

# Science P-6

At a Glance Documents

Implementation Draft 2019



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### Physical Science: Sand and water

#### Rationale

Sand and water provide a physical experience that is accessible and familiar from which learners ask big questions and begin to gather observational evidence. Learners will learn to differentiate among their senses and explore the types of information that they gather with each sense. Learners will be able to express their observations using descriptive vocabulary specific to each sense. Through the investigation of sand and water, learners will gain an understanding of cause and effect and begin to explore the control of variables. Learners will be challenged to make predictions and explain their thinking. Learners will begin to gain an understanding of how tools enhance their observations of the world around them.

#### Competencies

- Communication (COM)
- Critical Thinking (CT)
- Technological Fluency (TF)

#### Indicators

- **Investigate** the properties of sand and water (COM, CT)
- **Investigate** floating and sinking (COM, CT)
- **Investigate** capacity of various containers to hold sand and water (COM, CT, TF)
- **Investigate** how water interacts with a variety of materials (COM, CT, TF)

### Concepts (and Guiding Questions)

#### Properties of Sand and Water

- How are sand and water alike? How are they different?
- How can I use my senses to learn about sand and water?
- How are the sounds made when pouring sand and water different?
- How can I tell if sand is a liquid or a solid?
- Which solids pour most like water?

#### Capacity

- How much water can a container hold compared to another one that looks different?
- How can the capacity of a container be estimated?

#### Buoyancy

- How can I predict whether an object will sink or float?
- How can I make a sinking object into one that floats?

#### Absorption

- How can I determine whether a material will absorb or repel water?
- How do materials that absorb/repel water compare?

#### Skills

##### Investigate

Ask a simple question; locate 2-3 obvious details to support an answer; communicate findings.

### Life Science: Living Things

#### Rationale

The detailed investigation of various living things provides learners with an opportunity to ask questions and explore the world around them using their senses. Learners will build their descriptive vocabulary and practice their skill of observation. Learners will observe living things to note their appearance, behaviours, similarities, and differences. Learners will use these observations to classify living things. The investigation of living things also provides an introduction to data collection and the representation of data for others to interpret. Learners will observe various living things as they change over time.

#### Competencies

- Citizenship (CZ)
- Communication (COM)
- Creativity and Innovation (CI)
- Critical Thinking (CT)

#### Indicators

- **Investigate** living and nonliving things (CZ, COM, CT)
- **Investigate** change in living things (CZ, COM, CT)
- **Classify** living things (COM, CI, CT)

### Concepts (and Guiding Questions)

#### Living vs nonliving things

- How can I learn about living things using my senses?
- How can I tell if something is living or not?
- How are living things the same? How are they different?

#### Plants and animals change over time

- How does a plant/animal change over time?
- How are young animals similar to adult animals? How are they different?
- How can I record changes in living things for others to interpret?

#### Classification using single attributes

- How can I use my senses to gather evidence to classify living things?
- How can I describe sights, smells, textures and sounds found in nature?
- How can I classify living things in more than one way?

### Skills

#### Compare

Make observations; identify obvious similarities and differences; reflect on the findings

#### Investigate

Ask a simple question; locate 2-3 obvious details to support an answer; communicate findings.

#### Classify

Identify attributes and select basic criteria for groupings; sort based on the selected criteria and reflect on the grouping; incorporate a new item in a group, begin to offer a reason for the choice.

# Science Primary

Learners will investigate materials through the senses.

**Physical Science: Materials and the world around us**

## Rationale

Through an investigation of various materials, learners will make observations to note appearance, characteristics, similarities, and differences. Learners will use these observations to classify materials. Learners will also explore how properties of materials may change. Learners will be challenged to make predictions based on evidence gathered through observations made using the senses. Learners will be asked to use descriptive vocabulary to explain their observations and their thinking. Learners will also build on their understanding of cause and effect and continue the exploration of control of variables.

## Competencies

- Communication (COM)
- Critical Thinking (CT)
- Technological Fluency (TF)

## Indicators

- **Investigate** properties of materials (COM, CT, TF)
- **Investigate** classification of materials (COM, CT, TF)
- **Investigate** change in materials (COM, CT, TF)

## Concepts (and Guiding Questions)

### Properties of materials

- How can I learn about various materials and their properties using my senses?
- How can I determine the most suitable materials for building?

### Properties of materials change

- How can I change the properties of a material?
- How can I restore the original properties of a material following a change?

### Classification using single attributes

- How can I determine attributes that can be used to classify materials?
- How can I classify materials in more than one way?

## Skills

### Investigate

Ask a simple question; locate 2-3 obvious details to support an answer; communicate findings.

## Learners will test movement of objects.

### Physical Science: Movement

#### Rationale

With this outcome, learners will observe, describe, and discuss a variety of moving things, including themselves. Learners will ask big questions about how things move and the different types of movement. Using ramps, learners will explore ideas of cause and effect and experiment with the various ways they are able to affect the movement of objects. Learners will be challenged to make and test predictions of how objects will move based on observational evidence of properties of objects. Learners will also explore the sense of balance within themselves and explore ways to balance objects in their environment.

#### Competencies

- Communication (COM)
- Personal Career Development (PCD)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

#### Indicators

- **Investigate** types of movement (COM, PCD, CT)
- **Test** properties of objects that affect sliding and rolling (COM, CI, CT, TF)
- **Test** properties of ramps that affect movement (COM, CI, CT, TF)
- **Investigate** balance (COM, CT, TF)

### Concepts (and Guiding Questions)

#### Types of movement

- How do various animals move?
- How can I move like various animals?

#### Properties of objects determine movement

- How can I determine attributes that affect the movement of an object?
- How can I predict how an object will move?

#### Properties of ramps impact movement

- How can I change the way an object moves down a ramp (faster, farther, etc.)?
- How can I design a fair test to assess my ramp?
- How can I determine whether different surfaces affect the way an object travels down a ramp?

#### Balance

- How do balanced objects compare?
- How can I determine an effective base of an object for balance?

#### Skills

#### Test

Formulate a testable question; Hypothesize a reasonable result; Identify possible variables and begin to intentionally control variables; Design and conduct a simple experiment; Collect and begin to record evidence using the senses; Draw a simple conclusion based on evidence; Communicate findings; Predict the results of a similar experiment and justify the prediction; Evaluate limitations and improvements

#### Investigate

Ask a simple question; locate 2-3 obvious details to support an answer; communicate findings.



# Science Grade 1

Learners will analyse daily and seasonal change in the environment.

## Earth and Space Science: Daily and Seasonal Changes

### Rationale

A close observation of the environment allows learners to become aware of changes: changes in physical factors, such as temperature, wind, or light, and changes in plants and animals. Learners will discover that changes often occur in cycles, including the relatively short cycle of day and night and the longer cycle of the seasons.

Recognizing these patterns prepares learners to make predictions about how animals and plants adapt for seasonal change. This unit allows for data collection over time, preferably over the whole school year, as learners collect and record weather and seasonal observations.

### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Investigate** the effect of weather on the environment and on living things (CZ, COM, CT, TF)
- **Investigate** the effect of seasons on the environment and on living things (CZ, COM, CT, TF)
- **Compare** weather observed in seasons (COM, CT, TF)
- **Investigate** weather and seasonal preparedness (CZ, COM, PCD, CT, TF)
- **Investigate** the interconnectiveness of living things and seasonal cycles (CZ, COM, CT)

## Concepts (and Guiding Questions)

### Effect of weather on living things

- How does weather affect living things?
- How do plants change when it is sunny?
- How does animal behaviour change in different weather?
- How do temperature and sunlight change throughout the day?

### Effect of seasons on the environment and living things

- How do animals and plants change their behaviours or appearance for different seasons?
- How do the activities I do change with the seasons?

### Weather observed in seasons

- How do temperature and sunlight change with the seasons?
- How can I predict when it will be warm? When it will rain a lot?

### Weather and seasonal preparedness

- How can I prepare to stay safe in various seasons?
- How can I predict what weather protection I need each day?

### Interconnectiveness of living things and seasonal cycles

- How do living things show interconnectiveness?
- How do seasonal cycles affect living things?

## Skills

### Analyse

Gather and select information. Reflect on the information. Communicate findings.

### Investigate

Ask a question; locate 4-5 obvious details to support an answer; communicate findings.

### Compare

Make observations; begin to identify similarities and differences beyond the obvious; reflect on the findings.

# Science Grade 1

Learners will **analyse** interconnectiveness of living things and the environment.

## Life Science: Needs of living things

### Rationale

A study of living things provides an opportunity for learners to discover many different forms of life. Learners will investigate similarities and differences to develop an understanding of the general characteristics of living things. Learners will discover that all living things have needs; some of these needs are similar and some are unique. Learners should have opportunities to make first-hand observations of plants and animals. These observations will lead to grouping organisms based on similar characteristics, the beginnings of classification. Through investigations, learners will gain an awareness of the dynamic nature of life and the idea that all living things are interconnected. Learners will also explore the idea of stewardship of the earth and gain an appreciation of our shared responsibility for protecting living things and the environment.

### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Investigate** the needs of living things (CZ, COM, PCD, CT)
- **Classify** living things (COM, CI, CT, TF)
- **Investigate** living things within the environment, inclusive of a Mi'kmaw perspective (CZ, COM, PCD, CT)
- **Investigate** personal actions that can contribute to a healthy environment (CZ, COM, PCD, CT, TF)

## Concepts (and Guiding Questions)

### Requirements for life

- How does my favourite animal or plant get nourishment?
- How are plants and animals affected when they don't get the nourishment they need?

### Classification of living things

- How are living things similar? How are they different?
- How can living things be classified?

### Interconnectiveness of living things of the environment

- How does the environment help my favourite plant or animal survive?
- How do animals and plants interact?
- How do animals and plants interact with their environment?

### Personal actions that can contribute to a healthy environment

- How can my actions hurt the environment?
- How can I keep the environment healthy?

## Skills

### Analyse

Gather and select information. Reflect on the information. Communicate findings.

### Investigate

Ask a question; locate 4-5 obvious details to support an answer; communicate findings.

### Classify

Identify attributes and select criteria for groupings; sort based on selected criteria and reflect on the grouping(s); incorporate a new item in a group, offer a reason for the choice.

# Science Grade 1

Learners will **construct** a device in response to a problem.

**Physical Science: Materials, objects, and devices**

## Rationale

An investigation of materials and their properties will prepare learners to select appropriate materials for constructing a device to solve a problem. Examples of problems or tasks learners may solve include: design and create a device that can make a variety of sounds; design and create a container that can hold sand; design and create a container that can hold the most marbles; or design a house for the three little pigs. An investigation of how the properties of materials can change will allow learners to explore how objects can be made from recycled or reused materials. Learners will employ problem solving skills as they construct their devices.

## Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

## Indicators

- **Investigate** materials and their properties (COM, CT, TF)
- **Investigate** change in properties of materials (COM, CT, TF)
- **Evaluate** materials used in device construction (CZ, COM, PCD, CI, CT, TF)
- **Investigate** how recycled materials can be used differently in the construction of devices (CZ, COM, PCD, CI, CT, TF)

## Concepts (and Guiding Questions)

**Properties of materials for device construction**

- How are the objects I use everyday made?
- How can I test the properties of various materials?
- How can I determine which materials are best suited for various purposes?
- How do the materials I choose for device construction relate to the intended purpose of my device?
- How can I determine which materials I will use to construct my device?

**Properties of materials can change**

- How can I change the properties of various materials?
- How can I restore the original properties? Why or why not?
- How does water change the properties of materials?

**Materials can be recycled for different purposes**

- How can I build something new from something older?
- How will I join various materials together?

## Skills

### Construct

Respond to a given purpose; brainstorm ideas; identify a plan; build a model; test and revise, modify as necessary; reflect on the results

### Investigate

Ask a question; locate 4-5 obvious details to support an answer; communicate findings.

### Evaluate

Review steps and results from an investigation or problem solving; Reflect on and communicate solutions or findings.

# Science Grade 2

Learners will analyse the interconnectiveness of air and water in the environment, inclusive of a Mi'kmaw perspective.

## Earth and Space Science: Air and water in the environment

### Rationale

With this outcome, learners will explore the characteristics of air and water and their interconnectivity. Much of the science investigation to date has been of concrete objects; in contrast, gases are sometimes only visible through their effects. Through investigations, learners will explore changes and interactions of air and water when they are heated or cooled, as well as their movement through the environment. This will lead to an exploration of evaporation and condensation. Learners will have multiple opportunities to collect, record, and analyse data. Learners will discover that water and air are vitally important and gain an understanding how pollution can affect living things.

### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Investigate** the effect of temperature on the movement of air (COM, CT, TF)
- **Investigate** the relationship between air and water (COM, CT, TF)
- **Investigate** the interconnectiveness of Mi'kmaw people, air and water (CZ, COM, CT)
- **Analyse** how personal actions can contribute to healthy air and water (CZ, COM, PCD, CI, CT)

## Concepts (and Guiding Questions)

### Temperature affects the movement of air

- How can I show that air is a real substance if I can't see it?
- How can I tell that air takes up space?
- How does warm air move?
- How can I move an object using only air?

### Evaporation and condensation

- How can I find evidence of moisture in the environment?
- How does water form on the outside of a cold glass?
- How can I determine where the water from a puddle goes when it is sunny?
- How can I create an instrument to measure the amount of rainfall?

### Interconnective relationship of Mi'kmaw people with air and water

- How are air and water important to Mi'kmaw people?
- How can we keep water clean?

### Personal actions can contribute to a healthy environment

- How is water important to me?
- How can I keep the environment healthy?

## Skills

### Analyse

Gather and select information. Begin to consider appropriateness of information. Communicate findings.

### Investigate

Ask a question; locate several details to support an answer; organize details to compare choices; communicate findings.

# Science Grade 2

Learners will analyse the relationship between animal growth and the environment.

## Life Science: Animal Growth and Changes

### Rationale

Observing the growth and development of an individual organism can be a powerful learning experience, especially if the learner shares responsibility for its care. For example, learners can raise a butterfly from caterpillar to adult. The growth and development of the butterfly can then be compared to that of other animals and of themselves. This also provides an opportunity to investigate conditions for healthy growth of organisms. Learners will be challenged to make and record observations and to compare life cycles of various organisms. Learners will notice patterns of growth and how these patterns can be used to make predictions about different types of organisms.

### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Compare** patterns of growth (COM, CT)
- **Compare** the life cycles of familiar animals (COM, CT, TF)
- **Investigate** conditions for healthy growth (COM, CT, TF)
- **Analyse** environments that support the health and growth of animals (CZ, COM, CI, CT)
- **Investigate** the interconnectiveness of animals and the environment (CZ, COM, PCD, CT)

## Concepts (and Guiding Questions)

### Patterns of growth

- How do plants change as they grow?
- How do I change as I grow up?

### Life cycles of various animals

- How do plants make more plants?
- How do life cycles of various animals compare?

### Conditions for healthy growth

- How do the needs of animals and plants change as they grow?
- How can I stay healthy?

### There is an interconnectiveness between animals and the environment

- How can I design a home for my favourite organism?
- How can the environment hurt or help the growth of various organisms?

## Skills

### Analyse

Gather and select information. Begin to consider appropriateness of information. Communicate findings.

### Compare

Make observations; identify similarities and differences; begin to offer an interpretation; reflect on the findings

### Investigate

Ask a question; locate several details to support an answer; organize details to compare choices; communicate findings.

# Science Grade 2

Learners will investigate liquids, solids, and mixtures.

## Physical Science: Liquids and solids

### Rationale

Categorizing liquids and solids provides one way for learners to organize their understanding of everyday substances. Learners will observe the similar and unique properties of solids and liquids. They will investigate ways in which solids and liquids interact in mixtures and learn that substances can have both a solid and a liquid phase. Investigations will extend to real-world problems involving viscosity, solutions and buoyancy.

### Competencies

- Communication (COM)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Investigate** states of matter (COM, CT, TF)
- **Investigate** the properties of liquids and solids (COM, CT, TF)
- **Investigate** various combinations of liquids and solids (COM, CT, TF)

## Concepts (and Guiding Questions)

### States of matter

- How does the state of matter affect its properties?
- How can I change the state of water?

### Properties of liquids and solids

- How do various liquids compare?
- How do various solids compare?

### Dissolving and non dissolving

- How do various materials interact with water?
- How does mixing salt and water compare with mixing sand and water?
- How do various liquids mix together?

## Skills

### Investigate

Ask a question; locate several details to support an answer; organize details to compare choices; communicate findings.

# Science Grade 2

## Learners will test motion of objects.

### Physical Science: Motion

#### Rationale

The study of moving things offers learners an opportunity to develop a sense of space, orientation, perspective, and relationship. Through observation, and the use of specific language, learners develop the ability to describe where things are and how they are moving. Learners will explore how descriptions of an object's position and motion depend upon their perspective. Various types of motion will be explored as well as the factors that affect motion. Learners will engage in problem solving as they design and construct their own devices that move in specific ways. Learners will explore the design of fair tests which is the foundation for further scientific investigations involving control of variables.

#### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

#### Indicators

- **Investigate** types of motion (COM, CT, TF)
- **Investigate** factors that affect motion (COM, CT, TF)
- **Investigate** relative position and impact of perspective and orientation (CZ, COM, PCD, CT)
- **Test** ramp properties for their impact on motion (COM, CI, CT, TF)

### Concepts (and Guiding Questions)

#### Types of motion

- How can I predict how an object will move by examining it?
- How can I draw a diagram of the motion of an object?

#### Factors that affect motion

- How can I design a fair test to determine which toy car will move the fastest? Farthest? Slowest?
- How can I build an object that moves?
- How can I change how an object moves?
- How do height and surface properties of a ramp affect the motion of an object?

#### Relative position

- How can I identify an object's location using another student's description?
- How can position be described?

#### Impact of perspective and orientation

- How are perspective and orientation related?
- How does the appearance of an object change based on the perspective it is viewed from?

### Skills

#### Test

Formulate a testable question; Hypothesize a reasonable result; Identify possible variables and intentionally control variables; Design and conduct a simple experiment; Collect and record evidence using the senses; Draw conclusions based on evidence; Communicate findings; Predict the results of a similar experiment and justify the prediction; Evaluate limitations and improvements

#### Investigate

Ask a question; locate several details to support an answer; organize details to compare choices; communicate findings.

# Science Grade 3

## Learners will analyse soil in the environment.

### Earth and Space Science: Soil

#### Rationale

An investigation of soil will lead learners to the discovery that soil is an environment for many living things. By examining soils, learners discover that soils are made up of more than one type of substance and that the particular combination of materials in soil has an impact on the types of organisms that can live in the soil. A focus on the ways in which soil can be altered, especially changes that occur as a result of water, leads learners to discover how soil is impacted by humans and the environment. Learners will have opportunities to observe, manipulate, and test various soil samples to explore their composition, water absorption, drainage, and erosion.

#### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

#### Indicators

- **Investigate** the properties of soil (COM, CT, TF)
- **Investigate** how water interacts with soil in the environment (COM, CT, TF)
- **Classify** soil samples (COM, CI, CT)
- **Analyse** the interconnectiveness of soil, living things, and the environment (CZ, COM, PCD, CI, CT)

### Concepts (and Guiding Questions)

#### Properties of soil

- How do soils from different areas compare?
- How do soil characteristics change when digging down deeper into the earth?

#### Soil separation

- How can I separate soil into its component parts?
- How does separating the soil into its component parts help with soil classification?
- How do the component parts that make up soil differ in samples from various areas?

#### Erosion, water absorption and drainage

- How much water do different soil types hold?
- How do rain and moving water affect various soil types?

#### Soil as an environment for living things (interconnectiveness)

- How do the types of organisms differ in samples from various areas?
- How do the living organisms found in the soil differ as I dig down into the soil?
- How is soil important?

### Skills

#### Analyse

Gather and select appropriate information. Consider the appropriateness of information. Communicate findings.

#### Investigate

Ask questions; locate several details to support an answer; organize and compare details; communicate findings.

#### Classify

Identify attributes and select criteria for groupings; sort based on selected criteria and reflect on the grouping (s); incorporate a new item in a group, begin to offer a Rationale for the choice.



# Science Grade 3

## Learners will investigate plants in the environment.

### Life Science: Plants

#### Rationale

Learners will engage in careful observation of how plants grow and respond to their natural environment which will reveal patterns of growth. Learners will investigate how various conditions affect plant growth and they will explore and compare the life cycles of various plants. The interconnectedness between plants, the environment, and humans will be explored as well as the cultural importance of plants.

#### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Critical Thinking (CT)
- Technological Fluency (TF)

#### Indicators

- **Investigate** how various plant parts change over the life cycle (COM, CT, TF)
- **Investigate** factors that affect plant growth (COM, CT, TF)
- **Investigate** the interconnectiveness of plants, living things, and the environment (CZ, COM, PCD, CT)
- **Investigate** the uses of plants, including plants as medicine (CZ, COM, PCD, CT, TF)

### Concepts (and Guiding Questions)

#### Life cycles of various plants

- How do the functions of various plants parts compare?
- How do various plant parts change over the life cycle?
- How are roots important for healthy plants?
- How do plants make more plants?

#### Factors that affect plant growth

- How do the optimal conditions for plant growth compare for various types of plants?
- How do various factors alter the growth of roots, stems and leaves?

#### Interconnectiveness of plants, humans and the environment

- How are plants important for humans?
- How can we take care of plants and the environment?

#### Plants as medicine

- How are plants used?
- How are plants used as medicines?

### Skills

#### Investigate

Ask questions; locate several details to support an answer; organize and compare details; communicate findings.

# Science Grade 3

## Learners will investigate invisible forces.

### Physical Science: Invisible Forces

#### Rationale

This outcome will introduce learners to two kinds of forces that can act between objects when the objects are not touching, magnetic and electrostatic. Some forces involve direct pushes and pulls, where a surface is directly contacted, while others involve interaction at a distance. Through investigations, learners will discover that magnetic forces and static electric forces involve attraction and repulsion and that they act on different types of materials. Learners will explore how these forces can affect their everyday lives. Investigations of invisible forces presents an opportunity to practice skills such as data collection, data recording and data analysis as well as the skills of prediction and hypothesis creation.

#### Competencies

- Communication (COM)
- Critical Thinking (CT)
- Technological Fluency (TF)

#### Indicators

- **Investigate** electrostatic forces (COM, CT, TF)
- **Investigate** magnetic forces (COM, CT, TF)
- **Investigate** factors that affect magnet strength (COM, CT, TF)

### Concepts (and Guiding Questions)

#### Static electricity

- How can various materials be charged with static electricity?
- How can we make the biggest static charge?

#### Magnetic forces

- How can I make a magnet?
- How are various materials affected by magnets?

#### Factors that affect the strength of a magnet

- How can I measure the strength of a magnet?
- How can a magnet be made stronger??

#### Skills

#### Investigate

Ask questions; locate several details to support an answer; organize and compare details; communicate findings.

# Science Grade 3

Learners will **construct** a structure in response to a design challenge.

## Physical Science: Structures

### Rationale

By taking part in the problem solving process to address a challenge, learners will discover that the characteristics of the structures they build, such as their strength, are linked to the properties of the materials they use and to the particular way the materials are configured and joined. Learners will test and evaluate their structures based on design challenge criteria; they will be challenged to refine their designs as appropriate. The testing of structures allows for exploration of the idea of a fair test which provides the foundation for the scientific concept of control of variables. Testing and the design process will also provide opportunities to practice skills of measurement and data analysis.

### Competencies

- Communication (COM)
- Personal Career Development (PCD)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Investigate** shapes in structures (COM, PCD, CT, TF)
- **Evaluate** potential materials for use in construction (COM, PCD, CT, TF)
- **Investigate** ways that materials are joined during construction (COM, PCD, CI, CT, TF)
- **Evaluate** the structure according to design challenge criteria (COM, CT, TF)

## Concepts (and Guiding Questions)

### Structural materials and their properties

- How do the materials that make up the various structures I see around me compare?
- How does the choice of materials affect the properties of the structure?

### Structural shapes and their strength and stability

- How are various shapes used in the structures around me?
- How do the shapes used in construction affect the properties of the structure?

### Ways to join materials

- How are materials joined in structures that I see around me?
- How does the way of joining materials in construction affect the properties of the structure?

### Structure design

- How can I solve a design challenge?
- How can I tell if the structure I constructed met the design challenge?

## Skills

### Construct

Identify a purpose; brainstorm ideas; identify a plan; gather and select information to support plan; build a model; test and revise, modify as necessary; reflect on the results

### Investigate

Ask questions; locate several details to support an answer; organize and compare details; communicate findings.

### Evaluate

Review steps and results from an investigation or problem solving. Reflect on and communicate alternative solutions or findings. Begin to identify potential new problems or issues.

# Science Grade 4

Learners will investigate a variety of local natural habitats.

## Life Science: Habitat

### Rationale

Through careful observation of local habitats, learners will come to identify components and characteristics that differentiate various habitats. Learners will explore the basic needs of living things and explore how various organisms satisfy their needs in the habitat in which they are typically found. Students can begin to look for ways in which organisms in one habitat differ from those in others and to consider how some of those differences are helpful for survival.

### Competencies

- Citizenship (CZ)
- Communication (COM)
- Critical Thinking (CT)

### Indicators

- **Investigate** characteristics of a variety of local habitats and the organisms that inhabit them (CZ, COM, CT)
- **Investigate** factors necessary for survival of a plant or animal in a local habitat (CZ, COM, CT)
- **Investigate** the effect of changes in a habitat (CZ, COM, CT)

## Concepts (and Guiding Questions)

### Habitat components and characteristics

- How can different organisms share the same habitat?
- How can patterns and relationships be observed in local habitats?

### Survival needs of organisms

- How do various living things sense and respond to stimuli in their environment?
- How are various organisms adapted to survive in their habitat?

### Habitats can change

- How do local habitats change through the seasons? Over successive years?
- How can observations about habitats be recorded/displayed?
- How can a change in the habitat affect the organisms that live there?

## Skills

### Investigate

Ask and revise questions; Locate several relevant details to support an answer; organize and compare details; identify relationships and communicate findings.

# Science Grade 4

Learners will **analyse** interconnectiveness of and within local habitats, inclusive of a Mi'kmaw perspective.

## Life Science: Habitat

### Rationale

While exploring and investigating the plants and animals that live and interact in various local habitats, learners will observe the impact they can have on the environment. The concept of interconnectiveness will be further explored by looking at the variety of populations that exist in a habitat and the impact of the loss of one population on a community. Ideas of populations, food chains, predator/prey relationships and the roles of producers, consumers and decomposers will be developed. An analysis of interconnectiveness will empower students to take small steps in their local area to ensure habitats are preserved and protected.

### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Creativity and Innovation (CI)
- Critical Thinking (CT)

### Indicators

- **Analyse** relationships among organisms and the environment in a local habitat (CZ, COM, CT)
- **Analyse** food webs in a local habitat (CZ, COM, CI, CT)
- **Investigate** human impacts on local habitats (CZ, COM, PCD, CT)
- **Investigate** interconnectiveness of habitats (CZ, COM, PCD, CT)

## Concepts (and Guiding Questions)

### Interconnectiveness

- How are living and nonliving things interconnected within local habitats?
- How do various living things show interconnectiveness within local habitats?
- How are various habitats interconnected with each other?

### Food webs

- How can feeding relationships in a local habitat be illustrated?
- How does a change in the food web affect other organisms in the web?

### Human impacts

- How are humans impacting local habitats?
- How can humans reduce their impact on local habitats?

## Skills

### Analyse

Gather and select appropriate information; Begin to reflect on the appropriateness of the information; Communicate findings.

### Investigate

Ask and revise questions; Locate several relevant details to support an answer; organize and compare details; identify relationships and communicate findings.

# Science Grade 4

## Learners will investigate properties of light.

### Physical Science: Light

#### Rationale

An investigation of the properties of light allows for further development of scientific thinking processes. Learners will hone their skills of questioning, observation, cause and effect, as well as drawing conclusions from evidence. An exploration of the properties of light will begin by observing how light interacts with various objects in the environment. These observations help learners gain an understanding of light sources and of materials that block or change the path of light. Probeware serves as a useful tool that can provide quantitative and graphical data. From these investigations, learners begin to infer that light travels in straight lines.

#### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

#### Indicators

- **Investigate** natural and artificial sources of light (COM, CT, TF)
- **Investigate** how light is absorbed, transmitted, reflected and refracted (COM, CT, TF)
- **Measure** light using probeware (COM, CI, CT, TF)

### Concepts (and Guiding Questions)

#### Properties of light (absorption, transmission, reflection, refraction)

- How can the properties of light, such as absorption, transmission, reflection, refraction be demonstrated?
- How can various colours be created from white light?

#### Natural and artificial sources of light

- How do the properties of natural and artificial sources of light compare?
- How do we use natural and artificial light differently?

#### Measuring light

- How can light be measured?
- How can we use probeware to examine changes in the properties of light?

### Skills

#### Investigate

Ask and revise questions; Locate several relevant details to support an answer; organize and compare details; identify relationships and communicate findings.

#### Measure

# Science Grade 4

Learners will investigate how light is used.

## Physical Science: Light

### Rationale

An understanding of the properties of light will be enhanced as learners investigate how light is used in nature and in optical devices. An exploration of lenses and mirrors will lead to an understanding of how images can be distorted, magnified or made smaller. Learners will explore the functions of various optical devices that have been developed over time. These optical devices allow learners to enhance their senses and learn more about the universe.

### Competencies

- Communication (COM)
- Personal Career Development (PCD)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Investigate** technologies that use light (COM, PCD, CT, TF)
- **Investigate** optical devices (COM, PCD, CT, TF)

## Concepts (and Guiding Questions)

### Technologies that use light

- How is light used in various technologies?
- How can light be controlled?

### Optical devices

- How are optical devices helpful?
- How do various optical devices work?

## Skills

### Investigate

Ask and revise questions; Locate several relevant details to support an answer; organize and compare details; identify relationships and communicate findings.

# Science Grade 4

## Learners will investigate sound in the environment.

### Physical Science: Sound

#### Rationale

Sound is a phenomenon that can be sensed, measured and controlled in various ways. Music provides an appropriate context for this outcome. Learners will explore sound production using music to see how various musical instruments can impart different qualities of sound. An investigation of sound in the environment can be facilitated through the use of probeware. The varying ability of humans and other animals to detect sound can also be explored which will lead to discussions about the necessity of ear protection and technologies to enhance hearing.

#### Competencies

- Citizenship (CZ)
- Communication (COM)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

#### Indicators

- **Investigate** the impact of environmental factors on sound (CZ, COM, CT, TF)
- **Investigate** devices that produce, amplify and receive sound (COM, CT, TF)
- **Measure** sounds in the environment using probeware (COM, CI, CT, TF)

### Concepts (and Guiding Questions)

#### Environmental factors that impact sound

- How are sounds impacted by various environmental factors?
- How does noise pollution affect living things?

#### Sound devices

- How is sound used by various devices?
- How can I make a quiet sound louder?

#### Measuring sound

- How is sound measured?
- How can sounds be altered?

#### Skills

#### Investigate

Ask and revise questions; Locate several relevant details to support an answer; organize and compare details; identify relationships and communicate findings.

#### Measure



# Science Grade 4

Learners will test how properties of sound change.

## Physical Science: Sound

### Rationale

Learning how sound is caused by vibrations is important as learners explore both factors that affect sound production and how sound travels. Learners will inquire about sound production and how pitch and intensity can be varied. The testing of how various materials and states of matter reflect and transmit sound provides an opportunity to practice scientific processes. Using this knowledge, they will be able to design their own musical instruments or sound-making devices.

### Competencies

- Communication (COM)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Investigate** vibration as the source of sound (COM, CT)
- **Test** how various materials and states of matter absorb, reflect and transmit sound (COM, CI, CT, TF)
- **Investigate** how high pitched, low pitched, loud and soft sounds can be made (COM, CT, TF)

## Concepts (and Guiding Questions)

### Vibration as the source of sound

- How are sounds produced?
- How does a loud sound feel? How does a low sound feel?

### Properties of sound (pitch, volume)

- How can the properties of sound such as pitch and volume be demonstrated?
- How can we modify sound?
- How does sound change if the source of sound is moving?

### Sound interacts differently with different materials

- How does sound interact with various materials?
- How can I determine the loudest/quietest place in the school?

### Sound travels through solids, liquids and gases differently

- How does sound travel through water?
- How is sound affected when it travels through various states of matter?

## Skills

### Test

Formulate a testable question; Hypothesize a reasonable result; Identify possible variables and intentionally control variables; Design and conduct an experiment ; Collect and record evidence; Draw conclusions based on evidence; Communicate findings; Predict the results of a similar experiment and justify the prediction; Evaluate limitations and improvements.

### Investigate

Ask and revise questions; Locate several relevant details to support an answer; organize and compare details; identify relationships and communicate findings.

# Science Grade 4

Learners will analyse rocks, minerals, and fossils in the local environment.

## Earth and Space Science: Rocks and Minerals

### Rationale

In addition to exploring the living things around them, learners will become familiar with the Earth materials that make up their world. From observing, recording descriptions and classifying the rocks and minerals in their local habitat, to exploring the make-up of soil and the fossils that can be found in it, learners can hone their inquiry skills. An analysis of rocks, minerals, and fossils in the local environment provides an opportunity to discover that rocks are used for many things and that rock characteristics help determine their use.

### Competencies

- Citizenship (CZ)
- Communication (COM)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Investigate** properties of rocks and minerals in the local environment (CZ, COM, CT)
- **Investigate** how fossils are formed (COM, CT)
- **Classify** local rocks and minerals (COM, CI, CT)
- **Analyse** uses of rocks and minerals (CZ, COM, CT, TF)

## Concepts (and Guiding Questions)

### Properties of rocks and minerals

- How do various rocks from the local environment compare?
- How do minerals combine to make rocks?

### Fossil formation

- How do fossils form?
- How do fossils help us learn about the past?

### Classification

- How can local rocks and minerals be classified?
- How can classification help us learn about rocks and minerals?

### Uses of rocks and minerals

- How are rocks and minerals used in everyday life?
- How are rocks and minerals from everyday objects recycled?

## Skills

### Analyse

Gather and select appropriate information; Begin to reflect on the appropriateness of the information; Communicate findings.

### Investigate

Ask and revise questions; Locate several relevant details to support an answer; organize and compare details; identify relationships and communicate findings.

### Classify

Identify attributes and select criteria for groupings; Sort based on selected criteria and reflect on the grouping(s); Incorporate a new item in a group, begin to offer a Rationale for the choice based on relationships.

# Science Grade 4

Learners will investigate how the Earth's surface changes over time.

## Earth and Space Science: Rocks and Minerals

### Rationale

Through an investigation of how the Earth's surface changes over time, learners will extend their understanding of soil composition from concepts explored in grade 3 to look at the factors that affect landscape changes. Learners will investigate the changing landscape by examining the processes of erosion, transport and deposition. Additionally, learners will determine how wind, water and ice reshape the landscape. Learners will explore the impact of both humanity and nature on the Earth and will come to realise that the Earth is a dynamic, ever-changing planet.

### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Critical Thinking (CT)

### Indicators

- **Investigate** how rocks change (COM, CT)
- **Investigate** erosion (COM, CT)
- **Investigate** human impacts on the rock cycle (CZ, COM, PCD, CT)

## Concepts (and Guiding Questions)

### Rock cycle

- How is planet Earth considered a closed material system?
- How is soil part of the rock cycle?

### Erosion

- How can the effects of weather be seen on the Earth's surface?
- How do rocks change over time?
- How does erosion affect soil?

### Human impacts

- How are humans impacting the rock cycle?
- How can humans reduce their impact on the rock cycle?

## Skills

### Investigate

Ask and revise questions; Locate several relevant details to support an answer; organize and compare details; identify relationships and communicate findings

# Science Grade 5

## Learners will investigate weather.

### Earth and Space Science: Weather

#### Rationale

Daily weather conditions are not the result of random occurrences but are part of larger systems and patterns that can be predicted in the short term and on a seasonal basis. Through the study of weather, learners will investigate the characteristics of air, its movement and its ability to hold water. Learners will consider the various aspects of weather such as temperature, wind speed, precipitation and cloud formation. Data collection and predictive processes are developed using weather instruments and probeware.

#### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

#### Indicators

- **Investigate** the water cycle (COM, CT)
- **Measure** weather conditions using instruments and probeware (COM, PCD, CI, CT, TF)
- **Investigate** weather-related oral traditions, including Mi'kmaw oral traditions (CZ, COM, CT)

### Concepts (and Guiding Questions)

#### Water cycle in the atmosphere

- How does water move within the atmosphere?
- How do various forms of precipitation occur?

#### Weather Instruments and measurement

- How is weather measured?
- How do we predict weather?
- How does weather in different parts of the world compare?
- How does the weather in different seasons compare?
- How does collected weather data compare to weather measured in other places?

#### Weather oral traditions

- How do weather oral traditions inform us?
- How do weather oral traditions compare?

### Skills

#### Investigate

Ask and revise questions; Locate several relevant and dependable details to support an answer; Organize and compare details; Identify relationships and communicate findings.

#### Measure

# Science Grade 5

Learners will investigate how weather impacts daily life.

## Earth and Space Science: Weather

### Rationale

This investigation contextualizes and extends the weather-related learning from the previous outcome. Learners will explore the role of science and technology in weather preparedness and impacts on daily life. The significance of seasonal cycles and events for various cultures will be investigated. Learners will explore the impacts of weather on living and non-living things in their local environment.

### Competencies

- Citizenship (CZ)
- Communication (COM)
- Critical Thinking (CT)

### Indicators

- **Investigate** how weather affects living and non-living things in a local environment (CZ, COM, CT)
- **Investigate** how living things prepare for and respond to weather (CZ, COM, CT)
- **Investigate** the significance of seasonal cycles and natural seasonal events (CZ, COM, CT)

## Concepts (and Guiding Questions)

### Weather conditions affect living and non-living things

- How does weather impact daily life?
- How do animals respond to weather in different seasons?

### Weather-related technologies for preparing and responding to weather (umbrellas, showshoes, lightning rod, seawall)

- How do we use particular clothing or tools such as umbrellas, showshoes, lightning rod, and seawall to respond to weather conditions?
- How do we design structures to protect us from weather?

### Significance of seasonal cycles and events

- How are seasonal cycles important to various communities?
- How do living beings prepare for seasonal events?

## Skills

### Investigate

Ask and revise questions; Locate several relevant and dependable details to support an answer; Organize and compare details; Identify relationships and communicate findings.

# Science Grade 5

## Learners will construct effective simple and compound machines.

### Physical Science: Forces and Simple Machines

#### Rationale

Learners will explore motion and the forces causing motion with the application of forces to the construction of machines. Learners will investigate the ability of simple machines to accomplish tasks. The design and uses of simple and compound machines in daily life will be explored. Learners will construct solutions to design challenges using simple machines singly or in combination.

#### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

#### Indicators

- **Investigate** common simple and compound machines (COM, CT, TF)
- **Compare** machines used in daily life (CZ, COM, PCD, CT, TF)
- **Investigate** forces in simple machines (COM, CT, TF)
- **Apply** concepts of simple machines in the construction of simple and compound machines (COM, PCD, CI, CT, TF)
- **Test** constructed machines for effectiveness (COM, CT, TF)

#### Concepts (and Guiding Questions)

##### Types of simple and compound machines (levers, pulleys, screws, wheel and axle, wedge, inclined plane)

- How are the screw and inclined plane similar? How are they different?
- How do the various types of simple machines compare?

##### Simple and compound machines used in daily life

- How do I use simple machines every day?
- How can a simple machine help us to do work?

#### Types of forces in simple machines

- How do simple machines use the same forces differently to accomplish tasks?
- How do simple machines transfer force?

#### Constructing simple and compound machines

- How can I construct simple machines?
- How can I combine several simple machines to solve a complex task?

#### Machine effectiveness

- How can the effectiveness of a machine be tested?
- How can the effectiveness of a machine be improved?

#### Skills

##### Construct

Identify a purpose; Brainstorm ideas; Identify a detailed plan; Gather and select information to support plan; Identify and choose options within the plan offer reasons to support choices; Build a model; Test and revise, modify as necessary; Reflect on the results and alternative options.

##### Investigate

Ask and revise questions; Locate several relevant and dependable details to support an answer; Organize and compare details; Identify relationships

##### Compare

Make observations; Identify similarities and differences; Identify relationships and offer an interpretation; Reflect on the findings.

##### Apply

Carry out or complete a procedure/ technique.

##### Test

Formulate a testable question; Hypothesize a reasonable result; Identify possible variables and intentionally control variables; Design and conduct an experiment; Collect, record, and analyze evidence; Draw conclusions based on evidence; Communicate findings; Predict the results of a similar experiment and justify the prediction; Evaluate limitations and improvements.

# Science Grade 5

Learners will **analyse** how the body functions to meet its needs.

## Life Science: Healthy Body

### Rationale

Organs and systems function together to help humans and other animals meet their basic needs. Learners will explore the major internal organs through the use of models and simulations. Many factors can affect a healthy body and an analysis of how the body functions to meet its needs will allow learners to explore the role they play in maintaining a healthy body.

### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Investigate** the function and structure of body systems and how they are interconnected (COM, PCD, CT)
- **Analyse** ways to maintain health body systems (CZ, COM, PCD, CT, TF)
- **Investigate** the ways the body protects itself (CZ, COM, CT)
- **Measure** vital signs (COM, PCD, CT, TF)

## Concepts (and Guiding Questions)

### Basic structures and functions of body systems

- How are my major body systems structured?
- How do the major body systems function?

### Body systems are interconnected

- How are the major body systems interconnected?
- How does my digestive system interact with my circulatory system?

### Ways to maintain health

- How can I maintain a healthy body?
- Why is a healthy body important?

### Ways the body protects itself

- How does my body protect itself from microbes?
- How is my body designed physically for protection?

### Vital signs

- How can we measure vital signs?
- How can my vital signs be changed??

## Skills

### Analyse

Gather and select appropriate information; Begin to reflect on the appropriateness of the information; Communicate findings.

### Investigate

Ask and revise questions; Locate several relevant and dependable details to support an answer; Organize and compare details; Identify relationships

### Measure

# Science Grade 5

Learners will **test** how physical and chemical changes affect the properties of matter.

## Physical Science: Chemical and Physical Properties

### Rationale

Materials around us have properties that are important to their use. By studying materials used in various applications, learners will explore physical and chemical properties. Learners will test how substances can be changed through reactions to display new properties. Conservation of mass in physical and chemical changes will be investigated.

### Competencies

- Communication (COM)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Investigate** physical and chemical properties of matter (COM, CT, TF)
- **Compare** physical and chemical changes (COM, CT, TF)
- **Test** physical and chemical changes of various substances (COM, CI, CT, TF)
- **Investigate** the conservation of mass in physical and chemical changes (COM, CT)

## Concepts (and Guiding Questions)

### Physical and chemical properties of matter

- How do chemical and physical properties of a substance compare?
- How can physical and chemical properties be tested?

### Physical and chemical changes

- How do physical and chemical changes compare?
- How does dissolving happen?
- How can physical changes be reversed?  
Chemical changes?

## Conservation of mass during physical and chemical changes

- How do chemical changes affect mass? Physical changes?
- How can changes in mass be measured?
- How does the overall mass of an ice block change as it melts?

### Skills

#### Test

Formulate a testable question; Hypothesize a reasonable result; Identify possible variables and intentionally control variables; Design and conduct an experiment; Collect, record, and analyze evidence; Draw conclusions based on evidence; Communicate findings; Predict the results of a similar experiment and justify the prediction; Evaluate limitations and improvements.

#### Investigate

Ask and revise questions; Locate several relevant and dependable details to support an answer; Organize and compare details; Identify relationships.

#### Compare

Make observations; Identify similarities and differences; Identify relationships and offer an interpretation; Reflect on the findings.



# Science Grade 6

## Learners will test the flow of electrical energy through various materials.

### Physical Science: Electricity

#### Rationale

An exploration of how electricity works will help students recognize the need for safe practices when around electricity. Learners will investigate various materials and their ability to conduct electricity. The testing of series and parallel circuits allows for the refinement of scientific processes and permits the comparison of a variety of circuit pathways. From this, learners will be able to design solutions to electrical problems by completing various circuits and circuit drawings.

#### Competencies

- Communication (COM)
- Personal Career Development (PCD)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

#### Indicators

- **Investigate** static electricity (COM, CT, TF)
- **Investigate** materials that conduct electricity (COM, CT, TF)
- **Test** series and parallel circuits for movement of electric current (COM, CI, CT, TF)
- **Analyse** circuit drawings for effectiveness (COM, PCD, CT, TF)
- **Compare** how series and parallel circuits are used (COM, PCD, CT, TF)
- **Investigate** the relationship between electricity and magnetism (COM, CT, TF)

#### Concepts (and Guiding Questions)

##### Static Electricity

- How can static charge be generated?
- How does the static electricity in our clothes compare to the electricity that runs our computers?

##### Conductors and insulators

- How does conduction or insulation vary in different materials?
- How are conductors and insulators used in electrical devices?

##### Electric currents move through series and parallel circuits

- How does electricity move?
- How is the direction of the flow of electricity similar in series and parallel circuits? How is it different?
- How does a switch affect a circuit?
- How do differences in the circuit pathways affect the strength of the electrical current?

##### Using series and parallel circuits in everyday life

- How are series circuits used in everyday life?
- How are parallel circuits used in everyday life?

##### Circuit drawings

- How can circuits be represented for others to interpret?
- How can I tell if a circuit drawing would conduct electricity?

##### Electric currents have magnetic fields

- How can magnetic field be generated by an electric current?
- How are magnetically generated electric currents used?

#### Skills

##### Test

Formulate a testable question; Hypothesize a reasonable result; Identify possible variables and intentionally control variables; Design and conduct an experiment; Collect, record, and analyze evidence; Draw conclusions based on evidence; Communicate findings; Predict the results of a similar experiment and justify the prediction; Evaluate limitations and improvements.

##### Investigate

Ask and revise questions; locate several relevant and dependable details to support an answer; organize and compare details; identify relationships, recognize represented perspectives, and communicate findings.

##### Analyse

Gather and select appropriate information. Begin to reflect on accuracy, validity, and, importance, of the information. Communicate findings.

##### Compare

Make observations; identify similarities and differences; identify relationships and offer an interpretation; reflect on the findings.

# Science Grade 6

Learners will **evaluate** renewable and non-renewable sources of energy.

## Physical Science: Electricity

### Rationale

Learners will explore energy use at home and at school along with the impact energy consumption has on resources used to generate electricity. Learners will investigate energy transformations such as light, sound, motion, heat etc... and compare renewable and non-renewable sources of energy. Learners will explore how personal actions can lead to reducing electrical energy consumption in our environment.

### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Compare** renewable and non-renewable energy (CZ, COM, PCD, CT, TF)
- **Investigate** types of energy transformation (COM, CT, TF)
- **Analyse** impact of electrical energy consumption (CZ, COM, PCD, CT, TF)

## Concepts (and Guiding Questions)

### Methods of generating electricity, including renewable and non-renewable

- How is electricity generated?
- How do sources of renewable and non-renewable energy compare?

### Energy transformation

- How can energy be transformed?
- How can electrical energy generate light?
- How can we measure these energy transformations?

### Impact of energy consumption

- How does energy consumption impact the environment?
- How can energy consumption be reduced?

## Skills

### Evaluate

Review steps and results from an investigation or problem solving. Reflect on and communicate varying perspectives and alternative solutions or findings. Identify potential new problems and/or issues.

### Investigate

Ask and revise questions; locate several relevant and dependable details to support an answer; organize and compare details; identify relationships, recognize represented perspectives, and communicate findings.

### Compare

Make observations; identify similarities and differences; identify relationships and offer an interpretation; reflect on the findings.

### Analyse

Gather and select appropriate information. Begin to reflect on accuracy, validity, and, importance, of the information. Communicate findings.

# Science Grade 6

Learners will **evaluate** factors that influence flight.

## Physical Science: Flight

### Rationale

Learners will explore the science and technology involved in flight as they investigate how things fly and develop and test a variety of prototype devices. A comparison of the characteristics of flight for living and non-living things will provide a foundation for the investigation of forces involved in flight. Learners will test flying devices for design, lift, movement and control.

### Competencies

- Communication (COM)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Compare** the characteristics of flight for living and non-living things (COM, CT, TF)
- **Investigate** forces involved in flight (COM, CT, TF)
- **Test** flying devices (COM, CI, CT, TF)

### Concepts (and Guiding Questions)

#### Characteristics of flight for living and non-living things

- How do flying living things compare with flying non-living things?
- How can the principles of flight be demonstrated/seen?

#### Forces involved in flight

- How are forces balanced in a flying object?
- How is floating different from flying?

#### Flying devices

- How can I test a flying device?
- How can I improve the performance of a flying device?

## Skills

### Evaluate

Review steps and results from an investigation or problem solving. Reflect on and communicate varying perspectives and alternative solutions or findings. Identify potential new problems and/or issues.

### Compare

Make observations; identify similarities and differences; identify relationships and offer an interpretation; reflect on the findings.

### Investigate

Ask and revise questions; locate several relevant and dependable details to support an answer; organize and compare details; identify relationships, recognize represented perspectives, and communicate findings.

### Test

Formulate a testable question; Hypothesize a reasonable result; Identify possible variables and intentionally control variables; Design and conduct an experiment; Collect, record, and analyze evidence; Draw conclusions based on evidence; Communicate findings; Predict the results of a similar experiment and justify the prediction; Evaluate limitations and improvements.

# Science Grade 6

## Learners will investigate components of space.

### Earth and Space Science: Space

#### Rationale

Learners will investigate the interactions within the major components of the solar system and universe. These interactions will lead to an investigation of daily and seasonal cycles as well as the involvement of the Earth's moon in tides, eclipses and moon phases. Learners will also investigate how various cultures interpret space phenomena

#### Competencies

- Citizenship (CZ)
- Communication (COM)
- Creativity and Innovation (CI)
- Critical Thinking (CT)
- Technological Fluency (TF)

#### Indicators

- **Investigate** components of the solar system and constellations (COM, CT, TF)
- **Investigate** how Earth's rotation and revolution relate to the cycle of day and night, and the seasons (CZ, COM, CT)
- **Investigate** the involvement of Earth's Moon in tides, eclipses and moon phases (CZ, COM, CT)
- **Investigate** oral traditions of space phenomena, including Mi'kmaw oral traditions (CZ, COM, CI, CT)

#### Concepts (and Guiding Questions)

##### Characteristics of components of the solar system and constellations

- How does planet Earth relate to the rest of the universe and its components?
- How big is the universe? How do we know?
- Revolution and rotation of planets
- How do the planets move?
- How do rotation and revolution compare?

##### Tides

- How are tides created?
- How do tides change throughout the year?

##### Eclipses

- How are eclipses created?
- How do the types of eclipses compare?

##### Moon phases

- How does the appearance of the moon change throughout the cycle?
- How does the timing of moonrise and moonset change over a month?

##### Oral traditions of space phenomena, including Mi'kmaw oral traditions

- How does the story of Muin and the Seven Bird Hunters teach us about the progression of the constellations and the seasons?
- How can oral traditions teach us about space phenomena?

#### Skills

##### Investigate

Ask and revise questions; locate several relevant and dependable details to support an answer; organize and compare details; identify relationships, recognize represented perspectives, and communicate findings.

# Science Grade 6

Learners will investigate innovations used in space exploration.

## Earth and Space Science: Space

### Rationale

As various components of the solar system are explored, learners will investigate technologies such as telescopes, satellites and space probes that have been developed to allow for the exploration of the solar system. This creates a unique opportunity to discuss the role of technology in advancing scientific discovery. The experiences that astronauts have as they live in space can be explored alongside Canadian and global innovations.

### Competencies

- Citizenship (CZ)
- Communication (COM)
- Personal Career Development (PCD)
- Critical Thinking (CT)
- Technological Fluency (TF)

### Indicators

- **Investigate** Canadian and global innovations in space exploration (CZ, COM, PCD, CT, TF)
- **Investigate** how astronauts meet their needs in space (CZ, COM, PCD, CT, TF)

## Concepts (and Guiding Questions)

### Space exploration innovations

- How has technology permitted the exploration of space?
- How have Canadian scientists contributed to space exploration?

### Innovations have allowed humans to live in areas where they have not adapted

- How are the needs of humans in space different from those on Earth?
- How are the needs of humans met in space?

## Skills

### Investigate

Ask and revise questions; locate several relevant and dependable details to support an answer; organize and compare details; identify relationships, recognize represented perspectives, and communicate findings.

# Science Grade 6

Learners will **analyse** diversity of life in nature and significant relationships within the natural world.

## Life Science: Diversity of Life

### Rationale

Living things can be subdivided into smaller groups with common characteristics. Learners will explore classification schemes and identify similarities and differences among living things. Learners will make careful observations of living things to recognize distinguishing features. Additionally, the relationship between living things and their environment will be explored with a focus on adaptations of organisms for survival.

### Competencies

- Citizenship (CZ)
- Communication (COM)
- Creativity and Innovation (CI)
- Critical Thinking (CT)

### Indicators

- **Investigate** the characteristics of living things (COM, CT)
- **Classify** a set of living things (COM, CI, CT)
- **Investigate** applications of taxonomy for learning about diversity of life (COM, CT)
- **Compare** animals based on their characteristics (COM, CT)
- **Analyse** how organisms adapt depending on where they live (CZ, COM, CT)
- **Investigate** significant ecological relationships (CZ, COM, CT)

### Concepts (and Guiding Questions)

#### Characteristics of living things

- How do we know if something is alive?
- How do single-celled organisms meet their basic needs for survival?

#### Classification and taxonomy of living things

- How are single- or multi-celled organisms important in the Animal Kingdom?
- How do vertebrates compare to invertebrates?
- How are plants different from animals?
- How is classification useful?

#### General characteristics of animals (mammals, birds, reptiles, amphibians, fishes, insects etc...)

- How are animals in Kingdoms similar to each other?
- How do the various organisms of the animal phyla compare?

#### Adaptations to the environment

- How do the features of animals allow them to survive/thrive in their environment?
- How do changes in the environment affect the organisms that live there?

#### Ecological relationships (competition, symbiosis, predation)

- How do animals relate to one another?
- How are the relationships among animals interconnected within the environment?

### Skills

#### Analyse

Gather and select appropriate information. Begin to reflect on accuracy, validity, and, importance, of the information. Communicate findings.

#### Investigate

Ask and revise questions; locate several relevant and dependable details to support an answer; organize and compare details; identify relationships, recognize represented perspectives, and communicate findings.

#### Classify

Identify attributes and select criteria for groupings and subgroupings; sort based on selected criteria and reflect on the grouping(s); incorporate a new item in a group, offering a rationale for the choice based on relationships.

#### Compare

Make observations; identify similarities and differences; identify relationships and offer an interpretation; reflect on the findings.