Atlantic Canada
Science Curriculum

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CURRICULUM

Science
Grade Primary

Atlantic Canada Science Curriculum: Grade Primary

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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). The Atlantic Provinces Education Foundation (APEF) has developed new science curriculum guidelines for grades primary–10.

Atlantic Canada Science Curriculum: Grade Primary includes the following units: Exploring the World with Our Senses, Exploring Sand and Water with Our Senses, Exploring Moving Things with Our Senses, and Exploring the World of Living Things with Our Senses.

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

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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.

The Grade Primary Program

The first year of public school education guides children through the transition from home to school, fostering the students' independent, lifelong learning in a supportive community of learners. What and how children learn in their first year in school will have a major impact on successful learning experiences in school, on their personal development, and on their future participation in society.

The grade primary program must recognize and be responsive to each child's prior knowledge, skills, attitudes, learning pace, personal traits, interests, and preferred learning style. It is crucial that the range of experiences in the grade primary program meet children's varying needs and provide both support and challenge for all learners.

Since each child has a unique rate of development, as well as needs and abilities that are different from those of other children, the program must be developmentally appropriate for each child. Developmentally appropriate learning experiences and materials would involve children in, for example, manipulating concrete materials, exploring a tactile environment, and using oral language to learn.

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 to 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 with the students his/her expectations for communication and teamwork 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 the hands-on learning experience. This is 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 can 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 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 provide 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 of 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.

Overview of Primary Science

Science in grade primary focusses on outcomes that involve concepts and skills, not content. This guide provides a variety of activities in four units:

- Exploring the World with Our Senses
- Exploring Sand and Water with Our Senses
- Exploring Moving Things with Our Senses
- Exploring the World of Living Things with Our Senses

The variety of activities allows teachers flexibility in planning a range of learning experiences to engage students in science explorations that address the specific curriculum outcomes for grade primary science. It is not expected that teachers will incorporate all of the suggested activities into their instructional programs, but rather that the variety will afford teachers choice in instructional design. However, it is expected that the range of learning experiences will address all of the specific curriculum outcomes in the course of the year's program.

Teachers may choose to follow the design of the four units presented in this guide. Alternatively, they may choose to begin with learning experiences based on the first unit, Exploring the World with Our Senses, and then select activities from the other three units as contexts for reinforcing the outcomes addressed in the first unit and for focussing on the other specific curriculum outcomes for grade primary science.

Instructional design must reflect a balance of learning experiences focussed on specific curriculum outcomes for science and of learning experiences based on integrated explorations. Integrated learning experiences may be designed by focussing on one or more specific curriculum outcomes for science and looking for natural connections to other subject areas. Each unit includes suggestions for such connections.

Senses Background Information

"In observing, we learn to use all our senses. Physiologists tell us we have many more than the five basic senses. We have the senses of sight, sound, taste, smell, and touch. But we also have the sense of balance, the sense of muscle contraction, the sense of muscle memory, the sense of direction, the muscular senses we use when we investigate how heavy something is, and other internal senses. In our skin, we have four different kinds of receptors for cold, heat, deep pressure, and surface pressure. In all, there are some 30 different kinds of receptor systems in the human body; thus, one can say the human body has over 30 different kinds of senses.

In developing the skill of observation, children learn to use all their senses and attend to stimuli to be recorded in the sensory register, and from there move on for processing. Connections with the memory bank in the long-term memory help people recognize stimuli, making it easier for them to make perceptual sense. Since young children do not have the wealth of experience that older children and adults have, it is important for them to begin obtaining this experiential base. The more observation activities they perform, the more experiences they will add to their long-term memory stores, and the better able they will become to make connections with new things they observe."

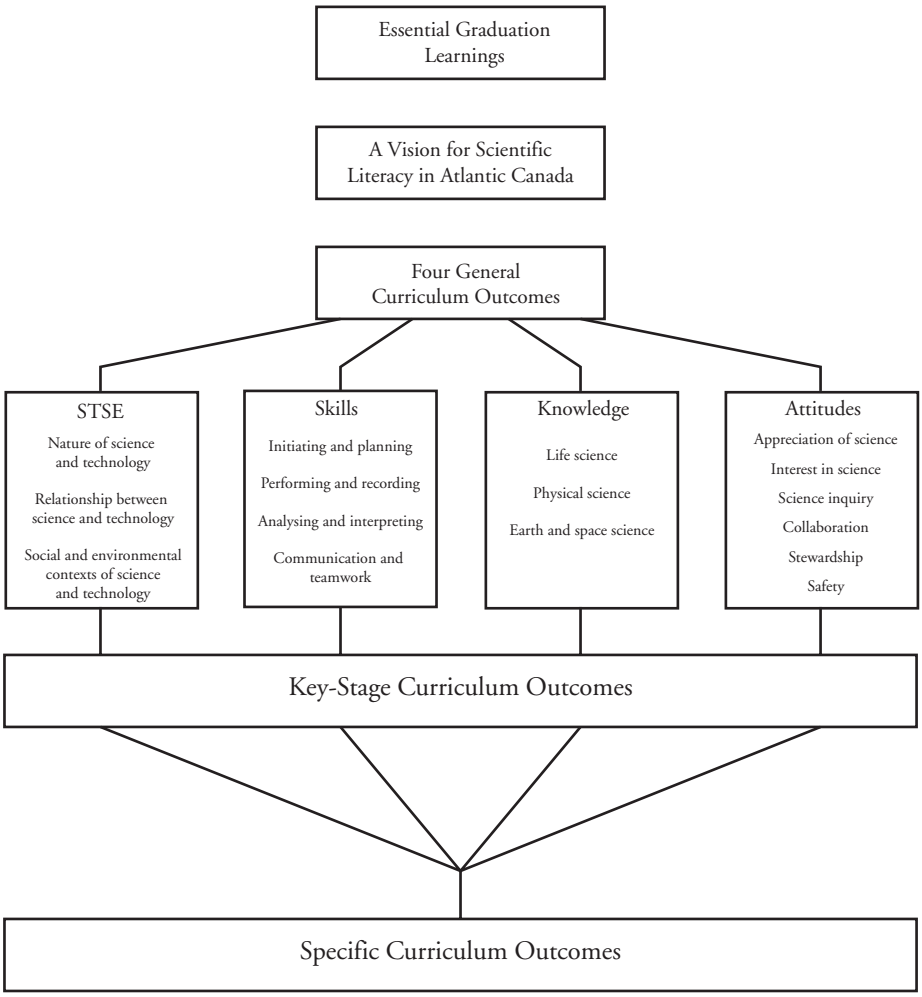
— *Elementary Science Methods: A Constructivist Approach*,
David Jerner Martin (NSSBB # 12583)

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 primary 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 four units for each grade level. Each unit is organized by topic. Grade primary science units and topics follow.

Exploring the World with Our Senses

- Sight
- Hearing
- Smell
- Taste
- Touch
- Observing Using More than One Sense

Exploring Sand and Water with Our Senses

- Sand Investigations
- Water

Exploring Moving Things with Our Senses

- Exploring with Ramps, Rollers, and Sliders
- Investigating with Ramps
- Investigating Our Own Movement
- Investigating Balance

Exploring the World of Living Things with Our Senses

- Investigating Living Things Outdoors
- Investigating Living Things in the Classroom

The following are the specific curriculum outcomes for science, grade primary.

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

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 a 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 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:

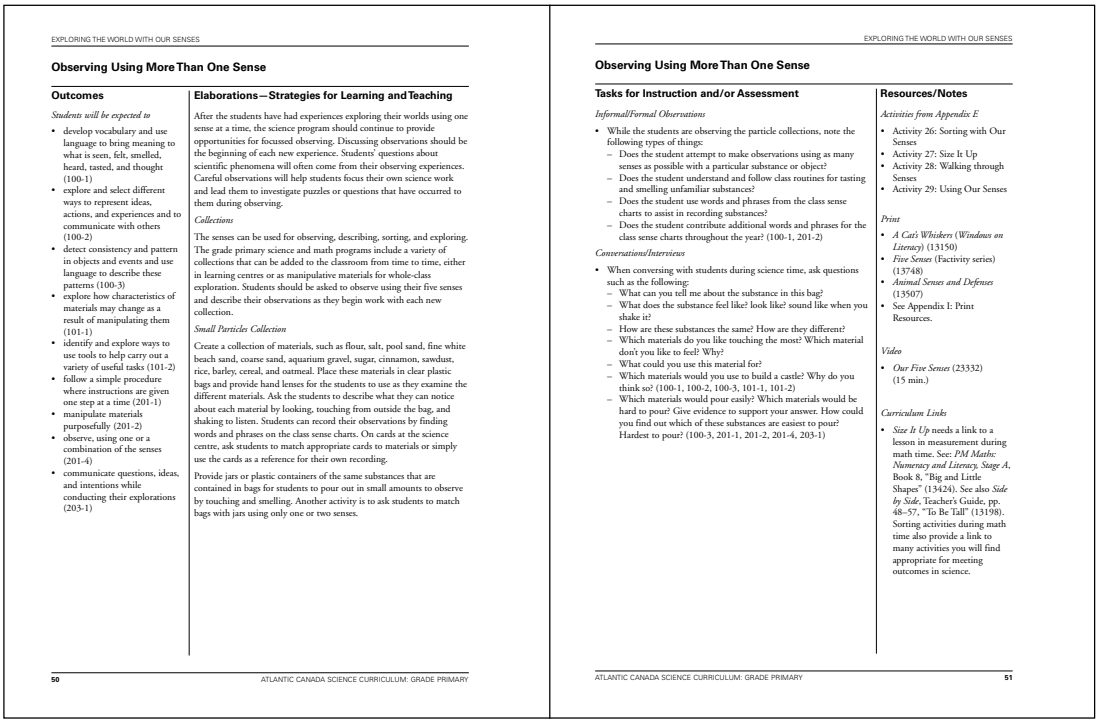
- 100s—Science-Technology-Society-Environment (STSE) outcomes
- 200s—Skills outcomes
- 300s—Knowledge outcomes
- 400s—Attitudes outcomes (see pages 16–18)

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



EXPLORING THE WORLD WITH OUR SENSES

Observing Using More Than One Sense

Outcomes	Elaborations—Strategies for Learning and Teaching
Students will be expected to • develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1) • explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2) • detect consistency and pattern in objects and events and use language to describe these patterns (100-3) • explore how characteristics of materials may change as a result of manipulating them (101-1) • identify and explore ways to use tools to help carry out a variety of useful tasks (101-2) • follow a simple procedure where instructions are given one step at a time (201-1) • manipulate materials purposefully (201-2) • observe, using one or a combination of the senses (201-4) • communicate questions, ideas, and intentions while conducting their explorations (203-1)	After the students have had experiences exploring their worlds using one sense at a time, the science program should continue to provide opportunities for focussed observing. Discussing observations should be the beginning of each new experience. Students' questions about scientific phenomena will often come from their observing experiences. Careful observations will help students focus their own science work and lead them to investigate puzzles or questions that have occurred to them during observing. *Collections* The senses can be used for observing, describing, sorting, and exploring. The grade primary science and math programs include a variety of collections that can be added to the classroom from time to time, either in learning centres or as manipulative materials for whole-class exploration. Students should be asked to observe using their five senses and describe their observations as they begin work with each new collection. *Small Particles Collection* Create a collection of materials, such as flour, salt, pool sand, fine white beach sand, coarse sand, aquarium gravel, sugar, cinnamon, sawdust, rice, barley, cereal, and oatmeal. Place these materials in clear plastic bags and provide hand lenses for the students to use as they examine the different materials. Ask the students to describe what they can notice about each material by looking, touching from outside the bag, and shaking to listen. Students can record their observations by finding words and phrases on the class sense charts. On cards at the science centre, ask students to match appropriate cards to materials or simply use the cards as a reference for their own recording. Provide jars or plastic containers of the same substances that are contained in bags for students to pour out in small amounts to observe by touching and smelling. Another activity is to ask students to match bags with jars using only one or two senses.

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EXPLORING THE WORLD WITH OUR SENSES

Observing Using More Than One Sense

Tasks for Instruction and/or Assessment	Resources/Notes
Informal/Formal Observations • While the students are observing the particle collections, note the following types of things: – Does the student attempt to make observations using as many senses as possible with a particular substance or object? – Does the student understand and follow class routines for tasting and smelling unfamiliar substances? – Does the student use words and phrases from the class sense charts to assist in recording substances? – Does the student contribute additional words and phrases for the class sense charts throughout the year? (100-1, 201-2) *Conversations/Interviews* • When conversing with students during science time, ask questions such as the following: – What can you tell me about the substance in this bag? – What does the substance feel like? look like? sound like when you shake it? – How are these substances the same? How are they different? – Which materials do you like touching the most? Which material don't you like to feel? Why? – What could you use this material for? – Which materials would you use to build a castle? Why do you think so? (100-1, 100-2, 100-3, 101-1, 101-2) – Which materials would pour easily? Which materials would be hard to pour? Give evidence to support your answer. How could you find out which of these substances are easiest to pour? Hardest to pour? (100-3, 201-1, 201-2, 201-4, 203-1)	*Activities from Appendix E* • Activity 26: Sorting with Our Senses • Activity 27: Size It Up • Activity 28: Walking through Senses • Activity 29: Using Our Senses *Print* • *A Cat's Whiskers* (*Windows on Literacy*) (13150) • *Five Senses* (Factivity series) (13748) • *Animal Senses and Defenses* (13507) • See Appendix I: Print Resources. *Video* • *Our Five Senses* (23332) (15 min.) *Curriculum Links* • *Size It Up* needs a link to a lesson in measurement during math time. See: *PM Maths: Numeracy and Literacy, Stage A*, Book 8, "Big and Little Shapes" (13424). See also *Side by Side*, Teacher's Guide, pp. 48–57, "To Be Tall" (13198). Sorting activities during math time also provide a link to many activities you will find appropriate for meeting outcomes in science.

ATLANTIC CANADA SCIENCE CURRICULUM: GRADE PRIMARY 51

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 primary, 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 brackets after the item.

Column Four: Resources/Notes

This column includes activities, which can be found in Appendices E–H in this document, and resources that may be used to address specific curriculum outcomes. These include *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.

Exploring the World with Our Senses

Introduction

Children have a natural curiosity about their surroundings—a desire to explore and investigate, see inside things, find out how they work, and find answers to their questions. In a learning environment rich in materials to explore, and with appropriate support and guidance, students can develop confidence in manipulating, exploring, and creating with a variety of materials; develop language to express, enlarge, and reflect upon their experience; and begin to develop an understanding of the materials and their use.

Focus and Content

The focus in this unit is on exploring the world through the senses and developing vocabulary to express observations. Young children have been avid investigators throughout their preschool years. The grade primary science program capitalizes on this natural tendency, inviting the students to explore in more focussed ways in the classroom setting.

Students will be invited to observe materials in the classroom and in the world outside the school. In whole-class, small-group, and individual contexts, the students will manipulate objects and materials, make observations, and share their observations and their questions.

Science Curriculum Links

This unit engages students in ways of working that will be fundamental to future science learning. The observation of features and properties of materials, substances, and objects and the language and symbols used to represent them will be a focus of the grade primary program in all subject areas. The work undertaken by the students should be integrated. In grade 1, students develop skills and connections in units such as Needs and Characteristics of Living Things, Properties of Objects and Materials, and Daily and Seasonal Changes.

The learning experiences of this unit will focus on student exploration through the senses. In the initial weeks, students will make observations using one sense at a time, honing their powers of observation and developing more specific language to describe these perceptions. The work with single sensing will probably require a week or two for each sense and should be conducted in the opening two months of the school year. Then the students can be asked to observe using one, two, or more senses, with the teacher designating senses to be used on some occasions, and the students deciding for themselves which senses would be the most appropriate in other circumstances.

After these initial experiences, students will broaden their explorations to a variety of new contexts. Observing through the senses provides the foundation for each new experience.

Curriculum Outcomes

The following outcomes are from *Common Framework of Science Learning Outcomes K to12*. Column one outcomes in the four-column spreads for this topic have been developed from these pan-Canadian outcomes.

STSE/Knowledge

Students will be expected to

100-1 develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought

100-2 explore and select different ways to represent ideas, actions, and experiences and to communicate with others

100-3 detect consistency and pattern in objects and events and use language to describe these patterns

101-1 explore how characteristics of materials may change as a result of manipulating them

101-2 identify and explore ways to use tools to help carry out a variety of useful tasks

Skills

Students will be expected to

Initiating and Planning

200-1 ask questions that lead to exploration and investigation

200-4 select and use materials to carry out their own explorations

Performing and Recording

201-1 follow a simple procedure where instructions are given one step at a time

201-2 manipulate materials purposefully

201-4 observe, using one or a combination of the senses

Analysing and Interpreting

202-1 use personal observations when asked to describe characteristics of materials and objects studied

202-2 place materials and objects in a sequence or in groups according to one or more attributes

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

203-4 respond to the ideas and actions of others and acknowledge their ideas and contributions

Sight

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Elaborations—Strategies for Learning and Teaching

Teachers may wish to organize the observing experiences as whole-class activities or as learning-centre activities. A balance and range of organizational styles will provide students with the most appropriate experiences. For whole-class activities, teachers will need to collect and have ready enough objects or materials for pairs of students. For learning centres, there should be sufficient samples for three to four students at a time.

Take advantage of any opportunity to ask students to describe what they see. When passing out manipulatives such as interlocking cubes and pattern blocks, ask the students to describe what they see when they examine the objects. Add new words to the sight chart. This procedure should be followed whenever manipulatives are used in art time, mathematics, health, or social studies. This type of focussing should take only a few moments at the beginning of the session and will demonstrate the connections among various learning experiences while building observation skills and language.

Students will be noticing the most common aspects of objects or materials that can be best perceived through the sense of sight. These include colour, shape, size, lustre, phase (solid, liquid, gas), and viscosity. While it is not expected that students will articulate these categories as properties of the material, the experiences will build the foundation for work with properties of the materials in later grades.

Teachers should be encouraging growth in qualitative observations and the use of vocabulary that is qualitative. Students may use terms such as “nice,” “gross,” and “yucky” and should be helped to move to more precise descriptions such as shaped like a “cube,” “fuzzy,” “brown,” and “yellow spots.”

Students should be encouraged to make quantitative observations using non-standard measures and by comparing to common objects such as big as a baseball, as long as a new pencil, as heavy as my lunch box. From time to time, students should make their own record of observations by drawing what they see; completing a teacher-made record sheet; replicating an object in Plasticine, and so on.

Getting Started—Make a Sight Chart

Begin by creating a sense chart for sight. A long, narrow chart allows for gradual addition of the students’ growing vocabulary of sight words and phrases. This chart should be posted in an area of the classroom that will be visible at all times to the students and that provides enough space to add other rectangular charts for the other senses as each new sense becomes the focus of classroom exploration.

Sight

Tasks for Instruction and/or Assessment

Informal/Formal Observation

- Note the student's growth in making observations and in developing vocabulary to express sight observations. (100-1, 202-1)
- Do the student's contributions indicate a growing attention to detail and accuracy in observing? Does the student use accurate vocabulary for properties such as colour, shape, relative position of objects, size, texture? (100-1, 202-1)
- Is the student able to compare objects or materials to other objects and materials when describing size and other characteristics? (100-1, 201-4, 202-1)
- Note the student's growing attention to detail when making a record of observations. (100-2)

Resources/Notes

Activity from Appendix D

- Activity 1: Seeing Is Believing

Print

- *National Geographic: Windows on Literacy*, Teacher's Guide, Emergent Stage, pp. 162–65
- *Look at This!* Factivity series (big book) (13739) (See Appendix H.)

Sight *(continued)*

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)

Elaborations—Strategies for Learning and Teaching

Whole-Class Observations

Teachers can begin the focus on observing through sight by inviting students to describe what they see when an object (fruit, vegetable, classroom manipulative) is displayed at class meeting time. The teacher can record the students' descriptions on chart paper and review all the features of the object that can be perceived by sight alone. This process might be repeated a few times before students are asked to make observations in groups and on their own. Students may want to bring interesting objects from home or suggest other classroom objects for observation time.

Go on a Sight Walk

Take students to familiar areas of the school and ask them to look around carefully to see everything there is to see in this place. A teacher, student helper, or volunteer might record the list of items the students can see. Are the students surprised at how many things they can see when they take some time and really look around?

Colour Walk

A challenging colour walk or colour search can be created using colour chips from a hardware store paint display. Provide each student or pair of students with a small number of colour chips and ask them to find something in the classroom or other designated environment that matches each colour chip. **Teacher Note**: *Watch for colour blindness.*

Look Up, Look Down

Take the students outdoors or try this right in the classroom. Ask them to look up and tell each other everything they can see. What details do they notice? What colours? Any surprises? Students might draw a diagram/picture of the things they noticed when looking upward. If the experience is conducted outdoors on a day with distinctive clouds against a blue sky, provide students with cotton batting or felt scraps to create a visual representation of the clouds they observed outdoors. On another day, ask the students to look down and carefully note everything they can see below them.

Play "I Spy" in the Classroom, around the Building, or Outdoors

Students can take turns selecting a mystery object that can be seen by everyone in the class and describing the object with a few sight clues. For example, "I spy with my little eye something that is round, as big as a cookie, and blue." Other students look around for specific objects and make guesses. This might be a good warm-up to class meeting time, science time, or waiting time such as line-up for movement through the building to some event or class. Provide the clues from time to time to extend the difficulty level and ensure that all students are challenged.

Sight *(continued)*

Tasks for Instruction and/or Assessment

Informal/Formal Observation

- Does the student contribute to group and class discussions when recordings are being made by the teacher? Are contributions relevant to the particular task? Do the student's contributions indicate an understanding of and interest in the observation going on in the classroom? (100-1, 202-1)
- Does the student use drawing, painting, and beginning writing to record some of the observations made through sight? (100-2, 202-1)
- Do the student's recordings demonstrate an interest in accuracy of detail and inventiveness in ways to represent what is seen? (100-2)

Performance

- Present the student with an unfamiliar object or material to observe using only sight. What characteristics does the students describe? Does the student give some details for colour, shape, size, and comparison to other objects or materials? (100-1, 100-2)

Resources/Notes

Activities from Appendix D

- Activity 2: Camouflage and Colour
- Activity 3: Our World in Colour
- Activity 4: Where Did the Colour Go?

Print

- *Science Everywhere*, Teacher's Guide, pp. 90–92; 124–35, Poster 6 (13389)
- *Rainforest Colors, Who's Hiding* Scholastic Science Resource Centre (13403) (See Appendix H.)

Curriculum Links

- Engaging students in patterning and attribute lessons during math time would also provide a nice link. From *Side by Side*, Teacher's Guide, see "The Necklace" (13198). See also PM Maths: Numeracy and Literacy, Stage A, Book 10: *Making a Butterfly* (13424).

Sight *(continued)*

Outcomes

Students will be expected to

- observe, using one or a combination of the senses (201-4)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Elaborations—Strategies for Learning and Teaching

See-through or Not?

Gather a collection of objects that are transparent, such as plastic bottles, plastic bags, lenses, see-through containers, and plastic wrap, and objects that let light through but cannot be seen through. Ask students to try looking through each object. What can they see? Ask them to put the objects into groups: good for looking through and not so good for looking through. On another occasion, invite students to observe through the objects and materials that can be seen through. What do they see? **Teacher Note:** *Students are not expected to know transparent, translucent, and opaque. Teacher should know these words and meanings so that they can answer any questions.*

Looking through Magnifiers

Ask students to look at objects or materials carefully and tell the class or each other what they see. Then provide students with plastic magnifiers, and ask them to look at the same objects and materials again. What do they see now? Add new details to their original list of descriptive features. Students may need help using the magnifier effectively; teachers can model the use of the magnifier when working with students.

Home Connections

During the week or two in which the class is focussing on observing through sight, the teacher can send invitations home for the family to do some of the observing with the student. A home record might include an invitation such as "I use my eyes to see many different things. Here are some of the colours of objects in my home." Student and family members or caregivers draw and colour objects of different colours chosen by the student.

Another home invitation might ask parents/caregivers to select one area of the home in which to notice and list all the objects and materials that can be seen.

Collections of Objects

Ask students to look at a collection of objects carefully and tell the class or each other what they see. Then ask them to place the objects in a pattern and tell what the pattern is. When students are working with a collection of objects that vary in a particular property such as length, heaviness, or texture, notice whether the student is able to place the objects in a serial order according to that property. For example, can the student order a set of twigs from the shortest to longest?

Sight *(continued)*

Tasks for Instruction and/or Assessment

Performance

- Note how the students are using the magnifiers. Watch to see if the students are trying different ways to hold the magnifiers.
  - Are they trying different distances from the eye?
  - Are they trying different distances from the object being observed?

  Teacher Note: *While mastery of a particular technique is not required, students' handling of the magnifier should indicate their understanding that it is a tool to enhance their ability to make observations by sight.*
  - Can students describe how an object looks different when seen through a magnifier compared to how it looks without the magnifier? (202-2)
- With the two-way magnifier, note whether students can manipulate the apparatus to take advantage of both magnifiers. (201-4)
- Provide the student with a collection of objects that vary in a particular property. Note if the student is able to order the set and explain the order. (202-2)

Resources/Notes

Activities from Appendix D

- Activity 5: See-through or Not
- Activity 6: Let's Look at Leaves, Feathers, and Shells
- Activity 7: Making the World Larger

Print

- *National Geographic: Windows on Literacy*, Teacher's Guide, Early Stage, pp. 38–41; 146–49; 166–69
- *Science Everywhere*, Teacher's Guide, pp. 103–5, Poster 4; pp. 136–41 (13389)
- *A Better Look, Seeing Things Up Close, Tools Can Help Us* (Windows on Literacy) (13150)
- *Red Leaf, Yellow Leaf* (big book) (13471) (See Appendix H.)

Hearing

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- manipulate materials purposefully (201-2)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Elaborations—Strategies for Learning and Teaching

Getting Started—Make a Sound Chart

Begin by creating a hearing chart and posting it beside the charts for the other senses. Introduce observing through the sense of hearing through a whole-class experience with the sound containers collection. Throughout the hearing explorations, record the students' growing vocabulary of words that describe sound. As students explore various ways to make sounds with the materials and collections available in the classroom, observe the ways each student approaches the materials, tries things, shares discoveries, perseveres with further exploration, or moves on to some other activity.

Sound Containers

A useful classroom collection for sound explorations is a set of opaque plastic containers each filled with a different object or substance that will make a sound when the container is shaken. Some suggestions for contents include sand, gravel, small spherical rocks such as pea gravel, different types of dried beans and seeds, cotton balls, marshmallows, an eraser, small plastic toys, small metal objects such as washers, bolts, and keys. This collection can be used on many occasions, both as self-selected and as teacher-directed activity. Questions to accompany this collection are, What does it sound like? Which ones sound the same? Which container makes the loudest sound? Which container makes the softest sound? Which containers hold many objects? Which containers hold only one object? Which containers hold a few objects? The goal here is to describe the mystery sound, not to guess what is inside each container.

Scrapers and Clappers

A second sound collection might include materials and objects that make interesting or distinctive sounds when scraped or clapped against one another. Materials might include sandpaper, combs, corrugated cardboard or plastic, tinfoil pie plates, tin pie plates and pot covers, wooden shapes, rocks, and plastic items. Once again, the goal here is to engage students in observing and describing sounds they can create with the collection. Students might be asked, What does the sound remind you of? What other things make similar sounds? Which scrapers or clappers make the loudest sound? Which make the quietest sound?

Sorting Sounds

Using a variety of sound makers from the various materials available in the classroom, invite students to sort the sound makers into any number of groups. Discuss with the students their rules for sorting and encourage them to try another sort, perhaps by ordering the sound makers from quietest to loudest, or lowest to highest. Students can leave a favourite set-up to present at sharing time and explain their rule to the rest of the class.

Hearing

Tasks for Instruction and/or Assessment

Informal/Formal Observation

- In group discussion time and in individual conversations, note the types of words and phrases the student is using to describe different sounds. (100-1, 201-4, 202-1)
- Does the student offer "sounds like a ..." comparison when the class is playing the mystery sound box game or the recorded sounds challenge? Does the student recognize and name loud sounds, quiet sounds, high sounds, and low sounds? (100-1, 100-2, 202-1, 202-2)
- Is there evidence of the students' vocabulary related to sounds growing to include words such as quiet, soft, faint, noisy, piercing, shrill, high, low, bass, and deep? (100-1, 200-1)
- Is there evidence of a growing vocabulary for different kinds of sounds such as buzz, drone, hum, mumble, mutter, murmur, talk, whisper, chatter, cry, wail, whimper, whine, groan, moan, laugh, giggle, scream, squeal, shriek, yell, shout, roar, cheer, bang, boom, crash, clang, hiss, cluck, honk, peep, quack, and tweet? (100-1)

Performance

- Does the student use a growing range of sound ideas and vocabulary in exploratory and play-based learning at learning centres or other independent work activities in the classroom? (101-2, 200-4, 201-2)

Resources/Notes

Activities from Appendix D

- Activity 8: Strange Sounds
- Activity 9: Scrapers and Clappers

Print

- *Science Everywhere*, Teacher's Guide, pp. 209–11 (13389)
- *What Makes This Sound?* (Factivity series) (13738) (See Appendix H.)

Video

- *Sound: A First Look* (23316) (17 min.)

Hearing *(continued)*

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

The Mystery Sound Box

Use a drum stick, pointer, or pencil to tap a mystery object inside a cardboard box that has been designed as the mystery sound box. Objects that may be used on successive occasions include a glass or bottle, drum, tin can, xylophone, or other musical instrument. The experiences can be extended by making other sounds inside the mystery box, such as shaking a bottle of marbles or beans, rubbing two materials together, or starting a mechanical toy. Students can be invited to bring a mystery object from home to present to the class inside the mystery sound box. During these brief experiences with the mystery sounds, the students are asked to describe the sound. While the students will enjoy guessing the source of the sound, the teacher should ask for some description of the sound along with the identification process.

Listening to Mystery Sounds

Using a recording of sounds, ask the students to identify possible sources. Once introduced, this can become a learning centre activity where students listen to a recording and identify sounds from a set of pictures or where students listen and draw the possible source of the sound. The experience might be extended by inviting students and their families to prepare a tape recording of a mystery sound for the student to present as a challenge to the class at sharing time.

Sounds around You

Walk in the hallway of the building with a tape recorder and record a few interesting sounds. Invite students to listen, describe, and identify the sounds. Have students work in groups of two or three with a parent volunteer, older student, or other educator to record sounds at different times in the school day and in different locations around the school and grounds. Invite each group to present its recording and lead a discussion about its sounds.

Describing Sound Differences

As a whole-class activity or in learning centres, ask the students to explore sounds with xylophones, water bottles scales, toy pianos, or small electronic keyboards. Ask the students to make high sounds and low sounds and present their sound patterns to the rest of the class. Suggest additional words and phrases for the hearing sense chart that describe the different tones, pitches, and loudness they observe.

Conversations around Sound

Initiate a class discussion regarding the ways sound is important to people. Note the growing understanding that sound is important for communication, safety, entertainment, and pleasure. Note the student's ability to identify uses of sounds by people and perhaps by other living things.

Hearing *(continued)*

Tasks for Instruction and/or Assessment

Performance

- Explore various sounds. Ask questions such as, What do you hear when a car backs up? What sound does a fire engine make? Other sounds to explore may be a police siren, a truck backing up, a whistle at a pool, a buzzer on a microwave, a clock ticking, a fog horn, a bell, a smoke alarm, a horn, and a phone ringing. (100-1, 202-1)

Paper and Pencil

- Does the student represent ideas through drawing, modelling with clay, or other media? (100-2)
- Does the student contribute to small-group and class discussion, making suggestions for additions to the sound chart and other group recording devices? (100-1, 202-1, 203-1, 203-2, 203-4)
- Does the student use beginning writing, drawing, and other means to record ideas about sound in his/her science log or journal? (100-2)

Presentation

- Does the student demonstrate to the class or small group by sharing a mystery sound, describing a mystery sound, comparing a mystery sound to other familiar sounds, offering an opinion as to loud/quiet, high/low, "sounds like a ..."? (100-2, 203-1, 203-4, 201-4)
- Does the student contribute to sharing time by describing what he/she did and learned about during centre time or independent work time? (100-2, 203-1)

Resources/Notes

Activities from Appendix D

- Activity 10: Name That Sound
- Activity 11: The Mystery Sound Box

Print

- *Science Everywhere*, Teacher's Guide, pp. 209–11 (11389)
- See Appendix H: Print Resources.

Smell

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)

Elaborations—Strategies for Learning and Teaching

Getting Started—Make a Smell Chart

Begin by creating a chart for the sense of smell. As the students explore with the sense of smell, add descriptive words and phrases to the chart. Post this chart beside the class sight chart. Involve the students in the ongoing development of the chart to help their vocabulary build. Use the smell chart to represent and enhance the students' growing vocabulary for smell observations. Teachers should demonstrate how to smell. This proper procedure should show students how to waft the odour towards them in order to smell it.

Whole-Class Smell Experiences

As an initial whole-class experience, the teacher can show an object or material with a distinctive aroma at the class meeting time and ask students to describe what they can smell. Teach the children an appropriate technique for smelling unfamiliar objects or substances. One technique is to hold the object away from the face and body and use a hand to wave the air above the object towards the face. Students may need to practise this procedure in a guided situation and can be invited throughout the smell experiences to discuss reasons why such a procedure is necessary. The reasons will be more obvious when the students are observing through smell substances that are powdery or liquid.

Hide a Smell

Another whole-class smell exploration can be created by hiding an object such as cut and peeled onion or garlic somewhere in the classroom. As students begin to notice the smell, invite them to become smell detectives and describe and suggest hiding places. Extend the experience by asking students if they know of animals that use smell to find objects. Share books, films, or other media presentations about the ways animals use the sense of smell.

Smell Preferences

Ask the students to share smells that they like and smells that they don't like. This can be done as a class activity with the teacher recording. The teachers can select a few of the substances that are common to many students and ask students to contribute their opinions of smell preferences to a class pictograph. Class graphs might be organized around ideas such as, "Smells I like most are baking cookies, oranges, and hot chocolate. Smells I don't like are fish, vegetables cooking, and paint."

Smell

Tasks for Instruction and/or Assessment

Informal/Formal Observation

- Demonstrate and extend the vocabulary students use to make observations. In group discussion time and in individual conversations, note the types of words and phrases the student is using to describe different smells. Some examples are as follows:
  - Does the student offer "smells like ..." comparisons when the class is investigating the smells of particular objects/substances?
  - Does the student differentiate between smells that they consider good smells and those that they consider to be bad smells?
  - Is there evidence of increasing vocabulary to describe smells beyond the typical terms such as good, bad, nice, and yucky?
  - Does the student begin to use vocabulary such as sweet, spicy, sour, sharp, musty, spoiled, or rotten to describe different smells? (100-1, 100-2)
- Does the student contribute to small-group and class discussions, making suggestions for additions to the smell chart and other group recording devices? (100-1)
- As students observe by smelling the materials and collections available in the classroom, observe the ways each student approaches the materials, tries things, shares discoveries, perseveres with further exploration, or moves on to some other activity. (100-2, 202-1, 201-4)
- Does the student represent ideas through drawing, modelling, making posters, or other media? (100-2)

Caution: Teachers should be aware of scent sensitivities and allergies.

Resources/Notes

Activities from Appendix D

- Activity 12: A Smell Chart
- Activity 13: Smells I Like
- Activity 14: Name That Flavour

Print

- *Science Everywhere*, Teacher's Guide, pp. 209–11 (13389)
- See Appendix H: Print Resources.

Smell *(continued)*

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)

Elaborations—Strategies for Learning and Teaching

Smell Jars

Use baby food containers or film canisters to make a set of smell jars. Put a few drops of a highly scented liquid on a cotton ball and place the cotton ball in the jar or canister. Liquids might include detergent, vinegar, oil of cloves, peppermint flavouring, and vanilla, lemon, and almond extract. Since some of the liquids may be coloured and may colour the cotton ball, wrap the baby food containers in construction paper or use dark film canisters. Invite students to conduct a variety of explorations with the smell jars. They can smell each using the waving technique and describe what they smell in terms of "This smells like ..." They might group the jars in categories such as "Smells I like and smells I don't like" or "Smells like food and doesn't smell like food." Remember to add new words and phrases to the smell chart with each new experience.

Match the Smell

After students have enjoyed open-ended explorations with the smell jars, invite them to match a set of the mystery jars with the bottles of liquids used to scent the cotton balls.

Smelly or Not?

To help students learn to distinguish between substances that have an odour and those that do not, ask them to name objects around the classroom or at home that do not seem to have a smell. Students can do a smell search finding all the things that have an odour and those that do not seem to have an odour. Students can be asked to sort collections of objects by the following rule: things that have an odour, things that don't have an odour, and things that sometimes have an odour.

Smells in Different Places

Ask students to think about different locations and the smells that they have experienced in those locations. The teacher should provide a large photo or picture of each location to help the students visualize and remember past experiences. Take advantage of any class trips away from the school to ask the students what they can smell. The teacher could summarize the information shared by the students as a class book, recording words and phrases about the remembered smells under the photo or drawing of the location. Some common locations include the playground, a farm, a downtown city area, the beach, the forest, the playground, the swimming pool, a shopping centre, or a bus.

Smell *(continued)*

Tasks for Instruction and/or Assessment

Performance

- Observe students as they smell. Is the student able to use the proper procedure when smelling both known and unknown substances (wafting, sniffing)? (201-4)

Presentation

- Can the student tell the class or a small group about the smell? Does discussion of the nature of the task occur? (100-1, 203-1)
- Does the student contribute to sharing time by describing what he/she did and learned about during centre time or independent work time? (100-2, 203-1, 202-1)

⚠ **Caution: Teachers should be aware of allergies.**

Resources/Notes

Activities from Appendix D

- Activity 15: Smell Jars
- Activity 16: Smells in Different Places

Print

- See Appendix H: Print Resources.

Smell *(continued)*

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)

Elaborations—Strategies for Learning and Teaching

Home Connections

Bring a smell from home. Ask families to help the students select an object or substance from home that can safely be brought to school. Have the students bring their mystery smell in a paper bag or plastic container to share at class meeting time or to put in a learning centre. Without looking into the bag or container, the students describe the smell and then try to identify the object or substance.

Ask parents/caregivers to discuss the smells in the various rooms and locations around the house. They might complete a home smell walk record sheet with their child that focusses on a walk around their home and smells that they wish to record.

Smells Are Important

Initiate a class discussion regarding the ways in which smells are important to people. Note the growing understanding that smelling is important for enjoying foods, for protection and safety, and for learning. Talk about how people use their ability to smell to know about their environment.

Smell *(continued)*

Tasks for Instruction and/or Assessment

Science Log/Journal

- Does the student use beginning writing, drawing, and other means to record ideas about smelling in his/her science log or journal? (100-1, 100-2, 201-4, 202-1)

Presentation

- Does the student understand that judging a smell to be good or bad is often a personal preference and what may seem to be a bad smell to some people may not be a bad smell to others? (101-2, 202-1)

⚠ **Caution: Talk about smells, allergies, and the rules for these in your classroom.**

Teacher Note: *Your communication to the home should include a caution regarding careful selection of objects or materials to be sent to school. Advise parents not to send common allergens such as perfume or peanut butter. You may wish to make a list suggesting some appropriate materials or substances.*

Resources/Notes

Activity from Appendix D

- Activity 17: Safety and Smell

Print

- See Appendix H: Print Resources.

Taste

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- manipulate materials purposefully (201-2)

Elaborations—Strategies for Learning and Teaching

Getting Started—Make a Taste Chart

Begin by creating a taste chart and posting this chart beside the charts for the other senses. Add the students' growing vocabulary for taste observations throughout and after the focussed classroom tasting experiences. During the initial experience, the teacher should help the students discover the four basic tastes—sweet, sour, salt, and bitter. Students are not expected to know these types.

Favourite Tastes

Introduce observing through taste by inviting students to discuss favourite foods and what makes these food popular. Ask students what makes something taste good to them. During this whole-class time, the teacher can provide each students with small samples of interesting-tasting edibles and have students describe the taste. A challenge with this sense will be broadening the students' vocabulary for describing taste. Common descriptions may be good, yucky, awful, sweet, and sour. Other ways students can be taught to describe tastes is to compare the taste to some other familiar taste such as, "This tastes as sweet as a sugar cube; this tastes like lemons."

Tasting Party

This is a fun way to introduce the explorations using taste. Introduce new foods that many children may not have tried before. The tasting party can make connections to other curriculum areas such as social studies and health. When tasting a variety of new foods, students can be asked to give their opinions as to likes and dislikes as well as favourite tastes. These opinions could be graphed using concrete graphs, represented by having the students form the graphs with their own bodies by lining up beside their favourite dish and then by contributing to picture graphs.

Taste

Tasks for Instruction and/or Assessment

Informal/Formal Observation

- Demonstrate and extend the vocabulary students use to make observations. In group discussion time and in individual conversations, note the types of words and phrases students use to describe different tastes.
  - Does the student offer "tastes like ..." comparisons when the class is exploring objects and substances?
  - Is there evidence of increasing vocabulary to describe tastes? Is there evidence of a growing vocabulary for different kinds of tastes such as sweet, sour, salt, and bitter? (100-1, 100-2)
- As students explore materials and substances by tasting, observe the ways each student approaches the materials, tries things, shares discoveries, perseveres with further exploration, or moves on to some other activity. (201-2, 201-4, 202-1)

Caution: The sense of taste should be used only when observing a substance or object whose source and composition are known to be safe and reliable.

Resources/Notes

Activities from Appendix D

- Activity 18: Taste Vocabulary
- Activity 19: A Tasting Party

Print

- *National Geographic: Windows on Literacy*, Teacher's Guide, Emergent Stage, pp. 50–53
- *Science Everywhere*, Teacher's Guide, pp. 157–59; 165–68, Poster 10; pp. 178–81 (13389)
- *Hot and Cold* (Windows on Literacy) (13150)
- See Appendix H: Print Resources.

Taste *(continued)*

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- manipulate materials purposefully (201-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

Mystery Jars

To distinguish between liquids that look similar but have different tastes, create a set of taste jars using pill vials or baby food containers; four jars for each pair or small group of students. Teachers have found that strawberry boxes are a convenient storage unit for the four containers of liquids. One jar should contain tap or spring water, a second should contain a sugar solution (try three teaspoons of sugar to every 200 mL of water), another might have several drops of concentrated lemon juice mixed with the water, and the final jar should contain water with a few drops of peppermint extract. Number each bottle for ease of identification of the liquids.

Distribute the sets of jars on separate tables. Ask the students to taste each liquid in turn by using a cotton swab dipped in the liquid. In their groups, children tell each other what taste they notice in each jar. Ask students to make a group-recording chart to show the tastes by the number of the bottle.

Identifying Objects and Substances by Taste

Have students do some taste testing while they are blindfolded. Ask each student to taste different foods or drinks while blindfolded and attempt to identify the unknown food or drink.

Sweetness Scale

To help students distinguish between similar tastes, create a collection of edibles that are all sweet. Ask students to taste and answer questions such as, Which substance is sweetest? Is fruit more sweet or less sweet than the peppermint? Working in groups, the students can place the food samples in order of sweetness from least sweet to most sweet. This experience could also be conducted with a variety of salty foods or sour foods. After the explorations, discuss the experience with the students. Did they notice that some people have different opinions about which substance is most sweet, most salty, most sour? Discuss that taste can be different for different people.

Four Tastes

Once students have had experiences with sweet, salty, sour, and bitter tastes, ask them to name foods or substances that they have experienced in each category. The class might keep a list under each of the four tastes. This is a good opportunity to connect with the health curriculum by discussing healthful eating and how taste affects what people eat.

Taste *(continued)*

Tasks for Instruction and/or Assessment

Informal/Formal Observations

- In group discussion time and in individual conversations, note the types of words and phrases the student is using to describe different tastes. (100-1, 202-1, 203-1, 203-2, 203-4)
  - makes comparisons to familiar tastes, such as "tastes like peppermint"
  - begins to use bitter, sour, sweet, salty to describe a variety of different substances
- Is the student developing motor coordination and organization skills necessary to manipulate the materials and containers used in the tasting experiences? (201-2, 201-4, 100-2)

⚠ **Caution: Teachers should be aware of students who are diabetic. Taste is related to what people like and dislike and what they are used to.**

Resources/Notes

Activities from Appendix D

- Activity 20: Mystery Jars
- Activity 21: Sweet Treats

Print

- See Appendix H: Print Resources.

Taste *(continued)*

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Elaborations—Strategies for Learning and Teaching

Tasting and Chewing

Have blindfolded students lick pieces of fruit and see if the fruit can be identified. After trying to observe with just a touch of the tongue, the student may chew the fruit. Does chewing a piece of fruit make it easier to identify?

Have a Snack Table

Create other tasting and chewing experiences for a learning centre throughout the day. Ask the student to wear a blindfold and have a partner pass the samples one at a time. The student begins by touching the sample to the tongue. Can he/she identify the food with just a touch of the tongue? If not, the student should chew the sample and see if he/she can identify it after chewing. Samples might include three or four different types of crackers, different kinds of cereal, different kinds of apples or other fruit.

Taste *(continued)*

Tasks for Instruction and/or Assessment

Performance

- Does the student demonstrate growing ease in speaking to the class or small group by sharing observations about tastes? (202-1)
- Does the student contribute to sharing time by describing what he/she did and learned about during centre time or independent work time? (100-1, 202-1)
- Ask students to place samples of substances in order of sweetness, sourness, or other taste attribute. In this way students can create concrete graphs showing substances from least sweet to most sweet or least sour to most sour. Can the student make distinctions of the intensity of a particular taste and then serial order the substances according to these distinctions? (202-2)

Presentation

- Does the student represent his/her science ideas through drawing, modelling with clay, or other media? (100-2)
- Does the student contribute to small-group and class discussions, making suggestions for additions to the taste chart and other group-recording devices? (201-4)
- Does the student use beginning writing, drawing, and other means to record ideas about taste in his/her science log or journal? (100-1)

Resources/Notes

Activity from Appendix D

- Activity 22: Tasting without Seeing

Print

- See Appendix H: Print Resources.

Touch

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- manipulate materials purposefully (201-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)

Elaborations—Strategies for Learning and Teaching

Getting Started—Make a Touch Chart

Begin by creating a touch chart.

Throughout the unit add the students' growing vocabulary to the touch chart. Is there evidence of a growing vocabulary for different kinds of textures such as soft, silky, furry, velvety, smooth, even, bumpy, flat, wet, moist, damp, dry, crisp, firm, flabby, feathery, woolly, spongy, sticky, prickly, glassy, gritty, gummy, cold, cool, chilly, hot, warm, slippery, slimy, greasy, oily, rough, jagged, pointed, and sharp?

The sense of touch can be thought of as including a few quite distinct perceptions, including temperature, pressure, and pain. The sense of pressure against the skin is the way we perceive both texture and weight. These aspects of touch can be perceived through the skin.

Other perceptions that we commonly categorize as touching really involve more of our body's systems than just the skin. For example, the hardness of an object is perceived through a combination of sensing through the skin and an integrated awareness by the brain about how much pressure the muscles are putting on the object and how the object feels in response to that pressure. We have a body sense in our muscles and joints that tells us how much pressure is being exerted and the position of our bones as we encounter the object.

In grade primary, it is sufficient that the students recognize an object's hardness or softness, its smoothness or fuzziness, etc., by touching with their skin. The observations that students will make in this unit will focus on texture, weight, (as heavy as ..., as light as ...), temperature (as hot as ..., as cold as ...).

Whole-Class Introductory Experiences

As the students explore with their sense of touch, add words and phrases to the touch chart that describe their perceptions. Some touch words that may be suggested include smooth, flat, wet, moist, damp, dry, crisp, firm, flabby, gummy, sticky, woolly, spongy, velvety, furry, silky, soft, cold, cool, chilly, hot, warm, sleek, slippery, slimy, greasy, oily, rough, bumpy, jagged, pointed, and sharp. Provide experiences with a wide variety of objects and materials to ensure that students have the opportunity to use the kind of vocabulary suggested here.

Touch

Tasks for Instruction and/or Assessment

Informal/Formal Observations

- Demonstrate and extend the vocabulary the students use to make observations. In group-discussion time and in individual conversations, note the types of words and phrases the student is using to describe different textures.
  - Does the student offer "feels like ..." comparisons when the class is exploring objects and substances through touch?
  - Is there evidence of a growing vocabulary to describe textures?
  - Does the student contribute to small-group and class discussions, making suggestions for additions to the touch chart and other group recording devices? (100-1)
- Does the student represent ideas through drawing, modelling with clay, or other media? (100-2, 201-4, 202-1)
- Have the children organize materials in sequence from the smoothest to the roughest. Examples might include sandpaper, wax paper, construction paper, aluminum foil, wool, Styrofoam balls, plastic, and popsicle sticks. (201-2)

Resources/Notes

Activity from Appendix D

- Activity 23: Developing a Touch Vocabulary

Print

- *National Geographic: Windows on Literacy*, Teacher's Guide, Emergent Stage, pp. 74–77
- *Science Everywhere*, Teacher's Guide, pp. 197–99 (13389)
- *My Bed is Soft* (Windows on Literacy) (13150)
- *Touch It!* (13505)
- See Appendix H: Print Resources.

Touch *(continued)*

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- observe, using one or a combination of the senses (201-4)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

Texture Collection

Gather a variety of objects and materials with distinctive textures. The collection can be stored and displayed in a variety of ways. With the students, teachers can make class touch books, bags of individual objects or materials, often called "feelie bags," or shoe box collections. Have students explore objects with their eyes closed or wearing blindfolds. Record the descriptions of the different textures on the touch chart. Extend the vocabulary by introducing new words that are appropriate to the objects in the collections.

Texture Rubbings

Students can use crayons and bond paper to create rubbings of some of the objects in the texture collection. These rubbings will contribute to the students' understanding of the different textures and can serve as a record of all the different textures being explored. The rubbings might be collected as a class book or assembled as an individual record for each student.

Feeling Temperature

Students can observe the temperature of a material or object through the sense of touch. Provide a variety of different substances and materials at a variety of different temperatures such as water, ice, ice packs, hot packs (warmed only), and metal objects. Ask students to place some objects in direct sunlight and others in dark places around the classroom. Can they change the temperature of a material by where they place it in the classroom? Ask students to place several objects in order from coolest to warmest, creating concrete graphs with the objects/materials.

Touch *(continued)*

Tasks for Instruction and/or Assessment

Science Log/Journal

- Does the student use beginning writing, drawing, and other means to record ideas about touch in his/her science log or journal? (100-1)

Performance

- Can the student create a concrete graph of objects or materials using attributes observed through the sense of touch, such as softest to hardest, coolest to warmest, roughest to smoothest? (202-2)

Presentation

- Does the student demonstrate to the class or small group by sharing observations about textures, presenting texture representations such as rubbings, posters, and collections? (100-1, 201-4)
- Does the student contribute to sharing time by describing what he/she did and learned about during centre time or independent work time? (203-1, 203-2, 203-4)

Resources/Notes

Activities from Appendix D

- Activity 24: How Does It Feel?
- Activity 25: Picture the Texture

Print

- *National Geographic: Windows on Literacy*, Teacher's Guide, Early Stage, pp. 130–33
- *Science Everywhere*, Teacher's Guide, pp. 190–93 (omit having students use a thermometer)
- *Popcorn and Candy, What's Inside?* (Windows on Literacy) (13150)
- See Appendix H: Print Resources.

Observing Using More than One Sense

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)
- observe, using one or a combination of the senses (201-4)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)

Elaborations—Strategies for Learning and Teaching

After the students have had experiences exploring their worlds using one sense at a time, the science program should continue to provide opportunities for focussed observing. Discussing observations should be the beginning of each new experience. Students' questions about scientific phenomena will often come from their observing experiences. Careful observations will help students focus their own science work and lead them to investigate puzzles or questions that have occurred to them during observing.

Collections

The senses can be used for observing, describing, sorting, and exploring. The grade primary science and math programs include a variety of collections that can be added to the classroom from time to time, either in learning centres or as manipulative materials for whole-class exploration. Students should be asked to observe using their five senses and describe their observations as they begin work with each new collection.

Small Particles Collection

Create a collection of materials, such as flour, salt, pool sand, fine white beach sand, coarse sand, aquarium gravel, sugar, cinnamon, sawdust, rice, barley, cereal, and oatmeal. Place these materials in clear plastic bags and provide hand lenses for the students to use as they examine the different materials. Ask the students to describe what they can notice about each material by looking, touching from outside the bag, and shaking to listen. Students can record their observations by finding words and phrases on the class sense charts. On cards at the science centre, ask students to match appropriate cards to materials or simply use the cards as a reference for their own recording.

Provide jars or plastic containers of the same substances that are contained in bags for students to pour out in small amounts to observe by touching and smelling. Another activity is to ask students to match bags with jars using only one or two senses.

Observing Using More than One Sense

Tasks for Instruction and/or Assessment

Informal/Formal Observations

- While the students are observing the particle collections, note the following types of things:
  - Does the student attempt to make observations using as many senses as possible with a particular substance or object?
  - Does the student understand and follow class routines for tasting and smelling unfamiliar substances?
  - Does the student use words and phrases from the class sense charts to assist in recording substances?
  - Does the student contribute additional words and phrases for the class sense charts throughout the year? (100-1, 201-2)

Conversations/Interviews

- When conversing with students during science time, ask questions such as the following:
  - What can you tell me about the substance in this bag?
  - What does the substance feel like? look like? sound like when you shake it?
  - How are these substances the same? How are they different?
  - Which materials do you like touching the most? Which material don't you like to feel? Why?
  - What could you use this material for?
  - Which materials would you use to build a castle? Why do you think so? (100-1, 100-2, 100-3, 101-1, 101-2)
  - Which materials would pour easily? Which materials would be hard to pour? Give evidence to support your answer. How could you find out which of these substances are easiest to pour? Hardest to pour? (100-3, 201-1, 201-2, 201-4, 203-1)

Resources/Notes

Activities from Appendix D

- Activity 26: Sorting with Our Senses
- Activity 27: Size It Up
- Activity 28: Walking through Senses
- Activity 29: Using Our Senses

Print

- *A Cat's Whiskers* (Windows on Literacy) (13150)
- *Five Senses* (Factivity series) (13748)
- *Animal Senses and Defenses* (13507)
- See Appendix H: Print Resources.

Video

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

Curriculum Links

- *Size It Up* needs a link to a lesson in measurement during math time. See: PM Maths: Numeracy and Literacy, Stage A, Book 8, *Big and Little Shapes* (13424). See also *Side by Side*, Teacher's Guide, pp. 48–57, "To Be Tall" (13198). Sorting activities during math time also provide a link to many activities you will find appropriate for meeting outcomes in science.

Observing Using More than One Sense *(continued)*

Outcomes

Students will be expected to

- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- identify common objects and events, using terminology and language that others understand (202-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

As work with this collection continues, students can sort the various bags of substances according to categories that make sense to them. Teachers can suggest ways of sorting such as serial ordering. Teachers can provide sorting mats and label cards to encourage more and different kinds of sorting.

Liquid Collections

Create sets of clear liquids such as water, white corn syrup, sugar water, water with a small amount of vinegar, and water with a small amount of clear food flavouring such as almond extract. Clear plastic containers with easily removed lids would be best. Ask students to make sight observations from outside the containers. Then students can pour small amounts of each liquid into paper ketchup cups to continue observing through smell and touch. Depending on the nature of the collection, the teacher will let the students know if tasting is appropriate. Students can record observations and make comparisons among different clear liquids.

Seeds Collection

Create a collection of different types of seeds, storing each type in small, clear plastic bags. Invite students to observe using senses, to draw and colour what they see, and then to sort and make patterns with the second collection.

⚠ **Caution: Do not eat these seeds.**

Exploring with Magnets Collection

Create a collection of many objects and materials that the students can use to explore magnets. Students can experiment with the magnets to determine which materials in the collection are attracted and which are not attracted. Ask students to observe the different materials and objects. How are they the same and how are they different? What do you feel when the magnets are pulled apart? How are the senses of touch and sight used here? Use the magnet on one side of a piece of paper to pull a toy across the other side of the paper.

Mystery Box, Mystery Sock, or Mystery Bag

Continue to use the mystery object activity to engage the students in using their senses in a focussed way. As the students gain experience, they should use three or more senses to make guesses or ask questions about the mystery object.

Observing Using More than One Sense *(continued)*

Tasks for Instruction and/or Assessment

Presentation

- As the students continue to make observations each time they approach a new task or experience, they should be finding a variety of ways to record their observations in class and personal formats. The students' drawings and beginning writing should show growth in attention to details observed. (100-2, 203-4)
- Create a sense box. Use vocabulary that students have developed to describe an object from the box. Use words other than the object. Sample objects might include Styrofoam ball, watch, tennis ball, fruit (orange), a piece of silk, crayon, chalk, party hat, pattern block, rock, container of sand, pine cone, and bean bag. (100-2, 202-2, 200-1, 201-4)
- Ask students to bring their own senses boxes. Have a class day where exploration of the boxes occurs. (100-2, 202-1, 202-2, 200-4, 201-2)

Resources/Notes

Activities from Appendix D

- Activity 30: Seed Collection
- Activity 31: Liquid Collection

Print

- *Food Alphabet* (big book) (13350)
- See Appendix H: Print Resources.

Exploring Sand and Water with Our Senses

Introduction

Exploring sand and water provides contexts for broadening the students' experiences with observing familiar substances. Students will experience and describe what happens when sand and water are moved, poured, or changed in some way. Students will continue to observe using the five senses and explore many aspects of both sand and water. Students will continue to use language to describe their observations and discoveries. They will ask questions and test ideas. They will investigate a variety of aspects of sand and water.

Focus and Content

The unit begins with an exploration of sand and water separately, then moves to investigations of the two substances together.

Students begin by carefully observing water using all five senses. Throughout the water experiences, students will explore concepts such as pouring, floating, sinking, absorption, and capacity.

Sand investigations begin with careful observation using the senses. Tasting is not appropriate for this substance. They will explore how sand feels, flows, piles, and slides. They will compare sand with other substances such as dirt, marbles, salt, and sugar. Sand is a solid, but it has fluid properties. Students might note whether sand is a liquid (it pours) or whether it is a solid (it is hard to crush).

Science Curriculum Links

Sand and water investigations will provide many links to the math curriculum as students describe amounts using non-standard measures. They will investigate capacity using non-standard units of their own devising. They will count. They will categorize objects that sink or float. They will order objects according to different properties, including sinking speed, absorption, and textures of different sands. There are many opportunities in these investigations for students to record their observations as graphs, charts, and diagrams.

Connections to visual arts are rich, as students create with water and paints, with sprays and jets of water, and with sand patterns.

The open-ended investigations with water and sand provide experiences that will enhance the more focussed work in the grade 1 science unit Materials, Objects, and Our Senses.

Curriculum Outcomes

The following outcomes are from *Common Framework of Science Learning Outcomes K to 12*. Column one outcomes in the four-column spreads for this topic have been developed from these pan-Canadian outcomes.

STSE/Knowledge

Students will be expected to

100-1 develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought

100-2 explore and select different ways to represent ideas, actions, and experiences and to communicate with others

100-3 detect consistency and pattern in objects and events and use language to describe these patterns

101-1 explore how characteristics of materials may change as a result of manipulating them

101-2 identify and explore ways to use tools to help carry out a variety of useful tasks

103-1 choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings

200-1 ask questions that lead to exploration and investigation

200-4 select and use materials to carry out their own explorations

201-1 follow a simple procedure where instructions are given one step at a time

201-2 manipulate materials purposefully

201-4 observe, using one or a combination of the senses

Skills

Students will be expected to

Analysing and Interpreting

202-2 place materials and objects in a sequence or in groups according to one or more attributes

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

203-4 respond to the ideas and actions of others and acknowledge their ideas and contributions

Sand Investigations

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

Sand investigations provide many rich opportunities for learning science, math, and language. The students should have time to play and investigate freely with sand and to use a variety of objects with the sand. During sand exploration, much of the learning will happen spontaneously and will be shaped by the interests of the students. Along with the free exploration provided by sand play, the teacher can invite the students to have additional observation experiences and to highlight characteristics of this unique yet common substance.

Sand consists of small particles of a variety of rocks and minerals, which may include felspar, quartz, and mica. These particles vary in size, shape, and colour, but all are comparatively small. Sand is formed from gradually disintegrating rocks. If the particles are sharp and angular, the sand tends to be new. If the particles are rounded and smooth to the touch, the sand is likely to be older. Sand is an interesting substance to explore because, although it is a solid, there are several ways in which dry sand behaves like a liquid. It pours and sprays. When a little water is added, it behaves like a liquid again: it pours, it finds its own level, and it does not hold a print or impression for long. Students can explore these characteristics of sand and continue to fine-tune the language they are developing to describe observations and phenomena.

Sand Box Investigations

Many grade primary classrooms have a sandbox or pans of sand for part or all of the year. As the students are using the sand area for open investigations and play, they are experiencing the properties of sand. In conversations with the students as they play in the sand area, the teacher can ask students to describe what they are doing and what they are noticing about the sand. There should be natural flow from the students' play to more focussed observing and investigating based on the students' own questions and things they want to try.

Sand Investigations

Tasks for Instruction and/or Assessment

Informal/Formal Observations

- Is the student increasing the range of vocabulary used to describe sand? Words and phrases to note include the following: crumbles, fall in, fill up, flattens out, levels off, piles up, sinks in, smooths out, trickles, pointed, crumbly, curved, dry, damp, flat, gritty, hard, high, level, low, and lumpy. (100-1)
- Does the student conduct ongoing explorations with sand? (101-1, 101-2)
- Does the student ask questions on sand that lead to explorations and investigations? Ask students questions such as, What are you observing here? How are you observing? (100-2, 103-1, 203-2, 203-4)

Resources/Notes

Activities from Appendix E

- Activity 32: Let's Explore!
- Activity 33: Let It Pour

Print

- See Appendix H: Print Resources.

Sand Investigations *(continued)*

Outcomes

Students will be expected to

- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)

Elaborations—Strategies for Learning and Teaching

Pouring, Dribbling, and Spreading Dry Sand

Students can observe what happens when they use their clenched fists as funnels to pour sand. Invite students to observe what the sand does when they pour it from their hands in a steady stream. Can the student make a tower by pouring the sand? How does the sand move? Can the student make a pattern on the pouring surface with the stream of sand? Can the student release a little sand at a time, dribbling it onto a pile or tower? Can the student use their hands to spread the sand into a thin covering of the work surface? What does the sand look and feel like when it is being spread out in a thin layer?

Touching Dry Sand

The students investigate the effects of adding water to sand by exploring different samples of sand with their hands (and feet if space is available). Begin by providing dry sand in the class sandbox or dish pans for each pair of students. Invite the students to pour some dry sand onto a large tray or piece of thick craft paper (for ease of pouring back into source container). Students can observe the pouring sand. Next, they should use their fingers to spread the sand over the work surface, describing the feeling of the sand particles. Students can draw patterns in the thinly spread sand, discussing how the sand feels and looks as they work with it.

Observing Dry, Damp, and Wet Sand

After observing and discussing dry sand, the teacher can provide pairs of students with shallow trays of each of the three sand samples dry, damp, and wet. The students can make comparisons of each, observing using two or three senses. They can try pouring each sample of sand and observing how each pours. They can try pressing hands or other shapes into each sample to see if they can make patterns, noting how well each type of sand holds a pattern.

Using samples of the three sand samples, which are securely locked in a plastic baggie, students can compare moving, settling, tipping, and the effects of pressure. They can rub the plastic baggies to see if there are differences in the sounds made when the different sand samples are rubbed.

Students can be blindfolded and feel the different dry, damp, and wet sand samples to see if they can distinguish one from another using the sense of touch.

Sand Investigations *(continued)*

Tasks for Instruction and/or Assessment

Informal Observations

- When the students are working with dry, damp, and wet sand samples, notice the student's awareness of the change in sand characteristics when water is added. (101-1)
- Was the student able to manipulate the different sand samples effectively, keeping each sample in its container? (201-1, 201-2)

Conversations/Interviews

- As the students investigate the dry, damp, and wet sand samples, ask questions such as the following:
  - What does it feel like—smooth, soft, cold, sharp, lumpy?
  - How does it feel when you pour it through your fist?
  - Which sand goes through your fist most easily?
  - Is it easy to spread sand when it is dry, damp, and/or wet?
  - What kinds of patterns did you make in the dry, damp, wet sand? Were your patterns the same? How were they different? (101-1, 100-3, 101-2, 103-1)

Presentation

- After pouring or dribbling dry sand, students can draw the patterns they created on the pouring surface using crayons or markers. Do the student's records resemble the pattern made with the sand? Is the student interested in making such a recording? Does the student think of other ways to record the sand patterns? (100-2)

Resources/Notes

Activities from Appendix E

- Activity 34: Wet Sand
- Activity 35: Exploring Dry Sand
- Activity 36: Wet and Dry Sand

Print

- *National Geographic: Windows on Literacy*, Teacher's Guide, Early Stage, pp. 102–105, 106–109
- *Marks in the Sand* (Windows on Literacy) (13150)
- *Mud, Mud, Mud* (Windows on Literacy) (13150)
- *The Underground Dance* (big book) (13349)
- See Appendix H: Print Resources.

Curriculum Link

- *Visual Arts Primary–6,* Nova Scotia Department of Education, 2000

Sand Investigations *(continued)*

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Elaborations—Strategies for Learning and Teaching

Sifting Sand

Gather a collection of materials that sand will sift through, such as colanders, flour sifters, fabric netting, door screening, funnels, strainers, different gauges of needlepoint plastic, fly swatters. Show the sifting materials to the students at a group meeting time. Encourage them to identify and discuss the uses of these objects. The teacher can ask the students to make predictions about how sand will flow through each material or object. Do they think sand will flow through? Will it flow through quickly or slowly? The teacher can provide a chart divided into two columns, one for fast sifters, and one for slow sifters. The students can then record some predictions. Then students can test the sifting materials by working in small groups with trays of sand, or they can test the predictions later at centre time at the sand table.

As an extension, students can be invited to make their own sand sifters using cardboard and paper scraps and other junk materials in the classroom. Student-made sifters should be tested and added to the class record chart as either fast or slow sifters.

Piling Sand

Students can investigate how sand finds its own level by pouring it to try to create piles and towers. Invite students to begin by pouring a containerful of dry sand into the middle of a bowl. They should notice that the sand forms a cone shape. Ask students to continue to try to make higher cones. What happens as they add more and more sand? Who has made the highest cone?

Students can repeat the cone-making investigations with damp sand and wet sand observing and describing what happens.

Tilting Sand

Students can spread sand over the bottom of tray. The sand could vary from dry to damp to wet. Observe what happens in each case when they slowly tilt the tray over the sand table.

Sand Investigations *(continued)*

Tasks for Instruction and/or Assessment

Performance

- As the student tests the various sifters, observe the student's ability to use manipulatives to carry out the exploration. Can the student pour sand through the object or material? Does the student watch carefully and decide whether the sifting was slow or fast? Does the student refer to the class prediction chart when carrying out the exploration? Does the student add to the class chart by recording objects or materials under the fast and slow columns? (101-1, 101-2, 103-1, 201-1, 201-2)
- After all sifters have been tested and the students have contributed to the class recording chart for fast sifters and slow sifters, invite students to order a collection of sifters from slowest to fastest. (202-2)

Resources/Notes

Activity from Appendix E

- Activity 37: Piling and Tilting

Print

- *The Underground Dance* (big book) (13349)
- See Appendix H: Print Resources.

Sand Investigations *(continued)*

Outcomes

Students will be expected to

- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)
- observe, using one or a combination of the senses (201-4)

Elaborations—Strategies for Learning and Teaching

Pouring Sand down a Chute

Students can pour different consistencies of sand (dry, damp, wet) down a chute held at various angles. Teachers might make a chute from plastic containers. Students should observe how the sand piles up. Then they should try things with the sand and the chute to see if there are differences in the shape or height of the pile. They might try different sized chutes or chutes made of different materials. They might try pouring faster or slower. They might try using more or less sand to see if the piles will look different. Students can compare the piles that they are creating with the chutes to piles of sand or gravel that they may have seen made by dump trucks. Students can use toy dump trucks to tip sand into piles and observe the shape and size of the piles.

Observing Different Types of Sand

Teachers can create a set of containers holding different types of sand—fine beach sand, coarse sand from clay-like soil, pool filter sand, etc. Students can observe the different sand samples using a handheld magnifying glass. Students should notice the different sizes and colours of sand particles. They should use the sense of smell to try to detect any differences in odour and the sense of touch to feel the different sizes and textures of sand particles. Sand samples can be shaken in plastic or paper containers to observe any differences in the sound the samples make when shaken against a container.

Students can make records of their sand observations in the science log or journal and contribute to class records.

Sand Investigations *(continued)*

Tasks for Instruction and/or Assessment

Informal Observation

- As the students observe the different types of sand, look for the following types of behaviours:
  - uses fingers and hands carefully to touch and manipulate samples of sand
  - controls placement of sand on work surface
  - holds magnifier appropriately
  - shares observations with others orally
  - makes a drawing or diagram of the sand particles as seen through the magnifier (201-1, 201-2, 201-4, 103-1)

Performance

- Ask the student to use a hand-held magnifier to observe coarse sand. Observe how the student holds the magnifier. Provide a recording sheet with a large replica of the hand-held magnifier. Ask the student to draw what is seen through the magnifier. (201-1, 201-2)

Conversation/Interviews

- As students investigate pouring sand down chutes, notice how they are manipulating the materials to make different sand piles. Ask the student questions such as:
  - What happened when you poured sand down the chute?
  - Can you make a tall pile? How?
  - Can you make a flat pile? How?
  - Which chute worked best for you? Why do you think that?
  - Do people use chutes like this outside of school? What for? (201-2, 101-2)

Resources/Notes

Activities from Appendix E

- Activity 38: Sand and Chutes
- Activity 39: The Difference in Sand

Print

- See Appendix H: Print Resources.

Water

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)

Elaborations—Strategies for Learning and Teaching

During free play or centre time with water, students will generate numerous questions about water and what happens when it is poured, disturbed, and sprayed; when a variety of objects are put in water; and how different materials absorb or repel water. Students will explore the concept of capacity using water and a variety of containers.

Throughout the year, teachers can provide opportunities for students to investigate properties of water as they explore at a water table or water pans. Young students are often fascinated by all the different ways they can manipulate water using simple apparatus such as plastic containers, plastic bottles, buckets, spoons, and straws. Many children enjoy investigating with floaters and sinkers, creating boats to hold "stuff," and watching the patterns and speed of sinking objects. Prior to any focussed investigations, students should have time to informally investigate with water, to make observations and discoveries on their own, and then contribute ideas for class investigations.

Throughout these explorations, the teacher should encourage the students to make careful observations and to use a variety of media to share their observations. Additional vocabulary should be added to the sense charts to include new descriptors that arise with the water observations.

Water

Tasks for Instruction and/or Assessment

Informal/Formal Observation

- In group discussion time and in individual conversation, note the types of words and phrases the student is using to describe characteristics of water. Note the types of terms and phrases students could be using in relation to the water investigations, including wet, dry, empty, full, bubble, blob, drip, drop, pool, puddle, wave, ripples, spout, dribble, pour, splash, wavy, and droplets. (100-1)

Performance

- As students explore water and other substances, observe the ways in which each student approaches the materials, tries things, shares discoveries, perseveres with further exploration, or moves on to some other activity. (101-1, 101-2)
- Does the student use a growing range of water-related concepts and vocabulary in exploratory and play-based learning at learning centres or other independent work activities in the classroom? (100-1)

Resources/Notes

Activity from Appendix E

- Activity 40: Water, Water Everywhere

Print

- *I Am Water* (big book) (13478)
- See Appendix H: Print Resources.

Teacher Note: *Do not drill vocabulary: always use vocabulary in context. Expose students to the rich language by modelling. Use the vocabulary wherever the opportunity presents itself.*

Water *(continued)*

Outcomes

Students will be expected to

- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

Pouring Substances

Teachers can provide a focus for water investigations by asking students to make careful observations of the surface of water and other substances as they are poured from one container to another. Provide a collection of containers such as detergent bottles, yogurt and ice cream containers, beakers with spouts, different types and sizes of spoons. Ask students to pour water from container to container. Ask students to watch how the water moves as it is poured and how the level of the water moves to find the lowest level in the container.

Ask students to pour other granular substances such as sand, cereal or grains, fine bath salts, crushed dried leaves, salt, ground rice, rice, tiny seeds (e.g., poppy), and small pebbles from the container to a flat surface such as an aluminum pie plate or plastic tray. Ask the students to observe how the substance pours and what the surface of the substance looks like after it has been poured onto the pie plate or tray. The students can compare the similarities and differences between these substances and water. Students will be able to observe, but finding the language to compare may be a bit difficult. Teachers should be aware of this struggle.

For example, the teacher can ask the students to pour sand, cereal, or salt on one side of a flat dish to make piles and then try to do the same with water on the other side of the dish. Observe what happens to the surface of the water and the surfaces of the granular substances.

Water *(continued)*

Tasks for Instruction and/or Assessment

Performance

- As students explore water and other substances, observe the ways in which each student approaches the materials, tries things, shares discoveries, perseveres with further exploration, or moves on to some other activity. (201-1, 201-2)

Presentation

- Does the student describe his/her water explorations and discoveries to the class or small group? (203-1)
- Does the student contribute to sharing time by describing what he/she did and learned during centre time or independent work time? (203-1)

Science Recording

- Does the student represent science ideas through drawing, modelling with clay, or other media? Does the student contribute to small-group and class discussions, making suggestions for additions to class charts and other group recording devices? (203-1, 203-4)

Resources/Notes

Activity from Appendix E

- Activity 41: It's Pouring

Print

- *Water Can Change* (Windows on Literacy) (13150)
- See Appendix H: Print Resources.

Curriculum Links

- Exploring water and sand provides an opportunity to link science to math through exploration of capacity.

Water *(continued)*

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)

Elaborations—Strategies for Learning and Teaching

Causing Disturbances in Water

To further explore the properties of water, students can observe what happens when they use their fingers, hands, and other objects to cause disturbances in the surface of water. Using a water table, dish pans, or large bowls, students can let the water settle until it is absolutely still and then try disturbing the water by dropping a small, light object into the middle and watching how the pattern of ripples forms and continues to move for some time. Students might make a diagram or drawing of what they observe. Ask the students to try dropping the small, light object nearer the edge of the pan. They can then compare the pattern with the previous one. Ask students to notice what happens when the ripples hit the edge of the container.

Students can continue to explore what happens to the surface of the water when they cause disturbances. The teacher can encourage the students to suggest ways in which they can disturb the water to produce different effects. Some suggestions might include dropping a small, light object then a larger light object and comparing patterns on the surface; dropping small, heavy objects to observe what happens and to notice patterns on the surface; blowing with a straw across the surface of the water and observing what happens; drawing a fingertip lightly and quickly across the surface to try to make V-shaped ripples. Students can place their pan or bowl of water in a sunny spot and notice reflections on the ceiling or walls. Can they make reflections of the ripples on the ceiling? Can they make the bright spot on the ceiling move?

Teachers can hold a class discussion that addresses the students' prior experiences outside school with ripples and patterns in water. They may suggest patterns such as those that ducks make when they swim; that boats make as they move through water; that raindrops make falling in a puddle; and that waves make in a pool, bathtub, lake, and ocean. Students can illustrate these patterns and find illustrations in children's books and magazines.

Water *(continued)*

Tasks for Instruction and/or Assessment

Science Log/Journal

- Does the student use beginning writing, drawing, and other means to record ideas about water explorations in her/his science log or journal? (100-2, 101-1, 101-2)

Presentation

- Does the student describe his/her water explorations and discoveries to the class or small group? (203-1)
- Does the student contribute to sharing time by describing what he/she did and learned during centre time or independent work time? (100-1, 203-1)

Resources/Notes

Activities from Appendix E

- Activity 42: Waves, Ripples, and Bubbles
- Activity 43: Stormy Weather

Print

- *Science Everywhere*, Teacher's Guide (13389)
- See Appendix H: Print Resources.

Water *(continued)*

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)

Elaborations—Strategies for Learning and Teaching

Dropping Water

The teacher can create collections of objects for dropping water onto dry surfaces and onto the surface of water. Droppers might include thick paintbrushes, plastic medicine droppers, straws, plastic coffee stirrers, or toothpicks. Collections of surfaces for dropping might include cardboard, old wood, fabrics, metal, pliable plastic, rigid plastic, finger paint, cardboard, felt, fabrics, sandpaper, petroleum jelly, and waxed paper.

After students have had time to explore freely with collections of droppers, the teacher can ask the students to plan some investigations with water dropping. The teacher can suggest explorations to challenge the students to further explore properties of water and to refine their observing skills.

Some explorations are shaking a thick paintbrush full of water onto a table to make drops of water; dropping water on various surfaces, noticing how the droplets form, and their size; moving droplets along by gently blowing or tilting the surface; using a straw or cocktail stick to put two drops of water so close together that they touch. Students can try dropping small amounts of water from various heights onto various surfaces, noticing sound, shape, and spread. Students can watch drips as a tap is turned off, noticing size, shape, travel, sound on impact. Students could try to make the largest drop possible from the tap without causing a stream of water. Students can observe rain falling on the school ground, observing the splashes on the ground.

Water *(continued)*

Tasks for Instruction and/or Assessment

Science Log/Journal

- Does the student use beginning writing, drawing, and other means to record ideas about water explorations in her/his science log or journal? (100-2, 100-1, 101-2)

Presentation

- Does the student describe his/her water explorations and discoveries to the class or small group? (203-1, 101-1)
- Does the student contribute to sharing time by describing what he/she did and learned during centre time or independent work time? (203-1)

Resources/Notes

Activity from Appendix E

- Activity 44: A Drop in the Bucket

Print

- See Appendix H: Print Resources.

Curriculum Links

- Creating art pieces using eye droppers or other splash techniques would provide students the opportunity to extend water to surface observations.

Water *(continued)*

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to these settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)

Elaborations—Strategies for Learning and Teaching

Exploring Floating and Sinking

Teachers can create collections of materials and objects that students will use to investigate concepts such as buoyancy and absorption. In these investigations, the concepts and the collections will overlap. The focus of the science learning is observation, willingness to try things, curiosity, and inventiveness. The students will be forming their own ideas about how buoyancy works, but should not be expected to give explanations at this time. Students' current understanding will be evident in the observations they make, in the things they try, and in the predictions they make about what they expect to happen when they try something. Students could look at shape, size, and other characteristics to help to decide if their objects will float or sink. Questions that they raise about floating and sinking can be addressed. Some may be: Will my boat float if I make it a different shape? Using a sponge bucket, how can the sound be changed?

Students can select objects from the collections, and after predicting what they think will happen, they can test to see which will sink and which will float. They can sort objects based on their sinking and floating predictions and then record their final sort by drawing or making a display of the objects and materials they tested. Students are not expected to understand the concept of absorption. This activity is a vehicle to strengthen their observations using their senses. By expressing observations based on their senses through a variety of activities, students will increase their vocabulary and experiences.

Making and Testing "Boats"

Teachers can create a collection of containers that float, including containers that float well and some that can float but sink easily when moved or tipped. Students can explore how the containers float best, how much of a load each container can carry before sinking, how they can make a container sink. Students might choose materials to test. Students should develop questions to explore. Other questions to discuss can be used with the senses such as the following: Does it look as if it will float? How does it feel? Do those that feel heavy sink? There are opportunities here to further extend observations based on the senses.

The purpose in asking questions such as these is to encourage students to observe more closely what happens when various materials are made wet. Watch for growing attention to detail and increasing sophistication in ways of expressing observations. Terms the students may use in connection with absorption explorations include drips on, drips through, soaks up, spreads out/spreads over, soggy, mushy, squelches, stiff, stringy, transparent, blot, soak, pour, drip, drop, disappear.

Students can use bits of materials such as paper, Styrofoam, plastic, leaves, Plasticine, and tinfoil to make boats that will float. Students should test their boats and prepare to share with the class what they made and how it worked.

Water *(continued)*

Tasks for Instruction and/or Assessment

Informal Observation

- As the student investigates water by causing disturbances, such as making ripples and plops, note the level of self-control and perseverance the student attains. (201-2)
- Note the student's level of interest in attempting the various types of investigation and the student's interest in creating new ways to investigate movement of water. Focus on observations and vocabulary. Ask questions about what they observe/notice. Tell me what you see. (201-1, 201-2)
- Continue to note the student's growing vocabulary for water related concepts vocabulary (e.g., ripples, splash, patterns, circles, waves, wavy) (101-1, 101-2)
- As students investigate buoyancy, notice the kinds of questions they ask and the tests of buoyancy they create. The expectation for investigation is that the student will think of tests to try to satisfy personal curiosity. The teacher can ask each student to describe what they are trying to do or find out. Notice how students try to manipulate materials. (201-1, 201-2)
- When students begin building and testing their own boats, ask them to explain how they built their boats and what they expect to happen when they float them. Students will enjoy trying to float other objects in their boats. Note each student's engagement and level of perseverance with these challenges. (201-1, 201-2)
- Collections of floaters and sinkers can include corks, lids, plastic boxes and bottles, twigs, acorns, balsa wood, eggshells, ice, a hollow rubber ball, a toy boat, keys, paper clips, stones, Plasticine, centicubes, coins, large and small metal washers, screws of various sizes. A collection of things that absorb can include paper towel, bread, clay flower pots, cloth, cotton balls, egg cartons, and sponges. (103-1, 201-2)

Resources/Notes

Activities from Appendix E

- Activity 45: Floating and Sinking
- Activity 46: I Can Float or Not

Print

- *National Geographic: Windows on Literacy*, Teacher's Guide, Emergent Stage, pp. 118–21
- *Science Everywhere,* Teacher's Guide, pp. 200–202 (13389)
- *Some Things Float* (Windows on Literacy) (13150)
- See Appendix H: Print Resources.

Curriculum Links

- Making boats to float from clay and loading them with cargo (unit cubes) can provide a link in math (number sense and capacity).

Water *(continued)*

Outcomes

Students will be expected to

- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings, and play roles that correspond to these settings (103-1)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry our their own explorations (200-4)
- manipulate materials purposefully (201-2)

Elaborations—Strategies for Learning and Teaching

Investigating Materials That Absorb Water and Materials That Are Water Repellent

Provide collections of objects and materials that absorb water and materials that are water repellent. Invite the students to conduct a variety of explorations with water and these materials. Such explorations might include the following:

- Students can wet a group of different materials and describe how they look and feel before wetting and after wetting.
- Students can observe what happens when they use different techniques to wet the materials. In one session, students can wet objects and materials by immersing them in water; in another session, they can wet by dropping water from spouted pourers or medicine droppers onto the materials. Another time, they can suspend a selection of different materials from a line above a pan of water allowing only the edge to touch the water. Students can make and compare observations of what happens when water is used in these different ways.
- Students can listen to the sounds made by wet materials when they are scratched, rubbed, and squeezed.
- Students can sort objects and materials from the collection into sets of absorbent and non-absorbent materials.
- Students can add objects and materials to the class collection. Students can bring materials from home to add to the class collections. They should try to predict which materials will be absorbent and which will be non-absorbent as they add them to the collection.
- Students can investigate the addition of water to a collection of different paper products to see if differences in types of paper make a difference in absorbency. A paper collection might include office paper, scribbler paper, towelling, toilet paper, wax paper, paper plates (of varying quality), blotting paper, construction paper, paper cups, and tissue paper. Students can sort these items into groups, such as fast absorbers, slow absorbers, and non-absorbers.

Investigating Materials Used for Absorbing Liquids

Students can investigate the various materials from home and school that are used for the purpose of cleaning up liquids such as paper towel, cleaning cloths, rags of various materials, sponges, and mops. As they clean up after their own water investigations, students can observe and compare how different materials absorb water. They can make judgments about the best materials for cleaning up in the classroom.

Water *(continued)*

Tasks for Instruction and/or Assessment

Informal Observation

- As the students explore absorption with the various collections of materials, the teacher can ask questions such as the following:
  - How does the wet piece feel when you touch it? squeeze it? Does it feel the same as this dry piece? Does the wet part look different from the dry part?
  - What happened to the paper when you soaked it?
  - Which materials let the water through? Which materials can the water not get through? (101-2, 103-1, 200-1, 200-4, 201-2)

Resources/Notes

Activities from Appendix E

- Activity 47: Soak It Up
- Activity 48: The Absorption Test

Print

- *Science Everywhere*, Teacher's Guide, pp. 203–205, Poster 12
- See Appendix H: Print Resources.

Water *(continued)*

Outcomes

Students will be expected to

- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to these settings (103-1)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry our their own explorations (200-4)
- manipulate material purposefully (201-2)

Elaborations—Strategies for Learning and Teaching

Art Experiences to Explore Absorption

The class can discuss ways in which absorbent materials can be made more water repellent. Students can add grease to paper and then observe what happens when drops of water are added to the coated paper. They can compare this to their observations of water drops on ungreased paper and on wax paper.

Crayon Relief Art

The teacher can invite students to use a crayon relief technique to create pictures and ask them to observe what happens to the watery paint as they wash over the sections of the paper covered with crayon as compared to the sections not covered.

Paint Blob Art

Students can drop paint on one-half of a sheet of paper and then fold it in half to create a paint blob shape. Students can observe the pattern they created as well as noticing the way the paint spread and stopped spreading to form the shape.

Dripping Paint

Students can drip watery paint on absorbent paper, observing what happens as they vary the size of the drops, the force of dripping, the colour of paint, and the position of the brush over the paper. The work created can be let dry and displayed along with a transcribed record of the observations the student made during the process.

Water *(continued)*

Tasks for Instruction and/or Assessment

Presentation

- Ask students to record in their science logs or some other format which materials they have decided make useful household absorbers. They might draw, paint, or paste actual samples of absorbent materials. Note whether or not the student can select the best materials for absorbing as cleaners, based on their investigations. (101-2, 201-2, 103-1, 200-1, 200-4)

Resources/Notes

Activity from Appendix E

- Activity 49: The Seascape

Print

- See Appendix H: Print Resources.

Curriculum Links

- *Visual Arts Primary–6,* Nova Scotia Department of Education, 2000

Exploring Moving Things with Our Senses

Introduction

This unit provides further opportunities for grade primary students to explore their surroundings through their senses. They will continue to investigate, to see inside things, and to find out how things work and how they can influence how things work. They will observe what they see happening using their five senses and grow in their ability to describe these perceptions and ideas using oral language and a variety of other media.

Focus and Content

In this unit, students will observe, describe, and discuss a variety of moving things—themselves, insects, birds, trees, doors, rain, fans, swings, volleyballs, wagons, and the moon. They will make records and draw pictures and diagrams to suggest the motions they observe. Students will be encouraged to raise questions about how things are moving. Do they move in a straight line? Is the motion fast or slow? How can you tell? How many ways does a growing plant move?

Students will have the opportunity to experience getting things to move or not to move and changing the direction or speed of things that are already in motion. They will experience the sense of balance within themselves and explore ways to balance objects in their environments. They will explore ways that they can change various aspects of objects in motion or at rest and ways they can manipulate objects and materials to make things happen. They will use things to balance such as ramps, themselves, and other materials in their environment.

Science Curriculum Links

The explorations of this unit provide early experiences for the students that will be investigated more formally in the grade 2 unit Relative Position and in the grade 3 unit Materials and Structures. The experiences with building and changing structures or creating motions with ramps, slides, and swings will contribute to the students' growing ability to design and build apparatus. The process of applying knowledge and experience to create something will be developed through all grades of the elementary science program.

Curriculum Outcomes

The following outcomes are from *Common Framework of Science Learning Outcomes K to 12*. Column one outcomes in the four-column spreads for this topic have been developed from these pan-Canadian outcomes.

STSE/Knowledge	Skills
Students will be expected to	*Students will be expected to*
100-1 develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought	**Initiating and Planning**
101-1 explore how characteristics of materials may change as a result of manipulating them	**200-1** ask questions that lead to exploration and investigation
101-2 identify and explore ways to use tools to help carry out a variety of useful tasks	**200-4** select and use materials to carry out their own explorations
103-1 choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings	**Performing and Recording**
	201-1 follow a simple procedure where instructions are given one step at a time
	201-2 manipulate materials purposefully
	201-4 observe, using one or a combination of the senses
	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
	203-4 respond to the ideas and actions of others and acknowledge their ideas and contributions

Exploring with Ramps, Rollers, and Sliders

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- manipulate materials purposefully (201-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

Explorations with ramps provide many opportunities for students to observe, describe their observations, and record their observations. Students can be asked to contribute to class discussions and class records as well as to make records such as diagrams on their own. At times students should be asked to explore with any combination of materials while at other times the teacher should select particular materials, and objects to focus the explorations. Teachers should ensure that all students have an opportunity to use the blocks.

Brainstorming about Ramps

Begin the unit with a brainstorming discussion about ramps. Talk about building ramps that students might see in life such as wheelchair ramps, parking garage ramps, and school ramps. Ask the students what they know about ramps and where they see examples of ramps at home, at school, and in the community. Encourage students to ask questions that they would like to ask about ramps and about what they would like to find out. Keep this initial brainstorm brief, retaining the chart for future use as the class continues to explore with ramps. As a class or in small groups, students should be encouraged to add new observations and to check information offered in the original brainstorming session. From time to time students will notice something in the brainstorm that they want to change or correct.

As the explorations begin, the teacher can ask students to share the questions they are investigating by saying things like, “What are you working on?” “What are you trying to do?” The teacher should begin a list of questions that students are investigating. Once this list is begun, the class should revisit the list of questions every day or so. Note whether or not the students are able to express their explorations in terms of a question.

“Messing About” with Ramps

Invite students to use materials from the unit collection and from around the classroom to build and explore their own ramps. Ask the students to draw their ramp before the end of the session and to save this diagram for the next time they are working with ramps. The next time students work with the materials, challenge them to build the same ramps using their diagrams. The goal here is not accurate replication of any particular ramp. The experience should provide students an opportunity to consider their diagrams and how useful they are in setting up the ramp. Teachers can ask students what makes a good diagram and what might they put in the next diagram. Teachers should use visual imagery whenever possible. Students might describe their ramps to another student.

Exploring with Ramps, Rollers, and Sliders

Tasks for Instruction and/or Assessment

Informal/Formal Observations

- Does the student contribute ideas to the class discussion in small groups or with the teacher? Does the student listen to other students, building on their contributions? (100-1, 203-4, 200-1)
- Teachers should create a collection of materials and objects to have on hand for ramp explorations. Many materials can be gathered around the school and the community. The collection may include wood for ramps and blocks; heavy cardboard, plastic, and Styrofoam for ramps; a variety of balls, paper cylinders, toy vehicles, straws, spools, film cases, paper clips, pencils, wooden building blocks, Duplo building blocks, and geometric solids. Throughout the investigation students, parents, and teachers can continue to add to the collection. (200-4, 201-2, 203-1, 203-2, 203-4)

Resources/Notes

Activities from Appendix F

- Activity 50: Getting to Know Ramps
- Activity 51: "Messing About" with Ramps

Print

- *National Geographic: Windows on Literacy*, Teacher's Guide, Early Stage, pp. 134–37
- *How Does It Move?* (Factivity series big book) (13736)
- *What Can Jump*? (13508)
- See Appendix H: Print Resources.

Curriculum Links

- Exploring concepts around three-dimensional geometry (GCO E) just before or during this unit would provide a link between science and math, providing students with geometric concepts and language on solids that are/are not helpful for building ramps and what objects move easily/not easily on them.

  For language arts, use prior shared reading/read-aloud time with students to explore concepts around movement.

Investigating with Ramps

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)
- observe, using one or a combination of the senses (201-4)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

Focussing Ramp Investigations

Students can use blocks and boards to build ramps and explore how objects roll down ramps. As students invent ramps and test different objects as rollers, teachers can focus the investigations by asking students to describe their activities. Teachers can collate a number of things students want to try and challenge everyone to try things with the ramps. Students should observe how their material rolls, what sound it makes, and the way it falls.

Ramp investigations can include the following:

- Which objects roll down the ramp well? Which objects don't roll? Which objects don't roll well or tend to roll off the ramp?
- How can you make the car, ball, or can roll more quickly? More slowly?
- Compare distances that different objects will roll after they come off the ramp.
- How can you make the ball, car, or can go further after it comes off the ramp?
- Observe objects of different weights and sizes as they roll down and off the ramp.

Classifying Rollers and Sliders

After the students have had several opportunities to investigate with ramps of their own design and a variety of objects from the class collection, ask them to identify objects that roll down the ramp and objects that slide down the ramp. Students may predict what they think will happen before they do it. Students may sort objects into rollers, sliders, and both rollers and sliders. Ask students about objects they believe can be both rollers and sliders. What must they do to an object to change it from a roller to a slider or from a slider to a roller?

A Venn diagram might be used for communicating the students' sort. As students conduct this classifying activity, ask them what they can observe through sight, sound, touch. Ask how they are using their senses to observe what is happening with the ramps, rollers, and sliders. How do they know it will slide down the ramp? Will the ride be smooth? slippery?

Investigating with Ramps

Tasks for Instruction and/or Assessment

Informal Observations

- Is there evidence of a growing vocabulary to describe the observations and the relative positions of things in motion? (100-1)
- Does the student create his/her own investigations of things in motion using the materials available in the classroom? (200-4, 201-2, 103-1)
- Does the student create and communicate questions or puzzles to solve through investigations? (200-1, 200-4, 203-1, 203-2, 203-4)
- Does the student engage with other students to create investigations? (203-1, 203-4, 101-1, 101-2)

Presentation

- After students have categorized objects as rollers, sliders, or both, ask them to make a group chart of their sorting. (201-1, 203-1)
- Notice how the students draw the arrangement of objects. Are they able to represent the objects so others can perceive them? Can they describe the sort from their diagram a day or so later? (203-1, 201-4)
- Can the students describe what they are investigating with their materials, along with what they found out? (200-4, 200-1, 203-1)

Resources/Notes

Activities from Appendix F

- Activity 57: A Fair Test
- Activity 58: Ramp Surfaces

Print

- See Appendix H: Print Resources.

Investigating with Ramps *(continued)*

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)
- observe, using one or a combination of the senses (201-4)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

Investigating Different Ramp Surfaces

Teachers can provide a collection of materials to place on the ramps, such as towels, plastic, carpeting, corrugated cardboard, sandpaper, fabric, and liquid soap. The student can place different materials on the ramp and try rolling familiar objects down the ramp. The student can predict how fast the object will move and then record in a diagram what happened. Which material allowed the fastest roll? The slowest roll? Which material changed the pattern of the rolling?

Build a Class Ramp

Ask the students to use their ramp diagrams to build the ramps again. Invite them to build the best ramps they can. Ask them if they want to make any adjustments to the ramps represented by their diagrams. Invite them to select some rollers and/or sliders to test their ramps. Invite them to adjust their ramps until they have built their best ramps. Ask them to describe why these are their best ramps. Record criteria for "best ramp" on class chart and challenge students to demonstrate their "best ramps" to each other.

Investigating with Ramps *(continued)*

Tasks for Instruction and/or Assessment

Interview/Conversation

- As the students build, test, and demonstrate "best ramps," notice if they discuss the concept of fairness when comparing two different ramps. (200-4, 201-2, 203-4, 101-1, 101-2, 200-1)
- Are they beginning to notice that in order to compare two ramps these ramps should be similar in construction, height, and length? Are they able to identify and then adjust factors that contribute to a fair comparison of two or more ramps? (201-2, 201-4, 203-1, 203-2, 103-1, 201-1)

Resources/Notes

Activities from Appendix F

- Activity 52: Using Our Ramps
- Activity 53: Sliders and Rollers
- Activity 54: Further Investigations with Sliders and Rollers
- Activity 55: Sliders or Not Sliders
- Activity 56: Rollers or Not Rollers

Print

- *Science Everywhere*, Teacher's Guide, pp. 194–96 (13389)
- See Appendix H: Print Resources.

Curriculum Links

- Investigating movement should naturally provide connections with math in GCO D, measurement (distance, height, mass), and GCO F, data management (graphing).

Teacher Note: *Be sure to let the physical education teacher know that you are working on movement outcomes in science. Physical education provides excellent contexts for students to explore ideas around movement and balance.*

Investigating Our Own Movement

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- follow a simple procedure where instructions are given one step at a time (201-1)
- observe, using one or a combination of the senses (201-4)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

Jumping, Rolling, and Moving Ourselves

Students can observe each other making different kinds of movements at different speeds and in different patterns. They can think about their own movements. An instructor (for example, karate or Tai Chi) might be invited to demonstrate movement or a video might be used.

Teachers can integrate these experiences with physical education, providing time for discussion and recording as a class. After an experience in the gymnasium or on the school grounds, students can share observations of their own and others' movements. Teachers can record on chart paper or in some other format the students' observations from the personal movement experiences. Students can be invited to relate knowledge about the movements of other living things such as birds flying or trees swaying in the wind and of inanimate objects such as planes and tractors.

Investigating Our Own Movement

Tasks for Instruction and/or Assessment

Performance

- The class may play movement games such as Do the Hokey Pokey or Frozen Tag or Bear Hunt to further demonstrate awareness of body movements. (103-1, 200-1)
- When students demonstrate movements for others, notice if they choose to interact with some object or material in the environment. (103-1, 200-4, 101-1, 101-2)
- Notice in the students' performance whether they demonstrate an awareness of audience and purpose. Are they able to focus on the task and create a performance that interests other students? (103-1, 201-1, 203-4, 201-1)
- Ask students to demonstrate a movement that they see around them in nature. Which senses do they use? Other students could use vocabulary to describe the movement and then guess what was represented. (201-2, 203-1, 203-2, 201-4)

Resources/Notes

Print

- *Science Everywhere*, Teacher's Guide, pp. 93–95, Poster 3 (13389)
- See Appendix H: Print Resources.

Video

- *How Things Move* (23328) (16 min.)

Investigating Balance

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)
- observe, using one or a combination of the senses (201-4)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

Explorations with balancing will provide many opportunities for students to observe phenomena around them. Initial experiences should focus on the students' observations of everyday objects "in balance" and quickly move to explorations of their own bodies "in balance." By playing games such as Frozen Tag, students will observe and discuss the sense of balance in their own bodies. Throughout balancing investigations students will have the opportunity to develop fine-motor coordination and to make observations by describing what happens when they create balanced systems.

Brainstorm Balancing

Teachers can begin the balancing investigations by conducting a class brainstorm of balancing. Ask the students what the word balancing means to them, where they see examples of balancing, when they have to balance something. Students will probably suggest examples of balancing such as riding a bicycle, playing on teeter-totters, skipping, doing cartwheels, handstands, and spinning.

Play Frozen Tag or Balance Statues

Create a game or experience where students try different types of balancing with their bodies. Try directions, such as, "Can you stand on one foot and one hand?" "Stand on one foot." "Stand on one foot with your hands above your head." "Stand on one foot with your arms stretched out from your sides." "Which way was easier for you?" "Which way was harder for you?" Ask students to observe the sense of balance in themselves and in others. After the activity invite the students to share their observations: what did it feel like to balance their bodies in different ways. Teachers might create a class record of the body-balancing experiences. This might include standing on one foot, hands in the air, bending forward, and so on.

Look for Things "in Balance"

Once the students have experienced, observed, and discussed balancing with their own bodies, the teacher can ask the students to look for objects in the classroom and on the school grounds that are "in balance." Students may identify items such as tables, chairs, easel, chart stand, cars, playground equipment, and even the school building. Ask the students to identify the parts of the object or structure that seem to keep it in balance. For tables and chairs students may identify the legs as important in keeping the object "in balance." Cars are standing on their wheels; the walls of the school are holding the building up.

Investigating Balance

Tasks for Instruction and/or Assessment

Informal/Formal Observations

- During the initial brainstorm notice the student's use of vocabulary to describe balance phenomena in the classroom, school ground, and community. (203-2, 203-4)
- Can the student describe what it feels like to balance in different ways? (101-1, 103-1)
- As the student tries different body balance positions notice whether or not he/she can identify the base of his/her body balance. (103-1)
- Can the student identify objects in the classroom and school grounds that are balanced such as tables, chairs, people, easel, cars, swing set, and climbing structure? (201-4, 203-1, 101-2)
- Can the student describe the parts of the object that seem to be holding it up or keeping it balanced? Does the student refer to these parts of the object as its base? For example, can the student tell that the four legs of the table help to keep it in balance much as our legs help to keep us in balance? Does the student recognize the base of various objects? (101-1, 200-1, 200-4, 201-2)

Performance

- Can the student balance his/her body in a variety of different ways, following simple directions such as
  - balance on one foot
  - balance on one foot, one hand (201-1)
- Play Frozen Tag or Balance Statues (201-1, 203-1, 203-4)

Resources/Notes

Activities from Appendix F

- Activity 59: Getting Balanced
- Activity 60: Experiencing Balance
- Activity 61: Things in Balance

Print

- See Appendix H: Print Resources.

Teacher Note: *You may wish to consider physical education activities and outcomes with this experience. Equipment such as mats, Hula Hoops, beanbags, and balancing beams can be used to extend the balancing activities.*

Investigating Balance *(continued)*

Outcomes

Students will be expected to

- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- select and use materials to carry out their own explorations (200-4)

Elaborations—Strategies for Learning and Teaching

Building with Blocks

Students can use their experiences with blocks to make observations and to extend the language they have to express what they are observing, trying, and discovering. The teacher can use these experiences to foster an awareness of positional relationships such as under, over, around, and beside. These experiences can be used to promote comparative language with questions such as, How high is the tower you built? What other things in the room are about as high as your tower? Which tower do you think is the highest? the shortest? Which tower has more blocks? Which tower has the fewest blocks?

Making Balances

Challenge the students to balance an object on some part of their bodies. 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, cardboard boxes) to find may ways to balance objects on some part of their bodies.

Investigating Balance *(continued)*

Tasks for Instruction and/or Assessment

Performance

- When building with blocks, does the student build a reliable base to support the structure? Can the student identify and describe the base that holds the structure in balance? (200-4, 101-2)

Resources/Notes

Activity from Appendix F

- Activity 62: Balance and Building

Print

- See Appendix H: Print Resources.

Exploring the World of Living Things with Our Senses

Introduction

Young students are usually fascinated by the life around them. They are great observers of the insects, plants, and animals that are common to their own environments.

In this unit, students use their senses to investigate the diverse characteristics of a variety of local insects, plants, and animals. They observe appearances, behaviour, similarities, and differences. Teachers should realize that animals and plants are a spiral development throughout grades 1 to 4 and should focus on the senses when doing this unit.

Focus and Content

The focus of this unit is inquiry through careful observing. Students will observe living things brought into the classroom, at home, and outdoors on or near the school grounds. Where possible, pets will be invited to the classroom so students can observe and communicate their observations. Students will make collections of samples of living things and then use their collections to describe, compare, question, and plan investigations. The inquiry will be extended by experiencing a variety of multimedia representations of living things from places other than their own community environment.

Science Curriculum Links

The informal explorations of living things in this unit will provide a natural link with science learning in the unit Needs and Characteristics of Living Things (grade 1) and Animal Growth and Changes (grade 2). The explorations will provide many opportunities for students to use oral language in purposeful and focussed ways to view a variety of multimedia texts and to represent their observations and questions in drawing, charts, graphs, and beginning writing.

Curriculum Outcomes

The following outcomes are from *Common Framework of Science Learning Outcomes K to 12*. Column one outcomes in the four-column spreads for this topic have been developed from these pan-Canadian outcomes.

STSE/Knowledge	Skills
Students will be expected to	*Students will be expected to*
100-1 develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought	**Analysing and Interpreting**
100-3 detect consistency and pattern in objects and events and use language to describe these patterns	**202-1** use personal observations when asked to describe characteristics of materials and objects studied
	202-2 place materials and objects in a sequence or in groups according to one or more attributes
	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
	203-4 respond to the ideas and actions of others and acknowledge their ideas and contributions

Investigating Living Things Outdoors

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

Knowledge of the diversity of organisms probably begins late in the year. With careful observations, students use their senses to investigate the diverse characteristics of a variety of local plants and animals. The world of living things will provide rich opportunities for grade primary students to use language to describe their observations, to ask questions about the world around them, and to use a variety of investigations and sources to answer their own questions.

Young students may also be keenly interested in forms of life that they may not have experiences with, such as whales, crabs, or extinct forms of life such as dinosaurs. The primary science program begins with exploration of common organisms but can expand to capitalize on the students' interests in the unusual and the "larger than life." Students could look for spiders and spider webs. Teachers could plant a bulb in the fall and bring it out when it comes up in the spring.

Throughout the grade primary science program, students have been encouraged to make careful observations using the five senses. During experiences with living things, note the student's use of senses to observe. Investigations with living things will provide many opportunities for sorting objects and representations of living things such as photos, drawings, and models. As the student sorts collections of living things or their representations, note how the student carries out this activity.

A Walk Outside

To begin observations of living things, the teacher can take the students on a walk outside the building, asking them to notice everything they think is alive. This walk can be repeated at different times of the year to notice the changes in living things at different seasons. Students can stop to observe and describe what they see, hear, touch, and smell.

⚠ **Caution: Teachers should be knowledgeable about tasting substances.**

The walk can be varied by asking the students to look up and notice everything they can above them. Next, they can look downwards to observe. Students can close their eyes and listen for sounds of living things. Are bird sounds different in winter and summer?

The teacher and students can create a variety of formats for the class record of the observations and should continually add additional vocabulary to the class sense charts. Teachers could put observation records and photos away so that students can recall what happened for each part of the year.

Investigating Living Things Outdoors

Tasks for Instruction and/or Assessment

Informal Observations

- Is the student extending vocabulary to describe observations? Does the student continue to refer to the class sense charts and to add new descriptive words to the chart? (100-1, 100-3, 203-1, 203-2)

Performance

- Can the students explain their rules for sorting? Can the students find alternative/different ways to sort the same items in a collection? (100-3, 202-2)

Journal

- Write and draw about your spider or caterpillar. How do you observe it? (100-1, 100-3)
- What plants that are available to taste in the fall, winter, spring, do you like? (100-1, 100-3)

Paper and Pencil

- Create a collage for each part of the year. (202-2)
- In their science logs/journals, the teacher should respond to things that the students did and then ask questions that lead back to more research—that helps them to proceed in an area of interest to him/her. (203-1, 203-4)
- Draw and label the things you found. (202-1)
- What does a leaf feel like when it is green? What does a leaf feel like when it is brown and ready to fall off a tree? How does it feel to stand in the sun in the fall? winter? summer? spring? (100-1, 203-2)

⚠ **Caution: Teachers should be aware of pet and plant allergies.**

Resources/Notes

Activities from Appendix G

- Activity 63: Going for a Walk
- Activity 64: Log Hotel
- Activity 65: Observe a Leaf
- Activity 66: Living and Non-Living
- Activity 67: Living Things Mobile

Print

- *National Geographic: Windows on Literacy*, Teacher's Guide, Emergent Stage, pp. 106–109; 170–73; 90–93; 38–41; 130–33
- *Science Everywhere*, Teacher's Guide, pp. 142–44, Poster 7 (13389)
- *Living Things* (Factivity series big book) (13747)
- *Red Leaf, Yellow Leaf* (big book) (13471)
- *A Baby Shark, A Bird Flies By, Our New Puppy, Plants and Animals Live Here, What Lives in a Swamp?* (Windows on Literacy) (13150)
- *Sorting Leaves*, PM Maths (13424)
- *Animal Graphs*, PM Maths (13425)
- See Appendix H: Print Resources.

Video

- *Living and Non-living Things* (23328) (12 min.)

Curriculum Links

- Sorting and graphing during math time will provide a link for many of the activities for this unit.

Investigating Living Things Outdoors *(continued)*

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

Hula Hoop Observations

On the school grounds or in another location, provide each pair or small group of children with a Hula Hoop. The students select a patch of ground, put down the Hula Hoop and observe everything they can that is living within the circle. Students can list things, count things, or draw what they observe. If the area will not be harmed by such an activity, the students can take samples of some of the living things they observe within their circle back to the classroom where they can sort and make displays.

Spider/Caterpillar

Collect some spiders and provide a house for them. Students can observe and feel spiders while looking at the them in a natural habitat. Deciding what to feed them can be a group discussion. Observations of spiders can include what they do, their body parts, and their webs. Students can magnify and draw the spiders and the webs. Use of language to describe the web, the spider, and its life can extend the student's vocabulary. A journal or diary with pictures about the spider can help understandings. Students could do the same task with a caterpillar.

Investigating Living Things Outdoors *(continued)*

Tasks for Instruction and/or Assessment

Informal Observations

- Is the student extending vocabulary to describe observations? Does the student continue to refer to the class sense charts and to add new descriptive words to the chart? (100-1, 100-3, 203-1, 203-2)

Performance

- Can the students explain their rules for sorting? Can the students find alternative/different ways to sort the same items in a collection? (100-3, 202-2)

Journal

- Write and draw about your spider or caterpillar. How do you observe it? (100-1, 100-3)
- What plants that are available to taste in the fall, winter, spring, do you like? (100-1, 100-3)

Paper and Pencil

- Create a collage for each part of the year. (202-2)
- In a science log/journal, the teacher should respond to something that the student did and then ask a question that leads back to more research—that helps the students to proceed in an area of interest to him/her. (203-1, 203-4)
- How did you sort the things you found in your circle? (202-2)
- Draw and label the things you found. (202-1)
- What does a leaf feel like when it is green? What does a leaf feel like when it is brown and ready to fall off a tree? How does it feel to stand in the sun in the fall? winter? summer? spring? (100-1, 203-2)

⚠ **Caution: Teachers should be aware of pet and plant allergies.**

Resources/Notes

Activities from Appendix G

- Activity 68: Sorting Rings Observations
- Activity 69: Insect Party

Print

- *Can You See An Insect?* (Windows on Literacy) (13150)
- *Insects Up Close* (13506)
- *Insects Change* (13512)
- See Appendix H: Print Resources.

Investigating Living Things in the Classroom

Outcomes

Students will be expected to

- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Elaborations—Strategies for Learning and Teaching

Making Collections

The teacher can initiate the collection-making activity by making and representing one or two interesting collections such as a leaf or seed collection, perhaps a collection of insects in jars. Students can make observations of the items in a collection, find common characteristics, and identify differences. Students may then want to make their own collections of non-living things such as rocks or cards. Students can use their collections to sort and classify according to characteristics they identify. They could make presentations to the class, showing their collections, describing the characteristics that are important to them, and answering questions of classmates. Students could look at the characteristics of living things. In a group discussion, students could sort their collections into two groups: living and non-living.

Observing Plants in the Classroom

The teacher can create a display of a variety of plants (e.g., cactus, flowering plant, vegetable, a cutting with roots in a clear container, or a small tree). Students can observe these samples closely to discover how they are alike or different (e.g., size, colour, number of leaves). Students can select a favourite plant and draw as many details as possible. Each student can communicate to the class why the plant is his/her favourite, using the pictures as a visual aid.

Visiting Pets

Teachers can create a schedule for pets to visit the classroom. The pet owner makes a brief presentation about the pet, and then the class makes and records observations. Students observe characteristics such as teeth, wings, number of legs, colour, skin covering, how it breathes, how it eats, and how it moves. Records can be made using charts and photos of each visiting pet. For the visiting pets activity, teachers and students can create a common format for recording observations of each pet.

Growing a Seed

Students can plant radish seeds in containers, and each student can predict the day when his/her plant will appear. Students can create illustrations or diagrams to demonstrate the growth of their seeds and, with the support of older students, class helpers, or the teacher, record observations every few days. By using their senses, students can observe, record, and build language around the growth of their seeds. Students will learn more about plants in the grade 3 science program.

Investigating Living Things in the Classroom

Tasks for Instruction and/or Assessment

Science Recording/Science Log

- Students should experience a variety of ways to record their observations. During living things investigations, note how the student contributes to group recording and how he/she makes recordings independently. (202-1, 203-4)
- Does the student contribute to class discussions, adding items to be recorded on charts, class books, and so on? (203-4, 203-2)
- Does the student participate in recording through modelling, role play, drawing, writing in small-group settings? (203-4)
- Does the student's science log show evidence of growth in ability to record observations through drawing and beginning writing? (203-1)
- Observe whether the student is using different media to represent observations of living things. Examples might include role playing, building models from Plasticine, painting, and tape recording. (100-3, 203-1)
- Using imaginary role playing with the senses as a theme, talk about sayings such as "smooth as ice," "hard as a rock," "loud as thunder," "tastes like vinegar," and "smells like chocolate." (202-1)

Journal

- Complete the following:
  - I know it is slippery because ... (100-3, 202-2)
  - I think like a scientist because I ... (203-2)

Resources/Notes

Activities from Appendix G

- Activity 70: Making Collections
- Activity 71: Let's Look at Seeds
- Activity 72: What's Your Rule?
- Activity 73: Animals or Not Animals?
- Activity 74: Plants or Not Plants?
- Activity 75: Alive or Not Alive?

Print

- See Appendix H: Print Resources.

Video

- *Plants: A First Look* (23315) (15 min.)

Appendices

Appendix A: Equipment Lists

School Materials

The school list consists of items that each school should have. This does not include items in the class or consumables list.

Supply List
attribute hoops
audiotapes
beach ball
beanbags
blocks of wood
bug viewers
centicubes
clipboards
combs
digital camera
double pan balances
eye droppers
football
funnel sets (3 per set)
golf ball
hexagram masses
Hula Hoops
interlocking cubes
lacrosse ball
magnets
magnifiers
paper clips
pattern blocks
ping pong ball
plastic buckets with lids
ramps of various sizes 3/4″ thick MDF
sand and water trough

soccer ball
sponge ball
straws
tape recorders
tennis ball
Wiffle ball

Classroom Supplies

The classroom list consists of items that each grade primary class should have. This does not include items listed in the other lists.

Supply List
building blocks
crayons
paint brushes
pencil sharpener
scissors
stapler

Consumables
aluminum foil
bags (paper)
bags (plastic, sealable)
cereal (variety)
chart paper
cinnamon (ground)
construction paper
cotton balls
cotton swabs
dish detergent
flavouring (mint, lemon, vanilla, etc.)
flour
food colouring
fruit (variety)
fruit crystals
gelatin

- glue
- gravel
- modelling clay
- paint (liquid)
- paper towel
- pasta (variety)
- pencils
- plastic cups (clear)
- plastic wrap
- radish seeds
- rice
- salt
- sand (various types)
- seeds (dried, various types)
- soil
- stir sticks
- sugar
- tissue paper
- vegetable oil

Recyclables and Collectibles

The recyclables and collectibles list consists of items that each grade primary teacher should have. This does not include items listed in the other lists.

Supply List

- baby food jars
- buttons
- cardboard
- cardboard tubes
- containers (plastic, opaque, with lids)
- film canisters (plastic with lids)
- magazines
- marbles
- material (cloth)

- milk cartons
- paint chips
- pie plates
- pill bottles (clear)
- plastic bags
- plastic bottles
- sawdust
- seeds (pinecone, peach, corn, watermelon, etc.)
- shoe boxes
- sponges
- strainers
- tin cans
- toy cars (die-cast metal)
- trays
- wind-up toys
- yarn

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 program is 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
Exploring the World with Our Senses	
Habitats: A Science Walk with David Suzuki (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 various insects and small creatures, providing interesting facts about each. He poses thoughtful questions that the children answer through observation and problem solving.
Our Five Senses (23332) 15 min., 2003	This short video is intended for students in grades primary–1. Students will learn that we have five senses, what the senses are, and how the senses 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.
Paddle to the Sea (23124) 28 min., 1966	This is a children's odyssey from the story by Holling C. Holling; about a hand-carved figure in a canoe, 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.
Seeing Things Series (S0756) 2 x 15 min., 1988	Dr. David Suzuki and the neighbourhood children explore the natural world together. Children use their skills of observation, and Suzuki inserts interesting facts about each creature and plant discussed.
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.
Sound: A First Look (23316) 17 min., 2001	This program introduces students to what sounds are, how sounds are made, and how sounds are different. Students learn that sounds are made when something vibrates, the differences between pitch and volume, and how musical instruments work. Students are engaged in a variety of activities or experiments on how to make a simple musical instrument out of materials found at home or school. It includes a teacher's guide and blackline masters.

Title	Description
Exploring Moving Things with Our Senses	
How Things Move (23327) 16 min., 2000	Roll, slide, bounce, and spin. Students in grades primary–2 will have fun watching objects and predicting movement while developing scientific skills about force and motion.
Exploring the World of Living Things with Our Senses	
An Alphabet of Insects (23049) 12 min., 1984	*An Alphabet of Insects* is an interdisciplinary program that uses a combination of animation and carefully selected nature photography to reinforce reading skills and give practice in observation and comparison. Told in rhyme, the program names insects and explains the structures, behaviour, and life cycles of a variety of insects.
The Animal Movie (23121) 10 min., 1966	This videotape is an animated cartoon that helps children explore why and how animals move as they do. A little boy discovers that he cannot compete with animals by imitating the way they move. He only outdistances them when he climbs into a vehicle that can travel in any environment. As a result of this, the film concludes that while other animals are trapped by their environments, humans, as inventors, are not.
Animal Tracks (V9993) 17 min., 1988	In this Nova Scotia Museum Clip, Debra Burleson and museum taxidermist Ed Claridge explain how to take and manage plaster and wax impressions of animal tracks in mud and snow.
Animals around You Series (Loan) (S2285) 1992	This series of programs introduces students to the habitats of animals around them. Components for this series are as follows: • *Animal Life Spans* (23202) • *At Home with Zoo Animals* (23179) • *Counting with Animals* (23175) • *Sizing Up Animals* (23174) • *Animals That Build* (22239) 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.

Title	Description
Critter Hunt (Dubbing or loan) 75 min., 1993	This is a series of six videos about common reptiles and amphibians (frogs, turtles, salamanders, snakes). Each program includes a teacher's guide and a set of blackline masters with exercises for the students to complete. Components of this series are as follows: • *Going on a Critter Hunt* (V2379/22904) • *Salamanders and Newts* (V2375/22903) • *Snakes* (V2376/22902) • *Tadpole in a Tank* (V2377/22900) • *Tadpoles and Frogs* (V2374/22905) • *Turtles* (V2378/22901)
Fourways Farm Series 1 (Loan) (S2158) 100 min., 1995	This series of 10 10-minute programs is designed to make a child'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. • *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 • *Ups and Downs* (21663) Weight, balance, simple pulleys • *Who's Been Eating?* (21664) Grouping of living things
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, math, music, and art. Components of this series are as follows: • *Appropriate Measures* (21666) Measurement and units of measurement • *Buried Treasure* (21667) Decomposition and preservation • *Floating and Sinking* (21668) Displacement • *Gauging the Weather* (21669) Weather

Title	Description
Fourways Farm Series 2 (continued)	• *Hot and Cold* (21670) Temperature • *Life and Death* (21671) Mortality • *Paws for Thought* (21672) Animal diversity • *Shadow Play* (21673) Light
Getting to Know Shore Birds of Nova Scotia (V0290) 10:13 min., 1989	Written and narrated by J. Shirley Cohrs on behalf of the Nova Scotia Bird Society, this slide-tape video transfer program identifies the common shore birds of Nova Scotia. The program provides a useful introduction to the shore birds that students will likely encounter on a field trip to the beach.
Common Nova Scotia Garden Birds: An Introduction (V0316) 12:23 min., 1989	This program is a video transfer of a filmstrip program. Bird watchers learn how to identify many common birds that inhabit Nova Scotia gardens at varying times of the year.
The Great Cover-Up: Animal Camouflage (22237) 15 min., 1988	Many animals, both common and exotic, owe their existence to camouflage, their ability to escape detection by potential predators, while other animals are unable to escape detection. The program introduces the most important kinds of camouflage and shows some of the ways that animals look like objects in their environment. Other animals are able to make themselves look more formidable and thus avoid predators.
Gus: A Life in the Slow Lane (V2488) 10 min., 2002	This video is a short biography of Gus, the gopher tortoise who is 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 Wildebeats. This program would be useful for classes planning a field trip to the Museum of Natural History in Halifax.
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) 1992	The Life Habitat series offers six 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) • *The Puzzle of the Rotting Log* (22432) • *The Secret of the Pond* (22427) • *What's in Your Backyard?* (22434)

Title	Description
Living and Non-living Things (23328) 12 min., 2000	This short video is intended for students in grades primary–2. Identify and describe the needs of living things, including air, water, and energy from food. Understand how living and nonliving things are different. Recognize that plants are things; see how they meet their needs and how they move, grow, and change. Compare objects at home, in a pond, in a neighbourhood, and on a farm and classify them as either living or non-living. It includes brief liner notes on the video case.
Plants: A First Look (23315) 15 min., 2001	This program provides students 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 back yards. 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. It includes teacher's guide and blackline masters.
Plants in Nova Scotia: Elementary Version (V2429) 10:05 min., 2000	This video is intended to replace a slide set as part of the *Plants in Nova Scotia* school kit of the Nova Scotia Museum of Natural History. The program is an overview illustrating the diversity of native plant life in the province, as well as basic distinctions between its many categories. This version features simplified terms and concepts more suitable for elementary classes. Available in French version (V2431).
Scientific Eye Series 2 (Loan) (S0917) 1986	Components of this series are as follows: • *What Is Life?* (20944) • *Shape and Strength* (20945) • *Seeing and Believing* (20946) • *Plants for Foods* (20947) • *Hearing and Sound* (20948) • *Getting Things Clean* (20949) • *Floating and Sinking* (20950) • *Fitness and Sport* (20951) • *Earth Ltd.* (20952)
See How They Grow (S2199) 180 min., 1996	This series shows animals as they grow from the first hours of life. Components of this series are as follows: • *Desert Animals* (22151) • *Farm Animals* (22152) • *Insects and Spiders* (22153) • *Jungle Animals* (22154) • *Pond Animals* (22155) • *Tree Animals* (22156)

Title	Description
Scary, Slithery Creatures in the Water (23226) 18 min., 1996	Jittery about jellyfish? Scared silly by sharks? Anxious about alligators? Find out why these and other amazing animals don't always deserve their bad reputations. Closed captioned.
Where Do Animals Go in Winter? (23169) 17 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.
What's the Biggest Living Thing? (21059) 11 min., 1987	Impressed with the size of elephants and giraffes in a zoo, Wondercat is curious about what the biggest living thing is. His investigations lead to the discovery that the word "big" needs careful definition. He finds that whales are the biggest animals; but to his surprise, he finds out that trees are the biggest living things. He is reminded that plants are living things too. Study sheet included.

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 each group member:

Collector	Recorder	Reporter	Group Member
• gathers supplies • puts supplies away • cleans up	• asks the group for ideas • writes down the 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 in grades primary–6. Ideally, a student's learning would be assessed every few weeks, and one or more students may be observed during each activity. The child 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 child'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

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 inappropriate planning
0 makes no attempt to solve 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 but collects inaccurate data
1 does not use the appropriate tools
0 makes no attempt to collect data using the tools

Communication of Results

4 concise explanation of method with conclusion based on data collected
3 satisfactory explanation of method with conclusion based on data collected
2 incomplete explanation of method and/or conclusion partially supported by data
1 explanation could not be understood/no reference to data
0 no explanation given/no conclusion given/no data presented

Appendix D: Activities for Exploring the World with Our Senses

The following appendix contains activities that teachers may wish to use or modify to support student achievement of specific curriculum outcomes at the primary and grade 1 level. These activities are noted in column four, Resources/Notes, in each unit on the two-page spread and are intended to supplement other hands-on learning experiences teachers may provide to address curriculum outcomes.

Teachers can also find well-written, easy-to-follow activities and curriculum links to science in the following resources that have been provided to each school:

National Geographic: Windows on Literacy, NSSBB #13150

Science Everywhere, Primary Teacher's Guide, NSSBB #13389

Science Everywhere, Primary Posters, NSSBB #13388

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

Science Everywhere, Grade One Posters, NSSBB #13390

Science Resource Kit Complete Kit, NSSBB #13403

Please note that some of the activities in the above resources are noted in column four in Resources/Notes. Activities from *Science Resource Centre: 240 Learning Centre Activities* are not referred to specifically. 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: Seeing Is Believing

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

Observe student participation in this activity.

Question

What difference do you notice with your eyes closed?

Materials

None required.

Procedure

- Have students together as a class in a circle on the floor (circle time).
- Ask students to close their eyes and describe what they see.
- Have students open their eyes, and after their eyes have adjusted to the light, ask them to tell you what they see.
- Invite students to describe what differences they noticed from when their eyes were closed and when they were opened. Discuss with children, How do we depend on sight?

Activity 2: Camouflage and Colour

Outcomes

Students will be expected to

- select and use materials to carry out their own explorations (200-4)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- ask questions that lead to exploration and investigation (200-1)
- observe, using one or a combination of the senses (201-4)
- follow a simple procedure where instructions are given one step at a time (201-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)

Assessment

- Students are able to describe what they observed.
- Students are able to select a variety of materials to carry out their observations.

Questions

- How were students able to hide their birds?
- What did they learn about camouflage and safety for animals?

Materials

- construction paper with pattern of birds (blue and red)
- variety of tissue paper, red, blue, and any other two colours (cut in 4-cm squares)
- brown construction paper
- glue
- scissors
- paper to mount the tree on

Procedure

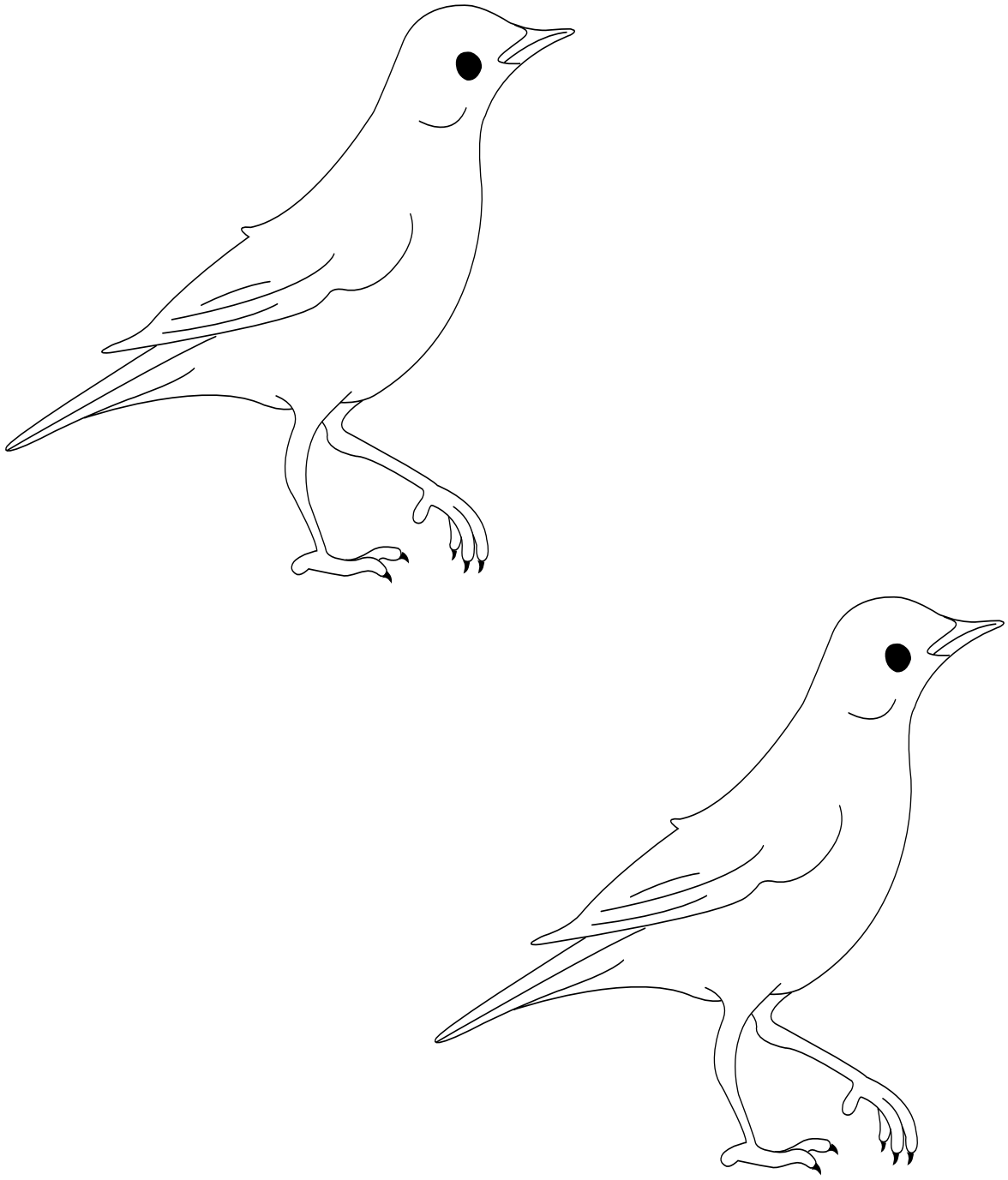
Have the students cut out a red bird and a blue bird. Invite the children to make a tree to hide both birds using any two colours they want for the leaves. Give them a brown strip of construction paper for the trunk of the tree. (The bird cannot go under the leaves.) The teacher should supply tissue paper squares in three or four colours, including red and blue. Discuss which tree best hid the birds and why. How did the colours help to hide the birds?

Animals often use camouflage to hide from their enemies. Can you think of any animals that do this? How does it protect them?

This activity could also be done with other animals in various habitats.

Camouflage and Colour Activity Sheet

A sample of a bird that could be used for this activity.



Activity 3: Our World in Colour

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)

Assessment

Observe student participation in this activity. Does the student use drawing, painting, and beginning writing to record some of the observations made through sight?

Questions

- What would the world be like without colour?
- Can you give an example of different shades of blue (or any other colour) in our world?

Materials

- colour chips from a paint store/hardware store/building supply store or crayons (boxes of 24/64)

Procedure

Provide each student or pair of students with several different colour chips or crayons. Have them walk around the classroom or other designated area and ask them to find something that matches each colour chip or crayon. Have them record their findings on the student activity sheet or in their science journals. Discuss the term “shading.” Discuss with students the many shades of colour in our world.

Our World in Colour Activity Sheet

Draw and colour the item that matched your colours. Use a different box for each colour.

Item:

Colour of Picture:

Item:

Colour of Picture:

Activity 4: Where Did the Colour Go?

Outcomes

Students will be expected to

- select and use materials to carry out their own explorations (200-4)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- ask questions that lead to exploration and investigation (200-1)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

- Students are able to describe what they observed when viewing objects using different transparent colours.
- Students are able to describe their observations.
- Students are able to select a variety of materials to carry out their observations.

Questions

- What words did the students use to describe what they observed?
- What did they notice changed when looking at objects with their colour viewers?

Materials

- food colouring
- rectangular or square transparent plastic containers with lids
- water
- optional: colour filters (from Spectrum Scientific)
- coloured cellophane name-tag holders (without pins)

Note: *There are a variety of materials to choose from.*

Procedure

Place a few drops of food colouring in the plastic container. Add water and put the lid on the container. Have the students look through the sides of the container. Invite the children to move about the classroom or outside using their new looking glasses. Challenge them to look at a variety of different coloured objects. Have them draw what they observed with and without the looking glasses. Ask the students to describe what happened. What caused some objects to seem to disappear? How could this affect which clothes to wear at night so that automobile drivers will see you?

Animals often use camouflage to hide from their enemies. Can you think of any animals that do this? Discuss these questions with your students.

Activity 5: See-Through or Not

Outcomes

Students will be expected to

- observe, using one or a combination of the senses (201-4)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

Students should develop an understanding of the concepts "being able to see through" and "not being able to see through."

Questions

- What did you notice were the differences between objects in relation to being able to see through them or not?
- How did you sort your objects?

Materials

- objects that can be seen through and objects that cannot—plastic pop bottles, clear plastic bags, pop cans, paper, wax paper, paper towel rolls, plastic wrap, aluminum foil, plastic tubs and lids
- attribute hoops/sorting rings

Procedure

Ask children what they think the concepts "see-through" and "not being able to see through" mean. Put their responses on chart paper or on the board.

Divide the students into groups. Give each group a variety of materials and ask them to see if they can see through them or not. Have them sort the objects using the sorting rings. During the activity ask groups to tell their sorting rule.

As a whole group, ask students to share the variety of sorting rules they used. Bring in the terms **opaque** and **transparent** (students should not be expected to know these terms, but they should be exposed to them). They could be used along with pictures to illustrate their meaning. Have students discuss things they can and cannot see through in the world around them. Take them on a walk around the building.

Activity 6: Let's Look at Leaves, Feathers, and Shells

Outcomes

Students will be expected to

- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- select and use materials to carry out their own explorations (200-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)

Assessment

- Note the student's ability to use the magnifier
  - varying the distance from the eye
  - varying the distance from the object
  - the technique used to hold the magnifier
- Is the student able to describe and draw the differences seen when using a magnifier compared to not using one?

Questions

- What happened to the size of the leaf when you looked at it through the hand lens?
- Were the colours the same or different?
- What did you notice about the leaf when you looked at it with the hand lens compared to looking at it with only your eyes?

Materials

- plastic hand-held magnifiers or lenses from the bug viewers
- leaves, shells, or feathers
- plain paper
- crayons

Procedure

Invite students to go outside with you and to get a leaf or leaves that have fallen from trees. Have them look at a leaf (leaves) without a magnifier. Have them describe and draw what they see.

Provide magnifiers and have students look at the leaf (leaves) again. Ask students what they can see now. What have they noticed has changed?

Have them draw the leaf (leaves) as they observed them using a magnifier. You may wish to do the same activity using feathers and/or shells.

Discussions could be carried out around questions that include the following:

- What differences did you notice when looking at the spots and lines on the leaves with the hand lens?
- What other objects could you observe with the magnifiers?
- Were the leaves different shapes?
- Who might need to use a magnifier?
- Can you think of when it might be useful to have a magnifier? What might a scientist use a magnifier for?

Extension

Have students do a leaf rubbing using crayons and plain paper. Invite students to explore the classroom looking at small things in a new way using a magnifier.

Ask students what they can learn by using a magnifier. Make a class list of things they would like to view using a magnifier.

Let's Look at Leaves, Feathers, and Shells Activity Sheet

Object being observed: _____

Without a magnifier
With a magnifier

Activity 7: Making the World Larger

Outcomes

Students will be expected to

- observe, using one or a combination of the senses (201-4)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)

Assessment

- Note the student's ability to use the magnifier correctly. The student should be able to focus the magnifier by varying the distance from the eye and the distance from the object.
- Is the student able to describe and draw any differences seen when using a magnifier compared to not using one?

Questions

- How close/far away do you need to hold the magnifier to be able to best see an object?
- Can you describe what you see?

Materials

- plastic hand-held magnifiers or magnifiers from bug viewers (class set or enough for groups of two)
- various objects to observe

Procedure

Ask the students to look at the objects carefully and tell the class or their partners what they saw. Have them draw what they saw on the student activity sheet provided or in their science scribblers or journals. Provide the students with plastic magnifiers, and ask them to look at the same objects and materials again. Have them describe the differences they observed (looks large, more detail ...). Have them draw what they saw on the student activity sheet provided or in their science scribblers or journals.

Teacher Note: *Allow the students to experiment with the use of the magnifier before they begin their observations. Using the magnifier is sometimes a difficult task for students, and a demonstration might be useful. They need practice in focussing on an object. Discuss with the students where magnifiers might be used.*

Making the World Larger Activity Sheet

My objects using only my eyes	My objects using a magnifier

Activity 8: Strange Sounds

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- manipulate materials purposefully (201-2)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

In group discussion time and in individual conversations, note the types of words and phrases the student is using to describe different sounds. Is there evidence of the student's vocabulary related to sounds growing to include words such as quiet, soft, faint, noisy, low, bass, and deep?

Questions

- What does it sound like?
- Which ones sound the same?
- Which container makes the loudest sound?
- Which container makes the softest sound?
- Which containers hold many objects?
- Which containers hold a few objects?

Materials

A set of opaque plastic or metal containers, each filled with a different object or substance that will make a sound when the container is shaken; suggested items could include sand, gravel, small spherical rocks (pea gravel), different types of dried beans and seeds, cotton balls, marshmallows, an eraser, small plastic toys, small metal objects (washers, bolts, screws), and keys

Procedure

This activity can be used as a self-selected and as a teacher-directed activity.

The goal here is to describe the mystery sound and to develop vocabulary, not to guess what is inside each container.

Sound words should be listed on the board, chart paper, or on a separate sheet that the class is developing for sound words.

Activity 9: Scrapers and Clappers

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- manipulate materials purposefully (201-2)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

- Students are able to describe sounds that they create.
- Students are able to sort materials based on the sounds they make.

Questions

- How did you sort the materials?
- What vocabulary was used to describe the sounds?

Materials

- a variety of materials that make various sounds
- sandpaper blocks
- combs
- corrugated cardboard
- aluminum pie plates
- pot covers
- plastic
- aluminum foil
- stones
- wood
- digital camera

Procedure

The purpose of this activity is to continue to give students experience with sound and building a "sound" vocabulary.

Discuss with students the words scrapers and clappers. Have students work in groups. Give each group a variety of materials to make sound with. Have students describe the sounds. Have the students sort the materials into scrapers and clappers or into groups of materials that make similar sounds.

Make a vocabulary list of sound words. Use a digital camera to take a picture of the object that made the sound and put the picture by the word. Discussion questions after the activity could include the following:

- What does the sound remind you of?
- Which scrapers or clappers make the loudest sound?
- Which makes the quietest sound?
- Could you use materials in a different way to change a sound from quiet to loud?

Activity 10: Name That Sound

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Assessment

Observe the student's ability to observe and describe characteristics of various mystery sounds. Assess the student's ability to record observations through pictures.

Questions

- How do sounds help us in our world?
- Can you match a sound to its object/animal?

Materials

- a tape or tapes with common sounds that children hear in their everyday lives

Procedure

This activity can be used with a group of students, as a station in centres, or as a class. Have students listen to the tape. Have them discuss what sounds they think they hear and the item that would make the sound. For a class discussion, the teacher could write the name of the items that made the sounds on the board. As a group, students could discuss the sounds together and report their findings to the class or teacher. The activity sheet could be used for students to draw the items that made the sounds. After class discussions and words are put on the board, students could label the items on their activity sheets.

Name That Sound Activity Sheet

Pictures of the item that made the sound	Word that names the item

Activity 11: The Mystery Sound Box

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Assessment

- Students are able to describe the sounds made in the mystery box.
- Students are able to use their previous knowledge to guess what the object is that made the sound.

Questions

- Where have you heard this sound before?
- What sound did you hear?
- Can you think of a good word to describe/tell the sound the object made?
- What vocabulary did the students use to describe the sounds the objects made?

Materials

- materials that make various sounds
- wind-up toy
- tin can
- drum
- glass bottle
- plastic bottle
- two objects being rubbed together

Procedure

Make a mystery sound box out of cardboard. Make a hole in it where you can hide your object and put your hand to the object to make a sound. You may wish to use a tissue box. This activity could also be used using a puppet theatre where the sound is made behind the curtains.

Make sounds using various objects. Ask students to describe each sound and what they think it is. Descriptive words could be added to the "sound" vocabulary chart.

Students could be given the opportunity to choose an object and to talk about the sounds it makes.

Activity 12: A Smell Chart

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)

Assessment

Observe students' ability to observe and communicate their experiences with others.

Questions

- What would the world be like without the sense of smell?
- What problems would there be?

Materials

- chart paper

Procedure

Take the class on a walk around the school (inside and out) and in a wooded area, field, or water near the school (if available). When the students come back to class, discuss the word "smell," what it means, and how we are able to smell things. Ask them to imagine what the world would be like without smell. Discuss their responses.

Create a smell chart for the sense of smell. Ask students for words or phrases to describe what they were able to smell on their walk. Add these words to the smell chart. New words and phrases should be added to the chart as the students develop them. At the start of this unit teachers should demonstrate to students how to smell. This proper procedure should show students how to waft the odour towards them in order to smell it.

Activity 13: Smells I Like

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)

Assessment

- Students are able to describe smells they like.
- Students are able to build on their smell vocabulary through discussions.
- Students are able to sort the smells into different categories.

Questions

- What words do students use to describe smells they like?
- Which groups of smells are liked more than others?

Materials

None required.

Procedure

This activity is set up to build on students' vocabulary of words to describe smells. Students should be given the opportunity to describe smells that are pleasant to them. These could then be put in categories and made into a class pictograph. Descriptive words used to describe smells should be added to the smell chart for the class.

Students could draw pictures of places and items that make their favourite smell. These could then be labelled with the smell that describes them. Use shared reading as an opportunity to introduce labelling as a textual feature of non-fiction.

Activity 14: Name That Flavour

Outcomes

Students will be expected to

- observe, using one or a combination of the senses (201-4)
- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

Students will be able to observe and describe characteristics of various smells.

Questions

- Does this smell remind you of another food with this flavour?
- Did the flavours of Kool-Aid have the same smell as the actual fruit they represented?

Materials

- three or four flavours of Kool-Aid (strawberry, lime, grape, orange)
- flour
- salt
- water
- vegetable oil
- resealable plastic bags
- paper bags

Procedure

The teacher or parent volunteer should make several kinds of play dough using various flavours of Kool-Aid. Put a sample of each flavour in a cloth or paper bag and pass it around. Students are asked to use their "super noses" to name the flavour and guess the colour.

Kool-Aid Play Dough

1/2 cup salt
2 1/2 cups flour
2 pkg. Kool-Aid
3 Tbsp oil
2 cups boiling water

Mix dry ingredients. Add oil and water and knead. Store in airtight plastic bags/containers. Refrigerate to cool.

Discussion questions could include

- What sense(s) did you use?
- Which smell did you like best?
- How did the colour help you guess the flavour?
- What would happen if you tried to smell two at the same time?

Students could use the play dough to make various geometric solids or shape it into the fruit the flavour of Kool-Aid represented.

Activity 15: Smell Jars

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)

Assessment

Observe the student's ability to observe and communicate their experiences with others and to use personal observations when asked to describe characteristics of materials.

Question

How do you react to different smells?

Materials

- baby food containers or film canisters to make smell jars
- cotton balls
- scented liquids (detergent, vinegar, cloves, peppermint flavouring, vanilla, lemon, or almond extract, etc.)

Procedure

This activity can be done as part of a centres approach to learning or in groups. The number of smell jars required depends on how the activity is set up. Since some of the liquids may be coloured and may colour the cotton ball, wrap the baby food containers in construction paper or use dark film canisters. Invite students to conduct a variety of explorations with smell jars.

They can smell each using the waving technique and describe what they smell in terms of "This smells like ..." They might group the jars in categories such as "smells I like and smells I don't like" or "smells like food and doesn't smell like food."

Remember to add new phrases and words to the smell chart.

Activity 16: Smells in Different Places

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)

Assessment

- Students are able to describe smells they have experienced in different places.
- Students are able to describe the differences in the smells, including ones they liked and didn't like.

Questions

- How can the sense of smell help us know where we are?
- What was the place that had the smell you liked the most?
- What was the place that had the smell you liked the least?

Materials

- pictures of various locations within your community
- pictures of various places within the school
- pictures from within a home

Procedure

This activity can either be done within the classroom setting using pictures to help students visualize places they have been or students could be taken on walks or class trips to various areas. Students could walk to a local grocery store, a farm, a bakery, a deli store, a garage, the ocean, or a lake.

Have students discuss the smells they experienced at different locations. The words that students use could be put beside the picture. This will help students to remember the words and to put meaning to them. Have them discuss how smells can help them know where they are.

Activity 17: Safety and Smell

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)

Assessment

Students are able to describe how smells help them to be safe.

Question

How can smells help us to be safe?

Materials

None required.

Procedure

Students will have an understanding of the term **smell** and the various smells that they experience. This activity could take place as a group or class discussion. Students should be given the opportunity to give examples where the sense of smell has helped them to be safe. One example which may be presented is that of burning food. Students should be allowed to share their experiences. Students could illustrate their discussions and write a sentence about the picture.

Activity 18: Taste Vocabulary

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)

Assessment

Students are able to reflect on their previous experiences to develop a taste vocabulary.

Questions

- How do we know if we like a particular food or not?
- What words do we use to describe the taste of food?

Materials

- chart paper

Procedure

This is an introductory lesson to begin the activities for the sense of taste. As a whole group, discuss with students the sense of taste and how it is used to help decide if they like a particular food or not. Have students give words they use to describe taste. The list should be posted in the classroom to be added to as further lessons are completed on this sense. Pictures of particular foods could be posted on the chart beside descriptive words for taste.

Students can draw a variety of pictures to display for this activity. This could be linked to health education outcome B1.3 on healthy eating. Or groups can cut pictures from magazines.

Activity 19: A Tasting Party

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- manipulate materials purposefully (201-2)

Assessment

- Students are able to describe food by its taste.
- Students build on their vocabulary for words to describe taste.
- Students are able to distinguish foods by their taste.

Questions

- How are you able to tell/guess food by its taste?
- What words did you use to describe the taste of the food?

Materials

- various types of fruit

Procedure

In any lesson on taste one must make sure that students do not have allergies to particular foods. The teacher must make sure that fruit is washed before students eat it. Parent volunteers could have the fruit plates made up prior to the class. Students could be asked to bring in fruit from home. One could also limit the fruit to different varieties of apples.

Have students taste the different types of fruit. Have them decide which fruits they like and which they do not like. The results could be graphed using concrete graphs (students lining up behind the fruit they like and do not like). Have students give examples of how they described the taste of the fruit.

This activity could be done several times limiting the variety of fruit each time or by using other types of food (e.g., cereal, crackers).

Activity 20: Mystery Jars

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- manipulate materials purposefully (201-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Assessment

Note the types of words and phrases the student is using to describe different tastes.

Question

Are there tastes you like better than others?

Materials

- baby food containers
- cotton swabs
- tap water
- sugar solution (15 mL of sugar to every 200 mL of water)
- concentrated lemon juice solution (several drops of concentrated lemon juice added to water)
- water and peppermint extract solution

Procedure

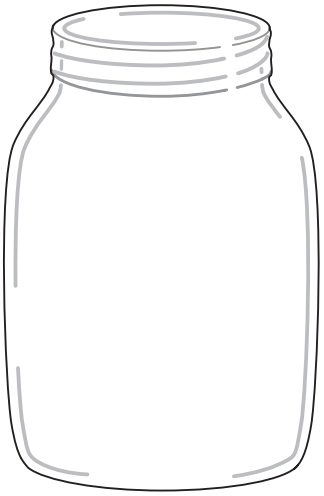
This activity can be done as part of a centres approach to learning or in groups. The number of taste jars required depends on how the activity is set up. Number each bottle for ease of identification. Distribute the sets of jars to the students (teachers find strawberry boxes are a convenient storage unit for four containers of liquid). Ask students to taste each liquid in turn by using a cotton swab dipped in the liquid.

In their groups have students tell each other what taste they noticed in each jar. Were there tastes they liked better than others? Why is taste important to us? Ask students to make a group recording chart to show the tastes by the number of the bottle. You may wish to use the student activity sheet for this activity. As a class, discuss the safety issues behind not tasting things that adults say are not safe. This could be linked to health education (outcome B2.1).

Mystery Jars Activity Sheet

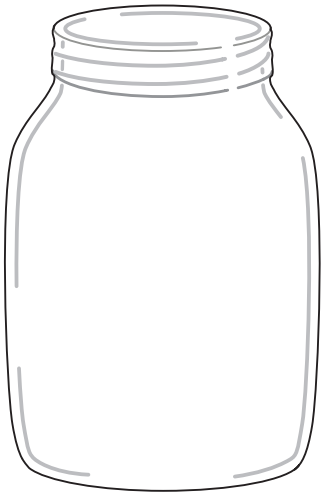
Record the name of the taste you think is in the jar and/or draw a picture.

1

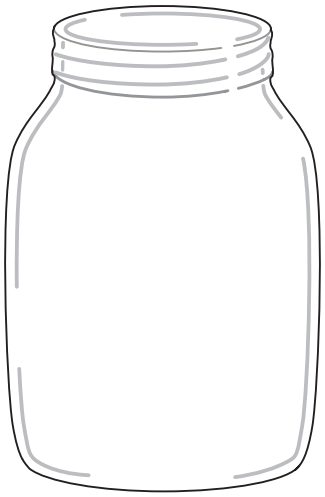


2

3



4



Activity 21: Sweet Treats

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- observe, using one or a combination of the senses (201-4)
- ask questions that lead to exploration and investigation (200-1)

Assessment

Students are able to make observations using the senses of sight, touch, taste.

Question

What words did students use to describe the taste of the raisins and grapes?

Materials

- fresh grapes
- raisins

Procedure

Ask the students, Who has tasted a grape and or raisin before? How many people like grapes and/or raisins? Make a graph to show the students' responses.

Have each student taste a grape and a raisin. Have students describe the taste of each. Write students' responses on chart paper. Ask students what they know about grapes and raisins. Bring forth the concept that grapes and raisins are the same fruit. Compare how they changed based on the five senses. Further discussions could be based around the following questions:

- What do they look like, feel like, and smell like?
- What would have to happen to change a grape into a raisin?
- How do the grapes and raisins look the same?
- How do they differ in taste, appearance, texture, smell, and size?
- Which is the sweeter, grapes or raisins?

Cut a raisin and a grape in half. What do they look like? How are they the same? How are they different? Which one contains more water? How could we find out? Students could be given the opportunity to let grapes dry out and observe what happens to them.

Activity 22: Tasting without Seeing

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

- Students are able to distinguish foods through the use of taste and touch.
- Students are able to describe the taste of the food to help decide what it is.

Questions

- How did the sense of touch help you to decide what the food was?
- How did the sense of taste help you decide what the food was?
- Was it easier or harder to guess the food without being able to look at it?
- Can the shape of a food item in your mouth help to identify it?

Materials

- various types of fruit
- various types of crackers
- various types of cereal

Procedure

⚠ **Caution: In any lesson on taste one must make sure that students do not have allergies to particular foods. When using a blindfold in this activity, teachers should be aware that wrapping cloth around a child's head and then using it on another child could lead to the transfer of lice. Caution needs to be taken as to the type of blindfolds being used or shared.**

This lesson can be done as a small-group activity or a learning centre activity that children go to at different times throughout the day. Have a few different varieties of a particular food set up at a table. Have the students try to distinguish the food by using their tongues. Are they able to distinguish it by the touch of the tongue? Then have the students chew the food and try to distinguish what it is. Follow up with a discussion on how our senses operate together to help us get to know the world around us.

Activity 23: Developing a Touch Vocabulary

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- manipulate materials purposefully (201-2)

Assessment

Students demonstrate and extend the vocabulary they use to make observations. Note the types of words and phrases the students are using to describe different textures.

Questions

- What is the reason for us to have the sense of touch?
- How does this sense help to protect us?

Materials

- sandpaper
- paper
- fabric
- foam
- vegetable oil
- scissors
- damp cloth
- cotton ball
- stone
- pine cone
- additional materials as suggested in procedures

Procedure

Whole-class introductory experience: Develop a touch chart and add words and phrases as students develop them. Some touch words that may be suggested could include flat, wet, moist, damp, dry, crisp, firm, flabby, gummy, sticky, woolly, spongy, velvety, furry, silky, soft, cold, cool, chilly, hot, warm, sleek, slippery, slimy, greasy, oily, rough, bumpy, jagged, pointed, and sharp. Provide experiences with a wide variety of objects and materials to ensure that students have the opportunity to use the kind of vocabulary suggested here. Take the students outside to expand their experiences with touch. Discuss safety issues in doing this.

Teacher Note: *You may wish to use a digital camera to take pictures of the objects used and place them by the vocabulary words developed.*

Activity 24: How Does It Feel?

Outcomes

Students will be expected to

- observe, using one or a combination of the senses (201-4)
- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- manipulate materials purposefully (201-2)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- identify common objects and events, using terminology and language that others understand (203-2)

Assessment

Students are able to describe objects according to their texture.

Questions

- How could you tell what an object was by its texture?
- In what ways does our sense of touch help us?

Materials

- cardboard boxes with a cut out hole (see picture example)
- everyday objects with different textures such as a ball, an eraser, a pinecone, shells

Procedure

Let students take turns reaching into the box to identify the object. You could use a tissue box. They should keep their guesses to themselves. Ask students to describe what the object feels like and, when asked, what the object might be.

Remove the object for everyone to see. Review words students used to describe the object. Were they good choices to help someone else guess? Repeat the activity until everyone has a turn.

Have students take their objects and discuss with them what other things might have the same texture. Make a list on the board. Discuss with the students why the texture of an object is an important way to describe or identify objects.

Activity 25: Picture the Texture

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

Note the students' rubbings and how they use vocabulary to describe them.

Question

How might a scientist or the police use a form of texture rubbings?

Materials

- crayons
- bond paper
- objects from the texture collection

Procedure

Have students choose an item(s) they wish to do texture rubbings on. Take students outside to make rubbings of tree bark, licence plates, leaves, etc. Explain the process for doing it. Have them record the name of the object and its texture on their rubbing.

Teachers may wish to use the student activity sheet for this activity or have students put their work in a class or individual booklet.

Picture the Texture Activity Sheet

Name of object:
Texture:

Name of object:
Texture:

Activity 26: Sorting with Our Senses

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- follow a simple procedure where instructions are given one step at a time (201-1)
- observe, using one or a combination of the senses (201-4)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)

Assessment

- Students are able to sort a variety of items using their senses.
- Students are able to communicate their reason for how they sorted their items and what sense or senses they used.

Questions

- What sorting rule did you use?
- What senses did you use to sort the objects?

Materials

- a variety of materials such as screws, spiral pasta, pasta in various colours and shapes, paint chips or crayons to match the pasta
- sorting rings

Procedure

This activity is just one of many that could be used to have children use a variety of their senses. From these activities children should have a better understanding of how we depend on a variety of our senses to do things.

Give the students a container of objects and have them sort them using their senses. Review with them the senses they could use. Have several groups use the same items and see how they sort them. Ask, What senses did you use to sort your items? Are there other ways you might have sorted them using another sense?

Have students share their collections with the whole class and have them explain what they did and the sense(s) they used.

Activity 27: Size It Up

Outcomes

Students will be expected to

- observe, using one or a combination of the senses (201-4)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- manipulate materials purposefully (201-2)
- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)

Assessment

- Students are able to compare objects according to height.
- Students are able to compare objects according to size.
- Students are able to compare objects according to how heavy they are.

Questions

- What were some different ways you sorted the objects?
- What senses did you use to sort them?
- What attributes did you use?

Materials

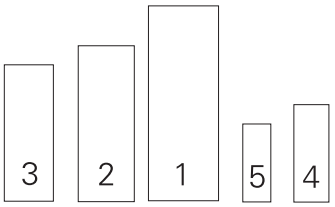
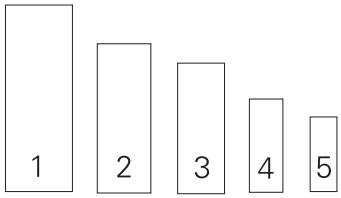
- cardboard tubes of various sizes
- objects with various weights/mass (cotton balls, pennies, cereal)
- balls of various sizes
- 2-L pop bottles
- pencils of various lengths
- boxes of various sizes
- egg timer
- science journal or activity sheet
- painted sunglasses, blindfolds* (Halloween masks), hands to cover eyes.

Caution: Sharing cloth blindfolds or any items that are put around hair is not suggested due to the possibility of transferring head lice from one student to another.

Procedure

- In advance, cut cardboard tubes into different lengths. Place objects of various weights (mass) in margarine containers. Fill 2-L pop bottles with different amounts of water. Organize six stations:
  - Station 1: Cardboard tubes numbered from shortest to tallest.
  - Station 2: Balls numbered from smallest to largest.
  - Station 3: Margarine containers numbered from lightest to heaviest.
  - Station 4: Pencils numbered from smallest to largest.
  - Station 5: Boxes numbered from smallest to largest.
  - Station 6: Pop bottles numbered from lightest to heaviest.
- Students are placed in pairs. One student has his/her eyes covered and is asked to compare one set of the objects according to height, size, or weight (mass). The other student records the number sequence in either the science journal or on a recording sheet.
- Students discuss their sorting pattern and the sense(s) that they used.
- Roles are then reversed.

Size It Up Activity Sheet

Object	Property	My Sequence	Actual Sequence
Example: Blocks	Height		

Activity 28: Walking through Our Senses

Outcomes

Students will be expected to

- observe, using one or a combination of the senses (201-4)
- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)

Assessment

Students are able to describe what they see, hear, smell, and feel.

Questions

- What senses did you use to describe your walk?
- How did you feel about the world around you?

Materials

- activity sheet (optional)
- clipboards

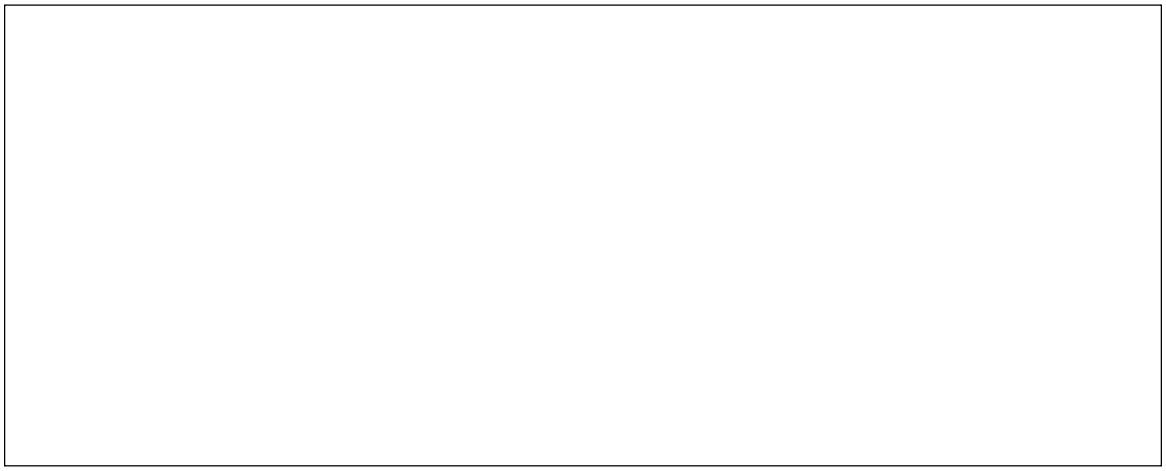
Procedure

Discuss changes that occur in the fall. Take the students on a fall walk to explore their environment. Have them record their findings on the activity sheet or in their science journals. Have them bring back to the classroom items they find (leaves, pine cones). Have them describe the articles using their senses.

In the classroom, develop a fall word chart using the words the students used. Have students draw their favourite fall object that they saw. Have them label a display with some of the objects they have brought in.

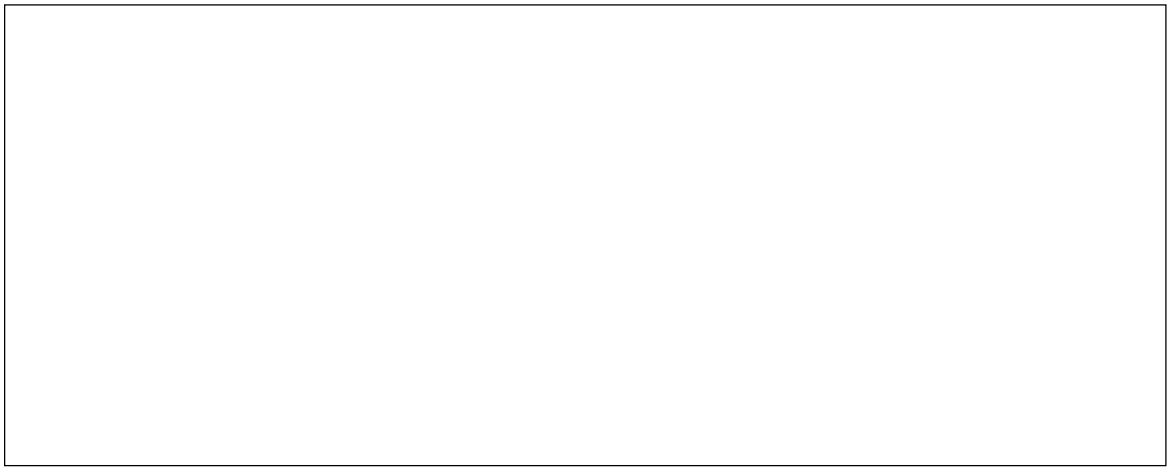
Walking through Our Senses Activity Sheet

On my walk, I saw _____.



It was _____.

On my walk, I saw _____.



It was _____.

Activity 29: Using Our Senses

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- follow a simple procedure where instructions are given one step at a time (201-1)
- observe, using one or a combination of the senses (201-4)
- communicate questions, ideas, and intentions while conducting their exploration (203-1)

Assessment

- Students are able to sort objects based on their colour.
- Students are able to sort objects based on how they feel.

Questions

- What sense did you use to sort the objects by colour?
- How were you able to sort the objects using the sense of touch?

Materials

- sealable plastic bags
- clear plastic bottles
- sand (white, dark), flour, salt, cinnamon, sawdust, rice (brown), cornmeal, oatmeal
- hand magnifiers
- pan balances
- attribute hoops/sorting rings

Procedure

Create a collection of materials such as flour, salt, sand, sugar, cinnamon, sawdust, rice, barley, and oatmeal. Place each item in a small sealable plastic bag. Make another set in clear plastic bottles. Discuss with students words they have used while exploring with their senses. Point to the words around the room or make a new list of words.

Give students hand magnifiers to examine the different materials. Have them describe the materials by looking, touching from the outside of the bag, and shaking the bag to listen. Depending on the development of the students, have them record words or phrases by using words from the class senses chart. Have cards with various sense words on them and have students match the materials to them. Have the students sort the materials according to colour and texture.

Have the same materials in plastic containers (each plastic container should be filled to the same level). Have students match the materials based on how they look. Have them explain what they did and how they made their decision. Have them sort the plastic containers from heaviest to lightest (you may wish to use balances to compare them).

Discuss with students what senses they used. Have them predict what each material was and then tell them what they were. Discuss with students where they would see these materials, where/how they are used, and where they came from. Have pictures showing the item with either where it came from, or how it is used, or the package it came in.

Activity 30: Seed Collection

Outcomes

Students will be expected to

- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- identify common objects and events, using terminology and language that others understand (202-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Assessment

- Students are able to use a variety of senses to distinguish the different characteristics of seeds.
- Students are able to sort the seeds into different groups and explain their sorting rules by using a variety of senses.

Questions

- What senses did you use to describe the seeds?
- How were you able to sort the seeds by using your senses?
- What similarities did you notice in the seeds when you observed them?
- What differences did you notice in the seeds when you observed them?
- Where have you seen seeds before?

Materials

- various types of seeds (acorns, pinecones, chestnuts, seeds from apples and oranges, vegetable or flower seeds, etc.)
- attribute hoops/sorting rings

Procedure

Place a variety of seeds on paper plates or in plastic containers. Have students take turns describing the seeds, how they feel, how they smell. Have students sort the seeds by allowing them to use their own sorting rules. Ask them to explain their rules. Ask students if there is more than one way to sort the seeds. Give them opportunities to use a variety of sorting methods and senses. Another option is to give the sorting rule

and see if students are able to sort the seeds according to the instructions. Invite them to draw and describe how seeds feel, smell, look, in their science journal.

Seeds such as bird seed can be used to make picture mosaics. Students should be given an opportunity to make designs using seeds and glue.

Activity 31: Liquid Collection

Outcomes

Students will be expected to

- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- identify common objects and events, using terminology and language that others understand (202-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Assessment

- Students are able to use their senses to make observations about a variety of liquids.
- Students are able to sort a variety of liquids using their senses.

Questions

- What senses did you use to make your observations?
- What sorting rule did you use to sort the liquids?
- How were the liquids the same?
- How were the liquids different?

Materials

- clear pill bottles
- ketchup cups
- liquids (dish detergent, vinegar, corn syrup, syrup, water, or water with food colouring)

Procedure

Have a variety of liquids in clear pill bottles with caps (these can be purchased at a local pharmacy). Have students observe the liquids by looking at them through the pill bottles. Have them describe how the liquids are different and the same. Students should then be given the opportunity to pour a small amount of each liquid into different ketchup cups. Have them use their senses of touch and smell to describe the characteristic of the liquids. Discussions could take place on how by using more than one sense they could make greater observations about the liquids. Have them try to decide what the different liquids are. Have them sort the liquids by using one or more of their senses.

Appendix E: Activities for Exploring Sand and Water with Our Senses

Activity 32: Let's Explore!

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Assessment

A record of students' observations during this investigation time should include comparisons, questions asked about sand (I wonder if ...? I wonder how ...? I wonder why ...?, I wonder what would happen ...?), and use of vocabulary introduced during more structured investigations.

Questions

- In what ways can you mould sand?
- How easily does the sand pour? Can you do anything to help?

Materials

- sand table
- plastic containers of different sizes and shapes
- sieves
- scoops, shovels, and rakes
- toy dump trucks
- ramps/chutes
- seashells and other items to make imprints in sand

Procedure

Students should have time to freely explore the properties of sand such as how it pours, takes shapes, moulds, flows, and so on.

Extension

- Students can create sand sculptures using damp sand.
- Students can design and create castles using containers and moulds.

Activity 33: Let It Pour

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)

Assessment

- What characteristics does sand have that helps it pour?
- What evidence is there that the sand pours?

Questions

- How does the sand pour?
- Does using your hands make a difference in the pouring?
- Do tools help the sand pour in different ways?
- What observations can you make about sand pouring?

Materials

- dry, clean sand
- sieves
- funnels
- plastic pan

Procedure

Connections to the senses should be made as students experience pouring dry sand. Students can use their hands and other implements to make patterns in the sand. A comparison to Japanese garden designs could be made.

To extend this activity, students could try pouring sand through various dimensions of sieves to compare with each other and with pouring through their hands. A further extension could be made by using sands of different coarseness to compare textures, looks, and sounds made.

Extension

Students make designs with glue then sprinkle with sand to have the sand make a design. Use a pendulum funnel to allow the motion of a pendulum and flowing sand to create patterns.

Students could create patterns and designs by layering coloured sands.

Activity 34: Wet Sand

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)

Assessment

- What evidence do you have to support your observations?
- What inferences can you make?

Questions

- What does sand feel like? pour like? sound like?
- Does wet sand and dry sand pour the same? feel the same?

Materials

- shallow, plastic pans
- 250-mL milk containers
- shells and other small, patterned objects
- resealable plastic bags

Procedure

Allow students to make comparisons and to observe using several senses. Teachers should generate a three-columned chart to compare pouring, feel, sounds made, and ability to hold shape of dry, damp, and wet sand. Comparison to occurrences in nature allows students to make real-world connections.

In addition to these activities, students can investigate how much water is needed to make the sand hold its shape by adding different amounts of water to sand and creating a moulded or sculptured shape.

Extension

There are several art activities involving sculpting, moulding, and patterns that would fit with this activity. Teachers can investigate some sand castle and sculpture events on the Internet to show students how other artists use sand as a sculpture medium.

Students can create a plaster cast of their hand print. Shells or other small items can be used to make prints that can also be cast in plaster.

Students can design and create patterns of sand and rocks in the style of a Japanese garden.

Activity 35: Exploring Dry Sand

Outcomes

Students will be expected to

- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)

Assessment

- Students are able to use fine motor skills to change the flow of sand as it is released from their hands.
- Students are able to communicate through oral language what they observed.

Questions

- What happens to the sand as it is released from your fingers/hand?
- What types of patterns does the sand make on a flat surface?
- How does the sand move?
- What does the sand feel like?

Materials

- sand and water tables
- buckets
- glue
- paper
- flat surface
- sand

Procedure

Invite students to talk about experiences they have had with sand: where they have had these experiences, with whom, and what they like or don't like about sand. Have students explore dry sand, working in groups of two or three. Have them feel the sand and describe how it feels.

Have students pour sand from their hands using various methods (pouring as a funnel, small amounts, large amounts, between their fingers). Have them describe what happens to the sand as it falls.

Have students try to build a hill by pouring the sand with their hands. Have students spread sand over a flat surface. Discuss with the students words that they used to describe their experiences. Build a list of vocabulary words and have it posted in the classroom.

Have students draw a picture. Have them put glue along the outline of the picture. Then have them pour sand over the glue. After the glue has dried have the students pour off the excess sand.

Activity 36: Wet and Dry Sand

Outcomes

Students will be expected to

- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)

Assessment

- Students are able to distinguish the difference between wet and dry sand.
- Students are able to communicate through oral language what they observed.
- Students are able to work co-operatively.
- Students are able to use a balance to observe the difference between wet and dry sand.

Questions

- What did you notice about the wet sand compared to the dry sand?
- What did you notice about the heaviness of the wet sand compared to the dry sand?

Materials

- sand and water tables or buckets
- dry sand
- wet sand
- balances
- shovels or cups for transferring sand

Procedure

Have students describe their experience with sand at the beach. Have two containers of sand for each group of two to four students. Have two balances for each group of four students. Have the students feel the wet sand and the dry sand. Ask them to describe any differences they noticed. Place their observations on the board or on chart paper.

Have the students fill one side of the balance with wet sand and the other with dry sand. What do they notice happened to the balance? Was one side heavier than the other, if so, which one? How could you tell? Ask students to discuss what they observed and what they thought caused it to happen. What made the sand heavier? Does it matter if sand is packed down? What could you could do with wet sand that you couldn't do with dry sand? This type of discussion will lend itself to further activities using wet sand. Brainstorm further exploration with sand. Chart ideas.

Activity 37: Piling and Tilting

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)

Assessment

- Students will be able to observe, illustrate, and discuss investigations using sand to make various forms.
- Students will be able to discuss what happens to sand when it is tilted and moved from side to side.
- Students will be able to distinguish the difference in results when using wet and dry sand as they do the activities.

Questions

- What happened to the dry sand as you tried to pour more on top of the mound it made?
- How did the wet sand react differently from the dry sand?

Materials

- sand
- objects to pour sand
- sand table
- trays
- containers to hold sand
- water
- buckets or bowls

Procedure

Have students work in groups. Give students sand and containers to pour it with. Have students pour dry sand from a container into a bucket or bowl. Have them describe what happened to the sand. Then have them pour more sand on the pile. Have them describe and illustrate what happened. Do the same using wet sand, and have students discuss and record the differences between using wet and dry sand. Discuss with students experiences they have had at a beach, and relate those experiences to the activity they just completed. Is it easier or harder to make a castle with wet or dry sand? Have students spread dry sand over the bottom of a tray. Have them tilt the tray and discuss what happened to the sand. Do the same activity using wet sand. Have students discuss the differences between the wet and dry sand. Discuss with students the concept of movement of sand along a beach. Do you think having rocks/shells/grass on a seashore is helpful? As an art activity, students could draw/create a sandy beach scene.

Piling and Tilting Activity Sheet

Illustration of my mound of dry sand

Illustration of my mound of wet sand

Activity 38: Sand and Chutes

Outcomes

Students will be expected to

- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)
- observe, using one or a combination of the senses (201-4)

Assessment

Observations and science logs are suggested.

Questions

- Which chute moved sand through easier for each type of sand?
- How did you know?

Materials

- fine sand
- coarse sand
- funnels
- 500-mL or 2-L drinking bottles or milk cartons
- small plastic containers

Procedure

Students can investigate different sands and different chutes. Sand chutes could be made by cutting the ends of various sizes of plastic drinking bottles or milk cartons. The idea of the angle or the length of the chute may occur to students as they investigate and could be discussed when making comparisons.

Activity 39: The Difference in Sand

Outcomes

Students will be expected to

- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)
- observe, using one or a combination of senses (201-4)

Assessment

- Students will be able to observe, illustrate, and discuss investigations using different types of sand.
- Students will be able to distinguish between different types of sand using various senses.
- Students will be able to use a magnifier to make observations about the different types of sand.

Questions

- What differences did you notice in the sand by using the sense of touch?
- How did the magnifier help you to observe the sand more clearly?

Materials

- various types of sand (beach sand, sand for roads, sand to mix with cement)
- buckets or bowls
- magnifiers or bug viewers

Procedure

Have students work in groups. Give students containers with different types of sand. Have students feel the different types of sand and describe similarities and differences they notice in them. Have students observe the sand with and without a magnifier and have them describe the differences.

Have students put sand in plastic containers and shake the containers to see if they hear any differences in the different types of sand.

An extension to this activity would be for students to do a crayon rub of the different types of sand and see if they notice any differences. Students could also illustrate where the different sands are used or come from (e.g., beach sand, sand for roads, sand to mix with cement). They could then put glue on the outline of the picture and glue sand to it.

Activity 40: Water, Water Everywhere

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- manipulate materials purposefully (201-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- select and use materials to carry out their own explorations (200-4)
- ask questions that lead to exploration and investigation (200-1)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)

Assessment

A record of observations of the growth of concepts from questions would be a way to measure growth as students use the water table to practise and expand on teacher-led activities in this appendix.

Question

What do you notice about water?

Materials

- water table
- plastic containers in various shapes
- plastic containers with spouts
- cloths for wiping spills
- collection of objects that float and sink
- items to make boats (aluminum foil, milk cartons, plastic containers, Plasticine)

Procedure

At a water table, students should have an opportunity to

- play with pouring water into different containers
- experience the floating and sinking of various articles
- use boats and cargo
- develop vocabulary such as capacity by a planned test

Activity 41: It's Pouring

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- manipulate materials purposefully (201-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- select and use materials to carry out their own explorations (200-4)
- ask questions that lead to exploration and investigation (200-1)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)

Assessment

The ability of students to predict what will happen as various substances are poured and how they are similar to and different from water will indicate comfort with the concept of how water behaves when poured.

Questions

- How is water like rice? sand? cereal?
- How is it different? (See analysis.)
- What is different about the levels of the solids and water when poured?

Materials

- plastic containers of various shapes and sizes
- plastic graduated cylinders
- plastic measuring cups
- rice
- sand
- cereals such as rice and round oat cereals
- pie plates
- pea gravel or marbles
- soil

Procedure

Beginning with the solids, teachers could instruct students to pour a substance, then discuss the questions in the analysis section. Moving from the soil, students should be directed to pour water and compare and contrast its pouring with the previous substances. A teacher-built compare/contrast chart would allow students to experience organizing thoughts.

Students could compare the levelling of water with the formation of hills in solids as these substances are poured. Teachers and students should compare the levelling of water with the formation of hills in solids as these substances are poured.

Analysis

How did the test substance pour? Use sight, hearing, and touch words to describe your observations. Use the same senses to describe how water poured. Which of the solids that were used pours most like water?

Describe some things you observed that are different when pouring the substances.

Activity 42: Waves, Ripples, and Bubbles

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- manipulate materials purposefully (201-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- select and use materials to carry out their own explorations (200-4)
- ask questions that lead to exploration and investigation (200-1)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)

Assessment

A series of drawings showing waves and ripples will show that students have observed differences in ways to cause disturbance in water.

Question

In what ways can water be disturbed?

Materials

- dish pans
- water
- straws
- collection of light, large objects
- collection of small, heavy objects
- paper, pencil

Procedure

Pour water into dish pans. Observe how water moves. Let it move until it comes completely still. Describe the differences between the moving and the still water.

Students could observe what happens when they put one finger, three fingers, or a flat hand in the water and push gently. After each test, the water should be left until it becomes completely still. Connections to nature should be made with each trial.

Students can observe what happens when a finger is moved across the water. A V-shaped ripple should occur. They could make connections to the real world (boats or ducks moving through the water, for example). Students could try dropping large, light objects (plastic yogurt container, for example) and small, heavy objects (a marble, for example) to observe differences in water disturbance.

Students could blow on the water with a straw and make observations. Connections to nature may be that this is what happens when the wind blows. Draw pictures to show how water can be disturbed.

Activity 43: Stormy Weather

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- manipulate materials purposefully (201-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- select and use materials to carry out their own explorations (200-4)
- ask questions that lead to exploration and investigation (200-1)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)

Assessment

- Demonstrate how water flows down a drain.
- What evidence do you have to support your explanations about water flowing?
- What do waves look like? Give evidence to support your answer.

Questions

- How can you make waves?
- Are waves all the same height and shape?
- What makes waves happen?

Materials

- two 2-L pop bottles
- one 600-mL plastic bottle with cap
- 1 tornado connector
- food colouring
- water
- cooking oil

Procedure

The simulation of a tornado or of water swirling down a drain can be produced using two 2-L pop bottles joined together with a tornado connector. Students could make the water swirl in both directions, making observations about the forces needed to make this happen.

Wave generation can be simulated using a 600-mL plastic bottle with a cap. Fill the bottle three-quarters full of water, add food colouring if desired. Add enough cooking oil to bring the water level up to the rounded shoulders of the bottle. Cap tightly.

Hold the bottle horizontally. By rocking the bottle gently back and forth, students can produce waves. Students can experience the size and shape of waves produced using various amounts of force.

Activity 44: A Drop in the Bucket

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- manipulate materials purposefully (201-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- select and use materials to carry out their own explorations (200-4)
- ask questions that lead to exploration and investigation (200-1)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)

Assessment

Links that students make between their observations and what happens in nature would be an indication that concepts are being understood.

Questions

- How can you make water drop and move on paper towel? (and other surfaces)
- What do the surfaces look like after the water is dropped?
- Where do the water samples go when dropped on surfaces?
- How do the water drops move on the surfaces?

Materials

- construction paper
- blotting paper
- paper towel
- cardboard
- fabrics (silk, leather)
- sandpaper
- waxed paper
- samples of wood
- petroleum jelly
- eye dropper

- large paint brush
- straws
- toothpicks
- stir sticks
- felt
- pots of sand (250 mL milk cartons with the lids cut off work well)

Procedure

Students should experience dropping and moving water on various surfaces. Students should talk about their observations of the ways in which water behaves on the surface tested.

Students can then test what happens to the sand in pots as water drops on it in different ways. The links that students make between their observations and what happens in nature should be noted as an indication that concepts are forming.

Extension

Students can wet paper, then observe the behaviour of diluted paints on this wet paper. Links can be made to absorption of water and how water moves.

Students can be introduced to music created by composers and be asked to draw the images they hear. These might include such classical works as Smetana's *The Moldau*, Debussy's *La Mer*, and Handel's *Water Music*. Traditional music might include "Shenandoah," "Haul Away Boys," "Rio Grande," or "The Erie Canal." Include appropriate popular music as well.

Activity 45: Floating and Sinking

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- manipulate materials purposefully (201-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- select and use materials to carry out their own explorations (200-4)
- ask questions that lead to exploration and investigation (200-1)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)

Assessment

Contributions to the class chart on floaters and sinkers can be used as indications of whether students are beginning to understand the concept of floating and sinking.

Questions

- Using the sorting rings, how do the given materials sort as “floaters” and “not floaters”?
- What words describe how the objects float?
- What ways can you use to show how water moves?
- What ways can you show how water makes sound?

Materials

- collection of articles that float and sink
- materials (Styrofoam, Plasticine, plastics, wood, milk cartons) from which to shape boats
- sorting rings

Procedure

Students will ask questions and then test their questions. Teachers should look for indications that concepts of floating and sinking are being formed.

A chart of student predictions about what will sink and what will float can be made before students begin experimenting. After experiencing floating and sinking articles, students can contribute to a class chart of their observations.

Extension

Students could create dance routines to illustrate any of the following concepts:

- water flowing in small streams, larger streams, rivers of various sizes
- waves landing on a beach
- stormy/calm water

Students could use musical instruments (ones they create or commercial ones) to create the sounds water might make as it flows, drips, crashes, rains, etc.

Sturdy glasses filled at different heights can be used to create musical sounds. Students could be introduced to other musicians who produce this type of music. The keywords "water with music" produced some examples.

Activity 46: I Can Float or Not

Outcomes

Students will be expected to

- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- explore how the characteristics of materials may change as a result of manipulating them (101-1)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)
- manipulate materials purposefully (201-2)

Assessment

- Students are able to observe the difference between sinking and floating.
- Students are able to decide which type of container holds more cargo than another.
- Students are able to record through illustration observations from their experiments.

Questions

- Did the shape of the container make a difference in how much cargo it could hold?
- What was the most cargo that a container could hold?

Materials

- various types of containers that float
- centicubes or other standard materials for cargo
- buckets or containers to hold water
- water

Procedure

Have students work in groups. Give students buckets with water and a variety of containers that float. Have students try the various containers in water to see if they float. Then have them add cargo to see which one will hold the most. As the children are doing this activity, discussions should take place around the shape of the container, how heavy it is, how deep it is, and how wide it is and the relationships these have on the amount of cargo they hold.

An extension to this would be for students to add movement to the water to see the impact it has on the floating of the containers and the amount of cargo they can hold. This activity can be related to the "real" world with discussions around objects that float (e.g., boats, canoes, rafts).

I Can Float or Not Activity Sheet

Illustration of a container that floats
Illustration of a container that sinks

Activity 47: Soak It Up

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- explore how characteristics of materials may change as a result of manipulating them (101-1)
- manipulate materials purposefully (201-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- select and use materials to carry out their own explorations (200-4)
- ask questions that lead to exploration and investigation (200-1)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)

Assessment

Being able to sort objects into those that absorb and those that repel water would indicate that students are beginning to understand the concepts of absorbing and repelling water.

Questions

- Which objects absorb or repel water?
- Which objects do not?

Materials

- ollections of objects that float or sink

Procedure

Using a variety of materials, students could decide which objects absorb and which objects repel water. Discussion on the description of the words will help students understand them.

A teacher-generated chart of absorbing and repelling that students contribute to as they work through the activities will allow students to share their observations.

Extension

Students can drop water from various objects onto coloured construction paper to make patterns. Using spray bottles or squirt tops will produce different patterns than dropping. An extension of this activity is to use diluted paint to develop splatter patterns on paper. Students could look at some examples of this type of work on the National Gallery of Canada website at <www.national.gallery.ca>.

Using diluted paint, students can blow paint across paper to produce fractal-like designs. This activity can be used to enforce the concept of water disturbance.

Activity 48: The Absorption Test

Outcomes

Students will be expected to

- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- manipulate materials purposefully (201-2)

Assessment

- Students are able to decide which materials absorb water better than others.
- Students are able to discuss the results of their findings and help to make a class chart showing their results.

Questions

- How were you able to decide which material absorbed the most water?
- Which paper towel would you recommend for use around the home?

Materials

- various brands of paper towels
- water
- standard measure devices
- standard containers to hold water

Procedure

Discuss with students commercials that claim that various brands of paper towels are the best for absorbing water. Explain to them that they are going to do their own tests. This activity is designed to have students test various brands of paper towels and their ability to absorb water. Students should be given a sheet of one brand at a time. A container holding the same amount of water should be used for each trial.

After the trials, have students discuss their results and make a chart illustrating their results. These results could be shared with the school. Students could design their own commercials and share them with the class. This activity could be carried out using various materials to test absorption (e.g., wax paper, napkins, cardboard).

Activity 49: The Seascape

Outcomes

Students will be expected to

- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- manipulate materials purposefully (201-2)

Assessment

Students are able to use paint, sand, and water to produce a seascape scene.

Questions

- What kinds of materials might be at the beach?
- Does a lake have the same types of materials as an ocean?
- Do all beaches look the same?

Materials

- paint
- shells (optional)
- paper
- glue
- sand

Procedure

During this unit students have worked with sand and water. Many, if not all, of the students have had an opportunity to go to a beach at the ocean or by a lake. This activity is designed to give students an opportunity to work with sand and water to create a seascape or a favourite time at the beach. For students who have not had this opportunity, pictures of children at the beach could be used as a motivational tool.

Children should be given the opportunity to paint their scene and if desired glue sand on for the beach area. Seashells could be added by gluing them on as well. Have the student tell a story about his/her scene, and either the teacher or student could write a sentence or two in marker. These pictures could be made into a class big book to be shared with other students.

Appendix F: Activities for Exploring Moving Things with Our Senses

Activity 50: Getting to Know Ramps

Outcomes

Students will be expected to

- select and use materials to carry out their own explorations (200-4)
- manipulate materials purposefully (201-2)
- ask questions that lead to exploration and investigation (200-1)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)

Assessment

- Students are able to contribute to class discussions in small groups or with the teacher.
- Students listen to each other and build on their contributions.

Questions

- How are ramps used in the world around us?
- How does the ramp you drew compare with your neighbour's ramp?
- What did you learn about ramps today?
- Have you seen ramps in your neighbourhood? If so, how are they used?
- What materials are used to build the ramps we've seen?

Materials

- pictures of ramps

Teacher Note: *If you search under "ramps" on the Internet, there are pictures that can be shown to children or be printed. Or you could use a digital camera to take pictures of ramps in your neighbourhood or in the metro area (car dealerships, wheelchair accessible buildings, slides, stairs).*

Procedure

Have a collection of pictures of ramps to show as examples of children's brainstorming.

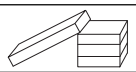
Brainstorm with the students, gathering from their prior knowledge what they know about ramps. Write their ideas on chart paper. After these discussions have the students draw examples of ramps that were discussed.

If there are ramps in the school or in the school area, take the children to see them and if possible, walk on them.

Have students draw a picture of a ramp they saw in their science journal or on the activity sheet.

Getting to Know Ramps Activity Sheet

My picture of a ramp



Activity 51: "Messing About" with Ramps

Outcomes

Students will be expected to

- select and use materials to carry out their own explorations (200-4)
- manipulate materials purposefully (201-2)
- ask questions that lead to exploration and investigation (200-1)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)

Assessment

- Students are able to contribute to class discussions in small groups or with the teacher.
- Students listen to each other and build on their contributions.
- Students are able to build a ramp using blocks and boards.
- Students are able to make a diagram of their ramp to use in another lesson.

Questions

- How can you build a ramp using blocks and boards?
- What did the ramp you made look like?
- How can we find out if these ramps will work?

Materials

- blocks of wood to build ramps
- boards for ramps

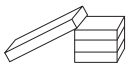
Procedure

In this activity students are given the opportunity to explore building ramps. Students should work in groups and try to build a variety of ramps. Students should make an illustration of the final ramp they built or the one they liked the most. Students should be made aware that they will be using this diagram to build their ramp for another activity.

Discussions could take place around the different ways children used the materials to make ramps. Which ramp is the tallest? Which ramp is the shortest?

"Messing About" with Ramps Activity Sheet

The ramp I built



Activity 52: Using Our Ramps

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- observe, using one or a combination of the senses (201-4)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- manipulate materials purposefully (201-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)

Assessment

- Students are able to develop an understanding of how various objects react when going down a ramp.
- Students work co-operatively.
- Students are able to recreate their ramps from drawings they made in another lesson.

Questions

- What did you notice happened to the objects as they went down the ramp?
- Were there any differences in the movement of the objects? If so, what?

Materials

- ramps
- blocks
- a variety of materials that will roll and slide on the ramp (blocks of wood, toy cars, paper towel rolls, unifex cubes, small boxes of cereal)

Procedure

In the first part of this activity students are to reconstruct their ramps from the previous lesson. The second part of this lesson will be for students to explore a variety of materials and how they react to going down a ramp. Students should work in groups. This activity may have to be done in the hall or the gym depending on the room available within the classroom. Discussions should take place around how the objects move. The next lesson will focus on the terms “sliders” and “rollers.”

Activity 53: Sliders and Rollers

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- observe, using one or a combination of the senses (201-4)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- manipulate materials purposefully (201-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)

Assessment

- Students have an understanding of the terms “sliders” and “rollers.”
- Students work co-operatively.
- Students are able to sort their objects into sliders and rollers.
- Students are able to give examples of where rollers and objects that slide are used in the world around them.

Questions

- Can you make an object roll and slide?
- What is the difference between an object that slides and one that rolls?
- Where are objects that slide or roll used in the world around you?

Materials

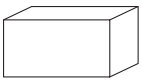
- ramps
- blocks
- a variety of materials that will roll and slide on the ramp (blocks of wood, toy cars, paper towel rolls, unifix cubes, small boxes of cereal)
- attribute hoops/sorting rings

Procedure

This activity may need to be done over more than one science period. Discuss with students the terms “slide” and “roll.” Ask them what they think they mean and to give examples of things that slide and roll. Take the children to the gym and have them demonstrate rolling and sliding with their bodies.

Have students set up their ramps and, using the objects from the previous lesson, discover which are sliders and which are rollers. Have them sort them using their sorting rings. Discussions could take place around why some objects roll better than others and why some objects slide better than others. What makes an object roll? What makes an object slide? The activity sheet provided could be used for students to record their observations. This could be done by illustration or in words.

Sliders and Rollers Activity Sheet

Objects that slide 	**Objects that roll** 

Activity 54: Further Investigations with Sliders and Rollers

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- observe, using one or a combination of the senses (201-4)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- manipulate materials purposefully (201-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)

Assessment

Students are able to distinguish different properties of objects and how they relate to sliding or rolling.

Questions

- Which objects roll down the ramp well?
- Which objects do not roll?
- Which objects slide?
- Which objects do not roll well or tend to roll off the ramp?
- How can you make the car, ball, or can roll more quickly? More slowly?

Materials

- ramps
- blocks
- a variety of materials that will roll and slide on the ramp (blocks of wood, toy cars, paper towel rolls, unifex cubes, small boxes of cereal)

Procedure

This activity will be a continuation of investigating how objects move on ramps. The activity should revolve around the questions listed above.

Compare distances that different objects will roll after they come off the ramp.

How can you make the ball, car, or can go further after it comes off the ramp?

Observe objects of different weights and sizes as they roll down and off the ramp.

Have students orally share their observations. Record any questions they have as inquiry for new experiments.

Activity 55: Sliders or Not Sliders

Outcomes

Students will be expected to

- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

When the activity is completed in Kidspiration, the teacher might review students' ideas together while looking at one student's version of the activity. Students can also print their images, but this becomes time-consuming.

Questions

- Which objects are not sliders?
- Which objects are sliders?
- How can you test to see if the objects do what you predict?

Materials

Kidspiration software installed on a computer, copy of the file: "sliding.kid." This file can be downloaded from the URL <http://lrt.EDnet.ns.ca>, as follows:

Click on the + beside Teacher Resources. Click on the name: "Science Materials" and find the link for "Sliders or Not Sliders."

Procedure

Students are provided with an activity sheet on the screen, which provides them with two grouping areas and a variety of images of objects. The objects are either rollers or sliders. Students are to select all the objects that can slide and drag them to the first box. The other objects should be dragged to the second box.

When a student has had a chance to complete the requirements of the activity, he/she should choose "No" when asked if he/she wants to save the work. This will keep the file unchanged for the next student.

Notes

Kidspiration is a concept-mapping program for early elementary students. It includes the ability to provide shapes that have been defined as "SuperGrouper" shapes. Any images put into the outline of a SuperGrouper shape becomes part of it and will move with the shape. This allows the use of the software for a wide variety of sorting and classification activities.

Activity 56: Rollers or Not Rollers

Outcomes

Students will be expected to

- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

When the activity is completed in Kidspiration, the teacher might review students' ideas together while looking at one student's version of the activity. Students can also print their images, but this becomes time-consuming.

Questions

- Which objects are not rollers?
- Which objects are rollers?
- How can you test to see if the objects do what you predict?

Materials

Kidspiration software installed on a computer, copy of the file: "rolling.kid." This file can be downloaded from the URL <http://lrt.EDnet.ns.ca>, as follows:

Click on the + beside Teacher Resources. Click on the name: "Science Materials" and find the link for "Rollers or Not Rollers."

Procedure

Students are provided with an activity sheet on the screen, which provides them with two grouping areas and a variety of images of objects. The objects are either rollers or sliders. Students are to select all the objects that can roll and drag them to the first box. The other objects should be dragged to the second box.

When a student has had a chance to complete the requirements of the activity, he/she should choose "No" when asked if he/she wants to save the work. This will keep the file unchanged for the next student.

Notes

Kidspiration is a concept-mapping program for early elementary students. It includes the ability to provide shapes that have been defined as "SuperGrouper" shapes. Any images put into the outline of a SuperGrouper shape becomes part of it and will move with the shape. This allows the use of the software for a wide variety of sorting and classification activities.

Activity 57: A Fair Test

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- observe, using one or a combination of the senses (201-4)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- manipulate materials purposefully (201-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)

Assessment

Students are able to design and recognize a fair test.

Question

What is a fair test?

Materials

- ramps
- blocks
- toy cars

Procedure

This activity is designed to develop the concept of a fair test.

Students select a roller that they think will roll the greatest distance in a straight line. Students are then given an opportunity to test their rollers against one another (use an open space, hallway, gym). Guide the students to identify the criteria for a fair test.

Ask students to set up their ramp and test their rollers, on signal. Have a student stand where the roller stops. (Students will build their ramps randomly about the room. Allow them to do this without interfering.) When students try to identify the best roller, they will realize that in order for this to be a fair test all the ramps will need to face the same direction.

Have students build their ramps so that they are all facing the same direction. Repeat the test. Students will recognize that in order for this to be a fair test all ramps need the same starting point or line.

Have students build their ramps facing the same direction and on the same start line. Repeat the test. Students will realize that the ramps need the same height in order for this to be a fair test.

Build ramps the same height, facing the same direction with the same starting point. Repeat the test. Students will identify the best roller(s). (It is important for students to understand that retesting is necessary in order to get the best evidence.)

Have students develop a working definition of a fair test. Students could be given the opportunity to do other fair tests using different ramps, sliders, and rollers.

Activity 58: Ramp Surfaces

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- observe, using one or a combination of the senses (201-4)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- manipulate materials purposefully (201-2)
- follow a simple procedure where instructions are given one step at a time (201-1)

Assessment

- Students are able to contribute to class discussions in small groups or with the teacher.
- Students listen to each other and build on their contributions.
- Students are able to solve problems that arise as the activity is taking place.
- Students are able to make decisions based on individual or group work.
- Students are able to predict what will happen to an object on different surfaces.

Questions

- Using the materials, how does the object move along the ramp?
- Does the surface of the ramp change the speed and distance the object travels?
- How does the surface of the ramp change the speed and distance the object travels?

Materials

- ramps
- blocks
- materials to change the ramp surface (towels, plastic, ramps made of different material)
- objects that slide or roll from previous activities

Procedure

Discuss with the children what the word "surface" means. Discuss with them different types of surfaces. Ask, Do you think how quickly an object moves has to do with the surface of a ramp? Have the children build their ramps. It might be suggested to students that they build a fairly high ramp (or they can discover this on their own). Have them use ramps of the same length, various surfaces, and the same height to see how their objects slide.

Have the children discuss the results of their experiments. Groups should share their ideas. Have a discussion with students on how we as a society use various surfaces for safety.

Activity 59: Getting Balanced

Outcomes

Students will be expected to

- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Assessment

Students are able to understand the term "balance."

Question

What does the word "balance" mean?

Materials

None required.

Procedure

This activity is an introduction to the concept of balance. Discuss with students activities that require balance without using the term balance.

- Have you ever tried to keep a book on your head while walking?
- Are you able to keep a pencil on your finger?
- What would happen if you tripped when you were walking?
- How are you able to keep yourself up when riding a bicycle?

Brainstorm with students what the term means and have them give examples of balancing. Students could be given the opportunity to illustrate what balance looks like to them. Develop a chart vocabulary of terms/situations related to balance.

Teachers teaching a combined primary/grade 1 class could combine these activities with those in grade 1 in the unit Needs and Characteristics of Living Things: Investigating Balance.

Activity 60: Experiencing Balance

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)
- follow a simple procedure where instructions are given one step at a time (201-1)

Assessment

- Students are able to demonstrate balancing.
- Students are able to follow directions.

Questions

- What balancing direction did you find hardest to do?
- What did your body feel like when you were balancing it in different ways?

Materials

None required.

Procedure

Teachers teaching a combined primary/grade 1 class could combine these activities with those in grade 1 in the unit Needs and Characteristics of Living Things: Investigating Balance.

Give students specific directions on how they are to balance their bodies. Directions such as, "Try to stand on one foot," "Try to stand on your left foot and touch your head with your hand," and "Try to stand on one foot and touch your nose." Teachers should be sensitive to the fact that not all students will find these activities easy. Ask students to describe how they felt as they tried the various balancing directions. This activity could also be done by the physical education teacher.

Activity 61: Things in Balance

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)

Assessment

- Students are able to observe things in balance in the world around them.
- Students are able to illustrate and record examples of things in balance

Questions

- What things did you observe that were in balance?
- How do you know they were in balance?

Materials

None required.

Procedure

Teachers teaching a combined primary/grade 1 class could combine these activities with those in grade 1 in the unit Needs and Characteristics of Living Things: Investigating Balance.

Take students on a walk around the school and the schoolyard. Have them give examples of things that are in balance (tables, chairs, trees). Have them discuss how they know they are balanced. Students should be given the opportunity to illustrate examples they observed in their science journals. Invite them to write what they observed.

Activity 62: Balance and Building

Outcomes

Students will be expected to

- explore how characteristics of materials may change as a result of manipulating them (101-1)
- identify and explore ways to use tools to help carry out a variety of useful tasks (101-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- ask questions that lead to exploration and investigation (200-1)
- select and use materials to carry out their own explorations (200-4)
- manipulate materials purposefully (201-2)
- choose materials to build a variety of real and imaginary settings and play roles that correspond to those settings (103-1)

Assessment

Students are able to build towers/buildings that are balanced.

Questions

- How do you know that your tower/building is balanced?
- What would happen to your tower/building if it were not balanced?

Materials

- blocks
- Lego/Dacta
- straws and connectors
- dominoes

Procedure

Teachers teaching a combined primary/grade 1 class could combine these activities with those in grade 1 in the unit Needs and Characteristics of Living Things: Investigating Balance.

In this activity have students build objects that are balanced. Students could be challenged to see who can build the tallest tower. Students could be given the opportunity to illustrate their building/tower and have another group of students build it by following their illustration. Directions could be given by the teacher as to the type of tower to be built, and students could be assessed on their ability to follow directions. A digital camera could be used to take a picture of a tower, and students could try to build it.

Balance and Building Activity Sheet

My Tower/Building

Appendix G: Activities for Exploring the World of Living Things with Our Senses

Activity 63: Going for a Walk

Outcomes

Students will be expected to

- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- ask questions that lead to exploration and investigation (200-1)

Assessment

- Students are able to describe observations using their senses.
- Students are able to observe living things in their environment.

Questions

- What senses did you use to make your observations?
- What living things did you observe?

Materials

None required.

Procedure

Prior to taking students outdoors, discuss with them what they think the concept "living things" means. Put their ideas on chart paper or on the board.

Take the students outdoors, for a nature walk. Have them observe the "living things" that they see. Stop at times and have students give examples of living things they see.

When you return to the classroom make a list of all of the living things that students observed. Have them illustrate some of the living things they observed in their science journals. Help them to label their pictures by having them use words from the living things chart the class developed. What do we want to know about living things? How can we find out?

Activity 64: Log Hotel

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- explore and select different ways to represent ideas, actions, and experiences and to communicate with others (100-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)

Assessment

- Observe children as they observe the log. Are they actually actively engaging in observations or are they recording the observations of others?
- Do the children use vocabulary from classroom tools such as the senses charts, word walls, brainstorm charts, illustrations, etc.?
- Observe how the children present their findings—does it accurately represent what they observed on, around, and in the rotting log?
- Note how students record their observations. Are they able to select from a variety of media to represent their observations of the items in the collection?

Questions

- What did you observe in the log?
- How does a log become a home for living things?
- How do living things depend on the log to survive?

Materials

- paper
- pencils
- clipboards
- colouring tools
- outdoor location with two or three rotting logs to observe
- clay, toothpicks, cardboard, and other materials that could be used to make models

Procedure

Brainstorm with the children prior to beginning the activity so that a starting point is determined. Do the children understand the word "rotting"? What purposes could a rotting log have? What might you expect to find in or around a rotten log? Tell your reasons. What might you not find in a rotten log? Tell your reasons. Move out into the area with the logs. Divide the children into groups so that all have an opportunity to closely observe the log and its contents. What do the children observe? Are the items living or non-living? What can they see living on it, in it, and under the log?

From a list of choices provided by the teacher, the children select a method for recording their observations. These choices reflect the various learning styles of the class and the many ways to "show what you know" (for example, through art, drama, models, journals, oral communication).

A wrap-up: Did the observations match the predictions? Perhaps suggest some reasons why they did/didn't. Additional questions for discussion could be as follows:

- What makes you think the log is dying? Rotting?
- Would living things tend to live in the log or eat the log?
- What do you think is inside the log?
- What does the log look like?
- What does the log feel like?
- Did you see any living things living under the bark?
- What is a hotel?
- What did you find inside the log?

Activity 65: Observe a Leaf

Outcomes

Students will be expected to

- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)

Assessment

Students are able to observe and describe a leaf, using their senses.

Question

What differences did you observe in the leaves you saw and collected?

Materials

- fresh leaves collected by the students

Procedure

Develop a senses chart while discussing observations of leaves.

Students could be taken on a class nature walk to observe and collect leaves.

Students look at their leaves and describe the shape and size, the edge (smooth, jagged), the colour, thickness, the veins inside the leaf, the stem, markings if any, the smell, texture of top and bottom of the leaf, degree of transparency, the brightness of its colour when held up to the light, etc., while indicating what sense they use for each observation.

Discussions could revolve around the following questions:

- Are all leaves the same?
- How many points are on the leaves?
- What did the leaves have in common?
- Did different sizes of the same kind of leaf have the same number of points?
- How do the leaves look, feel, and smell?
- Do leaves have a front and back?

Extension

- Students can sort the leaves by shape, colour, size, texture, smell.
- Students look for similarities among all leaves.
- Students can describe a leaf, and others have to guess which leaf it is.
- Students sort the leaves (e.g., maple leaves, birch leaves) and arrange them by size from small to large.
- Students can make leaf rubbings in different colours, cut out the leaves, and make a pattern with the class.
- The teacher can assemble a few very colourful leaves (in fall colours) and seal them by ironing between two sheets of wax paper under a cloth. Hang by the window.

Activity 66: Living and Non-Living

Outcomes

Students will be expected to

- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- ask questions that lead to exploration and investigation (200-1)

Assessment

- Describe observations using senses.
- Using the vocabulary, students are able to classify living and non-living things.

Questions

- How were you able to tell what is a living and non-living thing?
- What differences did you observe?

Materials

- plastic bags
- 2 hoops or pieces of yarn of different colours or sorting rings
- magnifying lenses or bug viewers
- a wide variety of living and non-living things

Procedure

Take students outdoors and have them observe a variety of living things. Discuss as a class what a living thing is. Then have the students go outside and observe non-living things. Discuss as a class what makes something a non-living thing. Discuss and develop a senses chart by asking students what senses they used to decide what is living or non-living. Sort things into groups of living and non-living things.

Have students collect five different living and five different non-living things. After students have made their collections, have them sort the found items into living and non-living things. Students should look at the sorting done by others and discuss their sorting rules. Have students record what they collected and how they sorted them.

Living and Non-living Activity Sheet

Living Things

Non-Living Things

Activity 67: Living Things Mobile

Outcome

Students will be expected to

- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

Students will be able to place objects or materials in a sequence or in groups according to one or more attributes.

Questions

- Using the sorting rings, classify the animals as those that live outdoors and those that do not live outdoors.
- What are some plants that live outdoors and some plants that do not live outdoors?
- What evidence do you have to support your answers?

Materials

- hanger
- yarn
- stapler
- paper
- pens and pencils
- magazines
- colouring books

Procedure

Have students draw five examples for one of the following:

- plants or animals that usually live outdoors
- plants or animals that usually live indoors

Then have students create a mobile with their drawings.

Alternative: Instead of drawing, students could cut out pictures from old magazines or colouring books. They could also print out pictures from the Internet or use clip art and colour their pictures. Students should display their mobiles for other classes to see.

Questions for discussions before, during, and after the activity could include the following:

- What are some plants that live outdoors?
- What are some animals that live outdoors?
- What are some plants that live indoors?
- What are some animals that live indoors?
- Are any of your animals endangered?

Discuss the characteristics of some creatures and plants that can live outdoors versus the characteristics of others that must live inside.

Activity 68: Sorting Rings Observations

Outcomes

Students will be expected to

- use personal observations when asked to describe characteristics of materials and objects studied (202-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)

Assessment

- Observe students as they explore the sorting ring community. Are they able to use their senses and sense words to describe what they observe?
- Students are able to accurately record their observations in some format.
- Students are able to select from a variety of ways to represent ideas, actions, and experiences to communicate with others.
- Students use oral or written language/representations to compare their findings to their predictions and also to the findings of their students.
- Students are able to explain their rule for sorting.

Questions

- What living things were you able to find?
- What differences did you observe in the number of living things you found and the location of the observation area (grassy area compared to asphalt area)?

Materials

- sorting rings
- sorting rings paper
- clipboards
- pencils
- colouring tools
- bug viewers
- clay, toothpicks, and other materials that can be used to make models

Procedure

Before heading outside, spend some time with the class brainstorming and discussing living things and what kinds of living things you may find inside and outside. What living things might you find in the classroom? in the sky? in the garden? on the playground?

On the school grounds or another outdoor location, divide the students into small groups and give each group a sorting ring. Have students place their sorting ring over a patch of ground. Students observe and record the living things that they observe.

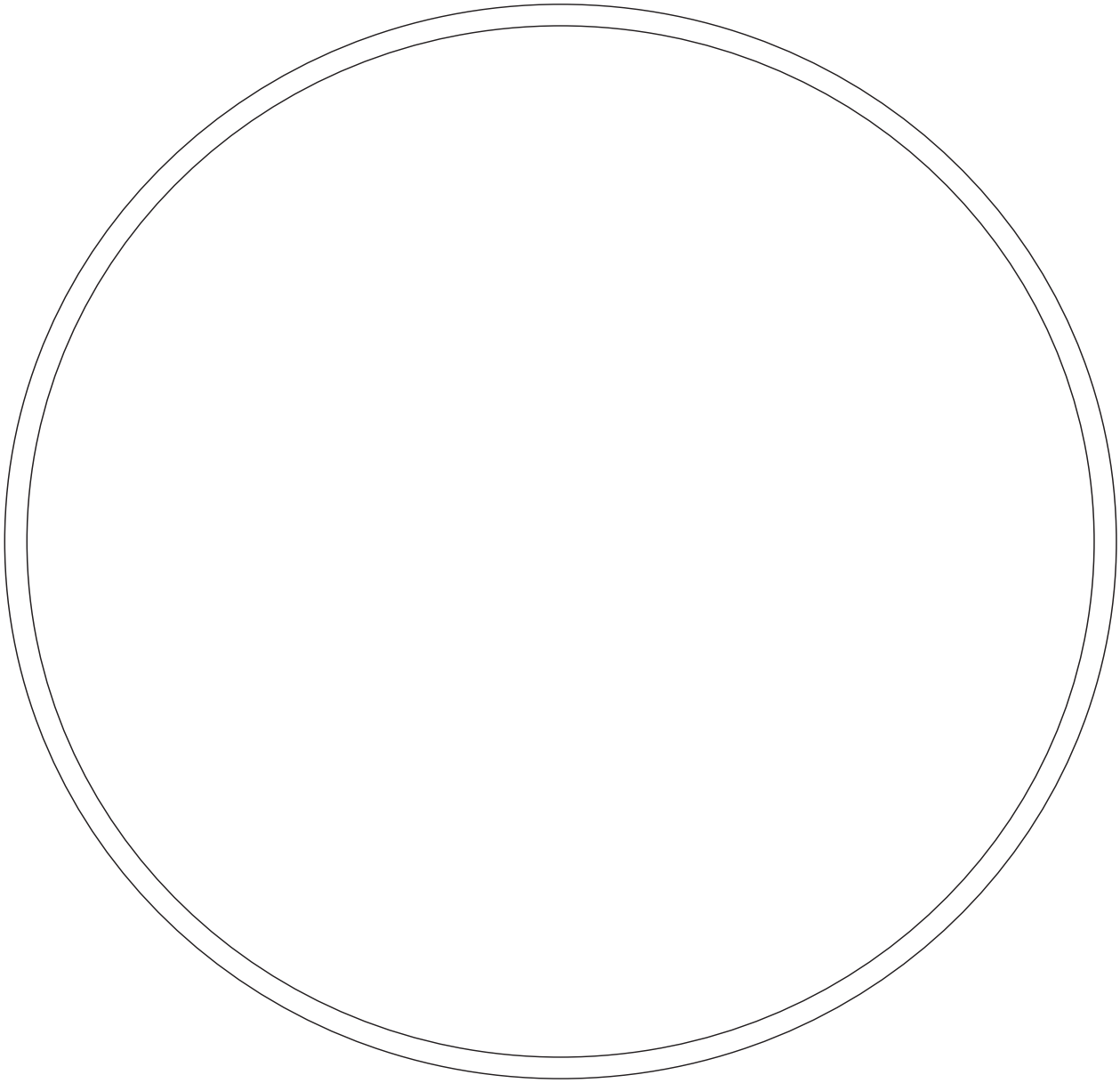
Observations can be recorded in many ways—pictures, words, tallies, picture graphs, etc. What did they see? How many ants, leaves, flowers, etc. were in their ring community? Did they find creatures/items that matched their predictions? Did they encounter any surprises?

Analysis

Compare observations with predictions of what the students thought they would see (from earlier class discussion). Students can show what they learned/observed through artwork, drama, nature logs, picture graphs.

If there are any items that the students can bring back into class without harming them, they can work together to sort and classify these items. Have them explain why they sorted items in a particular way and challenge them to find a second way to sort their objects. Did you find any items that should not be in your ring community? Bring forward a discussion on a healthy environment needed for living things to grow and thrive. How can we protect the environment for living things?

Sorting Rings Observations Recording Sheet



Activity 69: Insect Party

Outcomes

Students will be expected to

- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)

Assessment

- Students show appreciation of differences between body parts of humans and insects.
- Students show an interest in observing shape and function of the body parts of insects and other bugs.

Questions

- What do you think it would be like being an insect and having to find food?
- What differences did you notice between how you eat and how an insect does?

Materials

- chopsticks (cheap wooden ones, for sale in Chinese food stores)
- straws
- Popsicle sticks
- teaspoons (plastic)
- Styrofoam plates
- pencils
- paper towel
- Each plate should have a variety of the following food:
  a variety of cereal of different shapes and colours: small pieces of celery, lettuce, slices of carrots, and (for fun and as a treat) tiny pieces of colourful gummy candy, colourful (red) fruit juice

⚠ **Note: Be aware of food allergies.**

Optional: Each student may like to wear a simple insect mask (made in school or at home) or wear a simple insect costume.

Procedure

Begin the activity by discussing with students how insects pick up and carry things and eat and drink. Then introduce the activity.

- What do you think insects do all day every day?
- How does an insect pick up things, carry things, eat, and drink?
- What do you do when you pick up things, carry things, eat, or drink?
- At our insect party we'll pretend to be insects.
- You have to eat and drink using chopsticks, popsicle sticks, straws, spoons or your mouth.
- On a worksheet you check off if it was easy, or hard to do.

Students buzz around the room while the plates, chopsticks, straw, and popsicle sticks and worksheets and food are being distributed. At regular intervals the children have to buzz around. When all food is finished pour some fruit juice on the plates. Close the activity by discussing students' observations.

- Is it possible to pick things up using different methods?
- Does it matter where you hold the objects (top, middle, bottom)?
- Is it hard for insects to pick up food?
- Are there any other things that would be difficult to pick up with these utensils?
- Do insects give up when they cannot do something?

Discuss the results of their recording charts.

Teacher Note: *Volunteers would be helpful for this activity.*

Insect Party Activity Sheet

Fill in the following chart. E = easy H = hard

Food	2 Chopsticks	2 Spoons	2 Popsicle sticks	Straw	Mouth
cereal					
piece of lettuce					
carrot slices					
piece of celery					
pieces of gummy candy					
juice					

Activity 70: Making Collections

Outcomes

Students will be expected to

- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)

Assessment

- Observe the students as they discuss the collections. Do they all contribute to the discussion, taking turns to add and record observations?
- Are students able to explain their rule for sorting the collections? Can they guess a classmate's sorting rule?
- Can students use language from class charts, senses charts, etc., as they share and record their observations?
- Are students able to find similarities and differences within and among their collections?

Questions

- How did you group the items?
- What is your sorting rule?

Materials

- student collections of living and non-living things
- paper
- pencils
- colouring tools
- attribute hoops/sorting rings
- senses charts/related posters or charts created throughout this unit

Procedure

As a whole class, observe a teacher- or student-created collection and run through the process of observing similarities/differences, sorting the collection, and exploring a variety of ways to record observations. Divide the class into small groups to observe a variety of child- or teacher-created collections.

Students observe and sort objects, using all senses and noting (recording) similarities and differences.

Have students present their collections to the class, allowing time for comparison with the collections of the other students. Continually guide the discussion/comparisons back to the senses, using vocabulary that has been developed through brainstorming and recorded from the unit.

Activity 71: Let's Look at Seeds

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

- Observe students' contributions to the senses charts.
- Are students able to identify a variety of attributes?

Questions

- What senses did you use to make observations about the seeds?
- What were the ways you grouped your collections?

Materials

- collection of seeds from trees, plants, flowers, fruits, and vegetables (e.g., acorns, pine cones, elm seeds, corn, sunflower seeds)
- paper plates

Procedure

Divide the students into small groups.

Give each group a plate with a variety of seeds to explore with their senses. As a whole class, create senses charts with vocabulary for how the seeds feel, smell, look, taste (when appropriate), and sound. This activity should be followed by Activity 72: What's Your Rule?

Activity 72: What's Your Rule?

Outcomes

Students will be expected to

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)
- communicate questions, ideas, and intentions while conducting their explorations (203-1)
- identify common objects and events, using terminology and language that others understand (203-2)
- respond to the ideas and actions of others and acknowledge their ideas and contributions (203-4)
- follow a simple procedure where instructions are given one step at a time (201-1)

Assessment

- Observe if students can explain their sorting rules and the rules of their peers.
- Observe if students can use vocabulary from senses charts when discussing and sorting seeds.

Questions

- What was your sorting rule?
- What did you learn about seeds?

Materials

- collection of seeds from trees, plants, flowers, fruits and vegetables (e.g., acorns, pine cones, elm seeds, corn, sunflower seeds)
- paper plates
- sorting rings

Procedure

Divide students into pairs or small groups. Give each group a paper plate with a variety of seeds.

Give the students an opportunity to explore the seeds and discuss the seeds using their senses.

Have students sort seeds and tell their sorting rules. Prompt by asking, "Can you show me another way to sort your seeds?" Students can then move to another group and try to guess that group's sorting rule.

- What are seeds used for?
- What are some ways seeds move?
- Where do seeds come from?

Activity 73: Animals or Not Animals?

Outcomes

Students will be expected to

- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

When the activity is completed in Kidspiration, the teacher might review students' ideas together while looking at one student's version of the activity. Students can also print their images, but this becomes time-consuming.

Questions

- Which are the animals?
- Which are not the animals?
- How can you get evidence to support your predictions?

Materials

Kidspiration software installed on a computer, copy of the file: "animnot.kid." This file can be downloaded from the URL <http://lrt.EDnet.ns.ca>, as follows:

Click on the + beside Teacher Resources. Click on the name: "Science Materials" and find the link for "Animals or Not Animals."

Procedure

Students are provided with an activity sheet on the screen, which provides them with two grouping areas and a variety of images of plants and animals. The number of images is too great for all pictures to fit inside the shape for that category, but they may be asked to put two or four or five images into each space.

When a student has had a chance to complete the requirements of the activity, he/she should choose "No" when asked if he/she wants to save the work. This will keep the file unchanged for the next student.

Notes

Kidspiration is a concept-mapping program for early elementary students. It includes the ability to provide shapes that have been defined as "SuperGrouper" shapes. Any images put into the outline of a SuperGrouper shape becomes part of it and will move with the shape. This allows the use of the software for a wide variety of sorting and classification activities.

Activity 74: Plants or Not Plants?

Outcomes

Students will be expected to

- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

When the activity is completed in Kidspiration, the teacher might review students' ideas together while looking at one student's version of the activity. Students can also print their images, but this becomes time-consuming.

Questions

- Which are the plants?
- Which are not the plants?
- How can you get evidence to support your predictions?

Materials

Kidspiration software installed on a computer, copy of the file: "plntsnot.kid." This file can be downloaded from the URL <http://lrt.EDnet.ns.ca>, as follows:

Click on the + beside Teacher Resources. Click on the name: "Science Materials" and find the link for "Plants or Not Plants."

Procedure

Students are provided with an activity sheet on the screen, which provides them with two grouping areas and a variety of images of plants and animals. The number of images is too great for all pictures to fit inside the shape for that category, but they may be asked to put two or four or five images into each space.

When a student has had a chance to complete the requirements of the activity, he/she should choose "No" when asked if he/she wants to save the work. This will keep the file unchanged for the next student.

Notes

Kidspiration is a concept-mapping program for early elementary students. It includes the ability to provide shapes that have been defined as "SuperGrouper" shapes. Any images put into the outline of a SuperGrouper shape becomes part of it and will move with the shape. This allows the use of the software for a wide variety of sorting and classification activities.

Activity 75: Alive or Not Alive?

Outcomes

Students will be expected to

- detect consistency and pattern in objects and events and use language to describe these patterns (100-3)
- place materials and objects in a sequence or in groups according to one or more attributes (202-2)

Assessment

When the activity is completed in Kidspiration, the teacher might review students' ideas together while looking at one student's version of the activity. Students can also print their images, but this becomes time-consuming.

Questions

- Which are alive?
- Which are not alive?
- How can you test to see which are alive?

Materials

Kidspiration software installed on a computer, copy of the file: "alivenot.kid." This file can be downloaded from the URL <http://lrt.EDnet.ns.ca>, as follows:

Click on the + beside Teacher Resources. Click on the name: "Science Materials" and find the link for "Alive or Not."

Procedure

Students are provided with an activity sheet on the screen, which provides them with two grouping areas and a variety of images of plants and animals. The number of images is too great for all pictures to fit inside the shape for that category, but they may be asked to put two or four or five images into each space.

When a student has had a chance to complete the requirements of the activity, he/she should choose "No" when asked if he/she wants to save the work. This will keep the file unchanged for the next student.

Notes

Kidspiration is a concept-mapping program for early elementary students. It includes the ability to provide shapes that have been defined as "SuperGrouper" shapes. Any images put into the outline of a SuperGrouper shape become part of it and will move with the shape. This allows the use of the software for a wide variety of sorting and classification activities.

Appendix H: 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 Piper 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)

Elementary Science Methods: A Constructivist Approach, Second Edition (12583)

Factivity series, various titles and big books (13736–13777)

Fantastic Rocks (13510)

Frogs and Toads (13513)

Insects Change (13512)

Insects Up Close (13506)

Is That a Fact? (13145)

National Geographic: Windows on Literacy series (13150)

Nelson InfoRead (13456–13463)

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

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

PM Library Gold, Animal Facts (12810)

PM Library Turquoise, Animal Facts (12813)

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

Scholastic Science Resource Centre, Complete Kit (13403)

Science Everywhere, Teacher Guides (13389), Grade One (13391)

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

Side by Side, Teacher's Guide, Kindergarten/Early Emergent (13198)

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 grades primary and 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 under a separate heading.

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

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

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

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). *Light*. New York: Benchmark Education Company. ISBN: 1583442316

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). *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). *Sounds*. New York: Benchmark Education Company. ISBN: 1583440828

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

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*.)

Halpern, M. (1998). *A Look at Spiders*. Texas: Steck-Vaughn Company. ISBN: 0817272739 (Other titles in this series include *A Look at Dogs*, and *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, Leg 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). *The Wind*. New York: Newbridge Educational Publishing. ISBN: 156784927X

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

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

Sacks, J., and P. Goodman. (2002). *Arty Facts: Animals and Art Activities*. New York: Crabtree Publishing. ISBN: 0778711366 (Other titles in this series include *Insects and Bugs*, *Plants*, *Structures and Materials*, *Our Bodies*, *Light and Color*, *Oceans*, *Weather*, *Machines and Transportation*, *Planet Earth*, *Communication*, and *Space*)

Sands, K. (1999). *Crawl, Caterpillar, Crawl*. Texas: Steck-Vaughn Company. ISBN: 0871282475

Sands, K. (1999). *I'm a Little Seed*. Texas: Steck-Vaughn Company. ISBN: 0871282378

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