Atlantic Canada
Science Curriculum

NOVA SCOTIA

Department of Education
English Program Services

CURRICULUM

Science
Grade 1

Atlantic Canada Science Curriculum:
Grade 1

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Foreword

The pan-Canadian *Common Framework of Science Learning Outcomes K to 12* (1997) provides the basis for the curriculum described in *Foundation for the Atlantic Canada Science Curriculum* (1998).

Atlantic Canada Science Curriculum: Grade 1 includes the following units: physical science, life science, and earth and space science.

This guide is intended to provide teachers with the outcomes framework for the course. It also includes some suggestions to assist teachers in designing learning experiences and assessment tasks.

Contents

Introduction

Background

The curriculum described in *Foundation for the Atlantic Canada Science Curriculum* and related curriculum guides was planned and developed collaboratively by regional committees. The process for developing the common science curriculum for Atlantic Canada involved regional consultation with the stakeholders in the education system in each Atlantic province. The Atlantic Canada science curriculum is consistent with the framework described in the pan-Canadian *Common Framework of Science Learning Outcomes K to 12*.

Aim

The aim of science education in the Atlantic provinces is 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; to become lifelong learners; and to maintain a sense of wonder about the world around them. To develop scientific literacy, students require diverse learning experiences that provide opportunities to explore, analyse, evaluate, synthesize, appreciate, and understand the interrelationships among science, technology, society, and the environment.

Program Design and Components

Learning and Teaching Science

What students learn is fundamentally connected to how they learn it. The aim of scientific literacy for all has created a need for new forms of classroom organization, communication, and instructional strategies. The teacher is a facilitator of learning whose major tasks include

- creating a classroom environment to support the learning and teaching of science
- designing effective learning experiences that help students achieve designated outcomes
- stimulating and managing classroom discourse in support of student learning
- learning about and then using students' motivations, interests, abilities, and learning styles to improve learning and teaching
- assessing student learning, the scientific tasks and activities involved, and the learning environment to make ongoing instructional decisions
- selecting teaching strategies from a wide repertoire

Effective science learning and teaching take place in a variety of situations. Instructional settings and strategies should create an environment that reflects a constructive, active view of the learning process. Learning occurs through actively constructing one's own meaning and assimilating new information to develop a new understanding.

The development of scientific literacy in students is a function of the kinds of tasks in which they engage, the discourse in which they participate, and the settings in which these activities occur. Students' disposition towards science is also shaped by these factors. Consequently, the aim of developing scientific literacy requires careful attention to all of these facets of curriculum.

Learning experiences in science education should vary and should include opportunities for group and individual work, discussion among students as well as between teacher and students, and hands-on/minds-on activities that allow students to construct and evaluate explanations for the phenomena under investigation. Such investigations and the evaluation of the evidence accumulated provide opportunities for students to develop their understanding of the nature of science and the nature and status of scientific knowledge.

The Science Lesson—Links to the World

It is very important for children to learn through experiences in science. Students can engage in problem solving, decision making, and inquiry only through a hands-on approach to learning. Using their senses, and the power of observation, and recording their findings—in writing, by illustration, or verbally are key to a meaningful experience and understanding.

Before starting a science activity, the teacher should take the time to engage students in dialogue on their prior knowledge of a topic and to record key vocabulary words and thoughts to be used as a reference as the activity progresses. The teacher should also articulate and discuss expectations for communication and teamwork with the students before they engage in any hands-on learning experiences that require them to be involved in groups.

During the lesson, the teacher should walk among the groups and listen, prompt discovery through questioning, and respond to the students' work. The teacher should act as a guide and support person to help students see themselves as capable and successful. This is an ideal opportunity to assess students' ability to meet the outcomes through the activity being done. Assessment can be in the form of notes, check-off lists, sticky notes, or thoughts to be written down at a later time. Recording assessment during an activity is sometimes a challenge, as the teacher is managing the class, as well as answering individual or group questions. Recording can be done during follow-up time or at a time more manageable for the teacher.

The follow-up to a lesson is crucial as it allows students the opportunity to communicate the ideas, discoveries, and questions that arise from engaging in a hands-on learning experience. This occurs when the results of the activity are pulled together, and groups or individuals discuss with the whole class their findings from the activity. Additional vocabulary is often developed and should be recorded for future reference. Without follow-up to a lesson, an opportunity for students to achieve knowledge, skills, and attitude outcomes can be missed. It is important to use this as a time for students to ask questions that might lead to exploration and investigation throughout the unit. Oftentimes the follow-up discussions will lead to further investigations to be done at another time.

Follow-up time can also be an ideal time to *link* other subject areas with science. This could include, for example, reflection on prior activities in math such as in measurement or data management, a shared or read-aloud experience related to the activity during language arts time, or an art activity. The science activity should not be an activity done for the sake of doing an activity. Discussion and links to other areas are key to students' continuing to view learning as an integrated whole.

Writing in Science

Learning experiences should provide opportunities for students to use writing and other forms of representation as ways of learning. Students, at all grade levels, should be encouraged to use writing to speculate, theorize, summarize, discover connections, describe processes, express understandings, raise questions, and make sense of new information using their own language as a step to the language of science. Science logs are useful for such expressive and reflective writing. Purposeful note making is an intrinsic part of learning in science, helping students to better record, organize, and understand information from a variety of sources. The process of creating word webs, maps, charts, tables, graphs, drawings, and diagrams to represent data and results helps students learn and also provides them with useful study tools.

Learning experiences in science should also provide abundant opportunities for students to communicate their findings and understandings to others, both formally and informally, using a variety of forms for a range of purposes and audiences. Such experiences should encourage students to use effective ways of recording and conveying information and ideas and to use the vocabulary of science in expressing their understandings. Through opportunities to talk and write about the concepts they need to learn, students come to better understand both the concepts and related vocabulary.

Learners will need explicit instruction in, and demonstration of, the strategies they need to develop and apply in reading, viewing, interpreting, and using a range of science texts for various purposes. It will be equally important for students to have demonstrations of the strategies they need to develop and apply in selecting, constructing, and using various forms for communicating in science.

The Three Processes of Scientific Literacy

An individual can be considered scientifically literate when he/she is familiar with, and able to engage in, three processes: inquiry, problem solving, and decision making.

Inquiry

Scientific inquiry involves posing questions and developing explanations for phenomena. While there is general agreement that there is no such thing as the scientific method, students require certain skills to participate in the activities of science. Skills such as questioning, observing, inferring, predicting, measuring, hypothesizing, classifying, designing experiments, collecting data, analysing data, and interpreting data are fundamental to engaging in science. These activities provide students with opportunities to understand and practise the process of theory development in science and the nature of science.

Problem Solving

The process of problem solving involves seeking solutions to human problems. It consists of proposing, creating, and testing prototypes, products, and techniques to determine the best solution to a given problem.

Decision Making

The process of decision making involves determining what we, as citizens, should do in a particular context or in response to a given situation. Decision-making situations are important in their own right, and they also provide a relevant context for engaging in scientific inquiry and/or problem solving.

Meeting the Needs of All Learners

Foundation for the Atlantic Canada Science Curriculum stresses the need to design and implement a science curriculum that provides equitable opportunities for all students according to their abilities, needs, and interests. Teachers must be aware of, and make adaptations to accommodate, the diverse range of learners in their classes. To adapt instructional strategies, assessment practices, and learning resources to the needs of all learners, teachers must create opportunities that will permit them to address their various learning styles.

As well, teachers must not only remain aware of and avoid gender and cultural biases in their teaching, they must also actively address cultural and gender stereotyping (e.g., about who is interested in and who can succeed in science and mathematics). Research supports the position that when science curriculum is made personally meaningful and socially and culturally relevant, it is more engaging for groups traditionally under-represented in science and, indeed, for all students.

While this curriculum guide presents specific outcomes for each unit, it must be acknowledged that students will progress at different rates.

Teachers should provide materials and strategies that accommodate student diversity and should validate students when they achieve the outcomes to the best of their abilities.

It is important that teachers articulate high expectations for all students and ensure that all students have equitable opportunities to experience success as they work toward achieving designated outcomes. Teachers should adapt classroom organization, teaching strategies, assessment practices, time, and learning resources to address students' needs and build on their strengths. The variety of learning experiences described in this guide provides access for a wide range of learners. Similarly, the suggestions for a variety of assessment practices provide multiple ways for learners to demonstrate their achievements.

Assessment and Evaluation

The terms **assessment** and **evaluation** are often used interchangeably, but they refer to quite different processes. Science curriculum documents developed in the Atlantic region use these terms for the processes described below.

Assessment is the systematic process of gathering information on student learning.

Evaluation is the process of analysing, reflecting upon, and summarizing assessment information and making judgments or decisions based upon the information gathered.

The assessment process provides the data, and the evaluation process brings meaning to the data. Together, these processes improve teaching and learning. If we are to encourage enjoyment in learning for students now and throughout their lives, we must develop strategies to involve students in assessment and evaluation at all levels. When students are aware of the outcomes for which they are responsible and of the criteria by which their work will be assessed or evaluated, they can make informed decisions about the most effective ways to demonstrate their learning.

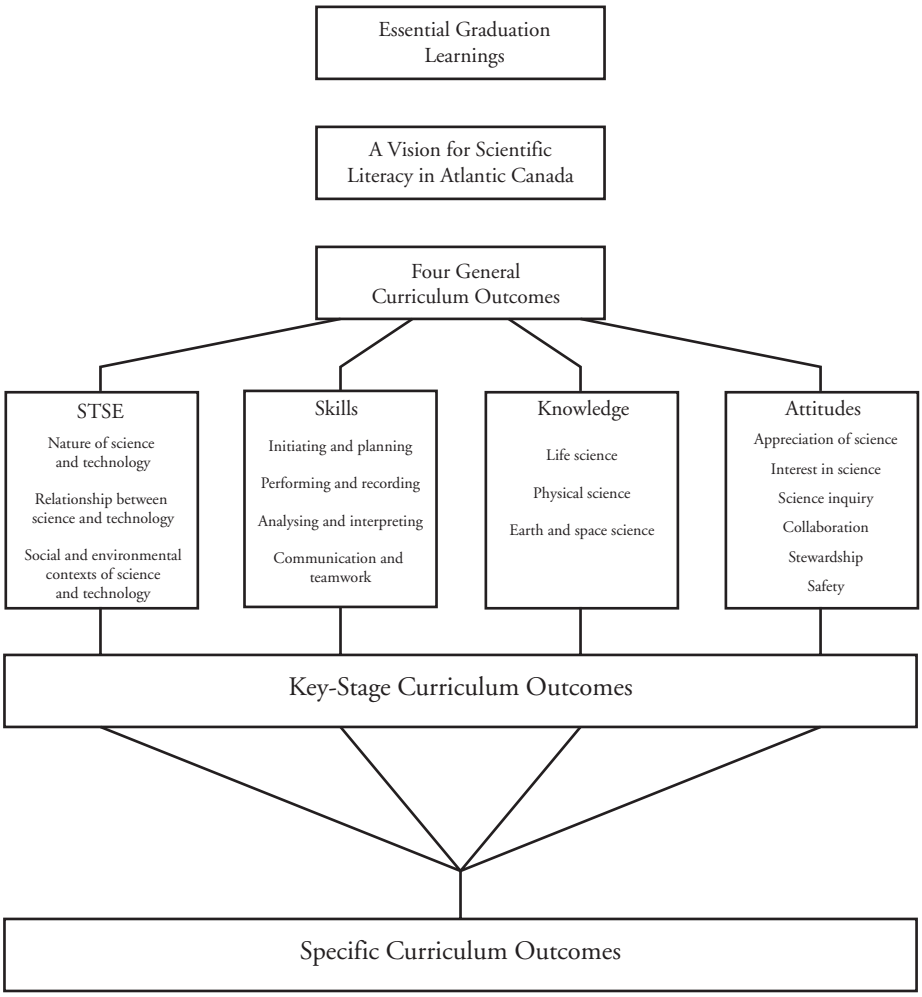
The Atlantic Canada science curriculum reflects the three major processes of science learning: inquiry, problem solving, and decision making. When assessing student progress, it is helpful to know some activities/skills/actions that are associated with each process of science learning. Student learning may be described in terms of ability to perform these tasks.

Curriculum Outcomes Framework

Overview

The science curriculum is based on an outcomes framework that includes statements of essential graduation learnings, general curriculum outcomes, key-stage curriculum outcomes, and specific curriculum outcomes. The general, key-stage, and specific curriculum outcomes reflect the pan-Canadian C*ommon Framework of Science Learning Outcomes K to 12*. The diagram below provides the blueprint of the outcomes framework.

Outcomes Framework



Essential Graduation Learnings

Essential graduation learnings are statements describing the knowledge, skills, and attitudes expected of all students who graduate from high school. Achievement of the essential graduation learnings will prepare students to continue to learn throughout their lives. These learnings describe expectations not in terms of individual school subjects but in terms of knowledge, skills, and attitudes developed throughout the curriculum. They confirm that students need to make connections and develop abilities across subject boundaries and to be ready to meet the shifting and ongoing opportunities, responsibilities, and demands of life after graduation. Provinces may add additional essential graduation learnings as appropriate. The essential graduation learnings are described below.

Aesthetic Expression

Graduates will be able to respond with critical awareness to various forms of the arts and be able to express themselves through the arts.

Citizenship

Graduates will be able to assess social, cultural, economic, and environmental interdependence in a local and global context.

Communication

Graduates will be able to use the listening, viewing, speaking, reading, and writing modes of language(s) as well as mathematical and scientific concepts and symbols to think, learn, and communicate effectively.

Personal Development

Graduates will be able to continue to learn and to pursue an active, healthy lifestyle.

Problem Solving

Graduates will be able to use the strategies and processes needed to solve a wide variety of problems, including those requiring language, mathematical, and scientific concepts.

Technological Competence

Graduates will be able to use a variety of technologies, demonstrate an understanding of technological applications, and apply appropriate technologies for solving problems.

General Curriculum Outcomes

The general curriculum outcomes form the basis of the outcomes framework. They also identify the key components of scientific literacy. Four general curriculum outcomes have been identified to delineate the four critical aspects of students' scientific literacy. They reflect the wholeness and interconnectedness of learning and should be considered interrelated and mutually supportive.

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.

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.

Knowledge

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

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.

Key-Stage Curriculum Outcomes

Key-stage curriculum outcomes are statements that identify what students are expected to know, be able to do, and value by the end of grades 3, 6, 9, and 12 as a result of their cumulative learning experiences in science. The key-stage curriculum outcomes are from the *Common Framework of Science Learning Outcomes K to12*.

Specific Curriculum Outcomes

This curriculum guide outlines specific curriculum outcomes for grade 1 science and provides suggestions for learning, teaching, assessment, and resources to support students' achievement of these outcomes. Teachers should consult *Foundation for the Atlantic Canada Science Curriculum* for descriptions of the essential graduation learnings, vision for scientific literacy, general curriculum outcomes, and key-stage curriculum outcomes.

Specific curriculum outcome statements describe what students are expected to know and be able to do at each grade level. They are intended to help teachers design learning experiences and assessment tasks. Specific curriculum outcomes represent a framework for assisting students to achieve the key-stage curriculum outcomes, the general curriculum outcomes, and ultimately the essential graduation learnings.

Specific curriculum outcomes are organized in three units. Each unit is organized by topic. Grade 1 science units and topics follow.

Physical Science: Materials, Objects, and Our Senses

- The Senses
- Objects Are Made from Materials
- Properties of Materials
- Constructing Objects

Life Science: Needs and Characteristics of Living Things

- Characteristics of Living Things
- Needs of Living Things
- Investigating Balance

Earth and Space Science: Daily and Seasonal Changes

- Introduction to Cycles: Daily/Seasonal Changes in Heat and Light
- Daily Changes in Living Things
- Seasonal Changes in Living Things

The following pages outline specific curriculum outcomes for grade 1 science, grouped by units and topics.

Physical Science: Materials, Objects, and Our Senses

Students will be expected to

The Senses

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)
- demonstrate and describe change in materials using the five senses (100-11, 101-3, 101-4)

Objects Are Made from Materials

- compare and describe various materials and report the results using a variety of formats (202-4, 100-13)

Properties of Materials

- predict and connect investigations on various materials, recording the results (200-3, 200-4, 201-5, 203-3)

Constructing Objects

- select, explain, and describe ways to use appropriate materials while constructing objects (101-5, 103-3)
- identify, solve, and evaluate problems that arise while constructing objects (200-2, 202-7, 203-1)

Life Science: Needs and Characteristics of Living Things

Students will be expected to

Characteristics of Living Things

- identify, conduct, measure, and record observations about animals and plants using appropriate terminology (201-5, 100-8, 203-2)
- listen and respond to another student's description of an animal or plant (203-4)

Needs of Living Things

- question, explore, observe, and identify the similarities and differences in how living things are able to meet their needs (200-1, 100-4, 100-5, 100-7)
- recognize that humans and other living things depend on their environment and identify personal actions that can contribute to a healthy environment (103-2)

Investigating Balance

- identify and investigate common characteristics of humans (100-8)
- identify and use a variety of materials, information, and ideas to explore balance (201-7)

Earth and Space Science: Daily and Seasonal Changes

Students will be expected to

Introduction to Cycles: Daily/Seasonal Changes in Heat and Light

- identify and record the days of the week, the names of the seasons, and predict the type of weather for various seasons (200-3, 203-2)
- describe ways of qualitatively measuring and recording environmental changes that occur in daily and seasonal cycles (101-6)
- observe and describe daily and seasonal changes in heat and light from the sun (100-14)

Daily Changes in Living Things

- investigate and describe, using a variety of formats, how the daily changes affect the characteristics, behaviours, and locations of living things (200-1, 102-4, 201-5)

Seasonal Changes in Living Things

- predict and communicate questions and answers to investigations about seasonal changes and describe these changes (202-9, 102-5, 202-7, 203-1)
- place materials and objects in a sequence or group according to various sorts (202-2)
- investigate and describe human preparations for seasonal changes (103-4)

Attitudes Outcomes

It is expected that the Atlantic Canada science program will foster certain attitudes in students throughout their school years. The STSE, skills, and knowledge outcomes contribute to the development of attitudes; and opportunities for fostering these attitudes are highlighted in the Elaborations—Strategies for Learning and Teaching sections of each unit.

Attitudes refer to generalized aspects of behaviour that teachers model for students by example and by selective approval. Attitudes are not acquired in the same way as skills and knowledge. The development of positive attitudes plays an important role in students' growth by interacting with their intellectual development and by creating readiness for responsible application of what students learn.

Since attitudes are not acquired in the same way as skills and knowledge, outcome statements for attitudes are written as key-stage curriculum outcomes for the end of grades 3, 6, 9, and 12. These outcome statements are meant to guide teachers in creating a learning environment that fosters positive attitudes.

The following pages present the attitude outcomes from the pan-Canadian *Common Framework of Science Learning Outcomes K to 12* for the end of grade 3.

Key-Stage Curriculum Outcomes: Attitudes

By the end of grade 3, students will be expected to

Appreciation of Science	Interest in Science	Scientific Inquiry
400 recognize the role and contribution of science in their understanding of the world *Evident when students, for example,* • give examples of science in their own lives • give examples of how objects studied and investigations done in class relate to the outside world • recognize that scientific ideas help us to explain how or why events occur	**401** show interest in and curiosity about objects and events within the immediate environment **402** willingly observe, question, and explore *Evident when students, for example,* • ask "why" and "how" questions about observable events • ask many questions related to what is being studied • participate in show-and-tell activities, bringing objects from home or sharing a story or an observation • ask questions about what scientists do • express enjoyment from being read to from science books • seek out additional information from library books and digital discs • express enjoyment in sharing science-related information gathered from a variety of sources, including discussions with family members and friends • ask to use additional science equipment to observe objects in more detail • express the desire to find answers by exploring and conducting simple experiments	**403** consider their observations and their own ideas when drawing a conclusion **404** appreciate the importance of accuracy **405** be open-minded in their explorations *Evident when students, for example,* • raise questions about the world around them • willingly record observations in a given format • compare results of an experiment with other classmates • use observations to draw a conclusion or verify a prediction • take the time to measure with care • willingly explore a change and its effects • choose to follow directions when they complete a simple investigation • express the desire to find answers by conducting simple experiments

Key-Stage Curriculum Outcomes: Attitudes

By the end of grade 3, students will be expected to

Collaboration	Stewardship	Safety
406 work with others in exploring and investigating *Evident when students, for example,* • willingly share ideas and materials • respond positively to others' questions and ideas • take on and fulfil a variety of roles within the group • participate in science-related activities with others, regardless of their age or their physical or cultural characteristics • respond positively to other people's views of the world	**407** be sensitive to the needs of other people, other living things, and the local environment *Evident when students, for example,* • ensure that living things are returned to an adequate environment after a study is completed • demonstrate awareness of the need for recycling and willingness to take action in this regard • show concern for other students' feelings or needs • care for living things that are kept in their classroom • clean reusable materials and store them in a safe place • willingly suggest how we can protect the environment	**408** show concern for their safety and that of others in carrying out activities and using materials *Evident when students, for example*, • are attentive to the safe use of materials • insist that classmates use materials safely • act with caution in touching or smelling unfamiliar materials, refrain from tasting them, and encourage others to be cautious • point out to others simple and familiar safety symbols • put materials back where they belong • follow given directions for set-up, use, and clean-up of materials • wash hands before and after using materials, as directed by the teacher • seek assistance immediately for any first-aid concerns like cuts, burns, and unusual reactions • keep the workstation uncluttered, with only appropriate materials present

Curriculum Guide Organization

Specific curriculum outcomes are organized into units for each grade level. Each unit is organized by topic. Suggestions for learning, teaching, assessment, and resources are provided to support student achievement of the outcomes.

The order in which the units of a grade appear in the guide is meant to suggest a sequence. In some cases, the rationale for the recommended sequence is related to the conceptual flow across the year. That is, one unit may introduce a concept that is then extended in a subsequent unit. Likewise, one unit may focus on a skill or context that will be built upon later in the year.

Some units or certain aspects of units may also be combined or integrated. This is one way of assisting students as they attempt to make connections across topics in science or between science and the real world. In some cases, a unit may require an extended time frame to collect data on weather patterns, plant growth, etc. These cases may warrant starting the activity early and overlapping it with the existing unit. In all cases, the intent is to provide opportunities for students to deal with science concepts and scientific issues in personally meaningful and socially and culturally relevant contexts.

Unit Organization

Each unit begins with a two-page synopsis. On the first page, introductory paragraphs provide a unit overview. These are followed by a section that specifies the focus (inquiry, problem solving, and/or decision making) and possible contexts for the unit. Finally, a curriculum links paragraph specifies how this unit relates to science concepts and skills addressed in other grades so teachers will understand how the unit fits with the students' progress through the complete science program.

The second page of the two-page overview provides a table of the outcomes adapted from the *Common Framework of Science Learning Outcomes K to 12* that the unit will address. The numbering system used is the one in the pan-Canadian document as follows:

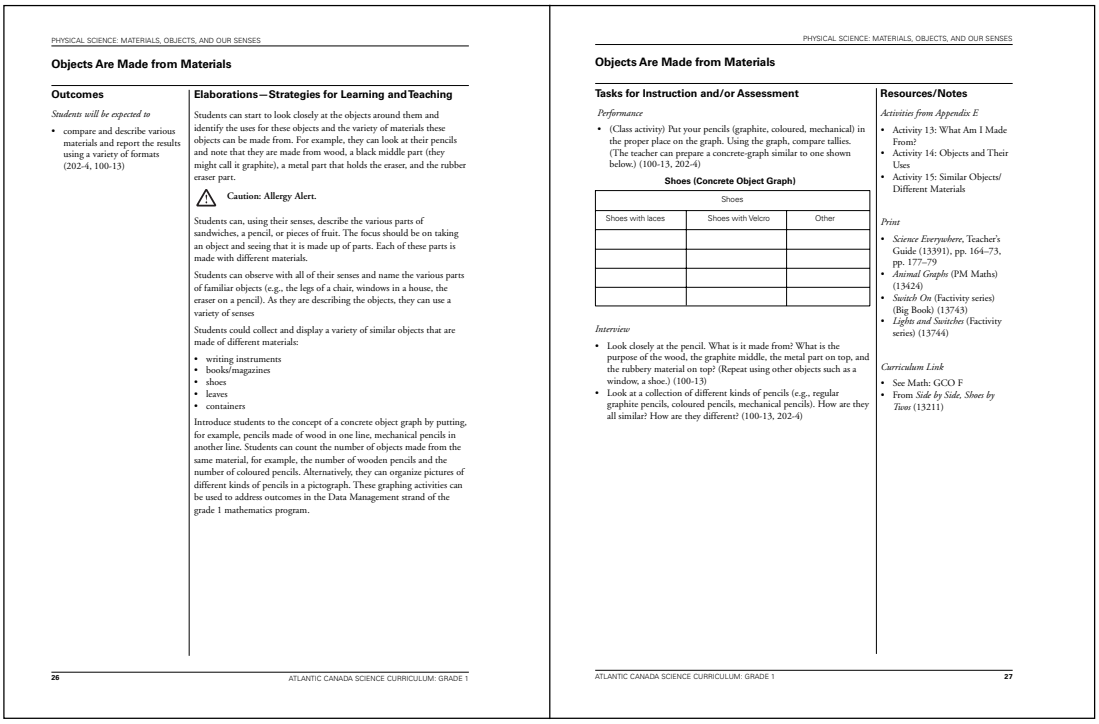
- 100s—Science-Technology-Society-Environment (STSE) outcomes
- 200s—Skills outcomes
- 300s—Knowledge outcomes
- 400s—Attitude outcomes (see pages 14–16)

These code numbers appear in parentheses after each specific curriculum outcome (SCO).

The Four-Column Spread

All units have a two-page layout of four columns as illustrated below. In some cases, the four-column spread continues to the next two-page layout. Outcomes are grouped by a topic indicated at the top of the left-hand page.

Two-Page, Four-Column Spread



PHYSICAL SCIENCE: MATERIALS, OBJECTS, AND OUR SENSES

Objects Are Made from Materials

Outcomes

Students will be expected to

- compare and describe various materials and report the results using a variety of formats (202-4, 100-13)

Elaborations—Strategies for Learning and Teaching

Students can start to look closely at the objects around them and identify the uses for these objects and the variety of materials these objects can be made from. For example, they can look at their pencils and note that they are made from wood, a black middle part (they might call it graphite), a metal part that holds the eraser, and the rubber eraser part.

⚠ **Caution: Allergy Alert.**

Students can, using their senses, describe the various parts of sandwiches, a pencil, or pieces of fruit. The focus should be on taking an object and seeing that it is made up of parts. Each of these parts is made with different materials.

Students can observe with all of their senses and name the various parts of familiar objects (e.g., the legs of a chair, windows in a house, the eraser on a pencil). As they are describing the objects, they can use a variety of senses

Students could collect and display a variety of similar objects that are made of different materials:

- writing instruments
- books/magazines
- shoes
- leaves
- containers

Introduce students to the concept of a concrete object graph by putting, for example, pencils made of wood in one line, mechanical pencils in another line. Students can count the number of objects made from the same material, for example, the number of wooden pencils and the number of coloured pencils. Alternatively, they can organize pictures of different kinds of pencils in a pictograph. These graphing activities can be used to address outcomes in the Data Management strand of the grade 1 mathematics program.

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PHYSICAL SCIENCE: MATERIALS, OBJECTS, AND OUR SENSES

Objects Are Made from Materials

Tasks for Instruction and/or Assessment

Performance

- (Class activity) Put your pencils (graphite, coloured, mechanical) in the proper place on the graph. Using the graph, compare tallies. (The teacher can prepare a concrete-graph similar to one shown below.) (100-13, 202-4)

Shoes (Concrete Object Graph)

Shoes		
Shoes with laces	Shoes with Velcro	Other

Interview

- Look closely at the pencil. What is it made from? What is the purpose of the wood, the graphite middle, the metal part on top, and the rubbery material on top? (Repeat using other objects such as a window, a shoe.) (100-13)
- Look at a collection of different kinds of pencils (e.g., regular graphite pencils, coloured pencils, mechanical pencils). How are they all similar? How are they different? (100-13, 202-4)

Resources/Notes

Activities from Appendix E

- Activity 13: What Am I Made From?
- Activity 14: Objects and Their Uses
- Activity 15: Similar Objects/ Different Materials

Print

- *Science Everywhere*, Teacher's Guide (13391), pp. 164–73, pp. 177–79
- *Animal Graphs* (PM Maths) (13424)
- *Switch On* (Factivity series) (Big Book) (13743)
- *Lights and Switches* (Factivity series) (13744)

Curriculum Link

- See Math: GCO F
- From *Side by Side, Shoes by Twos* (13211)

ATLANTIC CANADA SCIENCE CURRICULUM: GRADE 1 27

Column One: Outcomes

The first column provides the specific curriculum outcomes. These are based on the pan-Canadian *Common Framework of Science Learning Outcomes K to 12*. The statements involve the Science-Technology-Society-Environment (STSE), skills, and knowledge outcomes indicated by the outcome number(s) that appears in parentheses after the outcome. Some STSE and skills outcomes have been written in a context that shows how these outcomes should be addressed.

Specific curriculum outcomes have been grouped by topic. Other groupings of outcomes are possible and in some cases may be necessary to take advantage of local situations. The grouping of outcomes provides a suggested teaching sequence. Teachers may prefer to plan their own teaching sequences to meet the learning needs of their students.

In grade 1, the STSE and knowledge outcomes are combined.

Column one and column two define what students are expected to learn and be able to do.

Column Two: Elaborations—Strategies for Learning and Teaching

The second column may include elaborations of outcomes listed in column one and describes learning environments and experiences that will support students' learning.

The strategies in this column are intended to provide a holistic approach to instruction. In some cases, they address a single outcome; in other cases, they address a group of outcomes.

Column Three: Tasks for Instruction and/or Assessment

The third column provides suggestions for ways in which students' achievement of the outcomes could be assessed. These suggestions reflect a variety of assessment techniques and materials that include, but are not limited to, informal/formal observation, performance, journal, interview, paper and pencil, presentation, and portfolio. Some assessment tasks may be used to assess student learning in relation to a single outcome, others to assess student learning in relation to several outcomes. The assessment item identifies the outcome(s) addressed by the outcome number in parentheses after the item.

Column Four: Resources/Notes

This column includes activities to support student achievement in meeting specific curriculum outcomes found in Appendices E–G of this guide; National Geographic *Windows on Literacy* activities and text; *Science Everywhere* teacher's guide; print resources available through the Nova Scotia School Book Bureau (order numbers are listed beside titles); videos available through Education Media Library, Learning Resources and Technology (call numbers listed beside title); as well as links to other curriculum areas, where applicable. This column also provides an opportunity for teachers to make notes about other useful resources.

Physical Science: Materials, Objects, and Our Senses

Introduction

Our awareness of our environment, and the many materials found within it, is based on our sensory experiences. Through the wonders of our senses, we can make distinctions by recognizing things that may be good to eat, things that may pose dangers, materials that may be "harder" or "softer," or things that we may want to use. Our senses are immediate and automatic, but the ability to use our senses safely and effectively involves focus, discernment, awareness, and judgment.

The materials and objects around us have a wide variety of properties, representing the rich and diverse environments in which we live. Initially, young children may not make a clear distinction between objects and materials; however, through guided experiences that require careful and critical use of the senses, students can be encouraged to refine and become aware of their skills of observation. Students can also discover that the selection of materials is related to the purpose of the object.

⚠ **Caution: Before any activity involving food or scents, students with allergies should be identified. Show students how to waft odours toward their noses as a safe technique for smelling unknown materials. An activity involving food or scents will be noted as an "Allergy Alert" throughout this unit. Where an allergy has been identified, an alternative activity/materials should be sought.**

Focus and Context

Inquiry, with an emphasis on observation, is the focus for this unit. Students explore the world around them through their senses, making observations that will involve seeing, hearing, tasting, touching, and smelling. They use these senses to investigate the properties of objects and materials.

Science Curriculum Links

A variety of contexts could be used for this unit. Early in the school year, senses could be introduced using students' knowledge of food and the classroom pets that are being cared for throughout the year for the needs and characteristics of living things. As the students move into investigating objects and the materials they are made from, their toys and school supplies can be used for exploration. In constructing new objects, construction materials like straws, playdough, Popsicle sticks, and paper can be used.

Students may have investigated their senses in primary. This grade 1 unit will give students the background they need for a grade 2 unit, Properties of Liquids and Solids; a grade 3 unit, Materials and Structures; and a grade 5 unit, Meeting Basic Needs and Maintaining a Healthy Body.

Curriculum Outcomes

The following Nova Scotia outcomes are based on the outcomes from *Common Framework of Science Learning Outcomes K to12*. See Appendix H for the original outcomes that these were derived from.

STSE/Knowledge	Skills
Students will be expected to	*Students will be expected to*
100-9 identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials	**202-4, 100-13** compare and describe various materials and report the results using a variety of formats
100-11, 101-3, 101-4 demonstrate and describe change in materials using the five senses	**200-3, 200-4, 201-5, 203-3** predict and connect investigations on various materials recording the results
101-5, 103-3 select, explain, and describe ways to use appropriate materials while constructing objects	**200-2, 202-7, 203-1** identify, solve, and evaluate problems that arise while constructing objects

The Senses

Outcomes

Students will be expected to

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)
- demonstrate and describe change in materials using the five senses (100-11, 101-3, 101-4)

Elaborations—Strategies for Learning and Teaching

Observations using all of the senses is one of the foundations of scientific exploration. Students will be used to relying on their sense of sight for making most observations and may not realize just how much they can sense without the use of their eyes. Students can try to guess the identity of a type of food by closing their eyes and smelling, touching, listening, and, if possible, tasting the food. Teachers can make up a blank chart for describing words and build on it as the school year progresses:

Words I Can Use to Describe

Property	Describing Words
colour	red, green, ...
taste	sweet, sour, ...

⚠ **Caution: Before doing any activity involving foods or scents, students with allergies should be identified. Show students how to waft odours towards their noses as a safe technique for smelling unknown materials.**

Students can try tasting something with their noses plugged so they can experience the effect of odours on the sense of taste. Students can use sugar as a material that can be changed. By smelling and tasting it, students can make observations about its properties. One change, students may suggest, would be to dissolve the sugar in water. Coloured sugar and different types of sugar may extend this activity. Students in groups of two or four might look at the coloured sugar and/or different types of sugar and report to the class. Students might know other ways to change sugar, and a class discussion might result from their ideas. Fruit is another example that might be used to demonstrate ways in which material can be changed.

Students can remain silent in a specific place and identify the sounds they hear. They can shake or move a container filled with small objects to try to identify its contents, or describe the sounds it makes. They can explore how the sounds of various musical instruments can be changed, or they can use a keyboard that can switch from one instrument to another to show how the same note can sound different depending on the instrument. Alternatively, students can use a variety of objects, such as glass, a comb, spoons, and rubber bands, to make sounds. Many of these activities can be used to address music outcomes.

The Senses

Tasks for Instruction and/or Assessment

Performance

- Smell and taste chocolate powder. Taste it again after adding water. Does it taste different? Does it smell different? [Teachers may choose to do something else, such as identifying the difference in cookies before and after they are baked (smell the dough, then taste and smell the cookies), or in a piece of fruit before and after it is left to ripen.] (100-11)
- Use a variety of cans or pots. Tap on the bottoms with a wooden spoon or drumstick and listen to the different sounds. Can you make it louder? Softer? (100-11, 101-3, 101-4)
- Fill containers with different amounts of water. Tap the top of the bottles or containers with a spoon, and note the difference in sounds created. (Teachers may assist students in filling bottles. Teachers may wish to use plastic containers and compare the results with glass.) (100-11, 101-3, 101-4)

Journal

- My favourite toy (food, animal) is ... It looks like this ... It smells like ... It feels ... It sounds like ... It tastes like ... Or have the student draw a picture. (100-9)
- Draw pictures in your journal reflecting similar feedback. (100-9)

Interview

- What senses would you use to describe the following: fur, plastic, bird, cat, dog, flower, perfume, whistle, drums, shakers, salt, sugar. What words would you use to describe them? (Students should use more than one of their senses in their descriptions.) (100-9)

Presentation

- Objects or pictures can be used for a collage to show that items can be identified using the five senses. You may choose to make separate posters or tables for each of the senses. (100-9)

Resources/Notes

Appendix D Activities

- Activity 1: Identifying the Senses
- Activity 2: Which Sense?
- Activity 3: Taste
- Activity 5: Hearing
- Activity 6: Senses Popping
- Activity 7: Sight
- Activity 8: Smell
- Activity 12: Senses and Safety

Print

- *Science Everywhere*, Teacher's Guide, pp. 80–112 (13391) Posters 3 and 4 (13390)
- *The Five Senses* (Factivity series) (13748)

Video

- *Our Five Senses* (23332) 15 min.

Curriculum Link

- See Health: GCO A

The Senses *(continued)*

Outcomes

Students will be expected to

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)
- demonstrate and describe change in materials using the five senses (100-11, 101-3, 101-4)

Elaborations—Strategies for Learning and Teaching

Students should be encouraged to explore and describe objects of different sizes, shapes, and textures in paper bags and to identify the objects using their sense of touch.

For example, take a fresh sheet of aluminium foil and crumple it to show the difference texture can make to appearance. Compare different sweaters and describe how different stitches can be put together to give many looks and textures (such as smooth, rough, ribbed). Note the appearance of cream before and after it has been shaken enough to curdle it.

Once students are able to make observations using their senses, every classroom or outside experience can be used as an opportunity to practise making observations. Teachers can emphasize safety precautions for using their senses (e.g., the use of safety goggles, wafting techniques for smelling materials, tasting only when given permission, not touching hot objects or corrosive materials).

Students could go on a field trip or a walk around the school grounds to explore using their senses. Students could draw pictures of things they heard, touched, smelled, saw, and tasted under supervision. They can play I Spy or try playing the same game with a senses twist I Hear, I Feel, I Smell, or I Taste, to see what they can determine using their senses. Finding descriptive words for some of the later versions of this game will be challenging for most students.

Students can tape various sounds and then replay them for their classmates to see if they can identify what the sounds are.

Students might explore how their sense of smell can help them identify when food has gone bad. For example, students could discuss previous experiences with food that has gone bad (mouldy bread, sour milk ...).

Students can see how they use their senses while observing their classroom pets or plants throughout the year. This outcome can be reinforced in the Daily and Seasonal Changes unit, as students can use their senses to describe the changes that occur from one season to the next. For example, in autumn, they can see the leaves changing colour, and they can feel the dryness of the fallen leaves.

Students could try to identify and describe objects without the use of one or more of the senses. For example, they can try to identify objects while blindfolded, with mittens on, covering their ears, or plugging their noses. Students could explore paper bags containing several objects of different sizes, shapes, and textures and identify the objects using their sense of touch.

The Senses *(continued)*

Tasks for Instruction and/or Assessment

Informal/Formal Observation

- Observe students as they attempt to (100-9)
  - identify the senses as they use them
  - describe the objects using more than one of their senses
  - use a variety of describing words (examples to observe—yarn, vinegar, sugar, wood, mug, and building blocks)

Interview

- Describe this piece of aluminium foil. Can you change the way it looks? How? What does it look like now? (100-11, 101-3, 101-4)
- Compare a ball of yarn to knitted sweaters, and describe the differences in how they look. (Show students a variety of sweaters, some with plain knitting, turning them inside out to see the texture of the reverse side, some with cables or other textured designs.) (100-11, 101-3, 101-4)

Paper and Pencil

- Describe what you observed on your field trip. (101-4, 100-9)
- Develop a class senses chart to record students' observations. (101-4, 100-9)

Senses Chart

Object	Student's Observations				
	Sight	Touch	Taste	Hear	Smell
seaweed	green, floating, brown	cold, wet		loud	salty

Resources/Notes

Appendix D Activities

- Activity 4: The Changing Taste
- Activity 9: Sight
- Activity 10: Sight
- Activity 11A: Changing Materials
- Activity 11B: Touch

Print

- *Science Everywhere*, Teacher's Guide (13391) pp. 80–112, Posters 3 and 4 (13390)
- See Appendix G: Print Resources

Curriculum Link

- See Health: GCO B

Objects Are Made from Materials

Outcomes

Students will be expected to

- compare and describe various materials and report the results using a variety of formats (202-4, 100-13)

Elaborations—Strategies for Learning and Teaching

Students can start to look closely at the objects around them and identify the uses for these objects and the variety of materials these objects can be made from. For example, they can look at their pencils and note that they are made from wood, a black middle part (they might call it graphite), a metal part that holds the eraser, and the rubber eraser part.

Caution: Allergy Alert.

Students can, using their senses, describe the various parts of sandwiches, a pencil, or pieces of fruit. The focus should be on taking an object and seeing that it is made up of parts. Each of these parts is made with different materials.

Students can observe with all of their senses and name the various parts of familiar objects (e.g., the legs of a chair, windows in a house, the eraser on a pencil). As they are describing the objects, they can use a variety of senses

Students could collect and display a variety of similar objects that are made of different materials:

- writing instruments
- books/magazines
- shoes
- leaves
- containers

Introduce students to the concept of a concrete object graph by putting, for example, pencils made of wood in one line, mechanical pencils in another line. Students can count the number of objects made from the same material, for example, the number of wooden pencils and the number of coloured pencils. Alternatively, they can organize pictures of different kinds of pencils in a pictograph. These graphing activities can be used to address outcomes in the Data Management strand of the grade 1 mathematics program.

Objects Are Made from Materials

Tasks for Instruction and/or Assessment

Performance

- (Class activity) Put your pencils (graphite, coloured, mechanical) in the proper place on the graph. Using the graph, compare tallies. (The teacher can prepare a concrete-graph similar to one shown below.) (100-13, 202-4)

Shoes (Concrete Object Graph)

Shoes		
Shoes with laces	Shoes with Velcro	Other

Interview

- Look closely at the pencil. What is it made from? What is the purpose of the wood, the graphite middle, the metal part on top, and the rubbery material on top? (Repeat using other objects such as a window, a shoe.) (100-13)
- Look at a collection of different kinds of pencils (e.g., regular graphite pencils, coloured pencils, mechanical pencils). How are they all similar? How are they different? (100-13, 202-4)

Resources/Notes

Appendix D Activities

- Activity 13: What Am I Made From?
- Activity 14: Objects and Their Uses
- Activity 15: Similar Objects/ Different Materials

Print

- *Science Everywhere*, Teacher's Guide (13391), pp. 164–73, 177–79
- *Animal Graphs* (PM Maths) (13424)
- *Switch On* (Factivity series) (Big Book) (13743)
- *Lights and Switches* (Factivity series) (13744)

Curriculum Link

- See Math: GCO F
- From Side by Side Grade 1 Classroom Library, *Shoes by Twos* (13211)

Properties of Materials

Outcomes

Students will be expected to

- predict and connect investigations on various materials recording the results (200-3, 200-4, 201-5, 203-3)

Elaborations—Strategies for Learning and Teaching

Students will start to look more closely at various types of materials, the different forms they can take, and the properties that they have. Opportunities for both open-ended exploration of materials and explorations in which students follow simple steps should be undertaken.

A focus on materials can be initiated by making displays featuring one type of material (e.g., displays of objects made with plastic, paper, wood) or sorting activities whereby students sort objects into groups based on the materials they are made from. These will allow students to see the different forms materials can take.

From exploratory activities in which students investigate the properties of materials, students can make predictions about similar materials. This should lead to discussions about the type of objects that could be made from a material with the determined properties. For example, students can suggest which materials would be appropriate for building a bridge, a house, a bowl, or a swing. Literature can be used as a context. Students may try to predict which material would be the best to make a house for the pigs in the story *The Three Little Pigs*, for example, or a bridge for the story *The Three Billy Goats Gruff*.

Students can use their senses to explore, describe, and test their predictions about the properties of materials. Some of the properties of materials that students could explore are hardness, roughness, texture, colour, strength, odour, flexibility, stretch, and transparency. Teachers can devise simple procedures for students to follow to test some properties. For example, students may use simple procedures to test the strength of paper straws versus plastic straws by hanging paper clips from them until they bend. Alternatively, they could test the stretch of rubber bands when similar masses are hung from them.

Students can also devise their own methods for testing certain properties, like hardness or flexibility. They will do this naturally, by bending, stretching, rolling, and smelling the materials. Encourage them to describe what they are observing as they explore the various materials.

Teachers can make a chart listing a variety of materials and use the students' descriptions of the properties from the previous paragraph to fill in the chart.

Properties of Materials

Tasks for Instruction and/or Assessment

Informal/Formal Observation

- Observe students as they explore materials.
  - Student shares information with his/her classmates.
  - Student will make suggestions as to how to improve a test or procedure. (200-3, 200-4, 201-5, 203-3)

Performance

- Sort materials from the strongest to the weakest. Which of the materials here do you think is the strongest? Have students make a prediction. (Provide students with a variety of materials, such as paper, cardboard, paper towel.)

  Balance each piece of material over the ends of two paper cups, placed about 4 cm apart. Add pennies or washers, one at a time, until the material breaks or caves in.

  In a concrete-object chart, lay the pennies or washers that it took to break or bend each material. (200-3, 200-4, 201-5, 203-3)

Strength of Materials Chart

Materials	Prediction (# of pennies/washers)	Observations
Paper		
Cardboard		
Paper towel		

Interview

- How are these things alike? How are they different?

  (Teachers can display a variety of objects made out of the same material, e.g., plastic: blocks, plastic toys, plastic bags, plastic straws, plastic rulers.) (201-5, 203-3)

Resources/Notes

Appendix D Activities

- Activity 16: To Hold or Not to Hold
- Activity 17: The Strength of the Straw
- Activity 18: Properties of Materials

Print

- *Science Everywhere*, Teacher's Guide (13991), pp. 226–30, Poster 11 (13390)
- National Geographic: *Windows on Literacy*, Teacher's Guide, Emergent Stage, pp. 42–45, 146–49, 190–93; Early Stage, pp. 78–81; Fluent Stage, pp. 98–101
- *Wood, Toys, Bricks, Wood, and Stones, Hairy Harry, Magnets*, National Geographic (*Windows on Literacy*) (13150)
- *Fasten It* (Factivity series) (13770)
- See Appendix G: Print Resources.

Videos

- *What Is ... a Door?* (23343) 4 min.
- *What Is ... a Fence?* (23342) 4 min.
- *What Is ... a Wall?* (23344) 4 min.
- *What Is ... a Window?* (23345) 4 min.

Constructing Objects

Outcomes

Students will be expected to

- select, explain, and describe ways to use appropriate materials while constructing objects (101-5, 103-3)
- identify, solve, and evaluate problems that arise while constructing objects (200-2, 202-7, 203-1)

Elaborations—Strategies for Learning and Teaching

When students have identified that various materials have certain properties, they should then be prepared to use these properties to select appropriate materials for the objects that they will construct.

Students are to try to solve a problem or task involving a variety of senses. Some examples are to

- design and create a simple device that can make a variety of sounds
- design and create a container that can hold sand
- design and create a container that can hold the most marbles without breaking
- design a house for the *Three Little Pigs*
- design a bridge for the *Three Billy Goats Gruff*

Students can also explore how objects can be made from recycled or reused material. They can make objects out of used materials, for example,

- make an ornamental wreath out of garbage bags
- make a rag rug
- make a puppet out of old socks

Before they create their product, students should do activities that demonstrate various ways of joining materials. Twisted paper clips with straws, soaked peas stuck into toothpicks and left to dry, safety glue with stir sticks, Velcro, marshmallows stuck on toothpicks, and other methods of joining materials can be used.

⚠ **Caution: Students are not to eat these materials or put them in their mouths—students can choke on some of the smaller substances.**

Working in pairs, students can plan their design and talk together about the materials that they are going to use and how they will join them. As problems arise during the design and construction phases, students work together to solve them.

When they have finished their construction, they can show their product to the rest of the class and explain what it does and why they chose the materials and design that they did. The products that they make should be of their own design and, as such, will not all be the same as others in their class.

Constructing Objects

Tasks for Instruction and/or Assessment

Performance

- Provide students with a variety of materials, including materials for joining and cutting, such as glue, twist ties, marshmallows. Which materials seem to join the best? Which hold really well? (200-2, 202-7, 203-1)
- Use a variety of materials to construct a structure.
  - Students will discuss the appropriateness and performance of the selected materials. (101-5, 200-2, 202-7, 203-1)
- Using a variety of materials, design a tower that is strong enough to balance a book on. (101-5, 200-2, 202-7, 203-1)

Journal

- In this unit, I built a ... I learned all about ... I liked building the ... because ... (Students may draw pictures, and choose words from a list.) (202-7)

Interview

- Tell me some of the problems that you had while you were constructing your ... How did you solve them? (200-2, 202-7, 203-1)

Presentation

- Create a poster that shows pictures or drawings of things that can be recycled and things that can be reused. (103-3)

Portfolio

- Choose a piece of work that you are most proud of from this unit. Tell what you like about your work. (101-5, 103-3)

Resources/Notes

Appendix D Activities

- Activity 19: Make a Rainstick
- Activity 20: How Pencils Are Made
- Activity 21: Handmade Paper
- Activity 22: Build It!

Print

- *Science Everywhere*, Teacher's Guide (13391), pp. 231–39, Posters 11 and 12 (13390)
- National Geographic: *Windows on Literacy*, Teacher's Guide, Emergent Stage, pp. 66–69, 194–97
- *Making a Hat, You Can Make a Pom Pom*, National Geographic (*Windows on Literacy*) (13150)
- *Homes Everywhere* (Big Book) (13581)

Videos

- *How Do They ... Make Oatmeal Cookies?* (23346) 4 min.
- *How Do They ... Knit a Chain-link Fence?* (23347) 4 min.
- *How Do They ... Make Money?* (23348) 4 min.
- *How Do They ... Put the Centres in Chocolates?* (23349) 4 min.
- *How Do They ... Make Potato Chips?* (23350) 4 min.
- *How Do They ... Braid Rope?* (23351) 4 min.
- *How Do They ... Recycle Paper?* (23352) 4 min.
- *How Do They ... Recycle Steel?* (23353) 4 min.

Curriculum Links

- See Health: GCO C
- Building projects will naturally provide an opportunity to explore properties of geometric solids. See Math: GCO E.

Life Science: Needs and Characteristics of Living Things

Introduction

Students in grade 1 are interested in a wide variety of living things, including those found in their local environments and ones from afar. A study of living things provides an opportunity for students to discover the many different forms life takes. Students can observe similarities and differences and develop an understanding of the general characteristics of living things. Through this study, students also become aware that all living things—including themselves—have needs. They discover that some of the needs of organisms are similar, while others may be unique.

Focus and Context

The focus of this unit is inquiry. Instruction should provide many opportunities for students to participate in open-ended investigations involving living things. Students should have many opportunities to make first-hand observations of plants and animals inside and outside of the classroom. These observations will lead to grouping organisms based on similar characteristics, the beginnings of classification. The investigations will also lead to an awareness of the dynamic nature of life: all living things are interdependent and must take an active role in obtaining the necessities of life.

Classroom Pets, Farm Animals, Creatures of the Tundra, or Ocean Creatures are a few of the many contexts that this unit could have. The local environment and the creatures and plants that live there should be the determining factor in deciding the most appropriate context for this unit.

Science Curriculum Links

This unit will lead to a grade 2 unit, Animal Growth and Changes, and a grade 3 unit, Plant Growth and Changes, both of which focus on life cycles.

Curriculum Outcomes

The following Nova Scotia outcomes are based on the outcomes from *Common Framework of Science Learning Outcomes K to12*. See Appendix H for the original outcomes that these were derived from.

STSE/Knowledge	Skills
Students will be expected to	*Students will be expected to*
103-2 recognize that humans and other living things depend on their environment and identify personal actions that can contribute to a healthy environment	**201-5, 100-8, 203-2** identify, conduct, measure, and record observations about animals and plants using appropriate terminology
100-8 identify and investigate common characteristics of humans	**203-4** listen and respond to another student's description of an animal or plant.
	200-1, 100-4, 100-5, 100-7 question, explore, observe, and identify the similarities and differences in how living things are able to meet their needs
	201-7 identify and use a variety of materials, information, and ideas to explore balance

Characteristics of Living Things

Outcomes

Students will be expected to

- identify, conduct, measure, and record observations about animals and plants using appropriate terminology (201-5, 100-8, 203-2)
- listen and respond to another student's description of an animal or plant (203-4)

Elaborations—Strategies for Learning and Teaching

Throughout this unit, children are encouraged to use their five senses while making observations of classroom or visiting pets, such as fish, gerbils, or other appropriate animals, and of plants grown in the classroom or out in the school yard. Activities could start by comparing humans to other animals and then comparing animals to plants.

Terms such as legs, wings, ears, roots, and stems could be used to describe living things. A bird feeder set up at home or at school could attract various types of birds for students to observe and note their characteristics. Students could collect insects in clear, plastic bottles with holes in the lids and observe them, taking note of things such as the number of wings, legs, and antennae, and then return the insects after observation. These experiences can be extended with visits to farms, aquariums, a zoo or zoos, nature parks, or any other setting with live animals and plants. This will encourage students to show interest and curiosity about living things within their immediate environment. Other extensions could include the use of print resources, videos, and software.

In the classroom, teachers model recording strategies as they use tallies to create concrete graphs, picture graphs, and pictographs. This will also address outcomes from the Data Management strand in the grade 1 mathematics program. For example, students could use pictures of chickens, pigs, and cows to make a picture graph of the number of animals at a farm they visited. They could use non-standard units of measuring, such as "longer stem" or "shorter ears." They could make a concrete graph using themselves to illustrate the number of students in the class with certain eye colours. This could be done with one half of the class at a time so that the other half can see the graph.

Invite the students to brainstorm characteristics of humans. These characteristics could be divided into two categories—characteristics that are common to most people (such as hands, eyes) and characteristics that are unique to people (such as eye colour and hair colour). (Be sensitive to students' feelings, and do not do activities in which individual students are stigmatized for physical characteristics.) Teachers could use classroom literature and other resources to illustrate the diversity of characteristics.

Students can each take turns describing a feature of an animal or plant, and help each other with describing words.

Using the accumulated records of observations of different animal characteristics, encourage students to identify similarities and differences and group similar animals together. For example, they may group animals based on how many legs they walk on, whether they have wings or not, or whether they live in the water. They could group plants into trees, flowers, and shrubs or base the groups on the number or shapes of leaves.

Characteristics of Living Things

Tasks for Instruction and/or Assessment

Performance

- Have students collect pictures of plants or animals highlighting specific characteristics and display them in a collage format. (201-5, 203-2, 100-8)
- Group pictures of animals according to their characteristic. (201-5)
- Sort plants into groups. Describe the characteristics that you used to group them to your classmates. (201-5)

Paper and Pencil

- Complete the chart. On the back, draw a picture of your favourite animal. (100-8)

Can You See the Difference?

Characteristics	Human	Cat	Fish	Bird
Legs	2			
Eyes	2			
Ears	side of head			
Fur, feathers, or skin	skin			
Moves by ...	walking, running, swimming			

Teacher Note: *Instead of using words in the chart, pasting pictures in each column/row may be more suitable at grade 1.*

Presentation

- Tell us about your favourite animal or plant. (201-5, 203-4)
  - What type of animal/plant did you choose?
  - Where does your animal/plant live?
  - Where does your animal/plant get nourishment?
  - How does your animal/plant breathe?

Resources/Notes

Appendix E Activities

- Activity 23: The Bird Feeder
- Activity 24: Hungry Plants
- Activity 25: Topsy Turvy
- Activity 26: Sorting Rule
- Activity 27: Attached Ears
- Activity 28: Tongue Rolling
- Activity 29: Beanie Baby Bonanza

Print

- *Science Everywhere*, Teacher's Guide (13391), pp. 200–02, Poster 9
- National Geographic: *Windows on Literacy*, Teacher's Guide, Early Stage, pp. 42–54, pp. 142–45; Fluent Stage, pp. 42–45, 54–57, 122–25, 135–37
- *A Frog Has a Sticky Tongue; Seeds Grow into Plants; Sea and Land Animals; Big Red Tomatoes; Corn;* and *Peanuts*, National Geographic (*Windows on Literacy*) (13150)
- *Animal Teeth* (13509)
- *Amazing Animals* (Big Book) (13341)
- *What Can Jump?* (13508)

Video

- *Animal Parts* (23329) 15 min.

Curriculum Links

- See Health: GCO A

Needs of Living Things

Outcomes

Students will be expected to

- question, explore, observe, and identify the similarities and differences in how living things are able to meet their needs (200-1, 100-4, 100-5, 100-7)
- recognize that humans and other living things depend on their environment and identify personal actions that can contribute to a healthy environment (103-2)

Elaborations—Strategies for Learning and Teaching

Classroom discussion will generate questions such as, Which of these things is alive? and What does it need to live? These questions can provide a focus for this part of the unit. Living things grow and change, require air, food and water. Some questions that might be posed are, How do they eat? How often should I water this plant? or How much water do I use? Students could discuss how they care for a pet and/or plants.

Students could observe and care for their classroom and/or visiting animals or plants, as well as focus on a wide range of animals using a variety of resources (film, software, print), to learn how animals meet their needs. Students could explore ways in which different animals adapt to changes in temperature (hibernation, migration) and the ways in which the various animals move (flying, swimming, running) that help them live in their environments. Similarities and differences in the ways in which different animals get their food and protect themselves from danger can be explored. Students can also grow simple plants from seeds, take care of the plants as they grow, and see what their needs are.

They should try to predict which group of animals will fly, which will crawl, which will jump, or which will slide. Students could look at pictures of fish, birds, reptiles, and other types of animals and try to predict how they will move.

Opportunities should be provided for students to use a variety of sources of information (such as observing living things, books, videos, software, Internet) to find answers to their questions.

Using their knowledge of the needs of living things, students could investigate how people care for plants and animals in order to make sure that their needs are met. This can be compared to how plants and animals growing in the wild meet their needs. This is an opportunity to introduce the concept of technology as the means by which people manage their environment for their own needs.

Students should start to explore how important it is to take care of plant and animal habitats. Teachers can incorporate their class or school's environmental projects or initiatives into this unit.

Needs of Living Things

Tasks for Instruction and/or Assessment

Informal/Formal Observation

- Note the types of questions that students ask about living things. (100-5)
- Look at pictures of different animals and describe how they move. (200-1, 100-4, 100-5, 100-7)

Performance

- Plant a seed (e.g., bean) and use your knowledge of needs of living things to care for it. (200-1, 100-4, 100-5, 100-7)
- Take a walk around your school yard, looking for signs of pollution. Draw pictures of what you saw. (103-2)

Interview

- What kind of things would you do to take care of a plant? What would you do differently if you had to take care of a horse? (200-1, 100-4, 100-5, 100-7)
- In what different ways do animals move to get food or escape from other animals? (100-7)
- How would a bird move from one tree to another? (100-7)
- How would a baby girl or boy get to its toy? (100-7)
- How could you find additional information about plants/or animals? (Examples: CD-ROM, videos, visits to a zoo or zoos, books, Internet) (200-1)

Resources/Notes

Appendix E Activities

- Activity 30: Big and Strong
- Activity 31: Looking at Leaves
- Activity 32: Water, Water Everywhere
- Activity 33: A Day in My Life

Print

- *Science Everywhere*, Teacher's Guide (13391), pp. 192–99, Poster 9, pp. 203–18, Posters 9 and 10 (13390)
- National Geographic: *Windows on Literacy*, Teacher's Guide, Emergent Stage, pp. 94–97; Early Stage, pp. 54–57, 126–29, 162–65, 170–73; Fluent Stage, pp. 70–73, 138–41
- *People Build Dams; Animal Armour; Plants on My Plate; The Penguin Chick; Water, Land, and Air; Going up the Mountain;* and *Soil*, National Geographic (*Windows on Literacy*) (13150)
- *Living Things* (Factivity series) (Big Book) (13747)
- *Growing Up* (Factivity series) (13753)
- *Seeds and Plants* (Factivity series) (13752)
- *Animals around the World* (Big Book) (13504)
- *How to Grow a Sunflower* (Big Book) (13346)
- *Ahmed and the Nest of Sand* (13067)
- *Tangled in the Bay: The Story of a Baby Right Whale* (13065)

Videos

- *That's My Baby* (23320) 30 min.
- *Habitats* (23318) 15 min.
- *Home Sweet Home* (23321) 30 min.
- *Habitats: Homes for Living Things*, (23324) 18 min.
- *Plants: A First Look* (23315) 15 min.
- *What Is ... a Garden?* (23341) 4 min.

Investigating Balance

Outcomes

Students will be expected to

- identify and investigate common characteristics of humans (100-8)
- identify and use a variety of materials, information, and ideas to explore balance (201-7)

Elaborations—Strategies for Learning and Teaching

Challenge the students to balance an object on some part of their body. Can they balance an object like a pencil or a ruler on a finger? Can they balance a book or a beanbag on an outstretched foot? Provide time for the students to use balancing collections (large and small found objects such as paper rolls, wooden or plastic blocks, toys, Styrofoam blocks, plastic jars, or cardboard boxes) to find many ways to balance objects on some part of their bodies.

Students can develop questions to find out about and explore balance. Teachers can challenge students to balance an object on another object. Students can use objects such as rulers, metre sticks, pencils, or items from a balancing collection to create a balanced system of their own invention. Teachers can ask students to draw diagrams to build the same system the next day. While exact diagrams are not expected, the activity of making the diagram and revisiting it soon afterwards provides the student with an opportunity to experience the functional nature of diagrams.

The teacher can provide further balancing experiences using equal-arm balances, beginning with bucket balances. Student collections, such as 100 objects on the 100th day could be massed and graphed to show how the same amount of objects does not have the same mass. Challenges could include the following:

- Use a collection of different objects to balance the buckets. Draw the objects on each side of the balance.
- Use centicubes in one bucket to balance an attribute block in the other bucket. How many centicubes does it take?
- How many washers in one pan do you need to balance a toy car?

Encourage students to predict what they think it would take to balance ... What senses does this involve?

Students can look at pictures and determine different positions that objects use to balance on each other.

Investigating Balance

Tasks for Instruction and/or Assessment

Performance

- When balancing objects on a part of the body or on another object, can the student create a balanced system? (100-8)

Presentation

- Draw a diagram of the balanced system? (201-7)
- Describe the balanced system telling how it seems to be staying in balance? (201-7, 100-8)
- Can the student replicate a balanced system from a diagram? (201-7, 100-8)

Resources/Notes

Appendix E Activities

- Activity 34: Investigating Balance: An Introduction
- Activity 35: Observing Objects "In Balance"
- Activity 36: I Can Balance
- Activity 37: A Balanced System
- Activity 38: Introducing the Equal-Arm Balance
- Activity 39: My Predictions on Balancing

Print

- *As Heavy As*, PM Maths, Stage A (13424)
- See Appendix G: Print Resources

Curriculum Links

- See Math: GCO D (mass)

Earth and Space Science: Daily and Seasonal Changes

Introduction

In observing their environment, students become aware of things that change, including changes in physical factors, such as temperature, wind, or light, and changes in plants and animals found near their home. With guidance, students learn that changes often occur in cycles, including the relatively short cycle of day and night and the longer cycle of the seasons. Recognizing these patterns prepares students to discover relationships among events in their environment and between the environment and themselves.

Focus and Context

The inquiry focus in this unit will emphasize making observations of daily and seasonal events, recording these observations over time, and noting patterns or cycles that exist. The context for this unit is cycles. Students will learn that many things in life occur in cycles, and knowing about these cycles helps people make predictions and plan for the future.

This unit should be spread out over the whole school year, so that students can explore the seasonal changes that occur.

Science Curriculum Links

After the introduction to daily and seasonal changes in this unit, students will go on to investigate the causes of these changes in a unit on space in grade 6. They also look further into how animals and plants adapt to these changes in Habitats and Communities, grade 4, and Diversity of Life, grade 6.

Curriculum Outcomes

The following Nova Scotia outcomes are based on the outcomes from *Common Framework of Science Learning Outcomes K to12*. See Appendix H for the original outcomes that these were derived from.

STSE/Knowledge	Skills
Students will be expected to	*Students will be expected to*
101-6 describe ways of qualitatively measuring and recording environmental changes that occur in daily and seasonal cycles	**200-3, 203-2** identify and record the days of the week, the names of the seasons, and predict the type of weather for various seasons
100-14 observe and describe daily and seasonal changes in heat and light from the sun	**200-1, 102-4, 201-5** investigate and describe, using a variety of formats, how the daily changes affect the characteristics, behaviours, and locations of living things
103-4 investigate and describe human preparations for seasonal changes	**202-9, 102-5, 202-7, 203-1** predict and communicate questions and answers to investigations about seasonal changes and describe these changes
	202-2 place materials and objects in a sequence or group according to various sorts

Introduction to Cycles: Daily/Seasonal Changes in Heat and Light

Outcomes

Students will be expected to

- identify and record the days of the week, the names of the seasons, and predict the type of weather for various seasons (200-3, 203-2)
- describe ways of qualitatively measuring and recording environmental changes that occur in daily and seasonal cycles (101-6)

Elaborations—Strategies for Learning and Teaching

Students could display pictures of seasonal activities of humans and living things and of weather typical of various seasons. Discussions involving students describing their favourite weekly and seasonal activities will introduce the concept that the days of the week and the seasons have a sequence and that this sequence is repeated over and over. Teachers may wish to have a "Calendar Time" every morning, in which the date, day of the week, and month are identified.

Students and teachers can discuss how they are going to describe the changes that occur on a daily and seasonal basis. Discussion should focus on the types of language, drawings, and non-standard measurements that can be used to describe temperature (hot, warm, cold), light (light or dark, cloudy or sunny), position of the sun (drawing a picture of what they see when they look out the window and then drawing the sun at various times of the day), and types of precipitation (rain, fog, snow, sleet; perhaps using a bucket to measure the amount of rain or snow). This will prepare them for observing and recording environmental changes that occur in daily and seasonal cycles.

Students can go outdoors at various intervals during a day and note whether they feel it is hotter or colder. They will not be using thermometers at this level. However, a teacher may wish to show them one and use it at various times so they get the idea of what it is used for. This can be continued over the course of the school year so that students can see and feel that temperatures fluctuate on a daily and seasonal basis. They can also use their clothing as a measure of the temperature throughout the year. When it is cold, they wear clothing like mittens, hats, and parkas, and when it is warm, they wear clothing like swimming suits and shorts.

For observing the amount of sunlight, students can note the daily cycle of the sun rising and setting and the gradual darkness that occurs after the sun sets. Seasonal measurements would reflect the amount of daylight at various times of the school year. While students will probably be asleep when the sun rises, they will often see the sun set, and they can note trends by relating the sunset to daily activities they perform. For example, in the fall, the sun will set as they are going to bed, while in the winter, it will set before they have supper. In the summer, it may still be light when they are going to bed.

Introduction to Cycles: Daily/Seasonal Changes in Heat and Light

Tasks for Instruction and/or Assessment

Performance

- Use symbols representing sun, rain, snow, cloud, fog, and sleet to record daily weather conditions on a classroom calendar. Notice the types of precipitation over the various seasons. (101-6)
- For one week of every month, fill in the table.

  Teacher Note: *After each season, ask students to reflect on their findings. During which season do you get the most sunlight? the least sunlight?* (101-6)

Changes in Seasons

Month: (Student fills this in)		**Month: (Student fills this in)**		
Day of the Week (Student fills in)	Temperature (hot, cold, warm)	Rain, snow, fog, ...	Sunrise (relate to a daily activity)	Sunset (relate to a daily activity)
Monday			(e.g., before I got up)	(e.g., as I was eating supper)

Journal

- Every day, as the students fill in their journals, they can note the day of the week, the month, and the season. (200-3, 203-2)

Interview

- What is it like outside right now? Is it sunny or cloudy? Is it warm? What kind of clothes would you wear for this weather? (Repeat at various times during the day.) (203-2, 101-6)

Presentation

- Make a poster showing the kind of clothing worn in July and in December. (200-3, 203-2)

Resources/Notes

Appendix F Activities

- Activity 40: What Day Is It?
- Activity 41: Knowing the Seasons
- Activity 42: What Season Is It?
- Activity 43: What Is the Weather?
- Activity 44: Guess the Weather

Print

- *Science Everywhere*, Teacher's Guide (13391), pp. 66–69, Poster 2, pp. 249–54, Posters 13 and 14 (13390)
- National Geographic: *Windows on Literacy*, Teacher's Guide, Emergent Stage, pp. 122–25, 154–57; Early Stage, pp. 58–61, 154–57; Fluent Stage, pp. 190–93
- *Spring, Summer, Fall, Winter; Watch the Sky; Class Calender; The Night Sky;* and *Wind Power*, National Geographic (*Windows on Literacy*) (13150)
- *Changes in the Earth and Sky* (Factivity series) (Big Book) (13765)
- *Days of the Week*, PM Maths, Stage A (13424)

Introduction to Cycles: Daily/Seasonal Changes in Heat and Light *(continued)*

Outcomes

Students will be expected to

- observe and describe daily and seasonal changes in heat and light from the sun (100-14)

Elaborations—Strategies for Learning and Teaching

Students could observe and describe the types of precipitation that occur at various seasons of the school year.

Students can also note the position of the sun in the sky at different times of the day.

Caution: Students are not to look directly at the sun.

Where does the sun rise? Where does it set? Students can note these daily changes and do activities to see how their shadows change over the course of a day. To highlight daily changes in shadows, students could trace the shadow of a short straw that has been erected on a piece of paper by a window. The students could come back at another time of the day and trace the shadow again. Teachers may wish to encourage students to notice the differences in the position of the sun as it sets over the course of the school year. To highlight seasonal changes in the position of the sun and the resulting shadows (if desired), students could repeat the straw activity using a different piece of paper for each month and comparing the shadow lengths. The focus in these activities is on observing the position of the sun and the length of the shadows at various times, but not on explaining why this happens. When students investigate space in grade 6, they will explore the rotation of the Earth around the sun and propose explanations for shadow lengths.

Students could observe and describe the types of precipitation that occur at various seasons of the school year. Students can collect rain and snow in buckets or other containers and, using terms like “more than” or “less than,” describe the amounts of rain or snow that fell. They could also use non-standard units of measurement, such as how many pencils, crayons, or stir stick widths is the height of the rain in the container.

Students can make simple weather predictions related to the seasons, for example, predicting what the weather will be like in June or December.

Introduction to Cycles: Daily/Seasonal Changes in Heat and Light *(continued)*

Tasks for Instruction and/or Assessment

Performance

- Draw the position of the sun relative to a landmark such as a tree or mountain at various times during the day (morning, noon, and afternoon). (Repeat this activity for a week so that children will notice a movement pattern of the sun.) (100-14)

Caution: Do not look directly at the sun.

- (The teacher can pick two students to do this activity, with the other students watching.) With a partner and a piece of chalk, trace your feet on the pavement outside your school on a sunny day. Standing straight and still, ask your partner to mark on the pavement the end of your shadow. Repeat this at various times during the day, making sure to stand the same way each time. Answer the questions:
  - Is your shadow pointing the same way all day?
  - What happens to the length of your shadow during the day? (100-14)

Journal

- What happens to the sun as I go through my day? Where is it when I get on the bus? have my lunch? go to bed? (100-14)

Interview

- What would the weather be like during the winter break? What might the weather be like at Halloween? (100-14)
- When, during the day, is it usually warmer? When night comes, does it usually get warmer or colder? (100-14)

Presentation

- Cut out pictures of various types of clothes from advertising flyers. Sort and group the clothing according to seasonal use and different weather conditions. Create a poster from print resources to show the groupings. (100-14)

Resources/Notes

Appendix F Activities

- Activity 45: My Shadow
- Activity 46: Geometric Shadows
- Activity 47: The Warmth of the Sun
- Activity 48: Where Are the Clouds?
- Activity 49: Snow
- Activity 50: White Snow or Not?

Print

- *Science Everywhere*, Teacher's Guide (13391), pp. 63–65, Poster 1, pp. 118–29, Poster 5, pp. 130–46 (shadows with artificial light [light bulbs]), Poster 6 (13390)
- National Geographic: *Windows on Literacy*, Teacher's Guide, Emergent Stage, pp. 158–61; Early Stage, pp. 86–89, 178–81; Fluent Stage, pp. 182–85
- *Weather in the City; I Can See My Shadow; What Color Is the Sky?;* and *When a Storm Comes*, National Geographic (*Windows on Literacy*) (13150)
- *Season to Season*, Info Read (13462)
- See Appendix G: Print Resources

Daily Changes in Living Things

Outcomes

Students will be expected to

- investigate and describe, using a variety of formats, how the daily changes affect the characteristics, behaviours, and locations of living things (200-1, 102-4, 201-5)

Elaborations—Strategies for Learning and Teaching

In this part of the unit, students note the daily changes and cycles in living things. This section can reinforce the outcomes in the previous unit, Needs and Characteristics of Living Things.

Teachers should encourage students to ask questions about potential daily changes in a variety of living things. Some of their questions should be chosen for further exploration.

Students should keep track of their activities throughout the week to see what things they do on a daily basis (e.g., sleep at night, brush their teeth after eating, eat meals). Discussions should describe characteristics about themselves (such as sleepy, alert, hungry) and their location over the course of a day (such as bed, kitchen, playground, school).

If the students have pets, they can observe and record their activities to see their daily pattern. Students could note their natural habits and routines, such as when they sleep, as well as habits and routines that are established by the care they receive, and at feeding times.

Students could note the times of the day when the birds come to feed at a school or home bird feeder. Do different kinds of birds arrive at different times? Birds make excellent subjects to study, since they have daily cycles that are easily observable and well known. Many stories relate how a rooster crows at dawn or how an owl wakes up at night.

Students could explore, through print and electronic resources, about animals that are nocturnal, that is, sleep during the day and are awake at night. If any students have pet gerbils or hamsters, ask them to share the nighttime activities of these animals.

Students could explore through discussion the daily changes in plants. All plants change throughout the day, usually reacting to the presence or absence of sun. Some change more obviously than others, for example, pansies close up their flowers at night. Time-lapse videos or living species in the classroom can be used to show these changes.

Teachers might prompt the discussion by asking questions such as, Are there things you do every day ? What are things plants might do everyday? What about dogs or cats?

Daily Changes in Living Things

Tasks for Instruction and/or Assessment

Performance

- Complete the chart below. (200-1, 102-4, 201-5)

A Day in My Life

A record of the things I did today.		Name: _____ Date: _____	
Morning	Afternoon	Evening	Night

Interview

- What kind of things do you do at the same time each day or night (e.g., going to bed at night and getting up in the morning, eating breakfast)? (102-4)
- Do animals or plants do the same things at about the same time each day? Are there any plants or animals we could investigate to see if they have a daily routine too? What could we watch for? (200-1)
- Do birds sing when it is dark? Are there any animals that sleep during the day and are awake at night? What happens to flowers in the dark? What happens to flowers when the sun shines? (This should lead students to see that the time of day and sun affect the activity of plants and animals.) (102-4)

Resources/Notes

Appendix F Activities

- Activity 51: A Day in My Life

Print

- National Geographic: *Windows on Literacy*, Teacher's Guide, Emergent Stage, pp. 182–85
- *When the Rain Comes*, National Geographic (*Windows on Literacy*) (13150)
- *What Do I Do in a Day?* (Factivity series) (Big Book) (13769)
- See Appendix G: Print Resources

Seasonal Changes in Living Things

Outcomes

Students will be expected to

- predict and communicate questions and answers to investigations about seasonal changes and describe these changes (202-9, 102-5, 202-7, 203-1)
- place materials and objects in a sequence or group according to various sorts (202-2)

Elaborations—Strategies for Learning and Teaching

The suggestions on this page are meant to deal with the group of outcomes as a whole; thus there is not a strict alignment of suggestions to outcomes. As the school year progresses from late summer to fall, winter, and then spring, the various seasons can be highlighted throughout the classroom with pictures, displays, and outdoor walks. Students could identify questions about how living things cope with seasonal changes in temperature and the amount of light that happens in a season. The characteristics, behaviours, and locations of living things could be described by answering questions about them.

Students' questions about how living things cope with the seasons should form the basis for their investigations. Students could investigate how the amount of sunlight and temperature vary over the seasons by noting sunsets, sunrises, and the relative temperatures at various times of the day (qualitative: hotter, colder, types of clothing). They could note that in the winter, there is less sunlight, and the temperatures are colder. How living things cope with these changes is highlighted in this section.

A bird feeder could be set up outside of the school or home. Students could keep descriptions of the birds over the school year or season. They could note which ones do not show up at the feeder. This can be an introduction to the concept of migration. Depending on the local setting, students may be aware of other migratory species such as cod, caplin, whales, harp seals, caribou, geese, and ducks.

Students with dogs or cats should describe the changes that occur in their coats over the year, for example, shedding in spring and growing a thicker coat in autumn. Using printed or electronic media, students could research animals or plants that change colour over the year (snowshoe hares/rabbits).

There are various ways living things cope with seasonal changes, such as migration and hibernation. Many species have seasonal hibernation stages. Students could explore how and why certain animals can sleep for so long or go without food. Students can use interactive software, videos and print resources that illustrate the seasonal activities, behaviours, and locations of animals.

Students could investigate the changes that take place in plants. Students should observe the leaves and seeds falling from trees in the fall and seeds germinating and new leaves budding in the spring. They can draw pictures that show how the trees change over the seasons or use pictures from print resources. For example, predict that the leaves will fall in autumn, or predict that certain animals will hibernate during the winter.

Students could group pictures to depict the season they represent. Students should do various graphs and use the sorting rings to classify objects.

Seasonal Changes in Living Things

Tasks for Instruction and/or Assessment

Performance

- Select a tree in your community or at home. Observe it throughout the year, and draw the changes in the table or on a poster. Photographs may be used to show changes. (102-5, 202-7)

My Tree!

Fall	Winter	Spring

- Do a human bar graph of the students' birthdays by season. Have the students stand (by twos) in front of labels marked spring (March, April, May), summer (June, July, August), fall (September, October, November), and winter (December, January, February). Record results. (202-2)

Interview

- What happens in the fall? Do all trees lose their leaves? What do bears do to prepare for winter? What do rabbits do? What do geese do? What do people do? Have you noticed any changes in your pet? (This should lead to an understanding that animals will hibernate, migrate, or change their coats; some trees lose leaves.) (102-5, 202-7, 202-9)
- How does the way we dress depend on the weather? (202-2)

Paper and Pencil

- Predict the season: (203-1)
  - leaves fall off the tree
  - bears hibernate
  - squirrels start to hide their nuts and acorns
  - buds form on trees

Presentation

- Create posters to show behaviours or changes in living things in summer and winter (fish, bears, birds, trees, humans, etc.). (202-9, 102-5, 202-7, 203-1)
- Collect a variety of seasonal pictures and group them by the season they represent. (202-2)

Resources/Notes

Appendix F Activities

- Activity 52: My Tree or Bush
- Activity 53: A Mural

Print

- *Science Everywhere*, Teacher's Guide (13391), pp. 246–48, Poster 13 (13390)
- *Diary of an OakTree*, Oxford Literacy Web, Non-Fiction, Pack A (13450)
- See Appendix G: Print Resources

Seasonal Changes in Living Things *(continued)*

Outcomes

Students will be expected to

- investigate and describe human preparations for seasonal changes (103-4)

Elaborations—Strategies for Learning and Teaching

Students could question workers in their community about how they prepare for the winter. A field trip to a farm, zoo, fish plant, fishing village, or other area that needs to prepare for the seasons would be a valuable experience. A guest speaker involved in a related industry could describe the seasonal preparations that they have to complete.

Students' behaviours, location, and activities vary throughout the year, as well. Students can collaborate to design posters and murals that illustrate their seasonal activities, dress, and places where they like to go. They may even identify foods that they like to eat during the various seasons. Recess and lunch times that are "outside" days can be used to reinforce the concepts of dressing appropriately for the weather.

Seasonal Changes in Living Things *(continued)*

Tasks for Instruction and/or Assessment

Paper and Pencil

- Using print resources, write or draw the different types of things that are sold to help people prepare for the different seasons. (103-4)

Presentation

- Interview your parents to find out what they do around your home or with their cars to prepare for winter and summer. Present an oral report to the class. (103-4)
- Draw pictures to show what you do each season. (103-4)

My Activities

Fall	Winter
Spring	Summer

Portfolio

- Choose a piece of work to put in your portfolio that reflects seasonal changes. Tell what is special about it. (103-4)

Resources/Notes

Appendix F Activities

- Activity 54: Dress for the Season
- Activity 55: Our Seasonal Safety Mural

Print

- *Science Everywhere*, Teacher's Guide (13391), pp. 161–63, Poster 7, pp. 174–76, Poster 8, pp. 246–48, Poster 13 (13390)
- National Geographic: *Windows on Literacy*, Teacher's Guide, Emergent Stage, pp. 82–85; Early Stage, pp. 174–77
- *New Clothes* and *Weather Today*, National Geographic (*Windows on Literacy*) (13150)
- *What is Wind?* (Factivity series) (13766)
- *What is Rain?* (Factivity series) (13767)
- See Appendix G: Print Resources

Appendices

Appendix A: Equipment Lists

School Materials

This suggested school list consists of items that each school should have to do the hands-on, minds-on science activities as outlined in this guide. This does not include items in the class or consumables list.

	Materials, Objects and Our Senses Appendix D	Living Things Appendix E	Daily and Seasonal Changes Appendix F
Supply List			
ant farm		X	
attribute hoops	X	X	
aquarium		X	X
balances—junior (combo)		X	
batteries (for flashlights)	X		
beanbags		X	
binoculars		X	X
buckets, plastic containers with lids (8"x12"x12")	X		X
bug viewers		X	
building blocks (Lego, Mega Blocks)		X	
centicubes		X	
combs	X		
cubic metre set with corner inserts	X		
cups (plastic, transparent) (metric)		X	X
dominoes		X	
elastic bands	X		
electric stop watch			X
embroidery hoops		X	
eye droppers (7.5 cm long)	X	X	
fasteners (zippers, buttons, hook-and-loop strips)	X		

	Materials, Objects and Our Senses Appendix D	Living Things Appendix E	Daily and Seasonal Changes Appendix F
flashlights	X		
funnels			X
geometric solids			X
graduated beakers	X	X	X
hole punch	X	X	
hot air cornpopper	X		
hot plate			X
interlocking cubes (Cube-a-Link, Unifix)	X	X	
kettle			X
knife		X	
lamp/bulb	X		
magnifiers (table top tripod and reading glass magnifier	X	X	
marbles	X		
masses (hexagram, 54 colour-coded, stacking 1g–20 g per set)	X		
medicine droppers	X	X	
microscope	X	X	
microscope slides	X	X	
mirrors	X		
modelling clay	X		
multi-links	X	X	
musical instruments (bells, tambourines)	X		
overhead projector	X	X	X
paint brushes	X		

	Materials, Objects and Our Senses Appendix D	Living Things Appendix E	Daily and Seasonal Changes Appendix F
paper clips	X		
pattern blocks	X		
pipe cleaners		X	
pitchers	X	X	X
plastic tubing	X		
push pins	X		
safety goggles	X	X	X
spoons	X		
stethoscopes		X	
tape recorder	X		
tapes (audio)	X		
thermometers			X
washers	X		
wire mesh	X		
wooden blocks	X		

Classroom Supplies

This suggested classroom list consists of items that each class should have to do the hands-on, minds-on science activities as outlined in this guide. This does not include items listed in the other lists.

	Materials, Objects and Our Senses Appendix D	Living Things Appendix E	Daily and Seasonal Changes Appendix F
Supply List			
calendar			X
chalk			X
pencil sharpener	X		
pennies	X		
rulers	X	X	
scissors	X	X	X
weather chart			X
Consumables			
aluminum foil	X		
balloons	X		
batteries	X		
bird food		X	
bread	X		
celery or Chinese cabbage		X	
cellophane (red, blue, yellow)	X		
chart paper	X	X	X
chocolate	X		
coffee filters			X
construction paper	X	X	X
cooking oil	X		
cotton balls	X		
cotton swabs	X		
craft sticks	X		
crayons	X	X	X

	Materials, Objects and Our Senses Appendix D	Living Things Appendix E	Daily and Seasonal Changes Appendix F
dried beans	X		
drink crystals (powdered)		X	
feathers	X		X
flavouring (peppermint, maple)	X		
food colouring		X	
fruit (variety)	X		
glue (white, gluesticks)	X		X
graters (cheese or vegetable)	X		
gravel	X		
lemon juice	X		
markers (water soluble)		X	
masking tape	X	X	
onion	X		
paints	X		X
paper bags	X		
paper fasteners (brass)	X		
paper plates	X	X	
paper towels (variety)	X	X	
pasta (different types)	X		
peas	X		
pencils (wood, mechanical)	X	X	X
petroleum jelly (Vaseline)		X	
pine cones	X		
plant food		X	
plastic bags (resealable)	X	X	
plastic wrap	X	X	
popcorn flavouring	X		
popping corn	X		
rice	X		

	Materials, Objects and Our Senses Appendix D	Living Things Appendix E	Daily and Seasonal Changes Appendix F
salt	X		
sand	X	X	
sandpaper	X		
seashells	X		
seeds (radish, bean, flower, peach)		X	
sidewalk chalk			X
soap (unscented)	X		
soil		X	
sponge	X		
straws (plastic, paper)	X	X	
sugar (variety)	X		
syrup	X		
tissue paper	X		
toothpicks	X		
twine	X	X	
vinegar	X		
wax paper	X		

Recyclables and Collectibles

This suggested recyclables and collectibles list consists of items that each class should have to do the hands-on, minds-on science activities as outlined in this guide. This does not include items listed in the other lists.

	Materials, Objects and Our Senses Appendix D	Living Things Appendix E	Daily and Seasonal Changes Appendix F
Supply List			
baby food bottles	X	X	
boxes, various sizes for building (tissue, cereal, shoe)		X	
cardboard	X		
cloth	X		
earthworms		X	
glass bottles	X	X	
magazines	X	X	X
milk cartons	X	X	
newspapers	X	X	X
paint chips	X		
paper-towel rolls	X		
plastic	X		
plastic containers (variety of sizes)	X	X	X
plastic film canisters	X	X	X
pop bottles, 2 L	X		
rotting logs	X	X	X
screws (variety)	X		
wrapping-paper rolls	X		

Appendix B: Video Resources

Education Media Library

The Education Media Library has over 5000 titles in its video collection. All programs have been evaluated for curriculum fit and are intended to support the Nova Scotia Public School Program. They may be used by teachers and others engaged in public education in Nova Scotia. Public performance rights have been purchased so that all videos can be shown in classroom settings to students and educators.

The Media Library offers video loans and video dubbing services. Loan videos have an assigned number that begins with the number 2, e.g., 23456. These videos may be borrowed and returned. The videos that are available through dubbing begin with a V, e.g., V1123. The Media Library makes a copy of these videos, which is then retained by the client. Dubbing services are provided for the nominal recovery cost of the videocassette on which the programs are taped. Tape prices range from $1.44 for a 20-minute tape to $2.59 for a two-hour tape. Programs can be stacked onto one tape (e.g., four 30-minute programs onto one tape) or be dubbed on separate tapes.

The Learning Resources and Technology website <http://lrt.EDnet.ns.ca> provides a rich variety of curriculum-related resources to help teachers in their classrooms. Teachers can search the video database, find out about educational software, search the database of curriculum-related websites, download curriculum catalogues, access workshops on web safety, and find tips on integrating technology into the classroom.

Title	Description
Physical Science: Materials, Objects, and Our Senses	
Animals That Build (22239) 14 min., 1983	Humans are not the only animals that build. Beaver dams and bird and wasp nests are also familiar animal homes. The stickleback builds an underwater nest to house its young. African termites construct towers. Beautiful coral reefs are the work of coral polyps.
Beavers (23243) 5 min., 1981	This program examines the interesting life of the great dam builder, the beaver. Gnawing through trees, building lodges, and slapping their rudder-like tails on the water, these web-footed aquatic architects have intrigued people for a long time. DNR video collection.
Building Blocks (22925) 15 min., 1998	This program shows beehives and honey combs as strong shapes and then moves to buildings that humans create. The program includes the natural creation of dams and beavers and their building ability.
Dig Hole, Build House (23131) 29 min., 1995	A magical step-by-step house-building adventure filmed on location at a busy construction site. Watch earth-moving bulldozers dig; giant cement trucks pour; and carpenters, framers, roofers, plumbers, and others cut and pound as they turn an empty field and stacks of lumber into a beautiful new house. An educational tour of the home-building industry.
Fourways Farm Series 1 (Loan) (S2158) 100 min., 1995	This series of 10 10-minute programs is designed to make a student's early experience with primary-level science concepts enjoyable. *Fourways Farm* is all about exploration and investigation: first by the animals in the stories and afterwards in the classroom by the students themselves. Each program ends with the animals reviewing the day's events and a speculation that invites the students to participate in related activities. Components of this series are as follows: • *Drop of the Hard Stuff* 21655 properties of water • *Falling Upwards* 21656 gravity • *Material Differences* 21657 similarities and differences of materials • *Moonstruck* 21658 time and changes in the moon • *On Reflection* 21659 light and reflection • *The Sound of Music* 21660 sound patterns • *Sunflowers* 21661 conditions for plant growth • *Three of a Kind* 21662 reproduction, similarities between parents and offspring • *Who's Been Eating?* 21664 grouping of living things

Title	Description
Fourways Farm Series 2 (Loan) (S2159) 100 min., 1995	This is the second set of 10-minute videos in which assorted animal friends on Fourways Farm discover science in the world around them. *Fourways Farm* provides an introduction to science and is also useful in language arts, mathematics, music, and arts. Components of this series are as follows: • *Buried Treasure* 21667 decomposition and preservation • *Floating and Sinking* 21668 displacement • *Gauging the Weather* 21669 weather • *Hot and Cold* 21670 temperature • *Life and Death* 21671 mortality • *Paws for Thought* 21672 animal diversity • *Shadow Play* 21673 light
How Do They ... Make Oatmeal Cookies? (23346) 4 min., 1999	In this short video without words, students will discover the story behind the oatmeal cookies from the farmer's field to fresh from the oven. Brief teacher's guide is printed on the video jacket. From the *How Do They ...?* series.
How Do They ... Knit a Chain-link Fence? (23347) 4 min., 1999	This short video without words looks at the mystery of what lies behind the fences many children see around their schoolyards and neighbourhoods everyday. Brief teacher's guide is printed on the video jacket. From the *How Do They ...?* series.
How Do They ... Make Money? (23348) 4 min., 1999	This short video without words looks at the mysteries behind how the mint makes money. Brief teacher's guide is printed on the video jacket. From the *How Do They ...?* series.
How Do They ... Put the Centres in Chocolates? (23349) 4 min., 1999	This short video without words takes students to visit a factory to see how they put the centres in chocolates. Brief teacher's guide is printed on the video jacket. From the *How Do They ...?* series.
How Do They ... Make Potato Chips? (23350) 4 min., 1999	This short video without words examines how potato chips are made from where potatoes are grown, to slicing, open fryers, and cooked chips ready for salt or other spices and then bagged, sealed, and packed for shipping. Brief teacher's guide is printed on the video jacket. From the *How Do They ...?* series.
How Do They ... Braid Rope? (23351) 4 min., 1999	This short video without words looks at the mystery and twists and turns of rope-making from very fine fibres from the smallest cord to the thickest rope. Includes a brief teacher's guide printed on the video jacket. From the *How Do They ...?* series.

Title	Description
How Do They ... Recycle Paper? (23352) 4 min., 1999	This short video without words examines what happens to the paper we put in our recycling boxes. Includes a brief teacher's guide printed on the video jacket. From the *How Do They ...?* series.
How Do They ... Recycle Steel? (23353) 4 min., 1999	This short video without words will show students how sparks fly and molten metal run white hot on its way from scrap to fresh steel. Includes a brief teacher's guide printed on the video jacket. From the *How Do They ...?* series.
Our Five Senses (23332) 15 min., 2003	This short video is intended for students in grades primary to 1. Students will learn that we have five senses, what the senses are, and how they enable us to collect information about the varied sights, sounds, smells, textures, and tastes that form our environment. Students will also learn that there are sense organs connected with every sense. Brief liner notes are printed on the video case.
What Is ... a Wall? (23344) 4 min., 1999	This short program from the *What Is ...?* series provides a close-up look at the walls of a house, turning planes of light, shadow, colour, and texture. Natural sound of familiar objects is the background noise for this video.
What Is ... a Window? (23345) 4 min., 1999	This short program from the *What Is ...?* series explores patterns and images of the world as seen through windows. Natural sound of familiar objects is the background noise for this video.
What Is ... a Door? (23343) 4 min., 1999	This short program from the *What Is ...?* series provides a journey through the hidden secrets and familiar sights and sounds of doors. Natural sound of familiar objects is the background noise for this video.
What Is ... a Fence? (23342) 4 min., 1999	This short program from the *What Is ...?* series provides close-up views of wood, rain, and lichens in examining what a fence is. Natural sound of familiar objects is the background noise for this video.

Title	Description
Life Science: Needs and Characteristics of Living Things	
Animal Parts (23329) 15 min., 2000	This short video, intended for students in grades primary to 2, will introduce animal parts such as fur, feathers, scales, fins, and a better understanding of how animals use their body parts to move and how they obtain and process food. Includes brief liner notes on the video case.
Apples (22047) 30 min., 1996	This video explores our favourite fruit, the apple. Visit an apple orchard over the seasons from winter pruning to fall harvesting; hear the story of apple pioneers, Johnny Appleseed and John McIntosh; look at apple cells through an electron microscope; learn about how apples are cloned; and share in the excitement of apple bobbing and candied-apple making. Includes a teacher's guide. Closed captioned.
Autumn Silver (V9265) 20 min., 1986	This tourist promotional video introduces visitors to the wide range of attractions available in Nova Scotia during autumn. The program is useful to elementary classes studying the seasons and local geography.
Clouds, Weather, and Life (V2410) 25 min., 1999	This video is for use for primary through to grade 4 as an introduction to the hydrologic, or water cycle and to basic cloud identification. The program explains five scientific concepts of weather: the hydrologic cycle; life is dependent upon this cycle; the sun is the causative agent that powers the formation of clouds and the water cycle; the three states of water (gas, liquid, and solid); and weather is changeable in time and place. Includes a brief teacher's guide.
Does It Ever Rain in the Desert? (21058) 11 min., 1987	A trip to the dry desert shows Wondercat that appearances can be deceiving, that it does rain there. He learns why water does not soak into the desert very well and how much of it just runs off. Wondercat sees how life in the desert makes use of the little water that is there and how living things are adapted to a place where it does rain, but not very much or often. Study sheet included.
Eyewitness Series (Dorling Kindersley) 1994	Eyewitness is a series of 13 34-minute videos about the natural world of animals. Components of this series are as follows: • *Amphibian* 22467 • *Birds* 22447 • *Cat* 22448 • *Dinosaur* 22449 • *Dog* 22450

Title	Description
Eyewitness Series (cont'd)	• *Elephant* 22451 • *Fish* 22468 • *Horse* 22452 • *Insect* 22469 • *Jungle* 22453 • *Reptile* 22454 • *Shark* 22455 • *Skeleton* 22456
Habitats (23318) 18 min., 2000	This program, intended for elementary students (grades P–3), features the importance of habitats of plants and animals with live-action film and animation. Students will explore the tundra, desert, grassland, forests, and waterways of the world and learn about the plants and animals that live there.
Habitats: Homes for Living Things (23324) 15 min., 2000	This program, aimed at students grades primary to 2, explores ways that plants and animals find to meet their needs in the environment where they live. Students will visit a pond, a desert, a forest, a rain forest, and other habitats to discover how plants and animals adapt to survive in different climates and landscapes. A brief teacher's guide is provided on the video liner notes.
Home Sweet Home (23321) 30 min., 1998	This program is aimed at students in grades 1–2. Animal builders use body tools to build homes suited to their needs, using materials from nature that are around them. Students will see a beaver and weaver bird build their homes and look at the animals and plants in a pond. Students will be able to identify and describe behaviours that enable animals to survive.
Insects: Cycles of Life (21945) 19 min., 1987	Insect stages of development, foods, homes, and life processes are explained through this program. The photography is beautiful and subtly conveys the world of the insect through close-up photography.
Life Habitat (S2052) 1990–1991	The Life Habitat series offers six 15-minute video "field trips" into the heart and substance of the natural world. In the videos, children are seen exploring the food chain, the water cycle, the earth's recycling system, and countless unique wonders of the earth. Components of this series are as follows: • *Down on the Forest Floor* 22428 • *Life in the City Habitat* 22433 • *Puzzle of the Rotting Log, The* 22432 • *Secret of the Pond, The* 22427 • *What's in Your Backyard* 22434

Title	Description
Learning about Air (22260) 11 min., 1975	A mime, Mr. Air, greets the viewer and highlights the most fundamental characteristics of air throughout the program. Physical and chemical properties of air are demonstrated through a series of simple experiments. Air is established as a mixture of invisible gases that take up space, have weight, and exert pressure to make sounds and move things around. In addition to its basic role as a source of physical energy, air is shown to provide chemical energy for both inanimate objects, such as a candle, and animate objects—all living things. Topics include air, weight, mixture, pressure, force, wind, and energy. A brief study sheet is included.
Learning about Water (22259) 10 min., 1975	Photographs of Earth suspended in space illustrate that much of the Earth is covered by water. Children conduct a series of experiments that illustrate the water cycle. Topics include liquid, vapour, evaporation, condensation, stored energy, moving energy, and erosion. The video shows that water is essential to all life on Earth. Includes a brief study sheet.
Lessons from the Forest: Summer, Autumn, Winter, Spring (V1829) 88 min., 1995	The four programs in this compilation, "Summer" (29 min.), "Autumn" (22 min.), "Winter" (15 min.), and "Spring" (20 min.), look at the forest. What it gives us, how it works, what it means to animals, how we enjoy it, and ways to manage it are all topics that are examined from the perspective of the different seasons. Each segment is also available as a loan title (21602, 21603, 21604, and 21605).
Life and Living Series (Dubbing) 30 min., 1996	This series of two programs explores basic life processes and conditions for growth in plants, animals, and humans. Components for this series are as follows: *Growing* (V2369), 15 min. This program demonstrates what seeds need to grow, the growing process using several experiments, and time-lapse photography how plants cross-pollinate and produce seeds. *Starting Life* (V2368), 15 min. This program features a family who visits a farm and observes three animals having babies—a duck, a lamb, and a calf. The program compares animal births to humans. This program could compliment the book *Whose Egg Is This?* Teacher preview is suggested so young children are prepared for live animal births.

Title	Description
Paddle to the Sea (23124) 28 min., 1966	This film is a children's odyssey from the story by Holling C. Holling. A hand-carved figure in a canoe is launched toward the sea in the northern forest in the spring. There are many adventures, all photographed with great patience and an eye for the beauty of living things. The film gives vivid impressions of Canada's varied landscape and the life of its waterways.
Plants: A First Look (23315) 15 min., 2000	This program provides students (grades 1–3) with an overview of the world of plants. The video shows a variety of plant types in settings as diverse as deserts, tropical rain forests, and students' own backyards. The program shows how plants are similar to other living things and how they are different. It describes different plant parts and how they function. It shows students performing simple experiments or activities with plants that students can do at school or home. Includes a teacher's guide and blackline masters.
Seeing Things Series (S0756)	Dr. David Suzuki and the neighbourhood children explore the natural world together. Students use their skills of observation, and Suzuki inserts interesting facts about each creature and plant discussed. Components of this series are as follows: *Seeing Things: A Science Walk with David Suzuki* (21051), 15 min., 1988 The homes of various backyard plants and animals are explored by Dr. David Suzuki and his young neighbourhood friends. The group discusses camouflage and closely observes habitats. The children hypothesize why each lifeform has the habitat it does. *Habitats: A Science Walk with David Suzuki Series* (21054), 15 min., 1988 David Suzuki and several neighbourhood children go on a nature walk in his backyard. They use their senses to discover the nature of the backyard. Suzuki explains the habits of the various insects and small creatures, providing interesting facts about each. He poses thoughtful questions that the children answer through observation and problem solving.
Gus: A Life in the Slow Lane (V2488) 10 min., 2002	This video is a short biography of Gus, the gopher tortoise, the mascot of the Nova Scotia Museum of Natural History, on his 80th birthday. It features Gus's friend and mentor, Museum of Natural History herpetologist, John Gilhen, footage of Gus in the museum garden, and an original Gus song by Ashley Moffat and the Wildebeasts. This program would be useful for classes planning a field trip to the Museum of Natural History, Halifax.

Title	Description
Tadpoles and Frogs (22905) 14 min., 1993	This program examines the difference between a tadpole and a frog, how a frog breathes, and illustrates how a pond changes over the seasons. Teacher's guide and blackline masters are included to support and enrich information from the video.
That's My Baby (23320) 30 min., 1998	This program, designed for grades 1–2 shows how baby animals, from birds to elephants, are cared for and the different kind of care required. Students will see different ways animals move and basic changes in humans as they grow. The basic needs of humans and animals are compared.
Weather and Climate (21332) 15 min., 1991	This program answers questions that students ask concerning weather and climate. Examples are: What is weather? What causes the changes in seasons? What is atmosphere? What is subtropical climate?
What Is ... a Garden? (23341) 4 min., 1999	This short program from the *What Is ...?* series moves deep into the world of the garden, providing close-ups of stems, flowers, and leaves, giving a new perspective on familiar objects. This video without words has a background of natural sound. Liner notes are provided on the video jacket.
Where Do Animals Go in Winter? (23169) 15 min., 1995	Students learn how animals adjust to the cold temperatures and scarcity of food during winter. Animals change behaviour, diet, shelter, and appearance. See what squirrels, honey bees, bears, snakes, deer mice, fish, birds, elks, turkeys, and bison do to survive.

Appendix C: Classroom Management

Group Organization

Many of the science activities presented involve children working in small groups of 3–4 students. For many of our young students, this may be one of their first opportunities to work co-operatively with others, sharing resources and ideas. To make these group experiences more productive, you may find it helpful to assign the following rules/tasks to the members of each group:

Collector	Recorder	Reporter	Group Member
• gathers supplies • puts supplies away • cleans up	• asks group for ideas • writes down group's ideas • ensures that all members have completed their work	• shows what the group did • explains what the group did	• listens • participates • shares

Assessment Rubric

A comprehensive evaluation of a student's progress in science should include a performance-based assessment. Areas for consideration may include

- problem comprehension
- co-operative learning
- problem solving
- equipment use
- communication of results

The rubrics on the following page may be used for performance-based assessment. Ideally, a student will be assessed every few weeks, and one or more students may be observed during each activity. The student is informally observed during the activity, and the observed levels of achievement are highlighted on the rubric. The dated rubrics may then be added to the student's assessment portfolio and referred to for evaluation. Levels of performance and progress are easily tracked and any areas of concern identified.

The use of a clipboard and highlighter allows for ease of recording as observations are made.

Performance Assessment Rubric

Name:	**Date:**
Activity:	

Problem Comprehension

4 has complete understanding of the problem
3 understands most of the problem
2 understands some of the problem
1 tries but does not understand the problem
0 makes no attempt to understand the problem

Problem Solving

4 has a plan that could lead to the correct solution
3 follows basic procedure with minor error or omission
2 follows partially correct procedure with major error
1 plans inappropriately
0 makes no attempt to solve the problem

Co-operative Learning

4 consistently encourages work toward the group goals with skill and sensitivity
3 fulfils individual role with skill and sensitivity without prompting
2 fulfils individual role with sensitivity but needs occasional prompting
1 contributes only when prompted and needs reminders regarding sensitivity
0 refuses to work as a group member and/or shows no consideration for others

Equipment Use

4 accurately uses all appropriate tools to gather data
3 effectively uses some of the appropriate tools to gather data with minor errors
2 attempts to use the appropriate tools resulting in inaccurate data
1 does not use the appropriate tools
0 makes no attempt to collect data using the tools

Communication of Results

4 gives concise explanation of method with conclusion based on data collected
3 gives satisfactory explanation of method with conclusion based on data collected
2 gives incomplete explanation of method and/or conclusion partially supported by data
1 gives explanation that cannot be understood/makes no reference to data
0 gives no explanation/gives no conclusion/presents no data

Appendix D: Activities for Physical Science—Materials, Objects, and Our Senses

In the following appendices you will find activities you may wish to use or modify to support student achievement in meeting specific curriculum outcomes at the grade 1 level. These activities are referenced under column four, Resources/Notes, in each unit on the two-page spread and are meant to add to other hands-on learning experiences teachers may provide to meet curriculum outcomes.

You can also find well-written, easy-to-follow activities and curriculum links to science in the following resources in, or available to, schools through the Nova Scotia School Book Bureau:

National Geographic: *Windows on Literacy*, NSSBB #13150

Science Everywhere, Grade One Teacher's Guide, NSSBB #13391

Science Everywhere, Grade One Posters, NSSBB #13390

Science Resource Kit, Complete Kit, NSSBB #13403

Pan-Canadian Science Place, Complete Grade One Unit, NSSBB #13928

Please note that some of the activities in the above resources are referenced under column four in Resources/Notes. Activities from *Science Resource Centre: 240 Learning Centre Activities* are not referenced. Teachers are encouraged to look through this valuable resource to find activities for science and other curriculum areas as links to science, as needed.

Activity 1: Identifying the Senses

Outcome

Students will be expected to

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)

Assessment

Students are able to identify the five senses.

Questions

- What are the five senses?
- How do we use our senses in our daily activities?

Materials

- sandpaper
- pine cone
- paper
- water
- cloth
- plastic
- screws
- paint chips
- crayons
- interlocking cubes
- magnifers
- sand
- tambourine
- maraca
- bell
- opaque container with pasta in it
- lemon
- orange
- banana
- lemon juice
- sugar water
- maple flavouring
- peppermint flavouring
- cotton swabs
- additional materials or other materials could be used

Procedure

This activity is designed to review with students their five senses. A station approach where students rotate from one station to another will allow for each station to have a different sense activity set up at it. For example, a touch centre would have items such as sandpaper, a pine cone, paper, water, cloth, plastic, and screws to demonstrate the various textures a student may encounter. The taste station would have lemon juice, sugar water, maple flavouring mixed with water, and peppermint flavouring mixed with water. Cotton swabs would be used to dip in the solutions for the students to sample how different items taste. Students should be reminded not to double dip. A vocabulary of words that students use should be put up in the classroom at the end of the activity. Students should have an opportunity to share the words they used to describe objects. Students could use the activity chart to keep track of the vocabulary they used.

Identifying the Senses Activity Sheet

Name: _____

My Sense: _____

Object	Description

Activity 2: Which Sense?

Outcome

Students will be expected to

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)

Assessment

By playing the game I Spy, students will be able to describe the senses they used to play the game.

Questions

- What am I describing?
- What senses did you use to play the game?

Procedure

- Say "I spy with my little eye something that looks ..."
- Repeat, using different versions such as "I spy with my little eye something that feels ..."
- "I spy with my little eye something that smells ..."
- "I spy with my little eye something that feels ..."
- "I spy with my little eye something that tastes ..."

Alternative

The hearing, smelling, and feeling versions could be played with eyes closed so students have to guess what they hear, smell, or touch.

My Senses Chart

Word	Sense	Body Part
red	sight	eyes
hard	touch	hand/skin
jingly	hearing	ears
etc.		

Activity 3: Taste

Outcomes

Students will be expected to

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)

Assessment

- Students are able to describe an object by its taste.
- Students are able to develop vocabulary to describe various tastes

Questions

- What does this taste like?
- What are some of the words you used to help describe various tastes?

Materials

- See ideas below in procedure.

Procedure

Using a collection of fruits to test individually and then making a fruit salad would be a way to have students identify a number of familiar flavours. Some things to include could be apples, pears, bananas, pineapples, lemon juice, and so on.

Making a spicy yogurt dip to use with a collection of vegetables would allow for a wide variety of sour, salty, and spicy flavours. Some items to include could be pepper and salt for the yogurt. Dipping vegetables could include carrots, green peppers, celery, and broccoli.

Comparisons between grapes and raisins, plums and prunes, or fresh and dried apricots would create a discussion of how flavours can change.

There should be some discussion about things that taste bad (not things that students do not like to taste, but things that are dangerous). Recognition of the poison symbol could be reinforced at this point.

Extension

Students could try smelling one item while tasting another in order to investigate how closely linked the senses of taste and smell are.

Activity 4: The Changing Taste

Outcome

Students will be expected to

- demonstrate and describe change in materials using the five senses (100-11, 101-3, 101-4)

Assessment

- Students are able to distinguish the difference between various forms of sugar.
- Students are able to see that sugar is a material that can be changed.

Questions

- What forms of sugar did the students observe?
- How did the sugar change as water was added?
- Where would the various forms of sugar be used?

Materials

- brown sugar
- icing sugar
- granular sugar
- coloured sugar crystals
- water
- small containers to hold water

Procedure

Have the students smell and taste white granular sugar. Have them describe its properties. Have the students discuss ways they could change the properties of the sugar. They might suggest dissolving the sugar in water. Have them try to dissolve the sugar in water. Have a group discussion on the differences they notice in the smell, taste, and the property of the sugar after it has been dissolved.

You may wish to use a variety of different types of sugar for students to observe and alter the smell and taste of. Discussions could take place around where various forms of sugar are used and where they come from.

Activity 5: Hearing

Outcomes

Students will be expected to

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)
- demonstrate and describe change in materials using the five senses (100-11, 101-3, 101-4)

Assessment

- Students are able to make a variety of sounds.
- Students are able to identify what the sounds are made from.

Question

What am I hearing?

Materials

- keyboards
- collection of musical instruments
- found materials that could be made into percussion instruments, such as wood scraps, tins, plastic bottles, chip cans, plastic containers
- sandpaper
- rice
- dried beans, peas, and lentils
- plastic comb
- tissue paper
- spoons
- 2-L plastic drink bottles
- plastic tubing
- audio tape with common sounds for students to identify
- tape recorder or listening centre

Procedure

Using supplied materials, students can create a variety of sounds. With a partner whose back is turned, students can describe the sounds they hear. Such vocabulary words may include loud, soft, swishing, scraping, and pinging. Listening to the recorded sounds on the tape, students can guess the sound they hear, discuss possible sources of where the sound was made, and describe what the sound is.

See the section in the guide that outlines activities using the keyboard. Students could create their own instruments, such as drums, whistles, rain sticks, or percussion blocks, using found materials. Using the keyboard, create different sounds and patterns of sounds. Using other musical instruments, create other patterns. By putting the sounds (patterns) together, students can create and perform their own music.

A discussion of the various ways sounds can be changed and experiencing sounds with ears covered and uncovered allows students to make comparisons among sounds. Students should be encouraged to link the way sounds are made to the world around them. Sounds made naturally in nature (rain falling, birds singing) and sounds created by human-constructed items (bells, horns) should be included in the discussion.

Students could make their own stethoscope using 2-L plastic drinking bottles (cut the funnel end to use) and plastic tubing to investigate the rhythm of their heartbeat.

Students could make sound tapes and have their classmates try to guess the sounds.

Activity 6: Senses Popping

Outcomes

Students will be expected to

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)
- demonstrate and describe change in materials using the five senses (100-11, 101-3, 101-4)

Assessment

Students should contribute to a comparison chart on popped/unpopped corn and describe the senses used while observing the popping of the corn.

Question

What senses are being used? Describe how these are being used.

Safety

⚠ **Teachers need to be aware of food allergies and medical conditions that would make this activity dangerous for students.**

- Hot air poppers should be operated by an adult. Care should be taken to avoid the occasional exploding kernel.

Materials

- hot-air corn popper
- popping corn
- individual containers
- variety of flavoured toppings

Procedure

Popping corn is a multi-sensual event. Students can look, feel, and smell unpopped kernels of corn.

As popping occurs, the look, feel, and smell of the corn is altered. Students should be invited to close their eyes, cover their ears, and hold their noses during the popping of the corn to experience how information gathering is altered when some of the senses are impaired. Some will notice heightened information coming from the remaining senses.

The teacher should place a measured amount of kernels in the popper and turn it on. Questions about observations using the sensations may include

- What does the unpopped kernel feel like? smell like? look like? sound like?
- What do you hear as the corn begins to pop? List the sounds.
- What do you smell?
- How does the popped corn feel?
- How does the popped corn taste? How can you change the taste?

Extension

This activity leads to several art opportunities. For example, students could

- create a popcorn picture using the popped corn
- create a pattern or design using unpopped corn kernels
- create a dance showing what happens to the popcorn as it pops
- create a song about the popping corn or use instruments to create music about popcorn popping
- invent their own musical instruments and create their own music using them

Senses Popping

Sense	Popped	Un-popped
see		
hear		
smell		
touch		
taste		

Activity 7: Sight

Outcomes

Students will be expected to

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)
- demonstrate and describe change in materials using the five senses (100-11, 101-3, 101-4)

Assessment

Students could communicate their observations by drawing a close-up of their eye before and after looking down the tube.

Question

What does your eye look like?

Safety

Shining bright light into the eye and looking directly at the sun are dangerous to the eye.

Materials

- small mirror
- sheets of long paper

Procedure

Students should use the mirror to examine their eyes. They should note the pupil, the iris, the blood vessels, and the lashes.

Students should then make a tube using two sheets of white paper. They should look down the tube to focus on some print.

When the print has come into focus, the student should quickly look into the mirror to observe the size of the pupil and what happens to it.

Extension

Students could make a concrete graph by sorting themselves according to eye colour.

Activity 8: Smell

Outcomes

Students will be expected to

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)
- demonstrate and describe change in materials using the five senses (100-11, 101-3, 101-4)

Assessment

- Students are able to distinguish objects by their smell.
- Students are able to develop vocabulary to describe various smells.

Questions

- What does this smell like?
- What are some of the words you used to describe various smells?

Safety

Teachers need to be aware of sensitivities to odours. The selection of items to smell must be carefully monitored so as not to trigger reactions in people around and near the classroom. Samples below are suggested, but the decision of which to use must be made carefully. Some students who are aware of sensitivities should skip those that they are uncomfortable with. Samples should be kept in closed containers.

Students should be instructed on the safe procedure for smelling unidentified objects. Teachers should demonstrate lifting the lid and wafting an odour towards the nose with the hand rather than sticking the nose too close to the origin of the odour.

Materials

A collection of items to smell such as

- vanilla
- lemon juice
- onion
- apple
- chocolate
- seashell
- orange
- bread

Procedure

Students should try to identify items from their smell. Connections can be made to outdoor smells they like (grass, flowers, rain) and indoor smells they like (baked goods, favourite supper).

Students should have a chance to talk about smells they do not like and compare them with others. In the class, there should be some smells that some like while others do not There should also be some discussion about how some smells change. For example, cooking toast too long produces a different smell than a shorter cooking time. Toast also has a different smell than the bread from which it was made.

Activity 9: Sight

Outcomes

Students will be expected to

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)
- demonstrate and describe change in materials using the five senses (100-11, 101-3, 101-4)

Assessment

Students should be able to communicate what they have observed about colour combinations. This could be done orally to contribute to a class chart or visually by painting samples of their investigations.

Question

How do colour combinations work?

Materials

- white paper
- paint brushes
- paint (red, blue, yellow)

Procedure

Students should investigate colour changes by mixing various combinations of paint colours together.

An alternative would be to have samples of coloured water (water and food colouring) that could be poured in various combinations to produce different colours.

Activity 10: Sight

Outcomes

Students will be expected to

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)
- demonstrate and describe change in materials using the five senses (100-11, 101-3, 101-4)

Assessment

Students are able to make a chart of the colour combinations they make.

Question

How can you make a colour wheel?

Materials

- pattern
- card stock (old file folders, recipe cards)
- three pieces of Cellophane paper (red, blue, and yellow)
- white glue
- scissors
- hole punch
- paper fastener (brad)

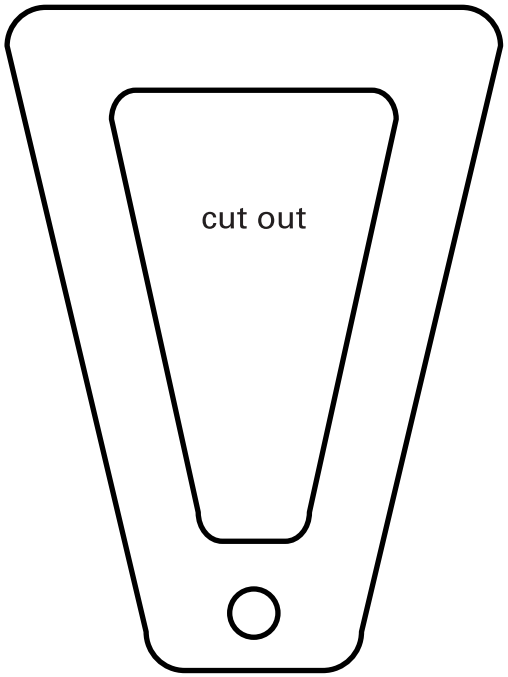
Procedure

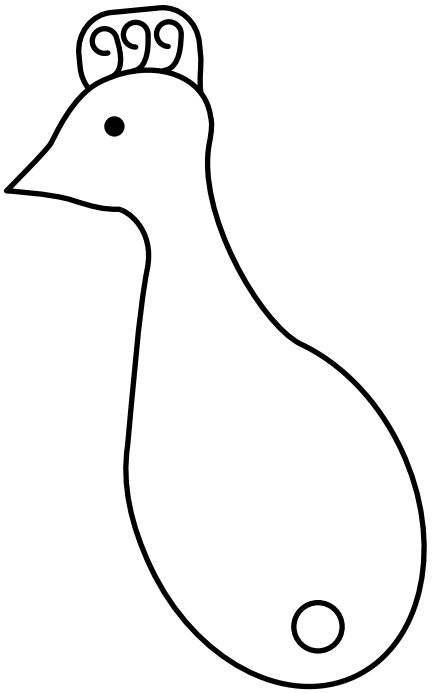
- Cut out six patterns for the colour holder from stiff paper making sure to cut out the centre.
- Cut the cellophane windows just smaller than the outside of your frame but larger than the inside measurement.
- Sandwich a coloured piece of cellophane between two pieces of cut out card stock. Glue together to make a window.
- Repeat until all three windows of different colours are made.
- When they are dry, stack them on top of each other, punch a hole in the centre of the narrow end, and fasten together with a paper fastener.

Extension

Add the peacock pattern to the front to make a bird using the colours for the tail.

Sight Activity Sheet





Activity 11A: Changing Materials

Outcome

Students will be expected to

- demonstrate and describe change in materials using the five senses (100-11, 101-3, 101-4)

Assessment

- Students are able to demonstrate and describe ways in which materials can be changed to alter their appearance.
- Students are able to demonstrate and describe ways in which materials can be altered to change their texture.

Questions

- How were you able to change the texture and appearance of your objects?
- What words did you use to describe the changes?
- What senses did you use to describe the changes?

Materials

- aluminum foil
- crayons
- pencils
- water
- bars of unscented soap
- carrot/cheese graters
- pencil sharper

Procedure

Have the students describe the texture and appearance of a flat sheet of aluminum foil. After they have described its appearance and texture have them crumble it up. Now have them describe the change in the texture and appearance.

Have students describe the texture and appearance of a bar of soap. Now have the students use a grater to make the soap bar into small pieces. Have them describe the change in appearance and texture.

Teacher Note: *If you do not feel it would be safe for students to use a grater, you could grate the soap. Have students describe the appearance and texture of a pencil. Now have them sharpen the pencil. Have the shavings put on a piece of paper and have students describe the change in texture and appearance. Students could note the texture and appearance of water before and after it is frozen.*

Changing Materials Activity Sheet

Name: _____

Name of Material:	**Name of Material:**
Before change	After change
Name of Material:	**Name of Material:**
Before change	After change

Activity 11B: Touch

Outcomes

Students will be expected to

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)
- demonstrate and describe change in materials using the five senses (100-11, 101-3, 101-4)

Assessment

Students should be able to sort items according to textures by completing a chart.

Question

- What does the sample feel like?
- What might it be?

Materials

- container such as a shoe box, pillow case, or paper bag
- collection of objects of different textures such as burlap, fur, polar fleece, plastic bag, net bag, marble, bread tag, metal washer, feather, gravel, soap

Procedure

Place items in a container so students can feel without seeing what the items are. Using words describing the property of the texture, students will build their vocabulary. Some words may be soft, hard, furry, or slippery. Students could try the same activity using gloves to experience what happens when their skin does not contact the object. Discussions could include how we feel and what makes us feel.

Extension

Making a touching page or small book would be a way of linking writing to the skills practised in science.

Items in Touch Container

How it feels	What I think

Activity 12: Senses and Safety

Outcome

Students will be expected to

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)

Assessment

- Students are able to describe/illustrate ways in which the senses help them to know when things are safe or not.
- Students are able to describe ways in which their senses help them to be "safe" on a daily basis.

Questions

- How is the sense of touch able to help you know if an area is safe or not?
- How does smell/sight help to determine whether food is safe to eat or not?
- How does the sense of hearing help you when you are outside riding your bike?
- How does the sense of taste help us decide what we like or do not like to eat?

Materials

- pictures of various ways our senses are used for safety (optional)
- an activity chart for students to illustrate and describe examples of senses and safety

Procedure

The purpose of this lesson is to expose children to the concept of safety and our senses. This activity can be done in the classroom through discussions and illustrations (pictures). Students could be taken on a field trip around the neighbourhood and note the senses they use or could use to make the trip a safe one.

Students should be given an opportunity to illustrate and describe senses and safety in their science journals or on the activity sheets.

Senses and Safety Activity Sheet

Name: _____

Sense	Illustration and description of how it helps with safety
Touch	
Sight	
Smell	
Hearing	
Taste	

Activity 13: What Am I Made From?

Outcomes

Students will be expected to

- compare and describe various materials and report the results using a variety of formats (202-4, 100-13)

Assessment

- Students are able to recognize that various objects are made of different materials.
- Students are able to use their senses to make observations about the objects they are viewing.

Questions

- What types of materials are the objects made of that you have observed?
- How have your senses helped to make your observations?
- What senses did you use to make your observations?

Materials

- pencils
- rulers (they do not have to be made of the same material)
- desks
- chairs
- an activity chart

Procedure

This lesson could be used as an introduction to the outcomes mentioned. Have students look at the objects mentioned under materials and have them discuss what they are made of, where they would be used, and what sense(s) they used to make their observations. Have students do this in groups.

Have students discuss their findings as a class. It is important for students to recognize the importance of their senses in making observations. Further discussions on objects and what they are made of and how they are used should be carried out.

What Am I Made From? Activity Sheet

Name: _____

Object	Sense(s) used	Made of	Used for
ruler			
desk			
chair			
pencil			

Activity 14: Objects and Their Uses

Outcomes

Students will be expected to

- compare and describe various materials and report the results using a variety of formats (202-4, 100-13)

Assessment

- Students are able to recognize that various objects are made of different materials.
- Students are able to use their senses to make observations about the objects they are viewing.
- Students are able to identify what objects are used for.

Questions

- What types of materials are the objects made of that you have observed?
- How have your senses helped to make your observations?
- What senses did you use to make your observations?
- What uses do the objects have that you observed?

Materials

- a variety of objects that students bring in
- objects observed on a field trip

Procedure

This activity is a continuation of Activity 13 (What Am I Made From?) In this activity students are invited to explore objects they have brought from home or from within the classroom. Students could work in groups to explore the objects brought in or students could talk about their objects in a "show and tell" format, having come prepared from home to answer the following questions:

- What types of materials are the objects made of that you have brought in?
- What uses do the objects have that you brought in?
- How have your senses helped to make your observations?
- What senses did you use to make your observations?

Follow-up discussions on objects, their uses, and what they are made of should be done after the group work. Students' ideas should be shared with the whole class. Students should be given the opportunity to illustrate and record their findings in their science journals. Students could write stories about one of their objects and what it would be like to be that object.

Activity 15: Similar Objects/Different Materials

Outcomes

Students will be expected to

- compare and describe various materials and report the results using a variety of formats (202-4, 100-13)

Assessment

- Students are able to recognize that various objects are made of different materials.
- Students are able to describe and sort objects according to their similarities and differences.

Questions

- What rule(s) did you use to sort your objects?
- How were the objects the same that you sorted together?
- How were the objects different that you sorted together?

Materials

- a variety of objects that are similar, but made of different materials
- a variety of objects that are similar, but have different uses
- sorting rings/attribute hoops

Procedure

This activity gives students an opportunity to sort objects in a variety of ways. It gives them an opportunity to explain their sorting rules and to problem solve. Have a variety of materials that have the same use, but are made of different materials. For example, give each group of students a variety of school supplies made of different materials; give groups of students a variety of clips (paper clips made of metal, plastic, bull dog clips, etc.); give each group of students a variety of containers made of different and like materials.

Follow-up discussions on the variety of similar objects that we have that are made of different materials, but have the same use, should be carried out as a class discussion. Students should record their experiences in their science journals. This could be in written, illustrated, or in both forms.

Activity 16: To Hold or Not to Hold

Outcomes

Students will be expected to

- predict and connect investigations on various materials recording the results (200-3, 200-4, 201-5, 203-3)

Assessment

- Students are able to recognize that materials that appear to be the same may have different strengths.
- Students are able to describe and sort materials by their strength.
- Students are able to follow directions in a step-by-step process.
- Students are able to make predictions based on the amount of weight the towels will hold.

Questions

- What did you observe regarding the brand of paper towel and how much it could hold?
- How did your predictions match up to your actual findings?
- Which paper towel would you recommend using around your home?

Materials

- a variety of brands of paper towels
- materials to use as weights (washers, pennies, centicubes, Cube-A-Links, Unifix cubes, standard masses)

Procedure

This activity gives students the opportunity to test the strength of various brands of paper towel. Prior to the lesson, a discussion could take place around commercials for paper towels and what they claim they can do. As well, discussions could take place on what the students know about paper towels and if, indeed, they know that there are a variety of different brands.

Each group of students should be given one sheet of a certain brand of paper towel. They should be instructed to hold it tightly by the ends while another student adds weights on top of it. Students should record the number of weights the towel will hold before it rips.

After students have completed the activity, they should have an opportunity to discuss their results. Comparisons of results between groups should be discussed. From their explorations students could recommend which paper towel they would use. For language arts, students could be introduced to commercials and language they use to promote a product. Students could develop their own commercial.

This activity could also be done using wet paper towels, bathroom tissue, or facial tissues.

Activity 17: The Strength of the Straw

Outcomes

Students will be expected to

- predict and connect investigations on various materials recording the results (200-3, 200-4, 201-5, 203-3)

Assessment

- Students are able to recognize that objects that appear to be the same may have different strengths.
- Students are able to follow directions in a step-by-step process.
- Students are able to make predictions.
- Students are able to determine the strength of two objects through exploration.

Questions

- What differences did you notice between the texture, look, and shape of the two types of straws?
- How did your predictions match up to your actual findings?
- Which straw was stronger according to your test?

Materials

- plastic straws
- paper clips
- paper straws (straws should be the same size)

Procedure

This activity gives students the opportunity to test the strength of straws made of two different materials. Students should be given the opportunity to predict which will be the strongest and how many paper clips will be able to be hung from them before they bend. Each group of students should be given two straws, one made of plastic, one made of paper. Have the students support the ends of a straw between two desks. Have them add paper clips until the straw bends. Repeat using the other straw.

After the lesson, discussions could take place regarding the use of plastics versus paper. The impact of plastic on the environment versus paper could also be discussed. A second part to this activity could be to compare the length or diameter of a straw and its strength.

The Strength of the Straw Activity Sheet

Name: _____

Type of straw	Diagram of my exploration:
Predictions as to how many paper clips it will hold	
Actual amount of paper clips it held	
Type of straw	Diagram of my exploration:
Predictions as to how many paper clips it will hold	
Actual amount of paper clips it held	

Activity 18: Properties of Materials

Outcomes

Students will be expected to

- predict and connect investigations on various materials recording the results (200-3, 200-4, 201-5, 203-3)

Assessment

The ability to sort materials with similar properties and/or to be able to choose an appropriate material would be evidence that students are comfortable with the concepts.

Question

What are the properties of your material?

Materials

- a bag containing various construction materials such as arborite, flooring, tiles, wood, Styrofoam, Cellophane, construction paper, glass (with smooth or tapered edges), iron

Procedure

Students can examine a material and discuss words that describe it. From these, students might suggest what the properties are for their material. The properties might suggest a use(s) for the material. Additional words can be added to their senses charts.

Activity 19: Make a Rainstick

Outcomes

Students will be expected to

- select, explain, and describe ways to use appropriate materials while constructing objects (101-5, 103-3)
- identify, solve, and evaluate problems that arise while constructing objects (200-2, 202-7, 203-1)

Assessment

Recording observations of evidence of collaboration and planning would be appropriate indications that students are constructing meaning from the concepts presented. Students should successfully complete a rainstick.

Question

Can you build a rain stick?

Materials

- wrapping-paper roll, paper-towel roll, toilet paper roll, chip canister, or mailing tube (the larger the roll, the more sound will be produced)
- Q-tips with one end cut off (the more Q-tips, the better the sound)
- masking tape
- push pins
- decorations for the outside (glue, tissue paper, paints, markers, crayons, yarn, feathers, etc.)
- beans, rice, and unpopped corn

Procedure

Using a push pin, poke a hole near the top of the roll starting from the outside and push the pin into the roll, continuing to make holes spiraling down the length of the roll with the push pin. Push Q-tips in so that the fuzzy part rests against the outside of the roll. Look into the ends of the roll from time to time. It may make a pattern. Tape one end of the roll firmly with masking tape. Pour beans, rice, unpopped corn, or some combination into the roll. Tape the open end of the roll securely. Decorate the outside of the roll with crayons, markers, paint, tissue paper, yarn, feathers, etc.

Extension

Students could describe the different types of sounds made by using different fillings inside the rainstick.

Activity 20: How Pencils Are Made

Outcomes

Students will be expected to

- select, explain, and describe ways to use appropriate materials while constructing objects (101-5, 103-3)
- identify, solve, and evaluate problems that arise while constructing objects (200-2, 202-7, 203-1)

Assessment

Students should be able to sort pencils according to their characteristics.

Questions

- How are pencils made?
- What sorting rule did you use?

Materials

- wooden and mechanical pencils
- computer with Internet connection

Procedure

As a class, gather as many pencils as you can by having people bring samples to the centre table. Sort the pencils. Discuss how and why the sort was made.

What characteristics does each group of pencils have in common?

In small groups, look at a sample of a wooden pencil and a plastic pencil. In a chart, describe what is the same and what is different about each type.

As a group, decide how each pencil was made. Look carefully and be as complete as you can. Draw what you think the steps are. Using keywords “incense cedar” in a search engine, visit The Pencil Pages to see how wooden pencils are made.

Activity 21: Handmade Paper

Outcomes

Students will be expected to

- select, explain, and describe ways to use appropriate materials while constructing objects (101-5, 103-3)
- identify, solve, and evaluate problems that arise while constructing objects (200-2, 202-7, 203-1)

Assessment

Students should be able to create paper.

Question

Can you make paper?

Materials

- frame
- screen
- shredded paper
- shredded fibres (dried lint works well)
- a bucket
- dry sheets of cloth
- drying rack

Procedure

Mix the fibres and pulp into a bucket to make a slurry. Scoop the pulp and fibres onto the screen and frame. Put it on top of a sheet of dry cloth. Put another piece of cloth on top of the paper. Squeeze excess water out of the wet paper. Place the paper on the drying rack to dry.

Activity 22: Build It!

Outcomes

Students will be expected to

- select, explain, and describe ways to use appropriate materials while constructing objects (101-5, 103-3)
- identify, solve, and evaluate problems that arise while constructing objects (200-2, 202-7, 203-1)

Assessment

Students should be able to collaborate, design, and build an object that fits the criteria in the procedure.

Questions

- What did you build?
- What, if any, problems did you have building it?

Materials

- a collection of recyclable materials such as milk cartons, plastic drinking bottles, wooden blocks, plastic building blocks, tape, string, toothpicks, dried peas

Procedure

Bridge

Using some of the materials on this table and your imagination, design and create a bridge for the Three Billy Goats Gruff.

Sand Container

Using some of the materials on this table and your imagination, design and create a container to hold sand.

House

Using some of the materials on this table and your imagination, design and create a house for the Three Little Pigs.

Mat

Using some of the materials on this table and your imagination, design and create a mat to keep your feet warm.

Marble Container

Using some of the materials on this table and your imagination, design and create a container to hold as many marbles as possible without breaking.

Sound Device

Using some of the materials on this table and your imagination, design and create a device that can make a variety of sounds.

Appendix E: Activities for Life Science—Needs and Characteristics of Living Things

Activity 23: The Bird Feeder

Outcomes

Students will be expected to

- identify, conduct, measure, and record observations about animals and plants using appropriate terminology (201-5, 100-8, 203-2)
- listen and respond to another student's description of an animal or plant (203-4)

Assessment

- Students are able to follow simple directions to build a bird feeder.
- Students are able to distinguish various parts of a bird after observing them.
- Students are able to describe differences between a bird and a human.

Questions

- What type of food should be put in the bird feeder?
- What are some of the main characteristics of birds that make them unique?
- How are birds different from humans in their appearance?

Materials

- 250-mL milk cartons
- scissors
- twine
- bird food
- hole punch

Procedure

The first part of this activity is for students to make a simple bird feeder that they can hang outside in the school yard. Have students cut an opening in the side of a milk carton. Have them use a hole punch to make an opening at the top of the milk carton to tie the twine to. Have the students take their bird feeders outside and with the help of an adult hang them from a branch on a tree. Have them put bird seed in them.

Teacher Note: *For environmental reasons the bird feeders should be taken down and recycled after they have been used.*

The second part of this activity is for students to observe their bird feeders and the birds that come to feed from them. Characteristics of the birds should be noted. Students should be given the opportunity to record their observations in their science journals both in written and diagram form. Prior to their recording, brainstorm with the class their knowledge of characteristics of birds. Develop a vocabulary list and have it posted in the classroom. Have students discuss the characteristics of humans. Have them compare the similarities and differences between birds and humans.

This activity can be used with plants and fish as well as other animals. The important point to note is that, where possible, students should be able to observe live plants, animals, etc. Allergies and safety must be taken into consideration when doing this activity.

As a follow-up, students could write about what it would be like to be a bird.

Activity 24: Hungry Plants

Outcomes

Students will be expected to

- identify, conduct, measure, and record observations about animals and plants using appropriate terminology (201-5, 100-8, 203-2)

Assessment

- Observe students making observations; note the vocabulary they use.
- Record observations.

Questions

- What happens after a few days?
- What happens after a few weeks?
- How do you think the two plants are different? Tell me your reasons.
- Do you think plants need minerals (food) to grow? Tell me your reasons.
- What are the names of the various parts of the radish?

Materials

- radish seeds
- sand
- containers
- minerals (plant food)
- water

Procedure

Grow two radish plants in different containers of clean sand. Make a solution of water and minerals (plant food) according to the directions on the package. Give one plant water with minerals and one plant with just water.

Have students observe the growth of the plants. Have them measure the growth over a period of time and keep a record of the growth. Give students the opportunity discuss the various parts of the plant.

Activity 25: Topsy Turvy

Outcomes

Students will be expected to

- identify, conduct, measure, and record observations about animals and plants using appropriate terminology (201-5, 100-8, 203-2)
- listen and respond to another student's description of an animal or plant (203-4)

Assessment

- Make drawings at different stages of discovery.
- Name and/or label parts of the plants.
- Communicate what they learned about plant growth.

Questions

- Are you able to grow a plant upside down? How do you know?
- What happened to the plant when it was turned upside down?
- How many days did it take for the radish to sprout?
- Would seeds sprout if put on paper towel?
- In which direction are the roots and leaves growing?
- What does a seed need to sprout?

Materials

- blotter paper (paper towel)
- pencils (or strips of wood)
- a glass bottle
- tape
- radish seeds
- water

Procedure

Roll blotter paper (paper towel) around the inside of a glass bottle. Fasten with tape. Place seeds between the glass and the paper near the top. Keep the water level in the glass just below radish seeds for a few days. After a few days the seeds will sprout. Where do the roots grow? Where do the stem and leaves grow? As soon as the leaves of one radish plant get above the top of the glass pour out the water, turn the glass upside down and place the rim on the pencils or strips of wood.

Keep the blotter moist by adding water several times a day.

Activity 26: Sorting Rule

Outcome

Students will be expected to

- listen and respond to another student's description of an animal or plant (203-4)

Assessment

Students are able to sort animals and plants and describe the sorting rule they used.

Questions

- What sorting rule did you use?
- How are the animals/plants in the various sorting groups unique to each other?

Materials

- pictures of a variety of plants and animals

Procedure

Give each group a variety of pictures with different types of plants or animals. Have them develop a sorting rule and have them sort the pictures. For example they could sort plants by ones that have flowers and ones that do not.

Have the groups of children explain their sorting rules to the class. Challenge students to use the same pictures, but use a different sorting rule.

This activity could also be done through a nature walk around the school area or in a local park or public gardens.

Activity 27: Attached Ears

Outcomes

Students will be expected to

- identify, conduct, measure, and record observations about animals and plants using appropriate terminology (201-5, 100-8, 203-2)

Assessment

- The teacher makes observations to add to the children's portfolio.
- The teacher has a chart with blocks (a rubric) with a child's name in each block where the teacher can record comments on the student.
- Students are able to do picture and real-life graphs.

Questions

Ask the students who do not have attached earlobes to look at the students that do have attached ear lobes and ask the following questions:

- Do only boys have attached ears?
- Do only girls have attached ears?
- Do only tall students have attached ears?
- Do only short students have attached ears?
- Do all students that have attached ears have the same length of tongue?
- Do all students that have attached ears have the same colour of hair?
- Do all students that have attached ears have the same colour of eyes?
- Do all students that have attached ears have the same colour of skin?
- Do all students that have attached ears have the same height?
- Do all students that have attached ears have the same body size?

Materials

- chart paper to chart some findings

Procedure

Remind students that different people can do different things. Show the students a student with attached ears. The students will take turns to show if their ears are attached or not. Next the students will divide themselves into two groups: those that have attached ears and those that don't. The two groups face one another. You may be able to graph this data.

Teacher Note: *Once the data is collected, teachers can note to students, based on their data, that there is no pattern for attached ears. Attached ears are hereditary.*

Activity 28: Tongue Rolling

Outcomes

Students will be expected to

- listen and respond to another student's description of an animal or plant (203-4)

Assessment

- The teacher makes observations to add to the children's portfolios.
- The teachers can lead students in picture and real-life graphs.
- Students are able to distinguish characteristics of humans that make them unique.

Questions

Ask the students who can't roll their tongues to look at the students that can and ask the following questions:

- Can only boys roll their tongues?
- Can only girls roll their tongues?
- Can only tall students roll their tongues?
- Can only short students roll their tongues?
- Do all students that can roll their tongues have the same length of tongue?
- Do all students that can roll their tongues have the same colour of hair?
- Do all students that can roll their tongues have the same colour of eyes?
- Do all students that can roll their tongues have the same colour of skin?
- Do all students that can roll their tongues have the same height?
- Do all students that can roll their tongues have the same weight?
- Do all students that can roll their tongues have the same size body?

Materials

- various charts to record various properties
- chart paper to record findings

Procedure

Remind students that different people can do different things. Show the students how to roll their tongues. The students will take turns trying to roll their tongues. Next, the students will divide the class into two groups facing each other: those that can roll their tongues and those that can't. Perhaps you may be able to graph some of the results.

Teacher Note: *When the teachers and students interpret the graph, they will probably not find any pattern. Tongue rolling is based on heredity. You cannot practise this and then be able to do it.*

Activity 29: Beanie Baby Bonanza

Outcomes

Students will be expected to

- identify, conduct, measure, and record observations about animals and plants using appropriate terminology (201-5, 100-8, 203-2)

Assessment

Observe if students can explain their sorting rules and group by one, or possibly more, characteristics.

Questions

- How are the Beanie Babies alike?
- Can the groups be sorted differently?
- What did you do if a Beanie Baby fit into more than one group?
- What characteristics did you use to sort your Beanie Babies?

Materials

- Beanie Babies brought from home
- chart paper/tag board or sentence strips
- pencils/paper
- sorting rings (hula hoops borrowed from the gym make good visuals for sorting rings)

Procedure

Group the Beanie Babies that have something in common. Ask students to tell how they knew to group them together. In what ways are they different?

Group them again. How did you know to put them together/apart? Draw or colour your groups.

Have students describe common characteristics of their Beanie Babies. Have students explore and describe how the animals that their Beanie Babies represent would move to meet their needs. Have students discuss and describe the materials their Beanie Babies are made of and have them describe the texture of the material. Ask questions about daily changes that affect the characteristics, behaviours, and locations of the animals their Beanie Babies represent.

Classroom Management: Bringing Beanie Babies from home is a high-interest activity for students. As it is likely that a large number of "beanies" will be brought into the classroom, teachers may wish to do this activity in small groups. One management idea is to have an older grade level facilitate this learning experience with the younger students. Small-group facilitation will allow for more discussion to occur among the students. Students can use tag board, or sentence strip pieces to

label the groups that students suggest (e.g., crawl/don't crawl, live on land/don't live on land, flies/doesn't fly). Cross-grade learning experiences are valuable as they contribute to building a positive school climate and allow for natural opportunities for relationship building and fostering leadership skills and increased self-esteem.

Follow-up: Discuss why scientists group certain living things together.

Extension

Ask the students if they can think of other examples where scientists, communities, and people make groupings?

This would also be a good opportunity to introduce the concept of Venn diagrams as a link to data management in math.

Activity 30: Big and Strong

Outcomes

Students will be expected to

- question, explore, observe, and identify the similarities and differences in how living things are able to meet their needs (200-1, 100-4, 100-5, 100-7)
- recognize that humans and other living things depend on their environment and identify personal actions that can contribute to a healthy environment (103-2)

Assessment

- Students are able to observe and describe characteristics of the plants.
- Students are able to record what they see.
- Students are able to brainstorm a list of needs of the plant.
- Students are able to formulate and ask questions about "what else" a plant needs to grow.

Questions

- How are the plants the same?
- How are they different?
- What is the plant looking for?
- How do you know?

Materials

- radish seeds
- containers or paper cups with a hole in the bottom
- earth
- trays
- water

Procedure

Take two containers of plants. Keep one on a sunny windowsill. Put one in a dark closet or under an opaque bag. Take two containers of plants. Water one container. Do not add water to the other. Have students observe the plants and record the growth through diagrams over a period of time. Additional questions that could be discussed as the plants develop are as follows:

- What do plants need to live and thrive?
- What makes a plant green?
- What makes a plant change colour?
- Do all plants need the same thing?
- Do some plants need more of one thing than others?
- Do plants grow quicker during sometimes of the year?
- Do plants grow better in the light or the dark?
- Do you think people need sun too?
- What else needs the sun?
- What happens when plants do not have all their needs?
- What happened to the plant under the bag?

Activity 31: Looking at Leaves

Outcomes

Students will be expected to

- question, explore, observe, and identify the similarities and differences in how living things are able to meet their needs (200-1, 100-4, 100-5, 100-7)

Assessment

- Observe students' ability to observe and describe characteristics of the plant.
- Students are able to record what they see.

Questions

- What does Vaseline feel and look like?
- Does how much Vaseline we use make a difference?
- What happened when the jelly was put on different parts of the plants?
- Will anything happen right away?

Materials

- radish seeds
- containers
- earth
- petroleum jelly (Vaseline)
- minerals (plant food)
- hand lenses
- bug viewers

Procedure

Rub petroleum jelly on the undersides of the leaves of a young plant. Do the same with the topsides of the leaves of another plant of the same kind. Rub the stem of a third plant of the same kind with petroleum jelly. Give them all water, sunlight, and minerals. What happens to the plants? How did you know? Give reasons for your answer.

Have students keep journals either through illustration and or written as to what they observed. Formulate questions about what happens to the water in the plant.

- What happens to the water in the plant?
- Does this affect its growth?
- Are there any other materials in the plant that might be affected by the Vaseline?
- When did you start noticing a change?
- What part of the plants must be kept clean?
- Which plant died?

Activity 32: Water, Water Everywhere

Outcomes

Students will be expected to

- question, explore, observe, and identify the similarities and differences in how living things are able to meet their needs (200-1, 100-4, 100-5, 100-7)

Assessment

- Students are able to make observations and predictions about water going into a plant.
- Students are able to record what they predict will happen and what they see.
- Students are able to formulate and ask further questions regarding water in plants.

Questions

- What do you think will happen?
- What happens?
- What happens after 5 minutes? 15 minutes? an hour?
- Where does the water go?

Materials

- celery stalks with leaves or Chinese cabbage
- knife
- containers with water
- ink or food colouring

Procedure

Cut 5 cm from the bottom of a celery stalk with leaves. Put the cut celery into water coloured with ink or food colouring. Cut off another small piece from the bottom. What do you see? Cut the stalk lengthwise. What do you see? Have students observe their celery stalks over a period of time. Have them record their observations in their science journals.

Additional discussions with children could focus around the following questions:

- What would happen to the celery if we left it out of the fridge for a day, two days, before putting it in the coloured water?
- Does a plant absorb water?
- Does a plant need water to survive?
- What happened to the celery?
- How does the coloured water get into the leaves of the celery?
- How can you relate this to plants at home?
- How do trees get water to their leaves?
- How long did it take for the coloured water to get to the leaves/stem?
- What happened to the celery stalk when it was placed in coloured water?
- Does the colour of the food colouring make a difference in what happens to the stalk/leaves?

Activity 33: A Day in My Life

Outcomes

Students will be expected to

- question, explore, observe, and identify the similarities and differences in how living things are able to meet their needs (200-1, 100-4, 100-5, 100-7)

Assessment

- daily journal of activities
- Are students able to sort their days into different time periods?

Questions

- What things do you do at the same time each day?
- Where do you spend most of your day?
- Compare your journal with others. See what is common and what is different.

Materials

- activity sheet
- pencils
- colouring tools

Procedure

Brainstorm with the students about things they do in morning/after school. Write their responses on chart paper. Ask students to give the purpose for doing these things. Is there anything you could leave out? Tell me your reasons.

Have students record their personal days in their journals using words from the chart, illustrations, etc. Share journals and outline/record, as a whole group, discuss commonalities among journals guiding discussion back to needs of humans (food, drink, rest, activity, clothing, cleaning, washrooms, etc.)

Students could be given the opportunity to compare their day to that of an animal. How are they different? How are they the same?

A Day in My Life Activity Sheet

Name: _____

My day in the morning:

My day after school:

Activity 34: Investigating Balance—An Introduction

Outcomes

Students will be expected to

- identify and investigate common characteristics of humans (100-8)
- identify and use a variety of materials, information, and ideas to explore balance (201-7)

Assessment

- Students are able to demonstrate an understanding of balance through prior knowledge and experience.
- Students are able to explore and discuss their sense of balance.
- Students are able to relate the term balance to animals.

Questions

- What do you think the word balance means?
- How does balance play an important role in our daily lives?
- How does balance play a role with animals?

Materials

None required.

Procedure

Have students brainstorm their understanding and experiences about balancing and what balancing means to them. Discuss examples of how they use balance in their daily activities. Have students explore and discuss their sense of balance. The following are examples you could do with them:

- Stand with your feet close together, with your feet far apart, with your arms out, and with your arms overhead. Which way was easier?
- Stand with two feet close together. Lean forward, sideways, backwards. Lean forward until you go off balance. What happened?
- Can you stand on one foot? Now change the shape of your body. How does it feel?
- Can you balance on one hand and one foot, two hands and one foot, two feet and one hand? Which balance did you find most difficult?
- Can you balance on one knee, on your bottom, on one knee and one elbow?
- Try some balances with your eyes closed.
- Have students discuss how animals balance and relate it to humans.

Activity 35: Observing Objects "In Balance"

Outcomes

Students will be expected to

- identify and investigate common characteristics of humans (100-8)
- identify and use a variety of materials, information, and ideas to explore balance (201-7)

Assessment

- Students are able to observe and describe objects that are in balance.
- Students are able to observe and describe plants that are balanced and why it is important.

Questions

- How can you tell if objects are in balance?
- How do plants depend on balance?

Materials

None required.

Procedure

Students will observe objects in the classroom and on the school ground that are in balance and what keeps them in balance. This is a good opportunity to discuss a solid base and what makes things move off balance (students tipping in their chairs, broken toys, riding a bicycle, etc.)

Students should observe and discuss balance in nature. For example, trees that grow straight and what happens to them when a windstorm blows them over, corn stalks in a corn field, flowers, etc.

Students should record their observations in their science journals.

Activity 36: I Can Balance

Outcomes

Students will be expected to

- identify and investigate common characteristics of humans (100-8)
- identify and use a variety of materials, information, and ideas to explore balance (201-7)

Assessment

- Students are able to demonstrate an understanding of balance.
- Students are able to record and describe how they are able to balance objects.

Questions

- What difficulties did you have when trying to balance objects on certain parts of your body?
- As humans, how is balance an important part of our daily lives?

Materials

- activity sheet
- various objects to balance (ruler, pencil, beanbag)

Procedure

Challenge students to balance various objects on their body. For example:

- Try to balance a pencil on your finger.
- Try to walk with the pencil balanced on your finger.
- Try to balance a beanbag on your head.
- Try to walk around with the beanbag on your head.

Have students draw diagrams on the activity sheet of their attempts to balance objects.

Discuss with students what, if any, challenges they had. Questions such as, How does balance help us in our daily lives? could be discussed.

I Can Balance Activity Sheet

Name: _____

What I balanced and the part of the body I balanced it on:

What I balanced and the part of the body I balanced it on:

Activity 37: A Balanced System

Outcomes

Students will be expected to

- identify and investigate common characteristics of humans (100-8)
- identify and use a variety of materials, information, and ideas to explore balance (201-7)

Assessment

- Students are able to create a balanced system.
- Students are able to record the system they built.

Questions

- How were you able to make a balanced system?
- What problems did you encounter?

Materials

- straws
- pipe cleaners or clay to hold the straws together
- Lego
- dominoes
- blocks
- interlocking cubes
- various-sized boxes (milk cartons, shoe boxes, cereal boxes, etc.)

Procedure

Students use a variety of objects to create a balanced system of their own invention. Have the students illustrate their balanced systems with the understanding that they will be using these diagrams to rebuild their balanced systems in the next session. (Scientists keep records and diagrams so that they can access their information or findings at a later date.)

At your next session challenge your students to rebuild their balanced systems using their diagrams. Discuss how useful the diagrams were. Challenge the students to add one object on top of their balanced systems. Can you do this and keep the system balanced? Where did you place the object? Could you place it somewhere else and still keep the system in balance? Did you need to change your original system?

Then try adding two or three objects. (Students are able to record their findings or the teacher could model recording.)

A Balanced System Activity Sheet

Name: _____

A diagram of my balanced system:

Activity 38: Introducing the Equal-Arm Balance

Outcomes

Students will be expected to

- identify and use a variety of materials, information, and ideas to explore balance (201-7)

Assessment

Students are able to use the equal-arm balance.

Question

How does the equal-arm balance help you see if objects are balanced?

Materials

- equal-arm balances
- various objects to balance

Procedure

Students need to be shown how to set up, take down, store, and care for the balancing equipment. They need to be introduced to the names of the parts: base, pole, fulcrum, arm, pans, clips, chain. Students need to discover or be shown where to look to see if their system is balanced. (Look at the arm not the pans.)

Allow students time to mess about and explore the equal-arm balance using a variety of objects from around the room. Encourage students to share and discuss their observations. You may wish to have students draw an example of a balanced system that they made with the balance.

Activity 39: My Predictions on Balancing

Outcomes

Students will be expected to

- identify and use a variety of materials, information, and ideas to explore balance (201-7)

Assessment

- Students are able to demonstrate an understanding of balance.
- Students are able to record and describe how they are able to balance objects.

Questions

- What difficulties did you have when trying to balance objects?
- How were you able to balance objects?

Materials

- various objects to balance (centicubes, attribute blocks, Multi-links, Unifix cubes)
- equal arm balances

Procedure

Discuss with students the use of the balances. Ask students to describe where they see balances used in everyday life. Challenge students to balance various objects and make predictions. For example, How many centicubes does it take to balance an attribute block? How many centicubes does it take to balance a Multi-link cube?

Have students record their results and draw a diagram of one example. Have students make predictions prior to the actual experiment. Have them record their predictions. Discuss with students what, if any, challenges they had. What did they notice about the size of an object compared to the amount that was needed to balance another object?

Appendix F: Activities for Earth and Space Science—Daily and Seasonal Changes

Activity 40: What Day Is It?

Outcomes

Students will be expected to

- identify and record the days of the week, the names of the seasons, and predict the type of weather for various seasons (200-3, 203-2)
- describe ways of qualitatively measuring and recording environmental changes that occur in daily and seasonal cycles (101-6)
- observe and describe daily and seasonal changes in heat and light from the sun (100-14)

Assessment

- Observe student participation in this activity.
- Assess the results of the student activity sheet.

Question

What have students learned about the activities they do?

Materials

- cards showing the days of the week

Procedure

Have students together as a class in a circle on the floor (circle time). Ask students what day it is. Have them name the days of the week. They can talk about what they did each day. Have a student(s) point to the words for the days of the week as the other students name them. Students can record a special event for each day on the activity sheet provided or in their daily journals or science journals.

Discussion questions for students could include, Why do we have days of the week? or How would our life be different if we had only five days of the week? What Day Is It? is an ongoing activity that can be used throughout the year.

What Day Is It? Activity Sheet

Name: _____

Day: _____

Day:_____

Activity 41: Knowing the Seasons

Outcomes

Students will be expected to

- identify and record the days of the week, the names of the seasons, and predict the type of weather for various seasons (200-3, 203-2)
- describe ways of qualitatively measuring and recording environmental changes that occur in daily and seasonal cycles (101-6)
- observe and describe daily and seasonal changes in heat and light from the sun (100-14)

Assessment

- Observe student participation in this activity.
- Assess the results of the student activity sheet.

Questions

- Are students willing to participate in discussions?
- Do students know the names of the four seasons?

Materials

- posters/cards showing the seasons

Procedure

Have students gather as a class in a circle on the floor (circle time). Ask students what the word "season" means. Have students describe the weather and any special events that take place during the time this lesson is presented (be aware of the diversity of cultures within your classroom). From these discussions have students brainstorm what the four seasons are.

Write the names of the seasons on the board or on chart paper. Have students discuss outdoor activities they would do during each season. This activity may be done throughout the year. Students could record the names of the four seasons in their science journals.

Have students line up by twos, in front of a sheet of paper that has the season of their birthdates on it. This will result in a human bar graph with the vertical axis being a multiple of two. Students should look at this real bar graph because it will help increase their understanding of graphing. Note that these months are not accurate for the season but easy for the students to understand. Once you have the class graph, have a student(s) look at this graph. Have students record the results of the graph on their sheets.

Knowing the Seasons Activity Sheet

Number of Students					
22					
20					
18					
16					
14					
12					
10					
8					
6					
4					
2					
	Spring (Mar., Apr., May)	Summer (Jun., Jul., Aug.)	Fall (Sep., Oct., Nov.)	Winter (Dec., Jan., Feb.)	

Season

Activity 42: What Season Is It?

Outcomes

Students will be expected to

- identify and record the days of the week, the names of the seasons, and predict the type of weather for various seasons (200-3, 203-2)
- describe ways of qualitatively measuring and recording environmental changes that occur in daily and seasonal cycles (101-6)
- observe and describe daily and seasonal changes in heat and light from the sun (100-14)

Assessment

- Observe student participation in this activity.
- Assess the results of the student activity sheet.
- Students are able to describe the various seasons.
- Students are able to build a sight vocabulary for each season.

Questions

- Are students able to describe the differences between each season?
- Are they able to develop and use a sight vocabulary as it relates to each season?

Materials

- posters/cards showing the seasons

Procedure

Take the students outdoors and discuss the weather with them. Have them describe the environment around them. Discuss with children the types of weather and temperature, that might take place during the various seasons. Develop a list of sight words for each season. Have the words listed under the season. Questions to discuss with children could include the following (have them explain their answers):

- What do you like about summer, winter, spring, fall?
- What things do you not like?
- Is it important to have different seasons?

Have the students complete the activity sheet provided. The sheets for various seasons could be completed as each season arrives. The sheets could be kept in the students' science journals.

Teacher Note: *This activity may be done at one time or spread out during the year, with each season being discussed at the time it arrives.*

What Season Is It? Activity Sheet

Name: _____

Season: _____

My Picture

My words to describe the season:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Activity 43: What Is the Weather?

Outcomes

Students will be expected to

- identify and record the days of the week, the names of the seasons, and predict the type of weather for various seasons (200-3, 203-2)
- describe ways of qualitatively measuring and recording environmental changes that occur in daily and seasonal cycles (101-6)
- observe and describe daily and seasonal changes in heat and light from the sun (100-14)

Assessment

- Observe student participation in this activity.

Questions

- How many rainy days were there?
- What type of weather did we have the most for the month?

Materials

- blank calendars

Procedure

Have students gather as a class in a circle on the floor (circle time). Ask students what day it is.

Have them describe the weather for the day. Build a list of sight words for describing the weather (cold, cloudy, rainy, sunny).

Have a weather calendar where students record the weather for each day, either by picture or in words (see sample—pictures could be used instead of words).

Questions for discussions could include the following:

- How does the type of weather affect how we dress and what we do on a particular day?
- What makes knowing the weather so important to us/society?

March 2005

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 Sunny	2 Sunny	3 Cloudy	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Activity 44: Guess the Weather

Outcome

Students will be expected to

- describe ways of qualitatively measuring and recording environmental changes that occur in daily and seasonal cycles (101-6)
- observe and describe daily and seasonal changes in heat and light from the sun (100-14)

Assessment

- Observe student participation in this activity.
- Students are able to recognize various weather patterns.
- Students are able to demonstrate their understanding of various weather patterns.

Question

Are students able to express themselves in a variety of ways in order to demonstrate their understanding of weather?

Materials

- charade cards
- blank cards

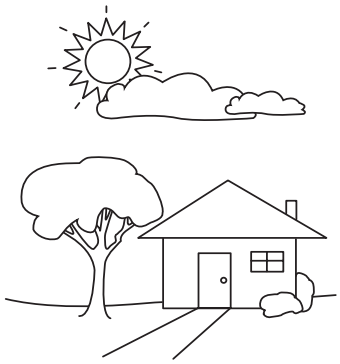
Procedure

This is an activity to help children develop their observation and reasoning skills. It also gives them a chance to express themselves in a variety of ways. This activity can be done as a class or small-group activity. Photocopy enough charade cards for the groups or a set for the class. Discuss the various weather patterns.

Have a student pick a card and act out the type of weather. Have the remainder of the students try to guess the weather condition. An option to this would be for students to make their own charade cards and use them for this activity. Ask students what they learned about weather. Have them discuss their feelings during various weather conditions.

Guess the Weather Activity Sheet

Name: _____

 Cloudy and Sunny	 Cloudy and Snowy	 Lightning
 Tornado	 Wind and Rain	 Sunny
 Windy	 Cloudy	 Rain and Lightning

Activity 45: My Shadow

Outcomes

Students will be expected to

- describe ways of qualitatively measuring and recording environmental changes that occur in daily and seasonal cycles (101-6)
- observe and describe daily and seasonal changes in heat and light from the sun (100-14)

Assessment

- Observe student participation in this activity.
- Students are able to describe changes they observed in their shadows.

Question

Were students able to see a change in the position of their shadows?

Materials

- sidewalk chalk

Procedure

Ask students what they know about shadows. Take them outside on a sunny day and have them look for shadows. See if they notice their own shadow.

Have students start tracing their shadow in the morning. Divide students into groups of two. Explain to them that they are going outside to trace their shadows. Explain that they need to mark where they are standing before they trace the shadow. Make sure they put their names on the shadows.

Take the students out a few hours later and have them stand where they were in the morning and have them trace their shadows again.

Have the students measure their shadows after they have been traced, using non-standard units. Discuss with the students any changes they noticed. Ask students, "What happened to the position of your shadow? Was your shadow longer/shorter? What did you notice about the position of the sun?" Take the students out again and have them trace their shadows on large paper. Have them create designs on the tracings using various media.

Activity 46: Geometric Shadows

Outcome

Students will be expected to

- describe ways of qualitatively measuring and recording environmental changes that occur in daily and seasonal cycles (101-6)
- observe and describe daily and seasonal changes in heat and light from the sun (100-14)

Assessment

- Observe student participation in this activity.
- Students are able to distinguish geometric shapes by their shadows.
- Students are able to observe and record their observations.

Questions

- Are students willing to participate in discussions?
- How were students able to distinguish their geometric solids by observing their shadows?

Materials

- paper
- pencils
- geometric solids

Procedure

This lesson would be a follow-up to the lesson on "My Shadow." Discuss with students what they have learned about shadows. Have them predict what shadows of geometric solids would look like. Have students recognize and describe 3-D shapes.

Have students take a variety of geometric solids outdoors to observe and trace their shadows. Use large paper for them to trace the shadows. Ask them to discuss what they observed about the shadows compared to the actual geometric solids.

Have the students compare the geometric solids to the tracings of their shadows. Are they the same? What, if any, are the differences? Have them colour in their shadows and name the 2-D shapes. Have them recognize 2-D and 3-D shapes in the environment.

Activity 47: The Warmth of the Sun

Outcome

Students will be expected to

- describe ways of qualitatively measuring and recording environmental changes that occur in daily and seasonal cycles (101-6)
- observe and describe daily and seasonal changes in heat and light from the sun (100-14)

Assessment

Students are able to observe through touch what effect the sun has on changing the temperature of water.

Questions

- What happened to the water?
- How did the temperature change?

Materials

- clear plastic cups
- water

Procedure

Discuss with children what they think happens to water after it has rained. What do they think the sun does to the water?

Give students two plastic glasses per group and have them fill them half full with water. Have them put one glass in the sunlight and the other glass in the shade (by a window and in a dark area in the classroom). After a while, have them check them to see which one is cooler. Discuss with students what differences (if any) that they noticed. Ask them what they think happened.

Activity 48: Where Are the Clouds?

Outcomes

Students will be expected to

- describe ways of qualitatively measuring and recording environmental changes that occur in daily and seasonal cycles (101-6)
- observe and describe daily and seasonal changes in heat and light from the sun (100-14)

Assessment

Students are able to use this experiment to demonstrate how to create steam to simulate a cloud.

Question

What happened to some of the water?

Materials

- clear plastic cups
- warm water
- kettle or a sunny window ledge

Procedure

Read the book *Watch the Clouds* (National Geographic Windows on Literacy Series) or another book on clouds. Discuss with students where clouds are located. Have students describe what they think clouds look like and what they are made of. Ask students what are some of the things that can happen to the weather when clouds are in the sky. Have students observe clouds outside during different times of the year and during various weather conditions.

Have students work in groups/pairs. Give students two plastic cups per group. Have students fill one cup 3/4 full of warm water (depending on the size of the cups being used). Have them put the empty cup on top of the one with warm water. In groups have them discuss and record their observations. Students could also put their cups on a sunny window ledge and observe what happens.

Have students fill in the activity sheet provided on the next page. Have them discuss what happened. Pose questions for discussions such as, What are clouds made of? and How does the sun help to create clouds? Students should share their ideas with the class.

Students could track cloudy days on a weather calendar. How many cloudy days were there in a particular month? Students could do research on clouds.

Where Are the Clouds? Activity Sheet

Name: _____

Draw and describe what you observed.

Activity 49: Snow

Outcomes

Students will be expected to

- observe and describe daily and seasonal changes in heat and light from the sun (100-14)
- identify and record the days of the week, the names of the seasons, and predict the type of weather for various seasons (200-3, 203-2)
- describe ways of qualitatively measuring and recording environmental changes that occur in daily and seasonal cycles (101-6)

Assessment

- Students will be able to predict what will happen to snow when it is put in a warm room/place.
- Students will be able to see the difference in the amount of snow a container holds before and after it has melted.
- Using non-standard units, students will be able to record their observations.

Questions

- What did the students observe about the snow as it was placed in a warm area?
- What was the difference in the amount of snow before it melted compared to after it melted?
- Was there a difference in their masses?
- How were they able to tell?

Materials

- containers to hold snow
- snow
- warm area
- balances

Procedure

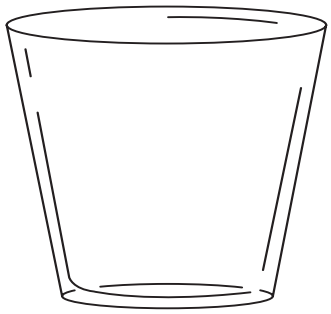
Discuss with students where snow comes from and what type of temperature needs to be outside before it snows. Have students predict what will happen to the snow when they bring it in from outdoors. Have students decide if they are going to pack the snow in the container or just put it in loosely. Have them predict how long it will take before anything happens.

Have students go outside to collect their snow. Have them bring it inside. Time how long it takes for the snow to melt. Ask students to discuss what they are observing. Have students compare how heavy the snow was before and after it melted.

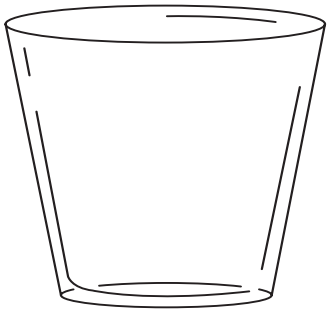
Have the students fill in the chart and describe what they observed. Discuss with students what happened. Would it be better to have snow or rain to help farmers' fields and wells have enough water? Read the book *Frosty the Snowman*.

Snow Activity Sheet

Snow Before



Snow After



Description of snow before

Description of snow after

Activity 50: White Snow or Not?

Outcome

Students will be expected to

- observe and describe daily and seasonal changes in heat and light from the sun (100-14)
- identify and record the days of the week, the names of the seasons, and predict the type of weather for various seasons (200-3, 203-2)

Assessment

Students are able to follow simple directions to carry out an experiment. Students are able to observe what snow is made up of and why they shouldn't eat it.

Questions

- What did the snow look like before it melted?
- What did students notice in/on the filter paper or in the water?

Materials

- clear cups/containers
- freshly fallen snow
- optional: filter paper/coffee filters and funnels

Procedure

Review with students where snow comes from and what happens to it when it is heated/warmed. Have them describe the colour of freshly fallen snow.

Have students collect freshly fallen snow in their clear containers. Have them draw and describe it. Have students observe the water that snow turned into and draw and describe what they saw.

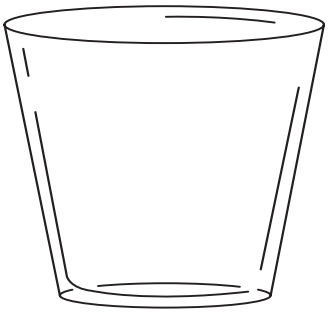
Option: filter paper could be used to better observe the particles in the snow. Discuss with students what they observed. Ask questions such as

- How do the particles get in the snow?
- Where do they come from?
- Should we eat snow?

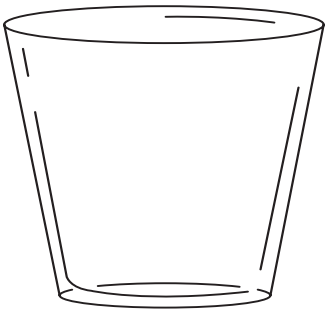
Explain the reasoning behind their responses. Discuss what that says about our environment. Would they have the same results if they tried this activity in the country away from cars, factories?

White Snow or Not? Activity Sheet

Snow



Melted Snow



Description of snow before.

Description of melted snow.

What did you observe in the container?

Activity 51: A Day in My Life

Outcomes

Students will be expected to

- investigate and describe, using a variety of formats, how the daily changes affect the characteristics, behaviours, and locations of living things (200-1, 102-4, 201-5)

Assessment

- Students are able to see the changes in behaviour during the day.
- Students are able to use a chart to record their findings.

Questions

- Are students able to record their information using a chart?
- Are students able to recognize changes in behaviour during various times of the day?

Materials

- A Day in My Life Activity Sheet

Procedure

Review with students how to fill in a chart. Go over the chart to be used in this lesson. Ask students to keep track of their activities over a day on the student activity sheet or in their science scribblers or journals.

The following day, discuss with students any changes in activities during the different time frames and why they took place.

A follow-up to this would be for them to discuss animals and plants and changes that might take place during the day.

A Day in My Life Activity Sheet

Name: _____ Date: _____

A Record of Things I Did Today

Morning	Afternoon	Night

Activity 52: My Tree or Bush

Outcomes

Students will be expected to

- place materials and objects in a sequence or group according to various sorts (202-2)
- predict and communicate questions and answers to investigations about seasonal changes and describe these changes (202-9, 102-5, 202-7, 203-1)

Assessment

- Students are able to predict the changes in their tree/bush over the four seasons.
- Students record their observations of the changes in their tree/bush over the four seasons.

Questions

- What did the students notice about their bush?
- What changes did they observe as the seasons changed?

Materials

- trees or bushes
- chart or method for recording

Procedure

Discuss with students changes they have noticed in trees and bushes during the various seasons. Take the students outside and have them choose a tree or bush they want to observe over the year. Discuss with them that they are going to first predict what will happen to their tree/bush during the seasons and record their predictions. Discuss with students how they came up with their predictions. Discuss with students that they are going to keep an actual record of their tree or bush during the seasons.

A discussion question might be, "What might happen to the same bush or tree in Florida? the Yukon?" This could lend to setting up pen pals on the Internet with a class in another area of the country or world.

My Tree or Bush Activity Sheet

Name: _____

Summer	Picture	Description
Spring	Picture	Description
Winter	Picture	Description
Fall	Picture	Description

Activity 53: A Mural

Outcomes

Students will be expected to

- place materials and objects in a sequence or group according to various sorts (202-2)
- predict and communicate questions and answers to investigations about seasonal changes and describe these changes (202-9, 102-5, 202-7, 203-1)

Assessment

Students are able to group pictures by the season they depict.

Questions

- What mural did you make?
- Can you put different mural puzzles together?

Materials

- mural paper
- crayons, paints, or pastels
- magazines
- glue
- scissors

Procedure

This activity would be good to do towards the end of this unit. The following are several suggestions for activities you might do with students using pictures from magazines or students' own drawings.

- Make four mural puzzles one for each season and give students a piece of the puzzle to draw a picture illustrating a season. Have them put their puzzle piece on the mural for their season (a mural could be done for each season).
- Have students cut out pictures from magazines and make a collage showing clothing for different seasons or one collage for each season.
- Be more specific with the drawings for each season (the changes in specific things such as trees or garden vegetables).

Activity 54: Dress for the Season

Outcomes

Students will be expected to

- investigate and describe human preparations for seasonal changes (103-4)

Assessment

Students will be able to demonstrate, through drawings or dress, proper clothing and safety measures needed for each season.

Question

What types of clothing do we need to wear to be "safe" in various seasons?

Materials

- paper
- crayons
- clothing and protective items (e.g., sunglasses, sunscreen, boots)

Procedure

Have students bring in clothes to depict various seasons. They might do skits to act out the season and safety procedures needed for each season (summer—sun screen, swimming safety). Students may also wish to illustrate dress and safety for various seasons. The following questions could help to lead discussions:

- What causes us to need different clothing for each season?
- What safety procedures might we need to follow in the various seasons?
- Are there some that are the same for all seasons? If so, which ones?

This activity could be used to talk about some animals and the changes in their fur during the various seasons.

Activity 55: Our Seasonal Safety Mural

Outcomes

Students will be expected to

- investigate and describe human preparations for seasonal changes (103-4)

Assessment

Students will be able to demonstrate, through drawings, proper safety measures needed for each season.

Materials

- paper
- crayons

Procedure

Using large mural paper, design a jigsaw puzzle for each season. Give each student or groups of students a jigsaw puzzle piece to illustrate a safety measure for a particular season. This puzzle could be displayed in the classroom or in the hall. Students could print on the picture the safety measure their illustration represents.

This activity could also be done on 11" x 17" paper with groups of four students doing a jigsaw puzzle on one particular safety issue. Discussions should take place on seasonal safety issues prior to the lesson, or this could be a follow-up to the lesson Dress for the Season. Various speakers could be brought in to talk about safety issues not only for humans but for plants and animals.

Appendix G: Print Resources

Authorized Learning

Resources

The following resources to support teaching and learning in science are currently available through the Nova Scotia School Book Bureau. The NSSBB number is given in parenthesis. For more details, visit the website at <https://w3apps.EDnet.ns.ca/nssbb>.

Ahmed and the Nest of Sand: A Piping Plover's Story (13067)

Alphakids, Complete Set, Levels 1–11 (fiction and non-fiction) (13417)

Animal Senses and Defenses (13507)

Animal Teeth (13509)

Cool Tools (13514)

Factivity Series, various titles and big books (13735–13777)

Fantastic Rocks (13510)

Frogs and Toads (13513)

Insects Change (13512)

Insects up Close (13506)

Is That a Fact? (13145)

National Geographic: Windows on Literacy (13150)

Nelson InfoRead (13456–13463)

Oxford Literacy Web, First Non-Fiction, Pack A (13450), *Pack B* (13451)

Pan-Canadian Science Place, Complete Grade One Unit (13928)

PM Library Gold, Animal Facts: Nocturnal Animals (12810)

PM Library Turquoise, Animals in the Wild (12813)

PM Maths: Numeracy and Literacy, Stage A (13424), *Stage B* (13425)

Scholastic Science Resource Centre, Complete Kit (13403)

Science Everywhere, Primary Teacher's Guide (13389), Grade 1 Teacher's Guide (13391)

Science Everywhere, Posters, Grade Primary (13388), Grade 1 (13390)

Side by Side, Grade Primary (13210) Grade 1 (13211)

Tangled in the Bay: The Story of a Baby Right Whale (13065)

Touch It! (13505)

What Can Jump? (13508)

Wonders of the Ocean (13511)

Big Books

Amazing Animals (13341)

Animals around the World (13504)

Be a Plant Scientist (13352)

Food Alphabet (13350)

Homes Everywhere (13581)

How to Grow a Sunflower (13346)

I Am Water (13478)

Red Leaf, Yellow Leaf (13471)

The Underground Dance (13349)

Touch the Earth (13467)

What Do I Eat? (13342)

Whose Baby? (13344)

Materials

Animals and Creatures, Lego Dacta (12378)

Buildings and Structures, Lego Dacta (12424)

Community and Transportation, Lego Dacta (12435)

Early Simple Machines Kit, Lego Dacta (12446)

Other Print Resources

This section contains additional resources that teachers may wish to access to support their science curriculum for grade primary and grade 1. Where possible, an ISBN number is included to aid in locating a title. Many of the titles are trade books available through Canadian publishers and educational distributors and can more than likely be found in publishers' catalogues as part of classroom sets of individual titles or guided reading packs. Many of these titles would be ideal for use during independent reading time in English language arts or as short read-alouds by the teacher. A number of the titles provide a math link for many science activities in appendices E–H that could be used during math time prior to an upcoming science lesson. Big books are listed in this appendix on pages 156 and 167.

Anton, William. (1999). *Day and Night*. New York: Newbridge Educational Publishing. ISBN: 1567844820

Anton, William. (1999). *Light and Shadow*. New York: Newbridge Educational Publishing. ISBN: 156784488X

Anton, William. (1999). *Where Does the Water Go?* New York: Newbridge Educational Publishing. ISBN: 1567845223

Bailey, J., and M. Penny. (2003). *Life in a Rotten Log*. Chicago, Illinois: Heinemann Library. ISBN: 1410903494

Bauer, D. (2003). *A Mirror Image*. Texas: Steck-Vaughn Company. ISBN: 0739859439

Bauer, D. (2003). *Animal Opposites*. Texas: Steck-Vaughn Company. ISBN: 0739858572

Bauer, D. (2003). *Fish Facts*. Texas: Steck-Vaughn Company. ISBN: 0739858378

Betz, A. (1999). *Animals Build*. New York: Newbridge Educational Publishing. ISBN: 1567844707

Blackwell Burke, M. (2001). *A Butterfly's Life*. Texas: Steck-Vaughn Company. ISBN: 0739823973

Blackwell Burke, M. (2001). *In Hiding: Animals under Cover*. Texas: Steck-Vaughn Company. ISBN: 073982399X (also available in big book)

Blackwell Burke, M. (2001). *Who's Hiding There?* Texas: Steck-Vaughn Company. ISBN: 0739823981

Brandenburg, Aliki. (1962). *My Five Senses*. New York: Harper Collins Publishing. ISBN: 0690047940

Burton, M., C. French, and T. Jones. (1999). *Across the Seasons*. New York: Benchmark Education Company. ISBN: 1892393611

Burton, M., C. French, and T. Jones. (1999). *Animal Coverings*. New York: Benchmark Education Company. ISBN: 1892393654

Burton, M., C. French, and T. Jones. (1999). *Animal Groups*. New York: Benchmark Education Company. ISBN: 1583442510

Burton, M., C. French, and T. Jones. (1999). *Animal Homes*. New York: Benchmark Education Company. ISBN: 1892393581

Burton, M., C. French, and T. Jones. (1999). *Animal Worlds*. New York: Benchmark Education Company. ISBN: 1583442022

Burton, M., C. French, and T. Jones. (1999). *Animals and Their Babies*. New York: Benchmark Education Company. ISBN: 1892393433

Burton, M., C. French, and T. Jones. (1999). *Are We Hurting the Earth?* New York: Benchmark Education Company. ISBN: 1583440534

Burton, M., C. French, and T. Jones. (1999). *Art around the World*. New York: Benchmark Education Company. ISBN: 1583440542

Burton, M., C. French, and T. Jones. (1999). *Bigger Than? Smaller Than?* New York: Benchmark Education Company. ISBN: 1892393387

Burton, M., C. French, and T. Jones. (1999). *Changing Weather*. New York: Benchmark Education Company. ISBN: 158344226X

Burton, M., C. French, and T. Jones. (1999). *Children as Young Scientists*. New York: Benchmark Education Company. ISBN: 1583440550

Burton, M., C. French, and T. Jones. (1999). *Clean Beaches*. New York: Benchmark Education Company. ISBN: 1583442308

Burton, M., C. French, and T. Jones. (1999). *Clouds*. New York: Benchmark Education Company. ISBN: 1583440577

Burton, M., C. French, and T. Jones. (1999). *Counting Insects*. New York: Benchmark Education Company. ISBN: 1583440593

Burton, M., C. French, and T. Jones. (1999). *Do We Need It? Do We Want It?* New York: Benchmark Education Company. ISBN: 1583441948

Burton, M., C. French, and T. Jones. (1999). *Endangered Animals*. New York: Benchmark Education Company. ISBN: 1583442359

Burton, M., C. French, and T. Jones. (1999). *Food around the World*. New York: Benchmark Education Company. ISBN: 1583440615

Burton, M., C. French, and T. Jones. (1999). *The Four Seasons*. New York: Benchmark Education Company. ISBN: 1583441980

Burton, M., C. French, and T. Jones. (1999). *Heat*. New York: Benchmark Education Company. ISBN: 1583440658

Burton, M., C. French, and T. Jones. (1999). *How Do Animals Stay Alive?* New York: Benchmark Education Company. ISBN: 1583442480

Burton, M., C. French, and T. Jones. (1999). *How Many Are Left?* New York: Benchmark Education Company. ISBN: 1583440666

Burton, M., C. French, and T. Jones. (1999). *I Hear!* New York: Benchmark Education Company. ISBN: 1583442030

Burton, M., C. French, and T. Jones. (1999). *Look at the Animals*. New York: Benchmark Education Company. ISBN: 1583441891

Burton, M., C. French, and T. Jones. (1999). *Light*. New York: Benchmark Education Company. ISBN: 1583442316

Burton, M., C. French, and T. Jones. (1999). *Measure Up!* New York: Benchmark Education Company. ISBN: 1583440739

Burton, M., C. French, and T. Jones. (1999). *My Five Senses*. New York: Benchmark Education Company. ISBN: 1892393646

Burton, M., C. French, and T. Jones. (1999). *My Week*. New York: Benchmark Education Company. ISBN: 158344212X

Burton, M., C. French, and T. Jones. (1999). *Needs and Wants*. New York: Benchmark Education Company. ISBN: 1892393484

Burton, M., C. French, and T. Jones. (1999). *Ocean Animals*. New York: Benchmark Education Company. ISBN: 1583440747

Burton, M., C. French, and T. Jones. (1999). *Our Class Survey*. New York: Benchmark Education Company. ISBN: 1583442545

Burton, M., C. French, and T. Jones. (1999). *Our Sun*. New York: Benchmark Education Company. ISBN: 1583442561

Burton, M., C. French, and T. Jones. (1999). *Peaches All the Time*. Benchmark Education Company. ISBN: 1583442618

Burton, M., C. French, and T. Jones. (1999). *Plants*. New York: Benchmark Education Company. ISBN: 1583442499

Burton, M., C. French, and T. Jones. (1999). *Reduce, Reuse, and Recycle*. New York: Benchmark Education Company. ISBN: 1583440798

Burton, M., C. French, and T. Jones. (1999). *Sports around the World*. New York: Benchmark Education Company. ISBN: 1583442502

Burton, M., C. French, and T. Jones. (1999). *Sounds*. New York: Benchmark Education Company. ISBN: 1583440828

Burton, M., C. French, and T. Jones. (1999). *Trees*. New York: Benchmark Education Company. ISBN: 1583440844

Burton, M., C. French, and T. Jones. (1999). *Water*. New York: Benchmark Education Company. ISBN: 1583442219

Burton, M., C. French, and T. Jones. (1999). *Water Goes Up! Water Comes Down!* New York: Benchmark Education Company. ISBN: 1583440852

Burton, M., C. French, and T. Jones. (1999). *What Can You Measure with a Lollipop?* New York: Benchmark Education Company. ISBN: 1583442448

Burton, M., C. French, and T. Jones. (1999). *What Comes Next?* New York: Benchmark Education Company. ISBN: 1583442391

Burton, M., C. French, and T. Jones. (1999). *What Do Pets Need?* New York: Benchmark Education Company. ISBN: 1583442227

Burton, M., C. French, and T. Jones. (1999). *What Floats? What Sinks?* New York: Benchmark Education Company. ISBN: 1583442367

Burton, M., C. French, and T. Jones. (1999). *What Pushes? What Pulls?* New York: Benchmark Education Company. ISBN: 1583442456

Burton, M., C. French, and T. Jones. (1999). *Your Body*. New York: Benchmark Education Company. ISBN: 1583442464

Butterfield, M., and W. Ford. (1997). *What Am I? Big, Rough, and Wrinkly*. Texas: Steck-Vaughn Company. ISBN: 0817272321

Butterfield, M., and W. Ford. (1997). *What Am I? Bouncy, Big, and Furry*. Texas: Steck-Vaughn Company. ISBN: 0817272283

Butterfield, M. and W. Ford. (1997). *What Am I? Bright, Lively, and Loud*. Texas: Steck-Vaughn Company. ISBN: 0817272275

Butterfield, M., and W. Ford. (1997). *What Am I? Brown, Fierce, and Furry*. Texas: Steck-Vaughn Company. ISBN: 0817272305

Butterfield, M., and W. Ford. (1997). *What Am I? Fast, Strong, and Striped*. Texas: Steck-Vaughn Company. ISBN: 0817272291

Butterfield, M., and W. Ford. (1997). *What Am I? Fierce, Strong, and Snappy*. Texas: Steck-Vaughn Company. ISBN: 0817272259

Butterfield, M., and W. Ford. (1997). *What Am I? Jumpy, Green, and Croaky*. Texas: Steck-Vaughn Company. ISBN: 0817272267

Butterfield, M., and W. Ford. (1997). *What Am I? Quick, Quiet, and Feathered*. Texas: Steck-Vaughn Company. ISBN: 081727233X

Caporale, S. (2003). *A Day at a Time*. Texas: Steck-Vaughn Company. ISBN: 073985853X

Caporale, S. (2003). *Penguins on the Go*. Texas: Steck-Vaughn Company. ISBN: 0739858556

Caporale, S. (2003). *Spots or Stripes?* Texas: Steck-Vaughn Company. ISBN: 0739858521

Coughlan, C. (1999). *Ants*. Minnestota: Pebble Books. ISBN: 0736802347 (Other titles in this series include *Beetles*, *Bumble Bees*, *Crickets*, *Dragonflies*, *Fireflies*, *Flies*, *Grasshoppers*, *Ladybugs*, and *Mosquitoes*.)

Daniel, C. (2001). *Amazing Birds of the Rainforest*. Texas: Steck-Vaughn. ISBN: 0739824015

Daronco, M., and L. Presti. (2001). *Measuring Tools*. New York: Benchmark Education Company. 158344435X

Franklin, T. (2003). *Machines That Work*. Texas: Steck-Vaughn Company. ISBN: 0739859226

Franklin, T. (2003). *Peanut Butter and Jelly*. Texas: Steck-Vaughn Company. ISBN: 0739859277

Freeman, M. (1999). *Watching the Weather*. New York: Newbridge Educational Publishing. ISBN: 1567844995

Frost, H. (2000). *Keeping Water Clean*. Texas: Steck-Vaughn Company. ISBN: 0736804080 (Other titles in this series include *Water as a Gas*, *Water as a Liquid*, *Water as a Solid*, *The Water Cycle*, and *We Need Water*.)

Frost, H. (2000). *Smelling*. Texas: Steck-Vaughn Company. ISBN: 073680384X (Other titles in this series include *Hearing*, *Seeing*, *Tasting*, *Touching*, and *Your Senses*.)

Halpern, M. (1998). *A Look at Spiders*. Texas: Steck-Vaughn Company. ISBN: 0817272739 (Other titles in this series include *A Look at Dogs*, *A Look at Snakes*.)

Halpern, M. (1999). *How Many Seeds?* Texas: Steck-Vaughn Company. ISBN: 0817282386

Halpern, M. (1999). *Where Do Bugs Live?* Texas: Steck-Vaughn Company. ISBN: 0817282483

Handwerker, S. (1997). *A New Nest*. Texas: Steck-Vaughn Company. ISBN: 0817264043

Handwerker, S. (1997). *A Rainbow Bird*. Texas: Steck-Vaughn Company. ISBN: 0817264051

Hoyo, M. (1997). *Horse Feathers!* Texas: Steck-Vaughn Company. ISBN: 081726440X

Hughes, M. (2003). *Ladybugs*. Chicago, Illinois: Heinemann Library. ISBN: 1410906493 (Other titles in this series include *Pill Bugs*, *Snails*, and *Spiders*)

Jiménez, V. (2003). *What Grows?* Texas: Steck-Vaughn Company. ISBN: 0739858327

Keo, E. (1997). *We Like the Sun*. Texas: Steck-Vaughn Company. ISBN: 0817264078

Leslie, K. (1999). *A Nest Full of Eggs*. Texas: Steck-Vaughn Company. ISBN: 0817282424

Leslie, R. (1998). *Storms!* Texas: Steck-Vaughn Company. ISBN: 0817272577

Leonhardt, A. (2001). *Save the Sea Turtles!* Texas: Steck-Vaughn Company. ISBN: 0739824074

Martin, E. (2003). *Changing Seasons*. Texas: Steck-Vaughn Company. ISBN: 0739859242

Martin, E. (2003). *Sky Colors*. Texas: Steck-Vaughn Company. ISBN: 0739859773

Mead, K. (1999). *A Busy Week*. Texas: Steck-Vaughn Company. ISBN: 0817264175 (also available in big book)

Mead, K. (1999). *A Pet for You*. Texas: Steck-Vaughn Company. ISBN: 0817272550

Mead, K. (1999). *Clap Your Hands!* Texas: Steck-Vaughn Company. ISBN: 0817282505

Mead, K. (1999). *We Make Cookies*. Texas: Steck-Vaughn Company. ISBN: 0817282408

Meyers, A. (1997). *Who Lives in the Woods?* Texas: Steck-Vaughn Company. ISBN: 081726423X

Miles, E. (2002). *Fur and Feathers*. Chicago, Illinois: Heinemann Library. ISBN: 1403404259 (Other titles in this series include *Ears, Eyes, Legs and Feet*, *Mouth and Teeth*, *Noses, Paws and Claws*, *Skins, Scales and Shells*, *Tails, Wings,* and *Fins and Flippers*)

Nayer, J. (1998). *Fall*. New York: Newbridge Educational Publishing. ISBN: 1567849059

Nayer, J. (1998). *In Spring*. New York: Newbridge Educational Publishing. ISBN: 1567849091

Nicol, L. (2002). *In the Henhouse*. Toronto: Pearson Education Canada. ISBN: 0130446564

Oxlade, C. (2003). *Ramps and Wedges*. Chicago, Illinois: Heinemann Library. ISBN: 140343803X

Oxlade, C. (2002). *Wool*. Chicago, Illinois: Heinemann Library. ISBN: 1403440999 (Other titles in this series include *Glass*, *Metal*, *Paper*, *Plastic*, and *Wood*)

Parkes, B. (1998). *Bubbles*. New York: Newbridge Educational Publishing. ISBN: 1567849064

Parkes, B. (1998). *Everyone Eats*. New York: Newbridge Educational Publishing. ISBN: 1567849067

Parkes, B. (1998). *How Animals Move*. New York: Newbridge Educational Publishing. ISBN: 1567844847

Parkes, B. (1998). *In Summer*. New York: Newbridge Educational Publishing. ISBN: 1567849172

Parkes, B. (1998). *Patterns*. New York: Newbridge Educational Publishing. ISBN: 1567849083

Parkes, B. (1998). *Push or Pull*. New York: Newbridge Educational Publishing. ISBN: 1567849040

Parkes, B. (1998). *The Sun*. New York: Newbridge Educational Publishing. ISBN: 1567849296

Parkes, B. (1998). *Using Tools*. New York: Newbridge Educational Publishing. ISBN: 1567849075

Parkes, B. (1998). *Water Changes*. New York: Newbridge Educational Publishing. ISBN: 1567849288

Parkes, B. (1998). *What Can Change?* New York: Newbridge Educational Publishing. ISBN: 1567845185

Parkes, B. (1998). *What Can Fly?* New York: Newbridge Educational Publishing. ISBN: 1567849229

Parkes, B. (1998). *Wheels*. New York: Newbridge Educational Publishing. ISBN: 1567849008

Parkes, B. (1998). *The Wind*. New York: Newbridge Educational Publishing. ISBN: 156784927X

Pollack, S. (1997). *The Mask*. Texas: Steck-Vaughn Company. ISBN: 0817264191

Potter, L. (2002). *Me and My Shadow*. Toronto: Pearson Education Canada. ISBN: 0130357227

Price, C. (1997). *Bats, Bats, Bats*. Texas: Steck-Vaughn Company. ISBN: 0817264493

Price, C. (1997). *Great White Sharks*. Texas: Steck-Vaughn Company. ISBN: 0817264094

Price, C. (1997). *Sam's Seasons*. Texas: Steck-Vaughn Company. ISBN: 0817264205

Price, C. (1997). *Season to Season*. Texas: Steck-Vaughn Company. ISBN: 0817264213

Reed, G. L. (2002). *Farm Animal Sounds*. Texas: Steck-Vaughn Company. ISBN: 0739844792

Ring, S. (2003). *Big, Bigger, Biggest*. Texas: Steck-Vaughn Company. ISBN: 0739858548

Ring, S. (2003). *Colors*. Texas: Steck-Vaughn Company. ISBN: 0739858335

Ring, S. (2003). *In the Desert*. Texas: Steck-Vaughn Company. ISBN: 0739859196

Ring, S. (2003). *What Time Is It?* Texas: Steck-Vaughn Company. ISBN: 0739859382

Ring, S. (1999). *Wonderfully Weird Animals*. New York: Newbridge Educational Publishing. ISBN: 1582730385

Robinson, F. R. (2001). *Arctic Life*. Texas: Steck-Vaughn Company. ISBN: 0739824090

Rubin, A. (2003). *Computers Can Help*. Texas: Steck-Vaughn Company. ISBN: 0739859366

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Appendix H: Pan-Canadian Outcomes Chart

The following outcomes are from *Common Framework of Science Learning Outcomes K to 12* that were used as guidelines for this science document. Column one outcomes have been developed from these Pan-Canadian outcomes.

Physical Science: Materials, Objects, and Our Senses

STSE/Knowledge	Skills
Students will be expected to	*Students will be expected to*
100-9 identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials	**Initiating and Planning**
100-11 demonstrate ways materials can be changed to alter their smell and taste	**200-2** identify problems to be solved
100-13 compare and describe the components of some familiar objects	**200-3** make predictions, based on an observed pattern
101-3 demonstrate ways in which we can use materials to make different sounds	**200-4** select and use materials to carry out their own explorations
101-4 describe ways in which materials can be changed to alter their appearance and texture	**Performing and Recording**
101-5 explore and describe ways to create useful objects by combining or joining different components or materials	**201-3** use appropriate tools for manipulating and observing materials and in building simple models
103-3 describe and demonstrate ways to use materials appropriately and efficiently to the benefit of themselves and others	**201-5** make and record relevant observations and measurements, using written language, pictures, and charts
	Analysing and Interpreting
	202-2 place materials and objects in a sequence or in groups according to one or more attributes
	202-4 construct and label concrete-object graphs, pictographs, or bar graphs
	202-7 propose an answer to an initial question or problem and draw simple conclusions based on observations or research
	Communication and Teamwork
	203-3 communicate procedures and results, using drawings, demonstrations, and written and oral descriptions

Life Science: Needs and Characteristics of Living Things

STSE/Knowledge	Skills
Students will be expected to **100-4** observe and identify similarities and differences in the needs of living things **100-5** describe different ways in which plants and animals meet their needs **100-7** describe the different ways humans and other living things move to meet their needs **100-8** identify and describe common characteristics of humans and other animals and identify variations that make each person and animal unique **103-2** recognize that humans and other living things depend on their environment, and identify personal actions that can contribute to a healthy environment	*Students will be expected to* **Initiating and Planning** **200-1** ask questions that lead to exploration and investigation **Performing and Recording** **201-5** make and record relevant observations and measurements, using written language, pictures, and charts **201-7** identify and use a variety of sources of science information and ideas **Communication and Teamwork** **203-2** identify common objects and events, using terminology and language that others understand **203-4** respond to the ideas and actions of others in constructing their own understanding

Earth and Space Science: Daily and Seasonal Changes

STSE/Knowledge	Skills
Students will be expected to **100-14** describe changes in heat and light from the sun **101-6** describe ways of measuring and recording environmental changes that occur in daily and seasonal cycles **102-4** investigate and describe changes that occur on a daily basis in the characteristics, behaviours, and location of living things **102-5** investigate and describe changes that occur in seasonal cycles in the characteristics, behaviours, and location of living things **103-4** investigate and describe human preparations for seasonal changes	*Students will be expected to* **Initiating and Planning** **200-1** ask questions that lead to exploration and investigation **200-3** make predictions based on an observed pattern **Performing and Recording** **201-5** make and record relevant observations and measurements, using written language, pictures, and charts **Analysing and Interpreting** **202-2** place materials and objects in a sequence or in groups according to one or more attributes **202-7** propose an answer to an initial question or problem and draw simple conclusions based on observations or research **Communication and Teamwork** **203-1** communicate questions, ideas, and intentions while conducting their explorations **203-2** identify common objects and events, using terminology and language that others understand