other than food and clothing?
 - Do you know of any animal stories that tell about Aboriginal customs as they relate to animals (e.g., “Raven that brought Light”)?

Recommended Learning Resources

- Animals Grow
- Cycle of Life/Recycle Handbook for Educators
- Once Upon a Seashore
- Salish Sea
- Salmonids in the Classroom

Grade 2 Life Science: Animal Growth and Changes

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • describe ways in which animals are important to other living things and the environment 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> make a comprehensive food web of items that can be obtained from a particular animal (e.g., leather, meat, milk) <input type="checkbox"/> identify things that are essential for the survival of an animal (e.g., water, food, and shelter) <input type="checkbox"/> with teacher support, illustrate ways in which animals contribute to the environment (e.g., interdependence of food chains; nutrients for soil) 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Make a list of things in the classroom and at home that can be obtained from animals (e.g., leather, wool, meat, milk, feathers). Have students work in teams to create a food web for a particular animal (e.g., chicken, cow) and show that they understand what food products can be obtained from their animal. 	<ul style="list-style-type: none"> • Assessment should indicate the extent to which student webs are in a proper sequence and that students recognize <ul style="list-style-type: none"> - that organisms living in a habitat compete with each other for food resources - the importance of plants as the food source at the start of all food chains - that arrows in a food web or food chain show the direction of energy flow.
<ul style="list-style-type: none"> • Collect information in picture form to indicate how some animals satisfy their basic needs of food, water, shelter, and protection. Ask students to create dioramas to present this information. 	<ul style="list-style-type: none"> • Student dioramas should show that their animal can meet its basic needs (e.g., food, water, shelter) in this environment, and can explain how their animal is important to other living things.

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Animal Growth and Changes (continued)

Recommended Learning Resources

- Animals Grow
- Below Zero
- Critters
- Cycle of Life/Recycle Handbook for Educators
- Everyday Life
- Exploring the Animal Kingdom
- Forests in Focus
- Hands-on Science (Growth and Changes in Animals)
- Kokanee of British Columbia
- The Lives of Ants & Bees for Students Series (Ant Bodies)
- The Marsh: Nature's Nursery
- Meeting Baby Animals
- Moths and How They Live
- Nature Babies Series
- Once Upon a Seashore
- Salish Sea
- Salmonids in the Classroom
- Science & Technology 2 (All About Animals)
- Smart-Bear Adventures, Volume 1

GRADE 2 PHYSICAL SCIENCE: PROPERTIES OF MATTER

Key Elements: Physical Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have recognized states of matter and investigated how liquids and solids interact.

Properties of Matter

The study of properties of matter begins with an exploration of common objects. Students discover the similarities and differences in the properties of materials and, through a series of activities and experiments, determine the three states of matter: solid, liquid, and gas. Further investigations explore how matter can be changed through mixing, dissolving, heating, cooling, or freezing.

Vocabulary

solid, liquid, gas, vapour, dissolve, float, sink, temperature, freeze, melt, evaporate, condense, boil, heat, cool, pressure

Knowledge

- water is the only substance that exists naturally on Earth in three states, which change from one to another depending on heat loss or gain
- changes of state are reversible
- solids stay the same shape, are visible, and can be felt (are usually hard)
- liquids flow and form shapes (i.e., take the shape of their container and can be poured), can be visible or invisible, and can usually be felt
- gases expand or contract to change shape, and are generally invisible, but can be felt when they are moving and pushing
- solids, liquids, and gases all have mass
- the volume of liquids does not change with the shape of the container
- solids can sink or float in liquids depending on density and shape
- liquids can float on top of other liquids
- gases “float” on top of liquids (bubbles rise) because they are less dense or “lighter”
- all gases are less dense than water

Skills and Attitudes

- demonstrate curiosity
- conduct simple experiments safely
- observe and record observations
- draw inferences about the real world from observations, demonstrations, and experiments

Grade 2 Physical Science: Properties of Matter

Prescribed Learning Outcomes

It is expected that students will:

- identify the properties of solids, liquids, and gases

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- observe and accurately list the properties of each state of matter (e.g., solid: stays the same shape, visible, you can feel it; liquid: changes shape, may be visible or invisible; gas: changes shape, generally invisible)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Make a collection of solids and have students examine them using their senses of sight and touch. Use a balance scale to measure the mass of three solids. • Provide a variety of containers filled with water and add a different solid. • Discuss what students have learned in these experiments. 	<ul style="list-style-type: none"> • During these experiences, students should record their observations in their science log. They should also be asked to ‘think aloud’ about <ul style="list-style-type: none"> - What will happen when each solid is added? (Assess if students are able to infer that the addition of each solid takes up more space and will add more mass.) - What will happen if they get into a bathtub that is filled to the top with water? (Assess if they are able to guess that it will overflow.) • Ask the students to list properties of solids, including that they stay the same shape.
<ul style="list-style-type: none"> • Make a collection of safe liquids and have students examine them using the senses of sight and touch (may be visible or invisible). Use a balance scale with an empty container. Add liquids. • Collect a number of one-litre containers and pour a litre of water from one to the next. 	<ul style="list-style-type: none"> • Students should record their observations and think about <ul style="list-style-type: none"> - What happens each time a liquid is added? (Assess if students are able to interpret from the observations that liquids have mass.) - What happens to the liquid’s shape? - What liquid’s property is evident through this experiment? (Students should notice the change of shape.)
<ul style="list-style-type: none"> • Blow up a variety of balloons with an air pump. Attach a filled balloon to one end of a wooden balance stick. Attach the same type of balloon to the other end and a string in the centre to make a simple balance. (Avoid using your mouth to inflate balloons as it will add warm moist air) • Take a deflated balloon and ask the class if it could lift a book. Place the book on the balloon. Inflate the balloon with an air pump. 	<ul style="list-style-type: none"> • Consider the extent to which students observe <ul style="list-style-type: none"> - the differences in shape - identify what is put into the balloons - that what is put into the balloons is invisible - that air takes up more space and has mass. • Ask students: <ul style="list-style-type: none"> - If the balloon lifts the book, what is making the book move? (Students should notice that air inside or outside the balloon exerts pressure.) What pushes the book down when the balloon empties? - What force caused the motion of the book to change by lifting?

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Properties of Matter (continued)

Planning for Assessment	Suggested Assessment Activities
	<ul style="list-style-type: none"> • Throughout the unit, students should maintain a science log that represents their learning. Logs should address the following <ul style="list-style-type: none"> - Two things I learned about solids - One thing I wonder about solids - Two things I learned about liquids - One thing I wonder about liquids - Two things I learned about gases - One thing I wonder about gases • Look for evidence of student understanding of key science concepts <ul style="list-style-type: none"> ➤ solid: stays the same shape, visible, you can feel it, has mass ➤ liquid: changes shape, may be visible or invisible, can be poured, has mass ➤ gas: changes shape, generally invisible, exerts pressure, has mass.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Below Zero • Discovery Works Modules for B.C. Grade 1 (Solids, Liquids, and Gases) • Hands-on Science (Properties of Liquids and Solids) • Matter, Matter Everywhere • Project WET • Science & Technology 2 (In the Kitchen) 	

Grade 2 Physical Science: Properties of Matter

Prescribed Learning Outcomes

It is expected that students will:

- investigate changes to the properties of matter when it is heated or cooled

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- conduct experiments on the properties of water (e.g., freezing, melting, evaporation)
- observe and accurately record changes during experiments
- describe in detail the results of their observations and investigations
- interpret their observations and answer specific questions (e.g., Will cold water freeze faster than hot water?)

Planning for Assessment

Suggested Assessment Activities

- Fill a container to the top with water. Have students recall the properties of water. Freeze the container. Ask, “Can we reverse the change?” Then, test this theory. Ask, “Guess what would happen if we freeze a milk container?” Then, test this theory.
- Heat some water and ask, “Where did the water go? Can we reverse the change?” Then, test this theory.
- Hold a very cold serving spoon over the steam so that students see the condensation.

- In these three experiments, evaluate students’ observations of:
 - the differences (state, colour, volume) between liquid water and frozen ice
 - the change of state and how the pan becomes dry and the steam rises
 - the liquid formation on the spoon.

- Have students place an ice cube in each of the following: polystyrene cup, paper cup, tin can, glass beaker, and plastic cup. Then have them place each container in hot tap water. Ask students to predict, observe, and record which ice cube melts first, second, third, and fourth. Ask students to record results in their journals.
- In pairs or small groups, have students design and present an experiment that answers the question: What are the conditions that cause a change in matter? Ask students to record results in their journals.

- Assess students’ science journals to ensure that they have recorded the properties of water, using scientific language and demonstrating understanding of the concepts. Look for evidence that students
 - used words such as matter, solid, liquid, gases, heat, and temperature to communicate understanding
 - followed clear procedures
 - designed an experiment that investigated a number of possible answers
 - developed answers based on observations from their experiments
 - used a variety of equipment safely.
 See also the sample scoring guide (**My Science Journal**) provided at the end of this grade.

Recommended Learning Resources

- Below Zero
- Discovery Works Modules for B.C. Grade 1 (Solids, Liquids, and Gases)
- Hands-on Science (Properties of Liquids and Solids)
- Matter, Matter Everywhere
- Project WET
- Science & Technology 2 (In the Kitchen)

Grade 2 Physical Science: Properties of Matter

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> investigate the interactions of liquids and solids 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> conduct experiments on the interactions of liquids and solids (e.g., sink, float, or dissolve) <input type="checkbox"/> observe and accurately record changes during experiments <input type="checkbox"/> describe in detail the results of their observations and investigations <input type="checkbox"/> interpret their observations and answer specific questions (e.g., Will solids sink, float, or dissolve in a liquid?) 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> Have students predict, observe, and explain the changes that occur when water is added to materials such as salt, rice, vegetable oil, soap powder, paper, sugar, or coins. Record explanations of which items dissolve in a liquid. 	<ul style="list-style-type: none"> Present students with the following problem: What do you think will happen when we put this powdered sugar drink into this water? Have students write a prediction in their science logs; then conduct the experiment. Look for evidence that students can make inferences. Then, have students observe and record results. Information on criteria for assessing journals (science logs) can be found in the Non-fiction Writing Performance Standards document.
<ul style="list-style-type: none"> Have students predict, observe, and explain changes that occur when items such as tinfoil, paper towel, toilet paper, sponge cloth, and modelling clay are placed in a container that has a measured amount of water. Identify and record which items absorb the most liquid. 	<ul style="list-style-type: none"> Present students with the problem of cleaning up a juice spill. Have them write in their science logs a prediction of which material would best absorb the spill. Look for student ability to infer, and assess log entries using criteria previously generated.
<ul style="list-style-type: none"> During student experiments testing whether different solids will float on water, have them focus on size, composition, shape, and density of the solids. 	<ul style="list-style-type: none"> Ask students to answer the following question: What did you notice about the things that floated and the things that sank? Students can rate their understanding by responding to the following statements <ul style="list-style-type: none"> - I used words and picture to tell about the things I learned. - I understood some important science ideas such as _____.

continued next page

Properties of Matter (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students test several containers for their cargo carrying capacity. Using a KWL strategy, ask students to summarize what they now know about characteristics necessary to create greater buoyancy. Ask students what they wonder makes a boat float and able to carry heavy loads. 	<ul style="list-style-type: none"> • Give students a lump of modelling clay and have them build a boat that can carry cargo. Have them test their boat using marbles, washers, etc., and record results (in writing or by drawing). Based on results, ask students to modify their designs to increase carrying capacity. After each test, have students draw the results, and write a summary of what they learned about floating and carrying capacity. <p>Look for the development of students' ability to interpret observations and make inferences. Student journals should include drawings, results, and rate their understanding. ("I told what I learned clearly in words and pictures.") See also the scoring guide (My Science Journal) provided at the end of this grade.</p>
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Below Zero • Hands-on Science (Properties of Liquids and Solids) • Matter, Matter Everywhere • Project WET • Science & Technology 2 (In the Kitchen) 	

GRADE 2 EARTH AND SPACE SCIENCE: AIR, WATER, AND SOIL**Key Elements: Earth and Space Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have described the interactions of air, water, and soil, and their importance for living things.

Air, Water, and Soil

This study focuses on the properties of air, water, and soil. Students investigate and describe characteristics of air and water in their daily lives, and learn about the water cycle and processes of evaporation and condensation. By examining soil in a variety of locations, students describe its components and uses. Students also learn that air, water, and soil are important to living things.

Vocabulary

evaporation, condensation, precipitation, dry, wet, clay, sand, evaporate, condense, freeze, rain, snow, air, water, soil, conservation, pollution, float, glide, wind, water cycle

Knowledge

- soils are composed of small particles of rock (sand and clay) and humus
- soils contain nutrients necessary for plants to grow
- soils have differing capacity to hold water depending on composition
- soil can be moved (eroded) by the action of wind, liquid water, and ice
- water cycles through precipitation, evaporation, and condensation
- the rate of evaporation of water from soils is determined by factors such as temperature, surface area, and wind speed
- evaporated water is a gas that becomes part of the air
- the evaporated water carried in air condenses into liquid water when the air is cooled
- air has mass and can push on things when it moves
- living things depend on water, air, and soil (either directly or indirectly)

Skills and Attitudes

- use magnifying devices
- compare the characteristics of soil samples
- record and interpret the results of investigations
- explain the events in the water cycle in order
- infer the effects of erosion, drought, and flood on living things
- recognize the value of conserving clean air and water and healthy soil

Grade 2 Earth and Space Science: Air, Water, and Soil

Prescribed Learning Outcomes

It is expected that students will:

- describe physical properties of air, water, and soil

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- list the properties of air (e.g., expands or contracts; generally invisible) and water (e.g., changes state; shaped by container)
- identify the main components of soil (e.g., sand, rocks, clay)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students use balloons, fans, paper airplanes, pin wheels, and parachutes to investigate properties of air. Ask students to draw the objects' motion in the air. 	<ul style="list-style-type: none"> • Verify that <ul style="list-style-type: none"> - students have followed instructions during activities - drawings have been labelled and motion words have been used.
<ul style="list-style-type: none"> • Ask students to explain what air is. Using their senses, have them list physical characteristics and explain, in simple words, why air is important for humans and living things. Ask students to explain how it behaves. 	<ul style="list-style-type: none"> • Have students write a short poem. Poems should include <ul style="list-style-type: none"> - words related to the senses - unit vocabulary - the importance of air for life.
<ul style="list-style-type: none"> • After a rainstorm, take students outside to observe a puddle, or pour water on the sidewalk or tarmac to create a puddle. Working in pairs, have students list everything they observe about the water in the puddle when they move objects in and out of it, walk in it, etc. Back in class, record student observations on chart paper—how water moves (e.g., ripples, waves) or what happens when objects are placed in the water (e.g., float sink). 	<ul style="list-style-type: none"> • Have students fill in a worksheet on the properties of water (e.g., identifying three things water does). Verify that students <ul style="list-style-type: none"> - included properties discussed in class - explained these properties using their own words.
<ul style="list-style-type: none"> • Explore ways air and water are used in technology (e.g., air bags, dams, windmills, water wheels). 	<ul style="list-style-type: none"> • At an activity centre, provide students with materials and a challenge to construct a device to show how air or water can do work for us (water wheel, windmill). Look for answers such as "Wind can <ul style="list-style-type: none"> - cool us down - blow things away - damage property - dry clothes - fly kites."

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Air, Water and Sea (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Provide samples of soil components (clay, sand, humus). Have students use their senses to describe each sample, and use a magnifying glass to observe particle size. 	<ul style="list-style-type: none"> • Provide a recording sheet divided into three types of soil. Have students describe what it looks and feels like. Consider the extent to which students have <ul style="list-style-type: none"> - organized information in the correct columns - used all senses to describe the soil types - used descriptive words that correspond to the soil types observed.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Air and Water • Everyday Life • Hands-on Science (Soils in the Environment) • Project WET • Seashore Surprises • Sharing a Small World: Environmental Activities for Young Learners 	

Grade 2 Earth and Space Science: Air, Water, and Soil

Prescribed Learning Outcomes

It is expected that students will:

- distinguish ways in which air, water, and soil interact

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- illustrate and accurately label the parts of the water cycle
- define and describe the processes of evaporation, condensation, and erosion

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • In small groups, have the students act out each phase of the water cycle, using their body, movement and sound. Then, ask students to diagram and label a picture to represent the water cycle. 	<ul style="list-style-type: none"> • Assess student contributions to the role play, looking for evidence that <ul style="list-style-type: none"> - all phases were demonstrated - students participated willingly - movement and sounds were appropriate. • Use the following checklist to assess the diagram <ul style="list-style-type: none"> - uses appropriate science vocabulary (evaporation, condensation, precipitation, ground water) - is labelled correctly - includes extra details – clouds, plants, glaciers.
<ul style="list-style-type: none"> • Place a mirror in the freezer section of the refrigerator for five to ten minutes. Remove the mirror from the freezer and breathe on it. Ask students what forms on it. 	<ul style="list-style-type: none"> • Assess students’ ability to observe and infer by <ul style="list-style-type: none"> - having them do a before/after illustration - asking them to compare what they found on the mirror to what they see on windows in a cold car/house - seeing how they use their senses to describe what they have seen.
<ul style="list-style-type: none"> • Provide students with materials containing moisture (e.g., wet paper towels, potato). Ask them to determine factors that affect drying rates (e.g., temperature, surface area, wind). 	<ul style="list-style-type: none"> • Note evidence of their ability to predict and test. Have students record their understandings about evaporation using a concept map.
<ul style="list-style-type: none"> • Have students compare three different types of soil (sand, clay, and humus). First they observe the soil types and feel their texture. Then, they put about 50ml of each type in a piece of cotton cloth, which they dip into water. They carefully remove them from the water and let them drip over a cup until not water is left. Ask them to observe which type of soil lets water drip the fastest and record the information. They then open the cloth pieces to feel the difference in texture of the soil when damp. 	<ul style="list-style-type: none"> • Assess students’ ability to: <ul style="list-style-type: none"> - work together - focus on the task - follow the procedures - dispose of used materials and tidy up.

continued next page

Air, Water and Sea (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> Gather three types of soil (rocky, humus, sandy). Place a measured amount of soil on a paper in front of a fan with a cardboard barrier behind, and have students measure the amount of soil that remains after the fan blows for a given amount of time. 	<ul style="list-style-type: none"> Suggest to students a scenario whereby there is a piece of land in a windy area. Have students infer which type of soil would best resist wind erosion, based on previous learning. Look for evidence that student responses are based on observations from the experiment (e.g., the wind doesn't move the rocks; the wind blows away the sandy soil).
<ul style="list-style-type: none"> Review the properties of air, water, and soil. 	<ul style="list-style-type: none"> Have students create Venn diagrams to illustrate similarities/differences in properties of air and water. Students must indicate that <ul style="list-style-type: none"> the three are necessary for life they are found everywhere on Earth they can be found in various forms.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> Everyday Life Hands-on Science (Soils in the Environment) Project WET Seashore Surprises Sharing a Small World: Environmental Activities for Young Learners 	

Grade 2 Earth and Space Science: Air, Water, and Soil

Prescribed Learning Outcomes

It is expected that students will:

- explain why air, water, and soil are important for living things

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- with teacher support, create a micro environmental system, infer possible consequences of changes in that ecosystem
- describe in detail how living things depend on air, water, and/or soil

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Collect forest soil (or other living soil). Put in a funnel in a glass jar, and leave exposed to a light bulb (≈100 watt) about 2.5 cm above the soil for several hours to dry the soil. 	<ul style="list-style-type: none"> • Consider the extent to which students can <ul style="list-style-type: none"> - predict what may happen to living things in soil - answer questions (e.g., Why are earthworms only found in certain places? What types of relationships may exist between small animals and living soil and plants growing?). • Evaluate students according to their ability to <ul style="list-style-type: none"> - extend observations to larger contexts (earthworms in nature) - link plants and animals.
<ul style="list-style-type: none"> • Ask students what would happen to an ecosystem if it did not rain for a long period of time. Discuss other possible scenarios (a flood, housing development, logging). Discuss what would happen to bigger living things in the same situations. 	<ul style="list-style-type: none"> • Have students draw a before/after picture of the results of large changes in an ecosystem. Ensure that students understand what an ecosystem is, what can happen in an ecosystem, especially from human involvement.
<ul style="list-style-type: none"> • Observe a goldfish in a glass bowl. Discuss whether or not the fish breathes. Introduce the concept of gills and help students understand that fish need air to live. 	<ul style="list-style-type: none"> • Ask students to draw a fish and its identifying parts, including gills. Verify students' understanding by having them complete sentences, such as <ul style="list-style-type: none"> - Fish need water to _____. - Fish collect air from water with their _____ to _____.
<ul style="list-style-type: none"> • Take the class into the schoolyard, and have them list on one side of a page all the living things they can see. On the other side, they should identify what each needs (e.g., air, water, soil). Help them by naming other living things that need the same things to survive (e.g., whale, seaweed, salamander, dragonfly, earthworm). 	<ul style="list-style-type: none"> • Observe students' ability to <ul style="list-style-type: none"> - work cooperatively - negotiate with others to justify their decisions - identify the needs of animals.

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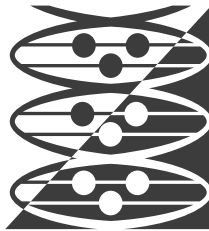
Air, Water, and Soil (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students put seeds in cotton balls in different dishes labelled 1 to 3. Using a droplet, have students add 5 drops of water to the 1st dish, 10 drops to the 2nd, and 20 drops to the 3rd. Have them add the same amount of water twice a day for a few days. 	<ul style="list-style-type: none"> • Ask students to record how many days it takes in each dish to germinate the seeds, and graph the results. Assess student ability to <ul style="list-style-type: none"> - organize work - graph precisely and reliably - reflect on the events observed.
<ul style="list-style-type: none"> • Have students compile an inventory of ways in which they use water. Challenge them to identify and present ways to reduce water usage. 	<ul style="list-style-type: none"> • Criteria for assessing student work could include <ul style="list-style-type: none"> - number of examples of misuses of water - relevance of solutions suggested - integration of facts learned in the unit.
<ul style="list-style-type: none"> • Investigate the issue of littering and develop an action plan on littering.. Have students brainstorm answers to questions such as <ul style="list-style-type: none"> - What happens when we litter? - What if it doesn't get picked up? - Is it easier to not litter or to pick it up afterward? 	<ul style="list-style-type: none"> • Ask students to complete a self-evaluation sheet on <ul style="list-style-type: none"> - my participation in the project - my cooperation with others - my helpfulness in running the project - my commitment to stopping littering.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Everyday Life • Hands-on Science (Soils in the Environment) • Project WET • Seashore Surprises • Sharing a Small World: Environmental Activities for Young Learners 	

MY SCIENCE JOURNAL

Name: _____ Date: _____

1. Still needs work (not yet within expectations)	2. Getting there (meets expectations)	3. A good scientist's journal (fully meets expectations)	4. Extra scientific thinking (exceeds expectations)
often forgets title and dates	usually uses titles and dates	frequently uses titles and dates; organization is clear	always uses titles and dates; organization is clear; adds science content
science writing and drawings are hard to read and understand	science writing and drawings can be read but are still unclear	science writing and drawings are clear and easy to read	science writing and drawings are clear and easy to read; adds labels to diagrams
needs lots of help to show what I have learned	needs some help to show my learning	can show details of my learning with a little help	can show details of my science thinking and learning on my own
not really sure how to reflect on my learning	can include some reflection on my learning (I know...I wonder...I can)	usually reflects on my learning (I know...I wonder...I can)	reflection on my learning includes details and thoughtful questions



CLASSROOM ASSESSMENT MODEL

Grade 3

ASSESSMENT OVERVIEW TABLE FOR: GRADE 3

The purpose of this table is to provide teachers with suggestions and guidelines for classroom-based formative and summative assessment and grading of Science K to 7.

Curriculum Organizers	Suggested Timeframe	Suggested Assessment Activities	Suggested Weight for Grading	Number of Outcomes	Number of Outcomes by Cognitive Level *		
					K	U & A	HMP
	Average # of hours						
PROCESSES OF SCIENCE	Integrated	Integrated	Integrated	2	1	1	1
LIFE SCIENCE	25-30	<ul style="list-style-type: none"> • group presentation • science journal • written report • demo • oral summary 	33 1/3 %	3	1	2	
PHYSICAL SCIENCE	25-30	<ul style="list-style-type: none"> • science journal • drawing • quiz • model 	33 1/3 %	3	1	1	1
EARTH AND SPACE SCIENCE	25-30	<ul style="list-style-type: none"> • written report • science journal • presentation • demo • chart • letter 	33 1/3 %	3	2	1	
TOTALS	75-90		100 %	11	4	5	2

* The following abbreviations are used to represent the three cognitive levels: K = Knowledge; U & A = Understanding and Application; HMP = Higher Mental Processes

GRADE 3: PROCESSES OF SCIENCE**Key Elements: Processes of Science**

Estimated Time: integrate with other curriculum organizers

Questioning

Raising good questions requires looking at an object or event in thoughtful ways. As they develop and learn new perceptions, students ask a variety of useful and necessary questions (e.g., I wonder... or... What causes...? How does...?). Learning to ask questions is a fundamental scientific skill, as not every question can be tested in science. How students learn to ask good science questions starts with distinguishing between what is certain and can be proven to be true, and what is uncertain and cannot yet be explored. Students begin by identifying simple science-related questions that can be tested, discussed, and answered. Allowing a variety of questions helps guide further observations and suggests explorations for students' curiosity and wonder.

Measuring and Reporting

Simple measurement requires the use of basic tools such as rulers, clocks, beakers, thermometers, and scales. The process of measuring involves comparing something to standard and non-standard units. These units are arranged on a scale that extends from least to most (e.g., coldest-hottest, shortest-tallest, lightest-heaviest). Previous skills of classifying, sorting, interpreting, and recording are used to quantify objects and amounts. When the appropriate forms and units of measure are understood, students can make precise measurements using different tools. In this way, objects can be compared with other objects using the standard units (length, mass, time, temperature, volume, etc.). Reporting what was measured and recorded is a careful science skill requiring precision and exactness. Reporting this type of data is done in many ways, but always done diligently.

Grade 3 Processes of Science

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • ask questions that foster investigations and explorations relevant to the content 	<ul style="list-style-type: none"> <input type="checkbox"/> ask a question specific to the content elements (e.g., “I wonder...?”; “What causes...?”; “What do I need to use to...?”; “How is ____ the same as ____?”) <input type="checkbox"/> ask questions that demonstrate a range of thinking skills (e.g., “What happens if ___?”; “Can you find a way to ___?”; “How is ____ both good and bad for ____ [the environment]?”; “What reason do you have for ____?”)
<ul style="list-style-type: none"> • measure objects and events 	<ul style="list-style-type: none"> <input type="checkbox"/> correctly use standard or non-standard units where appropriate (e.g., hand spans or metre stick) to develop quantitative descriptions <input type="checkbox"/> place objects/observations on appropriate scales (e.g., lightest to heaviest; shortest to longest; weakest to strongest; closest to farthest) <input type="checkbox"/> accurately record observations using charts and diagrams (e.g., Venn diagrams, compare/contrast charts) and standardized formats (e.g., Know, Want-to-Know, Did, Learned) to report results of measurements <input type="checkbox"/> apply appropriate scales for several events (e.g., day, night; seasons)

GRADE 3 LIFE SCIENCE: PLANT GROWTH AND CHANGES**Key Elements: Life Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have understood plant life cycles and why plants are important to other living things.

Plant Growth and Changes

The study of plants focuses on their characteristics, needs, and growth patterns. Through investigation and experimentation with a variety of plants, students determine the needs, structures, and adaptations of plants. Observing, measuring, and recording growth gives students the opportunity to understand the life cycle and different ways that plants can reproduce. Students also investigate plant uses, harvesting methods, and other relationships of plants to other living things.

Vocabulary

food, energy, root, stem, leaf, flower, pollen, seed, fruit, adaptation, life cycle, garden, harvest

Knowledge

- plants can reproduce in different ways (sexually from seed, or asexually from cuttings, bulbs, or tubers)
- the basic parts of plants include roots, stems, and leaves, which are adapted to the conditions in their environment
- plants carry on a variety of life processes
- plants need light, water, air, and nutrients to grow
- plants' characteristics change throughout their life cycle

Skills and Attitudes

- make inferences about a plant's environment from its characteristics
- demonstrate a sense of responsibility and caring for plants and for the environment

Grade 3 Life Science: Plant Growth and Changes

Prescribed Learning Outcomes

It is expected that students will:

- compare familiar plants according to similarities and differences in appearance and life cycles

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- classify several types of familiar plants and explain the sorting method, with teacher support
- accurately illustrate the life cycle of a flowering plant
- identify characteristics that remain constant and those that change throughout the life cycle of a flowering plant
- conduct experiments to compare conditions needed for healthy plant growth (e.g., water, light, soil)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Start a word wall of plant vocabulary 	<ul style="list-style-type: none"> • introductory activity—no corresponding assessment
<ul style="list-style-type: none"> • Provide plant samples for students to observe. Have them identify the basic parts. Focus students' observations by posing these questions: <ul style="list-style-type: none"> - What are the basic parts of a plant? - What is the function (purpose) of each part? 	<ul style="list-style-type: none"> • Have students use journals to sketch plants and label main parts. Drawings should include and explain: roots, stems, leaves, flowers, pistil, stamen, ovule, pollen, seeds, and fruit.
<ul style="list-style-type: none"> • Set up a plant observation centre where students sort and classify plants. Have students explain the method used and then re-sort and re-label the groups. Plants should be provided that show a variety of roots, leaves, flowers, and seeds. 	<ul style="list-style-type: none"> • In small groups, have students select two plants and use a Venn diagram to compare how they are the same and different. Students may prefer to draw the parts of each plant to show the differences. • Have students explain what criteria they used to sort and classify (e.g., roots: long/short, thick/thin; leaves: smooth/jagged edges, fat/thin shape).
<ul style="list-style-type: none"> • Have students in groups conduct experiments on plant growth using seeds, cuttings, tubers and shoots. Students could <ul style="list-style-type: none"> - vary growing conditions (e.g., light, water, soil, temperature) to see what is needed for healthy plant growth - predict the effects of changes in growing conditions - make observations (e.g., measure plant growth) and use notes and/or diagrams to record these 	<ul style="list-style-type: none"> • As students test conditions for plant growth, look for evidence that they are able to <ul style="list-style-type: none"> - use appropriate measuring instruments (e.g., rulers, measuring cups, timepieces) - record changes - describe their observations accurately - pose questions about what they see - use charts graphs or other organizers for data collection - show what they have learned by communicating findings to peers.

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Plant Growth and Changes (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Obtain pictures of the parts of a plant's life cycle, create four sets of pictures, and place in envelopes in random order. Ask teams of students to organize the parts into the proper life cycle sequence, from beginning, middle, and end. Discuss. Ask students <ul style="list-style-type: none"> - What characteristics stay the same over this plant's life cycle? - What characteristics change the same over this plant's life cycle? 	<ul style="list-style-type: none"> • Ask students to complete a life cycle diagram in their journals. Review with students criteria for a good journal entry (e.g., clean diagrams, complete vocabulary use, correct sequencing). See also the assessment tool (My Science Journal) provided at the end of this grade.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Activities of Plants • Below Zero • Cycle of Life/Recycle Handbook for Educators • The Budding Botanist (AIMS Activities) • Forests in Focus • Hands-on Science (Growth and Changes in Plants) • The Marsh: Nature's Nursery • Once Upon a Seashore • One Two Tree • Plant Parts • Primarily Plants (AIMS Activities) • Salish Sea • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Seeds and Plants • Watch It Grow! • What Are Plants? 	

Grade 3 Life Science: Plant Growth and Changes

Prescribed Learning Outcomes

It is expected that students will:

- describe ways in which plants are important to other living things and the environment

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- identify the needs of common plants and animals, and provide a detailed description as to how they meet those needs
- illustrate ways that plants and animals depend on each other, using drawings, charts, and/or Venn diagrams
- prepare a detailed report on ways plants are important to the environment, giving examples

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Brainstorm as a class to review the basic needs of plants and animals (e.g., air, water, food, sex, adaptations). 	<ul style="list-style-type: none"> • Have students in small groups construct Venn diagrams to compare and contrast needs of local plants and animals and how needs are met. Develop criteria with students for peer assessment (e.g., “One thing I learned from my partner’s work was...”; “My partner used these important science words: ...”; “My partner drew diagrams to help make things clear.”).
<ul style="list-style-type: none"> • Conduct a walking field trip to look for connections among plants and other living things. Have students <ul style="list-style-type: none"> - look for evidence of how humans can show respect for plants - infer why some plants are more abundant than others - suggest how plant resources can be conserved - infer from evidence what and how other living things depend on plants (e.g., chewed leaves, nests). 	<ul style="list-style-type: none"> • Ask students to complete a journal entry listing as many observations as they can on how living things depend on plants. Encourage students to organize observations (written or pictorial) in chart form. For example, divide a journal page into several sections (e.g., food, shelter, camouflage, recreation) and label/draw or write on each section. See also the assessment tool, “My Science Journal.”

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*Plant Growth and Changes (continued)***• Recommended Learning Resources**

- Activities of Plants
- Below Zero
- The Budding Botanist (AIMS Activities)
- Cycle of Life/Recycle Handbook for Educators
- Forests in Focus
- Hands-on Science (Growth and Changes in Plants)
- The Marsh: Nature's Nursery
- Once Upon a Seashore
- One Two Tree
- Plant Growth
- Plant Parts
- Primarily Plants (AIMS Activities)
- Project WET
- Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science
- Seeds and Plants
- Watch It Grow!
- What Are Plants?

Grade 3 Life Science: Plant Growth and Changes

Prescribed Learning Outcomes

It is expected that students will:

- describe how plants are harvested and used throughout the seasons

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- identify and illustrate different methods of harvesting (e.g., mechanized, by hand)
- research and report on how BC Aboriginal peoples use plants for food, medicine, and products

Planning for Assessment

Suggested Assessment Activities

- Find examples of how different plants (e.g., trees, berries, grains, herbs, sea plants) are harvested (e.g., logged, picked, by combine) at various times of the year.

- Have students report their findings using charts, diagrams, illustrations, brochures, including the name of plant, location, use, season, harvested and/or planted, and method of harvesting. Consider assessment criteria such as
 - student self-checks that all required parts are included (e.g., name of plant, use, season, method of harvest)
 - student organizes information clearly and appropriately for chosen format (e.g., chart: headings labelled, all columns completed; report: table of contents, index, captions for diagrams)
 - student demonstrates ability to use resources to find relevant science information.

- Organize field trips, guest speakers, or hands-on activities to have students investigate the use of plants for food, medicine, clothing, furniture, paper, shelter, tools, etc. within a variety of cultures and communities (in historical and contemporary contexts).

- In the case of guest speakers, look for evidence that students:
 - have generated or asked appropriate and relevant questions
 - were respectful
 - understood the relationship between the physical world and the spiritual world
 - understood the concept of community
 - understood traditional vs. non-traditional usage.
- Use LAPS: Listen, Ask yourself questions, Picture (draw) what you hear, Summarize (retell) what students heard/learned.

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Plant Growth and Changes (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Ask students to respond to a First Nations story on how Aboriginal plants are/were used. 	<ul style="list-style-type: none"> • Have students complete compare/contrast charts or journal entries based on the story. A compare/contrast chart could examine then/now uses; a journal entry could relate how the story is important to the listener in terms of a personal experience. Consider focusing students on “Science in Everyday Life” or “Science in My Life.”
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • The Budding Botanist (AIMS Activities) • Forests in Focus • Hands-on Science (Growth and Changes in Plants) • One Two Tree • Plant Parts • Primarily Plants (AIMS Activities) • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Seeds and Plants • Watch It Grow! • What Are Plants? 	

GRADE 3 PHYSICAL SCIENCE: MATERIALS AND STRUCTURES

Key Elements: Physical Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have examined the shapes of various structures and tested the materials for those structures.

Materials and Structures

The study of materials and structures begins with the examination of the shape, components, and function of natural and human-built structures. Students investigate and experience the design process as they select and use materials suitable to the task at hand, manipulate and test materials, and build structures. Students discover that the strength and other characteristics of structures they build are linked to the properties of the materials they use, and to the particular way the materials are configured and joined.

Vocabulary

strength, balance, structure, materials, force, gravity, tension, compression, flexible, dome, arch, triangle, pyramid, cylinder, load, fasteners, design, construction

Knowledge

- a structure is any supporting framework that is built to hold a load or enclose a 'space'
- geometric shapes and forms are concepts used to understand and describe natural and human-built structures
- structures are built to withstand the loads and forces acting on them without breaking.
- forces on structures can push, pull, stretch, squeeze, and bend the structure to move
- flexible structures allow some forces to move the structure without breaking
- stable structures are able to support greater loads
- strength and stability can also be achieved by adding width and mass, and by layering materials
- braces hold two or more structures together
- stability of a structure is related to its design (height, width, and base) and to its construction (materials and fasteners); buildings that are short and wide are usually more stable than objects that are tall and narrow
- folding, bending, or bracing can strengthen materials
- most stable structures contain triangle arrangements of the construction materials
- fasteners are used to join materials together

Skills and Attitudes

- recognize geometric shapes and forms
- demonstrate curiosity
- use problem-solving strategies in building simple structures
- use simple tools safely and carefully to build structures
- accept failures as part of engineering discovery
- question, measure, and report procedures and results

Grade 3 Physical Science: Materials and Structures

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> describe shapes that are part of natural and human-built structures (e.g., domes, arches, pyramids) 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> identify domes, triangles, arches, pyramids, cylinders in natural and human-built structures illustrate local structures using detailed diagrams, and accurately sort their characteristics (e.g., shapes, components) 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> Take a walk through the schoolyard and around the immediate neighbourhood to observe natural and human-built structures. Have students look at examples of structure/shapes occurring in nature. Examples: bees'/ wasps' nests, seashells, ant/termite hills, birds' nests, houses, etc. <p>Pose the following reflection questions to help students determine what they know about structures</p> <ul style="list-style-type: none"> What types of shapes are most common in our environment? What types of flexible shapes are common? How do you think structures are made strong and stable? 	<ul style="list-style-type: none"> Establish criteria for journal entries. Consider whether students <ul style="list-style-type: none"> list several observations use more than one sense draw quick diagrams as reminders or references use science language appropriate to topic (e.g., shape words for structure: triangle, oval, cylinder). Have students make journal entries in an "Engineering Design Book" including sketches. They can assess their own work using a rating scale. Discuss with students the following possible criteria <ul style="list-style-type: none"> I used pictures and words to tell about things I learned. I thought about what I wanted to tell before I put it down. I told what I learned clearly in words and pictures. I used the new science words I learned. I put down important information on shapes and structures.
<ul style="list-style-type: none"> Develop a Science Centre. Ask students to collect samples of similar structures found in nature or human-built environments (e.g., bird's nests and baskets, umbrellas and mushrooms, egg shapes and domes, beehives and brick wall) for the Centre. Identify the shapes of each—dome, triangle, arches, weave—and describe reasons why these shapes are important to the collected structures. 	<ul style="list-style-type: none"> Have students choose an object, identify its basic shape, and build a representative model of the object using modelling clay, straws, toothpicks, etc. Ask students to identify and label these shapes using geometry vocabulary (e.g., triangle, circle, square). Consider the extent to which students can <ul style="list-style-type: none"> pick out the main shapes of the structure count accurately how many of the shape are in the structure (e.g., how many Δs in a swing set) identify the number of lines, points, and angles are in each shape determine which is the most important shape in the structure and guess why.

continued next page

Materials and Structures (continued)

Recommended Learning Resources

- Below Zero
- Build It Up
- Hands-on Science (Materials and Structures)

Grade 3 Physical Science: Materials and Structures**Prescribed Learning Outcomes**

It is expected that students will:

- compare the effects of different materials, shapes, and forces on the strength and stability of different structures

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- describe and demonstrate construction techniques (e.g., joint construction, strengthening, and stabilizing) using given materials
- conduct a variety of experiments to test and compare the strength of different structures (e.g., arches, domes, and triangles)
- accurately measure and report the effects of various forces (e.g., compression, tension, load) on different structures

Planning for Assessment

- Brainstorm several methods for joining two similar pieces of material at their ends (e.g., two straws or two sticks). Have students try some of the brainstormed methods and compare the strength of these various materials when fastened with different methods (e.g., glue, string, tack, tape).
- Have students identify variables that will affect an investigation of which fasteners are better for building model structures. In small groups, have students carry out the investigations, record the steps they followed, and record their observations and the conclusions based on their results.

Suggested Assessment Activities

- Ask students these investigative questions about the materials and fasteners
 - Which materials are easier to joint?
 - What types of materials and fasteners are rigid and don't allow parts to move?
 - Which fasteners and materials are flexible and can move or rotate?
 - What combination of fasteners and materials work best?
 - Why are some fasteners better suited for some materials than others?
- Use an assessment checklist for Investigating Materials and Fasteners. Ensure that the student
 - makes predictions for rigid, or flexible purposes
 - develops and carries out a plan
 - later describes the steps followed
 - makes and records relevant observations
 - orders the materials according to strength
 - draws a conclusion based on observations
 - works cooperatively.

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Materials and Structures (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Use eight sheets of newspaper to roll into eight construction tubes; (best done around a stick, then remove stick). Construct a pyramid with these and 1 meter of masking tape. • After constructing identical tent structures no bigger than 30cm (e.g., triangle, square, pentagon, dome, arch, cube covered in paper), have groups of students test their structures for weakness. They can test for compression with a small load (film cans filled with plasticene make good standardized weights), and tension with elastic stretching pull. Explore ways to improve stability (e.g., better braces, tighter joint fasteners, more triangles). Predict and record results. (Warning: students should avoid testing to the breaking point.) 	<ul style="list-style-type: none"> • For completed newspaper structures, assess by asking <ul style="list-style-type: none"> - What did you do to get your paper to support itself? - Did your structure (pyramid) stay together when moved or carried? - What joint system worked best for a strong and stable structure? • Have students draw their structures and record predictions, then do tests record the results in their Design Journals. Assess their ability to suggest improvements, such as <ul style="list-style-type: none"> - add more braces - add more of the same shape - use a greater variety of shapes - make the structure simpler by removing material. - using different fasteners. <p style="text-align: right;"><i>continued next page</i></p>

Materials and Structures (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students use various materials (e.g., toothpicks, plastic straws, newspaper, cardboard) to make bridges, towers or geometric solids. Test each with various objects according to your main purpose (e.g., to hold a 2 kg load). The quantities of materials should be limited and specified for project construction. Various fasteners may be chosen, but if white glue is used, more success is expected. Allow proper drying time. • Project Ideas – best done in class time <ul style="list-style-type: none"> - Landing Pad (easy level): build a structure with a 10 x 10 cm base and a height of between 10 and 15 cm high. Can your structure hold a two Kilo weight? - Tallest Tower (medium skill level): build a tall tower with a 5 cm x 5 cm base and is more than 30cm tall. Can you tower stay together when a wind blows or if moved? - Covered Bridge (hard): build a 30cm bridge which is covered in paper and can hold a small weight. The bridge has to carry itself across two desks 25 cm apart. Can your bridge hold 4 film cans filled with plasticene? (approx. 0.5 Kilos) 	<ul style="list-style-type: none"> • After building a 30cm tent structure, students generate criteria for group assessment (e.g., What works? What would we improve? How well did we work together?). Note: to standardize building structures, the materials must be limited by number of pieces or total weight. • Model Project Assessment <ul style="list-style-type: none"> (1) Landing Pad for helicopters (easy) <ul style="list-style-type: none"> - A landing pad was built - Base size and height fits within range - Correct number of pieces - Uses joint fasteners explored in class - Holds half weight without breaking - Holds full weight and mostly stays together - Holds 2 Kilo weight successful (2) Tallest Tower (medium) <ul style="list-style-type: none"> - tower was built and stays together - 30cm high or taller - correct base size - tower stays together when air fan blows - tower stays together when moved and set down - structure uses flexible construction - uses the joint fasteners explored in class (3) Covered Bridges (hard): <ul style="list-style-type: none"> - a covered bridge was built - looks like a model bridge - is between 27 and 30cm in length - materials and fasteners allowed are used - bridge holds together across 25 cm gap - elastic hook is in middle and hold weight - bridge holds more weight without breaking - bridge holds four weight cans and does not break
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Below Zero • Build It Up • Hands-on Science (Materials and Structures) 	

Grade 3 Physical Science: Materials and Structures

Prescribed Learning Outcomes

It is expected that students will:

- conduct investigations into ways to improve the strength and stability of structures

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- identify several techniques for improving strength and stability (e.g., reinforcing, bundling, and bracing)
- describe and apply a variety of material-strengthening techniques and methods to improve the design and stability of a given structure (e.g., build a bridge or tower that supports a given load)

Planning for Assessment

Suggested Assessment Activities

- Have students explore ways to fold and combine paper to make it stronger. (Fold into an accordion, make rolls and glue, combine layers or make sandwich layers with folded and rolled paper.) Use a standard load mass to test the strength of each paper configuration. Students describe each paper configuration they used and record the mass it supported. Look for ideas such as the following
 - folding the paper so that it has pleats (accordion-like)
 - layering the paper
 - rolling the paper.

- To assess understanding, ask students
 - What did you do to get your paper to support a greater load?
 - How do we use this information in our everyday lives? (e.g., corrugated cardboard)

- Give groups of students the following challenge: Build a bridge that spans 30cm and supports a given mass (e.g., a container of marbles), using only paper and masking tape. Name the bridge.
- Have students examine photographs of local or famous bridges. Challenge them to use some of their new engineering knowledge to tell what shapes they see and how these affect bridge function.

- Have students
 - draw a design plan (blueprint)
 - identify shapes used to increase strength and stability
 - explain how materials were improved to increase strength and stability
 - pick one thing they would change about their bridges and do it.
 Establish assessment criteria with students. Consider
 - What mass do we predict our bridges will be able to support?
 - How did the shapes and materials we used make the bridge stronger? More stable?

Recommended Learning Resources

- Below Zero
- Build It Up
- Hands-on Science (Materials and Structures)

GRADE 3 EARTH AND SPACE SCIENCE: STARS AND PLANETS

Key Elements: Earth and Space Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have understood various components of the solar system and explained the significance of celestial objects for Aboriginal peoples.

Stars and Planets

This study focuses on the characteristics of stars and planets. Students describe the physical characteristics and components of the solar system: the Sun, planets, moons, comets, asteroids, and meteors. They observe and explain how the relative positions of the Earth, Moon, and the Sun are responsible for the moon phases, eclipses, tides and phenomena such as the cycle of day and night and the yearly cycle of the seasons. They observe and identify familiar patterns of stars and constellations. Students also explore the significance of celestial objects to indigenous peoples.

Vocabulary

seasonal cycle, day/night, sun, star, planet, meteor, comet, orbit, moon, axis, rotate, solar system, Milky Way, galaxy, constellation

Knowledge

- stars are made of burning gases
- the Sun is a star
- other stars are in the sky all the time, but are invisible because the Sun is too bright during the day
- the energy from the Sun is essential for life on Earth (either directly or indirectly)
- planets do not make their own light, but reflect light
- planets revolve around a star
- moons revolve around planets
- comets, asteroids, and meteors are smaller bodies also revolving around stars
- the cycle of day and night is a result of the Earth's rotation about its axis
- the Earth revolves around the Sun once a year
- constellations are groups of stars (humans have imagined pictures and names for these groups)
- the position of these constellations appears to change over the year because our planet travels in a very large orbit around the Sun
- celestial objects have a special significance to Aboriginal peoples

Skills and Attitudes

- demonstrate curiosity about space
- maintain an astronomy journal
- identify patterns based on recorded observations
- identify questions based on recorded data
- distinguish between scientific and cultural information

Grade 3 Earth and Space Science: Stars and Planets

Prescribed Learning Outcomes

It is expected that students will:

- describe characteristics and movements of objects in our solar system

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- ❑ prepare a detailed report on the unique features (e.g., location, size, temperature, appearance, length of day) of the planets, asteroids, comets, the Sun, and moon
- ❑ illustrate the solar system (the Sun, nine planets, moons, asteroids, comets, and meteors) using accurate drawings, diagrams, collages, models, electronic presentations, and/or group role play
- ❑ complete a detailed model, with explanations, showing that the Sun is the centre of the solar system, and that it is the source of energy for the Earth

Planning for Assessment

Suggested Assessment Activities

- To represent their understanding of the unique properties of planets, have students research and create a travel brochure to convince people to visit. Provide several sample brochures. Have students complete a draft layout, edit, and present their final brochures.

- To assess the content of student brochures, determine whether or not they have included:
 - location
 - size
 - composition
 - atmosphere
 - appearance
 - unique features/attractions
 - temperature
 - gravity
 - moons
 - length of day and year
 - length of traveling time from Earth
 - distance from the Sun.
- To assess how well students have written to communicate their ideas and information, use Assessing a Postcard or Travel Brochure— Teacher Observations (from the BC Performance Standards; Quick Scale).

- Have students use a globe, a flashlight, and a small ball to demonstrate the day and night positions of the Earth, Sun, and moon.

- When students are demonstrating the day and night positions of the Earth, Sun, and moon, look for evidence that they
 - correctly show the position of Sun, moon, and Earth, in order
 - use light to demonstrate day and night
 - show the rotation of the Earth
 - show that the Earth revolves around the Sun.

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Stars and Planets (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students role play the positions of the planets around the Sun to show the order and distances of the planets. Relative sizes can be represented with common spherical household objects (e.g., peppercorn, orange, basketball) or cardboard cut-outs done to scale (teacher-made). 	<ul style="list-style-type: none"> • Have students write a journal entry about the activity. Entries could address <ul style="list-style-type: none"> - "I found_____ interesting because _____." - "I was surprised about _____ because _____." - "I want to know about _____." <p>See also the sample assessment tool (My Science Journal) provided at the end of this grade.</p>
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Our Amazing Sun • Our Solar System • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Stars and Planets (Pan Canadian Science Place) 	

Grade 3 Earth and Space Science: Stars and Planets

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • compare familiar constellations in seasonal skies 	
Suggested Achievement Indicators	
<p><i>The follow following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> identify and accurately label the name of constellations on a constellation map <input type="checkbox"/> create a chart that records how constellations change position in the sky at different times of the year 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Obtain a copy of a northwest seasonal constellation map. Provide students with photocopies of the map with the names of the constellations removed. Ask them to label the ones they can identify. • Tape a copy of a specific constellation on top of foil. Place on cardboard. Poke holes through and place the foil on an overhead. Then have students make a foil-punctured, labelled print of a constellation of their choice. 	<ul style="list-style-type: none"> • When students are demonstrating knowledge of a few constellations, look for the ability to <ul style="list-style-type: none"> - identify the Big Dipper - notice that Polaris/North Star stays in one spot as all other stars in constellations rotate left to right about Polaris - notice that the position of Orion changes as the season changes.
<ul style="list-style-type: none"> • Have students read a number of stories about celestial bodies (from Greek myths to Aboriginal traditional stories) and use a graphic organizer to compare commonalities in stories. 	<ul style="list-style-type: none"> • Using charts, T-charts, etc., look for evidence of students' ability to record similarities among the stories they have chosen to compare (e.g., characters, animals, themes such as war or morality).
Recommended Learning Resources	
<ul style="list-style-type: none"> • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Stars and Planets (Pan Canadian Science Place) 	

Grade 3 Earth and Space Science: Stars and Planets

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • demonstrate awareness of the special significance of celestial objects for Aboriginal peoples 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> generate specific questions in response to an Aboriginal story focusing on celestial objects (e.g., stars, moon, planets, comets, eclipses) and illustrate answers using detailed drawings <input type="checkbox"/> write their own stories, complete with picture, on a celestial object (e.g., how the moon came to be; why the sun is so hot) 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have an Aboriginal speaker to share stories of local celestial events. Ask the speaker to focus on how astronomy affected community location, migration, ceremony, agricultural cycles, etc. 	<ul style="list-style-type: none"> • Have students write a thank you letter to the speaker stating at least one thing they learned. • In a follow-up discussion, consider the extent to which students understand <ul style="list-style-type: none"> - Aboriginal values and beliefs associated with celestial objects - how celestial objects may have influenced Aboriginal cultures - the role of Aboriginal Elders in their communities - the concept and meaning of respect in Aboriginal cultures.
<ul style="list-style-type: none"> • Ask students to develop their own stories, complete with pictures, or a dramatization of a celestial object (e.g., how the moon came to be; why the Sun is so hot). 	<ul style="list-style-type: none"> • Look for evidence of complete ideas on how something came to be. Criteria could include <ul style="list-style-type: none"> - title - developed characters - clear plot line (beginning, middle, end).
Recommended Learning Resources	
<ul style="list-style-type: none"> • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Stars and Planets (Pan Canadian Science Place) 	

MY SCIENCE JOURNAL

This assessment tool can be used with any activity where students are asked to use their journals.

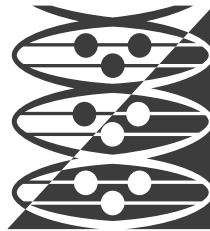
	1 (not yet within expectations)	2 (meets expectations)	3 (fully meets expectations)	4 (exceeds expectations)
Mechanics (date, title, diagrams, labels, organization)	rarely uses dates, titles, labels; diagrams do not include science concepts and not supported by writing	uses dates, titles, labels; diagrams usually include science concepts and are supported by writing	consistent attention to details and appropriate use of diagrams	complete attention to details, plus very clear organization
Science content	rarely uses scientific vocabulary; little or no recording of scientific observations or ideas	occasionally uses scientific vocabulary; some recording of scientific observations or ideas	appropriate and relevant use of most key science words; general understanding of scientific ideas; reasonable observations and reporting of results	appropriate and relevant use of science vocabulary; complete understanding of scientific ideas; detailed observations and reporting of results
Reflective thought (I know/I wonder/I can)	rarely reflects on what has been learned; has trouble expressing thoughts	sometimes reflects on what has been learned; needs to be reminded to “think about thinking”	usually reflects on work, expressing wonder	always reflects on work, expressing wonder and a clear sense of accomplishment

Teacher:

- 4 = exceeds expectations
- 3 = fully meets expectations
- 2 = meets expectations
- 1 = not yet within expectations

Student:

- 4 = best expectations
- 3 = quite good
- 2 = okay
- 1 = needs to be better



CLASSROOM ASSESSMENT MODEL

Grade 4

ASSESSMENT OVERVIEW TABLE FOR: GRADE 4

The purpose of this table is to provide teachers with suggestions and guidelines for classroom-based formative and summative assessment and grading of Science K to 7.

Curriculum Organizers	Suggested Timeframe	Suggested Assessment Activities	Suggested Weight for Grading	Number of Outcomes	Number of Outcomes by Cognitive Level *		
					K	U & A	HMP
	Average # of hours						
PROCESSES OF SCIENCE	Integrated	Integrated	Integrated	2		1	1
LIFE SCIENCE	25-30	<ul style="list-style-type: none"> • pair/share • summative project • graph • science journal • chart • drawing • oral summary 	33 1/3 %	4	1	1	2
PHYSICAL SCIENCE	25-30	<ul style="list-style-type: none"> • science journal • written summary • diagram • model 	33 1/3 %	3	1	2	
EARTH AND SPACE SCIENCE	25-30	<ul style="list-style-type: none"> • quiz • chart • written report • oral summary • poster • presentation 	33 1/3 %	2		2	
TOTALS	75-90		100 %	11	2	6	3

* The following abbreviations are used to represent the three cognitive levels: K = Knowledge; U & A = Understanding and Application; HMP = Higher Mental Processes

GRADE 4: PROCESSES OF SCIENCE**Key Elements: Processes of Science**

Estimated Time: integrate with other curriculum organizers

Interpreting Data

Interpreting data is a critical-thinking process used by scientific researchers to review the data gathered in the course of an investigation. Scientists explain the data to others and communicate a reasonable explanation about the trends and relationships they see. They also point out any inconsistencies they believe the evidence holds. For the data to be fully analysed in meaningful ways it requires prior scientific knowledge, mathematics, graphing techniques, and clear communication skills. At this stage, it is an extension of the process skills learned earlier – interpreting observations and making inferences (Grade 2). Interpreting data involves identifying patterns, thinking about missing data (errors), questioning if the data fits the estimates, finding one-to-one relations, sorting objects into useful arrangements, explaining the similarities and differences in the data, and summarizing what the facts and data might mean.

Predicting

Predicting involves making an objective guess about a future event, based upon what has been observed in the past and what might be expected to happen. Scientists always test whether their predictions might be correct or not. (Often, mathematics and graphing can be used to *extrapolate* into the future). Predictions should not involve guessing wildly, but should be based on prior knowledge and prior observations. These prior activities often produce questions that engage scientific curiosity. To make predictions that help them explore and test their observations, students must pay close attention to patterns and order within the previous data. They must also rely on all their previously acquired process skills such as measuring, inferring, and questioning to compare their expectations with the observed results. Good predictions seek to logically anticipate how future events might occur. Making a prediction, and determining how to test it with the right question constitute the beginning point for designing later experiments.

Grade 4 Processes of Science

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • make predictions, supported by reasons and relevant to the content 	<ul style="list-style-type: none"> <input type="checkbox"/> carefully observe a pattern of events (e.g., changes in vibration, pitch, weather patterns) <input type="checkbox"/> make initial predictions and refine them, based on test results (e.g., path light travels)
<ul style="list-style-type: none"> • use data from investigations to recognize patterns and relationships and reach conclusions 	<ul style="list-style-type: none"> <input type="checkbox"/> gather and correctly organize comprehensive data (e.g., weather charts) <input type="checkbox"/> accurately interpret what a given graph shows using detailed examples

GRADE 4 LIFE SCIENCE: HABITATS AND COMMUNITIES**Key Elements: Life Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have understood the structure and interactions of local ecosystems and shown respect for the environment.

Habitats and Communities

The study of habits and communities focuses on how organisms are adapted to an environment and interact with other living and non-living things. Students research or investigate organisms in two or more different habitats and identify which adaptations help organisms survive. The diversity and interactions of the living and non-living things in different habitats and communities can be compared. Students also develop an understanding of food chains. The relationship between humans and their environment is examined with particular emphasis on the relationship that Aboriginal peoples have with the environment.

Vocabulary

habitat, adaptation, population, community, food chain, food web, organism, producer, consumer, herbivore, omnivore, carnivore, predator, prey, scavenger, conservation, threatened, endangered, extinct

Knowledge

- living things find in particular environments the items and conditions that they need to grow and survive
- living things interact with each other in many ways and may depend on each other for food and shelter
- changes in habitat can affect the survival of an individual organism or an entire species
- food chains play an important role in population changes
- human choices and actions have a big impact on the environment

Skills and Attitudes

- observe animals and plants sharing a habitat (e.g., terrarium, aquarium)
- record observations and investigations using a variety of mediums such as journals, words, charts, and graphs
- infer why particular organisms, animals, and plants are able to share a habitat
- predict the effect of a change in the environment to the habitat and the organisms living there
- demonstrate respect for Aboriginal peoples
- demonstrate respect for living things and environments and a commitment for their care

Grade 4 Life Science: Habitats and Communities

Prescribed Learning Outcomes

It is expected that students will:

- compare the structures and behaviours of local animals and plants in different habitats and communities

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- explain in detail why organisms are found in specific local habitats, based on their structures and behaviours
- identify the structural adaptations of two or more organisms
- with teacher support, infer and justify what communities might interact in a particular environment

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Ask students to sort a variety of pictures into the various habitats (e.g., ocean, prairie, boreal forest, marsh, alpine, tundra, temperate rain forest, desert). Then, have students respond to the question, “What is a habitat?” (e.g., What do plants and animals need to survive). 	<ul style="list-style-type: none"> • Have students pair/share with a partner and tell all they know about the habitat in a given picture. Assess student understanding of <ul style="list-style-type: none"> - temperature - availability of water - light - food - shelter.
<ul style="list-style-type: none"> • Have students examine pictures of plants and animals found in specific habitats. Challenge them to identify structural adaptations that help the plants and animals to survive in a particular habitat (e.g., pine cones store seeds in drought; great blue heron has long legs for wading and long sharp beak for fishing). 	<ul style="list-style-type: none"> • To assess student understanding, create a four-column chart (task/prediction/find out/reason). Indicate that the task is to have them examine their own structural adaptation by taping a thumb to the palm of the same hand and try to tie their shoes or button their shirts. Look for evidence in the chart that they understand the concept of structural adaptation.
<ul style="list-style-type: none"> • Ask students to examine pictures of plants and animals in a variety of habitats, challenging them to think of behavioural adaptations that help the plants and animals to survive (e.g., bear hibernating in winter; tree losing its leaves in winter). 	<ul style="list-style-type: none"> • Have students complete a “Look it Over” chart, with sections on: “What I see/What this tells me.” For example, “I see a squirrel collecting nuts. This tells me the squirrel is saving food for the winter.” In assessing student charts, look for sensible inferences and justifications. Answers may vary according to experiences.
<ul style="list-style-type: none"> • Take students to visit local ecosystems (e.g., tide pools, forests, wetlands) to discover the interactions of organisms that make up communities within a habitat. 	<ul style="list-style-type: none"> • Assess student learning from field trips using pre- and post-trip activities. For example, have students predict and draw what they expect to find in a tide pool/stream. Then, after the field trip, have students draw new pictures to illustrate new insights.

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Habitats and Communities (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Set up a colony of mealworms, which can be obtained from a pet store or scientific supply company. Encourage students to predict and test the response of organisms to various environmental stimuli (e.g., light, touch, moisture, surface temperature). 	<ul style="list-style-type: none"> • Have students set up humane experiments to test mealworm behaviour (e.g., light and dark, wet and dry). Look for indications that students <ul style="list-style-type: none"> - ask relevant questions - predict, plan, and carry out procedures - collect and interpret data (e.g., If 20 out of 30 mealworms prefer dark conditions, what does this tell about mealworm behaviour?). Data can be graphed over trials and interpreted.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Critters • Cycle of Life/Recycle Handbook for Educators • Discovering Insects: Ants, Flies, Crickets • Discovering Insects: Defences • Forests in Focus • Habitats • Hands-on Science (Habitats and Communities) • Healthy Habitats (Pan Canadian Science Place) • Kokanee of British Columbia • The Lives of Ants & Bees for Students Series (Ant Bodies, Ant homes & Communities, Bees & Plants) • Once Upon a Seashore • Project WET • Project WILD • Salish Sea • Salmonids in the Classroom • Science and Technology 4 (Habitats) • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Urban Stewards • The Watershed Works 	

Grade 4 Life Science: Habitats and Communities

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • analyse simple food chains 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> construct and explain the elements of a simple food chain <input type="checkbox"/> interpret population changes from data in one- or two-factor graphs (e.g., rabbit only; rabbit/coyote) 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students examine food chains (e.g., plants, earthworm, mole, owl) and identify producer and consumer. They should identify consumers as herbivores, carnivores, and omnivores; and carnivores as predators or scavengers. 	<ul style="list-style-type: none"> • Ask students to use picture cards to build as many different food chains as possible, and explain how the food chains work. Look for correct use of vocabulary, logical links in the chain based on knowledge or inference (e.g., “I know coyotes eat mice, so I think foxes do too.”). Challenge students to make more than simple one-to-one links (e.g., fox eats rabbit too).
<ul style="list-style-type: none"> • Conduct an environmental simulation (e.g., Ecosystem Tag). Collect the results for graphing, and discuss population trends that could include endangerment and extinction. • Alternatively, in a tag game, assign students different animals in a given local ecosystem. Different coloured tokens (e.g., multilink cubes) represent different components of surviving in that ecosystem (food, water, shelter, reproduction). Values for tokens (e.g., how many green cubes = a good season of eating) are assigned to indicate if the “animal” survives. Such games can be modified to be simple or more complex. 	<ul style="list-style-type: none"> • Look for evidence that students can interpret the class graph. Can students <ul style="list-style-type: none"> - infer what the graph shows? - make predictions about future population trends, based on the graph?

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*Habitats and Communities (continued)***Recommended Learning Resources**

- Critters
- Cycle of Life/Recycle Handbook for Educators
- Discovering Insects: Ants, Flies, Crickets
- Discovering Insects: Defences
- Forests in Focus
- Hands-on Science (Habitats and Communities)
- Healthy Habitats (Pan Canadian Science Place)
- Kokanee of British Columbia
- Once Upon a Seashore
- Project WET
- Project WILD
- Salish Sea
- Salmonids in the Classroom
- Science and Technology 4 (Habitats)
- Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science
- Thinking Connections: Concept Maps for Life Science
- Urban Stewards
- The Watershed Works

Grade 4 Life Science: Habitats and Communities

Prescribed Learning Outcomes

It is expected that students will:

- demonstrate awareness of the Aboriginal concept of respect for the environment

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- describe in detail how to show respect for the environment (e.g., clean up school yard, recycle, weed garden)
- create accurate, detailed drawings to illustrate stories that demonstrate the relationship Aboriginal peoples have with the land, water, animals, plants, and sky (e.g., respect for water, earth)

Planning for Assessment

Suggested Assessment Activities

- Invite a local First Nations person to share an experience on how his or her culture shows respect for the environment. Students can compare this experience to their own, or suggest examples of how they are showing respect in other ways, in the community or in school. Contact the district Aboriginal Education coordinator or resource teacher for assistance in drawing on the local Aboriginal community.

- Review skills and attitudes related to invited guests, such as SWIM:
 - Sit up
 - Watch the speaker
 - Inquire (ask yourself what the speaker is saying)
 - Make connections with what you know already.
- Observe the extent to which students use LAPS strategy while listening to the speaker:
 - Listen
 - Ask yourself questions
 - Picture (draw) what you hear
 - Summarize (retell) what you heard.

- Read stories that demonstrate the relationship First Nations people have with the land, water, animals, plants, and the sky.

- Ask students to respond to the stories in their journals and reflect on ways they show respect for their own environment. Establish assessment criteria with students, such as students
 - select a relationship they have with any three of land, water, animal, plant, sky
 - tell how they personally show respect for each of their choices
 - indicate how their behaviour is similar to or different from the First Nations stories they read and wrote about.

Recommended Learning Resources

- Cycle of Life/Recycle Handbook for Educators
- Healthy Habitats (Pan Canadian Science Place)
- Once Upon a Seashore
- Project WET
- Salish Sea
- The Watershed Works

Grade 4 Life Science: Habitats and Communities

Prescribed Learning Outcomes

It is expected that students will:

- determine how personal choices and actions have environmental consequences

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- document the steps involved in supporting actions that positively affect the school environment (such as those involved in a garbage-less lunch campaign), using detailed checklists and various group projects
- prepare and illustrate a simple, local habitat improvement plan that shows which plants and animals benefit from the plan

Planning for Assessment

- Ask students to suggest possible actions that would improve their environment. They should identify any benefits and challenges associated with each action. For example, if the proposal was to add more plants to the schoolyard, student plans could look like the following:

Action	Benefits	Challenges
Schoolyard garden		
Classroom composting	Reduce classroom waste	Get <ul style="list-style-type: none"> • composter • worms • permission
Recycling		

Suggested Assessment Activities

- Look for evidence that student habitat action plans
 - are manageable
 - include the information needed to complete and sustain the project
 - present solutions to challenges
 - show indicators of success
 - indicate how each group will work together.
 -

Recommended Learning Resources

- Backyard Biodiversity and Beyond
- Cycle of Life/Recycle Handbook for Educators
- Hands-on Science (Habitats and Communities)
- Healthy Habitats (Pan Canadian Science Place)
- Kokanee of British Columbia
- Once Upon a Seashore
- Project WET
- Project WILD
- Salish Sea
- Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science
- Urban Stewards
- The Watershed Works

GRADE 4 PHYSICAL SCIENCE: LIGHT AND SOUND

Key Elements: Physical Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have described sources and investigated the properties of sound and light.

Light and Sound

Students become familiar with the properties of natural and artificial light by observing how light interacts with various objects in the environment. Through investigations, they gain understanding of light sources. Students discover that light travels in a straight path, and the type of material it strikes determines whether it is absorbed, reflected, or refracted. They also learn that forms of light are either visible or non-visible.

Students explore the properties of sound by discovering how sounds are made, how they change, and how sound travels. Through experimentation with a variety of objects, they discover how different materials transmit, reflect and absorb sound. They produce sounds and control frequency and pitch in the sound made.

Vocabulary

Light - reflect, refract, absorb, transmit, natural, artificial, light beam, transparent, translucent, opaque, spectrum

Sound - vibration, vocal cords, pitch, frequency, loudness, sound waves, reflect, absorb, transmit, echo

Knowledge

- light carries energy
- brighter light carries more energy
- forms of light can be either visible or invisible
- natural and artificial light have measurable properties (e.g., colour, wavelength, brightness)
- light can travel in a straight path (rays)
- light rays change direction (bend, refract) as they pass from one medium to another
- materials may transmit, absorb, or reflect light sound carries energy
- loud sounds carry more energy
- forms of sound can be either audible and inaudible
- sound is caused by vibrations in a medium
- sound can travel through many substances (e.g., air, water, metal)
- the shaking (oscillation) of objects is called vibrating
- vibrations are measured in the number of oscillations per time (called the frequency)
- higher (faster) the frequency corresponds to higher pitch sounds
- lower (slower) the frequency corresponds to lower pitch sounds
- materials may transmit, reflect, or absorb sound (an echo is reflected sound)
- sound travels through gas, liquid, and solids

Skills and Attitudes

- use appropriate vocabulary to describe observations, explorations, and experiments
- predict the results of light and sound experiments
- compile and interpret data to record and present results using tally charts, tables, and graphs
- communicate the procedures and results of investigations by using oral presentations, written notes and descriptions, drawings, and diagrams
- handle a variety of materials safely

Grade 4 Physical Science: Light and Sound

Prescribed Learning Outcomes

It is expected that students will:

- identify sources of light and sound

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- accurately sort various sources of light within their environment as natural or artificial
- relate vibrations to the production of sound (e.g., the human voice relies on the vibrations of vocal cords)

Planning for Assessment

- Take a short indoor/outdoor field trip to identify sources of light (e.g., overhead/hall lighting; Sun, traffic lights, exit signs, fire). Ask student to sort and classify into artificial or natural light sources.

- Ask students to close their eyes for one minute, and listen to identify all sources of sound, both indoors and outdoors. They should record observations in their journals.
- Place a 30cm ruler over the edge of the desk, and “twang” the ruler to demonstrate that vibration produces sound. Then have students suggest other examples of vibration (e.g., vocal cords, elastic bands, guitar).

Suggested Assessment Activities

- Have students keep an ongoing science journal where they reflect on what they have learned about light and sound, and make suggestions about how they could apply and extend their knowledge. Provide criteria such as the following:
 - Three things I learned
 - How I could use this information
 - Questions I have/things I wonder about
 - Experiments or activities that might help me learn more.

- Have students start a three-part approach “dictionary” to keep track of new vocabulary, such as the following:

word	means	diagram
vibration	back and forth movement that produces sounds	
frequency	how many vibrations per second	

Encourage students to maintain their dictionaries throughout the unit. Assess regularly, looking for

- clear diagrams
- good choice of synonym
- clear explanations.

Recommended Learning Resources

- Colour in Science
- Hands-on Science (Light)
- Hands-on Science (Sound)
- Primarily Physics – Investigations in Sound, Light and Heat Energy (AIMS Activities)
- Science & Technology 4 (Light)
- Science & Technology 4 (Sound)
- Science, Please! (Parts 1 & 2)
- Sound and Light (Pan Canadian Science Place)

Grade 4 Physical Science: Light and Sound

Prescribed Learning Outcomes

It is expected that students will:

- explain properties of light (e.g., travels in a straight path, can be reflected)

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- predict, demonstrate, and report on how light travels in a straight path and through different materials (e.g., reflects, refracts; is transparent, translucent, opaque)
- with teacher support, conduct an experiment to demonstrate how white light can be separated into colours

Planning for Assessment

Suggested Assessment Activities

- Hole punch the centre of two index cards. On a third card, mark a bulls eye in the centre. Line up the cards 30cm apart, and anchor them upright in modelling clay so that the two holes are lined up with the centre of the bull's eye. Ask students to predict the path light will travel. Darken the room. Have a student shine a flashlight through the punched holes. Record the path light travels. (e.g., Does the light hit the bulls eye?)
- Ask students to place a pencil in the centre of a clear glass of water, and observe what happens. Students should infer how light behaves when it passes through two media (light bends, refracts).
- Introduce the concepts of transparent, translucent, and opaque by having students sort a collection of materials (e.g., different types of paper; clear plastic bags, water bottles).

- Have students complete an entry in their science journals that includes
 - their predictions
 - labelled diagrams
 - what they observed
 - how this compared to their predictions
 - what this means about how light travels.
- Remind students to update their three-part-approach dictionaries.
- Challenge students to group the objects according to how or whether light passes through them. Ask students to record observations in a chart of their own making. After completing the chart, have students define each of: transparent, translucent, opaque in their own words/diagrams.

- Using a prism to separate white light, have students identify the colours of the spectrum and record their observations. (If no prisms are available, the shiny face of a CD can catch and separate the spectrum for viewing.)

- Ask students to create an ordered spectrum diagram and label observations. Encourage students to make connections to real-world observations of natural light (e.g., rainbows). Check diagrams for accuracy of their actual colour observations.

Recommended Learning Resources

- Colour in Science
- Hands-on Science (Light)
- Primarily Physics – Investigations in Sound, Light and Heat Energy (AIMS Activities)
- Science Answers
- Science & Technology 4 (Light)
- Science, Please! (Parts 1 & 2)
- Sound and Light (Pan Canadian Science Place)

Grade 4 Physical Science: Light and Sound**Prescribed Learning Outcomes**

It is expected that students will:

- explain properties of sound (e.g., travels in waves, travels in all directions)

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- demonstrate and report on how various materials will absorb, reflect, or transmit sound
- predict and record changes in vibration and pitch (e.g., by using a ruler) and describe the relationship between pitch and vibration

Planning for Assessment**Suggested Assessment Activities**

- Have student pairs explore how sound travels through solids, liquids, and gases by strumming the teeth of a comb in air, against a table and in a container of H₂O. Students should listen and record observations.
- In groups, have students pick an object that makes a sound (e.g., alarm clock, small bell). Challenge students to amplify and then absorb the sound (e.g., alarm clock in a coffee can or insulated by newspaper).

- Ask students to collect and interpret data in their science journals. Ensure that student journals
 - accurately use appropriate vocabulary (e.g., amplify, absorb)
 - demonstrate understanding of techniques of amplification and absorption
 - tell what was learned
 - extend knowledge to identify other examples of amplification and absorption.

- Make part of a musical scale by striking glass bottles containing varying amounts of water. Ask students to note changes in pitch and tone.
- Challenge students to design and build musical instruments (e.g., pencil box guitar with rubber bands, pan-pipe straws, plastic tub drums with balloon skins).
- Construct a glass water harmonica (singing wine glasses), which produces a range of sounds.

- Ensure that students can predict and identify which ones will produce the highest and lowest pitch.
- Work with students to develop criteria to assess musical instruments, such as
 - chose appropriate materials
 - demonstrated change of pitch and loudness
 - explained where the sound vibrations came from
 - indicated ways to improve the design
 - demonstrated how to maintain consistent note playing with pitch accuracy.

Recommended Learning Resources

- Hands-on Science (Sound)
- Primarily Physics – Investigations in Sound, Light and Heat Energy (AIMS Activities)
- Science Answers
- Science & Technology 4 (Sound)
- Science, Please! (Parts 1 & 2)
- Sound and Light (Pan Canadian Science Place)

GRADE 4 EARTH AND SPACE SCIENCE: WEATHER**Key Elements: Earth and Space Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have observed and measured weather conditions and analysed their impact on living and non-living things.

Weather

An important part of the study of weather is gaining understanding of the properties of air, its movement, and its ability to hold water. Students study various aspects of weather such as temperature, wind speed, precipitation, air pressure, and clouds, and begin to recognize the role these aspects play in weather systems. Students use appropriate tools and instruments to complete investigations. They investigate basic components of weather through observations, predictions, hypotheses, measurements, and recording data. Students examine the impact of weather on living and non-living things.

Vocabulary

temperature, wind speed, wind direction, water cycle, cloud, evaporation, condensation, precipitation, erosion, barometer, anemometer, thermometer, rain gauge, weather vane

Knowledge

- the surface of the planet Earth is surrounded by a blanket of air called the atmosphere
- most of the Earth's surface is covered by water and circulates through the water cycle
- the Earth's surface is heated by energy from the Sun
- weather conditions that can be observed and/or measured include temperature, wind speed, wind direction, precipitation, air pressure, and cloud formations
- weather conditions affect living things (e.g., growth, behaviour, food, shelter)
- weather conditions (e.g., erosion) affect non-living things

Skills and Attitudes

- observe weather conditions and record using graphs, tables, and charts
- interpret data from recorded observations
- predict weather conditions
- construct simple instruments

Grade 4 Earth and Space Science: Weather

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • measure weather in terms of temperature, precipitation, cloud cover, wind speed and direction 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> systematically chart daily temperatures using a thermometer <input type="checkbox"/> design, build and test a simple rain gauge, weather vane, and anemometer <input type="checkbox"/> identify, chart, and illustrate daily cloud cover <input type="checkbox"/> make a detailed local weather report based on collected data 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Brainstorm the basic elements of weather, and review the water cycle. Then start a word wall. 	<ul style="list-style-type: none"> • Pre-test knowledge of the water cycle by having students (individually or in small groups) label a simple drawing with relevant vocabulary (e.g., precipitation, condensation, evaporation). Students could begin a 3-point approach (drawing/word/definition) dictionary to keep track of weather words. Assess student drawings and dictionaries for completeness, accuracy, and relevance.
<ul style="list-style-type: none"> • Introduce students to safe use of thermometers, and have them practise reading thermometers placed in different water temperatures. 	<ul style="list-style-type: none"> • Over a week, ask students to individually demonstrate <ul style="list-style-type: none"> - safe handling of a thermometer they move between containers of warm and cold water - ability to read resulting temperatures. See the sample assessment tool (Thermometer Use) provided at the end of this grade.
<ul style="list-style-type: none"> • Develop a class chart for keeping track of daily weather, including <ul style="list-style-type: none"> - temperature - precipitation - wind direction - cloud cover - prediction of tomorrow’s weather. • Have students construct and test weather instruments and record findings, which could be used in a class weather station. Include <ul style="list-style-type: none"> - rain gauge - wind vane (wind direction) - anemometer (wind speed) - cloud identification. 	<ul style="list-style-type: none"> • Establish with students expectations for filling in the weather chart and use of weather instruments <ul style="list-style-type: none"> - clarity and accuracy of observations and measurements - daily entries for all categories - reasonable predictions - organization of observations.

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Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • In pairs, have students make a cloud model, answer questions, and record observations <ol style="list-style-type: none"> 1. Pour a cup of hot water into a clear glass jar. 2. Put ice in an aluminium pie pan. Cover the top of the bottle with the pan. 3. What is happening inside the bottle? What is happening on the bottom of the pie pan? Record observations. 4. Repeat the experiment. This time, instead of ice put warm water in the pan. • Have student pairs discuss <ul style="list-style-type: none"> - What caused the change on the bottom of the pie pan? - When did “liquid” water change to water vapour? Then have them predict and test the change in one variable. (Alternatively, demonstrate this activity for the class.) 	<ul style="list-style-type: none"> • Have each student pair label and present to the class a diagram (poster, overhead) of what they learned about cloud formation. Assess student diagrams to ensure that they are clear and easy to follow, and that they include the main steps in the process.
<ul style="list-style-type: none"> • Have students examine weather reports from various media (e.g., TV, newspaper, Internet, radio). Then ask students to prepare their own weather reports with themselves as meteorologist. 	<ul style="list-style-type: none"> • Student weather reports should <ul style="list-style-type: none"> - include current data - use all the categories of the class weather chart - provide a forecast for upcoming weather. Encourage students to report daily weather conditions to a broadcast program such as Skywatchers.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Discovery Works for Grade 4: Unit E – Weather and Climate • Exploring the Atmosphere: Meteorology in Canada • Hands-on Science (Weather) • Introduction to the Water Cycle • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Science & Technology 5 (Weather) • Science, Please! (Part 2) • Weather & Climate • Weather and Climate 	

Grade 4 Earth and Space Science: Weather**Prescribed Learning Outcomes**

It is expected that students will:

- analyse impacts of weather on living and non-living things

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- predict and report on how freezing and thawing affect a variety of materials (e.g., water and soil)
- accurately predict and test various materials for water resistance and insulation from cold (e.g., slow down the rate of a melting ice cube)
- research and create a comprehensive report on the effects of erosion, drought, or other local weather impacts (e.g., sand table rivers, effects of run-off)

Planning for Assessment

- Pick unusual weather conditions and have students role play their effects on living things (e.g., hurricane, tornado, flood, blizzard).
- Have students test the effects of freezing and thawing by completely filling a small plastic water bottle with water and placing in a freezer. Ask them to predict, observe, and record what happens.
- Test for the effects of drought by having students select and plant and observe the effects of little or no water. Record observations, and predict what the long-term effects might be.
- Test for the effects of erosion by having students compare areas of the schoolyard (or a nearby field) that are only dirt-covered and those that are grass-covered, after a rainfall.

- Have students collect samples of fabric, and predict on a scale of 1-3 which ones might be water resistant. Then ask students to test predictions. Discuss the qualities of cloth that seem to be water resistant (e.g., plastic backing on a piece of table cloth).

Suggested Assessment Activities

- Assess student inferences connecting the investigations in this unit with weather-related events (e.g., bursting pipes, potholes, browned-out lawns, crop failures, rockslides) by completing a T-chart: "What I see, What this tells me." Encourage students to use personal experiences and/or picture collections.

Look for explanations that

- show accurate observations
- show reasonable inferences
- use appropriate vocabulary.

- Challenge students to design an outfit for a snowperson so that there is no melting. Look for evidence that students
 - justify choice of materials
 - develop appropriate designs
 - are open to suggestions for improvement.

Recommended Learning Resources

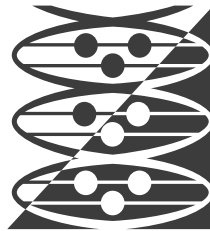
- Exploring the Atmosphere: Meteorology in Canada
- Hands-on Science (Weather)
- Introduction to the Water Cycle
- Project WET
- Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science
- Science, Please! (Part 2)
- Weather & Climate
- Weather and Climate

THERMOMETER USE

Name of student: _____ Date: _____

Use a rating scale such as the following to record individual student achievement/understanding.

Criteria — student is able to:	not yet within expectations	meets expectations	fully meets expectations	exceeds expectations
verbally describe parts of a thermometer				
verbally identify the thermometer as a tool for taking temperature readings				
verbally explain what temperature is				
show correct way to place thermometer in containers of hot/warm and cold water				
handle thermometer and hot water with care and attention, keeping self and others safe				
read numbers corresponding to temperature with a good degree of accuracy				
verbally explain the idea of minus (negative) numbers in relation to temperature				



CLASSROOM ASSESSMENT MODEL

Grade 5

ASSESSMENT OVERVIEW TABLE FOR: GRADE 5

The purpose of this table is to provide teachers with suggestions and guidelines for classroom-based formative and summative assessment and grading of Science K to 7.

Curriculum Organizers	Suggested Timeframe	Suggested Assessment Activities	Suggested Weight for Grading	Number of Outcomes	Number of Outcomes by Cognitive Level *		
					K	U & A	HMP
	Average # of hours						
PROCESSES OF SCIENCE	Integrated	Integrated	Integrated	3	2		1
LIFE SCIENCE	25-30	<ul style="list-style-type: none"> • quiz • model • written report 	33½ %	2	1	1	
PHYSICAL SCIENCE	25-30	<ul style="list-style-type: none"> • science log • written report • presentation • summative project 	33½ %	4	1	2	1
EARTH AND SPACE SCIENCE	25-30	<ul style="list-style-type: none"> • chart • presentation • self/peer assessment • debate 	33½ %	4	1	2	1
TOTALS	75-90		100 %	13	5	5	3

* The following abbreviations are used to represent the three cognitive levels: K = Knowledge; U & A = Understanding and Application; HMP = Higher Mental Processes

GRADE 5: PROCESSES OF SCIENCE

Key Elements: Processes of Science

Estimated Time: integrate with other curriculum organizers

Fair Testing

Before students undertake complex experiments, it is necessary that they learn to conduct a fair test of a single variable. For a test to be considered fair, all the experimental actions involved must be equally applied. All the conditions must be consistent and standardized. Standardizing the various conditions concerned with the test will allow only the intended influences to be observed. In practice, this means identical procedures must be uniformly performed while one variable is changed at a time. Accurate fair testing involves isolating variables, eliminating bias, repeating the results, and closely scrutinizing the intended question. The credibility of the experimental test is then judged in order to determine what really changed and why. Questions for test rigour include

- Is the experiment free of biased observations?
- Have all the variables been isolated?
- Did the experiment involve only one variable?
- Were the experimental results expected?
- Can other people repeat the experiments and get similar results?

Often, students can study a simple test and state how it might be unfair; but the ability to specify how a test is fair and how it ensures all outcomes have been equally determined is more difficult. At advanced levels of learning, fair testing includes controlled experiments with more than one variable and determining the independent and dependent variables. Later when designing experiments, students learn to check for bias, remove any chance influences, look for experimental errors, and determine whether the experimental question can be properly addressed before they start their investigations.

Designing Experiments

Designing experiments involves devising scientific investigations to test a prediction. The easiest means of checking a prediction is to ask a specific question that will confirm the predicted ideas. An experiment is a set of steps prepared or laid out to test a single question. It usually involves deciding how to conduct the investigation so the cause-and-effect properties are tested and directly measured. To ensure fair testing, all the experimental actions involved must be equally applied (planning and designing an experiment requires careful attention to these experimental actions). There are three main stages to most scientific investigations: *purpose, procedures, results*. Designing an experiment includes setting up the experimental problem, identifying the variables to be tested, planning for needed equipment, using inference to predict possible outcomes, and devising a set of tests to be carried out on all the outcomes. Once the experimental design is completed, advanced students at this level may choose to execute the procedure stage carefully and communicate the results to their peers.

Grade 5 Processes of Science

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • identify variables that can be changed in an experiment 	<ul style="list-style-type: none"> <input type="checkbox"/> accurately list variables that can be changed in a given experiment (e.g., the amount, material, duration) <input type="checkbox"/> outline an experiment where factors can be determined (e.g., toy car rally)
<ul style="list-style-type: none"> • evaluate the fairness of a given experiment 	<ul style="list-style-type: none"> <input type="checkbox"/> accurately list variables in a given experiment that can be tested (e.g., running shoe tread) <input type="checkbox"/> create a comprehensive report on the fairness of a given experiment
<ul style="list-style-type: none"> • describe the steps in designing an experiment 	<ul style="list-style-type: none"> <input type="checkbox"/> identify several of the components in an experiment (e.g., PURPOSE: develop an experimental prediction, write a testable question, identify the variables, plan setup and equipment, predict possible outcomes, devise a set of tests PROCEDURE: conduct the investigation as planned, then collect the results. RESULTS: analyse the data and communicate the final conclusions) <input type="checkbox"/> with teacher support, prepare an experimental plan that shows all the necessary components shown

GRADE 5 LIFE SCIENCE: HUMAN BODY

Key Elements: Life Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have recognized how the main systems of the human body work together.

Human Body

The study of the human body is a general overview of the structures and functions of the basic body systems, with particular emphasis on the study of the function of four organs: the heart, the lungs, the brain, and the skin. Through research and investigation of some easily observable and measurable indicators of body functions, students discover ways that our bodies' systems work together.

Vocabulary

cells, organs, heart, blood vessels, veins, arteries, trachea, lungs, esophagus, stomach, intestines, liver, kidney, bladder, colon, brain, spinal cord, nerves, blood cells, nerve cells, bones, cartilage, ligaments, muscles, tendons, skin, sense organs, membrane, digestion, nutrient, oxygen, carbon dioxide, pulse, reflex

Knowledge

- body organs interact with each other to ensure survival in the environment
- the respiratory system consists of the nose, mouth, trachea, and the lungs
- the circulatory system consists of the heart, arteries, veins, capillaries, and blood
- the function of the circulatory system is to transport oxygen, carbon dioxide, nutrients, waste products, water, and messenger chemicals to and from cells in the body via the blood
- the skeletal system consists of bones, cartilage, and ligaments
- the function of the skeletal system is to provide protection and structure, and to enable movement
- the muscular system is composed of muscles and tendons
- the function of the muscular system is to enable locomotion and the function of the some other body systems (e.g., circulatory, digestive, skin)
- the digestive system includes the teeth, mouth, esophagus, stomach, small intestine, liver, (pancreas), and large intestine
- the function of the digestive system is to extract nutrients and water from the food we eat so that it can be carried to all the cells of the body
- the excretory system consists of the kidneys and bladder
- the function of the excretory system is to eliminate soluble waste chemicals and regulate the amount of water in the body
- the nervous system consists of the brain, the spinal cord, nerves, and sensory organs
- the function of the nervous system is to allow us to sense and react to our environment and to control the other systems in the body

Skills and Attitudes

- use measurement tools
- design and carry out experiments on the functions of body systems and record results
- draw conclusions about the function and interactions of body systems

Grade 5 Life Science: Human Body

Prescribed Learning Outcomes

It is expected that students will:

- describe the basic structure and functions of the human respiratory, digestive, circulatory, skeletal, muscular, and nervous systems

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- identify the organs and their functions in a human body system
- illustrate the human respiratory, digestive, circulatory, skeletal, muscular, and nervous systems
- with teacher support, conduct various experiments to safely measure and record the responses of the various systems (e.g., heart rate, lung capacity, and reaction time)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Provide students with information on the heart, lungs, skin, and brain. 	<ul style="list-style-type: none"> • To check that students can identify and describe the functions of the heart, lungs, skin, and brain, have each student devise one question for each. Assign peers to attempt the questions, comment on appropriateness, and suggest improvements. Publish the edited questions and then select several to act as a written assessment tool to be given to the class as a whole.
<ul style="list-style-type: none"> • Have the class brainstorm all the words they associate with body systems. 	<ul style="list-style-type: none"> • Have each student “sort and predict” in a chart all the brainstormed words according to the appropriate body system. Ask students to self-correct the chart as they carry out further activities by moving or adding words to the appropriate body system (e.g., some might add liver to the digestive and circulatory systems).
<ul style="list-style-type: none"> • In groups, have students outline their bodies on a large sheet of paper. Ask groups to find, identify, and label the appropriate places of different organs that belong to the basic body systems, using books, the Internet, posters, or videos. • Have student groups make 3-D models of body organs and systems and describe how they function (e.g., use bottles for stomachs, old pantyhose for intestines, balloons for bladder, old combs for teeth). 	<ul style="list-style-type: none"> • Look for evidence that student models use <ul style="list-style-type: none"> - logical organization - reasonable representations - show major organs. Consider the extent to which students work effectively together and use learned vocabulary.

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Human Body (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Set up a series of learning stations where students work collaboratively and safely to investigate and conduct experiments on body systems. Ask students to <ul style="list-style-type: none"> - measure and record heart rate before and after some mild exercise (e.g., jumping jacks) - measure and record lung capacity by exhaling through a tube inserted into a container of water - measure and record reaction time by having one student grab a ruler dropped vertically by another student over several trials - test and record skin responses to hot and cold by having students dip one hand into hot and cold water for 30 seconds before immersing both in room temperature water. 	<ul style="list-style-type: none"> • When conducting investigative experiments, consider the extent to which students <ul style="list-style-type: none"> - ask appropriate questions (e.g., “How can I make my heart beat faster?” “What happens to my skin in hot and cold water?” “How fast can I catch a ruler?”) - gather and set up materials - follow a logical procedure that is fair and consistent - collect and clearly organize data - draw reasonable conclusions and be able to communicate them (e.g., oral class presentations, science journal entries) - work collaboratively with others (e.g., listening, encouraging each other, sharing observations).
<ul style="list-style-type: none"> • Revisit students’ original brainstorm of body system words to add to their initial sort-and-predict charts. 	<ul style="list-style-type: none"> • Have students choose three or more words they moved or added and justify in writing why they did so (i.e., tell what they learned). Assess responses to the following types of questions: <ul style="list-style-type: none"> - I moved _____ to _____ system because... - I learned that the _____ is important because... - One thing I found interesting/amazing about the _____ (system/organ) was... - I would like to learn more about the _____ (organ/system) because...
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • The Amazing Body for Students Series • Circulatory and Respiratory Systems • From Head To Toe (AIMS Activities) • Hands-on Science (The Human Body) • The Real World Science Series (The Skeletal and Muscular Systems; The Digestive & Excretory System; Respiratory and Circulatory System; The Brain and Nervous System) • Science & Technology 5 (The Human Body) • What’s Inside Your Body? 	

Grade 5 Life Science: Human Body

Prescribed Learning Outcomes

It is expected that students will:

- explain how the different body systems are interconnected

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- generate and answer several questions to investigate how body systems are integrated (e.g., How are the various systems connected to each other? Could one system live with the other systems? If not, why not?)
- demonstrate various ways in which body systems work together, using role plays, posters, and/or 3-D representations

Planning for Assessment

Suggested Assessment Activities

- Using learned vocabulary, ask students to describe how different systems are interconnected by linking parts and functions, such as
 - heart/lung/oxygen – CO₂ exchange
 - brain/nerve – message
 - tendons and ligaments/bones – movement
 - veins/arteries – circulate.

- Have student groups share how they linked the words. Consider the extent to which student presentations show a logical sequencing of words (e.g., muscles connect bones so that a body can move; lungs provide O₂ to the blood, which is pumped by the heart).

- Have students complete vocabulary word wheels for the various organs they study, divided into six sections plus a centre circle. The circle asks the question, “What is the system?” Each of the six sections asks the following questions
 - To which system does it belong?
 - To which system is it connected?
 - Is there only one system or many? Why?
 - What is the system’s main job?
 - Could we live without it? If so, how?
 - What does it need to work well?

- Ask students to assess each other’s word wheels for accuracy and clarify of information. Encourage students to provide each other with help completing their wheels if necessary.

Recommended Learning Resources

- The Amazing Body for Students Series
- Circulatory and Respiratory Systems
- From Head To Toe (AIMS Activities)
- Hands-on Science (The Human Body)
- The Real World Science Series (The Skeletal and Muscular Systems; The Digestive & Excretory System; Respiratory and Circulatory System; The Brain and Nervous System)
- Science & Technology 5 (The Human Body)
- Thinking Connections: Concept Maps for Life Science
- What’s Inside Your Body?

GRADE 5 PHYSICAL SCIENCE: FORCES AND SIMPLE MACHINES

Key Elements: Physical Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have understood the relationship between forces and mechanical advantage in simple machines.

Forces and Simple Machines

In this study, students begin to understand the relationship between effort (applied force) and simple machines. By exploring and experimenting with a variety of objects, students develop understanding of the relationship between the mass and motion of an object and the force needed to change the object's direction, speed, and position. Through hands-on activities, students identify and understand the characteristics and uses of the simple machines. Students describe how the application of machines reduces the applied force required for people to do work. They also design and construct both simple and compound machines with a useful function.

Vocabulary

simple machine, lever, wedge, pulley, ramp, screw, inclined plane, wheel, axle, effort force, force, fulcrum, mass (weight), load, friction, work, compound machine, unbalanced forces, balanced forces, equilibrium

Knowledge

- unbalanced forces 'change' motion, while balanced forces 'maintain' the motion
- a pulling or pushing force can be measured with a spring scale
- friction is a force parallel to a surface that will result when an object makes contact with a surface
- surface texture can be rough, smooth, or slippery depending upon the material that is at the surface
- frictional forces, mass, surface texture, and the slope all can affect the movement of an object down a ramp incline
- simple machines change the effect of how much effort force is applied to the machine to do something useful
- simple machines include lever, wedge, inclined plane, screw, roller, axle, wheel, and pulley
- simple machines don't change the load (mass); they change the amount of effort used to move the same mass
- compound machines are combinations of simple machines (screw and screw-driver, scissors, teeter-totter, ladder-and-slide, shopping cart, wood-axe, door handle, hinge, travois, wheelbarrow, pencil sharpener, hand-drill, push-mower, typewriter, bicycle)

Skills and Attitudes

- observe the effort used to change the direction and motion of objects (balanced and unbalanced forces)
- measure amount of effort force "saved" by using a simple machine
- demonstrate curiosity and show inventiveness
- design an investigation to test and compare simple machines
- ensure fair testing when conducting an experiment
- identify and control variables in an investigation
- communicate in various media to show how simple machines work
- use materials and tools safely

Grade 5 Physical Science: Forces and Simple Machines

Prescribed Learning Outcomes

It is expected that students will:

- demonstrate how various forces can affect the movement of objects

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- accurately describe the effects of increasing and decreasing the amount of force applied to an object (e.g., lifting a wooden block)
- compare the effects of friction on the movement of an object over a variety of surfaces (e.g., sandpaper, rug, smooth wood, chalk dust, gravel)
- with teacher support, design a fair test to see how an object's motion is affected by ramps with different surfaces, slope, length, and initial height

Planning for Assessment

Suggested Assessment Activities

- Use Toy Blocks, sewing thread, and hand-held spring gauges to measure push and pull effort forces. Tie the thread around one block and the end of the thread to the spring gauge. Holding the spring gauge, lift the block by pulling gently on the thread. With the block now hanging from the thread, read the measurement on the gauge.
- After trying one thread and one scale and one person, add people. For a two-person pull, lift opposite to each other around the block. Take a reading of pulling force shown on the scales.
Have students try it with three, four, and five people to see the effort forces changes fractionally by the number of people equally pulling on the block to lift it. Compare readings to the one-person lifting measurement.

- Students should predict and record the results for each activity. Look for evidence of
 - proper use of equipment
 - willingness to make/record a prediction
 - ability to provide a reason for the prediction
 - willingness to record a result contrary to a prediction
 - ability to reflect on reasons for different (or same) results
- Students should measure the two-person pull used to lift the block, being careful to pull equally around the block from two attachment points. Students should be able to notice a 50% change in pulling force as measured on the gauge. They are comparing this with the one-person lift/pull. Students could show their understanding by coming up with a fractional answer for the number of people pulling. Students are measuring balanced forces at the moment the block is stationary in the air, their hands are not moving, and the spring gauges are reading a steady number.

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Forces and Simple Machines (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> Using spring scales, ask students to compare the force needed to slide a measured mass/load (e.g., a book) up a ramp. Vary the nature of the surfaces texture (e.g., a smooth clay tile, a piece of sandpaper, piece of rug, smooth plastic). Take different readings using a spring scale to measure the amount of effort force used to slide the mass up the ramps. 	<ul style="list-style-type: none"> Look for evidence that students have followed the proper procedure for organizing and conducting an experiment: <ul style="list-style-type: none"> - asking a question - identifying the variable that will change (surface of the ramp) - identifying other variables that will stay the same (load, slope) - measuring, using the appropriate tool (spring scale) - recording trial results in a logical manner (chart) - drawing conclusions that reflect the question.
<ul style="list-style-type: none"> Design a fair test for a toy car gravity race. Have students test how different slopes, surfaces, or car weights (mass) affect their moving energy (momentum) and the distance finally travelled by the toy car. As an advance exploration, have students design and fair test how sports-balls drop and bounce against different textures of floors. (rug, tile, concrete, wood) What is being investigated is the main difference surface friction has on the returning upward bounce. Have students drop a ball using a standard height (e.g., 1 metre) to represent the force. They then describe the bouncing results. They must use the same ball for each surface (other students can use different balls for theirs). Sports-balls have differing compositions (rubber, leather, plastic) and therefore will have different upward bounces. Students should measure as many components as they believed are involved (size, weight, height, etc.). Caution: this investigation must be very carefully standardized, as many unseen variables are involved. (e.g., The elastic surface of the balls, the weight of the ball, the height of the drop and the height of the first return bounce, the quality or flatness of the floor). What should be changed is the type of floor face the balls drop onto, so they will bounce differently. 	<ul style="list-style-type: none"> As well as meeting the criteria for organizing and conducting experiments (see above), consider the extent to which students have identified all the variables involved and decided which variables to control. Use peer assessment for fair testing. Some criteria for students to consider include <ul style="list-style-type: none"> - My partner helped to set up a fair test by _____. - My partner had a good idea when _____. - We worked well together because _____. - We need to work on _____ to improve our test. - We need to work on _____ to improve how we work together. The preceding criteria can be put in a checklist and used throughout the unit. See also the assessment tool, "My Science Investigation – Drop the Bouncing Ball" located at the end of the Classroom Model When assessing students' conclusions, look for details about surface texture and MORE or LESS friction. They should also note that the height of the upward bounces is telling them some important fact about the investigation.

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Forces and Simple Machines (continued)

Recommended Learning Resources

- Hands-on Science (Simple Machines)
- OceanNews
- Putting it in Motion (Pan Canadian Science Place)
- Science Answers
- Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science
- Science & Technology 5 (Forces on Structures)
- Science, Please! (Parts 1 & 2)
- Simple Machines
- A World in Motion: The Design Experience

Grade 5 Physical Science: Forces and Simple Machines

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • demonstrate mechanical advantage of simple machines, including lever, wedge, pulley, ramp, screw, and wheel 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> identify and classify everyday devices according to the six basic machines (lever, wedge, inclined plane, screw, roller, axle, wheel, and pulley) <input type="checkbox"/> compare the advantages and disadvantages of various simple machines for identical tasks (i.e., choosing the right machine for the right job) 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Review the previous work on simple machines by making sure the vocabulary is understood. Check prior knowledge of forces including balanced and unbalanced, plus the concept that a simple machine has effort (force) going into the machine and the machine is putting out (output) a changed force. 	<ul style="list-style-type: none"> • Use observations and discussion to determine the students' understanding.
<ul style="list-style-type: none"> • Have examples of simple machines to show students, encouraging them to use learned vocabulary to describe the following <ul style="list-style-type: none"> - screw (screw-top jar lid; wood screw) - wedge (doorstop, nail) - pulley (yo yo, fishing reel) - lever (tweezers, scissors, shipper's dolly) - wheel (toy car, steering wheel) - axles (hinges, blinds, AV screen) - inclined plane (stairs, ramp). 	<ul style="list-style-type: none"> • Give students parts from a child's construction kit or find equipment from the science supply room. Have students fabricate and show one of each sample machine : <ul style="list-style-type: none"> - lever - wedge - inclined plane - screw - axle and wheel - pulley. Each machine can be submitted for assessment to the teacher or a partner. Alternatively, students can make labelled drawings of each simple machine and submit to a partner or the teacher for assessment.
<ul style="list-style-type: none"> • Take students on a walk (inside or outdoors) to see how many simple machines they can find. Be mindful that most wheels have bearings inside the axle and therefore are a compound machine. • Set up a machine ID table, using a variety of household gadgets and tools. Have students practise identifying the simple machines in each object and the job they do. 	<ul style="list-style-type: none"> • In their science logs, have students make labelled drawings of their discoveries and describe their experiments with simple machines. Look for <ul style="list-style-type: none"> - appropriate scientific vocabulary used - diagrams properly labelled - explanations provided as to how simple machines work. - appropriate procedures followed - predictions and hypotheses made and tested - results recorded.

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Forces and Simple Machines (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Set up stations that allow students to operate or manipulate simple machines such as levers, wheel and axle, wedges and screws, pulleys, and inclined planes to test how they make work easier. • Follow up by making effort comparison between different sizes of the same simple machine (e.g., three sizes of screwdriver, three lengths of scissors, three types of nail pulling levers) Determine the effort to use when operating these simple machines. Use the same test items for each. For the screw, use all screwdrivers (i.e., 2" #8), cut the same card-paper along a straight line with all the scissors, and finally try pulling out the same size common nails (i.e., 3" flat-head, half embedded in wood) with the nail pullers. 	<ul style="list-style-type: none"> • Develop a comparison system for the students or work with them to develop their own table. Remind them that to fair test they have to keep most of the parts identical. The table or chart should contain <ul style="list-style-type: none"> - columns or rows for one size of machine - columns or rows for each test item - a quality for measuring the item (e.g., screw: how many hand turns) - student effort rating (e.g., easy, medium-easy, hard, or no difference) - conclusion specifying which machine would be best for the tested item - evidence in their thinking that shows they can relate the best device for other possible situations with different items than the ones investigated. (e.g., small nails with smaller diameters, thinner paper for cutting, different types of screws).
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Hands-on Science (Simple Machines) • Putting it in Motion (Pan Canadian Science Place) • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Science & Technology 5 (Forces on Structures) • Science, Please! (Parts 1 & 2) • Simple Machines • A World in Motion: The Design Experience 	

Grade 5 Physical Science: Forces and Simple Machines

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> design a compound machine 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> identify the simple machine incorporated in the working parts of compound machines designed for a specific task (e.g., lifting, pulling, and carrying heavy loads) proficiently assemble a compound machine, illustrating in detail how it is constructed from a combination of simple machines 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> Have students examine items from around the school that they believe show a simple machine in operation. (e.g., can opener, scissors, paper cutter, playground slide, flat tongs for trash, dust pan, and flag pole rope) Using the previous machines, compare these to another set of devices found around the school, which show combinations of simple machines. (e.g., spring-loaded door, drawers, door hinges, roller blind, stage rope/curtain/hooks, freight dolly, mop squeeze rinse, trash picker with trigger grip and a dusk bucket on a pole). Have students prepare a compare and contrast sheet or a KWL using these items. Discuss how these examples combine and work with levers, pulleys, ramps, screws, wedge, wheels, incline plane. 	<ul style="list-style-type: none"> When assessing students initial compare and contrast focus on early understanding only. In particular look for <ul style="list-style-type: none"> alignment of matched items by similar function, (i.e., trash picker, dust bin) correct naming of simple machine part (i.e., lever, pulley etc.) ability to explain the machine’s function and necessity. After discussion, all students should be able to name the basic machine parts in the school examples: levers, pulleys, ramps, screws, wedge, wheel and axle, incline plane
<ul style="list-style-type: none"> Have students use the following process to design an imaginary compound machine <ul style="list-style-type: none"> start with an idea and provide a reason or necessity for the invention the machine should move an object (load) horizontally and vertically identify the simple machines parts that make up the compound machine by the purpose they serve draw a design on paper label the parts on paper (optional) build a labeled working model identify difficulties and suggest improvements to the design. 	<ul style="list-style-type: none"> When assessing students’ compound machines, consider the extent to which students have <ul style="list-style-type: none"> followed various steps of the design process designed a machine that consists of more than one interconnected simple machine designed the machine to move the object (load) upward designed the machine to move the object (load) a horizontal distance demonstrated creativity or originality shown understanding and are able to explain the machine’s function matched the machine with the task.

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Forces and Simple Machines (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Conduct a close look at some heavy equipment machinery in your neighbourhood. If possible, arrange a field-study to visit an industrial equipment site. Focus on the levers and wheels on machines and the way these work together. Also look at the large hand-tools used to repair these machines. (Note: at this level of understanding hydraulics are not explained. All large machines use hydraulic pistons and pumps to move their levers and wheels) 	<ul style="list-style-type: none"> • Assess student understanding by looking for their ability to <ul style="list-style-type: none"> - use correct vocabulary - identify how one simple machine is connected to another - describe how movement and motion of the one machine is transferred into the next simple machine (e.g., rotation into pulling – for a fishing reel). - demonstrate, using labelled diagrams, how human power is applied to the machine setup to make it work.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Below Zero • Hands-on Science (Simple Machines) • Putting it in Motion (Pan Canadian Science Place) • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Science, Please! (Parts 1 & 2) 	

Grade 5 Physical Science: Forces and Simple Machines

Prescribed Learning Outcomes

It is expected that students will:

- describe applications of simple and compound machines used in daily life in BC communities

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- give several examples of some common heavy machines that contain simple machines (e.g., fork-lift, backhoe, grader, crane, log-loader)
- illustrate in detail how a combination of simple machines can be used to solve various problems in daily life
- describe the various ways in which Aboriginal peoples in BC have used machines to meet basic and artistic needs in their daily lives

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students identify several methods and machines using human power for <ul style="list-style-type: none"> - lifting a load upward - lowering a load downward - lifting and swinging a load sideways - pulling a heavy load up a ramp - moving a very heavy load a short distance (e.g., a rock with a lever). • Have students identify where the fulcrum is located on several types of machines with lifting arms. • Common machines will have hydraulic oil systems, which are not simple, but all will be attached to a simple machine that students will be able to recognize. 	<ul style="list-style-type: none"> • When beginning to look at common machines students must be able to name where a lever is hinged, how it is pushed or pulled, and how it does work. • On machines with hydraulic pistons, ask students to explain how the hydraulics are attached to a simple machine (i.e., as enhancements).
<ul style="list-style-type: none"> • Present students with a specific problem-solving situation (e.g., how to transport a person in a wheelchair up or down a flight of stairs). Have them provide possible solutions using simple machines. The project task is to design an emergency exit machine for an injured person needing to go down the stairs and outside a door. The design must incorporate two or more simple machines. 	<ul style="list-style-type: none"> • When assessing student solutions, consider <ul style="list-style-type: none"> - whether the students have given a logical explanation of their solution - the simplicity and elegance of solution - the compatibility of machine for the task - whether the solution uses at least two simple machines - whether the solution uses three or more simple machines interconnected - whether the solution removes the person safely down the stairs - whether the solution gets the person outside the door.

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Forces and Simple Machines (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students investigate simple and compound machines used by Aboriginal peoples (e.g., hunting and/or fishing techniques, building canoes and/or Red River carts, creating and/or raising poles). • Ask students to research how Aboriginal peoples used, or continue to use, machines (simple and compound), and how adaptations, if any, have been made to meet needs; for example <ul style="list-style-type: none"> - snowshoes to snowmobiles - hand thrashing to horse-drawn mower to ploughs - cedar canoes to power boats - hand-made shelter to machines used to build homes. 	<ul style="list-style-type: none"> • Establish with students specific criteria for investigating, drawing, and labelling an Aboriginal machine, such as <ul style="list-style-type: none"> - identified resources used in making the machine and its purpose - indicated why a particular machine was chosen - showed how the machine was/is used - drawings and labels are accurate and appropriate. • Have students prepare a report to the class (e.g., posters complete with pictures showing “Then and Now”). Establish general criteria for assessing reports, posters, articles, etc., such as <ul style="list-style-type: none"> - use of at least three resources - use of scientific vocabulary - clear comparisons between then and now. Alternatively, ask students to complete a Know Wonder Learn (KWL) chart or concept map of what they have learned.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • OceanNews • Putting it in Motion (Pan Canadian Science Place) • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science 	

GRADE 5 EARTH AND SPACE SCIENCE: RENEWABLE AND NON-RENEWABLE RESOURCES

Key Elements: Earth and Space Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have assessed the environmental considerations associated with the extraction and use of renewable and non-renewable resources.

Renewable and Non-renewable Resources

This study is an introduction to renewable non-renewable resources in British Columbia. Students learn how people harvest or extract, process, and use renewable and non-renewable resources. Students classify living and non-living resources as renewable or non-renewable and investigate effective uses of various resources. They consider issues of resource use from various perspectives and identify ways in which people use resources responsibly.

Vocabulary

The following list will be dependent on local resources:

ecosystem, local environment, water cycle, groundwater, surface runoff, leaching, biodegradable, natural resources, watershed, air-shed, conservation, recycling, extraction, harvesting, renewable, non-renewable, pollution (water/air/soil), equilibrium, resource, raw materials, solar energy, environmental impact

Knowledge

- all resources used by humans, including fuels, metals and building materials, come from the Earth
- many resources take thousands or millions of years to develop and accumulate; as such, they are considered non-renewable resources (e.g., fossil fuels, rocks and minerals)
- some resources are constantly available and are considered to be renewable resources (e.g., hydropower, sun, and wind)

Skills and Attitudes

- analyse data to determine if a resource is renewable or non-renewable
- investigate an environmental resource issue
- identify variables that will determine if a particular locally used resource is renewable
- resources should be used carefully, recycled, and conserved by humans whenever possible
- demonstrate socially responsible actions

Grade 5 Earth and Space Science: Renewable and Non-renewable Resources

Prescribed Learning Outcomes

It is expected that students will:

- analyse how BC’s living and non-living resources are used

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- with teacher support, analyse data and correctly classify BC’s resources as renewable or non-renewable (e.g., renewable: salmon; non-renewable: copper)
- explain in detail various ways in which BC’s resources are used (i.e., for commercial and/or recreational purposes)

Planning for Assessment

Suggested Assessment Activities

<ul style="list-style-type: none"> • Brainstorm resources in British Columbia. Establish criteria for determining whether a resource is living (e.g., breathes, grows, uses energy) or non-living (none of the above examples). 	<ul style="list-style-type: none"> • Use T-charts to classify the brainstormed resources as living or non-living. Encourage students to use criteria developed for appropriate classification. Check for understanding by reviewing T-charts.
<ul style="list-style-type: none"> • Ask students to choose one resource and identify possible uses (e.g., trees: furniture, houses, paper, fuel, recreation; petroleum: fuel, plastics, clothing, cosmetics). 	<ul style="list-style-type: none"> • Have students construct word splashes or mind maps in small groups. Post student work and have groups do a gallery walk to review each other’s work. Ask students to write on a blank piece of paper beside each group presentation suggestions on what could be added. Student self-assessment of the gallery walk could address questions/statements such as <ul style="list-style-type: none"> - How helpful were the suggestions I gave? - Based on my gallery walk, now I know how/ why _____ is used/is an important resource. (summarize) - Questions I have about _____ are: _____ (give two or three). - I will find out about (question #?) by _____ (action plan).
<ul style="list-style-type: none"> • As a class, participate in local environmental education programs (e.g., salmonid enhancement, Project Wild, Project Tree, Project Wetlands, Project Oceans). 	<ul style="list-style-type: none"> • Most environmental education programs have developed assessment tools (e.g., Project Wild: salmonid enhancement).

Recommended Learning Resources

- Backyard Biodiversity and Beyond
- Forests in Focus
- OceanNews
- Our Resources (Pan Canadian Science Place)
- Project WET
- Salish Sea
- Salmonids in the Classroom
- Urban Stewards
- The Watershed Works

Grade 5 Earth and Space Science: Renewable and Non-renewable Resources

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • identify methods of extracting or harvesting and processing BC’s resources 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> illustrate several examples of resource harvesting or extraction (e.g., salmon, trees, oil, gas, water, copper, coal) <input type="checkbox"/> trace a finished BC resource-based product (e.g., a tin of salmon, cedar basket, oil and gas) to its source 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students choose a BC product and research how it is developed, and create a flowchart. For example, copper wire: ore extracted, crushed, and concentrated; sent to smelter and melted into bars; sent to manufacturers and made into wire, sheets, and pipes; sent to distributors, or sent to retailers such as hardware stores where the product is purchased. <p>Students may wish to contact, for example, mining companies, local manufacturers, and/or the appropriate government ministry.</p>	<ul style="list-style-type: none"> • Design with students a scoring guide to assess flowcharts. Criteria could include <ul style="list-style-type: none"> - uses appropriate vocabulary - is organized in a logical sequence - includes primary processes or main ideas - shows details for all parts of the process.
<ul style="list-style-type: none"> • Have students create diagrams or participate in simulations to illustrate examples of extraction (e.g., extraction—chocolate chip cookie mining). For example, in a chocolate cookie simulation, students use paperclips to “mine” chocolate “ore” from a cookie “claim” they have purchased (monopoly money). 	<ul style="list-style-type: none"> • Ask students to assess their own performance in the simulation according to pre-set criteria (e.g., amount of chocolate mined; value of chocolate; cost of the tools [paperclips] and claim [cookie]). • Have students compare what they did in the game to the actual extraction process. Criteria for assessment would include completion of each step in the process. Students then create an overview of the process, with a figurative representation, an explanation, an analogy, and two questions to find out more about the process.
Recommended Learning Resources	
<ul style="list-style-type: none"> • Forests in Focus • Kokanee of British Columbia • Our Resources (Pan Canadian Science Place) • Salmonids in the Classroom • Urban Stewards • The Watershed Works 	

Grade 5 Earth and Space Science: Renewable and Non-renewable Resources

Prescribed Learning Outcomes

It is expected that students will:

- analyse how the Aboriginal concept of interconnectedness of the environment is reflected in responsibility for and caretaking of resources

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- illustrate in detail various ways in which Aboriginal peoples take care of the land and the resources
- explain, citing examples, how and why Aboriginal peoples' unique relationship with the environment demonstrates responsibility for the land and resources

Planning for Assessment

Suggested Assessment Activities

- Discuss with students how Aboriginal peoples demonstrate pride and ownership of resources from the land (e.g., choosing to use only a part of a tree, so as to not kill it; only fishing for their family's needs; using all parts of the moose, or deer, so as not to waste it. Then, invite First Nations speakers to share their perspectives on the terms "living" and "non-living."

- Have students prepare questions to ask the speakers. Consider the extent to which students
 - show curiosity and respect
 - ask relevant and appropriate questions
 - demonstrate understanding of the Aboriginal concept of interconnectedness of the environment
 - identify ways in which Aboriginal peoples demonstrate care and responsibility for the environment.

- Have students explore controversial issues that are pertinent to First Nations people (e.g., a mining company comes into a small community – the First Nations community is concerned that their stores of fish will be depleted, and the water source may be contaminated; a logging company wants to clear-cut an area in a First Nations community – the First Nations people consider the trees sacred and necessary for various wildlife). Ask students to prepare and present written arguments using the RAFT strategy
R: Role of Writer – Who are you?
A: Audience – To whom is this written?
F: Format – What form will it take? a letter, a poem, a journal?
T: Topic + strong verb – What important topic have I chosen? Choose a strong verb to describe your intent

- Have students discuss the pros and cons from the point of view of the First Nations community, the mining company, or the deer population. Observe levels of student participation and willingness to listen to other points of view. Then have them write a statement summarizing a chosen point of view. Consider whether students have
 - identified needs and concerns of this point of view
 - expressed sensitivity to all points of view.

Recommended Learning Resources

- Cycle of Life/Recycle Handbook for Educators
- Once Upon a Seashore
- Our Resources (Pan Canadian Science Place)
- Salish Sea
- The Watershed Works

Grade 5 Earth and Space Science: Renewable and Non-renewable Resources

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> describe potential environmental impacts of using BC’s living and non-living resources 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> identify and describe a variety of solutions to address the issue of natural resource management in BC (e.g., conservation of resources through recycling) <input type="checkbox"/> collect relevant data and coherently articulate various points of view on a local resource issue in BC 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> Have students investigate ways of conserving resources through the practice of reduce, reuse, recycle by setting up a school- or community-based program (e.g., paper recycling/use reduction; can/bottle/juice box recycling; water conservation). 	<ul style="list-style-type: none"> Monitor student-generated conservation programs by tracking effectiveness (e.g., amount of paper saved; money earned from can/bottle/juice pack box). Have students develop a checklist on constitutes a successful program.
<ul style="list-style-type: none"> Collecting information from a variety of sources, have students debate a resource issue. Pro and con positions should be extended to include perspectives of Aboriginal peoples, impact on local jobs and the economy, environmental quality, living resources, and politics. Students should use a problem-solving or decision-making model to help them decide the issue, and write letters communicating the class results to key individuals in the community. 	<ul style="list-style-type: none"> Ask students to work together to debate the pros and cons involving the extraction or use of a BC resource. Look for evidence that students <ul style="list-style-type: none"> define/clarify the problem gather, analyse, and interpret information available synthesize information into a concise representation contribute to group problem solving and decision making understand that the use of BC resources affects local ecosystems as well as communities are able to make decisions based on responses, pro and con.
Recommended Learning Resources	
<ul style="list-style-type: none"> Backyard Biodiversity and Beyond Cycle of Life/Recycle Handbook for Educators Forests in Focus Kokanee of British Columbia Once Upon a Seashore Our Resources (Pan Canadian Science Place) Project WET Project WILD Salish Sea Urban Stewards The Watershed Works 	

MY SCIENCE INVESTIGATION—DROP THE BOUNCING BALL

This assessment tool can be used when teaching students various ways an effective science investigation can and should be conducted (e.g., determine if students have addressed what is needed; know how to proceed; understand the importance of predicting; examine variables; make fair observations; and draw relevant, conclusions). Although this scoring guide is written for dropping a bouncing ball, it can be used with other science investigations.

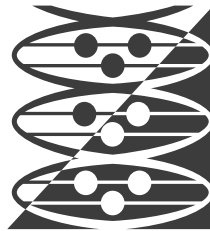
	1 (not yet within expectations)	2 (meets expectations)	3 (fully meets expectations)	4 (exceeds expectations)
Predicting	has difficulty predicting and/or prediction not reasonable given purpose of investigation	understands what a prediction is but may need to be encouraged to propose one and to record before proceeding	willing to make and record logical predictions for investigation (e.g., “I predict this hard floor will bounce less than the soft floor)	able to make accurate predictions without any assistance.
Organizing	little or no evidence of awareness or attempts to organize data in a logical manner	approaches organizing for investigation in an “as needed” manner (i.e., does not consistently plan ahead for how data will need to be organized/presented)	shows ability to consider how to organize data prior to undertaking investigation and how to proceed (e.g., prepare an empty chart or table)	organizes well, plans ahead, and adds new categories for organizing data
Identifying variables	little or no thought given to other variables that might affect investigation, even when questioned or encouraged	understands that a variable is something that can be changed/controlled but may not be able to identify all other possible variables	recognizes the main variable (e.g., force) as something changeable	recognizes that other changes could be considered variables (e.g., type of ball, bouncing surface)
Manipulating variables (modifying the testing)	does not change investigation to consider other variables for testing does not recognize need for more trials	carries out investigation for required variable (e.g., height, weight, floor textures) may not recognize that variables need to be tested more than once,	does not need to be encouraged/directed to test or consider other variables	investigates different variables (e.g., distance, size, materials, surfaces) and organizes collected data accordingly recognizes some variables are difficult to control
Recording observations	minimal recording of what is observed; no organization to data	records what is observed but may be reluctant to record observations contrary to predictions	records what is observed honestly	accurately records what is observed fairly, even when predictions are disproved (i.e., results don’t match)
Drawing conclusions	does not provide a clear conclusion. may remark on the effort they applied but does not refer to the science concepts	conclusion only restates the recorded results and observations	conclusion reflects science understanding within context (forces effect the bounce) and gives some reason for results based on observed evidence.	completes investigation with logical conclusions that reflect ability to match the evidence, the data collected, and the observations made. makes a comprehensive report that shows scientific understanding of the concepts of forces, friction, and fair tests

Teacher:

- 1** = not yet within expectations
- 2** = meets expectations
- 3** = fully meets expectations
- 4** = exceeds expectations

Student:

- 1** = needs to be better
- 2** = okay
- 3** = quite good
- 4** = best expectations



CLASSROOM ASSESSMENT MODEL

Grade 6

ASSESSMENT OVERVIEW TABLE FOR: GRADE 6

The purpose of this table is to provide teachers with suggestions and guidelines for classroom-based formative and summative assessment and grading of Science K to 7.

Curriculum Organizers	Suggested Timeframe	Suggested Assessment Activities	Suggested Weight for Grading	Number of Outcomes	Number of Outcomes by Cognitive Level *		
					K	U & A	HMP
	Average # of hours						
PROCESSES OF SCIENCE	Integrated	Integrated	Integrated	2	1	1	1
LIFE SCIENCE	25-30	<ul style="list-style-type: none"> • drawing • demo • written report • science log • presentation • diagram 	33½ %	3	1	1	1
PHYSICAL SCIENCE	25-30	<ul style="list-style-type: none"> • oral summary • lab report • quiz • critique • demo • model • diagram • summative project 	33½ %	4	2	2	2
EARTH AND SPACE SCIENCE	25-30	<ul style="list-style-type: none"> • quiz • presentation • portfolio • picture gallery • model • drawing • written report • game 	33½ %	3	1	1	1
TOTALS	75-90		100 %	12	2	5	5

* The following abbreviations are used to represent the three cognitive levels: K = Knowledge; U & A = Understanding and Application; HMP = Higher Mental Processes

GRADE 6: PROCESSES OF SCIENCE

Key Elements: Processes of Science

Estimated Time: integrate with other curriculum organizers

Controlling Variables

Discovering and then deliberately controlling the conditions that influence the outcome of an experiment are needed to avoid drawing incorrect conclusions from observations. It requires that all factors and influences be identified first and then manipulated in a systematic manner. Students must ensure that only one variable is changed (or tested) at a time. Those variables not changed are called the control. Important conditions to consider while experimenting might include

- determining equal measures by mass or volume of the test objects
- setting standard conditions for light, temperature, and water
- identifying other variables or factors that could affect the outcome
- limiting or removing those other variables not involved in the study
- following the experimental design by controlling relevant variables
- repeating the experiment many times to yield consistent results
- using the recorded data as evidence of a “cause” relationship.

When assessing students’ understanding and ability to apply controls to the variables, consider how the independence of the variables was restricted. Observe how the procedures followed during the investigation were uniformly applied to all similar components or test items throughout the experiment. By conducting fair tests, the cause and effect is best inferred from the results gathered. Observe how many recorded events were repeated to obtain consistent results before they were accepted.

Problem Solving

The process of scientific problem solving is a critical thinking response to observed experiences in which a science problem is solved. It combines all the activities of asking questions, gathering evidence, designing and proposing solutions, and testing those solutions by making a prototype. This grade level sees the beginning of technical design work, and problems are solved by practical methods. Problem solving includes these stages

- determine the humans needs involved in the situation (or assigned task)
- identify the task, and observe the key attributes involved
- establish the criteria for use of the prototype (set limits)
- plan creatively a possible set of solutions
- determine the available materials or equipment, and select a course of action
- draw a series of possible solutions for building
- build a prototype or model
- test and evaluate the model according to the criteria
- evaluate the results and redo if necessary
- communicate success to others.

When assessing students’ understanding and ability to apply solutions to a technical problem, consider how well they identify the problem, design possible solutions, construct a product or answer, test and evaluate the results, and communicate success. Students may not initially understand the concepts involved, but as the process continues, consider the extent to which the details are accurately identified and modifications made for a suitable outcome.

Grade 6 Processes of Science

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • manipulate and control a number of variables in an experiment 	<ul style="list-style-type: none"> <input type="checkbox"/> identify quantities of key factors (e.g., light, water, nutrition, temperature) as relevant variables in a test (e.g., of biological growth) <input type="checkbox"/> suggest and systematically implement controls on variables directly related to the outcome of an experiment (e.g., amount, quality, length) <input type="checkbox"/> explain, with reference to possible consequences, the importance of a consistent and standardized approach to dealing with variables
<ul style="list-style-type: none"> • apply solutions to a technical problem (e.g., malfunctioning electrical circuit) 	<ul style="list-style-type: none"> <input type="checkbox"/> make adjustments in technique when immediate results are not obtained (e.g., adjust microscope settings) <input type="checkbox"/> use a persistent and organized approach to determine why a technical product (e.g., an electrical circuit) is not working, and modify it to make it work <input type="checkbox"/> suggest effective and practical ways to modify a technological instrument or tool (vehicles, clothes, food, buildings, wrenches) to permit its function in an extreme environment

GRADE 6 LIFE SCIENCE: DIVERSITY OF LIFE**Key Elements: Life Science**

Estimated Time: 25 – 30 hours

By the end of the grade, students will have observed and classified various organisms according to their form and function.

Diversity of Life

The study of the diversity of life is an introduction to micro-organisms and biological classification systems. Students use appropriate tools to observe plants, animals, and micro-organisms. Students also use classification systems to group organisms according to features of form and function.

Vocabulary

microscopes, slide, cover slip, magnify, micro-organism, species, kingdom, Plantae, Animalia, Monera, Protista, Fungi, invertebrate, vertebrate, mammals, birds, reptiles, amphibians, fish, classification systems, cell, cell membrane, nucleus, chloroplasts, chlorophyll, colouration, mimicry, camouflage, behaviour

Knowledge

- cells are the basic units of life and carry on all the functions needed for survival
- living things may be unicellular or multicellular
- plant cells differ from animal cells in their structure
- scientists classify organisms into groups according to internal and external features
- scientists traditionally use a five-kingdom system to classify organisms
- the kingdoms are: Animalia, Plantae, Protista, Monera, and Fungi
- each of the kingdoms has its own set of characteristics

Skills and Attitudes

- classify organisms using attributes
- demonstrate the use of a microscope to view a prepared slide
- demonstrate safe practices in investigations
- show respect for all living organisms
- use appropriate tools and techniques to gather, analyse, interpret, and share scientific ideas

Grade 6 Life Science: Diversity of Life

Prescribed Learning Outcomes

It is expected that students will:

- demonstrate the appropriate use of tools to examine living things that cannot be seen with the naked eye

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- correctly use tools such as a magnifying glass or microscope to observe a variety of microscopic organisms
- precisely draw various characteristics of microscopic organisms on the basis of their own observations

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Prior to using microscopes to observe living micro-organisms, teach students about the microscope <ul style="list-style-type: none"> - handling the microscope (parts and functions) - adjusting the light - preparing a wet mount slide - focusing - determining the total magnification. 	<ul style="list-style-type: none"> • Observe student use of microscopes throughout the unit <ul style="list-style-type: none"> - safe caring and storage - small ocular to large lens - coarse to fine focus - commercial prepared slide use - student made slide use - adjusting the field of view.
<ul style="list-style-type: none"> • Have students explain the difference between a single letter (e.g., “g” “k”) cut from a newspaper and seen through a microscope, and one seen with the naked eye. Ask students, “What happens to the letter when moving the slide left, right, up, down?” 	<ul style="list-style-type: none"> • Observe student drawings of the letter, looking for <ul style="list-style-type: none"> - clarity - magnification - labelling - correct letter reversal.
<ul style="list-style-type: none"> • Have students examine microscopic organisms and plants by collecting more samples of water from ditches, puddles, tidal pools and examining the samples under a microscope or magnifier. Students should record their observations with special attention to the identifying cell characteristics. 	<ul style="list-style-type: none"> • Have students use their science logs to record observations. Check to determine whether or not student entries addressed <ul style="list-style-type: none"> - scale and size observations - colour and appearance features - how thing move (locomotion) - duration of movement. • Include self-assessment questions at the end of criteria sheets or descriptions of performance tasks so students can reflect on their learning. For example <ul style="list-style-type: none"> - What features changed when viewed using more magnification? - How accurately does your work on this assignment show what you know about classification of organisms? - What part do you think you will remember the longest and why? - What part will be the most difficult to remember?

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Diversity of Life (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students create wet slides using fresh or brackish pond water (or live specimens) and make observations using a microscope. Discuss identification of living things seen according to single-cell characteristics. (Note for some specimens a quieting solution will be needed to slow movements.) 	<ul style="list-style-type: none"> • Ask students to draw and label what they can see and identify according to specific characteristics such as <ul style="list-style-type: none"> - method of motion (e.g., flagellum) - animal or plant (e.g., types of cell matter) - colour, shape, and comparative size - cell structure (e.g., cell membrane) - name of known organisms (e.g., Plankton, Paramecium, Hydra, Amoeba, Daphnia).
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • BC Science 6 • BC Science Probe 6 • Cells and Life • McDougal Littell Science (Diversity of Living Things) • Nelson Science & Technology Skills Handbook • Once Upon a Seashore • Parasites & Partners • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Thinking Connections: Concept Maps for Life Science 	

Grade 6 Life Science: Diversity of Life

Prescribed Learning Outcomes

It is expected that students will:

- analyse how different organisms adapt to their environments

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- identify two or more specific adaptations of various life forms (e.g., colouration or other physical characteristics, mimicry or other behaviour)
- suggest a plausible explanation of how particular adaptations help life forms interact in their environments
- create a detailed report describing the symbiosis between two organisms

Planning for Assessment

Suggested Assessment Activities

- Using various pictures of wild birds, ask students to examine how the shapes of beaks have adapted to pick up the different types of foods eaten. Then, have students use various pliers and cutting tools (or forceps, tongs, and needle nose pliers) to pick up/stab/crack/tear different types of food (e.g., jelly bean, sunflower seeds, 'gummy worms', and sprouted wheat grass).

- Have students match which tool picks up the food item, according to a type of beak shape and food source:
 - short hooked and strong (meat eaters)
 - slender and sharp pointed (insect eaters)
 - thick and wedged (seed crackers)
 - long slender and bent (mud probing)
 - broad and serrated (plant tearing and grazing).
- Have students determine the best beak shape for specific feeding purposes. They can answer these questions and draw beak profiles matched with the pliers tool
 - Which position in the pliers is best for crushing food? Holding and carrying?
 - Which beaks are suited to cracking seeds?
 - How is the beak shape related to strong jaw muscles? Or to tearing large pieces of flesh?
 - Which beak shape is best for spearing wiggly food? What about straining food from muddy water or tearing out grass shoots?

- Most of the adaptation in animals is related to form and function. Challenge students to create an alien life form, labelling all the parts with a specific set of functions (purposes) matching the form (design). Most will begin with how the alien: feeds, moves, sees its environment, is covered, and interacts in a habitat (e.g., moves, feeds, sees, hears, and protects itself from the elements). The class should first agree on the specific alien environment and describe the ecosystem these life forms live in so reasonable limits are placed on the task.

- Using a diorama and written instructions, ask students to explain how all parts of the alien life form are specific adaptations to help it survive in the class's chosen environment. Look for evidence that student explanations address close connection between form and function, plus the
 - abiotic and biotic factors in its living environment
 - food habits and hunting methods
 - survival adaptations to body surfaces
 - survival adaptations from predators
 - survival adaptations for its environment
 - locomotion in the terrain.

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Diversity of Life (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Ask students to compare the adaptations of plant and animal species living in a single biome (habitat). Students should use a Venn diagram to represent their findings. • The Earth's six Biomes each have a set of similar plant, animal and climate features. Within biomes there are vanishing habitats, which contribute to extinction of certain species. Challenge students to prepare a visual display or presentation to include plant and animal adaptations, climate and weather details, vanishing habitats, and interesting facts. 	<ul style="list-style-type: none"> • Ensure that the student presentations include: <ul style="list-style-type: none"> - differences between the habitats if more than one is shown (e.g., salt/freshwater) - physical adaptations in animals (e.g., skin colouration) - animal behaviour adaptations (e.g., landlocked/ocean going) - plant adaptations to environmental changes - plant adaptations for moisture - plant adaptations for temperature (seasons) - interesting facts for soil, elevation, and "acts of nature" (e.g., fire, flood, erosion) - connection between extinction and vanishing habitats (e.g., non-adaptation).
<ul style="list-style-type: none"> • Choose for students a biologically diverse environment (e.g., rainforest, one geoclimactic zone). Then ask students to locate at least one example of mutualism, commensalism, and parasitism. 	<ul style="list-style-type: none"> • Challenge students to propose a set of safe and practical procedures to ethically study a symbiotic relationship in its natural environment. Students should <ul style="list-style-type: none"> - indicate at least one symbiotic relationship - describe advantages and disadvantages to each organism in the relationship - explain each species' basic needs (e.g., nutrition, shelter, climate) - pose questions for further study.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • BC Science 6 • BC Science Probe 6 • Butterflies: Amazing Insects • Cool Creatures: Reptiles • Cycle of Life/Recycle Handbook for Educators • Discovering Spiders, Snails and Other Creepy Crawlies • Ecology: Communities • Forests in Focus • Hands-on Science (Diversity of Living Things) • Kokanee of British Columbia • McDougal Littell Science (Diversity of Living Things) • OceanNews • Once Upon a Seashore • Our Wonderful World (AIMS Activities) • Parasites & Partners • Project WET • Project WILD • Salmonids in the Classroom • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Scientific Inquiry: Steps, Skills & Action • Thinking Connections: Concept Maps for Life Science • Urban Stewards • The Watershed Works 	

Grade 6 Life Science: Diversity of Life

Prescribed Learning Outcomes

It is expected that students will:

- distinguish between life forms as single or multi-celled organisms and belonging to one of five kingdoms: Plantae, Animalia, Monera, Protista, Fungi

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- accurately list the characteristics that define all living things, including ability to reproduce, grow, respire, use energy, respond to stimuli
- identify and distinguish Plantae, Animalia, Monera, Protista, and Fungi as kingdoms of life
- correctly sort micro-organisms according to their characteristics, with teacher support (e.g., a descriptive key for Monera, Protista, and Fungi)

Planning for Assessment

- Bring potatoes (tubers or seeds) to class and discuss whether they are living or non-living. Then establish what characteristics are required to enable the living potato to grow. Provide water, light, and temperature to the potatoes to allow them to grow. Teachers may choose to bring in other objects to discuss, asking
 - From where did the potato get its food? (stored energy)
 - Would these plants develop new potatoes?
 - How are dormant seeds, tubers and eggs similar or different living things?

Suggested Assessment Activities

- Have students add water, light, and temperature (necessities for life) for the potato to grow. Demonstrate successful growth after a period of time. Ask students to draw and label a flow-chart showing the major stages of the potato growth including applied factors (e.g., water light), and resulting changes over several days. Criteria for assessment could include documentation of
 - amount of light and temperature used
 - visible evidence of growth
 - observed evidence of decay.
- Have students design a controlled experiment for one of the three factors (water, light, and temperature). Set-up a growing station for two tuber (potato) pieces. Provide all three factors to one piece, and for the other tuber piece change the degree of one of the factors somehow. Grow both tubers with all other factors identically applied. On their reports, students should:
 - write a question (hypothesis) that states the purpose of the experiment in qualifying terms (e.g., Does a potato grow with only two hours of daily light?)
 - observe changes for both pieces
 - make connections to the outcomes seen
 - describe how the factors were kept unchanged (controlling variables)
 - explain their inferences about the growth
 - write concluding statements based on the facts and thinking applied to the report hypothesis.

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Diversity of Life (continued)

Planning for Assessment	Suggested Assessment Activities																								
<ul style="list-style-type: none"> Use a set of items such as buttons or garden seeds, or gather new non-living materials from which students create their own dichotomous key. Discuss with the class the common visible features of the items so 8-10 characteristic groupings are understood. Have students organize their items according to one of the 8-10 pre-established categories. Give students a container of the categorized materials to further sort into groups. Using a single phylum, such as Arthropoda, have students research four example creatures. Students each prepare a scientific booklet detailing four distinct classes within this phylum showing various pieces of information and demonstrating their understanding of the classification system according to each creature’s kingdom, phylum, class, order, family, genus, and species. (e.g., five commonly used Arthropoda classes = Diplopoda (millipedes) Crustacea (crabs) Insecta (grasshopper), Arachnida (spiders) Chilopoda (centipedes). 	<ul style="list-style-type: none"> For the buttons, ask students to develop their own classification key on paper. Consider the extent to which the key <ul style="list-style-type: none"> is based on obvious, observable, and measurable characteristics matches common characteristics precisely is not based on subjective characteristics (e.g., pretty) shows how a division of items at each stage builds a branching network of family membership uses features that are consistent in their similarities and differences across and within branches. See the sample assessment tool provided at the end of this grade (Arthropod Booklets). 																								
<ul style="list-style-type: none"> Provide students with coloured images of monera, protista, and fungi and teacher-supplied print materials. Then have students create a classification for these living things and prepare a descriptive matrix (e.g., colour, size, shapes, habitat, location, locomotion, cell complexity). Each row of the matrix represents one of the kingdoms. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>habitat</th> <th>colour</th> <th>size</th> <th>shapes</th> <th>cells</th> </tr> </thead> <tbody> <tr> <td>monera</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>protista</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>fungi</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		habitat	colour	size	shapes	cells	monera						protista						fungi						<ul style="list-style-type: none"> Using pond water samples, have students prepare live slides and inventory life forms observed, identifying some of the characteristics that define all living things (e.g., reproduce, grow, respire, use energy, respond to stimuli). Ask students to classify organisms in the three kingdoms based on the descriptive matrix discussed in class.
	habitat	colour	size	shapes	cells																				
monera																									
protista																									
fungi																									
	<ul style="list-style-type: none"> When assessing students’ understanding of classification systems, consider the extent to which students recognize that <ul style="list-style-type: none"> classification systems are based on similarities in form and function there are variations within species plant and animal membership is defined at a cellular level. 																								

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Diversity of Life (continued)

Recommended Learning Resources

- BC Science 6
- BC Science Probe 6
- Cells and Life
- Cool Creatures: Reptiles
- Cycle of Life/Recycle Handbook for Educators
- Discovering Spiders, Snails and Other Creepy Crawlies
- Forests in Focus
- Hands-on Science (Diversity of Living Things)
- McDougal Littell Science (Diversity of Living Things)
- Once Upon a Seashore
- Our Wonderful World (AIMS Activities)
- Salish Sea
- Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science
- Salmonids in the Classroom
- Thinking Connections: Concept Maps for Life Science

GRADE 6 PHYSICAL SCIENCE: ELECTRICITY

Key Elements: Physical Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have gained a basic understanding of electricity.

Electricity

In this study, students gain a basic understanding of how electricity works. They explore the characteristics of static and current electricity. Students discover the characteristics of conductors, insulators, switches, batteries, light bulbs, and electromagnets. Students test, design, construct, and evaluate various combinations of circuits, switches, batteries and bulbs. Students examine the production and transmission of electricity in British Columbia.

Vocabulary

atom, electron, static electricity and current electricity, electrical current, closed and open circuit, conductor, insulator, battery, magnetism, parallel circuit, series circuit, switch, voltage, geothermal, nuclear, tidal, solar, wind power, biomass power, coal, gas, fossil fuels, hydro, hydro-electric dams, renewable, non-renewable, consumption, conservation, electrocution, direct current, bulb, positive, negative, electrical energy

Knowledge

- static electricity is the result of the accumulation of excess charge on an object
- an electron is a negatively charged particle
- the presence of excess electrons produces a net negative charge, and the lack of electrons produces a net positive charge
- unlike electric charges attract, and like charges repel
- electric current is the movement of electrons through a conductor
- conductors permit a flow of electric current, while insulators block the flow of electric current
- chemicals can be used to transfer electrical energy (e.g., dry cell batteries)
- electric currents have magnetic fields
- electricity may flow in series or parallel circuits
- electrical energy can be transferred to produce heat, light, motion, and chemical activity (e.g., inside the standard light bulb is a filament that glows because it gives off heat and light energy); likewise, heat, light, motion, and chemical activity can be transferred to produce electrical energy
- different sources of energy can be transferred to produce electrical energy (e.g., wind, water, steam, solar, tidal, etc.)

Skills and Attitudes

- demonstrate curiosity, creativity, open mindedness, accuracy, precision, persistence, and appreciate their importance as scientific attributes
- manipulate, construct, and test electrical circuits that use batteries
- show increasing confidence as scientific problem solvers by asking questions, solving problems, and making decisions
- demonstrate the safe use of electricity
- demonstrate the safe use and handling of home electrical appliances

Grade 6 Physical Science: Electricity

Prescribed Learning Outcomes

It is expected that students will:

- evaluate various methods for producing small electrical charges

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- ❑ identify the charges (like, unlike, or no charge) of pairs of statically charged objects (e.g., charged through rubbing various fibres and solid materials) by systematically and accurately testing their attractions
- ❑ describe and distinguish between friction-produced electrical charge (static) and chemically produced electric charge (batteries)
- ❑ with teacher support, test and evaluate the effectiveness of various grounding techniques for preventing static charge build-up on objects

Planning for Assessment

- Have students explore making various static electrical charges using cloth, fur, hair, wool, and paper. Ask them to rub a plastic object (e.g., plastic spoon) or a glass object (e.g., glass rod) with these materials.
- Place the charged object next to loose paper punches (confetti) and ask students to observe the effect on the paper.

Suggested Assessment Activities

- Consider how well students can explain where the build up of excess electrons must be to cause the attractive (like and unlike) forces. Excess electrons (or deficient electrons) on an object move or pull things, showing the observer which attractive force is present: Negatively and positively charged materials attract one another; materials of the same charge repel one another.
- This is the introduction to the unit. Observe whether or not students use the correct terms and know when they have “charged” things, produced an “attractive force,” and neutralized or ‘grounded’ the objects.

- To show students that static charges move along objects, make an aluminium foil static indicator by suspending a small strip of folded foil on the end of a straw. Place a juice-box straw through a lid of a jar with the foil folded inside. Have students touch the end of the straw and observe how the foil strips respond inside the jar. When electrons move down the straw and reach the foil the charges force the foil strips away from each other. Note that this can be a teacher demonstration. Only one foil jar needs to be made.

- Have students explain answers when the items from above are placed near the end of the straw:
 - Where did the excess electron charges go?
 - What happens to the strips of foil?
 - If the object attracted things before, why do the foil strips move apart?
 - Touch the straw and see what happens.
- In a dry room have students rub feet on a rug (shoes on) and create a static charge on their bodies. Placing their hands near the foil jar experiment, allow them to discover by watching the foil strip moving apart whether or not they have a charge. Students should now be able to detail the electron path
 - from the rug
 - to their shoes and along their bodies
 - to their hands and onto the straw in the lid.
 These details can be demonstrated with a drawing, orally, or on a simple written test.

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Electricity (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students rub a comb or plastic spoon on a piece of wool and test to determine if there is an attraction to a variety of loose, small materials (e.g., paper confetti, yarn, dried rice). Then have students write a lab report explaining the reaction of the loose materials. • Have students experiment with various materials and complete simple diagrams showing which of the three attractive forces were seen first. Make single changes to the process of producing a charge to determine which effect is directly connected to the materials. 	<ul style="list-style-type: none"> • Lab reports must have labelled diagrams showing the students' understanding of the variables and the following questions <ul style="list-style-type: none"> - Which part do they find is rubbing on or off electrons for the type of static charge (like, unlike, neutral)? - Does changing the fabric change the type of attractive force? - Can a plastic spoon be hung and paper rubbed to produce an attractive force?
<ul style="list-style-type: none"> • Ask students to investigate batteries and bulbs using long strips of aluminium foil, using the foil as the pathway connecting the battery (stored charge) to light the bulb. Instruct students on the nature of continuous charge from a stored electrical battery, versus the nature of a sudden, once-only static discharge. 	<ul style="list-style-type: none"> • Observe student investigations, considering whether or not students <ul style="list-style-type: none"> - can light the bulb - make the light more intense, given two batteries - know how to prevent shorting out the battery, when asked.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • BC Science 6 • BC Science Probe 6 • Discovery Works for Grade 6: Unit D – Magnetism and Electricity • Electricity • Electromagnetism and Electronics • Hands-on Science (Electricity) • McDougal Littell Science (Electricity and Magnetism) • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Science, Please! (Parts 1 & 2) • Static Electricity (Revised) • Turn It On! (Pan Canadian Science Place) 	

Grade 6 Physical Science: Electricity

Prescribed Learning Outcomes

It is expected that students will:

- test a variety of electrical pathways using direct current circuits

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- proficiently assemble a working electrical circuit with a switch
- correctly explain the solution for fixing an improperly arranged circuit (short-circuit)
- demonstrate the difference between parallel and series circuits when using batteries

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Ask students to explore working electrical circuits using simple flashlight batteries and bulbs. Have them make predictions on how the charges from the batteries can travel through a metal pathway to light the bulb (see previous unit activity with aluminium strips). 	<ul style="list-style-type: none"> • Have students bring to class a flashlight and then disassemble it, drawing a detailed diagram of all the inside parts. Student diagrams must be able to show a flow of charge from beginning to end (battery to bulb and return).
<ul style="list-style-type: none"> • Using a set of battery and bulb kits from a science supply house, build examples for hands-on activities. Students identify arrangements of the electrical circuit. Some should produce a light or sound buzz; others need switches and two lights. Circuits should go from simple stage to complex ones and should include <ul style="list-style-type: none"> - two wires, two batteries, one light - four wires, two batteries, one light - four wires, two batteries two lights. 	<ul style="list-style-type: none"> • Have students build the various circuits. Assess student achievement using the following checklist <ul style="list-style-type: none"> - Are the wrong ends touching? - Is the circuit open (broken) or closed? - Are the right parts connected in the best order? - Is the bulb still good? Can it be checked? - Are any wires touching that should not be? - Does the circuit allow a complete one-way flow of electrical charges?
<ul style="list-style-type: none"> • Provide students with materials to make and build electrical circuits. Have students use their circuits to <ul style="list-style-type: none"> - determine the characteristics of series and parallel circuits - test a selection of materials to identify conductors, insulators, and resistors - make simple switches in the wire of the circuit (e.g., paperclips and thumbtacks). 	<ul style="list-style-type: none"> • Using diagrams of simple circuits and components, and ask students to predict which combinations would result in lighting a bulb. Students should be able to: <ul style="list-style-type: none"> - trace a continuous pathway - tell where the source of electric energy is - see if switches are open or closed - locate any short-circuits. • Given a battery, bulb, wires, and student-made switches, have students construct the following circuits <ul style="list-style-type: none"> - simple with one light bulb - series with two light bulbs - parallel with two light bulbs.

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*Electricity (continued)***Recommended Learning Resources**

- BC Science 6
- BC Science Probe 6
- Discovery Works for Grade 6: Unit D – Magnetism and Electricity
- Electricity
- Electromagnetism and Electronics
- Hands-on Science (Electricity)
- McDougal Littell Science (Electricity and Magnetism)
- Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science
- Science, Please! (Parts 1 & 2)
- Turn It On! (Pan Canadian Science Place)

Grade 6 Physical Science: Electricity

Prescribed Learning Outcomes

It is expected that students will:

- demonstrate that electricity can be transformed into light, heat, sound, motion, and magnetic effects

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- create circuits that reliably produce light, heat, sound, motion, and magnetic effects
- transfer electrical energy into multiple other forms of energy (e.g., light, heat, sound, motion energy), safely and reliably
- produce demonstrable magnetic effects using electric current

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Allow students to make light and sound circuits showing complete electrical pathways. Later, consider adding small electrical motors and electromagnets for more involved projects (e.g., Lighthouse with a flashing beacon). Recyclable parts may be substituted, such as flashlight parts, musical greeting cards, small wires, and Light Emitting Diodes (LEDs). 	<ul style="list-style-type: none"> • Have students build a simple circuit that has two batteries and two working switches. It must ring a bell or turn on the bulb, but not both at the same time. Assessment would cover the following range: <ul style="list-style-type: none"> - circuit is attempted but does not work - circuit is connected and one of the electric parts works (ring or light) - circuit works with all on or all off ring and light - circuit works but one of the components doesn't (2 switches 1 light OR light, ringer and 1 switch, etc.) - circuit works completely. One switch changes ring bell for working light; other switch turns all on or all off.
<ul style="list-style-type: none"> • Challenge students to construct a hypothesis for what happens when a length of aluminium foil 1 cm by 15 cm made into a folded ribbon touches each end of a D-cell battery for 5 seconds and then 10 seconds. Students should be able to answer these questions <ul style="list-style-type: none"> - Why did the ribbon get hot? - Is there a complete pathway? (circuit) - If there is no light or ringing, where does the electrical power go? - What question best describes what is being investigated in this experiment? (e.g., What happens to a circuit when electrons travel through it and do no work?) 	<ul style="list-style-type: none"> • Look for evidence that students noticed <ul style="list-style-type: none"> - different lengths and width affect light brightness - very small foil strips yield best illumination - battery contact must be maintained equally - torn or small tears in foil, disrupt output - wrong connects/shorts cause foil to heat up - shorts cause no light illumination.
<ul style="list-style-type: none"> • Ask students to prepare a poster identifying the dangers associated with static charges and electric current. 	<ul style="list-style-type: none"> • Ensure that the poster clearly demonstrates safety issues and that any pictures and text are easy to see from a distance.

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*Electricity (continued)***Recommended Learning Resources**

- BC Science 6
- BC Science Probe 6
- Electricity
- Electromagnetism and Electronics
- Hands-on Science (Electricity)
- Magnetism (Revised)
- McDougal Littell Science (Electricity and Magnetism)
- Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science
- Science, Please! (Parts 1 & 2)
- Turn It On! (Pan Canadian Science Place)

Grade 6 Physical Science: Electricity

Prescribed Learning Outcomes

It is expected that students will:

- differentiate between renewable and non-renewable methods of producing electrical energy

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- compile a comprehensive list of ways in which electricity is produced
- summarize the main advantages and disadvantages of the various methods used to produce the electricity used in our daily lives

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Using various pictures of everyday life, ask students to identify the types of uses communities have for energy and electricity. Work with students to classify electrical energy used to produce light, energy to produce heat, and to create motion. • Have students identify sources of electricity used in their community. Take students on a school building walk and then around the local block to identify how all these forms of energy relate back to an electrical source (e.g., wall outlet to breaker panel, roof wires to hydro pole, pole to larger poles). 	<ul style="list-style-type: none"> • Consider the number of examples of electrical energy use students can come up with. Ask students to informally assess how important energy is in their lives. Consider the extent to which they support their opinions with good examples of energy use.
<ul style="list-style-type: none"> • Have students examine how electrical energy is produced throughout Canada. Include a review of coal and gas powered plants, nuclear, hydro-electric and thermal waste plants. Then have students prepare a class project on the costs and benefits to show advantages and disadvantages. (Choose whether or not students do this in groups. The class project could be a poster of one method or a debate using a Not-In-My-Backyard [NIMBY] simulation.) 	<ul style="list-style-type: none"> • In the student's project, each advantage must be matched with at least one disadvantage. The presentation must show both an understanding of the science of production and some of the ethical considerations <ul style="list-style-type: none"> - cost to the environment now - cost to people now - cost to people and the environment in the future - economic costs - local efficiencies.
<ul style="list-style-type: none"> • Watch an educational video or conduct a field trip to research how hydroelectric dams work. Invite BC Hydro to make a presentation of power lines and transformer, or visit a BC Hydro facility in your community. 	<ul style="list-style-type: none"> • Using their field-trip notes ask students to construct a model to show how electricity is generated and/or transported in their community. Use standard poster- or model-making criteria to assess student work.

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Electricity (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students investigate how much electrical energy their home appliances use annually (i.e., using the rating on each appliance) and the cost. Students record their findings in chart form. Share and discuss results. • Ask students to create a graph that measures weekly electrical power consumption, using the household electrical meter as a source of data. 	<ul style="list-style-type: none"> • Have students design a media campaign on “Energy Conservation is Everyone’s Responsibility” to present in school or the community. Assess if campaigns include <ul style="list-style-type: none"> - past electrical usage patterns - current trends in electricity management - global electricity production and consumption - Provincial resource considerations - environmental considerations.
<ul style="list-style-type: none"> • Working in groups, have students research sources of energy that could be used more extensively in the future (e.g., geothermal heat, nuclear fission, tidal, solar, wind power, biomass energy). 	<ul style="list-style-type: none"> • When assessing the group project about sources of energy, consider the accuracy and clarity of the description and look for evidence that students have taken account of factors such as supply, cost, environmental impact, and location.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • BC Science 6 • BC Science Probe 6 • Hands-on Science (Electricity) • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Science, Please! (Part 2) • Scientific Inquiry: Steps, Skills & Action • Turn It On! (Pan Canadian Science Place) 	

GRADE 6 EARTH AND SPACE SCIENCE: EXPLORATION OF EXTREME ENVIRONMENTS

Key Elements: Earth and Space Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have demonstrated how exploration technologies help understand extreme environments and described Canada’s role in researching and developing such technologies.

Exploration of Extreme Environments

The study of extreme environments includes space, polar regions, oceans, deserts, caves, and volcanoes. Through discussions, observations, and research, students define extreme environments and explain obstacles to their exploration. Knowledge of past and present explorations is important in developing a greater understanding of extreme environments. Students may research the history of flight or evaluate either space or ocean exploration. Students discuss Canadian contributions to exploration technologies and consider how future technologies may affect them. In this unit, students demonstrate their knowledge and scientific skills when they design and construct models, prepare research reports, and conduct demonstrations and simulations.

Vocabulary

environment, extreme, technology, exploration, Canadarm, recycling, life-support (other vocabulary will depend on the specific extreme environment chosen by the teacher/class)

Knowledge

- there are living things naturally inhabiting many extreme environments, but much about them is still unknown
- technologies such as boats, clothing, and space ships have allowed humans to live in environments to which they are not fully adapted
- humans need more complicated technology to survive in and explore more extreme environments, which may have conditions such as high or low temperature or pressure, or the absence of an atmosphere or gravity
- Canadians have contributed to technological advancement in the exploration of extreme environments

Skills and Attitudes

- ask questions and exchange ideas to solve problems related to the exploration of extreme environments
- evaluate information and ideas encountered during investigations of extreme environment
- use appropriate tools to gather, analyse, interpret, and share scientific ideas
- formulate hypotheses
- appreciate the cumulative nature of technological advancement
- explain reasons for an adaptive technology and how it compensates for the extreme condition(s)
- construct models of exploration technologies

Grade 6 Earth and Space Science: Exploration of Extreme Environments

Prescribed Learning Outcomes

It is expected that students will:

- explain obstacles unique to exploration of a specific extreme environment

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- identify the salient characteristics of an extreme environment (e.g., space, polar ice, oceans, volcanoes, and the atmosphere—a place that humans do not naturally inhabit but choose to explore)
- give several examples of resources and knowledge that can be obtained from distant explorations
- give several examples of how technology can be used by humans to travel to and explore an unknown environment

Planning for Assessment

This unit is about the exploration of ONE specific extreme environment. As such, it is expected that teachers choose activities applicable to that specific environment.

- Have students pick one area of interest, and use a Know-Wonder-Learn strategy to discover elements of an unknown environment (e.g., deep ocean, solar system, Antarctic glaciers).

Suggested Assessment Activities

- Suggested questions re determining important elements:
 - Does the environment allow humans to visit easily? What vehicles are needed?
 - Can the environment be studied from a long distance?
 - What tools and instruments help humans study it? How do these tools work?
 - What are the harmful conditions that humans need to be protected from? How is this done?
 - What is known so far about this environment? What are the interesting unknowns?
 - What limits are currently challenging humans about exploring this environment?

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Exploration of Extreme Environments (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Ask students to conduct Internet research (Web Quest) on their selected environment. Pose questions such as the following to guide the search for answers and images <ul style="list-style-type: none"> Ocean - What is neutral and negative buoyancy? - How do humans breathe in diving suits? - What tools can divers use and hold? - How are Remote Operated Vehicles (ROVs) controlled? - How are samples picked up? - Can living samples be collected without being destroyed? Space - What is the range of gravity? - What is important to understand about working in zero gravity? - How do humans get oxygen to breath? - How do astronauts hold and grip tools? - Does radio communication work in space? - Can tests be done or should samples be collected? - How do astronauts go outside the ship? 	<ul style="list-style-type: none"> • Ask each student to present “expert” reports to the class on her or his selected environment, using information from the Web Quest and including related principals of science. Work with students to develop criteria for assessing presentations according to the science of the environment and how experts study it. <ul style="list-style-type: none"> Ocean environment research can address <ul style="list-style-type: none"> - buoyancy, - Bathyal and Abyssal Zone life forms - seafloor maps and geography - fluid and pressure at various depths - guyots and seamounts - salinity - ocean currents - oceanographic ships and vessels. Space environment experts can consider <ul style="list-style-type: none"> - vacuum and zero gravity - sources of food, water, and air - collecting and storing samples - space hazards (e.g., meteorites, solar flares) - sending data over great distances - working in space or on planet surfaces.
<ul style="list-style-type: none"> • Have students choose an extreme environment and prepare a timeline of developments and major events occurring in a technology during the past 100 years (e.g., 100 years of flight, 50 years of scuba diving). • Have students pick a current technology and make a cut-away model (3D) of their design improvements. 	<ul style="list-style-type: none"> • Consider the extent to which timelines use clear images and point form facts, including <ul style="list-style-type: none"> - intervals, which show dates and decades - facts that relate major successes/achievements - images that profile the technology - labels that enhance information. • Models should not be excessively large (shoe box size). Model must show an understanding of the scientific features related to exploring this environment. Written or labelled diagrams show further understanding that cannot easily be modelled. Criteria to consider <ul style="list-style-type: none"> - limits of human made materials - conditions affecting human travel in the environment - conditions affecting human communication - the nature and size of the physical environment - the dynamics of the extreme environment - reasons for human exploration.

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*Exploration of Extreme Environments (continued)***Recommended Learning Resources**

- BC Science 6
- BC Science Probe 6
- Biomes Atlases (Rivers, Lakes, Streams, and Ponds; Oceans and Beaches)
- Cycle of Life/Recycle Handbook for Educators
- Discovery Works for Grade 6: Unit E – Oceanography
- Hands-on Science (The Solar System)
- Heroes and Heroines – Explorers Past and Present
- McDougal Littell Science (Earth's Waters)
- McDougal Littell Science (Space Science)
- OceanNews
- The Sky's The Limit (AIMS Activities)
- Wonderwise: Women in Science Learning Series (Space Geologist)

Grade 6 Earth and Space Science: Exploration of Extreme Environments

Prescribed Learning Outcomes

It is expected that students will:

- assess technologies used for extreme environments

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- identify several types of equipment and methods currently used to explore extreme environments (e.g., scuba, fibre optics, Mars Lander)
- accurately describe the stages of development for a previously created technology (e.g., kites, balloons, planes, rockets, submarines, space suits)
- design a complete model for travelling into a specific extreme environment (e.g., submarines, sonic-aircraft, spaceships)
- coherently defend a position with respect to the ethical considerations involved in the development and use of new technologies (e.g., whether or not to take living samples, or use weapons in space)

Planning for Assessment

This unit is about the continued exploration of one specific extreme environment studied in the previous unit. As such, it is expected that teachers choose activities applicable to that specific environment.

- Introduce examples of technology that extend human exploration. Use a mechanical litter picker to show the principal of extended reach. Use images to show additional technology such as those for extending sight, grasping and holding, power and super strength, and manual/remote control, all used in a variety of environments.

Suggested Assessment Activities

- Ask students to produce a working drawing of a full-size mechanical device that could extend human reach when visiting an extreme environment. Student drawings should show
 - control of movement for grasping and holding
 - mechanical sensitivity for good pressure
 - strength and power for lifting items
 - guidance from the human operator.
 Several views will be needed to show actual parts and how they interact. Project could use found materials and model-making parts to be built later.

continued next page

Exploration of Extreme Environments (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Using the history of space exploration, show students how extreme exploration of our solar system and the moon has developed by key stages. Many stages are dependent on our tools and technologies at a particular time in history. (Construct a planet model with several dark side volcanoes, a light side impact crater, and a dark side rift valley; and a south pole with ice. Keep the planet model hidden from students throughout the space program.) <ol style="list-style-type: none"> 1. Hang your one-metre diameter “planet” at the end of the field from the goal posts. 2. The class starts one day by using their eyes to look across the field at the unknown object. What is it? 3. Next space day, class uses binoculars to study it closer. What details can be made out? 4. Day 3: use a stronger telescope to collect data. 5. Day 4: a space probe student is allowed to travel halfway to get a look (escorted by the teacher). 6. Day 5: first flyby several individual students get to run up to the object but cannot stop. They report what they saw. 7. Day 6: a single student with note pad is allowed to circle the object 5 times without stopping. Must make note while walking. Reports back to class. 8. Day 7: flyby with camera taking several pictures. 9. Day 8: first moon landing. Two students visit the planet on one side only and collect data. 10. Day 9: second moon landing. Two students visit the dark side of the planet and report back to class. 11. Finished portfolios or models completed. 	<ul style="list-style-type: none"> • This is a classic schoolyard Space Program to study an unknown planet hanging at the end of the soccer field. Students will experience stages of a “space program” and collect their own evidence of the discoveries. The finished evidence can be a portfolio of data, including writings, drawings and photographs. <p>Another way to collect the final evidence is for the students to model their own stages of discovery. Three different planet models are made from the collected data. Criteria could include</p> <ul style="list-style-type: none"> - early model shows colour, some shape characters and matches the first probe reports - middle model has the right size and shape, with three key features showing; matches the flyby drawings and correctly shows one key landform. - final stages: the model details the dark side and light side accurately; the landing details are shown.

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Exploration of Extreme Environments (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Introduce scientific concepts related to a variety of extreme environments, such as <ul style="list-style-type: none"> - oceans: fluid, pressure, dark, pressurized environment - skies: aerodynamics drag, lift, gravity, speed, payload, acceleration - space: vacuum, micro gravity, contained atmosphere, airlocks, gravitational pull. • Have students pick one of the extreme environments and complete a Know-Wonder-Learn chart for all of these scientific concepts before beginning a project. 	<ul style="list-style-type: none"> • Ask students to design and build a 3-D model of a transportation vehicle to travel in an extreme environment. Finished models should address these criteria <ul style="list-style-type: none"> - scientific principals were incorporated into the design (e.g., pressurized hull) - external devices and accessories extend human reach - scientific data is gathered - guidance and control are managed - power and propulsion are achieved. • Have students evaluate each other’s designs for viability according to the scientific concepts indicated (e.g., oceans are a fluid, skies need aerodynamic designs, and space is a vacuum).
<ul style="list-style-type: none"> • Discuss with the class the responsible use of any technology and the potential for misuse by society. • Discuss significant events in recent history that have involved ethical decisions about new technologies (e.g., atomic bombs, wonder drugs, radar detectors, office surveillance). 	<ul style="list-style-type: none"> • Once any technology has been discussed in class activities, students should be able to create a chart to compare the pros and cons associated with the design and use of the selected technology. • For a final assessment, supply students with the key features of a single technology (e.g., death star satellite) without associating pros and con values. Allow them to analyse the information and place key features into a Venn diagram format. Features should be sorted by <ul style="list-style-type: none"> - equal benefits for people and science - good for defence but costly for some humans - not good for people and costly for science.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • BC Science 6 • BC Science Probe 6 • Below Zero • Discovery Works Modules for B.C. Grade 6 (Oceanography) • Hands-on Science (The Solar System) • Heroes and Heroines – Explorers Past and Present • McDougal Littell Science (Earth’s Waters) • McDougal Littell Science (Space Science) • OceanNews • The Sky’s The Limit (AIMS Activities) 	

Grade 6 Earth and Space Science: Exploration of Extreme Environments

Prescribed Learning Outcomes

It is expected that students will:

- describe contributions of Canadians to exploration technologies

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- describe in detail the function of Canadian technologies involved in exploration of extreme environments (e.g., international space station, Canadarm, Newt Suit, satellite telecommunications, robotics, and ocean mapping)
- illustrate with accurate, detailed drawings a range of Aboriginal technologies (e.g., Inuit sleds, Haida ocean canoes, Algonquin/Cree snowshoes)

Planning for Assessment

This unit focuses on Canadian Research and Development contributions in many extreme environment. As such, it is expected that teachers choose activities applicable to several exploration technologies.

- Ask students to investigate the research and development history of various Canadian technologies and the people involved.
- In teams, have students determine how to incorporate teaching this history by designing a board game with chance events similar to those stages indicated by the research. Teams determine board elements according to
 - resources used by the technology
 - environment being explored
 - random events both positive and negative
 - key features based on the history of the development of the technology
 - important people to be included.

Suggested Assessment Activities

- Ask student to design the “Canadian Extreme Exploration” Board game where players travel through different Canadian technologies. The players develop successes and pitfalls based on challenges faced by the real development of these fields. Consider whether students have
 - combined technologies
 - included chance events and obstacles based upon an understanding of the extreme environment.

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Exploration of Extreme Environments (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students hypothesize how Aboriginal knowledge assists exploration of extreme environments. Then, invite an Aboriginal Elder to discuss Aboriginal technologies. Contact the district Aboriginal Education coordinator or resource teacher for assistance in drawing on the local Aboriginal community. 	<ul style="list-style-type: none"> • Have students collect pictures or replicas of technologies used traditionally by local Aboriginal peoples for transportation, shelter, and clothing (e.g., the stalks of sea onion were dried and cured, then spliced or plaited together to make fishing lines, nets, ropes, and harpoon lines). <p>Arrange pictures as a gallery walk. Ask students to describe how each object was used, identify the key principals involved (e.g., extending reach), and suggest how it might assist exploration of extreme environments. This would be a good test of students understanding of concepts so far, such as</p> <ul style="list-style-type: none"> - humans extend their reach with a tool - local materials were used to make the needed technology - methods were used for improving strength or mass of the tool - humans developed the technologies in stages.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • BC Science 6 • BC Science Probe 6 • Discovery Works for Grade 6: Unit E – Oceanography • OceanNews • Shared Learnings: Integrating BC Aboriginal Content K-10 • Wonderwise: Women in Science Learning Series (Space Geologist) 	

ARTHROPODS BOOKLETS

Four Creatures: _____

Kingdom (= Animalia) Phylum (= arthropoda) Class Order Family Genus Species

(mnemonic) Kings play cards on fat green stools

BASIC BOOKLET APPEARANCE CRITERIA

- The booklet is accurate, interesting and informative.
- All parts listed in the handout for the contents were used in your layout.
- Four classes of arthropods are described according to their unique characteristics.
- Scientific names for all four creatures are given and explained
- Colourful pictures are drawn (or magazine photographs are well glued).
- Classroom quality guidelines are fully followed
- A checklist and peer review were completed for the finished booklet.
- The booklet was submitted with the correct page size and bindings.
- Your project was finished on time by due date.

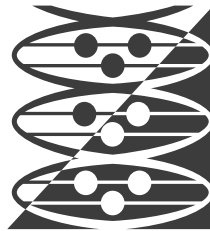
BOOKLET SECTIONS BASIC CONTENTS CRITERIA

A majority of these 10 things are explained in your booklet:

<ul style="list-style-type: none"> <input type="checkbox"/> four different arthropods <input type="checkbox"/> habitats, colonies, and homes each prefers <input type="checkbox"/> body characteristics <input type="checkbox"/> habits <input type="checkbox"/> food and enemies <input type="checkbox"/> movement methods <input type="checkbox"/> information about the arthropod's environment 	<ul style="list-style-type: none"> <input type="checkbox"/> stages of the life cycle for each of the four arthropods <input type="checkbox"/> how other animals interact with these arthropods <input type="checkbox"/> other interesting facts <input type="checkbox"/> recommendations for keeping creatures alive <input type="checkbox"/> four families of the Arthropoda class are shown with diagrams
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FINAL BOOKLET CRITERIA

- cover includes all names and title
- all sections are gathered into a final product
- table of contents is arranged in correct order
- glossary is included at the end of the booklet
- frequently asked questions are included and answered
- pages appear clear and easy to read
- facts and information presented are scientifically correct
- pictures and diagrams are properly labelled
- each section provides details about the creatures physical body
- a bibliography of references that were used in the research is included



CLASSROOM ASSESSMENT MODEL

Grade 7

ASSESSMENT OVERVIEW TABLE FOR: GRADE 7

The purpose of this table is to provide teachers with suggestions and guidelines for classroom-based formative and summative assessment and grading of Science K to 7.

Curriculum Organizers	Suggested Timeframe	Suggested Assessment Activities	Suggested Weight for Grading	Number of Outcomes	Number of Outcomes by Cognitive Level *		
					K	U & A	HMP
	Average # of hours						
PROCESSES OF SCIENCE	Integrated	Integrated	Integrated	2		1	1
LIFE SCIENCE	25-30	<ul style="list-style-type: none"> • presentation • model • map • quiz • summative project 	33½ %	4		1	3
PHYSICAL SCIENCE	25-30	<ul style="list-style-type: none"> • lab report • chart • quiz • model 	33½ %	3	1	1	1
EARTH AND SPACE SCIENCE	25-30	<ul style="list-style-type: none"> • model • written report • map 	33½ %	3		3	
TOTALS	75-90		100 %	12	1	6	5

* The following abbreviations are used to represent the three cognitive levels: K = Knowledge; U & A = Understanding and Application; HMP = Higher Mental Processes

GRADE 7: PROCESSES OF SCIENCE

Key Elements: Processes of Science

Estimated Time: integrate with other curriculum organizers

Hypothesizing

Hypothesizing happens when a prediction is made about the causes and results of an event with two variables. The investigation and testing of the event is referred as to a scientific inquiry and includes these actions:

- examine previous predictions
- formulate questions that can be answered by scientific investigations
- suggest possible explanation based upon a number of inferences
- identify the independent and dependent variables
- determine if the key variables can be isolated for testing
- predict cause and effect, and state a testable hypothesis
- determine limits for the controls
- design the experiment
- conduct the experiment and collect data
- analyse the results
- communicate by reporting the result
- repeat and retest if necessary.

When assessing students' understanding and ability to apply hypothesizing and questioning skills, consider how well their experimental design identifies and fairly tests the independent and dependent variables.

Developing Models

Creating physical models and building prototypes is very similar to the design problem-solving steps and includes investigating a question or observations with these actions:

- determine the appropriateness for a model (and scale) that fit the question
- identify the specifics of the problem observed and select possible solutions
- problem solve creatively, and plan a set of procedures
- determine available materials or equipment
- build a prototype or model (drawings help)
- test and evaluate the model
- communicate and present a product
- evaluate the results.

When assessing students' understanding and ability to apply modeling, consider how well the model communicates students' synthesis and understanding of the concepts involved, and consider the extent to which the model is relevant and accurately identifies the key components of the system (validity). Good models should demonstrate the basic principle or phenomenon involved and allow students to represent their understanding according to analogies of the scientific concepts.

Grade 7 Processes of Science

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<ul style="list-style-type: none"> • test a hypothesis by planning and conducting an experiment that controls for two or more variables 	<ul style="list-style-type: none"> <input type="checkbox"/> supply relevant supporting evidence for hypotheses presented <input type="checkbox"/> develop a testable question that considers the variables involved based on previous inferences <input type="checkbox"/> communicate precisely the question under observation so others can review the plan and procedures <input type="checkbox"/> question the relevance of the hypothesis by checking the control and the accuracy of the testing methods (fair test) <input type="checkbox"/> communicate the results of an experiment, using graphs and charts
<ul style="list-style-type: none"> • create models that help to explain scientific concepts and hypotheses 	<ul style="list-style-type: none"> <input type="checkbox"/> observe a problem situation, and formulate a plan for investigating a solution <input type="checkbox"/> plan in detail all of the steps necessary to build or make a product, and prepare a written outline showing the order of events <input type="checkbox"/> identify key components of the system or process being modelled. <input type="checkbox"/> develop a testable question that considers the variables involved (independent and dependent) <input type="checkbox"/> build a relevant and appropriate model based on the available materials and constraints of the problem <input type="checkbox"/> apply all appropriate safety measures when building a model

GRADE 7 LIFE SCIENCE: ECOSYSTEMS

Key Elements: Life Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have developed a basic understanding of ecosystem relationships and evaluated human impact on the environment.

Ecosystems

This study is undertaken to achieve a basic understanding of ecosystems in order to make informed, ethical decisions about their conservation. Through observation and investigation of local ecosystems, students describe characteristics, conditions essential for growth, and reproduction of organisms as well as the roles of these organisms. Students analyse human activity in local ecosystems and propose how best to preserve that ecosystem.

Vocabulary

ecosystem, biosphere, organisms, cycle, food chain, food web, photosynthesis, sustainability, stewardship, producer, consumer, decomposer, micro-organisms, niche, population, species, community, biomes, detritivores, herbivores, carnivores, omnivores, predator, prey, habitat

Knowledge

- living things interact with each other and their physical environment
- organisms are influenced by environmental forces, and each organism influences the environment to some extent
- ecosystems are entire systems formed by interactions among the different living and non-living parts of the environment (e.g., forests, deserts)
- non-living physical characteristics of an ecosystem include: soil, landforms, water, sunlight, temperature
- organisms interact with each other and use and recycle chemicals from the environment
- living things need energy to carry out their activities; the flow of energy from one organism to another is part of an energy web
- producers of food such as plants are related to consumers (e.g., animals) and decomposers (e.g., bacteria and fungi) in webs of interdependence called food chains and food webs
- food webs are individual food chains that are linked
- populations are groups of the same kinds of organisms (species) living together because they share common environmental needs
- populations in ecosystems tend to be regulated by predation and competition
- human activity such as logging, farming, fishing, and buildings can impact the living (biotic) and physical (abiotic) components of an ecosystem

Skills and Attitudes

- observe and record the biotic and abiotic components in a local ecosystem
- analyse limiting factors in an ecosystem
- design and conduct a simulation to demonstrate control of one or more variables in an ecosystem
- create models to show large scale ecosystems
- show respect for the environment

Grade 7 Life Science: Ecosystems

Prescribed Learning Outcomes

It is expected that students will:

- analyse the roles of organisms as part of interconnected food webs, populations, communities, and ecosystems

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- identify populations of organisms in communities and ecosystems according to simplified food webs
- explain how habitats provide basic needs for the organisms living in them (e.g., food, water, light)
- identify factors that are critical for healthy populations and ecosystems, including air and water quality (e.g., acid rain, greenhouse gases, turbidity), and explain their significance

Planning for Assessment

- Identify local ecosystems within your school district. (Local ecosystems include unused building lots, wild areas on property edges, schoolyard fringe, parks with tall grass and brush, intertidal zones, forest, stream valleys, parks with wooded areas, beaches.)

Suggested Assessment Activities

- Have students bring (or provide them with) pictures from old magazines that include various carnivores, omnivores, herbivores, and plants. Have the students cut them out to arrange and glue in a manner that represents food chains within a food web. Items may be connected and information added by students.

Criteria to assess student work include

- carnivores, omnivores, herbivores, and plants are all represented
- they are in the appropriate order
- no elements are missing
- the food chains are accurate and clearly illustrated
- the food web is accurate and clearly illustrated
- added information is clear, appropriate, accurate, and comprehensive.

- After exploring other topics in Ecology (such as food chains, food webs, and photosynthesis), research and organize information from a variety of sources on ecosystems. Then create a presentation.

- Have students complete an Ecology Report. Look for evidence that student reports
 - describe organisms in terms of their roles in a food web
 - describe ways species interact with each other
 - identify and describe recovery stages of a local damaged ecosystem
 - outline factors that influence the length and quality of life.

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Ecosystems (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Do a community survey of a city or town's waterways, farms, malls, storm drains, wetlands, highways, and subdivisions. • Generate opportunities so students meet those who make decisions about the city's (town's) infrastructure (e.g., water, transportation, waste, air quality, land use) and the area's natural resources base as it relates to air and water. • Visit a local water treatment plant. 	<ul style="list-style-type: none"> • Create a model showing a city's (town's) urban environment based on survey information. Student models could include <ul style="list-style-type: none"> - green space - pavement - wetlands and undeveloped land - the effects of pollution - where water comes from and goes - effects of pollution on the environment. See the sample scoring guide (Ecosystems Diorama) provide at the end of this grade.
<ul style="list-style-type: none"> • Ask students to illustrate a food web (e.g., marsh plant, protozoa, amphipod, stickleback, great blue heron), and identify each organism in terms of its niche role (producer, consumer, decomposer). • Ask students to create a graphic organizer with major headings in order to illustrate an ecosystem. Students should receive a page of circles to fill in and complete for an ecosystem (e.g., marine tidal zone). Students then write or draw the food items into the circles, and draw appropriate producer, consumer, decomposer links between items. 	<ul style="list-style-type: none"> • Have students observe populations in a 1m² quadrant (terrestrial or aquatic habitat). Students then design a map to present their collected data in an organized way that shows the connections between types of organisms and plant matter they are physically near. <p>Criteria for assessing student maps include</p> <ul style="list-style-type: none"> - shows a colour coded legend - indicates the variety and number of plant species - shows the number of separate animal organisms by symbol or icon - shows animals on or near plant matter they eat.
<ul style="list-style-type: none"> • Have students investigate sources of CO₂ and acid rain in the community. 	<ul style="list-style-type: none"> • Students should develop questions that isolate cause and effect factors (e.g., Do smoke, rotting leaves create CO₂?). Then ask students to design an experiment to control one of these cause-and-effect factors. The experiment does not necessarily have to be performed.

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*Ecosystems (continued)***Recommended Learning Resources**

- BC Science 7
- BC Science Probe 7
- Beavers: The Master Builders
- Below Zero
- Biology Concepts
- The Biosphere
- Cycle of Life/Recycle Handbook for Educators
- Ecology: Communities
- Ecology: Food Chains
- Ecology: Organisms in their Environment
- Ecosystems
- Forests in Focus
- Kokanee of British Columbia
- McDougal Littell Science (Ecology)
- Nelson Science & Technology 7
- Nelson Science & Technology Skills Handbook
- Our Wonderful World (AIMS Activities)
- Parasites & Partners
- Project WILD
- Salish Sea
- Salmonids in the Classroom
- Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science
- Thinking Connections: Concept Maps for Life Science
- The Watershed Works
- Wonderwise: Women in Science Learning Series (Urban Ecologist)

Grade 7 Life Science: Ecosystems

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • assess survival needs and interactions between organisms and the environment 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> identify interactions between decomposers, producers, and consumers, according to the food pyramid <input type="checkbox"/> describe in detail how decomposers recycle nutrients within ecosystems, and how plants, animals, and decomposers depend on each other (composting) <input type="checkbox"/> explain and provide several examples of how energy is transferred through food webs and food chains within an ecosystem 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Review prior learning and understanding of key terms and concepts using crossword puzzles and vocabulary materials. 	<ul style="list-style-type: none"> • introductory activity – no corresponding assessment necessary
<ul style="list-style-type: none"> • Visit a compost to observe its contents at an interval of 3-4 weeks. Inventory the layers, items, and life forms. Take a top item sample for experimentation. As a possible extension activity, measure the temperature at various levels of the composter. 	<ul style="list-style-type: none"> • Use a baggie to create a compost to observe over time. It should contain organic material and be void of air pockets. Ensure that students observe and record changes in the material (e.g., gas production, changes in colour and structure), on a weekly basis. As an extension, have students design an experiment to determine how to accelerate the process, once the factors are understood. • Ask students to illustrate a food web (e.g., containing cat, caterpillar, corn, bacteria, cow, crow, deer, hawk, human, lettuce, mouse, fox, rabbit). Students should be able to identify each organism in terms of its niche (producer, consumer, decomposer).
<ul style="list-style-type: none"> • Investigate the food volume required by various species. Determine the volume of biomass required to sustain various creatures (e.g., volume of grass for elephants, plankton for whales, mosquitoes and swallows, prey and bears). 	<ul style="list-style-type: none"> • Students draw a diagram with the food pyramid data. Teachers look for evidence that their diagram details how the amount of organisms (biomass) at the base of the food pyramid increases. Criteria could include the following: <ul style="list-style-type: none"> - matrix compares more than two organisms - organisms are from the same environment - quantified data are used for each organism, such as <ul style="list-style-type: none"> ➢ relative size ➢ amount of food eaten daily ➢ number of organisms in a measured area (e.g., 20 grams of plankton per litre of seawater) ➢ estimated number in the environment.

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Ecosystems (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Discuss with students how light energy is transformed into chemical energy, which is transformed into mechanical energy in a living creature (all living things use nutrients produced either by photosynthesis or chemosynthesis). 	<ul style="list-style-type: none"> • Grow and raise micro pets (e.g., brine shrimp, fruit flies, mealworms, crickets) by successfully managing its energy sources. Sustain life to these organisms for a period of time equal to one life cycle.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Backyard Biodiversity and Beyond • BC Science 7 • BC Science Probe 7 • Below Zero • Biology Concepts • The Biosphere • Cycle of Life/Recycle Handbook for Educators • Ecology: Communities • Ecology: Food Chains • Ecology: Organisms in their Environment • Ecology: Populations • Ecosystems • Ecosystems: The Role of Abiotic Factors • Forests in Focus • Kokanee of British Columbia • McDougal Littell Science (Ecology) • Nelson Science & Technology 7 • Our Wonderful World (AIMS Activities) • Parasites & Partners • Project WET • Project WILD • Salish Sea • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Thinking Connections: Concept Maps for Life Science • Urban Stewards • The Watershed Works • Wonderwise: Women in Science Learning Series (Urban Ecologist) 	

Grade 7 Life Science: Ecosystems

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • assess the requirements for sustaining healthy local ecosystems 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> create and justify a description of a suitable environment for a specific organism, taking into account the limiting factors (e.g., food, water, light, living space) <input type="checkbox"/> explain relationships between living (biotic) and non-living (abiotic) things within an ecosystem (e.g., soil, bacteria, plants, animals), with reference to several examples <input type="checkbox"/> evaluate the likely effects of habitat loss for certain species 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • On a schoolyard walk, have students study interactions among living and non-living parts in the natural ecosystem. Students should record their observations and write journal entries. • Later visit an Estuary region and observe the many types of interactions to see. 	<ul style="list-style-type: none"> • introductory activity – no corresponding assessment necessary
<ul style="list-style-type: none"> • Have students discuss key components for creating and maintaining a contained ecosystem (e.g., vivarium). Have students research the limiting factors specific to an organism. 	<ul style="list-style-type: none"> • Have students build and maintain a non-commercial container for a miniature ecosystem. The vivarium must sustain plant and animals with adequate light, food, water, living space for the life forms to be placed inside (insects, invertebrates, fish, amphibians).
<ul style="list-style-type: none"> • After creating an ecosystem, have students explain all items in the ecosystem, justifying how each contributes to the ecosystem. • Explore reclamation of a “clean” land site for how various living organisms can be reintroduced naturally and by conservation methods. Sites could include: mining (tailings), volcanic lava beds, old garbage dumps, sand dune beaches, and glacial moraines, 	<ul style="list-style-type: none"> • When explaining any ecosystem, natural or artificial, students should be able to answer questions such as the following: <ul style="list-style-type: none"> - Who are the decomposers in the ecosystem? - Where are the detritivores mostly located? (Detritus) - How do the producers feed the consumers? - What predators are in the ecosystem naturally? - How many predators can this ecosystem support?

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Ecosystems (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Ask students to research a species that has become endangered/extinct as a result of habitat loss. Using the food chain and communities concept, have students relate the impact this loss has had on other organisms. Special attention should be placed on critical members of the food chain and bio-diversity of the ecosystem. 	<ul style="list-style-type: none"> • Assign students to work in one of these ecosystems for a display project: <ul style="list-style-type: none"> - water (wetlands) – bird life - water (standing) – mosquitoes - wild plant market gardens - ethno-botany projects – how people use plants. Displays should show <ul style="list-style-type: none"> - how a scientific investigation was conducted in collecting and detailing the facts about an endangered/extinct organism - some steps people can take to remedy the habitat loss problem. - how this endangered organism is connected to other life forms. - scientifically why this endangered organism must be protected as well as its habitat.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Backyard Biodiversity and Beyond • BC Science 7 • BC Science Probe 7 • Below Zero • Biology Concepts • The Biosphere • Cycle of Life/Recycle Handbook for Educators • Ecology: Populations • Ecosystems • Forests in Focus • Kokanee of British Columbia • McDougal Littell Science (Ecology) • Nelson Science & Technology 7 • Our Wonderful World (AIMS Activities) • Project WET • Project WILD • Salish Sea • Salmonids in the Classroom • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Thinking Connections: Concept Maps for Life Science • Urban Stewards • The Watershed Works • Wonderwise: Women in Science Learning Series (Urban Ecologist) 	

Grade 7 Life Science: Ecosystems

Prescribed Learning Outcomes	
<p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • evaluate human impacts on local ecosystems 	
Suggested Achievement Indicators	
<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> describe, using examples, how forestry practices affect ecosystems (e.g., riparian zones, fishing, forest debris, beetle kill, controlled burn) <input type="checkbox"/> determine the sources of pollutants, and analyse their effects (e.g., autos and air quality, oil spills and water contamination) <input type="checkbox"/> describe, using examples, how practices of Aboriginal peoples in BC affect environmental sustainability in a specific ecosystem 	
Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Working in groups, have students imagine they are to decide on the appropriate harvest of some Forest land outside city limits. Several interest groups have come forward with suggestions and points of view. Have student groups identify the pros and cons of each suggestion, make an informed decision, and prepare a summary of their decision and of the supporting rationale. 	<ul style="list-style-type: none"> • As groups present viewpoints and persuasive arguments to the other members of the class, look for evidence that they have presented <ul style="list-style-type: none"> - major aspects of the living forest - a range of perspectives - relevant issues and conclusions - identified ethical considerations - expressed awareness of other’s viewpoints - consider forest floor sustainability - consider watershed resource affect.
<ul style="list-style-type: none"> • Research Aboriginal practices within a specific ecosystem (e.g., river: salmon fishing; intertidal waters: herring roe; forestry: trapping). • Working in groups, have students identify the pros and cons of Aboriginal practices within a specific ecosystem (e.g., controlled burns, fish wheels, culturally modified trees). • Discuss the Aboriginal value (concept) of “giving back to the environment what you take” and how it may affect a specific ecosystem (i.e., reforestation, protecting stream beds, harvest rotation). 	<ul style="list-style-type: none"> • Student research and discussion should reflect <ul style="list-style-type: none"> - understanding of Aboriginal practices and values - sensitivity to Aboriginal concerns - how practices affect environmental sustainability.

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Ecosystems (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students assess ways in which humans affect habitats, both positively and negatively (e.g., urbanization, adding greenbelts, habitat fragmentation, or riparian zones). Views could be portrayed in multimedia presentations. Include the level of damage and stage of recovery of a given local ecosystem. Students could be asked to make a pro/con chart or a before and after diorama display. Please see the Scoring Guide at the end of this unit. 	<ul style="list-style-type: none"> • Choose a large habitat and have students create a pro/con chart reflecting the human impacts on it and a list of experimental questions for further study. Assess by having students pose relevant questions, such as those focused on <ul style="list-style-type: none"> - looking for a cause and effect link (e.g., Does new road building cause water erosion?) - asking if changing one impact slightly will reverse an effect (e.g., Is the effluent water temperature encouraging the wrong shellfish to grow?).
<ul style="list-style-type: none"> • Ask students to record how people in a community interact with each other and with ecosystems at a local level. Have students list non-point sources of aquatic pollution (a river or sewer pipe is a point source, while farm manure is a non-point sources of aquatic nitrates). 	<ul style="list-style-type: none"> • After students build the polluted community model, assess how well they can suggest rearranging the model to reduce aquatic pollution. Some questions might be: <ul style="list-style-type: none"> - Is the run-off water cleaner? - Are oils and other messy chemical removed from sewage? - Does less farm manure enter the ditches? - How can solid wastes be better handled before going to the landfill site?
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • Backyard Biodiversity and Beyond • BC Science 7 • BC Science Probe 7 • Below Zero • Biology Concepts • The Biosphere • Cycle of Life/Recycle Handbook for Educators • Forests in Focus • Gitga'ata Spring Harvest • Kokanee of British Columbia • Legacy of an Oil Spill • McDougal Littell Science (Ecology) • Nelson Science & Technology 7 • Our Wonderful World (AIMS Activities) • Project WET • Project WILD • Salish Sea • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Thinking Connections: Concept Maps for Life Science • The Watershed Works 	

GRADE 7 PHYSICAL SCIENCE: CHEMISTRY

Key Elements: Physical Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have understood the characteristics of mixtures and solutions, as well as chemical and physical properties of various substances.

Chemistry

In this introduction to chemistry, students develop a greater understanding of matter through various hands-on activities in a “kitchen chemistry” setting. Students use appropriate tools and techniques to understand the characteristics of mixtures and solutions. They gain understanding of the pH scale by testing weak acids or bases. Students are also introduced to the particle model theory and to quantitative and qualitative properties of materials, as well as chemical and physical changes in matter.

Vocabulary

matter, volume, state, solid, liquid, gas, chemical change, physical change, reversible and non-reversible changes, pure substance, element, compound, mixture, solution, suspension, emulsion, solubility, concentration, dilute, saturation, supersaturated, unsaturated, dissolve, pH, acid, acidic, base, basic, neutral, hydrometer

Knowledge

- matter is anything that has mass and volume; it is generally classified as pure substances or mixtures
- the observable properties of matter include colour, texture, and state
- the measurable properties of matter include density, melting and freezing points
- changes to matter can be reversible (mixtures and changes of state) and non-reversible (mechanical change such as grinding, chemical change such as cooking)
- matter is made up of tiny particles (particle model theory)
- pure substances are either elements or compounds, and their properties are always the same
- mixtures have two or more kind of particles
- mixtures can be classed as solutions, suspensions, or mechanical mixtures
- mixtures can be separated physically or chemically by removing one of the components (evaporation, crystallization, filtration, dissolving, magnetic separation, flotation)
- suspensions consist of solid pieces scattered throughout the mixture
- solutions are mixtures that appear as a single substance
- pH is the measure of the tendency toward acidic or basic conditions

Skills and Attitudes

- demonstrate curiosity, scepticism, creativity, open-mindedness, accuracy, precision, honesty, and persistence as important scientific attributes
- ask questions and formulate hypotheses that are tentative and testable, and draw conclusions from results
- use appropriate tools and techniques to gather, analyse, interpret, and share information
- recognize that an experiment must be repeated and yield consistent results to be considered scientifically valid
- develop models to represent systems or analogies about matter
- handle chemicals and equipment safely and responsibly

Grade 7 Physical Science: Chemistry

Prescribed Learning Outcomes

It is expected that students will:

- conduct investigations into properties of matter

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- identify several qualitative (e.g., colour, texture, state) and quantitative (e.g., density, melting point, freezing point) properties of materials
- accurately measure, record, and present data collected during an experiment involving solutions and mixtures
- describe chemical and physical changes in matter, citing examples

Planning for Assessment

Suggested Assessment Activities

- Provide an outline of the particle model theory.
- Molecules of different substances have different properties and travel up a solvent paper strip to produce coloured streaks. Have student explore Chromatography by using pen inks with water.
- Have students use a felt ink colour to make a 2mm dot near the end of a paper strip. (Use coffee filter paper.) Hang the ends vertically in water and allow it to be absorbed and the water will dissolve the ink particles and move them into coloured bands.

- Consider how well the students relate the resulting colours according to the particle model theory. Ask students to explain
 - why multiple colours, not the original colour, are seen
 - how the original ink can be one colour but the chromatogram shows many
 - how all the inks fit into the spaces of the original colour.
- For a final assessment, model solid, liquid, and gas states for students by using cups and bags filled with the same amount of marbles. (These containers show there are spaces between molecules and that the spaces can be increased in a large bag.) After these demonstrations students should be able to provide a written explanation of this analogy by using the particle model theory in words and simple diagrams. If a different molecule (rice) is added to the marbles what chemistry can be explained by this modelling?

- Work with heating water and cooling water exercises separately. Demonstrate the boiling point of water (e.g., using a microwave oven and thermometer). Have students record results of the demonstration.
- On a different day have students use ice cubes to measure the cooling of several different samples of water (differing quantities).

- Have students accurately report all their measurements. If certain tools are used be sure that the reported measures use the correct units. Suggested measurements:
 - temperature before & after
 - volume of liquid
 - mass of solids (ice cubes)
 - observations of physical features
 - time involved heating or cooling.

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Chemistry (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Demonstrate for students a number of reversible and non-reversible processes, each representing a different chemical or physical process <ul style="list-style-type: none"> - burning paper (combustion) - carbonated drinks (gaseous) - borax and glue [slime] (suspension) - cooking oatmeal (heating). - sand and water (mud) - breaking up soup crackers [mush]. 	<ul style="list-style-type: none"> • Ask students to describe in their science journals whether the original material has changed into a new substance with different properties. Then have students create a four-column chart, classifying processes as either physical or chemical, and reversible or non-reversible. Assess student ability to properly classify processes.
<ul style="list-style-type: none"> • In “What Happens When labs” have students measure and record simple experiments conducted by making various solutions and mixtures. The main purpose is to see how students perform the processes, not just discover what happens and in what amounts. Students must record measurements of mass, size, number, and amounts using measuring tools. Students must observe what they see in detailed charts, not what they think is happening. Suggested labs <ul style="list-style-type: none"> - underwater volcano - juice crystals dissolving until saturation - salt water and fresh water mixing - exothermic reaction—calcium chloride and vinegar - proportions for a perfect cup of coffee - bread yeast and sugar substitutes. 	<ul style="list-style-type: none"> • In all these investigations, students must start by asking the What Happens When ... question to be explored. The question also has to have a How Much is Needed component. For example: <ul style="list-style-type: none"> - What happens when juice crystals are mixed in water and how much makes a good drink? - What happens when one package of yeast is mixed with one package of sugar substitute? Have students design their own lab procedures and record and observe their data. The collected results are then formatted into a report. To assess student lab work, see the sample scoring guide (Laboratory Report) provided at the end of this grade.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • BC Science 7 • BC Science Probe 7 • Below Zero • Nelson Science & Technology 7 • Project WET • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Science, Please! (Parts 1 & 2) 	

Grade 7 Physical Science: Chemistry**Prescribed Learning Outcomes**

It is expected that students will:

- classify substances as elements, compounds, and mixtures

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- accurately sort products found in the home into substances, suspensions, emulsions, mechanical mixtures, and solutions and summarize their similarities and differences
- correctly relate the particle theory to the properties of elements, compounds, and mixtures

Planning for Assessment**Suggested Assessment Activities**

- Using materials from home, ask students to prepare examples of
 - substances (e.g., sugar)
 - suspensions (e.g., pepper and water)
 - emulsions (e.g., oil and vinegar)
 - mechanical mixtures (e.g., tea leaves and coffee beans)
 - solutions (e.g., salt and water).

- Using the particle theory of matter, students should be able to diagram how the different molecules mix together when making
 - mixtures (mechanical & emulsions)
 - solutions
 - compounds.

- As an extension to previous work showing the particle model theory using marbles and rice. Now observe students as they combine mini marshmallows to model atoms and molecules in regular compounds (CO₂ sugar, water, salt) Use coloured mini marshmallows and toothpicks to make molecular structures.

- Determine if the models were correctly arranged according to standard molecular diagrams shown in chemistry references.
 - Assess students work according to
 - can they identify which molecules are involved?
 - can they change the model to show chemical changes?
 - have they identified the correct number and type of molecules needed?

Recommended Learning Resources

- BC Science 7
- BC Science Probe 7
- McDougal Littell Science (Chemical Interactions)
- Nelson Science & Technology 7
- Nelson Science & Technology Skills Handbook
- Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science
- Science, Please! (Parts 1 & 2)

Grade 7 Physical Science: Chemistry**Prescribed Learning Outcomes**

It is expected that students will:

- measure substances and solutions according to pH, solubility, and concentration

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- describe the effects of a variety of factors (e.g., type of solute, type of solvent, temperature) on solubility
- determine factors (e.g., heat, stirring, surface area) that affect the rate at which substances dissolve
- use test papers with teacher support to carefully analyse various substances and solutions for acidic or basic characteristics (pH scale)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Use lab equipment to measure (e.g., volume, mass) of a solvent and solute. Prepare various water and salt mixtures. Use a whole, raw egg and shell (as a hydrometer) to indicate density of a solvent and solute. Use fruit juice crystals to prepare several “drink” solutions. 	<ul style="list-style-type: none"> • When finished, students can quantify their results by <ul style="list-style-type: none"> - mass of crystals used - volume and mass of water used - measure of final solution - percentage by mass of each solution.
<ul style="list-style-type: none"> • Ask students to problem solve how to dissolve lifesavers at a faster rate, and record a list of possible variables to test. Once the important dissolving factors have been identified, have students design an experiment to test these factors in a precise, measurable way. 	<ul style="list-style-type: none"> • Have students prepare reports showing that the variables were tested in a fair manner. Student reports should address <ul style="list-style-type: none"> - time - physical motion (stirring, shaking) - crushing - flavour - temperature of solvent - different solvents. Reliability can be tested later by a peer.

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Chemistry (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Use marbles and rice to demonstrate the particle theory of matter. Explain how compounds in a solution are a mixture of different molecules together in the same container. • Explain to students using the particle model theory that pure water is made up of hydrogen (H) and oxygen-hydrogen (OH) molecular parts called ions and these combine to form water molecules (H₂O) all the time. These molecules form the particles in all solutions of pure water. But various waters can have different amounts of these particles. When the number of (H) ions is measured it is called pH. It is a measure of the tendency towards acidic or basic conditions. High numbers of (H) ions = more acid water, while a low number of (H) ions = basic water. Thus a high number of (H) ions means a low pH and vice versa. 	<ul style="list-style-type: none"> • Use known food and household products (e.g., apple juice, lemon juice, detergent, soda) to make solutions in water. Then have students test these products with pH paper and determine the correct range of their pH measure according to the colour chart for the pH indicator papers. • Increase the sophistication of the testing by using a greater variety of household substances, and use indicator paper that reads pH with greater precision. Have students record their testing in precise chart format to reinforce effective reporting.
<ul style="list-style-type: none"> • Ask students to hypothesize what realistic procedures can be used to make sugar dissolve in a liquid completely. Discuss with the class ways in which the relevant factors (stirring, particles, temperature) can be scientifically measured. Allow students to make a saturated solution of salt or sugar and follow up by conducting the experiment. They should then report results on the dissolving factors: stirring, particle size, and temperature. • Using salt or sugar, have students determine how to saturate cold water; then observe what happens when a small amount of fresh water at the same temperature (e.g., 5ml or 10ml, coloured using food colour) is added to the top of the salt solution. This is a good model of how Estuary river water mixes with the ocean. 	<ul style="list-style-type: none"> • Using the particle theory of matter, students should be able to diagram how the different molecules mix together when dissolving <ul style="list-style-type: none"> - at room temperature - if more heat is applied - if they are made as small as possible. For very hot saturated solutions students should be able to describe what happens when the liquid cools. (crystals grow). • For the Estuary fresh and saltwater mixing, students should be able to describe that <ul style="list-style-type: none"> - fresh water is less dense than saltwater - freshwater floats on top of saltwater - river-water floats onto the ocean water at the mouth of an Estuary.

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Chemistry (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Have students make purple cabbage tea. Chop 250 ml of cabbage leaves and cover with boiling water. After it cools, test various food ingredients for a colour change. Ask students to observe and record details to prove that acid foodstuffs turn one colour and basic foods turn a different colour. Use distilled water for a neutral solution. • Ask students to infer from known ideas (e.g., lemon is acidic, baking soda is basic) the colour scale for a full range of acids and base foodstuffs. Hint: when testing dry powders, sprinkle powder into 5ml sample of cabbage tea. For wet liquids drip liquid into a 5ml sample of cabbage tea. 	<ul style="list-style-type: none"> • Testing with the cabbage tea on household foodstuff, students should report <ul style="list-style-type: none"> - types of colours cabbage tea can change - which foods are acid, base, or neutral - the relative acidic or basic strength - if no colour change, conclude food is neutral.
<ul style="list-style-type: none"> • As an extension, have students use pH papers and litmus papers with the same food ingredients (dry and liquid). 	<ul style="list-style-type: none"> • To assess the extension activity, look for student's ability to set up a controlled set of procedures to determine pH readings for dry and liquid ingredients in an orderly arrangement. The collected data becomes their final chart for a report.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> • BC Science 7 • BC Science Probe 7 • Below Zero • McDougal Littell Science (Chemical Interactions) • Project WET • Sci Short • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Science, Please! (Parts 1 & 2) 	

GRADE 7 EARTH AND SPACE SCIENCE: EARTH'S CRUST

Key Elements: Earth and Space Science

Estimated Time: 25 – 30 hours

By the end of the grade, students will have demonstrated understanding of the Earth's surface and how it changes over time.

Earth's Crust

The study of the Earth's crust includes an investigation of the Earth's structure, characteristics of the Earth's core, geological processes, rock and mineral formations, and changes in the landscape over time. Students examine theories explaining the Earth's geology and the dynamics of plate tectonics. Through investigation, observation, diagrams, and models, students begin to identify geological features and simulate changes that occur on the Earth's surface and on the ocean floor. Students apply this knowledge to suggest the effect that these features and changes have on people and communities. They identify technologies that are related to the scientific study of these changes.

Vocabulary

crust, mantle, outer core, inner core, weathering, erosion, deposition, fossil, fossil record, geologic time scale, rock cycle, plate tectonics, continental crust, mid-ocean ridge, delta, mountain, valley, volcano, plain, plateau, ocean crust, convergent, divergent, transform plate boundaries, subduction zone, igneous, metamorphic, sedimentary, magma, lava, seismic waves

Knowledge

- the Earth is broadly differentiated into a crust, mantle, and core
- the geosphere refers to the physical Earth; the atmosphere refers to the air; the biosphere refers to life forms; and the hydrosphere refers to water
- mountains, valleys, plains, deserts, rivers, lakes, and oceans are features of the surface of Earth
- the Earth's crust and uppermost mantle are made of large moving sections called tectonic plates
- the features on the surface of the Earth are formed by tectonic activity, particularly at convergent, divergent, or transform fault tectonic plate boundaries and by the processes of wind, water, and ice that wear down surface features over time
- the theory of plate tectonics explains how and why the tectonic plates move and explains why the Earth's surface is continually changing
- stress in the Earth's crust is released in tectonic plate movement and earthquakes
- heat within the Earth is released in volcanic activity
- information about the mantle and core is obtained by recording and charting energy waves from earthquakes and by looking at rocks exposed at the Earth's surface
- earthquakes are common along all tectonic plate boundaries and occur deep in the Earth at subduction zones
- rocks are made of minerals that have unique properties
- minerals are made from pure elements in the Earth
- minerals can be identified by their colour, lustre, hardness, cleavage, crystal structure, and their reaction to certain chemicals
- rocks are classified by how they are formed within the rock cycle and their mineral content
- igneous, sedimentary, and metamorphic rocks can be changed from one form to another
- fossils in sedimentary rocks allow us to interpret ancient environments
- the history of changes in life on Earth are recorded in the fossil record
- the geologic time scale is based on changes in life on Earth

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Key Elements (continued)

Key Elements: Earth and Space Science

Skills and Attitudes

- use analogies to visualize science concepts
- collect data from research resources and apply to diagrams and graphs
- report on the rock cycle from lab research results and observations
- observe how the positions of earthquakes, volcanoes, and mountain ranges outline the boundaries of tectonic plates
- classify rock collections
- examine and identify commonly found rocks and local geological formations
- use models to predict how earthquake waves travel through the Earth and how this information leads to an understanding of the interior of the Earth
- investigate the use of models to show large scale systems

Grade 7 Earth and Space Science: Earth's Crust

Prescribed Learning Outcomes

It is expected that students will:

- compare the characteristics of the Earth's core, mantle, and crust, and describe the formation of rocks

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- accurately list the characteristics of each layer of the Earth
- construct a flow chart to explain in detail the geological processes involved in forming minerals and rocks
- catalogue the properties of rock and mineral samples (e.g., cleavage, colour, crystal habit, fracture, hardness, lustre, and streak) on the basis of a detailed examination

Planning for Assessment

- Compare the Earth to an apple. Examine the crust (skin), mantle, (flesh), and outer and inner core (core and seeds). Cut the apple in half, showing students the thinness of the skin, which is analogous to the thinness of the Earth's crust.
- Search available resources for diagrams, and have students locate and name the layers of the geosphere.
- Construct a data table that summarizes, in sequence, the names, thickness, and temperature of each of the Earth's layers.
- Generate a class discussion with the following questions:
 - How have we acquired our information about the Earth's layers?
 - Is it possible to travel through the centre of the Earth?
 - Can we send probes to the centre of the Earth as we send probes out into space?
 - How far have we drilled into the Earth's crust?

Suggested Assessment Activities

- Assess students by asking them to construct a bar graph of the Earth's layers using their data table. Graph thickness (0 to 3000 km) against continental crust, ocean crust, lithosphere, mantle, outer core, and inner core. Graphs should be well labelled and accurate.
- Ask students to draw a wedge-shaped diagram, which represents a slice of the Earth, from the crust to the centre of the inner core. Divide the slice into layers of appropriate thickness and ask students to label them and add the information from their data table to the layers. Ask students to summarize changes in the layers by drawing arrows that indicate changes in temperature and density. Assess students' ability to
 - accurately transfer the information from the data tables to the diagram
 - summarize changes from the surface to the centre of the Earth.

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Earth's Crust (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Discuss and list the characteristics of igneous, sedimentary, and metamorphic rocks. Discuss how and why rocks change from one type to another. Show students examples of the three types of rock, and invite them to create a collection of rock samples or rock photos in the classroom. • Model Igneous Rock: Melt sugar and allow it to cool rapidly on a pan set over an ice bath; and slowly (over several weeks) in a jar. Notice the difference in crystal habit or texture. Compare the fast-cooled solution to a piece of obsidian (volcanic glass). Compare the slow cooled crystals to the mineral crystals in a piece of granite. Ask students where igneous rocks could form and what the conditions would be like in each environment. • Make sedimentary rocks: Use concentrated salt and sugar solutions and a thin slurry of Plaster of Paris to cement jars of sand into "sandstone." As the water evaporates and the salt or sugar crystals (or plaster) precipitate between the sand grains, the sediments are cemented together. • Ask the students where and how sediments accumulate and what conditions would be necessary for forming sedimentary rocks. If cements crystallize from solutions, where is the formation of sedimentary rock likely to occur on the Earth's surface? • Model metamorphic rocks by layering sand and silt and chunks of wax crayon between two pieces of aluminium foil. Place a hot iron on top of the aluminium foil and press down, long enough for the wax crayon to melt. Peel off the aluminium foil once the "rock" has cooled and cut the rock in two. Ask students if they can tell which direction the pressure was applied from what they see. Ask students if this rock would have "morphed" if no heat was involved. • Discuss where each type of rock can be found and how one type of rock can be changed to another. Chart what processes are necessary to change the rocks. Explain to the students that these changes are summarized in the rock cycle. 	<ul style="list-style-type: none"> • As each rock type is modelled or illustrated, have students report on what they have learned. Reports should address the following <ul style="list-style-type: none"> - a description of each rock type - the method for forming each rock model - places on Earth where the formation of each rock could occur and the conditions which would have to be present in order for the rock to form - criteria for identifying each rock type. • Assess students' knowledge of igneous, sedimentary, and metamorphic rocks in a Rock Cycle Report that summarizes facts about each type of rock and how they may change from one form to another. Reports could be done as posters, booklets, or classroom displays. Students may wish to add photos (of rock samples or outcrops) to illustrate their understanding of the rock cycle.

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Earth's Crust (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> Investigate the properties of minerals (e.g., cleavage, colour, crystal habit, fracture, hardness, lustre, and streak) by showing students samples or photos of minerals, which clearly illustrate various properties. Include gemstones as examples of minerals and use them to discuss various properties. Have students create a mineral report for up to ten different minerals. Use a generic fact sheet and complete it with the students for a known mineral such as diamond. The fact sheet should include spaces for cleavage, colour, crystal habit, fracture, hardness, lustre, streak, space for an illustration, and space for common occurrences and uses of the mineral. Students should then choose minerals from a collection or list supplied by the teacher and research each one, completing a mineral report sheet for each. By examining a collection of minerals, students will be compiling their own mineral identification booklet. 	<ul style="list-style-type: none"> In evaluating students' mineral reports, make sure that they have <ul style="list-style-type: none"> identified the mineral properties illustrated with diagrams, drawings or photos described all the minerals included in their report described where the minerals could be found.
<ul style="list-style-type: none"> Discuss the difference between rocks and minerals. Examine the rock cycle charts (and classroom rock samples) and, using students mineral properties reports, identify as many minerals as possible. Challenge students to explain why minerals are often easier to identify in igneous intrusive rocks. Ask students to consider what conditions would be needed for large mineral specimens to form. 	<ul style="list-style-type: none"> Set up a practical test. Have between 10 and 20 stations each with a rock sample or illustration to be identified as igneous, sedimentary or metamorphic; or with a question about a mineral property. Have individual students move at timed intervals to each station to complete the questions. Caution: the rock samples or illustrations must be very obvious for students to be successful.
<p>Recommended Learning Resources</p> <ul style="list-style-type: none"> BC Science 7 BC Science Probe 7 Down To Earth (AIMS Activities) Earth in Action Series Earth in Change: The Earth's Crust Fire and Ice Geologist's Notebook Series: Three Rocks Geologist's Notebook Series: What Exactly Are Minerals? Mountains and Mountain Building Processes Nelson Science & Technology 7 OceanNews Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science Wonderwise: Women in Science Learning Series (Space Geologist) 	

Grade 7 Earth and Space Science: Earth's Crust**Prescribed Learning Outcomes**

It is expected that students will:

- analyse the dynamics of tectonic plate movement and landmass formation

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- explain how earthquakes have helped scientists understand the Earth's structure (e.g., primary and secondary seismic waves)
- detail the effects of earthquakes, volcanoes, and fault boundaries on the Earth's crust
- model tectonic plate movement to show convergent, divergent, and transform plate boundaries

Planning for Assessment

- Introduce earthquakes by bending a wooden metre stick. Demonstrate the elastic strength in the wood and ask students what will happen if you continue to apply force to the wood. Demonstrate with an old metre stick or a stick. Point out to students that the vibration of the stick as it breaks is a good model of an earthquake. When brittle, the cold Earth's crust builds up stresses near fault zones; when the elastic strength of the rock is exceeded the rock will break and major vibrations, like earthquake waves, occur.

Suggested Assessment Activities

- introductory activity – no corresponding assessment necessary

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Earth's Crust (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Model earthquake waves with a slinky or long spring. Moving the slinky directly back and forth between two students mimics a primary or P wave. Moving the slinky side to side, making the spring move like the movement of a snake, mimics a secondary wave or S wave. P waves will travel through rock or liquid, while S waves only travel through rock. Have students research how the speeds of P waves and S waves relate to fast cars, airplanes, jets, and the speed of sound. Can an earthquake be felt before it is heard? (The speed of sound in air is only 0.34 km/second, and jet fighters fly at about 0.85 km/second.) P waves travel at speeds of 4 to 7 km per second, and S waves travel at 3 to 4 km per second. (There are also surface waves, known as L waves, that travel along the surface of the crust and are the slowest earthquake waves.) • Earthquake waves bend as light waves bend going from one medium into another. Demonstrate this, using a pencil in a glass of water. Guided inquiry • Ask students to predict what will happen to earthquake waves as they travel from one medium to another. If light waves bend, will earthquake waves bend? Compare students' predictions of earthquake waves with diagrams in texts and resource books. 	<ul style="list-style-type: none"> • Assessment for this section might be done through a guided inquiry. Have students predict what would happen if stress builds up in hot material within the geosphere: <ul style="list-style-type: none"> - Would an earthquake occur? - Can an earthquake occur in the mantle? - Can an earthquake occur in the outer or inner core? - A flexible, plastic ruler is unlikely to break the same way as the wooden metre stick. What property found in the mantle and core does this characterize? <p>Ask students to apply their knowledge of the Earth's layers, and remind them that S waves cannot travel through liquids. Ask students to draw the pathway of earthquake waves as they go through the Earth's layers. Assess students' ability to predict that the S waves will stop at the outer core and that waves will bend as they go from layer to layer.</p>

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Earth's Crust (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • The crust of the Earth is broken into tectonic plates. Use the analogy of cars to introduce the three different types of tectonic plate boundaries: at a divergent plate boundary, tectonic plates move away from one another; at a convergent plate boundary, plates collide; and at a transform fault boundary, plates pass one another going in opposite directions. <ul style="list-style-type: none"> - Earthquakes, volcanoes, mountain ranges, and faults mark the outline of the plates. Discuss with students why this would be so and how plate movement shapes the surface of the geosphere. Ask: <ul style="list-style-type: none"> - Which area of a tectonic plate (the edge or the centre) will be more likely to experience an earthquake or a volcano? - Where do people need to be particularly mindful of earthquakes as they construct buildings, bridges, etc.? - Can earthquakes ever occur in the centre of tectonic plates? - What would happen to the surface of the Earth if all plate movement stopped? • Have students visit an Internet web site that shows plate movement over time. • Examine a world map with earthquakes and volcanoes and other tectonic features marked on it. Discuss the Ring of Fire with students and what it is like for people all around the Pacific to live with earthquakes and volcanoes. 	<ul style="list-style-type: none"> • Use large tectonic world maps for students to consolidate plate tectonic ideas. Assess students' ability to <ul style="list-style-type: none"> - name the seven major tectonic plates - identify the three types of tectonic plate boundaries using three different colours. (divergent plate boundaries are single lines; convergent boundaries are sawtooth lines and transform fault plate boundaries are double lines) - label the tectonic plate on which BC is located, as well as the neighbouring plates - show cross-section diagrams of the three types of plate boundaries with arrows indicating the direction of plate movement. <p>As an extension, students may complete their tectonic map by outlining the Ring of Fire and adding it to their map key.</p>
<p>Recommended Learning Resources:</p> <ul style="list-style-type: none"> • BC Science 7 • BC Science Probe 7 • Down to Earth (AIMS Activities) • Earth in Action Series • Earth in Change: The Earth's Crust • Earthquakes: Our Restless Land • Geologist's Notebook Series: Three Rocks • Geologist's Notebook Series: What Exactly Are Minerals? • McDougal Littell Science (The Changing Earth) • McDougal Littell Science (Earth's Surface) • Mountains and Mountain Building Processes • Nelson Science & Technology 7 • OceanNews • Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science • Volcanoes: Understanding the Hazards 	

Grade 7 Earth and Space Science: Earth's Crust

Prescribed Learning Outcomes

It is expected that students will:

- explain how the Earth's surface changes over time

Suggested Achievement Indicators

The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome. Students who have fully met the prescribed learning outcome are able to:

- explain how scientists use the placement and position of an object to infer the time of events (e.g., superposition)
- illustrate how fossils come to be associated with sedimentary rock
- report on how fossil record is used to identify Millennium changes in the Earth's surfaces

Planning for Assessment

- Use any recycling bin or garbage can to simulate how scientists study the geological past. Allow groups of students to "excavate" 10-20 cm of paper and study the "past" events (e.g., layers, depth of placement).

Suggested Assessment Activities

- Ask students to create a model that describes how the objects in the recycling bin are events occurring through time (time-rock). Consider the extent to which students
 - collected data accurately
 - sorted facts from unnecessary data
 - identified types of artefacts (e.g., paper, debris)
 - shown the placement of artefacts correctly
 - used systematic procedures for "excavating"
 - identified errors inferred by the placement of the artefacts in the excavation.
- Ask students what other events could disrupt the "time-rock" sequence. Could layers be overturned? Folded? Or "eroded away"?

continued next page

Earth's Crust (continued)

Planning for Assessment	Suggested Assessment Activities
<ul style="list-style-type: none"> • Discuss what a fossil is. Ask students <ul style="list-style-type: none"> - Is a fossil a bone or shell? (A fossil is the trace, imprint, or remains of an ancient life form found within the rock record.) - What kind of fossils humans will leave behind? Would a rusting piece of machinery be considered a fossil? A buried paved road? A concrete building foundation? A bone? False teeth? - What kinds of life forms are most likely to fossilize? Will a jellyfish make a fossil as easily as a dinosaur bone? • Make clay 'fossils' with the class by pressing leaf shapes into soft art clay. Allow time for drying; then make plaster moulds of each shape. Using this experience, discuss how real fossils are formed. Have students create a sequence of images for these fossil-making events as a cartoon strip. 	<ul style="list-style-type: none"> • Assign students the task of making several fossils in Plaster of Paris. Ask students to bring in a variety of different items with which to make fossils. Students should bring in something with hard parts and something that is more delicate, like a leaf or a feather. The Plaster of Paris must partially set before the items are pressed into it. Some items can be used for impressions and some can be left within the plaster. A feather will make a detailed fossil imprint if the plaster is almost set. Students can paint their fossils after they are dry, for a more realistic look. Grey or brown discoloured water is all that is needed. Assess student understanding of their fossil displays by having them answer the following questions: <ul style="list-style-type: none"> - Did some items fossilize more readily than others? - How realistic is the fossil rock record? - Do fossils provide a complete look at ancient life forms, or is there a bias? (limited view-point) - Can fossils be found in any type of rock? Are they more likely in sedimentary rock? Why? (Students should use the rock cycle to help solve this question.)
<ul style="list-style-type: none"> • Some fossil locations are extraordinary in their preservation. These fossil sites are called fossil Lagerstätten (translates loosely to "motherlode"). The Burgess Shale in BC is one of these and has been designated as a UNESCO world heritage site. The La Brea Tar pits in California and the Solenhofen Limestone in Germany are other examples. <ul style="list-style-type: none"> - Find a set of real fossils or use images of real fossils or fossil Lagerstätten image collections so that students can explore how ancient environments and life forms differed from modern ones - Use the fossil examples to look at geologic time and the fossil record. Ask students: <ul style="list-style-type: none"> - How long ago did life appear on Earth? - What were the oldest life forms like? - How old are the oldest mammals, birds, and dinosaurs? 	<ul style="list-style-type: none"> • Ask students to research fossil Lagerstätten sites and find out why they are so extraordinary. Have individual students do poster displays or short reports on different Lagerstätten sites or the class could choose one, such as the Burgess Shale, to research together. A class project on the Burgess Shale might include a short report done on one of the fossils by each student. Criteria for evaluation might include <ul style="list-style-type: none"> - name of the fossil - size of the fossil - preservation of the fossil (e.g., bone, imprint) - habitat of the fossil - lifestyle of the fossil - a modern animal to which the fossil is similar - unique features of the fossil - biographical sources - virtual museum Internet links (URLs).

continued next page

Earth's Crust (continued)

Recommended Learning Resources

- BC Science 7
- BC Science Probe 7
- Earth in Action Series
- Fire and Ice
- Geologist's Notebook Series: Three Rocks
- Geologist's Notebook Series: What Exactly Are Minerals?
- McDougal Littell Science (The Changing Earth)
- McDougal Littell Science (Earth's Surface)
- Mountains and Mountain Building Processes
- Nelson Science & Technology 7
- OceanNews
- Science Detective™ Beginning: Higher-Order Thinking, Reading, Writing in Science

ECOSYSTEMS DIORAMA

Snapshot	1. Not Yet Within Expectations	2. Meets Expectations	3. Fully Meets Expectations	4. Exceeds Expectations
Attitude & Work Habits (task completion, time management, effort, interest)	<ul style="list-style-type: none"> task incomplete poor time management weak effort shows little interest in the topic 	<ul style="list-style-type: none"> Some project elements missing Usually engaged in the activity/project Adequate effort applied Show some interest in the topic 	<ul style="list-style-type: none"> completes project on time engaged in the activity/project gives activity/project best effort collaborates with peers 	<ul style="list-style-type: none"> task completed early gives best effort consistently uses rubric as a guide independently meets challenges & solves problems takes initiative to engage in further research out of school
Design (scale, key components, details, accuracy)	<ul style="list-style-type: none"> understanding of scale not evident missing several key components few details included many errors evident in model elements 	<ul style="list-style-type: none"> attempt to create to scale model appearance achieves its basic purpose key components are almost all included, though simplistic some details included many components show accuracy 	<ul style="list-style-type: none"> generally created to scale all components present creativity and originality evident accuracy can be seen in most components 	<ul style="list-style-type: none"> accurate scale additional relevant components/details included shows strong detail in creativity & original ideas components designed with precision
Content Knowledge (unit concepts)	<ul style="list-style-type: none"> few concepts included in model misunderstanding of many concepts unable to apply concepts to new situations 	<ul style="list-style-type: none"> some concepts included in model basic or partial understanding of concepts evident applies new concepts with some errors 	<ul style="list-style-type: none"> all concepts/principles included in model thorough and accurate understanding evident applies concepts accurately to new situations 	<ul style="list-style-type: none"> additional concepts included beyond required components thorough and integrated understanding with new insights demonstrates a broader, more global perspective than required

continued next page

Ecosystems Diorama (continued)

Snapshot	1. Not Yet Within Expectations	2. Meets Expectations	3. Fully Meets Expectations	4. Exceeds Expectations
<p>Quality (aesthetically pleasing, neatness, labelling, materials)</p>	<ul style="list-style-type: none"> • little effort evident • poorly constructed • labels missing • materials do not suit model component 	<ul style="list-style-type: none"> • some attempt to organize model/display • some missing labels • little variety in materials used 	<ul style="list-style-type: none"> • model is well organized and has a pleasing appearance • layout demonstrates care and thoughtfulness • labels used where appropriate • assembly shows care and time invested • variety of materials used 	<ul style="list-style-type: none"> • appearance of model attracts/engages the audience • labels are referenced to descriptors and/or a key is used • model components are student created
<p>Presentation (ideas, focus, oral communication, grammar, body language, eye contact)</p>	<ul style="list-style-type: none"> • ideas misinterpreted and statements regarding key ideas are incomplete or absent • little focus on key points of the presentation • rarely varies language; voice is often difficult to hear; may be inarticulate • poorly formed sentences and may speak slang • little or no use of body language to add emphasis • little or no eye contact made with audience 	<ul style="list-style-type: none"> • expression of ideas incomplete and statements are limited • attempt to maintain focus on key points of the presentation • some varied language for effect; voice is sometimes clear, fluctuates, and is at an appropriate volume • most sentences grammatically correct; may speak some slang • some use of body language to add emphasis • eye contact with audience attempted 	<ul style="list-style-type: none"> • expresses valid ideas clearly and concisely to form logical statements • presentation stays focused on the key points • generally varies language for effect; voice is usually, clear, holds fluctuation, and at an appropriate volume • uses grammatically correct sentences and language • appropriate use of body language adds emphasis • consistent eye contact with most of the audience 	<ul style="list-style-type: none"> • expresses ideas with insight and forms comprehensive statements • presentation is focused on the key points and may extend the key points • powerfully and confidently varies language for effect; voice has clarity, fluctuation, and appropriate volume • language is highly developed and uses newly learned words and terms appropriately within presentation • body language is naturally used and provides a positive emphasis • consistent eye contact made that includes the entire audience

LABORATORY REPORT

Student's name: _____ Date: _____

Statement or Question investigated: _____

Procedures Skills

- Is able to follow written or oral directions with care
- Chooses and uses appropriate materials and equipment for the task
- Is able to use the chosen materials and equipment with accuracy
- Uses the equipment carefully and follows all safety procedures
- Cleans up work station according to class expectations

Measurement Skills

- Uses appropriate tools to measure mass, volume, length, time, and quantity
- Uses the appropriate metric units for the measurements taken
- Uses and applies math skills to determine the correct measurements
- Correctly converts between metric units when necessary

Observation Skills

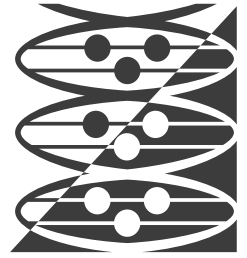
- Uses observations skills in making decisions
- Records data in a systematic fashion
- Collected observations show both quantitative descriptions and adjectives
- Collected observations show what was seen, and do not need to be revised
- Rough observations lab notes are kept and submitted with final report

Communication Skills

- Lab report clearly shows an understanding of the problem to be investigated
- Lab report details all the features investigated
- Report ends with a conclusions based upon the observations
- Concluding statement specifically addresses the experimental question investigated
- Report shows an understanding of possible errors and reasons for inaccuracy
- Concluding statement refers to generalizations learned from the observed results

Presentation Skills

- The report contains basic identification: name, topic, class, teacher and date
- All rough lab documents are attached to final report
- The report is neatly written or typed for legibility
- The report contains print, charts and labelled diagrams
- The report is completed on time



LEARNING RESOURCES

Science K to 7

This section contains general information on learning resources and provides the titles, descriptions, and ordering information for the recommended learning resources in the Science K to 7 Grade Collection.

What Are Recommended Learning Resources?

Recommended learning resources are resources that have undergone a provincial evaluation process using teacher evaluators and have Minister's Order granting them provincial recommended status. These resources may include print, video, software and CD-ROMs, games and manipulatives, and other multimedia formats. They are generally materials suitable for student use, but may also include information aimed primarily at teachers.

Information about the recommended resources is organized in the format of a Grade Collection. A Grade Collection can be regarded as a "starter set" of basic resources to deliver the curriculum. In many cases, the Grade Collection provides a choice of more than one resource to support curriculum organizers, enabling teachers to select resources that best suit different teaching and learning styles. Teachers may also wish to supplement Grade Collection resources with locally approved materials.

What Kinds of Resources Are Found in a Grade Collection?

Learning resources in a Grade Collection are categorized as either comprehensive or additional. Comprehensive resources provide a broad coverage of a significant number of the learning outcomes. Additional resources are more topic-specific and support individual curriculum organizers or clusters of outcomes.

The ministry updates the Grade Collections on a regular basis on the ministry web site http://www.bced.gov.bc.ca/irp_resources/lr/resource/gradcoll.htm

Please check this site for the most current list of recommended learning resources in the Grade Collection for each [IRP](#).

How Can Teachers Choose Learning Resources to Meet Their Classroom Needs?

Teachers must use either:

- provincially recommended resources
OR
- resources that have been evaluated through a local, board-approved process.

Prior to selecting and purchasing new learning resources, an inventory of those resources that are already available should be established through consultation with the school and district resource centres. The Ministry also works with school districts to negotiate cost-effective access to various learning resources.

Information about Ministry initiatives to support resource acquisition can be found at: http://www.bced.gov.bc.ca/irp_resources/lr/resource/res_main.htm

What Are the Criteria Used to Evaluate Learning Resources?

The Ministry of Education evaluates learning resources that support BC curriculum, and that will be used by teachers and/or students for instructional and assessment purposes. Evaluation criteria focus on content, instructional design, technical considerations, and social considerations.

Additional information concerning the review and selection of learning resources is available from the ministry publication, *Evaluating, Selecting and Managing Learning Resources: A Guide* (Revised 2002) http://www.bced.gov.bc.ca/irp/resdocs/esm_guide.pdf

What Funding is Available for Purchasing Learning Resources?

As part of the selection process, teachers should be aware of school and district funding policies and procedures to determine how much money is available for their needs. Funding for various purposes, including the purchase of learning resources, is provided to school districts. Learning resource selection should be viewed as an ongoing process that requires a determination of needs, as well as long-term planning to co-ordinate individual goals and local priorities.

SCIENCE K TO 7 GRADE COLLECTIONS

















The Science K to 7 Grade Collection chart for each grade lists the recommended learning resources by media format, showing links to the curriculum organizers. The chart is followed by an annotated bibliography. Teachers should check with suppliers for complete and up-to-date ordering information. Most suppliers maintain web sites that are easy to access.

Web Sites

Due to their transitory nature, web sites are not typically evaluated as part of the provincial evaluation process. However, in some cases, the Internet is the most up-to-date source of information relevant to students in Science K to 7. As with all supplementary resources, local approval is required before use. Teachers should preview the sites in order to select those that are appropriate for use by their students, and must also ensure that students are aware of school district policies on Internet and computer use.

MEDIA ICONS KEY

The following icons identify the media formats of the recommended resources in the annotated bibliographies of the Grade Collections. Not all media formats are found in each Grade Collection.


	<i>Audio Cassette</i>
	<i>CD-ROM</i>
	<i>DVD</i>
	<i>Film</i>
	<i>Games/Manipulatives</i>
	<i>Kit</i>
	<i>Multimedia</i>
	<i>Music CD</i>
	<i>Print Materials</i>
	<i>Print Series</i>
	<i>Record</i>
	<i>Slides</i>
	<i>Software</i>
	<i>Video</i>
	<i>Video Series</i>
	<i>Web Site</i>

**SCIENCE – KINDERGARTEN
GRADE COLLECTION**

*Current as of March 2005. For latest updates go to
http://www.bced.gov.bc.ca/irp_resources/lr/resource/gradcoll.htm*

	Life Science	Physical Science	Earth and Space Science
	<i>Characteristics of Living Things</i>	<i>Properties of Objects and Materials</i>	<i>Surroundings</i>
Comprehensive Resources			
My World (Pan Canadian Science Place)			
Additional Resources – Print			
Are Trees Alive?	✓		
Below Zero		✓	
Cycle of Life/Recycle Handbook for Educators			
Fall Into Math and Science (AIMS Activities)		✓	
Forests in Focus	✓		
Project WET	✓	✓	
Salish Sea	✓		
Salmonids in the Classroom	✓		
Sense-Able Science (AIMS Activities)	✓		
Spring Into Math and Science (AIMS Activities)		✓	
Additional Resources – Print Series			
Nature Babies Series	✓		
Additional Resources – Video/DVD			
Birds & Animals You Might See	✓		✓
Everyday Life	✓	✓	✓
The Fabulous Five: Our Senses			✓

 Indicates satisfactory to good support for the majority of the learning outcomes within the curriculum organizer.

 Indicates support for one or more learning outcomes within the curriculum organizer.

 Indicates minimal or no support for the prescribed learning outcomes within the curriculum organizer.

 **Are Trees Alive?**

Author(s): *Miller, D. S.*

General Description:

A beautifully illustrated trade book which uses poetic comparisons of plants and humans to help children learn how trees live and grow, e.g., 'A trunk supports the body of a tree, like your legs support your body.' An additional information section at the back of the book gives more detailed information about world trees and some of the life they support.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓											

Supplier: *Raincoast Books*

9050 Shaughnessy Street
Vancouver, BC V6P 6E5

Telephone: (604) 323-7100

Fax: (604) 323-2600

Toll Free: 1-800-663-5714

Web Address: www.raincoast.com

Price: Not available

ISBN/Order No: 0-8027-8801-7

Copyright: 2002

Year Recommended in Grade Collection: 2005

 **Below Zero**

General Description:

Below Zero is based on the *Project Wild* model. Instructional activities are designed for easy integration into K-7 school subjects. The teacher resource materials concentrate on the understanding and conservation of wildlife in a frozen environment. Goal of the resource is to help learners develop awareness, knowledge, skills, and commitment to make informed decisions, responsible behaviour, with wise actions concerning wildlife in winter and frozen environments.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓		✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$25.00 with workshop

ISBN/Order No: 1-55029-146-7

Copyright: 2003

Year Recommended in Grade Collection: 2005



Birds & Animals You Might See

General Description:

An eleven minute video shows British Columbia animals involved in their daily life in their environment. It covers behaviours such as hibernating, migration, and how some other behaviours help animals adapt to seasonal conditions. It would help students begin to understand the interactions of animals with each other and the environment. It portrays the Kermodei bear and links it to First Nations beliefs. It reports on two endangered animals and challenges the students to become environmental helpers.

Caution: *Teacher needs to supplement the narration of the video as it does not lead itself to student engagement.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓										

Supplier: *Back on Track Productions (Westland Television)*

Box 684
 Kaslo, BC V0G 1M0
 Telephone: 250-353-2697
 Fax: 250-353-2192

Web Address: www.westlandtv.com

Price: Not available

ISBN/Order No: Not available

Copyright: 2004

Year Recommended in Grade Collection: 2005



Cycle of Life/Recycle Handbook for Educators

Author(s): *Arntzen, H. et al.*

General Description:

This 276-page teacher resource is divided into five sections: Introduction, Music, Biology, Recycling, and Resources. Through songs and activities, Kindergarten to Grade 7 students learn about at-risk Canadian plants and animals species. Topics include sustainability of resources, life cycles, food chains and webs, ecological footprints, the interrelated nature of living things, and Aboriginal practices. There is a music CD, *Cycle of Life*, with 14 ecology/nature songs. Lyrics are included in print material.

Caution: *See Author's caution re: p. 83, Stan Rodger's song, lyrics refer to "beer" and "hell."*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Artist Response Team Inc. (ART)*

P.O. Box 91
 Brentwood Bay, BC V8M 1R3
 Telephone: (250) 544-4006
 Fax: (250) 544-4075

Price: \$35.00

ISBN/Order No: 0-9736-847

Copyright: 2004

Year Recommended in Grade Collection: 2005



Everyday Life

General Description:

A fast paced 55-minute video broken into 11 five-minute segments showing everyday life in the animal world. It covers communicating, feeding, moving, cleaning, sleeping, working, building, as well as intelligence, language use, and education in an entertaining format using clear images. The narration is clear using an age appropriate format that includes some scientific terminology

Caution: *There are several scenes of body functions, such as urination, defecation, and regurgitation.*

One segment also portrays a snake killing a baby mammal (rat).

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓										

Supplier: *National Film Board of Canada*

200-1385 West 8th Avenue
Vancouver, BC V6H 3V9

Telephone: (604) 666-3838

Fax: (604) 666-1569

Toll Free: 1-800-267-7710

Web Address: www.nfb.ca

Price: Not available

ISBN/Order No: Not available

Copyright: 2003

Year Recommended in Grade Collection: 2005



The Fabulous Five: Our Senses

General Description:

A 18-minute video designed to help children identify their five senses and show them how their senses allow them to know their world. Some descriptive vocabulary is developed (e.g. sweet, salty, sour, and bitter) to describe tastes. Additional activities are suggested for further independent and group exploration in a 25-page teacher support package. The evaluation activity suggested, however, would not be suitable for Kindergarten students.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓												

Supplier: *Marlin Motion Pictures Ltd.*

211 Watline Avenue
Mississauga, ON L4Z 1P3

Telephone: (905) 890-1500

Fax: (905) 890-6550

Toll Free: 1-800-865-7617

Price: Not available

ISBN/Order No: 76750

Copyright: 2005

Year Recommended in Grade Collection: 2005



Fall Into Math and Science (AIMS Activities)

General Description:

Book investigates student characteristics as well as traditional fall events through numerous hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project. Emphasis is on graphing.

Caution: *One of the activities requires students to taste a variety of nuts. Be alert to potential allergies.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓												

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-18-5/20120

Copyright: 1987

Year Recommended in Grade Collection: 2005



Forests in Focus

General Description:

Forests in Focus is an 85-page activity book on the BC forest environment. It consists of 34 activities, a glossary, stories (for activities), and appendices containing detailed BC information. It is designed for K-12 use but not all activities are appropriate for all grades. Organizers and suggested themes are included in the introduction. All activities are organized 'lab style' with objectives, materials, method, and evaluation. Content is based upon forest process and ecosystem, and does not emphasize harvesting issues.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$26.00

\$22.00 with workshop

ISBN/Order No: 0-7726-3966-3

Copyright: 1999

Year Recommended in Grade Collection: 2005



My World (Pan Canadian Science Place)

General Description:

Package includes three 8-page colourful student texts, a big book, and teacher's guide. Concepts covered include living/non-living differences, similarities between plants and animals, and basic needs of living things. The teacher's guide offers activities and assessment tools, as well as a chart of developmental skills in regards to scientific processes; it is essential to the program..

Caution: *The big book and the student texts are identical.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓												

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Large Student Book: \$60.00
Student Book Pack: \$75.00
Teacher's Guide: \$35.00

ISBN/Order No: Large Student Book: 0-7791-34893
Student Book Pack: 0-7791-3595-4
Teacher's Guide: 0-7791-3490-7

Copyright: 2004

Year Recommended in Grade Collection: 2005



Nature Babies Series

Author(s): *Lang, A.*

General Description:

A series which reviews the life cycle of some common animals and portrays their daily life in easy to read paragraphs. Very clear close-up photos show the creatures and their habitats. A 'Did You Know' section enables further research, and an index enables quick searches. Because the information is parallel in each book, comparison charts could be created.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓										

Supplier: *Fitzhenry & Whiteside Ltd.*

195 Allstate Parkway
Markham, ON L3R 4T8

Telephone: (905) 477-9700

Fax: (905) 477-9179

Toll Free: 1-800-387-9776

Web Address: www.fitzhenry.ca

Price: \$8.95 to \$9.95 per book

ISBN/Order No: Various

Copyright: 2004

Year Recommended in Grade Collection: 2005

**Project WET****General Description:**

The 500-page detailed teacher resource includes directions and extensions for 120 activities related to water, wetlands, and water resource management. Each activity includes objectives, method, background, materials, procedures, variations, extensions and evaluation. A wealth of teaching ideas for Grades K to 7. A global perspective, but produced from Montana State University.

Caution: *Not much Canadian or BC highlights. Images are mostly global but some captions are US locations. Dual temperature references, i.e. Fahrenheit/Celsius.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$30.00 with workshop

ISBN/Order No: Not available

Copyright: 1995

Year Recommended in Grade Collection: 2005

**Salish Sea**

Author(s): *Arntzen, H. et al.*

General Description:

This 108-page detailed teacher resource includes background directions, activities, and extensions related to ecosystems, both land and marine, which are specific to the West Coast. This cross-curricular resource contains many Aboriginal references and suggests activities, songs, and projects to amplify student appreciation of historical stewardship and respect for the delicate balance of a coastal ecosystem. There are many references and web links as back-up material. A CD of eco-songs, one in Cowichan language, accompanies this resource which contains a wealth of teaching, learning, and hands-on activities for Grades K to 7.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Parks Canada*

711 Broughton St., 2nd Floor
Victoria, BC V8W 1E2

Telephone: (250) 363-3511

Fax: (250) 363-8552

Price: \$30.00

ISBN/Order No: 0-660-18596-2

Copyright: 2001

Year Recommended in Grade Collection: 2005



Salmonids in the Classroom

General Description:

Salmonids in the Classroom (either Primary or Intermediate versions) is a comprehensive collection of resource materials for the study of Pacific salmonids in British Columbia. The programs are divided into clearly organized and paced 10 units following the life cycle habitats of the salmon. Each unit in the guide includes suggested activities. Content is primarily science-oriented but the development of the units has a language arts approach incorporating unifying themes. The programs would allow the integration of science, social studies and language for extensive periods of time.

Caution: *The material has limited assessment devices explained. It make suggestions for assessment activities but doesn't give any 'how to do' assessment resources.*

Audience: *General*

ESL - late primary to early intermediate; good key visuals; variety of student activities

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓		✓	✓	✓	✓					

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Primary: \$71.10

Intermediate: \$66.60

ISBN/Order No: Primary: S33

Intermediate: S39

Copyright: 2001

Year Recommended in Grade Collection: 2005



Sense-Able Science (AIMS Activities)

General Description:

Book investigates the five senses: sight, touch, taste, smell, and hearing through 27 hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project. Includes songs and poems.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓											

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-42-8/08168

Copyright: 1994

Year Recommended in Grade Collection: 2005



Spring Into Math and Science (AIMS Activities)

General Description:

Book investigates typical Spring topics such as sprouting seeds, rainbows, leprechauns, and bunnies through numerous hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓											

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-16-9/20122




Copyright: 1987

Year Recommended in Grade Collection: 2005

**SCIENCE – GRADE 1
GRADE COLLECTION**

*Current as of March 2005. For latest updates go to
http://www.bced.gov.bc.ca/irp_resources/lr/resource/gradcoll.htm*

	Life Science	Physical Science	Earth and Space Science
	<i>Needs of Living Things</i>	<i>Force and Motion</i>	<i>Daily and Seasonal Changes</i>
Comprehensive Resources			
There are no comprehensive resources for Grade 1 Science			
Additional Resources – Print			
Are Trees Alive?	✓		
Below Zero			
Cycle of Life/Recycle Handbook for Educators			
Earth Watch (Pan Canadian Science Place)			
Forests in Focus			
Glide Into Winter with Math and Science (AIMS Activities)			✓
Hands-On Science: Daily and Seasonal Changes			✓
It's Alive! (Pan Canadian Science Place)			
Kokanee of British Columbia	✓		
Let's Move (Pan Canadian Science Place)			
Mostly Magnets (AIMS Activities)		✓	
Once Upon a Seashore	✓		
Project WET			✓
Salish Sea	✓		
Salmon Forest			
Salmonids in the Classroom	✓		
Sense-Able Science (AIMS Activities)	✓		
Spring Into Math and Science (AIMS Activities)			✓
Additional Resources – Print Series			
Discovery Works Modules for B.C. Grade 1			✓
Investigation Series		✓	
Nature Babies Series			

-  Indicates satisfactory to good support for the majority of the learning outcomes within the curriculum organizer.
-  Indicates support for one or more learning outcomes within the curriculum organizer.
-  Indicates minimal or no support for the prescribed learning outcomes within the curriculum organizer.

	Life Science	Physical Science	Earth and Space Science
	<i>Needs of Living Things</i>	<i>Force and Motion</i>	<i>Daily and Seasonal Changes</i>
Additional Resources – Print Series (con't)			
Science All Around Me Series		✓	
Seasons Series			✓
Additional Resources – Video/DVD			
Birds & Animals You Might See	✓		
Chickens Aren't The Only Ones	✓		
Desert Giant - The World of the Saguaro Cactus	✓		
Everyday Life	✓	✓	✓
Living or Non-Living?	✓		
Additional Resources – Software/CD-ROM			
One Two Tree	✓		



Are Trees Alive?

Author(s): *Miller, D. S.*

General Description:

A beautifully illustrated trade book which uses poetic comparisons of plants and humans to help children learn how trees live and grow, e.g., 'A trunk supports the body of a tree, like your legs support your body.' An additional information section at the back of the book gives more detailed information about world trees and some of the life they support.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓											

Supplier: *Raincoast Books*

9050 Shaughnessy Street
Vancouver, BC V6P 6E5

Telephone: (604) 323-7100

Fax: (604) 323-2600

Toll Free: 1-800-663-5714

Web Address: www.raincoast.com

Price: Not available

ISBN/Order No: 0-8027-8801-7

Copyright: 2002

Year Recommended in Grade Collection: 2005



Below Zero

General Description:

Below Zero is based on the *Project Wild* model. Instructional activities are designed for easy integration into K-7 school subjects. The teacher resource materials concentrate on the understanding and conservation of wildlife in a frozen environment. Goal of the resource is to help learners develop awareness, knowledge, skills, and commitment to make informed decisions, responsible behaviour, with wise actions concerning wildlife in winter and frozen environments.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓		✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$25.00 with workshop

ISBN/Order No: 1-55029-146-7

Copyright: 2003

Year Recommended in Grade Collection: 2005



Birds & Animals You Might See

General Description:

An eleven minute video shows British Columbia animals involved in their daily life in their environment. It covers behaviours such as hibernating, migration, and how some other behaviours help animals adapt to seasonal conditions. It would help students begin to understand the interactions of animals with each other and the environment. It portrays the Kermodei bear and links it to First Nations beliefs. It reports on two endangered animals and challenges the students to become environmental helpers.

Caution: *Teacher needs to supplement the narration of the video as it does not lead itself to student engagement.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓										

Supplier: *Back on Track Productions (Westland Television)*

Box 684
 Kaslo, BC V0G 1M0
 Telephone: 250-353-2697
 Fax: 250-353-2192

Web Address: www.westlandtv.com

Price: Not available

ISBN/Order No: Not available

Copyright: 2004

Year Recommended in Grade Collection: 2005



Chickens Aren't The Only Ones

General Description:

Video that animates a well loved children's book depicting living things which hatch from eggs. Interesting support material to introduce or summarize life cycle studies.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓										

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
 Woodstock, ON N4S 6E3
 Telephone: (519) 537-2360
 Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: Not available

ISBN/Order No: 5-1245F-1#389

Copyright: 2003

Year Recommended in Grade Collection: 2005



Cycle of Life/Recycle Handbook for Educators

Author(s): Arntzen, H. et al.

General Description:

This 276-page teacher resource is divided into five sections: Introduction, Music, Biology, Recycling, and Resources.

Through songs and activities, Kindergarten to Grade 7 students learn about at-risk Canadian plants and animals species. Topics include sustainability of resources, life cycles, food chains and webs, ecological footprints, the interrelated nature of living things, and Aboriginal practices. There is a music CD, *Cycle of Life*, with 14 ecology/nature songs. Lyrics are included in print material.

Caution: See Author's caution re: p. 83, Stan Rodger's song, lyrics refer to "beer" and "hell."

Audience: General

Category: Teacher Resource

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: Artist Response Team Inc. (ART)

P.O. Box 91
Brentwood Bay, BC V8M 1R3

Telephone: (250) 544-4006

Fax: (250) 544-4075

Price: \$35.00

ISBN/Order No: 0-9736-847

Copyright: 2004

Year Recommended in Grade Collection: 2005



Desert Giant - The World of the Saguaro Cactus

Author(s): Bash, B.

General Description:

A 30-minute video in DVD format that describes how some basic needs of some plants and animals are met in their environment. Good visual images of snakes and cacti are provided. There is a segment on the seasonal changes that occur in a desert ecosystem. The use of resource books to find scientific information is encouraged. There is a small package of teacher support material which suggests follow-up activities.

Caution: May not work in some older DVD players. Teacher print material is very limited.

Audience: General

Category: Student, Teacher Resource

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓										

Supplier: Canadian Learning Company Inc.

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: DVD: \$59.95

CD-ROM: \$59.95

ISBN/Order No: DVD: 126.062D/52135

CD-ROM: 52135CDR

Copyright: 2003

Year Recommended in Grade Collection: 2005



Discovery Works Modules for B.C. Grade 1

General Description:

This American multimedia resource, organized by modules across several grades, consists of an annotated teaching guide, a poster book, picture cards, activity cards, and teacher resource book all stored in a nylon and plastic carrying bag. Full-colour photographs and illustrations in the teaching guide complement teaching strategies and lesson plans. Teacher resource book contains blackline masters for parent letters, activities, student recording, assessment grids, and unit project suggestions. The most suitable module for Grade 1 is *Weather and Seasons* (Earth and Space Science). The most suitable module for Grade 2 is *Solids, Liquids and Gases* (Physical Science).

Caution: *The writing on the front of the activity cards will require adult support.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓										

Supplier: *Thomson Nelson*

1120 Birchmount Road
Scarborough, ON M1K 5G4

Telephone: (416) 752-9448

Fax: (416) 752-8101

Toll Free: 1-800-268-2222/1-800-668-067

Web Address: www.nelson.com

Price: Not available

ISBN/Order No: Solids, Liquids, and Gases:
0-382-33903-7
Weather and Seasons: 0-382-33896-0

Copyright: 1996

Year Recommended in Grade Collection: 2005



Earth Watch (Pan Canadian Science Place)

General Description:

A 16-page student text which poses questions and gives pictorial tools to enable the students to answer these. The accompanying teacher guide has organizational information and suggested activities to help teachers address all outcomes for this unit. Evaluation tools and blackline masters are included.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓											

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Student Text: \$6.25
Teacher's Guide: \$33.00
Program and Assessment Guide: \$45.00

ISBN/Order No: Student Text: 1-5526-8897-6
Teacher's Guide: 0-7791-3494-X
Program and Assessment Guide:
0-7791-0091-3

Copyright: 2005

Year Recommended in Grade Collection: 2005



Everyday Life

General Description:

A fast paced 55-minute video broken into 11 five-minute segments showing everyday life in the animal world. It covers communicating, feeding, moving, cleaning, sleeping, working, building, as well as intelligence, language use, and education in an entertaining format using clear images. The narration is clear using an age appropriate format that includes some scientific terminology

Caution: *There are several scenes of body functions, such as urination, defecation, and regurgitation.*

One segment also portrays a snake killing a baby mammal (rat).

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓										

Supplier: *National Film Board of Canada*

200-1385 West 8th Avenue
Vancouver, BC V6H 3V9

Telephone: (604) 666-3838

Fax: (604) 666-1569

Toll Free: 1-800-267-7710

Web Address: www.nfb.ca

Price: Not available

ISBN/Order No: Not available

Copyright: 2003

Year Recommended in Grade Collection: 2005



Forests in Focus

General Description:

Forests in Focus is an 85-page activity book on the BC forest environment. It consists of 34 activities, a glossary, stories (for activities), and appendices containing detailed BC information. It is designed for K-12 use but not all activities are appropriate for all grades. Organizers and suggested themes are included in the introduction. All activities are organized 'lab style' with objectives, materials, method, and evaluation. Content is based upon forest process and ecosystem, and does not emphasize harvesting issues.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$26.00

\$22.00 with workshop

ISBN/Order No: 0-7726-3966-3

Copyright: 1999

Year Recommended in Grade Collection: 2005



Glide Into Winter with Math and Science (AIMS Activities)

General Description:

Book investigates typical winter activities through numerous hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓											

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-17-7/20121

Copyright: 1987

Year Recommended in Grade Collection: 2005



Hands-On Science: Daily and Seasonal Changes

Author(s): *Lawson, J. et al.*

General Description:

Teacher's guide which offers several hands-on activities with blackline masters for student work and for assessment.

Caution: *Does not contain any information on BC Aboriginal people.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓											

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:
www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-76-5

Copyright: 2001

Year Recommended in Grade Collection: 2005



Investigations Series

Author(s): *Whitehouse, P.*

General Description:

Four small booklets which include a table of contents and index. The booklets develop the four concepts of pushing, pulling, sliding, and rolling in simple easy-to-understand form. Some elementary ideas of friction have been included. No teacher support material provided.

Caution: *No teacher support material provided.*

Audience: *General*

LD - concepts are broken down into easily understood components with lots of repetition

ID - concepts are broken down into easily understood components with lots of repetition

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓											

Supplier: *J. Appleseed*

PO Box 129
Collingwood, ON L9Y 3Z7

Telephone:

Fax:

Toll Free: 1-866-575-5007

Web Address: www.jappleseed.ca

Price: \$8.65 each

ISBN/Order No: Pulling: 1-4034-3468-9
Pushing: 1-4034-3469-7
Rolling: 1-4034-3470-0
Sliding: 1-4034-3471-9

Copyright: 2003

Year Recommended in Grade Collection: 2005



It's Alive! (Pan Canadian Science Place)

General Description:

A 16-page student book and teacher guide which address characteristics of living things, as well as features of animals and plants. Photos and print are clear and appropriately sized. The accompanying teacher manual gives suggestions for extending the learning. Evaluation tools, including a rubric, are offered.

Caution: *Teacher's guide is essential to cover the learning outcomes as there is a lack of depth in some areas.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓											

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Student Text: \$6.25
Teacher's Guide: \$33.00
Program and Assessment Guide: \$45.00

ISBN/Order No: Student Text: 1-55268-893-3
Teacher's Guide: 0-7791-3491-5
Program and Assessment Guide: 0-7791-0091-3

Copyright: 2000

Year Recommended in Grade Collection: 2005



Kokanee of British Columbia

General Description:

Activities and researched facts for the study and class investigation of landlocked salmonids called Kokanee. This is very appropriate for Interior waterways where Kokanee are mostly found. The teacher resource is organized to present all the same elements of the BC Salmon programs for Coastal BC using the Kokanee instead. Nine activities cover historical evolution life cycle, habitat, and human impacts so students will understand the relationship between Kokanee and the Interior environment. Field studies and observations are detailed in well organized units.

Caution: *This resource covers several learning outcomes at the Primary level, but it is more suitable for the Intermediate level.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓		✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$22.00

ISBN/Order No: 0-7726-5130-2

Copyright: 2004

Year Recommended in Grade Collection: 2005



Let's Move (Pan Canadian Science Place)

General Description:

A 16-page student booklet that promotes visual examination of photographs and poses questions for thinking. The teacher's guide provides suggestions for activities and ready to use activity masters. A *Program and Assessment Guide*, as well as an *Integrating Science and Language Guide* are also available for teacher's use.

Caution: *There is some concern about the lack of depth in some areas.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓											

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Student Text: \$6.25

Teacher's Guide: \$33.00

ISBN/Order No: Student Text: 0-7791-3492-3

Teacher's Guide: 0-7791-3493-1

Copyright: 2004

Year Recommended in Grade Collection: 2005



Living or Non-Living?

General Description:

A 15-minute video which covers the major characteristics of living and non-living things. Real-life frames that would be familiar to young children are used for the examples. Some teacher support materials suggesting follow-up activities are included.

Caution: *Limited teacher support.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓											

Supplier: *Ethos Ltd.*

4981 Highway 7 East, Unit 12A, Ste 235
Markham, ON L3R 1N1

Telephone: (905) 471-7654

Fax: (905) 471-7976

Toll Free: 1-800-471-0737

Price: Not available

ISBN/Order No: V1229

Copyright: 2001

Year Recommended in Grade Collection: 2005



Mostly Magnets (AIMS Activities)

General Description:

Book investigates magnets through 20 hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓											

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-29-0/20145

Copyright: 1991

Year Recommended in Grade Collection: 2005



Nature Babies Series

Author(s): *Lang, A.*

General Description:

A series which reviews the life cycle of some common animals and portrays their daily life in easy to read paragraphs. Very clear close-up photos show the creatures and their habitats. A 'Did You Know' section enables further research, and an index enables quick searches. Because the information is parallel in each book, comparison charts could be created.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓										

Supplier: *Fitzhenry & Whiteside Ltd.*

195 Allstate Parkway
Markham, ON L3R 4T8

Telephone: (905) 477-9700

Fax: (905) 477-9179

Toll Free: 1-800-387-9776

Web Address: www.fitzhenry.ca

Price: \$8.95 to \$9.95 per book

ISBN/Order No: Various

Copyright: 2004

Year Recommended in Grade Collection: 2005



Once Upon a Seashore

Author(s): *Snively, G.*

General Description:

This 304-page adult reference was designed to help teachers in their study of the seashore. It contains clear illustrations, photos, a glossary, transparencies, activity sheets, and offers ideas for drama, creative writing, and art. An excellent resource for field trips to the seashore.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓	✓	✓	✓	✓						

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Not available

ISBN/Order No: 0-9687811-0-1/LA S65

Copyright: 2001

Year Recommended in Grade Collection: 2005



One Two Tree

General Description:

A cross-curricular CD-ROM learning resource which teaches young learners about trees. It offers in-depth information while allowing for integration of math, language arts, and art. Games can be played independently or with a partner. Animated real footage of animals, as well as photographs of various stages of tree parts growth (buds, leaves, etc.) add to the interest of the activity. Extensive teacher support package is provide.

System Requirements:

Macintosh: Power PC; 8 to 16 Mb RAM; Colour Monitor with SVGA Graphics (256 colour and 640 x 480 screen resolution), 4x CD-ROM Drive, 8 bit Sound Card, Quick Time 2

Windows: IBM Pentium PC, 8 to 16 Mb RAM, Colour Monitor with SVGA Graphics (256 colour and 640 x 480 screen resolution), 4x CD-ROM Drive, 8 bit Sound Card, Quick Time 2

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓		✓									

Supplier: *Icon Media Productions Inc.*

19165 Loyalist Parkway
RR3
Consecon, ON KOK 1T0
Telephone: 613-399-3957
Fax:

Web Address: www.iconmedia.net

Price: Windows CD: \$32.00
Macintosh CD: \$32.00

ISBN/Order No: Not available

Copyright: 2002

Year Recommended in Grade Collection: 2005



Project WET

General Description:

The 500-page detailed teacher resource includes directions and extensions for 120 activities related to water, wetlands, and water resource management. Each activity includes objectives, method, background, materials, procedures, variations, extensions and evaluation. A wealth of teaching ideas for Grades K to 7. A global perspective, but produced from Montana State University.

Caution: *Not much Canadian or BC highlights. Images are mostly global but some captions are US locations. Dual temperature references, i.e. Fahrenheit/Celsius.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1
Telephone: (250) 356-7111
Fax: (250) 952-6684
Toll Free: 1-800-387-9853

Web Address:
www.env.gov.bc.ca/hctf/wild.htm

Price: \$30.00 with workshop

ISBN/Order No: Not available

Copyright: 1995

Year Recommended in Grade Collection: 2005



Salish Sea

Author(s): *Arntzen, H. et al.*

General Description:

This 108-page detailed teacher resource includes background directions, activities, and extensions related to ecosystems, both land and marine, which are specific to the West Coast. This cross-curricular resource contains many Aboriginal references and suggests activities, songs, and projects to amplify student appreciation of historical stewardship and respect for the delicate balance of a coastal ecosystem. There are many references and web links as back-up material. A CD of eco-songs, one in Cowichan language, accompanies this resource which contains a wealth of teaching, learning, and hands-on activities for Grades K to 7.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Parks Canada*

711 Broughton St., 2nd Floor
Victoria, BC V8W 1E2

Telephone: (250) 363-3511

Fax: (250) 363-8552

Price: \$30.00

ISBN/Order No: 0-660-18596-2

Copyright: 2001

Year Recommended in Grade Collection: 2005



Salmon Forest

Author(s): *Suzuki, D. et al.*

General Description:

A richly illustrated picture book suitable for teacher use with the whole class. It describes the salmon life cycle, as well as the interrelationships between salmon and other life forms in a forest ecosystem. It also honors Aboriginal use of salmon as a staple. A recipe is included at the end of the book.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓											

Supplier: *Harper Collins Canada Ltd.*

1995 Markham Road
Scarborough, ON M1B 5M8

Telephone: (416) 321-2241

Fax: (416) 321-3033

Web Address: www.harpercanada.com

Price: Not available

ISBN/Order No: 1-55054-937-5

Copyright: 2003

Year Recommended in Grade Collection: 2005



Salmonids in the Classroom

General Description:

Salmonids in the Classroom (either Primary or Intermediate versions) is a comprehensive collection of resource materials for the study of Pacific salmonids in British Columbia. The programs are divided into clearly organized and paced 10 units following the life cycle habitats of the salmon. Each unit in the guide includes suggested activities. Content is primarily science-oriented but the development of the units has a language arts approach incorporating unifying themes. The programs would allow the integration of science, social studies and language for extensive periods of time.

Caution: *The material has limited assessment devices explained. It make suggestions for assessment activities but doesn't give any 'how to do' assessment resources.*

Audience: *General*

ESL - late primary to early intermediate; good key visuals; variety of student activities

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓		✓	✓	✓	✓					

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Primary: \$71.10

Intermediate: \$66.60

ISBN/Order No: Primary: S33

Intermediate: S39

Copyright: 2001

Year Recommended in Grade Collection: 2005



Science All Around Me Series

Author(s): *Bryant-Mole, K.*

General Description:

A series of four student books which provides extension opportunities for students. Concepts are well developed and go beyond the basics.

Caution: *No teacher supports provided.*

Audience: *General*

Gifted - extensions to major concepts are provided

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓											

Supplier: *J. Appleseed*

PO Box 129
Collingwood, ON L9Y 3Z7

Telephone:

Fax:

Toll Free: 1-866-575-5007

Web Address: www.jappleseed.ca

Price: \$10.45 each

ISBN/Order No: Floating and Sinking: 1-4034-0049-0

Forces: 1-4034-0050-4

Magnets: 1-4034-0052-0

Moving: 1-4034-0054-7

Copyright: 1998

Year Recommended in Grade Collection: 2005



Seasons Series

Author(s): *Thayer, T.*

General Description:

A well illustrated resource that could help ESL learners become more familiar with the culture/customs of Canada.

Caution: *A bit too simplistic for regular learners (Science content is limited).*

Audience: *ESL - easy to follow language. Canadian experiences and cultural references*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓											

Supplier: *J. Appleseed*

PO Box 129
Collingwood, ON L9Y 3Z7

Telephone:

Fax:

Toll Free: 1-866-575-5007

Web Address: www.jappleseed.ca

Price: \$8.65

ISBN/Order No: Fall: 0-8225-1991-7
Winter: 0-8225-1989-5
Spring: 0-8225-1990-9
Summer: 0-8225-1988-7

Copyright: 2002

Year Recommended in Grade Collection: 2005



Sense-Able Science (AIMS Activities)

General Description:

Book investigates the five senses: sight, touch, taste, smell, and hearing through 27 hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project. Includes songs and poems.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓											

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-42-8/08168

Copyright: 1994

Year Recommended in Grade Collection: 2005



Spring Into Math and Science (AIMS Activities)

General Description:

Book investigates typical Spring topics such as sprouting seeds, rainbows, leprechauns, and bunnies through numerous hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓											

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-16-9/20122

Copyright: 1987

Year Recommended in Grade Collection: 2005

**SCIENCE – GRADE 2
GRADE COLLECTION**

Current as of March 2005. For latest updates go to
http://www.bced.gov.bc.ca/irp_resources/lr/resource/gradcoll.htm

	Life Science	Physical Science	Earth and Space Science
	<i>Animal Growth and Changes</i>	<i>Properties of Matter</i>	<i>Air, Water, and Soil</i>
Comprehensive Resources			
There are no comprehensive resources for Grade 2 Science			
Additional Resources – Print			
Air and Water (Pan Canadian Science Place)			✓
Animals Grow (Pan Canadian Science Place)	▣		
Below Zero	✓	▣	
Critters	✓		
Cycle of Life/Recycle Handbook for Educators	▣		
Forests in Focus	✓		
Hands-On Science: Growth and Changes in Animals	✓		
Hands-On Science: Properties of Liquids and Solids		▣	
Hands-On Science: Soils in the Environment			▣
Kokanee of British Columbia	✓		
Matter, Matter Everywhere (Pan Canadian Science Place)		▣	
Once Upon a Seashore	▣		
Project WET	✓	▣	▣
Salish Sea	▣		
Salmonids in the Classroom	▣		
Science & Technology 2: All About Animals	✓		
Science & Technology 2: In the Kitchen		▣	
Sharing a Small World: Environmental Activities for Young Learners			▣
Additional Resources – Print Series			
Discovery Works Modules for B.C. Grade 1		✓	
Nature Babies Series	✓		

▣ Indicates satisfactory to good support for the majority of the learning outcomes within the curriculum organizer.

✓ Indicates support for one or more learning outcomes within the curriculum organizer.

□ Indicates minimal or no support for the prescribed learning outcomes within the curriculum organizer.

	Life Science	Physical Science	Earth and Space Science
	<i>Animal Growth and Changes</i>	<i>Properties of Matter</i>	<i>Air, Water, and Soil</i>
Additional Resources – Video/DVD			
Birds & Animals You Might See	✓		
Chickens Aren't The Only Ones	✓		
Desert Giant - The World of the Saguaro Cactus	✓		
Everyday Life	✓		✓
Exploring the Animal Kingdom	✓		
The Marsh: Nature's Nursery	✓		
Meeting Baby Animals	✓		
Moths and How They Live	✓		
Additional Resources – Video/DVD Series			
The Lives of Ants & Bees for Students Series	✓		
Additional Resources – Software/CD-ROM			
Seashore Surprises			✓
Smart-Bear Adventures, Volume I	✓		



Air and Water (Pan Canadian Science Place)

General Description:

A colourful 32-page student text which includes a glossary and index. The text presents the concepts in an interesting, informative, easy to follow manner; it is engaging for students. Activities suggested are easy to do. The teacher's guide is well-organized and gives adequate support, including blackline masters and assessment tools. Teachers may buy the accompanying kit items from publisher or may buy them separately. *A Program and Assessment Guide*, as well as a *Integrating Science and Language Guide* are also available for teacher's use.

Caution: *Some of the activities suggested do not relate closely to the learning outcomes. The equipment kit contains only a small portion of the materials needed to carry out the activities.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Student Text: \$7.00
Teacher's Guide: \$33.00

ISBN/Order No: Student Text: 1-55268-917-4
Teacher's Guide: 0-7791-3497-4

Copyright: 2000

Year Recommended in Grade Collection: 2005



Animals Grow (Pan Canadian Science Place)

General Description:

A 32-page student book abundantly illustrated with clear diagrams (e.g. life cycles) and photos/drawing. Print is large enough for small children, key words are in bold characters of a different colour. Suggested activities and experiments are organized in easy-to-do steps. Some critical thinking questions throughout the booklet. The teacher's guide is well-organized, with content background, outcomes, vocabulary, assessment tools, ESL learners tips and blackline masters for activities and assessment. Aboriginal content identified with easy-to-locate symbol.

Teachers may buy the accompanying kit items from publisher or may buy them separately. *A Program and Assessment Guide*, as well as a *Integrating Science and Language Guide* are also available for teacher's use.

Caution: *Some of the activities suggested in the student text need special resources or environments (seasons) to care for larva or bird feeders.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Student Text: \$7.00
Teacher's Guide: \$33.00

ISBN/Order No: Student Text: 1-55268-913-1
Teacher's Guide: 0-7791-3495-8

Copyright: 2000

Year Recommended in Grade Collection: 2005



Below Zero

General Description:

Below Zero is based on the *Project Wild* model. Instructional activities are designed for easy integration into K-7 school subjects. The teacher resource materials concentrate on the understanding and conservation of wildlife in a frozen environment. Goal of the resource is to help learners develop awareness, knowledge, skills, and commitment to make informed decisions, responsible behaviour, with wise actions concerning wildlife in winter and frozen environments.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓		✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$25.00 with workshop

ISBN/Order No: 1-55029-146-7

Copyright: 2003

Year Recommended in Grade Collection: 2005



Birds & Animals You Might See

General Description:

An eleven minute video shows British Columbia animals involved in their daily life in their environment. It covers behaviours such as hibernating, migration, and how some other behaviours help animals adapt to seasonal conditions. It would help students begin to understand the interactions of animals with each other and the environment. It portrays the Kermodei bear and links it to First Nations beliefs. It reports on two endangered animals and challenges the students to become environmental helpers.

Caution: *Teacher needs to supplement the narration of the video as it does not lead itself to student engagement.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓										

Supplier: *Back on Track Productions (Westland Television)*

Box 684
Kaslo, BC V0G 1M0

Telephone: 250-353-2697

Fax: 250-353-2192

Web Address: www.westlandtv.com

Price: Not available

ISBN/Order No: Not available

Copyright: 2004

Year Recommended in Grade Collection: 2005



Chickens Aren't The Only Ones

General Description:

Video that animates a well loved children's book depicting living things which hatch from eggs. Interesting support material to introduce or summarize life cycle studies.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓										

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: Not available

ISBN/Order No: 5-1245F-1#389

Copyright: 2003

Year Recommended in Grade Collection: 2005



Critters (AIMS Activities)

General Description:

Book investigates a variety of 'critters,' including insects, spiders, mealworms, earthworms, snails, silkworms, and isopods, through numerous hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓		✓								

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-23-1/20137

Copyright: 1992

Year Recommended in Grade Collection: 2005



Cycle of Life/Recycle Handbook for Educators

Author(s): Arntzen, H. et al.

General Description:

This 276-page teacher resource is divided into five sections: Introduction, Music, Biology, Recycling, and Resources. Through songs and activities, Kindergarten to Grade 7 students learn about at-risk Canadian plants and animals species. Topics include sustainability of resources, life cycles, food chains and webs, ecological footprints, the interrelated nature of living things, and Aboriginal practices. There is a music CD, *Cycle of Life*, with 14 ecology/nature songs. Lyrics are included in print material.

Caution: See Author's caution re: p. 83, Stan Rodger's song, lyrics refer to "beer" and "hell."

Audience: General

Category: Teacher Resource

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: Artist Response Team Inc. (ART)

P.O. Box 91
 Brentwood Bay, BC V8M 1R3
 Telephone: (250) 544-4006
 Fax: (250) 544-4075

Price: \$35.00

ISBN/Order No: 0-9736-847

Copyright: 2004

Year Recommended in Grade Collection: 2005



Desert Giant - The World of the Saguaro Cactus

Author(s): Bash, B.

General Description:

A 30-minute video in DVD format that describes how some basic needs of some plants and animals are met in their environment. Good visual images of snakes and cacti are provided. There is a segment on the seasonal changes that occur in a desert ecosystem. The use of resource books to find scientific information is encouraged. There is a small package of teacher support material which suggests follow-up activities.

Caution: May not work in some older DVD players. Teacher print material is very limited.

Audience: General

Category: Student, Teacher Resource

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓										

Supplier: Canadian Learning Company Inc.

95 Vansittart Avenue
 Woodstock, ON N4S 6E3
 Telephone: (519) 537-2360
 Fax: (519) 537-1035
 Web Address: www.canlearn.com

Price: DVD: \$59.95
 CD-ROM: \$59.95

ISBN/Order No: DVD: 126.062D/52135
 CD-ROM: 52135CDR

Copyright: 2003

Year Recommended in Grade Collection: 2005



Discovery Works Modules for B.C. Grade 1

General Description:

This American multimedia resource, organized by modules across several grades, consists of an annotated teaching guide, a poster book, picture cards, activity cards, and teacher resource book all stored in a nylon and plastic carrying bag. Full-colour photographs and illustrations in the teaching guide complement teaching strategies and lesson plans. Teacher resource book contains blackline masters for parent letters, activities, student recording, assessment grids, and unit project suggestions. The most suitable module for Grade 1 is *Weather and Seasons* (Earth and Space Science). The most suitable module for Grade 2 is *Solids, Liquids and Gases* (Physical Science).

Caution: *The writing on the front of the activity cards will require adult support.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓										

Supplier: *Thomson Nelson*

1120 Birchmount Road
Scarborough, ON M1K 5G4

Telephone: (416) 752-9448

Fax: (416) 752-8101

Toll Free: 1-800-268-2222/1-800-668-067

Web Address: www.nelson.com

Price: Not available

ISBN/Order No: Solids, Liquids, and Gases:
0-382-33903-7
Weather and Seasons: 0-382-33896-0

Copyright: 1996

Year Recommended in Grade Collection: 2005



Everyday Life

General Description:

A fast paced 55-minute video broken into 11 five-minute segments showing everyday life in the animal world. It covers communicating, feeding, moving, cleaning, sleeping, working, building, as well as intelligence, language use, and education in an entertaining format using clear images. The narration is clear using an age appropriate format that includes some scientific terminology

Caution: *There are several scenes of body functions, such as urination, defecation, and regurgitation.*

One segment also portrays a snake killing a baby mammal (rat).

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓										

Supplier: *National Film Board of Canada*

200-1385 West 8th Avenue
Vancouver, BC V6H 3V9

Telephone: (604) 666-3838

Fax: (604) 666-1569

Toll Free: 1-800-267-7710

Web Address: www.nfb.ca

Price: Not available

ISBN/Order No: Not available

Copyright: 2003

Year Recommended in Grade Collection: 2005



Exploring the Animal Kingdom

General Description:

This 25-minute video with a teacher's guide has two older students describing the classification of the Animal Kingdom. Clips of different living things are used to illustrate the differences between the classes. Some animation is used to clarify concepts.

Caution: *Much of the student activities suggested in the teacher resource would be too difficult for independent work at this level.*

Audience: *Gifted - extends concepts beyond the scope of regular learners*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *B.C. Learning Connection Inc.*

#4 - 8755 Ash Street
Vancouver, BC V6P 6T3

Telephone: (604) 324-7752

Fax: (604) 324-1844

Toll Free: 1-800-884-2366

Price: \$26.00

ISBN/Order No: SC0334

Copyright: 2003

Year Recommended in Grade Collection: 2005



Forests in Focus

General Description:

Forests in Focus is an 85-page activity book on the BC forest environment. It consists of 34 activities, a glossary, stories (for activities), and appendices containing detailed BC information. It is designed for K-12 use but not all activities are appropriate for all grades. Organizers and suggested themes are included in the introduction. All activities are organized 'lab style' with objectives, materials, method, and evaluation. Content is based upon forest process and ecosystem, and does not emphasize harvesting issues.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$26.00

\$22.00 with workshop

ISBN/Order No: 0-7726-3966-3

Copyright: 1999

Year Recommended in Grade Collection: 2005



Hands-On Science: Growth and Changes in Animals

Author(s): *Lawson, J. et al.*

General Description:

Teacher's guide which offers several hands-on activities with blackline masters for student activities and for assessment.

Caution: *Does not contain any information on BC Aboriginal people.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:

www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-78-1

Copyright: 2001

Year Recommended in Grade Collection: 2005



Hands-On Science: Properties of Liquids and Solids

Author(s): *Lawson, J. et al.*

General Description:

Teacher's guide which offers several hands-on activities with blackline masters for students and for assessment.

Caution: *Some of the photocopy-ready material is too advanced. Deals with gases minimally.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:

www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-80-3

Copyright: 2001

Year Recommended in Grade Collection: 2005



Hands-On Science: Soils in the Environment

Author(s): *Lawson, J. et al.*

General Description:

Teacher's guide which offers several hands-on activities with blackline masters for student work and for assessment.

Caution: *Some of the blackline masters may be a bit difficult for Grade 2 students.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:

www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-59-5

Copyright: 2001

Year Recommended in Grade Collection: 2005



Kokanee of British Columbia

General Description:

Activities and researched facts for the study and class investigation of landlocked salmonids called Kokanee. This is very appropriate for Interior waterways where Kokanee are mostly found. The teacher resource is organized to present all the same elements of the BC Salmon programs for Coastal BC using the Kokanee instead. Nine activities cover historical evolution life cycle, habitat, and human impacts so students will understand the relationship between Kokanee and the Interior environment. Field studies and observations are detailed in well organized units.

Caution: *This resource covers several learning outcomes at the Primary level, but it is more suitable for the Intermediate level.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓		✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$22.00

ISBN/Order No: 0-7726-5130-2

Copyright: 2004

Year Recommended in Grade Collection: 2005



The Lives of Ants & Bees for Students Series

General Description:

Three 10- to 11-minute videos which explore the body structures of ants and bees and shows their social behaviour and life cycles. The segment on the ant uses computerized 3D images. The symbiotic relationship between the bees and the plants is outlined. On-line resources are available for use once this series is purchased.

Caution: *One interview with the scientists may be a little hard to understand due to regional accents. The quality of the on-line component is unknown as access was not available to the review team.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓		✓								

Supplier: *McIntyre Media Ltd.*

75 First St., Suite 203
Orangeville, ON L9W 5B6

Telephone: (519) 942-9640

Fax: (519) 942-8489

Toll Free: 1-800-565-3036

Web Address: www.mcintyre.ca

Price: Videos: \$89.00 each
or \$249.00 for all three

ISBN/Order No: Ant Bodies: 73418-HAVTX
Ant Homes & Communities:
73419-HAVTX
Bees & Plants: 73420-HAVTX

Copyright: 2004

Year Recommended in Grade Collection: 2005



The Marsh: Nature's Nursery

General Description:

In this 15-minute video, David Suzuki and naturalist Barbara McKean guide children through a marsh in Spring to discover the continuing life cycles of plants, animals, insects, and in particular, frogs.

Audience: *General*

ESL - suitable for all language proficiencies; teacher support for beginner level required; visual and oral cues correspond

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓	✓									

Supplier: *Magic Lantern Communications (Ontario)*

1075 North Service Road West - Unit 27
Oakville, ON L6M 2G2

Telephone: (905) 827-2755

Fax: (905) 827-2655

Toll Free: 1-800-263-1717

Price: Not available

ISBN/Order No: Not available

Copyright: 1988

Year Recommended in Grade Collection: 2005



Matter, Matter Everywhere (Pan Canadian Science Place)

General Description:

A colourful 33-page student text which includes a glossary and index. It presents new materials in an interesting, informative, easy to follow manner. Simple experiments are presented to help students discover the properties. The teacher's guide is well organized and gives adequate support including blackline masters and assessment materials. Teachers may buy the accompanying kit items from publisher or may buy them separately. *A Program and Assessment Guide*, as well as an *Integrating Science and Language Guide* are also available for teacher's use.

Caution: *Limited activities for gases.*

The equipment kit contains only a small portion of the materials needed to carry out the activities.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Student Text: \$7.00
Teacher's Guide: \$33.00

ISBN/Order No: Student Text: 1-55268-914-X
Teacher's Guide: 0-7791-3496-6

Copyright: 2000

Year Recommended in Grade Collection: 2005



Meeting Baby Animals

General Description:

This 17-minute video shows several different animal classes, mammals, birds, amphibians, and reptiles, and describes their different life cycles. The audio encourages the students to examine how the babies are similar and different from their parents and how different animals care for their young. A summary at the end asks comparative questions.

Caution: *No teacher support material provided.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *B.C. Learning Connection Inc.*

#4 - 8755 Ash Street
Vancouver, BC V6P 6T3

Telephone: (604) 324-7752

Fax: (604) 324-1844

Toll Free: 1-800-884-2366

Price: \$26.00

ISBN/Order No: SC0335

Copyright: 2003

Year Recommended in Grade Collection: 2005



Moths and How They Live

General Description:

This 17-minute video outlines pupating, metamorphosis, and the life cycle of moths. References to the Emperor moth, the Pepper moth, and the Leaf Roller moth.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: Not available

ISBN/Order No: Not available

Copyright: 1992

Year Recommended in Grade Collection: 2005



Nature Babies Series

Author(s): *Lang, A.*

General Description:

A series which reviews the life cycle of some common animals and portrays their daily life in easy to read paragraphs. Very clear close-up photos show the creatures and their habitats. A 'Did You Know' section enables further research, and an index enables quick searches. Because the information is parallel in each book, comparison charts could be created.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓										

Supplier: *Fitzhenry & Whiteside Ltd.*

195 Allstate Parkway
Markham, ON L3R 4T8

Telephone: (905) 477-9700

Fax: (905) 477-9179

Toll Free: 1-800-387-9776

Web Address: www.fitzhenry.ca

Price: \$8.95 to \$9.95 per book

ISBN/Order No: Various

Copyright: 2004

Year Recommended in Grade Collection: 2005



Once Upon a Seashore

Author(s): *Snively, G.*

General Description:

This 304-page adult reference was designed to help teachers in their study of the seashore. It contains clear illustrations, photos, a glossary, transparencies, activity sheets, and offers ideas for drama, creative writing, and art. An excellent resource for field trips to the seashore.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓	✓	✓	✓	✓						

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Not available

ISBN/Order No: 0-9687811-0-1/LA S65

Copyright: 2001

Year Recommended in Grade Collection: 2005



Project WET

General Description:

The 500-page detailed teacher resource includes directions and extensions for 120 activities related to water, wetlands, and water resource management. Each activity includes objectives, method, background, materials, procedures, variations, extensions and evaluation. A wealth of teaching ideas for Grades K to 7. A global perspective, but produced from Montana State University.

Caution: *Not much Canadian or BC highlights. Images are mostly global but some captions are US locations. Dual temperature references, i.e. Fahrenheit/Celsius.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$30.00 with workshop

ISBN/Order No: Not available

Copyright: 1995

Year Recommended in Grade Collection: 2005



Author(s): Arntzen, H. et al.

General Description:

This 108-page detailed teacher resource includes background directions, activities, and extensions related to ecosystems, both land and marine, which are specific to the West Coast. This cross-curricular resource contains many Aboriginal references and suggests activities, songs, and projects to amplify student appreciation of historical stewardship and respect for the delicate balance of a coastal ecosystem. There are many references and web links as back-up material. A CD of eco-songs, one in Cowichan language, accompanies this resource which contains a wealth of teaching, learning, and hands-on activities for Grades K to 7.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Parks Canada*

711 Broughton St., 2nd Floor
Victoria, BC V8W 1E2

Telephone: (250) 363-3511

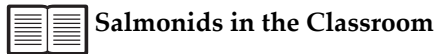
Fax: (250) 363-8552

Price: \$30.00

ISBN/Order No: 0-660-18596-2

Copyright: 2001

Year Recommended in Grade Collection: 2005



General Description:

Salmonids in the Classroom (either Primary or Intermediate versions) is a comprehensive collection of resource materials for the study of Pacific salmonids in British Columbia. The programs are divided into clearly organized and paced 10 units following the life cycle habitats of the salmon. Each unit in the guide includes suggested activities. Content is primarily science-oriented but the development of the units has a language arts approach incorporating unifying themes. The programs would allow the integration of science, social studies and language for extensive periods of time.

Caution: *The material has limited assessment devices explained. It make suggestions for assessment activities but doesn't give any 'how to do' assessment resources.*

Audience: *General*

ESL - late primary to early intermediate; good key visuals; variety of student activities

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓		✓	✓	✓	✓					

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Primary: \$71.10

Intermediate: \$66.60

ISBN/Order No: Primary: S33

Intermediate: S39

Copyright: 2001

Year Recommended in Grade Collection: 2005



Science & Technology 2: All About Animals

General Description:

Small child-friendly text with supporting teacher manual. Student text makes very good use of visuals and presents easily accomplished activities. Suggested follow-ups summarize and/or extend learning. Teacher manual gives pre-teaching, lesson help, and assessment activities in an easy to use format, including very usable blackline masters.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *Pearson Education Canada*

26 Prince Andrew Place
Don Mills, ON M3C 2T8

Telephone: (416) 447-5101

Fax: 1-800-563-9196

Toll Free: 1-800-387-8028/7851

Web Address: <http://www.pearsoned.com>

Price: Not available

ISBN/Order No: Student Text: 0-13-088971-7
Teacher's Guide: 0-13-027911-0

Copyright: 2000

Year Recommended in Grade Collection: 2005



Science & Technology 2: In the Kitchen

Author(s): *Harcourt, L. et al.*

General Description:

Small 16-page student book which differentiates between three states of matter and offers easy experiments for students to investigate absorption, buoyancy, and mixtures. Teacher guide gives good support including easy-to-use blackline masters.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *Pearson Education Canada*

26 Prince Andrew Place
Don Mills, ON M3C 2T8

Telephone: (416) 447-5101

Fax: 1-800-563-9196

Toll Free: 1-800-387-8028/7851

Web Address: <http://www.pearsoned.com>

Price: Not available

ISBN/Order No: Student Text: 0-13-019763-7
Teacher's Guide: 0-13-027911-0

Copyright: 2000

Year Recommended in Grade Collection: 2005



Seashore Surprises

General Description:

An interactive CD-ROM which provides video of a seashore depicting the interaction between water and soil and how water is important for living things. The users are invited to build an underwater habitat and try their skills at a seashore memory game. Strong links are made to four selections of children's literature. Six written teacher resources are provided. This resource is easy to use and the interactive segments are engaging.

System Requirements for Macintosh: System 7.5.5; 16 Mb RAM; Colour Monitor; Sound Card; 4X Speed CD-ROM Drive.

System Requirements for Windows: System 95/98/NT 4.0; 16 Mb RAM; Colour Monitor; Sound Card; 4X Speed CD-ROM Drive; Direct X version 3.0 or later recommended.

Caution: *The video segment is small and would be suitable for viewing by only a small group.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: DVD: \$59.95
CD-ROM: \$59.95

ISBN/Order No: DVD: 5-4055/126088D
CD-ROM: 5-4055/CDR

Copyright: 2003

Year Recommended in Grade Collection: 2005



Sharing a Small World: Environmental Activities for Young Learners

General Description:

A 32-page teacher's guide to environmental activities for primary students. Exposes learners to basic concepts and terminology. Organization makes it teacher friendly, with key elements such as objectives, skills, time suggested, materials, and vocabulary listed on a side bar at the beginning of each activity. Some of the activities could be modified for younger learners (K/1).

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *Population Connection*

1400 - 16th Street NW, Suite 320
Washington, DC 20036

Telephone: 202-332-2200

Fax: 202-332-2302

Toll Free: 1-800-767-1956

Web Address:

Price: \$5.00 US

ISBN/Order No: 0-945219-18-0

Copyright: 2001

Year Recommended in Grade Collection: 2005



Smart-Bear Adventures, Volume I

Author(s): *Whistler, J.*

General Description:

Interactive CD-ROM which includes oral and read-along information. A magnifying feature allows the students to examine details. An activity centre is presented which allows the students to create and print a stamp picture. Students can connect to the Internet and receive a daily update on the weather and bear activity on the mountains at Whistler, BC.

System Requirements for Macintosh: Mac OSX 10.3, 128 Mb RAM; 10 MB Hard Disk Space, 800 x 600 Display, G3 or G4 400 MHz processor; Video Card, Sound Card, CD-ROM Drive

System Requirements for Windows: 98-XP, Pentium 2 or equivalent processor; 128 Mb RAM 10 MB Hard Disk Space 800 x 600 Display, Video Card, Sound Card, CD-ROM Drive

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓										

Supplier: *Leboe & Grice Multimedia, LG Media Arts*

107 - 9440 - 202 Street
Langley, BC V1M 4A6

Telephone: (604) 888-0828

Fax: (604) 888-8093

Toll Free: 1-888-633-4218

Web Address: <http://www.leboe-grice.com>

Price: Volume I CD-ROM: \$24.95

Read & Play: \$8.00

Teacher Guide: Included by request

ISBN/Order No: Volume I CD-ROM: 1-894333-16-0

Read & Play: 1-894333-18-7

Teacher Guide: 1-894333-20-9

Copyright: 2004


Year Recommended in Grade Collection: 2005

**SCIENCE – GRADE 3
GRADE COLLECTION**

Current as of March 2005. For latest updates go to
http://www.bced.gov.bc.ca/irp_resources/lr/resource/gradcoll.htm

	Life Science	Physical Science	Earth and Space Science
	<i>Plant Growth and Changes</i>	<i>Materials and Structures</i>	<i>Stars and Planets</i>
Comprehensive Resources			
There are no comprehensive resources for Grade 3 Science			
Additional Resources – Print			
Below Zero	✓		
The Budding Botanist (AIMS Activities)			
Build It Up (Pan Canadian Science Place)			
Cycle of Life/Recycle Handbook for Educators	✓		
Forests in Focus			
Hands-On Science: Growth and Changes in Plants			
Hands-On Science: Materials and Structures			
Once Upon a Seashore	✓		
Primarily Plants (AIMS Activities)			
Project WET	✓		
Salish Sea	✓		
Science & Technology 3: Plant Growth	✓		
Science Detective™ Beginning: Higher-Order, Thinking, Reading, Writing in Science			
Stars and Planets (Pan Canadian Science Place)			
Watch It Grow! (Pan Canadian Science Place)			
Additional Resources – Video/DVD			
Activities of Plants	✓		
The Marsh: Nature's Nursery	✓		
Our Amazing Sun			✓
Our Solar System			✓
Plant Parts	✓		
Seeds and Plants	✓		
What Are Plants?	✓		

 Indicates satisfactory to good support for the majority of the learning outcomes within the curriculum organizer.

 Indicates support for one or more learning outcomes within the curriculum organizer.

 Indicates minimal or no support for the prescribed learning outcomes within the curriculum organizer.

	Life Science	Physical Science	Earth and Space Science
	<i>Plant Growth and Changes</i>	<i>Materials and Structures</i>	<i>Stars and Planets</i>
Additional Resources – Software/CD-ROM			
One Two Tree	✓		



Activities of Plants

General Description:

This 14-minute video and teacher's guide covers the plant life cycle. It is a thorough investigation of photosynthesis, pollination, and fertilization. It is visually stimulating and uses scientific vocabulary appropriate for this age.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *B.C. Learning Connection Inc.*

#4 - 8755 Ash Street
Vancouver, BC V6P 6T3

Telephone: (604) 324-7752

Fax: (604) 324-1844

Toll Free: 1-800-884-2366

Price: \$26.00

ISBN/Order No: SC0330

Copyright: 2003

Year Recommended in Grade Collection: 2005



Below Zero

General Description:

Below Zero is based on the *Project Wild* model. Instructional activities are designed for easy integration into K-7 school subjects. The teacher resource materials concentrate on the understanding and conservation of wildlife in a frozen environment. Goal of the resource is to help learners develop awareness, knowledge, skills, and commitment to make informed decisions, responsible behaviour, with wise actions concerning wildlife in winter and frozen environments.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓		✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$25.00 with workshop

ISBN/Order No: 1-55029-146-7

Copyright: 2003

Year Recommended in Grade Collection: 2005



The Budding Botanist (AIMS Activities)

General Description:

Book investigates plant life through numerous hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-40-1/08164

Copyright: 1993

Year Recommended in Grade Collection: 2005



Build It Up (Pan Canadian Science Place)

General Description:

A 32-page user friendly student booklet which is clear, concise and meets Grade 3 prescribed learning outcomes. The teacher's guide has some useful information and activities, and is easy to use. Teachers may buy the accompanying kit items from publisher or may buy them separately. A *Program and Assessment Guide*, as well as an *Integrating Science and Language Guide* are also available for teacher's use.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Student Text: \$7.00
Teacher's Guide: \$33.00

ISBN/Order No: Student Text: 0-7791-0028-X
Teacher's Guide: 0-7791-3499-0

Copyright: 2000

Year Recommended in Grade Collection: 2005



Cycle of Life/Recycle Handbook for Educators

Author(s): *Arntzen, H. et al.*

General Description:

This 276-page teacher resource is divided into five sections: Introduction, Music, Biology, Recycling, and Resources.

Through songs and activities, Kindergarten to Grade 7 students learn about at-risk Canadian plants and animals species. Topics include sustainability of resources, life cycles, food chains and webs, ecological footprints, the interrelated nature of living things, and Aboriginal practices. There is a music CD, *Cycle of Life*, with 14 ecology/nature songs. Lyrics are included in print material.

Caution: See Author's caution re: p. 83, Stan Rodger's song, lyrics refer to "beer" and "hell."

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Artist Response Team Inc. (ART)*

P.O. Box 91
Brentwood Bay, BC V8M 1R3

Telephone: (250) 544-4006

Fax: (250) 544-4075

Price: \$35.00

ISBN/Order No: 0-9736-847

Copyright: 2004

Year Recommended in Grade Collection: 2005



Forests in Focus

General Description:

Forests in Focus is an 85-page activity book on the BC forest environment. It consists of 34 activities, a glossary, stories (for activities), and appendices containing detailed BC information. It is designed for K-12 use but not all activities are appropriate for all grades. Organizers and suggested themes are included in the introduction. All activities are organized 'lab style' with objectives, materials, method, and evaluation. Content is based upon forest process and ecosystem, and does not emphasize harvesting issues.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$26.00

\$22.00 with workshop

ISBN/Order No: 0-7726-3966-3

Copyright: 1999

Year Recommended in Grade Collection: 2005



Hands-On Science: Growth and Changes in Plants

Author(s): *Lawson, J. et al.*

General Description:

This 76-page teacher's guide offers activities, experiments, diagrams and background knowledge for the study of plants. It does not cover the prescribed learning outcomes for Grade 3 thoroughly, but is an easy to use and age appropriate resource that uses excellent scientific investigation.

Caution: *Poor quality binding/cover, paper and visuals.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:

www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-88-9

Copyright: 2001

Year Recommended in Grade Collection: 2005



Hands-On Science: Materials and Structures

Author(s): *Lawson, J. et al.*

General Description:

This teacher guide offers nine activities that support all of the physical and process prescribed learning outcomes for Grade 3. They are well organized, age appropriate, and use scientific methods. Assessment and foundation skills are covered in the first half of the resource.

Caution: *Poor quality binding, cover, paper and visuals.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:

www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-57-9

Copyright: 2001

Year Recommended in Grade Collection: 2005



The Marsh: Nature's Nursery

General Description:

In this 15-minute video, David Suzuki and naturalist Barbara McKean guide children through a marsh in Spring to discover the continuing life cycles of plants, animals, insects, and in particular, frogs.

Audience: *General*

ESL - suitable for all language proficiencies; teacher support for beginner level required; visual and oral cues correspond

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓	✓									

Supplier: *Magic Lantern Communications (Ontario)*

1075 North Service Road West - Unit 27
Oakville, ON L6M 2G2

Telephone: (905) 827-2755

Fax: (905) 827-2655

Toll Free: 1-800-263-1717

Price: Not available

ISBN/Order No: Not available

Copyright: 1988

Year Recommended in Grade Collection: 2005



Once Upon a Seashore

Author(s): *Snively, G.*

General Description:

This 304-page adult reference was designed to help teachers in their study of the seashore. It contains clear illustrations, photos, a glossary, transparencies, activity sheets, and offers ideas for drama, creative writing, and art. An excellent resource for field trips to the seashore.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓	✓	✓	✓	✓						

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Not available

ISBN/Order No: 0-9687811-0-1/LA S65

Copyright: 2001

Year Recommended in Grade Collection: 2005



One Two Tree

General Description:

A cross-curricular CD-ROM learning resource which teaches young learners about trees. It offers in-depth information while allowing for integration of math, language arts, and art. Games can be played independently or with a partner. Animated real footage of animals, as well as photographs of various stages of tree parts growth (buds, leaves, etc.) add to the interest of the activity. Extensive teacher support package is provide.

System Requirements:

Macintosh: Power PC; 8 to 16 Mb RAM; Colour Monitor with SVGA Graphics (256 colour and 640 x 480 screen resolution), 4x CD-ROM Drive, 8 bit Sound Card, Quick Time 2

Windows: IBM Pentium PC, 8 to 16 Mb RAM, Colour Monitor with SVGA Graphics (256 colour and 640 x 480 screen resolution), 4x CD-ROM Drive, 8 bit Sound Card, Quick Time 2

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓		✓									

Supplier: *Icon Media Productions Inc.*

19165 Loyalist Parkway
RR3
Consecon, ON KOK 1T0
Telephone: 613-399-3957
Fax:

Web Address: www.iconmedia.net

Price: Windows CD: \$32.00
Macintosh CD: \$32.00

ISBN/Order No: Not available

Copyright: 2002

Year Recommended in Grade Collection: 2005



Our Amazing Sun

General Description:

This 25-minute video examines many aspects of the star that is the center of our solar system, the Sun. It examines all aspects and activity of the Sun and its far reaching effects, especially on Earth. Aboriginal historical perspectives of the Sun are included. Visuals are current and close-up photography reveals fascinating phenomena occurring on the Sun's surface. The scope and depth of topic go beyond this age level, but presentation is clear and easily understood. Script is included for follow-up. Support material includes questions, simple activities, and a glossary.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *Marlin Motion Pictures Ltd.*

211 Watline Avenue
Mississauga, ON L4Z 1P3
Telephone: (905) 890-1500
Fax: (905) 890-6550
Toll Free: 1-800-865-7617

Price: Not available

ISBN/Order No: 76814

Copyright: 2004

Year Recommended in Grade Collection: 2005



Our Solar System

General Description:

This 15-minute video and support material present the characteristics and movements of the objects in our solar system in an engaging and efficient manner. It is visually stimulating and uses abundant scientific vocabulary concisely.

Caution: *Imperial and Metric measures used.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: \$39.95

ISBN/Order No: 1-2286F-1#32

Copyright: 1999

Year Recommended in Grade Collection: 2005



Plant Parts

General Description:

This video and teacher's guide are a thorough investigation of the parts of a plant and their functions with appropriate scientific vocabulary. The video is well developed and sequenced. Visuals are age appropriate, and video fosters and encourages asking questions, which is one of the Science processes for this grade.

Caution: *Support material is slightly high for Grade 3 reading and writing levels.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *B.C. Learning Connection Inc.*

#4 - 8755 Ash Street
Vancouver, BC V6P 6T3

Telephone: (604) 324-7752

Fax: (604) 324-1844

Toll Free: 1-800-884-2366

Price: \$26.00

ISBN/Order No: SC0336

Copyright: 2003

Year Recommended in Grade Collection: 2005



Primarily Plants (AIMS Activities)

General Description:

Book investigates plant growth, seeds and spores, plant needs, and plant parts through 26 hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-24-X/20124

Copyright: 1990

Year Recommended in Grade Collection: 2005



Project WET

General Description:

The 500-page detailed teacher resource includes directions and extensions for 120 activities related to water, wetlands, and water resource management. Each activity includes objectives, method, background, materials, procedures, variations, extensions and evaluation. A wealth of teaching ideas for Grades K to 7. A global perspective, but produced from Montana State University.

Caution: *Not much Canadian or BC highlights. Images are mostly global but some captions are US locations. Dual temperature references, i.e. Fahrenheit/Celsius.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$30.00 with workshop

ISBN/Order No: Not available

Copyright: 1995

Year Recommended in Grade Collection: 2005



Author(s): Arntzen, H. et al.

General Description:

This 108-page detailed teacher resource includes background directions, activities, and extensions related to ecosystems, both land and marine, which are specific to the West Coast. This cross-curricular resource contains many Aboriginal references and suggests activities, songs, and projects to amplify student appreciation of historical stewardship and respect for the delicate balance of a coastal ecosystem. There are many references and web links as back-up material. A CD of eco-songs, one in Cowichan language, accompanies this resource which contains a wealth of teaching, learning, and hands-on activities for Grades K to 7.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Parks Canada*

711 Broughton St., 2nd Floor
Victoria, BC V8W 1E2

Telephone: (250) 363-3511

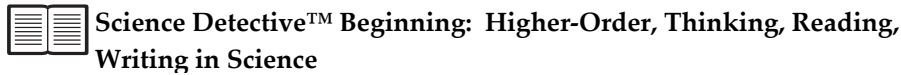
Fax: (250) 363-8552

Price: \$30.00

ISBN/Order No: 0-660-18596-2

Copyright: 2001

Year Recommended in Grade Collection: 2005



Author(s): Fischer, S. et al.

General Description:

Teacher resource for ESL or Learning Assistance programs includes simplified pages of science concepts in all strands. Basic teaching strategy of read and complete sheet. Good collection of key visuals and graphic organizers.

Audience: *ESL - key visuals and basic one page text per topic*
LD - key visuals and frames can be used to help learn concepts

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓	✓	✓	✓	✓					

Supplier: *The Critical Thinking Co.*

P.O. Box 1610
1069 Broadway Ave.
Seaside, CA 93955-1610

Telephone: (831) 393-3288

Fax: (831) 393-3277

Toll Free: 1-800-458-4849

Web Address: www.criticalthinking.com

Price: \$18.99 US

ISBN/Order No: 0-89455-834-X

Copyright: 2004

Year Recommended in Grade Collection: 2005



Science & Technology 3: Plant Growth

General Description:

This set includes a 42-page student booklet and teacher's guide. It is a clear and concise resource that covers the Grade 3 Life Science outcomes. The books are user-friendly for both student and teacher. Science content is well developed and processes are emphasized.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *Pearson Education Canada*

26 Prince Andrew Place
Don Mills, ON M3C 2T8

Telephone: (416) 447-5101

Fax: 1-800-563-9196

Toll Free: 1-800-387-8028/7851

Web Address: <http://www.pearsoned.com>

Price: Not available

ISBN/Order No: Student Text: 0-201-64976-4
Teacher's Guide: 0-201-65424-5

Copyright: 2000

Year Recommended in Grade Collection: 2005



Seeds and Plants

General Description:

This 15-minute video and support material effectively covers two of the learning outcomes for plant growth and changes. It is clear, engaging, and contains extensive scientific vocabulary. Video could be used in 'chunks' or as a whole.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: \$39.95

ISBN/Order No: 1-2288F-1#7

Copyright: 2000

Year Recommended in Grade Collection: 2005



Stars and Planets (Pan Canadian Science Place)

General Description:

The 32-page student book and 102-page teacher's guide thoroughly cover the learning outcomes for the Grade 3 Earth and Space Science curriculum. This package offers the teacher a complete program including activities, experiments, blackline masters, assessment, extensions, and clear, concise information.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Student Text: \$7.00

Teacher's Guide: \$33.00

Program and Assessment Guide: \$45.00

ISBN/Order No: Student Text: 0-7791-3500-8

Teacher's Guide: 0-7791-3501-6

Program and Assessment Guide:
0-7791-0091-3

Copyright: 2005

Year Recommended in Grade Collection: 2005



Watch It Grow! (Pan Canadian Science Place)

General Description:

This 32-page user-friendly student booklet and the teacher's guide cover all Grade 3 Life Science learning outcomes. Text and visuals are clear and concise. Teachers may buy the accompanying kit items from publisher or may buy them separately. A *Program and Assessment Guide*, as well as an *Integrating Science and Language Guide* are also available for teacher's use.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Student Text: \$7.00

Teacher's Guide: \$33.00

ISBN/Order No: Student Text: 0-7791-0025-5

Teacher's Guide: 0-7791-3498-2

Copyright: 2000

Year Recommended in Grade Collection: 2005



What Are Plants?

General Description:

This 14-minute video fully meets the requirements of Grade 3 prescribed learning outcomes for Life Science in an engaging manner that is age/grade appropriate. Visuals are colourful and will enhance investigations. The script appears at the bottom of the screen throughout video, and is followed with a summary and a follow-up quiz. Support material is appropriate.

Caution: *Script appears on screen throughout video
Would use in segments, a lot of information is presented quickly
American accent*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓									

Supplier: *B.C. Learning Connection Inc.*

#4 - 8755 Ash Street
Vancouver, BC V6P 6T3
Telephone: (604) 324-7752
Fax: (604) 324-1844
Toll Free: 1-800-884-2366

Price: \$26.00

ISBN/Order No: SC0338


Copyright: 2003


Year Recommended in Grade Collection: 2005

**SCIENCE – GRADE 4
GRADE COLLECTION**

Current as of March 2005. For latest updates go to
http://www.bced.gov.bc.ca/irp_resources/lr/resource/gradcoll.htm

	Life Science	Physical Science	Earth and Space Science
	<i>Habitats and Communities</i>	<i>Light and Sound</i>	<i>Weather</i>
Comprehensive Resources			
There are no comprehensive resources for Grade 4r Science			
Additional Resources – Print			
Backyard Biodiversity and Beyond, 1999 Edition	✓		
Critters (AIMS Activities)	✓		
Cycle of Life/Recycle Handbook for Educators			
Discovering Insects: Ants, Flies, Crickets	✓		
Discovery Works for Grade 4: Unit E - Weather and Climate			✓
Forests in Focus	✓		
Hands-On Science: Habitats and Communities	✓		
Hands-On Science: Light		✓	
Hands-On Science: Sound		✓	
Hands-On Science: Weather			
Healthy Habitats (Pan Canadian Science Place)			
Kokanee of British Columbia	✓		
Once Upon a Seashore			
Primarily Physics - Investigations in Sound, Light and Heat Energy (AIMS Activities)			
Project WET			✓
Project WILD	✓		
Salish Sea			
Salmonids in the Classroom	✓		
Science Answers Series		✓	
Science Detective™ Beginning: Higher-Order, Thinking, Reading, Writing in Science	✓		
Sound and Light (Pan Canadian Science Place)			
Thinking Connections: Concept Maps for Life Science	✓		

 Indicates satisfactory to good support for the majority of the learning outcomes within the curriculum organizer.

 Indicates support for one or more learning outcomes within the curriculum organizer.

 Indicates minimal or no support for the prescribed learning outcomes within the curriculum organizer.

	Life Science	Physical Science	Earth and Space Science
	<i>Habitats and Communities</i>	<i>Light and Sound</i>	<i>Weather</i>
Additional Resources – Print (con’t)			
Urban Stewards	✓		
The Watershed Works			
Additional Resources – Print Series			
Science & Technology 4	✓	✓	
Science & Technology 5 (Weather)			✓
Additional Resources – Video/DVD			
Discovering Insects: Defences	✓		
Exploring the Atmosphere: Meteorology in Canada			✓
Introduction to the Water Cycle			✓
Habitats	✓		
Science, Please!		✓	✓
Weather and Climate			✓
Weather & Climate			✓
Additional Resources – Video Series			
The Lives of Ants & Bees for Students Series	✓		



Backyard Biodiversity and Beyond, 1999 Edition

Author(s): *Dulc, S. et al.*

General Description:

BC produced teacher resource has been revised and is now coil bound. Contains background information and student activities around the topic of biodiversity. It features native flora and fauna, as well as biodiversity issues and success stories. The booklet contains six modules and 150+ pages of instructional activities.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓		✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$22.00

ISBN/Order No: 0-7726-3954-X

Copyright: 1999

Year Recommended in Grade Collection: 2005



Critters (AIMS Activities)

General Description:

Book investigates a variety of 'critters,' including insects, spiders, mealworms, earthworms, snails, silkworms, and isopods, through numerous hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓		✓								

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-23-1/20137

Copyright: 1992

Year Recommended in Grade Collection: 2005



Cycle of Life/Recycle Handbook for Educators

Author(s): *Arntzen, H. et al.*

General Description:

This 276-page teacher resource is divided into five sections: Introduction, Music, Biology, Recycling, and Resources. Through songs and activities, Kindergarten to Grade 7 students learn about at-risk Canadian plants and animals species. Topics include sustainability of resources, life cycles, food chains and webs, ecological footprints, the interrelated nature of living things, and Aboriginal practices. There is a music CD, *Cycle of Life*, with 14 ecology/nature songs. Lyrics are included in print material.

Caution: See Author's caution re: p. 83, Stan Rodger's song, lyrics refer to "beer" and "hell."

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Artist Response Team Inc. (ART)*

P.O. Box 91
Brentwood Bay, BC V8M 1R3

Telephone: (250) 544-4006

Fax: (250) 544-4075

Price: \$35.00

ISBN/Order No: 0-9736-847

Copyright: 2004

Year Recommended in Grade Collection: 2005



Discovering Insects: Ants, Flies, Crickets

Author(s): *Brillon, G.*

General Description:

Book introduces ants, flies, and crickets, and addresses how to catch, house, and care for them. Includes various related activities.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Quintin Publishers / Éditions Michel Quintin*

Box 340
4818 Foster Road
Waterloo, QC J0E 2N0

Telephone: (450) 539-3774

Fax: (450) 539-4905

Price: Not available

ISBN/Order No: 2-89435-010-4

Copyright: 1994

Year Recommended in Grade Collection: 2005



Discovering Insects: Defences

General Description:

This video investigates defense mechanisms in insects and shows examples of active and passive defense strategies.

Audience: *General*

ESL - intermediate to advanced language proficiency; appropriate pacing; visual and oral cues correspond; descriptive; specialized vocabulary may require explanation

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Encyclopedia Britannica Educ. Corp.*

310 South Michigan
Chicago, IL 60604

Telephone: (312) 347-7900 ext. 6464

Fax: (312) 347-7903

Toll Free: (800) 554-9862 (orders)

Price: Not available

ISBN/Order No: Not available

Copyright: 1988

Year Recommended in Grade Collection: 2005



Discovery Works for Grade 4: Unit E - Weather and Climate

General Description:

This 41-page student booklet moderately investigates weather and climate. It fully meets the Grade 4 curriculum, but only slightly addresses impacts of weather conditions. Each chapter contains relevant knowledge and hands-on activities. Throughout this booklet scientific processes are stressed.

Caution: *Some pages are dense with text and the amount of technical vocabulary may overwhelm some students.*

Glossary is difficult to use, i.e., reference to 'DSI' means looking in another book.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Thomson Nelson*

1120 Birchmount Road
Scarborough, ON M1K 5G4

Telephone: (416) 752-9448

Fax: (416) 752-8101

Toll Free: 1-800-268-2222/1-800-668-067

Web Address: www.nelson.com

Price: Not available

ISBN/Order No: 0-618-00256-1

Copyright: 2003

Year Recommended in Grade Collection: 2005



Exploring the Atmosphere: Meteorology in Canada

General Description:

This 23-minute video traces the historical development of meteorology in Canada, focussing on the study of the ozone layer. It explains the reasons for weather observations and the advances made in technology.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *McNabb and Connolly*

60 Briarwood Avenue
Mississauga, ON L5G 3N6

Telephone: (905) 278-0566

Fax: (905) 278-2801

Web Address: www.mcnabbconnolly.ca

Price: Not available

ISBN/Order No: Not available

Copyright: 1989

Year Recommended in Grade Collection: 2005



Forests in Focus

General Description:

Forests in Focus is an 85-page activity book on the BC forest environment. It consists of 34 activities, a glossary, stories (for activities), and appendices containing detailed BC information. It is designed for K-12 use but not all activities are appropriate for all grades. Organizers and suggested themes are included in the introduction. All activities are organized 'lab style' with objectives, materials, method, and evaluation. Content is based upon forest process and ecosystem, and does not emphasize harvesting issues.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$26.00

\$22.00 with workshop

ISBN/Order No: 0-7726-3966-3

Copyright: 1999

Year Recommended in Grade Collection: 2005

 **Habitats**

General Description:

This well-paced 15-minute video and support package presents an overview of the world's habitats: polar, tundra, temperate, coniferous and deciduous forest, desert, fresh and salt water. Each habitat presented shows the dominant plants and different animals which are adapted to varied conditions. Age appropriate references and maps are incorporated. A support package with comprehension and assessment is included.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035


Web Address: www.canlearn.com

Price: \$39.95

ISBN/Order No: 1-2283 F-1#60

Copyright: 1999

Year Recommended in Grade Collection: 2005

 **Hands-On Science: Habitats and Communities**

Author(s): *Lawson, J. et al.*

General Description:

This 75-page teacher resource is well organized and creates a balance between knowledge, investigation, and applications of science processes of predicting and interpreting data. Background information is provided, activities are age/grade appropriate and engaging. It provides scope for different learning styles, and as well, provides black and white diagrams, assessment strategies, and rubrics.

Caution: *Does not address Aboriginal content/roles/context.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:

www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-61-7

Copyright: 2001

Year Recommended in Grade Collection: 2005



Hands-On Science: Light

Author(s): *Lawson, J. et al.*

General Description:

This 52-page teacher resource contains eight units/modules which address the properties of light. Each unit contains activities, investigations, and applications of science which are age/grade/topic appropriate. Assessment strategies and indicators are present. Science background information, annotated web site, and extensions are included in this resource.

Caution: *This resource is 'light' only. Visuals, diagrams and master are black and white only.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:

www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-63-3

Copyright: 2001

Year Recommended in Grade Collection: 2005



Hands-On Science: Sound

Author(s): *Lawson, J. et al.*

General Description:

This 59-page teacher resource is divided into 11 modules designed for classroom implementation. Modules include knowledge and applications. Investigations emphasize the science process for this grade level. Blackline masters and diagrams support learning activities. Assessment activities and strategies follow investigations. Teacher background references and annotated web sites are included.

Caution: *Does not cover Light part of Prescribed Learning Outcomes.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:

www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-65-X

Copyright: 2001

Year Recommended in Grade Collection: 2005



Hands-On Science: Weather

Author(s): *Lawson, J. et al.*

General Description:

This 80-page teacher resource is arranged into a 12 unit format which allows teachers to plan and implement investigations, activities, and test which match the Grade 5 curriculum for weather. Many activities are adaptable to different learning styles, independent, or cooperative learning. Assessment strategies and rubrics are provided for each unit. Background information, teacher reference, and annotated web sites are provided.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:

www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-79-X

Copyright: 2001

Year Recommended in Grade Collection: 2005



Healthy Habitats (Pan Canadian Science Place)

General Description:

The 48-page student text and 108-page teacher's guide investigate topics prescribed in the Grade 4 learning outcomes for Habitats and Communities. Processes of sciences, predicting, and interpreting, are addressed in hands-on activities. Aboriginal content is embedded in the teacher's guide.

Caution: *The text is most useful and effective when used with teacher's guide.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Student Text: \$9.00

Teacher's Guide: \$35.00

Program and Assessment Guide: \$50.00

ISBN/Order No: Student Text: 0-7791-0045-X

Teacher's Guide: 0-7791-3502-4

Program and Assessment Guide:
0-7791-0093-X

Copyright: 2005

Year Recommended in Grade Collection: 2005



Introduction to the Water Cycle

General Description:

Thirty-minute video illustrates the many different ways that water is recycled. It defines condensation, evaporation, and precipitation, demonstrating how sun and wind are major factors affecting the water cycle.

Audience: *General*

ESL - intermediate to advanced language proficiency; requires pre-teaching of vocabulary and concepts

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Encyclopedia Britannica Educ. Corp.*

310 South Michigan
Chicago, IL 60604

Telephone: (312) 347-7900 ext. 6464

Fax: (312) 347-7903

Toll Free: (800) 554-9862 (orders)

Price: Not available

ISBN/Order No: Not available

Copyright: 1988

Year Recommended in Grade Collection: 2005



Kokanee of British Columbia

General Description:

Activities and researched facts for the study and class investigation of landlocked salmonids called Kokanee. This is very appropriate for Interior waterways where Kokanee are mostly found. The teacher resource is organized to present all the same elements of the BC Salmon programs for Coastal BC using the Kokanee instead. Nine activities cover historical evolution life cycle, habitat, and human impacts so students will understand the relationship between Kokanee and the Interior environment. Field studies and observations are detailed in well organized units.

Caution: *This resource covers several learning outcomes at the Primary level, but it is more suitable for the Intermediate level.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓		✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$22.00

ISBN/Order No: 0-7726-5130-2

Copyright: 2004

Year Recommended in Grade Collection: 2005



The Lives of Ants & Bees for Students Series

General Description:

Three 10- to 11-minute videos which explore the body structures of ants and bees and shows their social behaviour and life cycles. The segment on the ant uses computerized 3D images. The symbiotic relationship between the bees and the plants is outlined. On-line resources are available for use once this series is purchased.

Caution: *One interview with the scientists may be a little hard to understand due to regional accents.*

The quality of the on-line component is unknown as access was not available to the review team.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
		✓		✓								

Supplier: *McIntyre Media Ltd.*

75 First St., Suite 203
Orangeville, ON L9W 5B6

Telephone: (519) 942-9640

Fax: (519) 942-8489

Toll Free: 1-800-565-3036

Web Address: www.mcintyre.ca

Price: Videos: \$89.00 each
or \$249.00 for all three

ISBN/Order No: Ant Bodies: 73418-HAVTX
Ant Homes & Communities:
73419-HAVTX
Bees & Plants: 73420-HAVTX

Copyright: 2004

Year Recommended in Grade Collection: 2005



Once Upon a Seashore

Author(s): *Snively, G.*

General Description:

This 304-page adult reference was designed to help teachers in their study of the seashore. It contains clear illustrations, photos, a glossary, transparencies, activity sheets, and offers ideas for drama, creative writing, and art. An excellent resource for field trips to the seashore.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓	✓	✓	✓	✓						

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Not available

ISBN/Order No: 0-9687811-0-1/LA S65

Copyright: 2001

Year Recommended in Grade Collection: 2005



Primarily Physics - Investigations in Sound, Light and Heat Energy
(AIMS Activities)

General Description:

Book investigates sound, light, and heat energy through 26 hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-46-0/20125

Copyright: 1994

Year Recommended in Grade Collection: 2005



Project WET

General Description:

The 500-page detailed teacher resource includes directions and extensions for 120 activities related to water, wetlands, and water resource management. Each activity includes objectives, method, background, materials, procedures, variations, extensions and evaluation. A wealth of teaching ideas for Grades K to 7. A global perspective, but produced from Montana State University.

Caution: *Not much Canadian or BC highlights. Images are mostly global but some captions are US locations. Dual temperature references, i.e. Fahrenheit/Celsius.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$30.00 with workshop

ISBN/Order No: Not available

Copyright: 1995

Year Recommended in Grade Collection: 2005



Project WILD

General Description:

Teacher resource contains directions and extensions for approximately 80 activities that are related to wildlife and resource management. Each activity includes objectives, method, background, materials, procedure, variations, extension, and evaluation.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$25.00 with workshop

ISBN/Order No: Not available

Copyright: 1998

Year Recommended in Grade Collection: 2005



Salish Sea

Author(s): *Arntzen, H. et al.*

General Description:

This 108-page detailed teacher resource includes background directions, activities, and extensions related to ecosystems, both land and marine, which are specific to the West Coast. This cross-curricular resource contains many Aboriginal references and suggests activities, songs, and projects to amplify student appreciation of historical stewardship and respect for the delicate balance of a coastal ecosystem. There are many references and web links as back-up material. A CD of eco-songs, one in Cowichan language, accompanies this resource which contains a wealth of teaching, learning, and hands-on activities for Grades K to 7.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Parks Canada*

711 Broughton St., 2nd Floor
Victoria, BC V8W 1E2

Telephone: (250) 363-3511

Fax: (250) 363-8552

Price: \$30.00

ISBN/Order No: 0-660-18596-2

Copyright: 2001

Year Recommended in Grade Collection: 2005



Salmonids in the Classroom

General Description:

Salmonids in the Classroom (either Primary or Intermediate versions) is a comprehensive collection of resource materials for the study of Pacific salmonids in British Columbia. The programs are divided into clearly organized and paced 10 units following the life cycle habitats of the salmon. Each unit in the guide includes suggested activities. Content is primarily science-oriented but the development of the units has a language arts approach incorporating unifying themes. The programs would allow the integration of science, social studies and language for extensive periods of time.

Caution: *The material has limited assessment devices explained. It make suggestions for assessment activities but doesn't give any 'how to do' assessment resources.*

Audience: *General*

ESL - late primary to early intermediate; good key visuals; variety of student activities

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓		✓	✓	✓	✓					

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Primary: \$71.10

Intermediate: \$66.60

ISBN/Order No: Primary: S33

Intermediate: S39

Copyright: 2001

Year Recommended in Grade Collection: 2005



Science Answers Series

Author(s): *Cooper, C.*

General Description:

These are 32-page student booklets which focus on light and sound, and forces and motion. They are age/grade appropriate, include current science content, as well as hands-on investigations which emphasize the scientific processes at this grade level.

Caution: *Measurements are given in both Metric and Imperial standards.*

Audience: *General*

Gifted - could easily be used independently, thoughtful and clever activities

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓							

Supplier: *J. Appleseed*

PO Box 129
Collingwood, ON L9Y 3Z7

Telephone:

Fax:

Toll Free: 1-866-575-5007

Web Address: www.jappleseed.ca

Price: Not available

ISBN/Order No: Forces and Motion: From Push to Shove: 1-4034-3548-0

Light: From Sun to Bulbs:
1-4034-3550-2

Sound: From Whisper to Rock Band:
1-4034-3553-7

Copyright: 2004

Year Recommended in Grade Collection: 2005



Science Detective™ Beginning: Higher-Order, Thinking, Reading, Writing in Science

Author(s): Fischer, S. et al.

General Description:

Teacher resource for ESL or Learning Assistance programs includes simplified pages of science concepts in all strands. Basic teaching strategy of read and complete sheet. Good collection of key visuals and graphic organizers.

Audience: *ESL - key visuals and basic one page text per topic*
LD - key visuals and frames can be used to help learn concepts

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓	✓	✓	✓	✓					

Supplier: *The Critical Thinking Co.*

P.O. Box 1610
1069 Broadway Ave.
Seaside, CA 93955-1610
Telephone: (831) 393-3288
Fax: (831) 393-3277
Toll Free: 1-800-458-4849

Web Address: www.criticalthinking.com

Price: \$18.99 US

ISBN/Order No: 0-89455-834-X

Copyright: 2004

Year Recommended in Grade Collection: 2005



Science, Please!

General Description:

Fast, factual explanations of scientific phenomena and discoveries, who said science can't be fun? A poster with excellent questions and an extensive interactive web site support these videos (Part 1 and Part 2). Although the DVDs were not available for the reviewers, they felt DVD format would be more easily used as this is a series of science mini-clips.

Caution: *Teacher should preview Part 1, clip 3, for questionable humour.*

Audience: *General*

Gifted - fast-paced, attention-grabber

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *National Film Board of Canada*

200-1385 West 8th Avenue
Vancouver, BC V6H 3V9
Telephone: (604) 666-3838
Fax: (604) 666-1569
Toll Free: 1-800-267-7710

Web Address: www.nfb.ca

Price: Not available

ISBN/Order No: 193C 9101 197

Copyright: 2001

Year Recommended in Grade Collection: 2005



Science & Technology 4

Author(s): *Campbell, S. et al.*

General Description:

Science & Technology 4 is comprised of three student booklets and accompanying teacher guides: *Habitats, Sound and Light*. The visuals are bright, the applications are innovative, and are within the capabilities of this age/grade level. The Science is accurate and well presented. This resource is well-adapted to multi-learning styles.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Pearson Education Canada*

26 Prince Andrew Place
Don Mills, ON M3C 2T8

Telephone: (416) 447-5101

Fax: 1-800-563-9196

Toll Free: 1-800-387-8028/7851

Web Address: <http://www.pearsoned.com>

Price: Not available

ISBN/Order No: Student Text: Various
Teacher's Guide: Various

Copyright: 2000

Year Recommended in Grade Collection: 2005



Science & Technology 5

Author(s): *Campbell, S. et al.*

General Description:

The student booklet and teacher resource are well organized, with appropriate visuals that promote a good balance between knowledge and applications. Titles include: *Forces on Structures, The Human Body* (for Grade 5), and *Weather* (for Grade 4). This resource is flexible, could be used as a whole or in part, depending on classroom needs. Many hands-on and stimulating activities in a well organized format.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓							

Supplier: *Pearson Education Canada*

26 Prince Andrew Place
Don Mills, ON M3C 2T8

Telephone: (416) 447-5101

Fax: 1-800-563-9196

Toll Free: 1-800-387-8028/7851

Web Address: <http://www.pearsoned.com>

Price: Not available

ISBN/Order No: Student Text: Various
Teacher's Guide: Various

Copyright: 2000

Year Recommended in Grade Collection: 2005



Sound and Light (Pan Canadian Science Place)

General Description:

This 48-page student book and accompanying teacher's guide cover the learning outcomes for Grade 4 Physical Science.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Student Text: \$9.00

Teacher's Guide: \$35.00

Program and Assessment Guide: \$50.00

ISBN/Order No: Student Text: 0-7791-3503-2

Teacher's Guide: 0-7791-3504-0

Program and Assessment Guide:
0-7791-0093-X

Copyright: 2005

Year Recommended in Grade Collection: 2005



Thinking Connections: Concept Maps for Life Science

Author(s): *Burggraf, F.*

General Description:

Teacher resource for ESL or Learning Assistance programs with simplified pages of Science concepts in Grades 4 to 7 intermediate strands. Basic teaching strategy of read and complete sheets, and a reinforcement of vocabulary and concepts. Good collection of key visuals and graphic organizers.

Audience: *ESL - key visuals and basic one page text per topic*
LD - key visuals and frames can be used to help learn concepts

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *The Critical Thinking Co.*

P.O. Box 1610
1069 Broadway Ave.
Seaside, CA 93955-1610

Telephone: (831) 393-3288

Fax: (831) 393-3277

Toll Free: 1-800-458-4849

Web Address: www.criticalthinking.com

Price: \$23.99 US

ISBN/Order No: 0-89455-702-5

Copyright: 2001

Year Recommended in Grade Collection: 2005



Urban Stewards

Author(s): *Keetch, T.*

General Description:

Engages students in stimulating hands-on science and environmental education activities in the classroom and outside. Match to the learning outcomes in a cross-curricular fashion.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *Stanley Park Ecology Society*

PO Box 5167
2nd Floor, Stanley Park Dining Pavilion
Vancouver, BC V6B 4B2

Telephone: 604-257-6908

Fax: 604-257-8378

Web Address: www.stanleyparkecology.ca

Price: Not available

ISBN/Order No: Not available

Copyright: 2004

Year Recommended in Grade Collection: 2005



The Watershed Works

Author(s): *Bernbach, L. et al.*

General Description:

This booklet is an extensive guide for the study of the Fraser River Basin in BC. It includes student activities and teaching strategies that promote awareness and understanding of the social, economic, and environmental issues that are relevant to this area.

Caution: *These are photocopied pages in a binder.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Not available

ISBN/Order No: Not available

Copyright: 1998

Year Recommended in Grade Collection: 2005

 **Weather and Climate**

General Description:

This 15-minute video and support package visually addresses age and grade learning outcomes for weather. Key terms and concepts are clearly presented in an engaging manner. Science vocabulary and diagrams are accurate and clearly explained. Extreme weather conditions are highlighted with easily understood explanations.

Caution: *Imperial and Metric measurements appear. American locations sometimes used.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: \$39.95

ISBN/Order No: 1-2284F-1#49

Copyright: 1999

Year Recommended in Grade Collection: 2005

 **Weather & Climate**

General Description:

This 12-minute video covers the knowledge content of weather in an engaging age/grade appropriate manner. Visuals are accurate, diagrams extend knowledge, and are easily understood. Narration is lively and promotes scientific interest in this topic. Support material is reproducible print.

Caution: *Imperial measure is coupled with Metric.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓								

Supplier: *B.C. Learning Connection Inc.*

#4 - 8755 Ash Street
Vancouver, BC V6P 6T3

Telephone: (604) 324-7752

Fax: (604) 324-1844

Toll Free: 1-800-884-2366

Price: \$26.00

ISBN/Order No: SC0337

Copyright: 2000

Year Recommended in Grade Collection: 2005

**SCIENCE – GRADE 5
GRADE COLLECTION**


Current as of March 2005. For latest updates go to
http://www.bced.gov.bc.ca/irp_resources/lr/resource/gradcoll.htm

	Life Science	Physical Science	Earth and Space Science
	<i>Human Body</i>	<i>Forces and Simple Machines</i>	<i>Renewable and Non-Renewable Resources</i>
Comprehensive Resources			
There are no comprehensive resources for Grade 5 Science			
Additional Resources – Print			
Backyard Biodiversity and Beyond, 1999 Edition			✓
Below Zero		✓	
Cycle of Life/Recycle Handbook for Educators			✓
Forests in Focus			✓
From Head To Toe (AIMS Activities)			
Hands-On Science: Simple Machines		✓	
Hands-On Science: The Human Body			
Kokanee of British Columbia			✓
Once Upon a Seashore			✓
Our Resources (Pan Canadian Science Place)			
Project WET			✓
Project WILD			✓
Putting It In Motion (Pan Canadian Science Place)			
Salish Sea			✓
Salmonids in the Classroom			✓
Science Answers Series		✓	
Science Detective™ Beginning: Higher-Order, Thinking, Reading, Writing in Science			
Thinking Connections: Concept Maps for Life Science	✓		
Urban Stewards			✓
The Watershed Works			
A World in Motion: The Design Experience		✓	

 Indicates satisfactory to good support for the majority of the learning outcomes within the curriculum organizer.

 Indicates support for one or more learning outcomes within the curriculum organizer.

 Indicates minimal or no support for the prescribed learning outcomes within the curriculum organizer.

	Life Science	Physical Science	Earth and Space Science
	<i>Human Body</i>	<i>Forces and Simple Machines</i>	<i>Renewable and Non-Renewable Resources</i>
Additional Resources – Print Series			
Science & Technology 5		✓	
Additional Resources – Video/DVD			
Circulatory and Respiratory Systems	✓		
Science, Please!		✓	
Simple Machines		✓	
Additional Resources – Video/Series			
The Amazing Body for Students Series	✓		
The Real World Science Series	✓		
What's Inside Your Body?	✓		
Additional Resources – Multimedia			
OceanNews		✓	✓



The Amazing Body for Students Series

General Description:

Bones & Muscles, Eyes, The Senses are part of the Amazing Body for Students Video Series. *Bones & Muscles* is a 9-minute video that is a contemporary presentation of bones, muscles and how they work together. The visuals are well paced, engaging and use the latest in close-up, real-life photography. They also make connections to other body systems. *Eyes* is a 10-minute video that uses close-up photography to examine the parts of the eye, how it functions, and how images are transmitted to the brain. *The Senses* is a 13-minute video that presents information on the senses (sight, hearing, touching, smelling and tasting) in the first sequence. The second sequence highlights the link between taste and smell. The images are close-up, real-life and use the latest technology.

Caution: Websites require registration. *Imperial measurements in 'Eyes.'* In *'The Senses,'* a mother is shown nursing her baby.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓							

Supplier: *McIntyre Media Ltd.*

75 First St., Suite 203
Orangeville, ON L9W 5B6

Telephone: (519) 942-9640

Fax: (519) 942-8489

Toll Free: 1-800-565-3036

Web Address: www.mcintyre.ca

Price: Videos: \$89.00 or
\$329.00 for all three

ISBN/Order No: *The Senses:* 270152
Eyes: 270153
Bones & Muscles: 270155

Copyright: 2004

Year Recommended in Grade Collection: 2005



Backyard Biodiversity and Beyond, 1999 Edition

Author(s): *Dulc, S. et al.*

General Description:

BC produced teacher resource has been revised and is now coil bound. Contains background information and student activities around the topic of biodiversity. It features native flora and fauna, as well as biodiversity issues and success stories. The booklet contains six modules and 150+ pages of instructional activities.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓		✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:
www.env.gov.bc.ca/hctf/wild.htm

Price: \$22.00

ISBN/Order No: 0-7726-3954-X

Copyright: 1999

Year Recommended in Grade Collection: 2005



Below Zero

General Description:

Below Zero is based on the *Project Wild* model. Instructional activities are designed for easy integration into K-7 school subjects. The teacher resource materials concentrate on the understanding and conservation of wildlife in a frozen environment. Goal of the resource is to help learners develop awareness, knowledge, skills, and commitment to make informed decisions, responsible behaviour, with wise actions concerning wildlife in winter and frozen environments.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓		✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$25.00 with workshop

ISBN/Order No: 1-55029-146-7

Copyright: 2003

Year Recommended in Grade Collection: 2005



Circulatory and Respiratory Systems

General Description:

Twenty-minute video summarizes the circulatory and respiratory systems. It uses real-world situations to demonstrate heart rate, blood flow, and breathing rates. Accompanying teacher's guide contains suggested activities.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓							

Supplier: *National Geographic Society - School Publishing*

2180 Buckingham Road, Suite 204
Oakville, ON L6H 6H1

Telephone: 1-800-368-2728

Fax: 1-800-840-9807

Toll Free: 1-800-368-2728

Price: Not available

ISBN/Order No: Not available

Copyright: 1994

Year Recommended in Grade Collection: 2005



Cycle of Life/Recycle Handbook for Educators

Author(s): *Arntzen, H. et al.*

General Description:

This 276-page teacher resource is divided into five sections: Introduction, Music, Biology, Recycling, and Resources.

Through songs and activities, Kindergarten to Grade 7 students learn about at-risk Canadian plants and animals species. Topics include sustainability of resources, life cycles, food chains and webs, ecological footprints, the interrelated nature of living things, and Aboriginal practices. There is a music CD, *Cycle of Life*, with 14 ecology/nature songs. Lyrics are included in print material.

Caution: See Author's caution re: p. 83, Stan Rodger's song, lyrics refer to "beer" and "hell."

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Artist Response Team Inc. (ART)*

P.O. Box 91
Brentwood Bay, BC V8M 1R3

Telephone: (250) 544-4006

Fax: (250) 544-4075

Price: \$35.00

ISBN/Order No: 0-9736-847

Copyright: 2004

Year Recommended in Grade Collection: 2005



Forests in Focus

General Description:

Forests in Focus is an 85-page activity book on the BC forest environment. It consists of 34 activities, a glossary, stories (for activities), and appendices containing detailed BC information. It is designed for K-12 use but not all activities are appropriate for all grades. Organizers and suggested themes are included in the introduction. All activities are organized 'lab style' with objectives, materials, method, and evaluation. Content is based upon forest process and ecosystem, and does not emphasize harvesting issues.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$26.00

\$22.00 with workshop

ISBN/Order No: 0-7726-3966-3

Copyright: 1999

Year Recommended in Grade Collection: 2005



From Head To Toe (AIMS Activities)

General Description:

Book investigates body systems through numerous hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓							

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-02-9/20129

Copyright: 1986

Year Recommended in Grade Collection: 2005



Hands-On Science: Simple Machines

Author(s): *Lawson, J. et al.*

General Description:

This 64-page teacher's guide offers activities, background knowledge, diagrams, and clear instructions. It thoroughly covers the study of simple and compound machines and could be easily used for a wide range of teaching styles.

Caution: *The binding, cover, paper and visual quality is poor.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓							

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:
www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-77-3

Copyright: 2001

Year Recommended in Grade Collection: 2005



Hands-On Science: The Human Body

Author(s): *Lawson, J. et al.*

General Description:

This 109-page teacher guide supports the Grade 5 prescribed learning outcomes through active applications and investigations. It offers the teacher: diagrams, activities, and assessment blackline masters. The knowledge content is age appropriate.

Caution: *Poor quality paper, cover, binding.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓							

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:

www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-71-4

Copyright: 2001

Year Recommended in Grade Collection: 2005



Kokanee of British Columbia

General Description:

Activities and researched facts for the study and class investigation of landlocked salmonids called Kokanee. This is very appropriate for Interior waterways where Kokanee are mostly found. The teacher resource is organized to present all the same elements of the BC Salmon programs for Coastal BC using the Kokanee instead. Nine activities cover historical evolution life cycle, habitat, and human impacts so students will understand the relationship between Kokanee and the Interior environment. Field studies and observations are detailed in well organized units.

Caution: *This resource covers several learning outcomes at the Primary level, but it is more suitable for the Intermediate level.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓		✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$22.00

ISBN/Order No: 0-7726-5130-2

Copyright: 2004

Year Recommended in Grade Collection: 2005



General Description:

OceanNews is a series of learning resource packages developed by the Public Education Program of the Bamfield Marine Station to promote marine education. Each issue of *OceanNews* covers a theme of marine science: Exploring the Fluid Frontier, Marine Mammals, Seabirds, and Marine Pollution. Each theme issue comprises a newsletter, a teacher's guide, and an Ocean Explorer computer disk. Provides background concepts and current research in marine science. Activities in the teacher's guides extend concepts. Software programs enhance and extend activities. Systems Requirement: Installed Acrobat Reader®

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓	✓	✓					

Supplier: *Bamfield Marine Sciences Centre*

Bamfield, BC V0R 1B0

Telephone: (250) 728-3301

Fax: (250) 728-3452

Web Address: www.bms.bc.ca

Price: 5 copies of each newsletter + 1 CD: \$53.00
30 copies + 1 CD: \$73.00

ISBN/Order No: Not available

Copyright: 1994

Year Recommended in Grade Collection: 2005



Author(s): *Snively, G.*

General Description:

This 304-page adult reference was designed to help teachers in their study of the seashore. It contains clear illustrations, photos, a glossary, transparencies, activity sheets, and offers ideas for drama, creative writing, and art. An excellent resource for field trips to the seashore.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓	✓	✓	✓	✓						

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Not available

ISBN/Order No: 0-9687811-0-1/LA S65

Copyright: 2001

Year Recommended in Grade Collection: 2005



Our Resources (Pan Canadian Science Place)

General Description:

The 48-page student book and 111-page accompanying teacher's guide investigates and presents scientific activities and information that covers the the Grade 5 learning outcomes for Renewable and Non-Renewable Resources. The content is BC oriented.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓							

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Student Text: \$9.00

Teacher's Guide: \$34.00

Program and Assessment Guide: \$50.00

ISBN/Order No: Student Text: 0-7791-4674-3

Teacher's Guide: 0-7791-3508-3

Program and Assessment Guide:
0-7791-0093-X

Copyright: 2005

Year Recommended in Grade Collection: 2005



Project WET

General Description:

The 500-page detailed teacher resource includes directions and extensions for 120 activities related to water, wetlands, and water resource management. Each activity includes objectives, method, background, materials, procedures, variations, extensions and evaluation. A wealth of teaching ideas for Grades K to 7. A global perspective, but produced from Montana State University.

Caution: *Not much Canadian or BC highlights. Images are mostly global but some captions are US locations. Dual temperature references, i.e. Fahrenheit/Celsius.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$30.00 with workshop

ISBN/Order No: Not available

Copyright: 1995

Year Recommended in Grade Collection: 2005



Project WILD

General Description:

Teacher resource contains directions and extensions for approximately 80 activities that are related to wildlife and resource management. Each activity includes objectives, method, background, materials, procedure, variations, extension, and evaluation.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$25.00 with workshop

ISBN/Order No: Not available

Copyright: 1998

Year Recommended in Grade Collection: 2005



Putting It In Motion (Pan Canadian Science Place)

General Description:

The 64-page student booklet and accompanying teacher's guide contain information and activities that support the Grade 5 outcomes for Physical Science. Both components are required to fully cover the processes of science and to make effective use of the student booklet. The student booklet does not stand on its own. The scientific processes are embedded in the teacher's guide.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓							

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7

Telephone: (905) 887-7323

Fax: (905) 887-1131

Toll Free: 1-800-268-3860/1-800-625-858

Web Address: www.scholastic.ca

Price: Student Text: \$9.00

Teacher's Guide: \$35.00

Program and Assessment Guide: \$50.00

ISBN/Order No: Student Text: 0-7791-0088-3

Teacher's Guide: 0-7791-3507-5

Program and Assessment Guide:
0-7791-0093-X

Copyright: 2005

Year Recommended in Grade Collection: 2005



The Real World Science Series

General Description:

These four 15-minute video and support packages present well-paced, accurate, engaging science which describes four body systems. The diagrams, visuals, and vocabulary are clear and age/grade appropriate. Interconnectedness of systems is stressed.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓							

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: Videos: \$39.95 each

ISBN/Order No: The Skeletal and Muscular Systems:
1-2642-F-1#2
The Digestive & Excretory System:
1-2640F-1#12
Respiratory and Circulatory System:
1-2641F-1#3

Copyright: 2002

Year Recommended in Grade Collection: 2005



Salish Sea

Author(s): *Arntzen, H. et al.*

General Description:

This 108-page detailed teacher resource includes background directions, activities, and extensions related to ecosystems, both land and marine, which are specific to the West Coast. This cross-curricular resource contains many Aboriginal references and suggests activities, songs, and projects to amplify student appreciation of historical stewardship and respect for the delicate balance of a coastal ecosystem. There are many references and web links as back-up material. A CD of eco-songs, one in Cowichan language, accompanies this resource which contains a wealth of teaching, learning, and hands-on activities for Grades K to 7.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Parks Canada*

711 Broughton St., 2nd Floor
Victoria, BC V8W 1E2

Telephone: (250) 363-3511

Fax: (250) 363-8552

Price: \$30.00

ISBN/Order No: 0-660-18596-2

Copyright: 2001

Year Recommended in Grade Collection: 2005



Salmonids in the Classroom

General Description:

Salmonids in the Classroom (either Primary or Intermediate versions) is a comprehensive collection of resource materials for the study of Pacific salmonids in British Columbia. The programs are divided into clearly organized and paced 10 units following the life cycle habitats of the salmon. Each unit in the guide includes suggested activities. Content is primarily science-oriented but the development of the units has a language arts approach incorporating unifying themes. The programs would allow the integration of science, social studies and language for extensive periods of time.

Caution: *The material has limited assessment devices explained. It make suggestions for assessment activities but doesn't give any 'how to do' assessment resources.*

Audience: *General*

ESL - late primary to early intermediate; good key visuals; variety of student activities

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓		✓	✓	✓	✓					

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Primary: \$71.10

Intermediate: \$66.60

ISBN/Order No: Primary: S33

Intermediate: S39

Copyright: 2001

Year Recommended in Grade Collection: 2005



Science Answers Series

Author(s): *Cooper, C.*

General Description:

These are 32-page student booklets which focus on light and sound, and forces and motion. They are age/grade appropriate, include current science content, as well as hands-on investigations which emphasize the scientific processes at this grade level.

Caution: *Measurements are given in both Metric and Imperial standards.*

Audience: *General*

Gifted - could easily be used independently, thoughtful and clever activities

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓							

Supplier: *J. Appleseed*

PO Box 129
Collingwood, ON L9Y 3Z7

Telephone:

Fax:

Toll Free: 1-866-575-5007

Web Address: www.jappleseed.ca

Price: Not available

ISBN/Order No: Forces and Motion: From Push to Shove: 1-4034-3548-0

Light: From Sun to Bulbs:
1-4034-3550-2

Sound: From Whisper to Rock Band:
1-4034-3553-7

Copyright: 2004

Year Recommended in Grade Collection: 2005



Science Detective™ Beginning: Higher-Order, Thinking, Reading, Writing in Science

Author(s): *Fischer, S. et al.*

General Description:

Teacher resource for ESL or Learning Assistance programs includes simplified pages of science concepts in all strands. Basic teaching strategy of read and complete sheet. Good collection of key visuals and graphic organizers.

Audience: *ESL - key visuals and basic one page text per topic*
LD - key visuals and frames can be used to help learn concepts

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓	✓	✓	✓	✓					

Supplier: *The Critical Thinking Co.*

P.O. Box 1610
1069 Broadway Ave.
Seaside, CA 93955-1610
Telephone: (831) 393-3288
Fax: (831) 393-3277
Toll Free: 1-800-458-4849

Web Address: www.criticalthinking.com

Price: \$18.99 US

ISBN/Order No: 0-89455-834-X

Copyright: 2004

Year Recommended in Grade Collection: 2005



Science, Please!

General Description:

Fast, factual explanations of scientific phenomena and discoveries, who said science can't be fun? A poster with excellent questions and an extensive interactive web site support these videos (Part 1 and Part 2). Although the DVDs were not available for the reviewers, they felt DVD format would be more easily used as this is a series of science mini-clips.

Caution: *Teacher should preview Part 1, clip 3, for questionable humour.*

Audience: *General*

Gifted - fast-paced, attention-grabber

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *National Film Board of Canada*

200-1385 West 8th Avenue
Vancouver, BC V6H 3V9
Telephone: (604) 666-3838
Fax: (604) 666-1569
Toll Free: 1-800-267-7710
Web Address: www.nfb.ca

Price: Not available

ISBN/Order No: 193C 9101 197

Copyright: 2001

Year Recommended in Grade Collection: 2005



Science & Technology 5

Author(s): *Campbell, S. et al.*

General Description:

The student booklet and teacher resource are well organized, with appropriate visuals that promote a good balance between knowledge and applications. Titles include: *Forces on Structures*, *The Human Body* (for Grade 5), and *Weather* (for Grade 4). This resource is flexible, could be used as a whole or in part, depending on classroom needs. Many hands-on and stimulating activities in a well organized format.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓							

Supplier: *Pearson Education Canada*

26 Prince Andrew Place
Don Mills, ON M3C 2T8

Telephone: (416) 447-5101

Fax: 1-800-563-9196

Toll Free: 1-800-387-8028/7851

Web Address: <http://www.pearsoned.com>

Price: Not available

ISBN/Order No: Student Text: Various
Teacher's Guide: Various

Copyright: 2000

Year Recommended in Grade Collection: 2005



Simple Machines

General Description:

This 15-minute video and support package presents a well-paced, age and grade appropriate introduction to the six simple machines, giving real life examples and demonstrating mechanical advantage.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓							

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: \$39.95

ISBN/Order No: 1-2289F-1#36

Copyright: 1999

Year Recommended in Grade Collection: 2005



Thinking Connections: Concept Maps for Life Science

Author(s): *Burggraf, F.*

General Description:

Teacher resource for ESL or Learning Assistance programs with simplified pages of Science concepts in Grades 4 to 7 intermediate strands. Basic teaching strategy of read and complete sheets, and a reinforcement of vocabulary and concepts. Good collection of key visuals and graphic organizers.

Audience: *ESL - key visuals and basic one page text per topic
LD - key visuals and frames can be used to help learn concepts*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *The Critical Thinking Co.*

P.O. Box 1610
1069 Broadway Ave.
Seaside, CA 93955-1610
Telephone: (831) 393-3288
Fax: (831) 393-3277
Toll Free: 1-800-458-4849
Web Address: www.criticalthinking.com

Price: \$23.99 US

ISBN/Order No: 0-89455-702-5

Copyright: 2001

Year Recommended in Grade Collection: 2005



Urban Stewards

Author(s): *Keetch, T.*

General Description:

Engages students in stimulating hands-on science and environmental education activities in the classroom and outside. Match to the learning outcomes in a cross-curricular fashion.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *Stanley Park Ecology Society*

PO Box 5167
2nd Floor, Stanley Park Dining Pavilion
Vancouver, BC V6B 4B2
Telephone: 604-257-6908
Fax: 604-257-8378
Web Address: www.stanleyparkecology.ca

Price: Not available

ISBN/Order No: Not available

Copyright: 2004

Year Recommended in Grade Collection: 2005



The Watershed Works

Author(s): *Bernbach, L. et al.*

General Description:

This booklet is an extensive guide for the study of the Fraser River Basin in BC. It includes student activities and teaching strategies that promote awareness and understanding of the social, economic, and environmental issues that are relevant to this area.

Caution: *These are photocopied pages in a binder.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Not available

ISBN/Order No: Not available

Copyright: 1998

Year Recommended in Grade Collection: 2005



What's Inside Your Body?

General Description:

These two, 26-minute videos fully cover the Grade 5 curriculum in Life Science. Difficult concepts are covered in an entertaining, clever, and age appropriate way. The bone, muscle, and nervous systems are studied independently, and then how they are interconnected, in one video. The other video covers the heart, blood, digestion, and respiratory systems and their interconnectedness. The visuals diagrams, narration, and overall presentation are stimulating, informative, and engaging.

Caution: *Imperial measure is used but Metric equivalent appears on screen.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓							

Supplier: *B.C. Learning Connection Inc.*

#4 - 8755 Ash Street
Vancouver, BC V6P 6T3

Telephone: (604) 324-7752

Fax: (604) 324-1844

Toll Free: 1-800-884-2366

Price: \$26.00 each

ISBN/Order No: Heart & Blood/Digestion & Respiration: SC0339
Bones & Muscles/Nervous System: SC0340

Copyright: 2000

Year Recommended in Grade Collection: 2005

**A World in Motion: The Design Experience****General Description:**

A World in Motion: The Design Experience consists of three different challenges suitable for Grade 5. The series of experiments are sequential, clearly explained, and easily performed by students.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓							

Supplier: *S.A.E. International (The Engineering Society*

400 Commonwealth Drive
Warrendale, PA 15096

Telephone: (724) 776-4841

Fax: (724) 776-0790

Toll Free: 1-877-606-7323

Web Address:

<http://www.sae.org/servlets/index>

Price: Not available

ISBN/Order No: Not available


Copyright: 2003


Year Recommended in Grade Collection: 2005

**SCIENCE – GRADE 6
GRADE COLLECTION**

Current as of March 2005. For latest updates go to
http://www.bced.gov.bc.ca/irp_resources/lr/resource/gradcoll.htm

	Life Science	Physical Science	Earth and Space Science
	<i>Diversity of Life</i>	<i>Electricity</i>	<i>Exploration of Extreme Environments</i>
Comprehensive Resources			
B.C. Science Probe 6			
BC Science 6			
Additional Resources – Print			
Below Zero			✓
Cycle of Life/Recycle Handbook for Educators	✓		✓
Discovering Spiders, Snails and Other Creepy Crawlies	✓		
Discovery Works Modules for B.C. Grade 6			✓
Electricity		✓	
Forests in Focus	✓		
Hands-On Science: Diversity of Living Things	✓		
Hands-On Science: Electricity			
Hands-On Science: The Solar System			✓
Kokanee of British Columbia	✓		
McDougal Littell Science Grade 6		✓	✓
Nelson Science & Technology Skills Handbook	✓		
Once Upon a Seashore			
Our Wonderful World (AIMS Activities)	✓		
Project WET	✓		
Project WILD	✓		
Salish Sea	✓		
Salmonids in the Classroom	✓		
Science Detective™ Beginning: Higher-Order, Thinking, Reading, Writing in Science			
The Sky's The Limit (AIMS Activities)			✓
Thinking Connections: Concept Maps for Life Science			

 Indicates satisfactory to good support for the majority of the learning outcomes within the curriculum organizer.

 Indicates support for one or more learning outcomes within the curriculum organizer.

 Indicates minimal or no support for the prescribed learning outcomes within the curriculum organizer.

	Life Science	Physical Science	Earth and Space Science
	<i>Diversity of Life</i>	<i>Electricity</i>	<i>Exploration of Extreme Environments</i>
Additional Resources – Print (con't)			
Turn It On! (Pan Canadian Science Place)			
Urban Stewards	✓		
The Watershed Works	✓		
Additional Resources – Print Series			
Biomes Atlases			✓
Discovery Works for Grade 6		✓	✓
Parasites & Partners Series	✓		
Additional Resources – Video			
Butterflies: Amazing Insects	✓		
Cells and Life	✓		
Cool Creatures: Reptiles	✓		
Ecology: Communities	✓		
Electromagnetism and Electronics		✓	
Heroes and Heroines - Explorers Past and Present			✓
Magnetism (Revised)		✓	
Science, Please!		✓	
Scientific Inquiry: Steps, Skills & Action	✓	✓	
Static Electricity (Revised)		✓	
Additional Resources – Video Series			
Wonderwise: Women in Science Learning Series			✓
Additional Resources – Multimedia			
OceanNews	✓		✓



B.C. Science Probe 6

Author(s): *Doyle, S.*

General Description:

This 284-page comprehensive student text fully supports the Grade 6 BC curriculum. The visuals are well chosen and, in many instances, reflect BC content and highlight Canada in general. Key vocabulary is boldly highlighted. This resource considers different styles of learning (e.g., visual learner). The applications and activities are easy-to-use and engaging. This resource contains a skills handbook reference for scientific investigations (i.e. lab reports, microscope skills, designing fair test). Aboriginal content is included.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Thomson Nelson*

1120 Birchmount Road
Scarborough, ON M1K 5G4

Telephone: (416) 752-9448

Fax: (416) 752-8101

Toll Free: 1-800-268-2222/1-800-668-067

Web Address: www.nelson.com

Price: Not available

ISBN/Order No: Student Text: 0-17-627176-7

Copyright: 2005

Year Recommended in Grade Collection: 2005



BC Science 6

Author(s): *Mason, A. et al.*

General Description:

This BC Science student book fully supports the BC Grade 6 curriculum. Key science vocabulary is boldly highlighted. This resource comprehensively covers Diversity of Life, Electricity, and Extreme Environments. Both Canadian and BC examples are used throughout. Aboriginal content is included. Hands-on student activities are varied and promote investigations and applications. Scientific processes are appropriate for Grade 6. A skillpower section included in the student text supports scientific investigations.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *McGraw-Hill Ryerson Ltd. (Ontario)*

300 Water Street
Whitby, ON L1N 9B6

Telephone: (905) 430-5000

Fax: (905) 430-5194

Toll Free: 1-800-565-5758 (orders)

Web Address: www.mcgrawhill.ca

Price: \$49.95

ISBN/Order No: 0-07-095900-5

Copyright: 2005

Year Recommended in Grade Collection: 2005



Below Zero

General Description:

Below Zero is based on the *Project Wild* model. Instructional activities are designed for easy integration into K-7 school subjects. The teacher resource materials concentrate on the understanding and conservation of wildlife in a frozen environment. Goal of the resource is to help learners develop awareness, knowledge, skills, and commitment to make informed decisions, responsible behaviour, with wise actions concerning wildlife in winter and frozen environments.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓		✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$25.00 with workshop

ISBN/Order No: 1-55029-146-7

Copyright: 2003

Year Recommended in Grade Collection: 2005



Biomes Atlases

General Description:

Biologists divide the living world into major zones called biomes, such as deserts, mountains and highlands, oceans, waterways, the Arctic tundra, and polar deserts. This series is an excellent addition to the Grade 6 study of the extreme environments listed above, making solid connections between the earth's climate and the plants and animals that live in each biome.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *J. Appleseed*

PO Box 129
Collingwood, ON L9Y 3Z7

Telephone:

Fax:

Toll Free: 1-866-575-5007

Web Address: www.jappleseed.ca

Price: \$14.25 each

ISBN/Order No: Arctic Tundra and Polar Deserts:
1-4109-0020-7

Deserts and Semideserts:
1-4109-0021-5

Mountains and Highlands:
1-4109-0012-6

Copyright: 2003

Year Recommended in Grade Collection: 2005



Butterflies: Amazing Insects

General Description:

This 20-minute video/support package presents the butterfly as an example of a highly adapted organism with a diversity of 150,000 species. Both structural and behaviour adaptations are presented through superb close-ups and time-enhanced photography. Migration patterns of the Monarch butterfly are shown. Respectful tips on how to attract and observe butterflies are included.

Caution: *Explicit butterfly sex scene.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: \$39.95

ISBN/Order No: 1-2278F-1#58

Copyright: 1999

Year Recommended in Grade Collection: 2005



Cells and Life

General Description:

Sixteen-minute video examines the functions and structures of plant and animal cells through micro-photography. Time-lapse photography illustrates movement, feeding, and reproduction of unicellular organisms.

Audience: *General*

ESL - intermediate to advanced language proficiency; mid to late - intermediate grade level; specialized vocabulary; well explained; illustrated

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Visual Education Centre Ltd.*

Unit 3 - 41 Horner Avenue
Etobicoke, ON M8Z 4X4

Telephone: (416) 252-5907

Fax: (416) 251-3720

Toll Free: 1-800-668-0749

Web Address:

<http://www.kftv.com/company-33221.html>

Price: Not available

ISBN/Order No: Not available

Copyright: 1990

Year Recommended in Grade Collection: 2005



Cool Creatures: Reptiles

General Description:

Twenty-two-minute video examines four reptile groups in detail: crocodilians, snakes, lizards, and turtles. Focus is on their movement, hunting abilities, and defense mechanisms. Includes a comprehensive teacher's guide with objectives, review questions, script, glossary, and bibliography.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *McIntyre Media Ltd.*

75 First St., Suite 203
Orangeville, ON L9W 5B6

Telephone: (519) 942-9640

Fax: (519) 942-8489

Toll Free: 1-800-565-3036

Web Address: www.mcintyre.ca

Price: Not available

ISBN/Order No: Not available

Copyright: 1994

Year Recommended in Grade Collection: 2005



Cycle of Life/Recycle Handbook for Educators

Author(s): *Arntzen, H. et al.*

General Description:

This 276-page teacher resource is divided into five sections: Introduction, Music, Biology, Recycling, and Resources. Through songs and activities, Kindergarten to Grade 7 students learn about at-risk Canadian plants and animals species. Topics include sustainability of resources, life cycles, food chains and webs, ecological footprints, the interrelated nature of living things, and Aboriginal practices. There is a music CD, *Cycle of Life*, with 14 ecology/nature songs. Lyrics are included in print material.

Caution: *See Author's caution re: p. 83, Stan Rodger's song, lyrics refer to "beer" and "hell."*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Artist Response Team Inc. (ART)*

P.O. Box 91
Brentwood Bay, BC V8M 1R3

Telephone: (250) 544-4006

Fax: (250) 544-4075

Price: \$35.00

ISBN/Order No: 0-9736-847

Copyright: 2004

Year Recommended in Grade Collection: 2005



Discovering Spiders, Snails and Other Creepy Crawlies

Author(s): Brillon, G.

General Description:

Book introduces earthworms, slugs, snails, arachnids, centipedes, and sowbugs, detailing how to trap, house, and care for them. Includes numerous related activities.

Caution: *Although there is a warning about the black widow, other dangers such as the recluse spider, anaphalactic shock, and infections from bites are not mentioned (i.e., centipedes).*

Audience: General

Category: Teacher Resource

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Quintin Publishers / Éditions Michel Quintin*

Box 340
4818 Foster Road
Waterloo, QC J0E 2N0
Telephone: (450) 539-3774
Fax: (450) 539-4905

Price: Not available

ISBN/Order No: 2-920438-53-0

Copyright: 1992

Year Recommended in Grade Collection: 2005



Discovery Works for Grade 6

General Description:

Unit D: Magnetism and Electricity - This 38-page resource moderately investigates the properties of magnetism and electricity and their applications. Hands-on experiments are basic and follow a clear scientific process. *Unit E:*

Oceanography - This 48-page resource moderately investigates the ocean, its ecosystems, and the technology used to explore this extreme environment. It includes hands-on experiments which emphasize the scientific process.

Caution: *Unit D: does not address all the PLOs, children portrayed do not seem 'modern' or Grade 6 age.*

Unit E: does not cover all PLOs.

Audience: General

Category: Student, Teacher Resource

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Thomson Nelson*

1120 Birchmount Road
Scarborough, ON M1K 5G4
Telephone: (416) 752-9448
Fax: (416) 752-8101
Toll Free: 1-800-268-2222/1-800-668-067
Web Address: www.nelson.com

Price: Not available

ISBN/Order No: Unit D: 0-618-00255-3
Unit E: 0-618-00268-5

Copyright: 2003

Year Recommended in Grade Collection: 2005



Discovery Works Modules for B.C. Grade 6

General Description:

This American multimedia resource, organized by modules across several grades, consists of an annotated teaching guide, a student book with text and activities, a science notebook, a teacher's edition of the science notebook, a teacher resource book, an assessment guide, and a science processor (CD-ROM and teacher/user guide) that provides supplementary science investigation formats, by module and by U.S. grade match. Transparencies, videos, and videodisks have not been evaluated.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Thomson Nelson*

1120 Birchmount Road
Scarborough, ON M1K 5G4

Telephone: (416) 752-9448

Fax: (416) 752-8101

Toll Free: 1-800-268-2222/1-800-668-067

Web Address: www.nelson.com

Price: Not available

ISBN/Order No: Student Book: 0-382-33436-1
Teaching Guide: 0-382-33488-4
Unit Science Processor: 0-382-38732-5

Copyright: 1996

Year Recommended in Grade Collection: 2005



Ecology: Communities

General Description:

Twelve-minute video presents several examples of communities and describes relationships of mutualism, commensalism, and parasitism. Includes a brief discussion guide with objectives, vocabulary, and activities.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓	✓					

Supplier: *Magic Lantern Communications (Ontario)*

1075 North Service Road West - Unit 27
Oakville, ON L6M 2G2

Telephone: (905) 827-2755

Fax: (905) 827-2655

Toll Free: 1-800-263-1717

Price: Not available

ISBN/Order No: Not available

Copyright: 1992

Year Recommended in Grade Collection: 2005



Electricity

Author(s): *Goodyear, J. et al.*

General Description:

The *Electricity* student and teacher guides provide a clear and step-by-step introduction to the concepts of electricity. It is appropriate as a teacher resource rather than whole-class textbook sets.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *GTK Press*

18 Wynford Drive, Unit 109
Don Mills, ON M3C 3S2

Telephone: (416) 385-1313

Fax: (416) 385-1319

Toll Free: 1-866-485-7737

Web Address: www.gtkpress.com

Price: Student Journal: \$6.00
Teacher's Guide: \$20.00

ISBN/Order No: Student Journal: 1-894318-24-2
Teacher's Guide: 1-894318-23-4

Copyright: 1999

Year Recommended in Grade Collection: 2005



Electromagnetism and Electronics

General Description:

Short, effective video on physical facts for electricity, electromagnets, and electric motors. Suitable for Grade 6, not highly engaging, but factually correct.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *B.C. Learning Connection Inc.*

#4 - 8755 Ash Street
Vancouver, BC V6P 6T3

Telephone: (604) 324-7752

Fax: (604) 324-1844

Toll Free: 1-800-884-2366

Price: \$26.00

ISBN/Order No: SC0332

Copyright: 2000

Year Recommended in Grade Collection: 2005



Forests in Focus

General Description:

Forests in Focus is an 85-page activity book on the BC forest environment. It consists of 34 activities, a glossary, stories (for activities), and appendices containing detailed BC information. It is designed for K-12 use but not all activities are appropriate for all grades. Organizers and suggested themes are included in the introduction. All activities are organized 'lab style' with objectives, materials, method, and evaluation. Content is based upon forest process and ecosystem, and does not emphasize harvesting issues.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$26.00

\$22.00 with workshop

ISBN/Order No: 0-7726-3966-3

Copyright: 1999

Year Recommended in Grade Collection: 2005



Hands-On Science: Diversity of Living Things

Author(s): *Lawson, J. et al.*

General Description:

Good resource for teachers to use in preparing student lessons and assessment tasks. Many ready-made blackline masters are provided to guide students through open-ended activities. Other black and white masters provide graphic organizers useful to all students, including ESL, gifted, and LD learners. More material is provided than required for curriculum outcomes. Much of the additional activities provide good teacher background of the concepts explored.

Audience: *General*

ESL - frameworks and Graphic organizers provide good concept support

Gifted - offers extension

LD - frames and organizers helpful

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:

www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-81-1

Copyright: 2001

Year Recommended in Grade Collection: 2005



Hands-On Science: Electricity

Author(s): *Lawson, J. et al.*

General Description:

Program investigates electrical energy, including static electricity, electromagnetism, and current electricity.

Hands-on activities construct a variety of electrical devices and models to show how electrical energy is transformed and controlled.

Audience: *General*

ESL - frames and organizers provide good support

Gifted - offer extensions and enrichment explorations

LD - frame and graphic organizers helpful to master concepts

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:

www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-85-4

Copyright: 2001

Year Recommended in Grade Collection: 2005



Hands-On Science: The Solar System

Author(s): *Lawson, J. et al.*

General Description:

The Solar System develops students' scientific literacy through active inquiry, problem solving, and decision making. The text is clearly laid out and the scope and range of topics are appropriate for Grade 6 learners. ESL, gifted, and LD students would find appropriate material, as well as general audiences. Teacher background knowledge is provided for each unit.

Audience: *General*

ESL - clear and simple blackline masters

Gifted - a variety of extensions with an in-depth component are included

LD - clear and simple blackline masters

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Portage & Main Press*

100 - 318 McDermot Avenue
Winnipeg, MB R3A 0A2

Telephone: (204) 987-3500

Fax: 1-866-734-8477

Toll Free: 1-800-667-9673

Web Address:

www.portageandmainpress.com

Price: \$22.00

ISBN/Order No: 1-894110-89-7

Copyright: 2001

Year Recommended in Grade Collection: 2005



Heroes and Heroines - Explorers Past and Present

General Description:

This 21-minute video examines the past and present explorers of Antarctica. It is a comparison of historical and contemporary researchers and research technology.

Caution: *Support material is scant.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: Not available

ISBN/Order No: 5-5035F-1#2

Copyright: 2001

Year Recommended in Grade Collection: 2005



Kokanee of British Columbia

General Description:

Activities and researched facts for the study and class investigation of landlocked salmonids called Kokanee. This is very appropriate for Interior waterways where Kokanee are mostly found. The teacher resource is organized to present all the same elements of the BC Salmon programs for Coastal BC using the Kokanee instead. Nine activities cover historical evolution life cycle, habitat, and human impacts so students will understand the relationship between Kokanee and the Interior environment. Field studies and observations are detailed in well organized units.

Caution: *This resource covers several learning outcomes at the Primary level, but it is more suitable for the Intermediate level.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓		✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$22.00

ISBN/Order No: 0-7726-5130-2

Copyright: 2004

Year Recommended in Grade Collection: 2005



Magnetism (Revised)

Author(s): *Colgren, J.*

General Description:

Magnets are shown, discussed, and demonstrated. The relationship between magnets and electricity are presented. Suitable for studying magnetic forces and magnetic poles. Properties of magnetism are shown and the basic relationships between magnetism and electricity is explored. Print materials include blackline masters.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Marlin Motion Pictures Ltd.*

211 Watline Avenue
Mississauga, ON L4Z 1P3

Telephone: (905) 890-1500

Fax: (905) 890-6550

Toll Free: 1-800-865-7617

Price: Not available

ISBN/Order No: 76526

Copyright: 2003

Year Recommended in Grade Collection: 2005



McDougal Littell Science Grade 6

General Description:

An excellent teacher resource and advanced student text. Can be used to broaden key understandings of the Grade 6 outcomes for all science curriculum topics. Titles include: *Electricity and Magnetism, Diversity of Living Things, Earth's Waters, and Space Science*. It is an excellent learning reference for gifted Grade 6 students who find the more traditional Grade 6 textbooks limited in scope and content.

Audience: *Gifted - advanced learners at grade level*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Thomson Nelson*

1120 Birchmount Road
Scarborough, ON M1K 5G4

Telephone: (416) 752-9448

Fax: (416) 752-8101

Toll Free: 1-800-268-2222/1-800-668-067

Web Address: www.nelson.com

Price: Modules: \$26.95 each

ISBN/Order No: Electricity and Magnetism:
0-618-33440-8
Diversity of Living Things:
0-618-33434-3
Earth's Waters: 0-618-33417-3
Space Science: 0-618-33421-1

Copyright: 2004

Year Recommended in Grade Collection: 2005



Nelson Science & Technology Skills Handbook

Author(s): *Alldred, N. et al.*

General Description:

Nelson Skills Handbook is an excellent student and teacher resource for the skills and processes of Science at both Grade 6 and 7 levels. Contains diagrams for steps in various science processes and can be used as a resource for classes needing support for student hands-on activities. Shows the clear difference between scientific inquiry and technological problem-solving.

Audience: *General*
ESL

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓	✓					

Supplier: *Thomson Nelson*

1120 Birchmount Road
Scarborough, ON M1K 5G4

Telephone: (416) 752-9448

Fax: (416) 752-8101

Toll Free: 1-800-268-2222/1-800-668-067

Web Address: www.nelson.com

Price: \$19.45

ISBN/Order No: 0-17-612020-3

Copyright: 2000

Year Recommended in Grade Collection: 2005



OceanNews

General Description:

OceanNews is a series of learning resource packages developed by the Public Education Program of the Bamfield Marine Station to promote marine education. Each issue of *OceanNews* covers a theme of marine science: Exploring the Fluid Frontier, Marine Mammals, Seabirds, and Marine Pollution. Each theme issue comprises a newsletter, a teacher's guide, and an Ocean Explorer computer disk. Provides background concepts and current research in marine science. Activities in the teacher's guides extend concepts. Software programs enhance and extend activities. Systems Requirement: Installed Acrobat Reader®

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓	✓	✓					

Supplier: *Bamfield Marine Sciences Centre*

Bamfield, BC V0R 1B0

Telephone: (250) 728-3301

Fax: (250) 728-3452

Web Address: www.bms.bc.ca

Price: 5 copies of each newsletter + 1 CD: \$53.00
30 copies + 1 CD: \$73.00

ISBN/Order No: Not available

Copyright: 1994

Year Recommended in Grade Collection: 2005



Once Upon a Seashore

Author(s): *Snively, G.*

General Description:

This 304-page adult reference was designed to help teachers in their study of the seashore. It contains clear illustrations, photos, a glossary, transparencies, activity sheets, and offers ideas for drama, creative writing, and art. An excellent resource for field trips to the seashore.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓	✓	✓	✓	✓						

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Not available

ISBN/Order No: 0-9687811-0-1/LA S65

Copyright: 2001

Year Recommended in Grade Collection: 2005



Our Wonderful World (AIMS Activities)

General Description:

Book investigates our relationship with the environment through numerous hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project. Some non-metric references.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓	✓					

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-08-8/20133

Copyright: 1987

Year Recommended in Grade Collection: 2005



Parasites & Partners Series

General Description:

The series provides good content for Grade 6 and 7 Life Sciences. Explains the close relationship between various animals, plants, and other creatures. From tiny bacteria living inside or on other organisms to survive. Detailed look at some of the most bizarre and surprising organisms and their parasitic relationships.

Audience: *General*

ESL

LD - high interest, but will need vocabulary support

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓	✓					

Supplier: *J. Appleseed*

PO Box 129
Collingwood, ON L9Y 3Z7

Telephone:

Fax:

Toll Free: 1-866-575-5007

Web Address: www.jappleseed.ca

Price: \$12.00 each

ISBN/Order No: Feeders: 1-4109-0355-9

Hitchers and Thieves: 1-4109-0356-7

Lodgers and Cleaners: 1-4109-0358-3

Copyright: 2003

Year Recommended in Grade Collection: 2005



Project WET

General Description:

The 500-page detailed teacher resource includes directions and extensions for 120 activities related to water, wetlands, and water resource management. Each activity includes objectives, method, background, materials, procedures, variations, extensions and evaluation. A wealth of teaching ideas for Grades K to 7. A global perspective, but produced from Montana State University.

Caution: *Not much Canadian or BC highlights. Images are mostly global but some captions are US locations. Dual temperature references, i.e. Fahrenheit/Celsius.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$30.00 with workshop

ISBN/Order No: Not available

Copyright: 1995

Year Recommended in Grade Collection: 2005



Project WILD

General Description:

Teacher resource contains directions and extensions for approximately 80 activities that are related to wildlife and resource management. Each activity includes objectives, method, background, materials, procedure, variations, extension, and evaluation.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$25.00 with workshop

ISBN/Order No: Not available

Copyright: 1998

Year Recommended in Grade Collection: 2005



Salish Sea

Author(s): *Arntzen, H. et al.*

General Description:

This 108-page detailed teacher resource includes background directions, activities, and extensions related to ecosystems, both land and marine, which are specific to the West Coast. This cross-curricular resource contains many Aboriginal references and suggests activities, songs, and projects to amplify student appreciation of historical stewardship and respect for the delicate balance of a coastal ecosystem. There are many references and web links as back-up material. A CD of eco-songs, one in Cowichan language, accompanies this resource which contains a wealth of teaching, learning, and hands-on activities for Grades K to 7.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Parks Canada*

711 Broughton St., 2nd Floor
Victoria, BC V8W 1E2

Telephone: (250) 363-3511

Fax: (250) 363-8552

Price: \$30.00

ISBN/Order No: 0-660-18596-2

Copyright: 2001

Year Recommended in Grade Collection: 2005



Salmonids in the Classroom

General Description:

Salmonids in the Classroom (either Primary or Intermediate versions) is a comprehensive collection of resource materials for the study of Pacific salmonids in British Columbia. The programs are divided into clearly organized and paced 10 units following the life cycle habitats of the salmon. Each unit in the guide includes suggested activities. Content is primarily science-oriented but the development of the units has a language arts approach incorporating unifying themes. The programs would allow the integration of science, social studies and language for extensive periods of time.

Caution: *The material has limited assessment devices explained. It make suggestions for assessment activities but doesn't give any 'how to do' assessment resources.*

Audience: *General*

ESL - late primary to early intermediate; good key visuals; variety of student activities

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓		✓	✓	✓	✓					

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Primary: \$71.10

Intermediate: \$66.60

ISBN/Order No: Primary: S33

Intermediate: S39

Copyright: 2001

Year Recommended in Grade Collection: 2005



Science Detective™ Beginning: Higher-Order, Thinking, Reading, Writing in Science

Author(s): *Fischer, S. et al.*

General Description:

Teacher resource for ESL or Learning Assistance programs includes simplified pages of science concepts in all strands. Basic teaching strategy of read and complete sheet. Good collection of key visuals and graphic organizers.

Audience: *ESL - key visuals and basic one page text per topic*
LD - key visuals and frames can be used to help learn concepts

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓	✓	✓	✓	✓					

Supplier: *The Critical Thinking Co.*

P.O. Box 1610
1069 Broadway Ave.
Seaside, CA 93955-1610

Telephone: (831) 393-3288

Fax: (831) 393-3277

Toll Free: 1-800-458-4849

Web Address: www.criticalthinking.com

Price: \$18.99 US

ISBN/Order No: 0-89455-834-X

Copyright: 2004

Year Recommended in Grade Collection: 2005



Science, Please!

General Description:

Fast, factual explanations of scientific phenomena and discoveries, who said science can't be fun? A poster with excellent questions and an extensive interactive web site support these videos (Part 1 and Part 2). Although the DVDs were not available for the reviewers, they felt DVD format would be more easily used as this is a series of science mini-clips.

Caution: *Teacher should preview Part 1, clip 3, for questionable humour.*

Audience: *General*

Gifted - fast-paced, attention-grabber

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *National Film Board of Canada*

200-1385 West 8th Avenue
Vancouver, BC V6H 3V9

Telephone: (604) 666-3838

Fax: (604) 666-1569

Toll Free: 1-800-267-7710

Web Address: www.nfb.ca

Price: Not available

ISBN/Order No: 193C 9101 197

Copyright: 2001

Year Recommended in Grade Collection: 2005



Scientific Inquiry: Steps, Skills & Action

General Description:

Scientific Inquiry is a valuable tool that will cover the Processes and Skills of Science from Grade 4 to 7. This video brings excitement and precision of scientific inquiry into the classroom through a series of case studies, real scientists are interviewed. Insightful description of the scientific processes of an experiment.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *McIntyre Media Ltd.*

75 First St., Suite 203
Orangeville, ON L9W 5B6

Telephone: (519) 942-9640

Fax: (519) 942-8489

Toll Free: 1-800-565-3036

Web Address: www.mcintyre.ca

Price: Not available

ISBN/Order No: 600303

Copyright: 2003

Year Recommended in Grade Collection: 2005



The Sky's The Limit (AIMS Activities)

General Description:

Book investigates aspects of flight through numerous hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-44-4/20128

Copyright: 1994

Year Recommended in Grade Collection: 2005



Static Electricity (Revised)

Author(s): *Colgren, J.*

General Description:

This program helps to explain situations related to the effects of static electricity. Describes the atomic structures and the movement of electrons. It shows how objects can pick up a static electric charge and how that can attract or repel other charged objects. Demonstrations are shown with balloons, water, house carpets, pith balls, and a Van de Graaf generator. Lightning is explained according to static discharge.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Marlin Motion Pictures Ltd.*

211 Watline Avenue
Mississauga, ON L4Z 1P3

Telephone: (905) 890-1500

Fax: (905) 890-6550

Toll Free: 1-800-865-7617

Price: Not available

ISBN/Order No: 78583

Copyright: 2003

Year Recommended in Grade Collection: 2005



Thinking Connections: Concept Maps for Life Science

Author(s): *Burggraf, F.*

General Description:

Teacher resource for ESL or Learning Assistance programs with simplified pages of Science concepts in Grades 4 to 7 intermediate strands. Basic teaching strategy of read and complete sheets, and a reinforcement of vocabulary and concepts. Good collection of key visuals and graphic organizers.

Audience: *ESL - key visuals and basic one page text per topic
LD - key visuals and frames can be used to help learn concepts*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *The Critical Thinking Co.*

P.O. Box 1610
1069 Broadway Ave.
Seaside, CA 93955-1610
Telephone: (831) 393-3288
Fax: (831) 393-3277
Toll Free: 1-800-458-4849
Web Address: www.criticalthinking.com

Price: \$23.99 US

ISBN/Order No: 0-89455-702-5

Copyright: 2001

Year Recommended in Grade Collection: 2005



Turn It On! (Pan Canadian Science Place)

General Description:

The text and teacher's guide progress from answering basic facts about electricity to exploring uses of electricity in society, to an engaging end product — designing a simple electrical toy.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓						

Supplier: *Scholastic Canada/Les éditions Scholastic*

175 Hillmount Road
Markham, ON L6C 1Z7
Telephone: (905) 887-7323
Fax: (905) 887-1131
Toll Free: 1-800-268-3860/1-800-625-858
Web Address: www.scholastic.ca

Price: Student Text: \$9.00
Teacher's Guide: \$35.00
Program and Assessment Guide: \$50.00

ISBN/Order No: Student Text: 0-7791-0087-5
Teacher's Guide: 0-7791-3510-5
Program and Assessment Guide:
0-7791-0093-X

Copyright: 2005

Year Recommended in Grade Collection: 2005



Urban Stewards

Author(s): *Keetch, T.*

General Description:

Engages students in stimulating hands-on science and environmental education activities in the classroom and outside. Match to the learning outcomes in a cross-curricular fashion.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *Stanley Park Ecology Society*

PO Box 5167
2nd Floor, Stanley Park Dining Pavilion
Vancouver, BC V6B 4B2

Telephone: 604-257-6908

Fax: 604-257-8378

Web Address: www.stanleyparkecolgy.ca

Price: Not available

ISBN/Order No: Not available

Copyright: 2004

Year Recommended in Grade Collection: 2005



The Watershed Works

Author(s): *Bernbach, L. et al.*

General Description:

This booklet is an extensive guide for the study of the Fraser River Basin in BC. It includes student activities and teaching strategies that promote awareness and understanding of the social, economic, and environmental issues that are relevant to this area.

Caution: *These are photocopied pages in a binder.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Not available

ISBN/Order No: Not available

Copyright: 1998

Year Recommended in Grade Collection: 2005



Wonderwise: Women in Science Learning Series

General Description:

Set of two 18-minute videos highlighting women in science: Adriana Ocampo, a space geologist; and Carmen Cid, an urban ecologist. The videos follow the women as they observe, measure, and demonstrate scientific processes and investigation.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓	✓					

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: Videos: \$39.95 each


















ISBN/Order No: Space Geologist: 5-5141F-1#1
Urban Ecologist: 5-4630F-1#2

Copyright: 2002

Year Recommended in Grade Collection: 2005

**SCIENCE – GRADE 7
GRADE COLLECTION**

Current as of March 2005. For latest updates go to
http://www.bced.gov.bc.ca/irp_resources/lr/resource/gradcoll.htm

	Life Science	Physical Science	Earth and Space Science
	<i>Ecosystems</i>	<i>Chemistry</i>	<i>Earth's Crust</i>
Comprehensive Resources			
B.C. Science Probe 7			
BC Science 7			
Additional Resources – Print			
Backyard Biodiversity and Beyond, 1999 Edition	✓		
Below Zero		✓	
Cycle of Life/Recycle Handbook for Educators			✓
Down To Earth (AIMS Activities)			✓
Ecosystems	✓		
Forests in Focus			
Kokanee of British Columbia			
Nelson Science & Technology Skills Handbook	✓	✓	
Our Wonderful World (AIMS Activities)			
Project WET	✓	✓	
Project WILD			
Salish Sea			
Salmonids in the Classroom	✓		
Science Detective™ Beginning: Higher-Order, Thinking, Reading, Writing in Science			✓
Thinking Connections: Concept Maps for Life Science	✓		
Urban Stewards	✓		
The Watershed Works			
Additional Resources – Print Series			
McDougal Littell Science Grade 7		✓	✓
Nelson Science & Technology 7	✓	✓	✓
Parasites & Partners Series	✓		

 Indicates satisfactory to good support for the majority of the learning outcomes within the curriculum organizer.

 Indicates support for one or more learning outcomes within the curriculum organizer.

 Indicates minimal or no support for the prescribed learning outcomes within the curriculum organizer.

	Life Science	Physical Science	Earth and Space Science
	<i>Ecosystems</i>	<i>Chemistry</i>	<i>Earth's Crust</i>
Additional Resources – Video/DVD			
Beavers: The Master Builders	✓		
Biology Concepts: Ecology	✓		
The Biosphere	✓		
Earth in Change: The Earth's Crust			✓
Earthquakes: Our Restless Land			✓
Ecology: Communities	✓		
Ecology: Food Chains	✓		
Ecology: Organisms in their Environment	✓		
Ecology: Populations	✓		
Ecosystems: The Role of Abiotic Factors	✓		
Fire and Ice			✓
Geologist's Notebook: Three Rocks			✓
Geologist's Notebook: What Exactly Are Minerals?			✓
Gitga'ata Spring Harvest	✓		
Legacy of an Oil Spill	✓		
Mountains and Mountain Building Processes			✓
Sci Short	✓	✓	
Science, Please!		✓	
Volcanoes: Understanding the Hazards			✓
Additional Resources – Video/DVD Series			
Earth In Action Series			✓
Wonderwise: Women in Science Learning Series	✓		✓
Additional Resources – Multimedia			
OceanNews			✓



B.C. Science Probe 7

Author(s): *Chapman, A. et al.*

General Description:

This comprehensive student text fully supports the Grade 7 BC curriculum. The visuals are well chosen and reflect Canadian content. The applications and activities are easy-to-use and engaging. Aboriginal content is included.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Thomson Nelson*

1120 Birchmount Road
Scarborough, ON M1K 5G4

Telephone: (416) 752-9448

Fax: (416) 752-8101

Toll Free: 1-800-268-2222/1-800-668-067

Web Address: www.nelson.com

Price: Not available

ISBN/Order No: Student Text: 0-17-627184-8

Copyright: 2005

Year Recommended in Grade Collection: 2005



Backyard Biodiversity and Beyond, 1999 Edition

Author(s): *Dulc, S. et al.*

General Description:

BC produced teacher resource has been revised and is now coil bound. Contains background information and student activities around the topic of biodiversity. It features native flora and fauna, as well as biodiversity issues and success stories. The booklet contains six modules and 150+ pages of instructional activities.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓		✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$22.00

ISBN/Order No: 0-7726-3954-X

Copyright: 1999

Year Recommended in Grade Collection: 2005



BC Science 7

Author(s): *Mason, A. et al.*

General Description:

A comprehensive resource published to match the complete Grade 7 curricular components. The text promotes active learning, employs a solid Grade 7 science vocabulary, and has a well prepared glossary and index aligned with the body of the text. Student activities are easy to follow and use easily accessible material. CD-ROM helpful to generate tests. Text may be used in any chapter order.

Caution: *Student workbook is a consumable product that is under copyright and cannot be photocopied.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *McGraw-Hill Ryerson Ltd. (Ontario)*

300 Water Street
Whitby, ON L1N 9B6

Telephone: (905) 430-5000

Fax: (905) 430-5194

Toll Free: 1-800-565-5758 (orders)

Web Address: www.mcgrawhill.ca

Price: Student Text: \$49.95

Teacher's Resource w/CD-ROM: \$99.95

ISBN/Order No: Student Text: 0-07-094786-4

Teacher's Resource w/CD-ROM:

0-07-094790-2

Copyright: 2004

Year Recommended in Grade Collection: 2005



Beavers: The Master Builders

General Description:

This 30-minute video compares the skills, tools, and resources of the beaver to those of humans as both species attempt to construct shelters before winter sets in the Rockies (US side). Using nighttime, underwater photography this video shows how all species are interconnected and impact both the living and nonliving parts of local ecosystem. The narration is lively and thought provoking.

Caution: *British accent and some terms, i.e., larder, Imperial measurement.*

Local ecosystem is in Rockies, Wyoming, US.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *McNabb and Connolly*

60 Briarwood Avenue
Mississauga, ON L5G 3N6

Telephone: (905) 278-0566

Fax: (905) 278-2801

Web Address: www.mcnabbconnolly.ca

Price: \$99.00

ISBN/Order No: Not available

Copyright: 2003

Year Recommended in Grade Collection: 2005



Below Zero

General Description:

Below Zero is based on the *Project Wild* model. Instructional activities are designed for easy integration into K-7 school subjects. The teacher resource materials concentrate on the understanding and conservation of wildlife in a frozen environment. Goal of the resource is to help learners develop awareness, knowledge, skills, and commitment to make informed decisions, responsible behaviour, with wise actions concerning wildlife in winter and frozen environments.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓		✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$25.00 with workshop

ISBN/Order No: 1-55029-146-7

Copyright: 2003

Year Recommended in Grade Collection: 2005



Biology Concepts: Ecology

General Description:

Thirty-minute video introduces basic ecology concepts, including terminology, cycles of water, carbon and nitrogen, producer-consumer-decomposer relationships, and world biomes. Accompanying teacher's guide provides activity masters, glossary, quiz, background, strategies, extensions, bibliography, and answer key.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Educational Activities, Inc.*

1937 Grand Avenue
Baldwin, NY 11510

Telephone: (516) 223-4666

Fax: (516) 623-9282

Toll Free: 1-800-645-3739

Web Address: www.edact.com

Price: Not available

ISBN/Order No: Not available

Copyright: 1992

Year Recommended in Grade Collection: 2005



The Biosphere

General Description:

Short, effective video on major components of ecosystems and the biosphere. Living and non-living factors, changes in the ecosystem succession, and biomes. Suitable for Grade 7, not highly engaging, but factually correct.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *B.C. Learning Connection Inc.*

#4 - 8755 Ash Street
Vancouver, BC V6P 6T3

Telephone: (604) 324-7752

Fax: (604) 324-1844

Toll Free: 1-800-884-2366

Price: \$26.00

ISBN/Order No: SC0331

Copyright: 2003

Year Recommended in Grade Collection: 2005



Cycle of Life/Recycle Handbook for Educators

Author(s): *Arntzen, H. et al.*

General Description:

This 276-page teacher resource is divided into five sections: Introduction, Music, Biology, Recycling, and Resources. Through songs and activities, Kindergarten to Grade 7 students learn about at-risk Canadian plants and animals species. Topics include sustainability of resources, life cycles, food chains and webs, ecological footprints, the interrelated nature of living things, and Aboriginal practices. There is a music CD, *Cycle of Life*, with 14 ecology/nature songs. Lyrics are included in print material.

Caution: *See Author's caution re: p. 83, Stan Rodger's song, lyrics refer to "beer" and "hell."*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Artist Response Team Inc. (ART)*

P.O. Box 91
Brentwood Bay, BC V8M 1R3

Telephone: (250) 544-4006

Fax: (250) 544-4075

Price: \$35.00

ISBN/Order No: 0-9736-847

Copyright: 2004

Year Recommended in Grade Collection: 2005



Down To Earth (AIMS Activities)

General Description:

Book investigates aspects of geology, oceanography, and meteorology through numerous activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project. Some non-metric references.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-00-2/20132

Copyright: 1987

Year Recommended in Grade Collection: 2005



Earth In Action Series

General Description:

This series of three 30-minute videos and accompanying teacher guides are clear, concise, and appropriately paced for the Grade 7 audience.

Caution: *Slight American accent, miles are referred to.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *McIntyre Media Ltd.*

75 First St., Suite 203
Orangeville, ON L9W 5B6

Telephone: (519) 942-9640

Fax: (519) 942-8489

Toll Free: 1-800-565-3036

Web Address: www.mcintyre.ca

Price: Videos: \$165.00 each

ISBN/Order No: Plate Tectonics: 110066
Volcanoes & Earthquakes: 110067
Forces Shaping The Earth: 110068

Copyright: 2003

Year Recommended in Grade Collection: 2005



Earth in Change: The Earth's Crust

General Description:

This video shows the earth's crust undergoing continual change. Plate tectonics, erosion, and weathering are explained using both live footage and diagrams.

Audience: *General*

ESL - suitable for moderate to advanced language proficiency; clear science concepts; interesting, dramatic style; suitable pacing and language

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Encyclopedia Britannica Educ. Corp.*

310 South Michigan
Chicago, IL 60604

Telephone: (312) 347-7900 ext. 6464

Fax: (312) 347-7903

Toll Free: (800) 554-9862 (orders)

Price: Not available

ISBN/Order No: Not available

Copyright: 1989

Year Recommended in Grade Collection: 2005



Earthquakes: Our Restless Land

General Description:

Twenty-two-minute video explores the earth's composition, including plate tectonics, continental drift, subduction, and seismology. It features real footage of classrooms during the Los Angeles earthquake in 1989.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *McIntyre Media Ltd.*

75 First St., Suite 203
Orangeville, ON L9W 5B6

Telephone: (519) 942-9640

Fax: (519) 942-8489

Toll Free: 1-800-565-3036

Web Address: www.mcintyre.ca

Price: Not available

ISBN/Order No: Not available

Copyright: 1994

Year Recommended in Grade Collection: 2005



Ecology: Communities

General Description:

Twelve-minute video presents several examples of communities and describes relationships of mutualism, commensalism, and parasitism. Includes a brief discussion guide with objectives, vocabulary, and activities.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓	✓					

Supplier: *Magic Lantern Communications (Ontario)*

1075 North Service Road West - Unit 27
Oakville, ON L6M 2G2

Telephone: (905) 827-2755

Fax: (905) 827-2655

Toll Free: 1-800-263-1717

Price: Not available

ISBN/Order No: Not available

Copyright: 1992

Year Recommended in Grade Collection: 2005



Ecology: Food Chains

General Description:

Thirteen-minute video presents several examples of food chains and webs in the ocean, emphasizing energy flow through the food chains. Includes a brief discussion guide with activities.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Magic Lantern Communications (BC)*

23022 Cliff Avenue
Maple Ridge, BC V2X 7Z9

Telephone: (604) 476-1853

Fax: (604) 476-1859

Toll Free: 1-800-263-1818

Price: Not available

ISBN/Order No: Not available

Copyright: 1992

Year Recommended in Grade Collection: 2005



Ecology: Organisms in their Environment

General Description:

This video examines the interactions between organisms in their environments, and poses two questions: "What are ecosystems and how do organisms interact in them?" and "How do matter and energy flow in the environment?" The concepts of ecosystem, population, niche, food chain, food web, food pyramid, and the carbon cycle are all explained.

Audience: *General*

Gifted - some advanced material in video suitable for highly able gifted learner

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Marlin Motion Pictures Ltd.*

211 Watline Avenue
Mississauga, ON L4Z 1P3

Telephone: (905) 890-1500

Fax: (905) 890-6550

Toll Free: 1-800-865-7617

Price: Not available

ISBN/Order No: Not available

Copyright: 2003

Year Recommended in Grade Collection: 2005



Ecology: Populations

General Description:

Thirteen-minute video presents several examples of populations and examines the physical and biological factors that limit the growth of a population. Includes a brief discussion guide with activities.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Magic Lantern Communications (Ontario)*

1075 North Service Road West - Unit 27
Oakville, ON L6M 2G2

Telephone: (905) 827-2755

Fax: (905) 827-2655

Toll Free: 1-800-263-1717

Price: Not available

ISBN/Order No: Not available

Copyright: 1992

Year Recommended in Grade Collection: 2005



Ecosystems

Author(s): *Chernin, B. et al*

General Description:

Resource contains text, numerical data, graphs, illustrations, photos, and maps on issues and topics related to ecosystems and resource management. The focus is on becoming environmentally literate to make informed personal decisions. Package opens out to a wall chart for classroom use.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Thomson Nelson*

1120 Birchmount Road
Scarborough, ON M1K 5G4

Telephone: (416) 752-9448

Fax: (416) 752-8101

Toll Free: 1-800-268-2222/1-800-668-067

Web Address: www.nelson.com

Price: Not available

ISBN/Order No: 7715-81807

Copyright: 1995

Year Recommended in Grade Collection: 2005



Ecosystems: The Role of Abiotic Factors

General Description:

This video examines the role non-living, abiotic factors play in shaping ecosystems. Five abiotic factors are examined: water, air, soil, heat, and light. In addition, three air-mediated cycles are presented: the water cycle, the carbon dioxide/oxygen cycle, and the nitrogen cycle. Concepts are well developed to an advanced level, and is recommended for highly able/gifted students.

Caution: *Pre-teaching suggestions are essential; "chunking" video is advised.*

Audience: *General*

Gifted - concepts well-developed to an advanced level

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Marlin Motion Pictures Ltd.*

211 Watline Avenue
Mississauga, ON L4Z 1P3

Telephone: (905) 890-1500

Fax: (905) 890-6550

Toll Free: 1-800-865-7617

Price: Not available

ISBN/Order No: Not available

Copyright: 2003

Year Recommended in Grade Collection: 2005



Fire and Ice

General Description:

This 15-minute video is a presentation of how Antarctica landscape/icescape was formed. It also presents two scientists in Antarctica who both study the Earth's crust/glaciers and who both find evidence to support two very different theories about the shape, temperature, and climate of Antarctica as it might have been millions of years ago. It is an interesting look at two earth scientists using technology, direct, and indirect evidence.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: \$39.95

ISBN/Order No: 5-5032F-1#4

Copyright: 2001

Year Recommended in Grade Collection: 2005



Forests in Focus

General Description:

Forests in Focus is an 85-page activity book on the BC forest environment. It consists of 34 activities, a glossary, stories (for activities), and appendices containing detailed BC information. It is designed for K-12 use but not all activities are appropriate for all grades. Organizers and suggested themes are included in the introduction. All activities are organized 'lab style' with objectives, materials, method, and evaluation. Content is based upon forest process and ecosystem, and does not emphasize harvesting issues.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$26.00

\$22.00 with workshop

ISBN/Order No: 0-7726-3966-3

Copyright: 1999

Year Recommended in Grade Collection: 2005



Geologist's Notebook: Three Rocks

Author(s): *LaComb, L.*

General Description:

This video program looks at three rocks: igneous, sedimentary, and metamorphic. The video investigates how they are formed and how they relate to one another through the rock cycle. The video follows the process of weathering including mechanical, chemical, and biological weathering, and explains how heat and pressure can metamorphose rock into another form.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *B.C. Learning Connection Inc.*

#4 - 8755 Ash Street

Vancouver, BC V6P 6T3

Telephone: (604) 324-7752

Fax: (604) 324-1844

Toll Free: 1-800-884-2366

Price: \$26.00

ISBN/Order No: SC0328

Copyright: 2003

Year Recommended in Grade Collection: 2005



Geologist's Notebook: What Exactly Are Minerals?

Author(s): *LaComb, L.*

General Description:

This video is an in-depth explanation of the chemical structure of minerals, and looks at properties geologists use to identify them, such as hardness, luster, cleavage, and crystal form. The video also explains the relationship between minerals and rocks, and how humans obtain minerals.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *B.C. Learning Connection Inc.*

#4 - 8755 Ash Street

Vancouver, BC V6P 6T3

Telephone: (604) 324-7752

Fax: (604) 324-1844

Toll Free: 1-800-884-2366

Price: \$26.00

ISBN/Order No: SC0329

Copyright: 2003

Year Recommended in Grade Collection: 2005



Gitga'ata Spring Harvest

General Description:

This 25-minute video examines a seasonal camp and follows a daily rhythm of food gathering and harvesting (cedar, seaweed, halibut, salmon, etc.). Elders share their wisdom and respect for the environment and highlight cultural values of the Gitga'ata peoples.

Caution: *Aboriginal perspective only represented concerning resource management.*

Safety standards (one child in boat without lifejacket).

Current salmon farming practices referred to as 'bastardization' of species.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *McNabb and Connolly*

60 Briarwood Avenue
Mississauga, ON L5G 3N6

Telephone: (905) 278-0566

Fax: (905) 278-2801

Web Address: www.mcnabbconnolly.ca

Price: \$95.00

ISBN/Order No: Not available

Copyright: 2003

Year Recommended in Grade Collection: 2005



Kokanee of British Columbia

General Description:

Activities and researched facts for the study and class investigation of landlocked salmonids called Kokanee. This is very appropriate for Interior waterways where Kokanee are mostly found. The teacher resource is organized to present all the same elements of the BC Salmon programs for Coastal BC using the Kokanee instead. Nine activities cover historical evolution life cycle, habitat, and human impacts so students will understand the relationship between Kokanee and the Interior environment. Field studies and observations are detailed in well organized units.

Caution: *This resource covers several learning outcomes at the Primary level, but it is more suitable for the Intermediate level.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
	✓	✓		✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$22.00

ISBN/Order No: 0-7726-5130-2

Copyright: 2004

Year Recommended in Grade Collection: 2005



Legacy of an Oil Spill

General Description:

This 28-minute video investigates short term and long term effects and recovery of a shoreline ecosystem after 11 million gallons of crude oil were spilled by super tanker, *Exxon Valdez*, in 1989. Scientists conduct on-site research on several species of fish, birds, and marine mammals to gauge recovery. The complexity and delicate interaction of an ecosystem and what happens when these are unbalanced are underscored.

Caution: *Some clips of animals suffering may be difficult to watch.*

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: \$39.95

ISBN/Order No: 1-2842F-1#4

Copyright: 1999

Year Recommended in Grade Collection: 2005



McDougal Littell Science Grade 7

General Description:

This series is an excellent teacher resource to be used to broaden understanding of Grade 7 curricular topics. Titles include: *Ecology, Chemical Interactions, The Changing Earth, and Earth's Surface*. It is an excellent learning tool for gifted Grade 7 students who find the more traditional Grade 7 texts limited in scope.

Audience: *Gifted - provides a depth of topics not found in a general text*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Thomson Nelson*

1120 Birchmount Road
Scarborough, ON M1K 5G4

Telephone: (416) 752-9448

Fax: (416) 752-8101

Toll Free: 1-800-268-2222/1-800-668-067

Web Address: www.nelson.com

Price: Modules: \$26.95 each

ISBN/Order No: Ecology: 0-618-33429-7
Chemical Interactions: 0-618-33438-6
The Changing Earth: 0-618-33424-6
Earth's Surface: 0-618-33419-X
Electricity and Magnitism:
0-618-334-408

Copyright: 2004

Year Recommended in Grade Collection: 2005



Mountains and Mountain Building Processes

General Description:

This 23-minute video presents a thorough overview of how the Earth's crust is constantly changing through mountain formation, volcanoes, and earthquakes. Using worldwide examples, clear graphics, and scientific vocabulary it makes a clear connection between crust and surface formations. There is support material to accompany the video which elaborates on vocabulary, suggests activities, and provides assessment.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

Web Address: www.canlearn.com

Price: \$39.95

ISBN/Order No: 1-2649F-1#4

Copyright: 2000

Year Recommended in Grade Collection: 2005



Nelson Science & Technology 7

General Description:

These are a series of modules reprinted from the *Nelson Science and Technology 7* student text (which is not recommended). *The Earth's Crust, Interactions Within Ecosystems, Pure Substances and Mixtures*, and particularly helpful, *The Skills Handbook* comprise this recommended series.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *Thomson Nelson*

1120 Birchmount Road
Scarborough, ON M1K 5G4

Telephone: (416) 752-9448

Fax: (416) 752-8101

Toll Free: 1-800-268-2222/1-800-668-067

Web Address: www.nelson.com

Price: Skills Handbook: \$19.45
Modules: \$15.45 each

ISBN/Order No: Skills Handbook: 0-17-612020-3
Pure Substances and Mixtures:
0-17-612001-7
The Earth's Crust: 0-17-612004-1
Interactions Within Ecosystems:
0-17-612000-9

Copyright: 2000

Year Recommended in Grade Collection: 2005



Nelson Science & Technology Skills Handbook

Author(s): *Alldred, N. et al.*

General Description:

Nelson Skills Handbook is an excellent student and teacher resource for the skills and processes of Science at both Grade 6 and 7 levels. Contains diagrams for steps in various science processes and can be used as a resource for classes needing support for student hands-on activities. Shows the clear difference between scientific inquiry and technological problem-solving.

Audience: *General*
ESL

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓	✓					

Supplier: *Thomson Nelson*

1120 Birchmount Road
Scarborough, ON M1K 5G4

Telephone: (416) 752-9448

Fax: (416) 752-8101

Toll Free: 1-800-268-2222/1-800-668-067

Web Address: www.nelson.com

Price: \$19.45

ISBN/Order No: 0-17-612020-3

Copyright: 2000

Year Recommended in Grade Collection: 2005



OceanNews

General Description:

OceanNews is a series of learning resource packages developed by the Public Education Program of the Bamfield Marine Station to promote marine education. Each issue of *OceanNews* covers a theme of marine science: Exploring the Fluid Frontier, Marine Mammals, Seabirds, and Marine Pollution. Each theme issue comprises a newsletter, a teacher's guide, and an Ocean Explorer computer disk. Provides background concepts and current research in marine science. Activities in the teacher's guides extend concepts. Software programs enhance and extend activities. Systems Requirement: Installed Acrobat Reader®

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
					✓	✓	✓					

Supplier: *Bamfield Marine Sciences Centre*

Bamfield, BC V0R 1B0

Telephone: (250) 728-3301

Fax: (250) 728-3452

Web Address: www.bms.bc.ca

Price: 5 copies of each newsletter + 1 CD:
\$53.00
30 copies + 1 CD: \$73.00

ISBN/Order No: Not available

Copyright: 1994

Year Recommended in Grade Collection: 2005



Our Wonderful World (AIMS Activities)

General Description:

Book investigates our relationship with the environment through numerous hands-on activities that integrate math, science, language arts, and social studies. Detailed support materials accompany each project. Some non-metric references.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓	✓					

Supplier: *Spectrum Educational Supplies Ltd. (Ontario)*

125 Mary St.
Aurora, ON L4G 1G3

Telephone: (905) 841-0600

Fax: (905) 727-6265

Toll Free: 1-800-668-0600

Web Address: <http://www.spectrumed.com>

Price: \$35.95

ISBN/Order No: 1-881431-08-8/20133

Copyright: 1987

Year Recommended in Grade Collection: 2005



Parasites & Partners Series

General Description:

The series provides good content for Grade 6 and 7 Life Sciences. Explains the close relationship between various animals, plants, and other creatures. From tiny bacteria living inside or on other organisms to survive. Detailed look at some of the most bizarre and surprising organisms and their parasitic relationships.

Audience: *General*

ESL

LD - high interest, but will need vocabulary support

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓	✓					

Supplier: *J. Appleseed*

PO Box 129
Collingwood, ON L9Y 3Z7

Telephone:

Fax:

Toll Free: 1-866-575-5007

Web Address: www.jappleseed.ca

Price: \$12.00 each

ISBN/Order No: Feeders: 1-4109-0355-9

Hitchers and Thieves: 1-4109-0356-7

Lodgers and Cleaners: 1-4109-0358-3

Copyright: 2003

Year Recommended in Grade Collection: 2005



Project WET

General Description:

The 500-page detailed teacher resource includes directions and extensions for 120 activities related to water, wetlands, and water resource management. Each activity includes objectives, method, background, materials, procedures, variations, extensions and evaluation. A wealth of teaching ideas for Grades K to 7. A global perspective, but produced from Montana State University.

Caution: *Not much Canadian or BC highlights. Images are mostly global but some captions are US locations. Dual temperature references, i.e. Fahrenheit/Celsius.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$30.00 with workshop

ISBN/Order No: Not available

Copyright: 1995

Year Recommended in Grade Collection: 2005



Project WILD

General Description:

Teacher resource contains directions and extensions for approximately 80 activities that are related to wildlife and resource management. Each activity includes objectives, method, background, materials, procedure, variations, extension, and evaluation.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *Wild BC*

P.O. Box 9354, St. Prov. Gov.
200A-333 Quebec Street
Victoria, BC V8W 9M1

Telephone: (250) 356-7111

Fax: (250) 952-6684

Toll Free: 1-800-387-9853

Web Address:

www.env.gov.bc.ca/hctf/wild.htm

Price: \$25.00 with workshop

ISBN/Order No: Not available

Copyright: 1998

Year Recommended in Grade Collection: 2005



Salish Sea

Author(s): Arntzen, H. et al.

General Description:

This 108-page detailed teacher resource includes background directions, activities, and extensions related to ecosystems, both land and marine, which are specific to the West Coast. This cross-curricular resource contains many Aboriginal references and suggests activities, songs, and projects to amplify student appreciation of historical stewardship and respect for the delicate balance of a coastal ecosystem. There are many references and web links as back-up material. A CD of eco-songs, one in Cowichan language, accompanies this resource which contains a wealth of teaching, learning, and hands-on activities for Grades K to 7.

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓					

Supplier: *Parks Canada*

711 Broughton St., 2nd Floor
Victoria, BC V8W 1E2

Telephone: (250) 363-3511

Fax: (250) 363-8552

Price: \$30.00

ISBN/Order No: 0-660-18596-2

Copyright: 2001

Year Recommended in Grade Collection: 2005



Salmonids in the Classroom

General Description:

Salmonids in the Classroom (either Primary or Intermediate versions) is a comprehensive collection of resource materials for the study of Pacific salmonids in British Columbia. The programs are divided into clearly organized and paced 10 units following the life cycle habitats of the salmon. Each unit in the guide includes suggested activities. Content is primarily science-oriented but the development of the units has a language arts approach incorporating unifying themes. The programs would allow the integration of science, social studies and language for extensive periods of time.

Caution: *The material has limited assessment devices explained. It make suggestions for assessment activities but doesn't give any 'how to do' assessment resources.*

Audience: *General*

ESL - late primary to early intermediate; good key visuals; variety of student activities

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
✓	✓	✓		✓	✓	✓	✓					

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Primary: \$71.10

Intermediate: \$66.60

ISBN/Order No: Primary: S33

Intermediate: S39

Copyright: 2001

Year Recommended in Grade Collection: 2005



Sci Short

General Description:

An introduction to acids and the pH scale, plus a look at the origins of acid rain, and its effect on the environment. Part 3 - Acid Death - examines experiments on *Lake 223* in Northern Ontario, and how its ecosystem was destroyed by acid rain.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *TV Ontario - Program Sales*

P.O. Box 200, Station Q
 2180 Yonge Street
 Toronto, ON M4T 2T1
 Telephone: (416) 484-2882
 Fax: (416) 484-2896

Web Address: www.tvo.org/sales

Price: Not available

ISBN/Order No: Not available

Copyright: 2001

Year Recommended in Grade Collection: 2005



Science Detective™ Beginning: Higher-Order, Thinking, Reading, Writing in Science

Author(s): *Fischer, S. et al.*

General Description:

Teacher resource for ESL or Learning Assistance programs includes simplified pages of science concepts in all strands. Basic teaching strategy of read and complete sheet. Good collection of key visuals and graphic organizers.

Audience: *ESL - key visuals and basic one page text per topic*
LD - key visuals and frames can be used to help learn concepts

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
			✓	✓	✓	✓	✓					

Supplier: *The Critical Thinking Co.*

P.O. Box 1610
 1069 Broadway Ave.
 Seaside, CA 93955-1610
 Telephone: (831) 393-3288
 Fax: (831) 393-3277

Toll Free: 1-800-458-4849

Web Address: www.criticalthinking.com

Price: \$18.99 US

ISBN/Order No: 0-89455-834-X

Copyright: 2004

Year Recommended in Grade Collection: 2005



Science, Please!

General Description:

Fast, factual explanations of scientific phenomena and discoveries, who said science can't be fun? A poster with excellent questions and an extensive interactive web site support these videos (Part 1 and Part 2). Although the DVDs were not available for the reviewers, they felt DVD format would be more easily used as this is a series of science mini-clips.

Caution: *Teacher should preview Part 1, clip 3, for questionable humour.*

Audience: *General*

Gifted - fast-paced, attention-grabber

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *National Film Board of Canada*

200-1385 West 8th Avenue
Vancouver, BC V6H 3V9

Telephone: (604) 666-3838

Fax: (604) 666-1569

Toll Free: 1-800-267-7710

Web Address: www.nfb.ca

Price: Not available

ISBN/Order No: 193C 9101 197

Copyright: 2001

Year Recommended in Grade Collection: 2005



Thinking Connections: Concept Maps for Life Science

Author(s): *Burggraf, F.*

General Description:

Teacher resource for ESL or Learning Assistance programs with simplified pages of Science concepts in Grades 4 to 7 intermediate strands. Basic teaching strategy of read and complete sheets, and a reinforcement of vocabulary and concepts. Good collection of key visuals and graphic organizers.

Audience: *ESL - key visuals and basic one page text per topic*
LD - key visuals and frames can be used to help learn concepts

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *The Critical Thinking Co.*

P.O. Box 1610
1069 Broadway Ave.
Seaside, CA 93955-1610

Telephone: (831) 393-3288

Fax: (831) 393-3277

Toll Free: 1-800-458-4849

Web Address: www.criticalthinking.com

Price: \$23.99 US

ISBN/Order No: 0-89455-702-5

Copyright: 2001

Year Recommended in Grade Collection: 2005



Urban Stewards

Author(s): *Keetch, T.*

General Description:

Engages students in stimulating hands-on science and environmental education activities in the classroom and outside. Match to the learning outcomes in a cross-curricular fashion.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *Stanley Park Ecology Society*

PO Box 5167
2nd Floor, Stanley Park Dining Pavilion
Vancouver, BC V6B 4B2

Telephone: 604-257-6908

Fax: 604-257-8378

Web Address: www.stanleyparkecology.ca

Price: Not available

ISBN/Order No: Not available

Copyright: 2004

Year Recommended in Grade Collection: 2005



Volcanoes: Understanding the Hazards

General Description:

Twenty-minute three-part video introduces volcanic activity, causes of vulcanism, different types of volcanic activity, and the hazards of living in an active volcanic zone. Includes a single-page teacher's guide with a vocabulary list, discussion questions, and activities.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
							✓					

Supplier: *McIntyre Media Ltd.*

75 First St., Suite 203
Orangeville, ON L9W 5B6

Telephone: (519) 942-9640

Fax: (519) 942-8489

Toll Free: 1-800-565-3036

Web Address: www.mcintyre.ca

Price: Not available

ISBN/Order No: Not available

Copyright: 1992

Year Recommended in Grade Collection: 2005



The Watershed Works

Author(s): *Bernbach, L. et al.*

General Description:

This booklet is an extensive guide for the study of the Fraser River Basin in BC. It includes student activities and teaching strategies that promote awareness and understanding of the social, economic, and environmental issues that are relevant to this area.

Caution: *These are photocopied pages in a binder.*

Audience: *General*

Category: *Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓					

Supplier: *BCTF Lesson Aids Service*

100 - 550 West 6th Avenue
Vancouver, BC V5Z 4P2

Telephone: (604) 871-2182

Fax: (604) 871-2295

Toll Free: 1-800-663-9163

Web Address:

<http://www.bctf.bc.ca/lessonaids>

Price: Not available

ISBN/Order No: Not available

Copyright: 1998

Year Recommended in Grade Collection: 2005



Wonderwise: Women in Science Learning Series

General Description:

Set of two 18-minute videos highlighting women in science: Adriana Ocampo, a space geologist; and Carmen Cid, an urban ecologist. The videos follow the women as they observe, measure, and demonstrate scientific processes and investigation.

Audience: *General*

Category: *Student, Teacher Resource*

Grade Level:

K	1	2	3	4	5	6	7	8	9	10	11	12
						✓	✓					

Supplier: *Canadian Learning Company Inc.*

95 Vansittart Avenue
Woodstock, ON N4S 6E3

Telephone: (519) 537-2360

Fax: (519) 537-1035

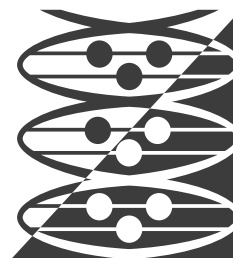
Web Address: www.canlearn.com

Price: Videos: \$39.95 each

ISBN/Order No: Space Geologist: 5-5141F-1#1
Urban Ecologist: 5-4630F-1#2

Copyright: 2002

Year Recommended in Grade Collection: 2005



GLOSSARY

Science K to 7

This glossary includes terms used in this Integrated Resource Package, defined specifically in relation to how they pertain to Science K to 7 topics. It is provided for clarity only, and is not intended to be an exhaustive list of terminology related to Science K to 7 topics. Entries in this glossary have been adapted with permission from the Recommended Resources published by

- McGraw-Hill Ryerson
- Scholastic Canada Ltd.
- Thomson Nelson.

A

acid

A compound that produces hydrogen ions (H^+) in water. Strong Acids can cause serious burns on skin. Acidic solutions turn blue litmus paper red and will have a pH value smaller than 7.

acidic

A term used to describe a solution that has a value below 7 on the pH scale; the more acidic a solution, the lower its pH value.

adaptation

The physical characteristic, or behaviour trait that helps an organism survive in its local environment.

amphibian

A class of vertebrates that is born in water and lives both in water and on land. Amphibians begin life in water with gills; later, they develop lungs and legs so they can walk on land as adults. Examples include frogs, toads, and salamanders.

Animalia

One of the Kingdoms of Life (which are part of the scientific system of classification). This Kingdom includes insects, birds, fish, and mammals.

arch

An arch is a curved structure. The separate parts of the curve all push against one another and hold up the arch.

arteries

Thick, muscular vessels that carry blood away from the heart to the rest of the body.

attract

When objects are pulled together by a physical forces that combines to unite the surfaces of the objects.

axis

A straight line that runs through the centre of an object.

B

balanced forces

When the total of all forces on an object equals zero and the object's motion does not change.

base

A compound that produces hydroxide (OH^-) in water. A solution that is basic turns red litmus paper blue because it has less hydrogen ions.

basic

A term used to describe a solution that has a value above 7 on the pH scale; the more basic a solution, the higher its pH value.

battery

An energy source that uses a chemical reaction to create an electric current.

biodegradable

Material that is able to be broken down or decomposed by natural processes into simpler compounds. Natural processes include exposure to sun, water, and air.

biomass power

Energy created by burning any type of plant or animal tissue to heat water and create steam, which turns turbines and generates electricity.

biomass

An ecology term for the total mass of living organisms in a certain area.

biomes

Large regions of Earth where temperature and precipitation are distinct and certain types of plants and animals are found.

biosphere

The parts of Earth where life can be found, from mountaintops to the deepest parts of the ocean.

buoyancy

The ability to float in water; the upward force of water on any object placed in water.

C**calculate**

To figure out by using mathematics the number for quantities, amounts, sizes, lengths, or mass of items.

camouflage

The colouring of an animal that allows it to blend into its environment to survive better.

Canadarm

A robotic manipulator arm developed by the Canadian Space Agency. The arm is controlled by astronauts inside the space shuttle.

carnivore

A consumer that eats other animals. For example, wolves and orca are carnivores.

cell

A microscopic structure that is the basic unit of all living things. Organisms can be made of as little as one cell (some types of bacteria) or as many as several trillion cells (human beings).

cell cytoplasm

The thick liquid inside the cell; area where the work of the cell is done, as directed by the nucleus.

cell membrane

A thin layer that surrounds the cell cytoplasm and controls which materials enter and leave the cell.

cell nucleus

The cell structure that acts as the control centre by directing all of the cell's activities, such as movement and growth.

cell wall

In plant cells the protective outer layer that surrounds the cell membrane and some protists. It provides protection and support for the cell.

chlorophyll

A green pigment found in chloroplasts that gives plants and some Protista their green colour. It captures sunlight used for photosynthesis.

chloroplast

A plant cell structure containing chlorophyll, found in all green plant cells and some Protista.

classify

Grouping and labelling a collections of items, objects, or living things. The grouping arrangements match a set of classification rules and common characteristics indicating their similarities and differences. [see SORT]

climate

The weather pattern for a geographical region over a long period of time.

cloud

Water vapour in the atmosphere that has cooled and come into contact with tiny particles of dust.

colouration

An adaptation of an organism's colour to help it survive in its environment. Mimicry and camouflage are examples of colouration.

compare

To look and identify two or more objects and see how they are different and how they are the same.

compound machine

Any machine containing two or more simple machines.

compound

A pure substance that is made up of two or more different elements and consists of only one kind of particle.

compression

An engineering term used opposite to tension; any of the forces applied towards the centre of structural objects.

concentration

The quantity of solute that is dissolved in a certain quantity of solvent; the more solute dissolved, the greater the concentration.

condensation

The process of changing from a gas or a vapour to a liquid.

conductor

A material that lets electricity flow through it easily; for example, most metals are good conductors.

conservation

Preserving and carefully managing natural resources so that they can be used by present and future generations. We conserve resources by using them more efficiently, with minimum waste.

construct

To make or build a model or to build a simple structure by joining materials together.

consumer

An organism, such as an animal, that must obtain its food by eating other organisms in its environment; can be a herbivore, carnivore, or omnivore.

consumption

The amount of resources or energy used by a household.

continental crust

The parts of Earth's crust that have continents on them.

continental shelf

A shallow underwater ledge located between a continent and the deep ocean crust.

cover slip

A small, thin piece of glass used to cover a specimen on a microscope slide.

crust

The thin, outer layer of Earth; made of solid rock. The crust "floats" on the inner layers of Earth because it is made of lighter materials than the lower layers.

D**decomposer**

An organism that breaks down (decomposes) dead or waste materials, such as rotting wood, dead animals, or animal waste and returns important nutrients to the environment.

design-process

The sequence of steps that take an idea to a completed plan; can be the planning and building processes where prototypes are created and evaluated to solve technological problems.

detrivore

An organism that feeds on large bits of dead and decaying plant and animal matter. For example, earthworms, dung beetles, and wolverines are detritivores.

dilute

A solution that has a low concentration of the dissolved substance (the solute).

dissolve

To completely mix one substance (the solute) in another (the solvent) to form a solution. For example, if you add sugar to water, the sugar dissolves in the water.

E**Earth's inner core**

The innermost layer of Earth, which is made up of iron and nickel.

echo

Repetition of sound produced by reflection of sound waves from a surface.

ecosystem

The network of interactions that link together the living and non-living parts of an environment.

effort force

The concept used to describe the force going into moving a simple machine a certain distance; used to describe the degree of effort someone applies to operate a machine.

electric current

A continuous flow of electric charge moving from one place to another along a pathway; required to make all electrical devices work; measured in amperes (A).

electrical energy

The better term for electricity; the form of energy that consists of a flow of electric charges as the energy is transferred through a conductor.

electrical switch

A device that controls the flow of electric current through a circuit. In an open circuit, a light will be off; in a closed circuit, a light will be on.

electricity

See electrical energy.

electromagnet

A magnet that is created by using electricity in a circuit placed around a piece of metal conductor such as steel or lead.

electromagnetism

A magnetic force caused by electric charges in motion; also, the relationship between magnetism and electricity where one can make the other.

electron

A negatively charged particle that is found outside the nucleus of an atom.

element

A pure substance that cannot be broken down into any other pure substance; made up of one type of atom.

emulsion

A special kind of suspension that has been treated to prevent the parts of the mixture from separating. For example, homogenized milk is an emulsion.

energy

Energy cannot be seen or touched. Energy is a property of all matter. Energy comes in many forms and can be transferred from one object to another, but it cannot be created or destroyed; written as the symbol E.

environmental impact

The effect, usually negative, of a human activity on a local area.

equilibrium

A condition where structures or systems are in complete balance. A state of rest or balance, in which all opposing forces are equal. [see BALANCED FORCES]

erosion

The loosening, dissolving, wearing away, or moving of soil and rock from one place to another by wind or water.

estimate

A math and science term for referring to how students use prior knowledge to make a reasonable and sensible decision about amounts. Amounts can be quantity, number, volume, length, weight, or size.

estuary

The region where a river flows into the ocean and fresh river water mixes with saltwater.

evaporate

To change into a gas or vapour.

exploration

Travelling some distance to observe a place or region to learn more about it.

extraction

Removing rock or minerals from the earth.

extreme environment (1)

A place where the conditions are so harsh that human survival is difficult or impossible without technology. For example, deserts, volcanoes, and space are extreme environments for humans to spend long periods of time.

extreme environment (2)

An environment that is difficult to reach, and that has extreme conditions such as high or low temperatures, high or low pressure, or little atmosphere or gravity. Space, deep oceans, the high arctic, the upper stratosphere, polar regions, and deep caves are extreme environments.

F**fair test**

A test of a single variable when all the experimental actions around it are applied equally. During a scientific investigation, accurate fair testing involves isolating variables, eliminating bias, repeating the results, and analysing the intended experiment for errors.

fasteners

Special materials used for *joining* structural parts in construction. Fasteners are of differing types (e.g., fixed, rotating, rigid, flexible, and adjustable) and can serve different purposes. Nails, pins, bolts, glue, string, tape, sleeves, and screws are examples of fasteners used to join construction parts together.

food chain

A method for describing how food energy passes from organism to organism. The description establishes a hierarchy of organisms where each feeds on those below and is the source of food for those above.

food web

A network of interconnected food chains in an ecosystem.

force

The physics term used to describe the energy applied in various ways to move objects or change their position. Force usually involve a push or a pulling and is either balanced or unbalanced by other forces.

fossil fuels

Fuel formed over millions of years from compression of the decayed remains of living matter. Coal, oil, and natural gas are fossil fuels.

friction

The resistance a body meets when moving over a surface or through a gas or liquid; the force that resists the motion of two surfaces that are touching each other.

fulcrum

The point on which a lever rests or turns.

Fungi

One of the Kingdoms of Life (which are part of the scientific system of classification). Fungi are a life form consisting of a single or many-celled organisms, which have cell walls, do not have chlorophyll, get food from the environment, and reproduce by spores.

G**geothermal**

Energy obtained from the natural heat of the Earth.

gravity

The forces of attraction which the Earth has for objects on its surface; also the force of attraction between any two objects.

H**habitat**

The place where an animal or a plant naturally lives or grows and that provides it with everything it needs to grow.

heat

The transfer of thermal energy to other substances that are at a different temperature. Cold things still have heat energy.

herbivores

An animal that eats only plants. (also see CARNIVORE, OMNIVORE)

hydrometer

A device that reads specific gravity and is used to determine density of liquids.

I**inclined plane**

A sloping surface; a simple machine that can be used to alter the effort and distance involved in doing work.

insulator

Material that does not transfer heat readily; also, a substance that does not allow any electric current to transfer to other objects.

invertebrate

An animal that does not have a backbone or spinal column. Examples of invertebrates include insects, worms, and crabs.

L**lava**

The term used for magma, or molten rock, when it breaks through Earth's crust and reaches the surface, as in a volcanic eruption.

leaching

The process by which soluble materials in the soil, such as nutrients, pesticide chemicals, or contaminants, are washed into a lower layer of soil or are dissolved and carried away by water.

lever

One of the simplest machines; a rigid beam that rotates around a fixed support point called the fulcrum. Levers changes the direction and effort force needed to move a load.

life cycle

All the stages in the life of a plant or animal organism, between life and death.

life-support

Any human-built system that provides air, water, food, and environmental conditions to sustain humans or other living things.

light absorption

To soak up visible and invisible electromagnetic radiation energy ranging in wavelength from about 400 to 700 nanometers. Light is usually absorbed by rough, dark surfaces.

light refraction

The bending of light into a different direction where it follows a new straight-line path.

light

Visible and invisible electromagnetic radiation energy, ranging in wavelength from about 400 to 700 nanometers and travels at a speed of 299, 972 km/s.

load

The mass (weight) of an object to be moved.

local environment

All the influences and conditions in which organisms live, including the actual place, circumstances, soil, water, air, and climate that surround and affect plants and animals in a particular area, and which determine their form and survival.

loudness

Amount of energy that a sound carries.

M**magma**

Hot melted rock formed deep below Earth's crust by high temperatures and pressures; cools to form igneous rock.

mantle

The layer of Earth between the crust and the outer core; a hot, thick layer of solid and partly melted rock.

mass

The amount of matter in something, which is measured in grams (g).

materials

The collection of physical and chemical attributes for the objects used to build structures. "Construction materials" refers to the type of substance and its properties.

measure

Using special tools to accurately determine the amount of an object without guessing or estimating. The measured amount must be described relative to a standard unit system.

micro-organism

A living thing that is too small to be seen without the help of a microscope. For example, bacteria and some algae are micro-organisms.

mid-ocean ridge

A raised part of the sea floor, which can become large enough to be considered an underwater mountain range.

migration

The seasonal movement of animals to a less-harsh environment. For example, the elk moves from the mountains to spend the winter in the lowlands.

mimicry

Adaptations that let one animal look or behave like another animal for survival reasons.

mixture

A combination of two or more different types of matter that can be separated by physical changes.

N

model

A method for showing an idea using objects and/or pictures. When students build a model, they make a physical structure to represent their idea.

Monera

One of the Kingdoms of Life forms; comprises the bacteria, blue-green algae, and various primitive micro-organisms.

natural gas

A fossil fuel formed by the decomposition of microscopic plants and animals over millions of years.

net charge

No static charge available as the amount of excess (+) electrons is equal to the amount of deficient (-) electrons.

neutral charge

No static charge and no excess electron or missing electrons.

neutral pH

Neither an acid nor a base. On the pH scale, a neutral substance or solution has a pH value of 7. Pure distilled water has a pH of 7.

niche

The way that an organism fits into an ecosystem, in terms of where it lives, how it obtains its food, and how it interacts with other organisms.

non-renewable

Something that cannot be replaced once it is used or that may take many hundreds of years to be replaced.

nuclear energy

Energy that uses uranium as a fuel to heat water and produce steam, which turns a turbine and produces electricity.

O

observation

Activities where the senses are used to collect and record how objects or events behave. Students record what they see, smell, touch, or read from measuring tools. They do not state opinions about these events.

oceanic crust

The parts of Earth's crust that have only ocean floor on them; thinner and denser than the continental crust.

omnivore

An animal that eats both plants and animals. (see HERBIVORE, CARNIVORE)

opaque

Matter that does not allow any light to pass through.

orbit

A circular path that one object travels around another object.

organ

A body part composed of a collection of differing cells and tissues organized to perform a specific function.

P

parallel circuit

A circuit in which the current travels along two or more separate paths to different devices. The current travels through each part of the circuit devices at the same time.

pH scale

A scale that measures the acidity of substances in solution; has numbers from 0 (strongly acidic) to 7 (neutral) to 14 (strongly basic).

photosynthesis

The process in which the Sun's energy is used by plants to make sugar (food) from carbon dioxide and water. Oxygen is released in this process.

Plantae

One of the Kingdoms of Life (which are part of the scientific system of classification). This Kingdom includes all land plants.

plate tectonics

The theory that the surface of Earth consists of large plates that are continually moving.

predator

An organism that hunts another living thing for food. [see CARNIVORE]

predict

Thinking by using prior knowledge about what a student knows to work out what is going to probably happen next, in a pattern of events.

pressure

A force applied equally to all surfaces of objects or surfaces. Air pressure is the force of all the atmosphere gases pushing down on people at the Earth's surface.

prey

An organism that is hunted by a predator.

producer

An organism that creates its own food rather than eating other organisms to obtain food; for example, a plant. (see also CONSUMER)

Protista

One of the Kingdoms of Life (which are part of the scientific system of classification). This Kingdom includes complex one-celled micro-organisms, such as amoeba, protozoa, slime molds, and algae.

pure substance

A substance that is composed of only one type of atomic particle and therefore always has the same properties. There are two kinds of pure substances: elements and compounds.

R

radar

An acronym for RAdio Detection And Ranging. A device that sends out radio waves and picks up any echoes that are bounced back off objects to tell the distance, speed, direction of motion, and shape of objects.

ramp

Interchangeable with term meaning an incline plane or sloping surface.

S

recording

To describe (an observation) by using words, numbers, writing, or pictures. To only describe what has been seen, measured, or calculated without any subject judgments.

renewable resources

Natural resources that can be renewed or replaced by nature within 100 years.

rift

An opening in the oceanic crust as plates move away from each other, where molten materials from Earth's mantle can escape.

rotate

To spin around on an axis.

saturated

A solution that contains as much of one substance (the solute) as can be dissolved in another substance (the solvent). For example, when you cannot dissolve any more drink crystals in water, the solution is saturated.

scavenger

Any animal that preys on food predators have killed, or food recently discarded.

screw

A simple machine consisting of an incline plane wrapped around a cylinder.

scuba

An acronym for Self-Contained Underwater Breathing Apparatus; allows divers to carry their air supply on their backs.

sediment

Small pieces of material that have broken off of rocks and have been deposited by water, wind, or ice.

sedimentary rock

Layered rock formed when sediment is compressed and forced together naturally over millions of years.

seismic wave

An energy wave that is released by an earthquake and travels outward from its focus.

series circuit

A circuit in which the current travels along a single path to two or more electric devices; the current must travel through each part of the circuit, one device after the other, in turn.

SI system

The most widely used and accepted version of the metric system of measurement employed by all scientists (SI is an abbreviation of *Le Système International d'Unités*); includes the units metre, litre, and gram.

simple machine

One of the basic devices used to redirect forces for a useful function: lever, wedge, ramp, screw, wheel, axle, and pulley.

solubility

The ability of a substance (the solute) to dissolve in another substance (the solvent). Temperature plays an important role in solubility. For example, you can dissolve more orange-drink crystals in warm water than in cold water.

solute

The smaller part that is put into a solution. A solute is mixed with a solvent to form a solution.

solution

A homogeneous mixture of two or more substances that combine so that the mixture is the same throughout and the properties of the substances blend.

sonar

An acronym for SOund NAvigation and Range; a device that ships use to chart the depth of oceans using the echoes of sound waves.

sort

Separating a collection of items, drawings, objects, ideas, or numbers into categories of attributes. [see CLASSIFY]

sound absorption

To soak up audible noise. Sound is usually absorbed by thick, dense materials.

sound waves

A movement of particles that transfers sound from one place to another.

sound

A form of energy that you can hear when something vibrates.

species (1)

A term used to describe a group of organisms that can mate and produce offspring that can in turn produce more offspring.

species (2)

Form *Scientific Names*: species is a specific division in the classification system of organisms. It is the category below genus.

spin-off technology

An everyday use of a technology that was first developed for another purpose. For example, bar codes used in grocery stores were first developed by NASA for space exploration.

static-electric charge

A type of electricity where the electric charges build up on an object by rubbing another object. The movement of the charge off the charged object is called a static discharge. For example, electric charges built up in rubbing a balloon against your pet's fur.

static-electric discharge

A form of electrical energy moving unbalanced charged electrons on an object back to a balanced condition.

subduction zone

A place on Earth's crust where high pressure pushes an oceanic plate under another, converging tectonic plate.

sunlight

Full spectrum electromagnetic radiation carrying energy from the nearest star to our planet.

supersaturated

A solution that is more than saturated; using temperature changes, a solution is forced to dissolve more of the substance (the solute) than would normally be found in a saturated solution.

surface runoff

Precipitation that travels over the soil surface to the nearest stream. It does not soak into the soil surface.

suspension

A cloudy mixture in which clumps of a solid or droplets of a liquid are scattered throughout a liquid or gas. For example, muddy water is a suspension.

sustainability

The ability of ecosystems to bear the impact of the human population over a long period of time, through the replacement of resources and the recycling of waste.

T**technology**

Any method or tools that are made using scientific principles to solve problems. Science and technology make it possible to survive in challenging environments.

temperature

The measure of how hot or cold something is. In relative terms, it is a measure of the amount of heat present.

tidal energy

Energy created by filling a reservoir with ocean water at high tide, and later releasing the water through hydroelectric turbines as the tide ebbs to produce electricity.

U**unbalanced forces**

Forces pulling or pushing each other in which one is greater than all others; when the net force on an object does not equal zero.

unicellular

Made of only one cell; a characteristic of organisms in the Monera Kingdom.

V**veins**

Thin tubes that carry blood back to the heart from every part of the body.

verify

To double check by working out the answer or solution again. Usually another way is used to show that the first answer is correct because the second method yields an identical result.

vertebrate

Animal with a backbone, or spinal column; birds, fish, and mammals are examples of vertebrates.

vibration

The back and forth or up and down movement of an object.

voltage

A measure of the energy available to move charges in a circuit between positively-charged and negatively-charged terminals of a battery: measured in volts (V).

W

water pressure

The application of force by water that increases with depth; measured in atmospheres.

weigh

To determine the mass of...

weight

Term often used as a synonym for mass in commercial and everyday use; in scientific and technical work, this term should be replaced by mass or force, depending on the application.

weights

Objects made from steel or metal, manufactured to be used for standard mass sets.

