



Grade 1 Daily and Seasonal Changes

TEACHER'S GUIDE

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Daily and Seasonal Changes

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Let's Do Science, Newfoundland and Labrador

Grade 1 Unit 1: Daily and Seasonal Changes Teacher's Guide

Reviewer:

Catherine Phillips, NL

Science Consultants:

Ron Ballentine, ON

Nadine Norris, ON

Indigenous Reviewer:

Craig White, Education Consultant, St. John's, NL

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175 Hillmount Road, Markham, Ontario, Canada, L6C 1Z7.

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Welcome to the *Daily and Seasonal Changes* Unit

In this unit, students develop their understanding of daily and seasonal changes (including the seasons, weather, day vs. night, and the importance of the sun) through a variety of explorations and investigations. Multiple program components will engage students and support learning of the specific science concepts.

Science Cards

This collection of 10 Science Cards will support students' exploration of daily and seasonal changes with each large-format card focusing on a different concept. The bright, colourful photographs and detailed illustrations will engage students and give them multiple opportunities to explore a variety of concepts. These stand-alone cards can also be used at centres to stimulate student explorations. Also, digital versions of these cards are available on the Teacher's Website to be used with an Interactive Whiteboard.



Science Read Aloud

The Read Aloud text allows you to introduce and engage students with science concepts. *First Snow in the Woods* by Carl R. Sams II and Jean Stoick uses vibrant photographs and gentle prose to express the change of seasons from fall to winter.



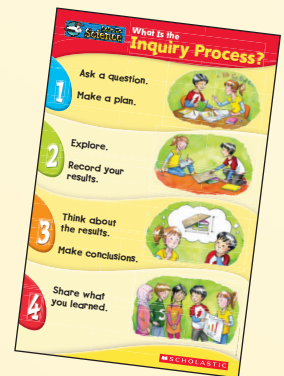
Anchor Video

The Anchor Video: *Daily and Seasonal Changes*, found on the Teacher's Website, introduces students to essential questions about concepts including the changing seasons, the importance of the sun, differences between day and night, and the daily cycles of people, plants, and animals. The video gives a number of examples to activate students' thinking and to promote questions.



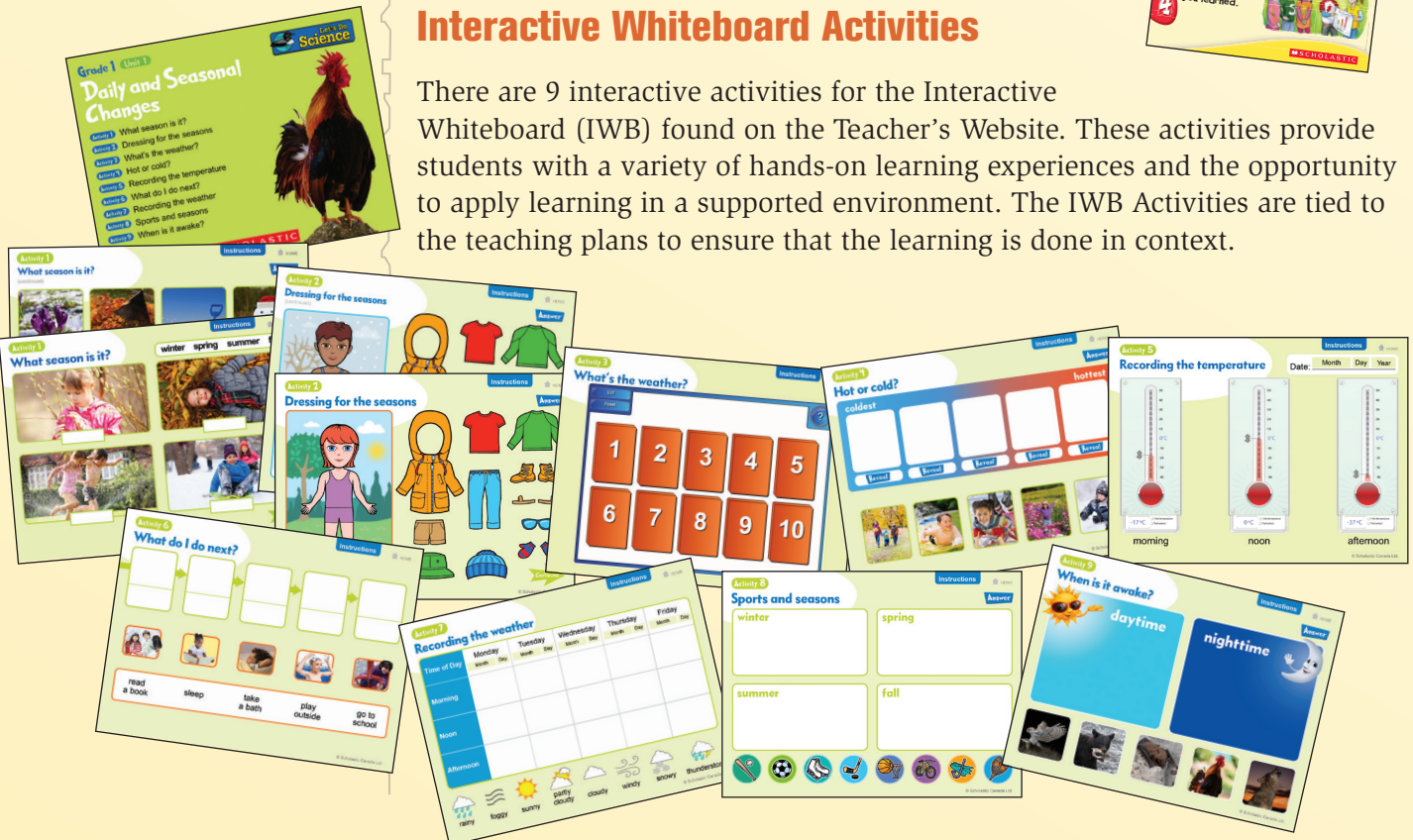
Poster

The *What Is the Inquiry Process?* poster will support students as they follow the steps for guided and open inquiries throughout the unit and learn to question, observe, and explore.



Interactive Whiteboard Activities

There are 9 interactive activities for the Interactive Whiteboard (IWB) found on the Teacher's Website. These activities provide students with a variety of hands-on learning experiences and the opportunity to apply learning in a supported environment. The IWB Activities are tied to the teaching plans to ensure that the learning is done in context.





Science Library

The Science Library provides a collection of colourful and engaging non-fiction and fiction texts at a variety of reading levels. These texts support students as they explore various science concepts and skills. See the Science Library Guide in the Teacher's Guide Binder or online for brief summaries, science connections, and suggested reading approaches (e.g., Independent Reading and Read Aloud).

Teacher's Guide

This guide provides detailed suggestions for using all of the program components including the Science Cards, Anchor Video, reproducible Blackline Masters (BLMs), and IWB activities with your students. Visual cues such as book covers, thumbnail images, and icons highlight the use of each program component along with tools such as Science Folders and Journals, the Word Wall, and the I Wonder Wall. Strategies and tools you need to assess students' learning, such as rubrics and checklists, are also included.

Embedded within the teaching plans are connections to Guided, Shared, and Read Aloud texts from *Literacy Place for the Early Years*, Grade 1 that relate to the concepts explored in *Daily and Seasonal Changes*.

Teacher's Website

In addition to the Science Cards, Anchor Video, and IWB Activities mentioned above, the Teacher's Website provides a digital copy of the Teacher's Guide for this unit along with access to an image bank containing the variety of photographic images found on the Science Cards and IWB Activities. These images may be used for teachers to create new IWB activities or for students to incorporate into presentations. Find the Teacher's Website at scholastic.ca/education/nlscience
Password: Sci1nL2

Planning Guide for *Daily and Seasonal Changes*

Teaching Plans	Specific Curriculum Outcomes	Program Components	Materials	Literacy Place Connections
What Are the Seasons? Students will practise inquiry skills, and will group and sequence objects and materials related to the seasons.	Skills [GCO 2] • 3.0 • 9.0	- Anchor Video: <i>Daily and Seasonal Changes</i> - Science Card 1 - IWB Activity 1 - IWB Activity 2 - BLM <i>What Should I Wear? 1 and 2</i> - BLM <i>The Four Seasons</i>	- silly summer and winter hats - variety of seasonal items (such as those at the Curiosity Centre) - dolls or stuffed animals and season-specific doll clothes or pictures of season-specific clothes - index cards - digital camera (optional) - reference materials related to seasons in NL, Canada, or elsewhere in the world - students' Science Folders - hula hoop - globe or ball	<i>What Do You See? A Book About the Seasons</i> (Guided Reading, Level D) <i>Spring Is Here!</i> (Guided Reading, Level C) <i>What Do I Need?</i> (Guided Reading, Level D)
Why Is the Sun Important? Students will develop and practise inquiry skills while exploring changes in heat and light from the sun.	Skills [GCO 2] • 5.0 • 8.0 • 13.0 STSE/K [GCO 1/3] • 4.0	- Science Card 2 <i>What Is the Inquiry Process?</i> poster	- index cards - thermometer - small containers of cold water and warm water - coloured markers - digital camera (optional)	<i>A Hot Day</i> (Guided Reading, Level C)
What Is It Like Outside? Students will describe daily changes in temperature and weather.	Skills [GCO 2] • 1.0 • 2.0 • 3.0 • 5.0 • 7.0 • 8.0 • 13.0 STSE/K [GCO 1/3] • 4.0 • 6.0	- Science Card 3 - IWB Activity 3 - IWB Activity 4 <i>What Is the Inquiry Process?</i> poster - IWB Activity 5 - Science Card 4	- index cards - students' Science Journals - thermometer(s) - coloured markers - masking tape or chalk - notebooks - pictures or videos of weather reports - digital camera (optional)	<i>Rain</i> (Read Aloud—Changes Inquiry Unit)

Teaching Plans	Specific Curriculum Outcomes	Program Components	Materials	Literacy Place Connections
What Is My Daily Cycle? Students will describe, sequence, and group their daily activities in relation to the day-night cycle. They will observe and describe daily changes in weather.	Skills [GCO 2] • 9.0 • 10.0 STSE/K [GCO 1/3] • 11.0	- Science Card 5 - BLM <i>My Day</i> - Science Card 6 - IWB Activity 6 - BLM <i>My Weather Report</i> - IWB Activity 7 - BLM <i>What Is Your Favourite Game?</i> - IWB Activity 8	- index cards or masking tape - three colours of sticky notes - index cards - icons, cut outs, or sketches that represent weather conditions - items or pictures of items related to seasonal sports (e.g., hockey puck, skateboard, bike, skis, ice skates, jump rope, in-line skates, baseball, basketball) - reference materials that report day lengths	
Do Animals and Plants Have Daily Cycles? Students will investigate and describe daily changes in the characteristics, behaviours, and locations of animals and plants.	STSE/K [GCO 1/3] • 11.0 • 12.0	- Science Card 5 (optional) - Science Card 7 <i>What Is the Inquiry Process?</i> poster - BLM <i>My Pet's Day</i>	- time-lapse video of a morning glory or sunflower seedlings - reference materials related to diurnal and nocturnal animals	<i>Daytime, Nighttime</i> (Shared Reading—Changes Inquiry Unit)
How Do We Prepare for the Seasons? Students will explore and describe human preparations for seasonal changes.	STSE/K [GCO 1/3] • 15.0	- Science Card 8 - IWB Activity 2 - BLM <i>Getting Ready 1 and 2</i>	reference materials related to seasonal changes for people working in the food industry (e.g., fishers and farmers)	<i>Camping at the Lake</i> (Shared eReading)
How Do Animals and Plants Prepare for the Seasons? Students will explore seasonal changes in the behaviours, characteristics, and locations of animals and plants.	STSE/K [GCO 1/3] • 14.0	<i>First Snow in the Woods</i> (Read Aloud) - Science Card 9 - Science Card 10 - BLMs <i>Pond Life 1</i> and <i>Pond Life 2</i> - Science Card 1 (optional)	- reference material related to - seasonal changes in native animals of Newfoundland and Labrador - seasonal changes in pond life - seasonal activities of people who work with animals - digital camera and printer (optional)	<i>What Do You Do in the Cold?</i> (Shared Reading—Changes Inquiry Unit) <i>Winter Animals Are Sleeping</i> (Guided Reading, Level E)

Preparing for the Unit

1. Curiosity Centre

The curiosity centre gives students an opportunity to investigate science ideas and tools through active participation, free explorations, and independent play. In this hands-on centre, students can touch, feel, and explore objects related to daily and seasonal changes.

The Curiosity Centre could have

- season-related items (fall leaf, paper snowflake, sunglasses, seed package, mittens, umbrella, beach shovel and pail, sandals, rain boots, rake, photograph of a komatik [Inuit sled])
- tools for measuring weather-related phenomena, such as a rain gauge, thermometer, weather vane, barometer
- clocks, calendars, globes
- flash cards (e.g., days of the week, months of the year, seasons, weather symbols and words)

Check the centre frequently to ensure it is well stocked with items. Ask students to contribute to the centre by bringing in additional items or photographs related to weather and the seasons; if any students self-identify as Aboriginal, ask them to bring items in these categories that are related to their culture. Remind students to tidy up the materials when they are finished.

Note: You may choose to display new items every few days or introduce items one at a time throughout the unit.

2. Science Journals and Folders



Demonstrate for students how to record observations, questions, ideas, results, notes, and so on, by writing or drawing pictures in their Science Journals. Encourage students to add new questions or ideas to their Journals as often as they like.

Science Journals along with completed BLMs, drawings, stories, etc. related to the unit can be stored in the students' Science Folders.

3. Word Wall



Add any relevant science terminology to the Word Wall throughout the unit.

4. I Wonder Wall

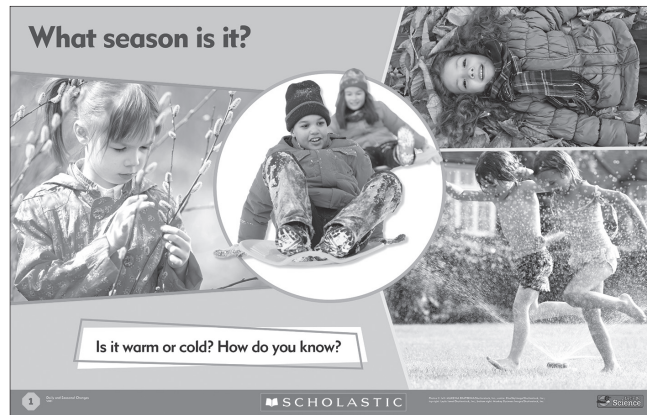


Build the I Wonder Wall throughout the unit by posting students' questions as they arise. Refer to the I Wonder Wall often and select questions that students may be ready to answer.

5. Reading Centre

Add texts (books, magazines, and photographs) relating to weather and the seasons to the Reading Centre. Or, you may choose to include these texts in the Curiosity Centre. The titles in the Science Library will help start off a collection of books. Also refer to the lists of texts pertaining to Daily and Seasonal Changes in the Additional Resources section of this guide (pages 74–75).

What Are the Seasons?



Focus: Students will practise inquiry skills, and will group and sequence items related to the seasons.

Specific Curriculum Outcomes

Students will be expected to:

- 3.0 communicate using scientific terminology [GCO 2]
- 9.0 sequence or group materials and objects [GCO 2]

Performance Indicators

Students who achieve these outcomes will be able to:

- name and sequence the seasons and months
- group objects by season
- work with others in exploring and investigating

NOTES:

Attitude Outcome Statements

Encourage students to:

- willingly observe, question, and explore [GCO 4]
- show interest in and curiosity about objects and events within the immediate environment [GCO 4]

Cross-Curricular Connections

Math

It is expected that students will:

- demonstrate an understanding of repeating patterns [1PR1]

English Language Arts

Students will be expected to:

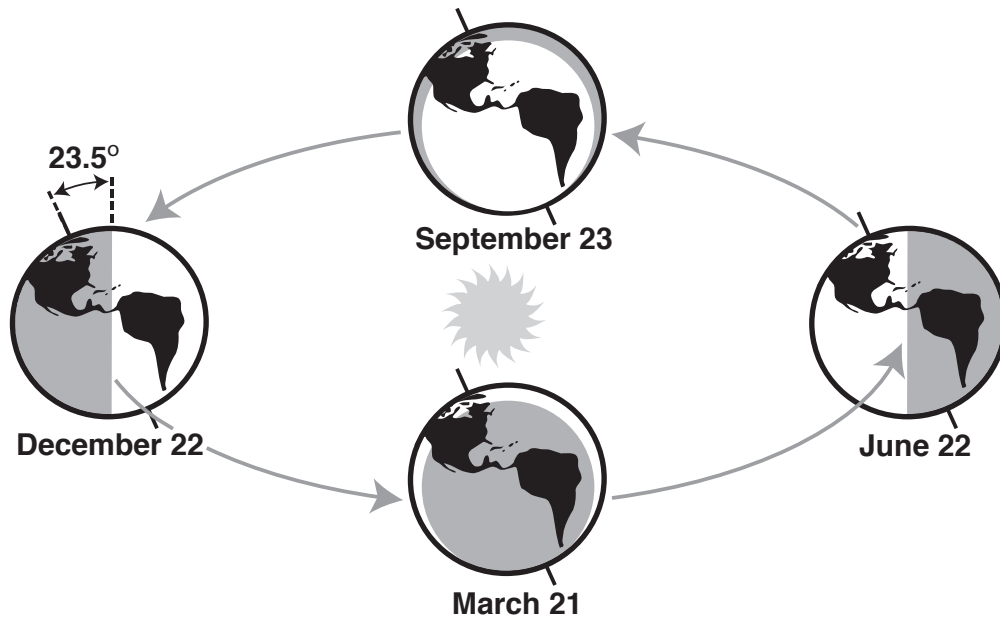
- speak and listen to explore, extend, clarify, and reflect on their thoughts, ideas, feelings, and experiences [GCO 1]
- communicate information and ideas effectively and clearly, and to respond personally and critically [GCO 2]
- interpret, select, and combine information using a variety of strategies, resources, and technologies [GCO 5]

Getting Organized

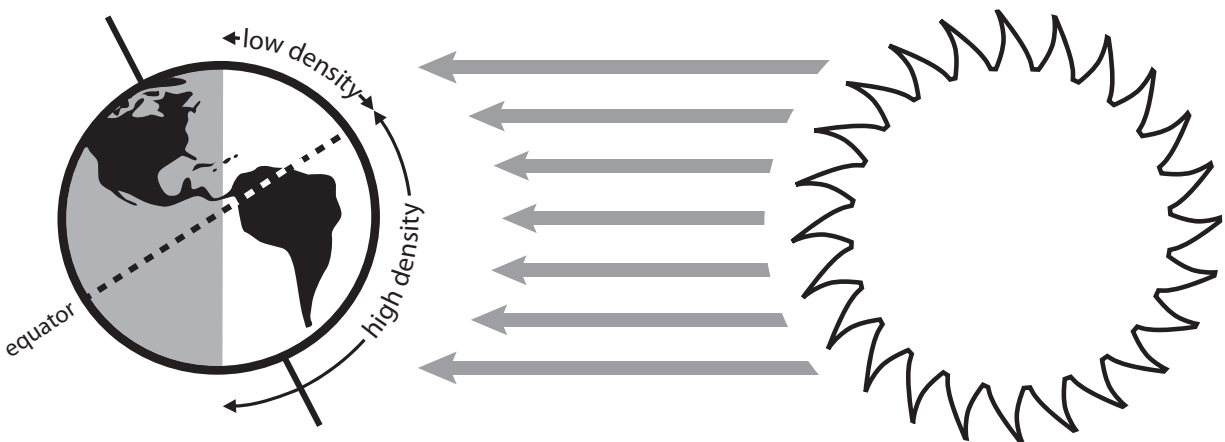
Program Components	Materials	Before You Begin	Vocabulary
• Anchor Video: <i>Daily and Seasonal Changes</i> • Science Card 1 • IWB Activity 1 • IWB Activity 2 • BLM <i>What Should I Wear? 1 and 2</i> • BLM <i>The Four Seasons</i> Literacy Place: • <i>What Do You See? A Book About the Seasons</i> (Guided Reading, Level D) • <i>Spring Is Here!</i> (Guided Reading, Level C) • <i>What Do I Need?</i> (Guided Reading, Level D)	• silly summer and winter hats • variety of seasonal items (such as those at the Curiosity Centre) • dolls or stuffed animals and season-specific doll clothes or pictures of season-specific clothes • index cards • digital camera (optional) • reference materials related to seasons in NL, Canada, or elsewhere in the world • students' Science Folders • hula hoop • globe or ball	• Post the <i>What Is the Inquiry Process?</i> poster. • Display a KWHL chart. • If you choose, invite a meteorologist or other expert to speak to the class about how the sun causes the seasons (or locate a suitable video).	• cycle • days of the week • group • months of the year • seasons • sequence • today • tomorrow • yesterday

Science Background

- Earth's seasons are caused by Earth's tilt and its orbit around the sun, which results in yearly changes in the amount of sunlight received by Earth's surface.
- Earth rotates once every 24 hours on an axis that runs between the poles. Earth also orbits the sun once every 365 days. Relative to the path of Earth's orbit, Earth's axis is tilted by 23.5° —globes are tilted to model this. As Earth orbits the sun each year, the axis is tilted either toward or away from the sun.



- The Northern Hemisphere of Earth is tilted away from the sun in the winter and toward the sun in the summer. As a result, the Northern Hemisphere receives a lower density of solar rays in the winter than in the summer. This difference in the amount of incoming heat and light from the solar rays causes the seasons. The seasons in the Southern Hemisphere are the reverse of those of the Northern Hemisphere.



Relative density of solar rays on December 21

Possible Misconceptions

At this stage, students tend to believe that all other people have lives and experiences very similar to their own, unless they have direct experiences of other places or cultures. These ideas can be challenged through discussion and research about the weather and seasons in other provinces and countries.

ACTIVATE

If the Hat Fits

Put on a silly summer hat. Invite or wait for students to comment on the hat or ask about it. Prompt thinking about seasonal conditions by asking:

- **Should I wear this outside today? Why or why not?**
- **When should I wear it?**

Students may suggest a season, a month, or specific weather. Then put on a silly winter hat. Ask:

- **Is this one okay to wear outside today? Why or why not?**

Encourage all suggestions and guide consideration of weather and seasons by using prompts such as:

- **Why?**
- **How do you know that?**
- **Have you ever worn a hat like this? When?**

Anchor Video

Play the Anchor Video: *Daily and Seasonal Changes* which is located on the Teacher's Website. Set a focus for viewing by asking students to think about what they like best about each season. You may choose to pause the video to allow students to answer questions or to discuss any questions which students may have.



What Season Is It?

Ask questions such as:

- **Can anyone name the seasons?**
- **What season are we in today?**
- **What is your favourite season?**
- **What do you like about this season? What don't you like about it?**

Have students look at the four seasonal images on Science Card 1. Ask students to describe the differences they see. Prompt thinking by asking questions such as:





- Is it warm or cold? How do you know?
- How do you know it's colder in this picture?
- You said that there was snow in this picture. How does snow feel?
- How do you feel when you play in the snow?

Using students' answers and questions, start a KWLH chart about the seasons. Model asking questions, for example:

- I wonder why it doesn't snow in summer? How might I find out?

CONNECT



What Season?

Have students name the seasons shown on Science Card 1, then add the names to the Word Wall. Add them in such a way that you can indicate a cycle by motioning with your hand (e.g., place "seasons" at the top, then place the names below so that each is the corner of a box). Have students put them in sequence by asking questions such as:

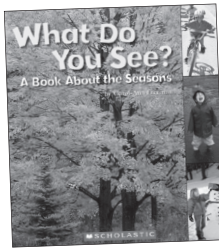
- How many seasons are there?
- What comes after fall? after winter?
- What happens the next year? Do they go in the same order?

Point out that the seasons make a cycle by motioning in a circle around the names of the seasons on the Word Wall. Explain that things happen in a cycle when they go around and around in the same sequence or order. Put "sequence" and "cycle" on the Word Wall. Invite students to communicate their understanding by asking:

- Do you know anything else that goes around and around in the same sequence?

Guide students to considering the days of the week and the months of the year as cycles. Add any other terms that come up in the discussion (e.g., "month," "day," "week") to the Word Wall. Relate these to the seasons by asking questions such as:

- What season is May in? What month comes before May?
- What month comes after May? What season is that?



Literacy Place Connection:

What Do You See? A Book About the Seasons (Guided Reading, Level D) illustrates how a tree changes in each season and provides images of what can be seen in different seasons. The seasons are also illustrated to show a cycle.

Seasonal Items

Allow students to explore and play freely with a variety of seasonal items (such as those at the Curiosity Centre). As they explore, invite students to tell you what season the items are for. Encourage students to communicate their thinking by asking questions such as:

- How do you know?
- Why did you pick that season?

Model asking questions that can lead to exploration and investigation such as:

- I wonder if people in other countries need mittens? Does anyone know how I could find out?
- I'd like to know why we plant seeds in the spring.
- What do you wonder about?



Use the KWLH chart or the I Wonder Wall to record students' comments and questions. Invite students to suggest and bring in other items for the Curiosity Centre.



Literacy Place Connection:

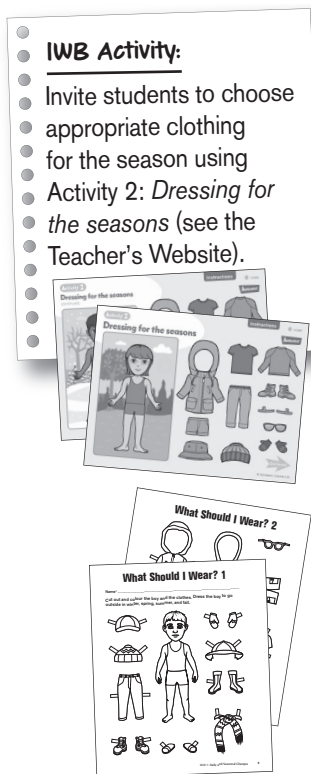
The media text *Spring Is Here!* (Guided Reading, Level C) illustrates several different signs of spring's arrival. Discuss with students how each image is a sign of spring. Invite students to suggest images that could be included for other seasons.



What Should I Wear?

Have students work in small groups. Provide each group with a doll or stuffed animal and some season-specific clothes (actual doll clothes or pictures). Challenge the students to dress the doll/animal appropriately to go outside today. Guide exploration by asking:

- Why should we put that on today?
- What would we have put on yesterday?
- Do you think we would put the same clothes on tomorrow?



Then, say something such as, “He/she is going on a trip to a different country. In that country, it is like this outside.” (Point to a different season on Science Card 1.) Ask:

- **Can he/she still wear this? Why?**
- **What should we change?**

Let students change the clothing to suit the seasonal change. As they work, ask students to explain their choices. Encourage students to consider safety in their choices and explanations. Prompt thinking by asking questions such as:

- **Why do we need to put on boots? How do boots help us?**
- **We didn't put a coat on this time. Why is that?**
- **Why do we need a coat now?**
- **What might happen if he/she didn't wear a coat?**
- **Why do we put on sunglasses? How does that keep us safe?**

Students could also use the paper doll and clothes found on BLM *What Should I Wear? 1* and *2* for this activity. Invite students to colour the clothes. Then have an adult or older buddy help students to cut them out (being careful not to cut off the tabs). Students can dress the boy to go outside in various seasons.

CONSOLIDATE

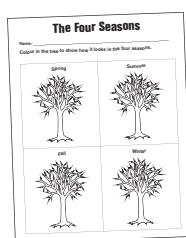
The Four Seasons

Divide students into small groups. Place index cards with the names of the seasons on the floor or on containers close to the Curiosity Centre for each group. Have each student pick one seasonal item or photo from the Curiosity Centre. Challenge students to place items in the season they think is correct. Record any questions or concerns that arise as students work. For example, items like umbrellas or sunglasses may be used in more than one season. Open up the discussion by asking questions such as:

- **Why do we wear sunglasses?**
- **Is it sunny in every season?**
- **When do we not need sunglasses?**

When sorting is completed, invite students to compare their choices with those of other groups. Encourage group members to explain any choices that differ among groups. Alternatively, have students take digital photographs of their work and compare the photographs on the Interactive Whiteboard.

Give students a copy of BLM *The Four Seasons*. Provide them with coloured pencils or crayons and ask them to draw details on the tree to show how it





will look in each season. Introduce students to their Science Folders; have students store their completed BLMs in their Science Folders.

**Literacy Place Connection:**

What Do I Need? (Guided Reading, Level D) shows what we need to go outside in different kinds of weather. Discuss with the students in which seasons these types of weather conditions occur.

EXPLORE MORE

What Season Is It There?

Invite students to explore what the seasons are like in another part of the province (e.g., Labrador versus Newfoundland or different regions within either), Canada, or the world. Individually or in small groups, allow students to decide what area they want to explore further. Provide reference materials such as books or websites. If possible, connect with a class in another part of the world so students can communicate directly about their experiences with the seasons. Have students create a presentation on a bulletin board in the class to communicate their findings.

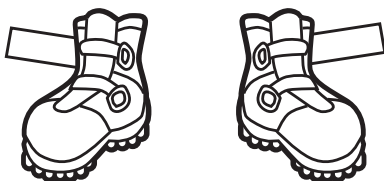
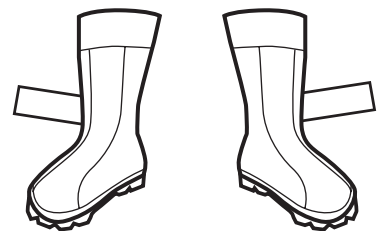
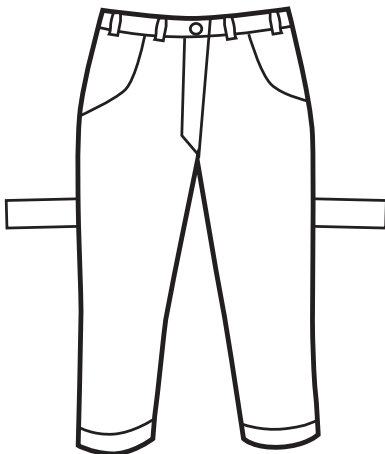
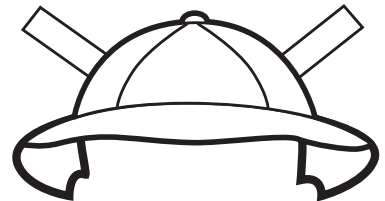
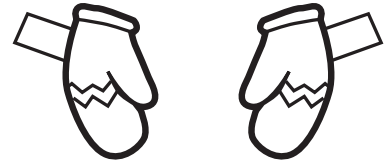
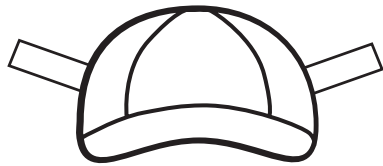
The Reason for the Seasons

Share a video or invite an expert to speak to the class about how the sun causes the seasons. (See Additional Resources on pages 74–75). After viewing the video or presentation, place a hula hoop in the centre of the classroom to represent the sun. Invite a volunteer to hold a globe or a ball marked with “poles” at an approximately 23.5° tilt, to model the tilt of the Earth. Add a sticky note or a piece of modelling clay to the globe to model the province. Have the student “orbit” around the sun so that they are always facing the same wall, while holding the tilted globe or ball. Stop the student at every half turn (summer and winter) or every quarter turn (summer, fall, winter, spring) and discuss the position of their province relative to the sun.

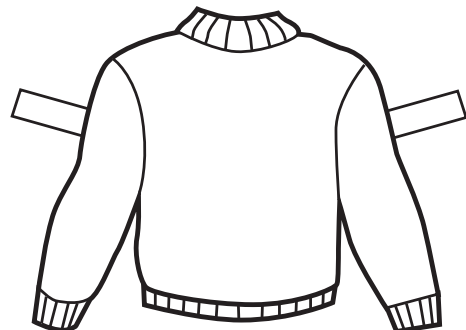
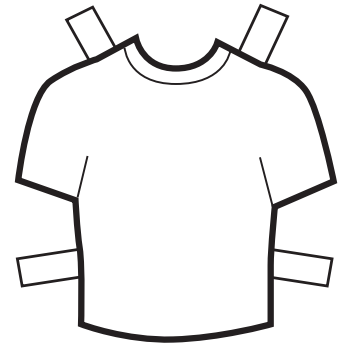
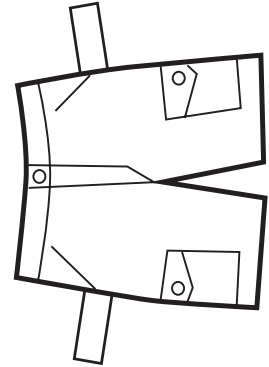
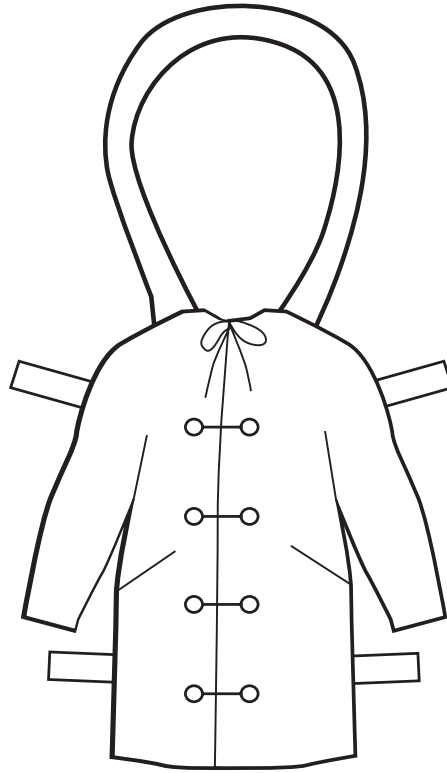
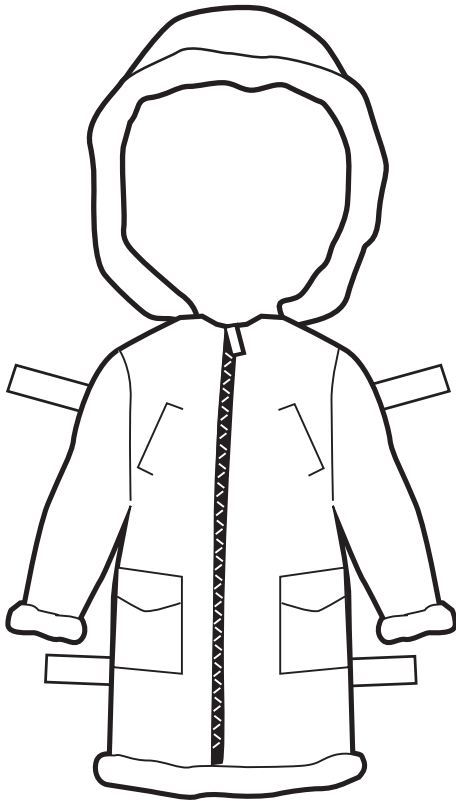
What Should I Wear? 1

Name: _____

Cut out and colour the boy and the clothes. Dress the boy to go outside in winter, spring, summer, and fall.



What Should I Wear? 2

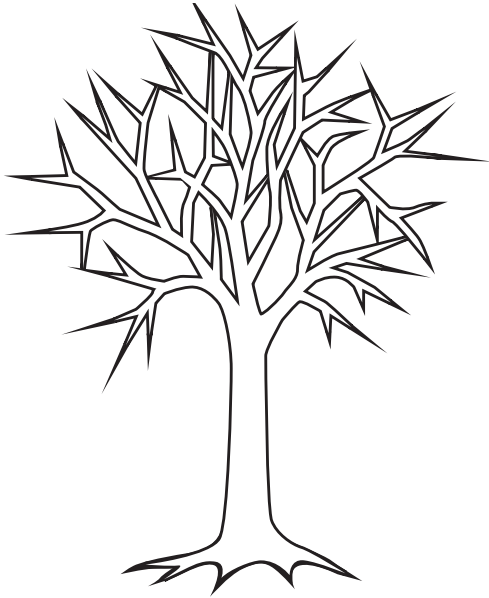


The Four Seasons

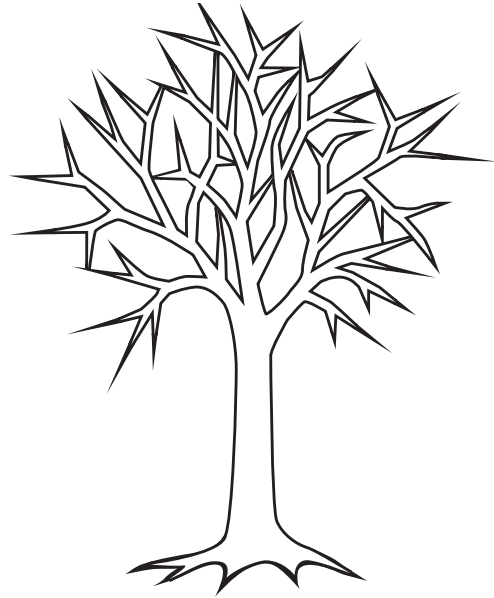
Name: _____

Colour in the tree to show how it looks in the four seasons.

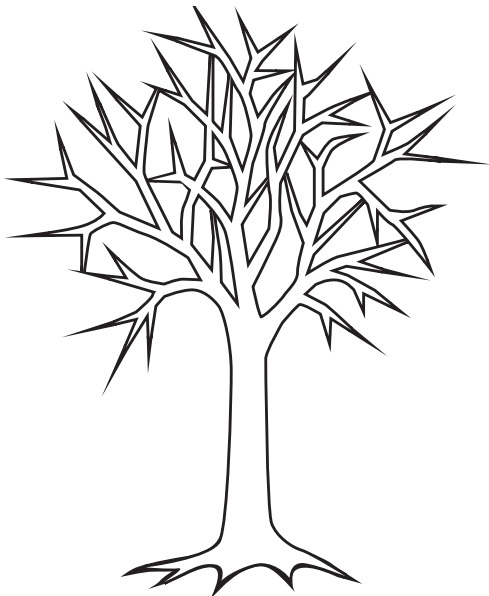
Spring



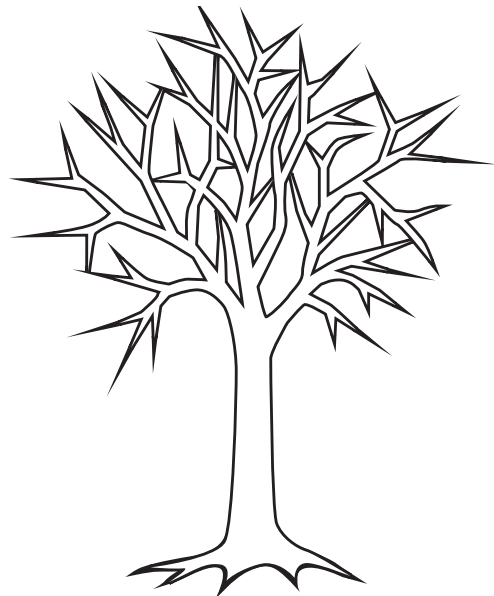
Summer



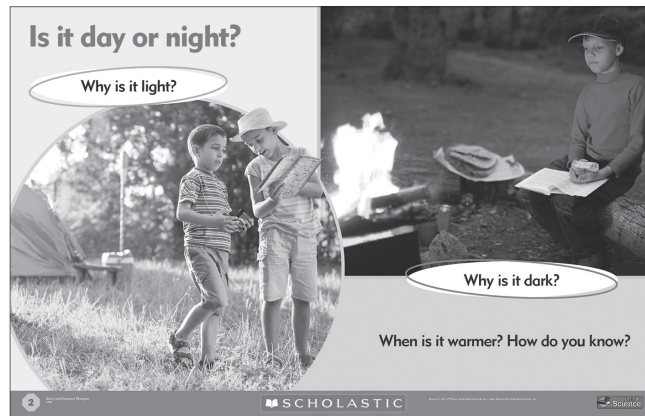
Fall



Winter



Why Is the Sun Important?



Focus: Students will develop and practise inquiry skills while exploring changes in heat and light from the sun.

Specific Curriculum Outcomes

Students will be expected to:

- 4.0 explore and investigate changes in heat and light from the sun [GCO 1/3]
- 5.0 follow safety procedures and rules [GCO 2]
- 8.0 communicate while exploring and investigating [GCO 2]
- 13.0 propose an answer to the initial question or problem and draw a simple conclusion [GCO 2]

Performance Indicators

Students who achieve these outcomes will be able to:

- describe changes in air temperature and light in sunlight and shade
- draw a picture showing differences in light and heat in summer and winter

NOTES:

Attitude Outcome Statements

Encourage students to:

- recognize the role and contribution of science in their understanding of the world [GCO 4]
- consider their observations and their own ideas when drawing a conclusion [GCO 4]
- show concern for their safety and that of others in carrying out activities and using materials [GCO 4]

Cross-Curricular Connections

English Language Arts

Students will be expected to:

- communicate information and ideas effectively and clearly, and to respond personally and critically [GCO 2]
- use writing and other forms of representation to explore, clarify, and reflect on their thoughts, feelings, experiences, and learnings; and to use their imaginations [GCO 8]
- create texts collaboratively and independently, using a variety of forms for a range of audiences and purposes [GCO 9]

Getting Organized

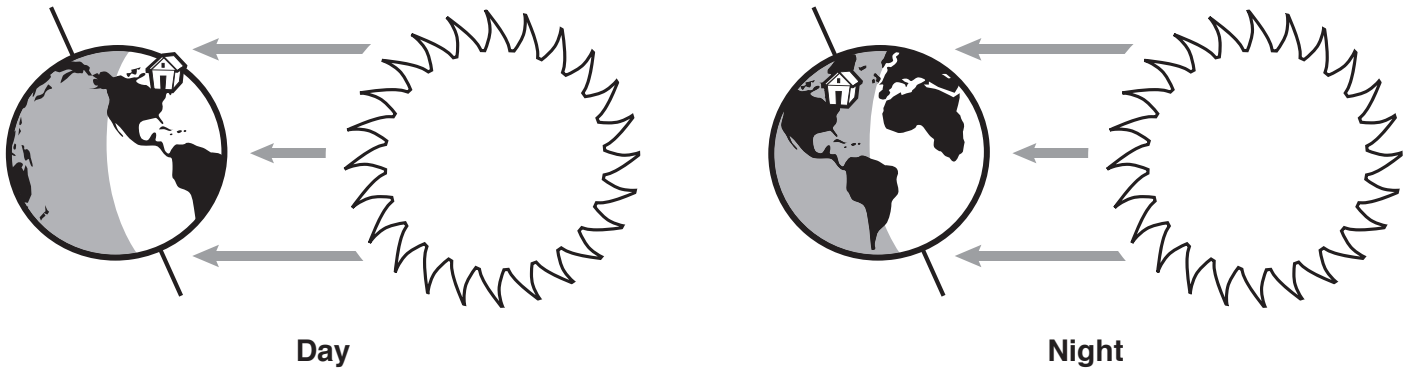
Program Components	Materials	Before You Begin	Vocabulary	
• Science Card 2 • <i>What Is the Inquiry Process?</i> poster Literacy Place: • <i>A Hot Day</i> (Guided Reading, Level C)	• index cards • thermometer • small containers of cold water and warm water • coloured markers • digital camera (optional)	• Prepare a KWHL chart.	• bright • cold • cool • dark • day • hot • light • measure • moon • night • shade • sun • temperature • thermometer • warm	• conclude • explore • investigate • observe • predict • record

Safety

- Provide students with shatterproof thermometers and supervise them closely when they handle the thermometers.
- Review school safety rules before students go outside for an investigation.

Science Background

- Earth's rotation causes day and night. Sunlight strikes only the side of the Earth that faces the sun, which changes as Earth rotates every 24 hours. Earth's rotation also makes it appear that the sun rises over the east, arcs across the sky, and goes down in the west.



- Shade is caused by the presence of an object or substance that absorbs some of the energy from the sun's rays, such as the water in clouds.
- Liquid-filled thermometers exploit the fact that liquids expand when heated, and contract when cooled. In the closed tube of a thermometer, this causes the height of the liquid in the tube to rise or fall a consistent distance in relation to temperature.
- Sunlight is an important, renewable source of energy (solar energy). Although the technology has advanced, the idea of using the sun's energy for human activities is old. Early Indigenous peoples used the sun's energy to dry food for storage (e.g., caribou meat would be dried to form jerky). Among early European peoples, it was common to use the sun's energy to dry grains or fruit.
- Sunburns are caused mainly by absorption of ultraviolet (U.V.) waves. Overexposure of the skin to U.V. waves can cause skin cancer. Sunblock lotions contain chemicals through which U.V. waves cannot pass.

Possible Misconceptions

Students may believe that the sun moves in the sky. They are also likely to believe that scientists make big “discoveries” in a mysterious way, instead of

being curious and asking questions about the world around them and trying to answer those questions.

ACTIVATE



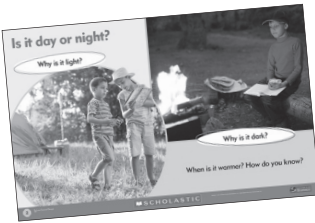
What Is the Temperature?

Write “temperature” on the Word Wall. Ask:

- What does “temperature” mean?
- What words can we use to describe something that is hot? cold?

Add students’ suggestions of descriptive words, along with “hot” and “cold,” to the Word Wall. If necessary, explain that the temperature is a measurement that tells us how hot or cold something is.

CONNECT



Day and Night

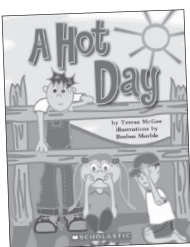
Share Science Card 2 with the class. Have students identify which image shows day and which shows night, then ask:

- How do you know? What is different?
- Is the temperature the same at night and in the day?
- Is the sun out during the night or day? How about the moon?
- What else do you know about night and day?
- What would you like to find out about night and day?

Record students’ responses in a KWL chart. Then, read the supplementary questions on the Science Card: *Why is it light? Why is it dark? When is it warmer? How do you know?* Have students offer answers. Prompt thinking by asking students to explain their answers and by asking questions such as:

- Why is it warmer in the day than at night?
- Does the sun always come up at the same time every day? Does it always go down at the same time?
- What else would you like to know about the sun? How could we find out?

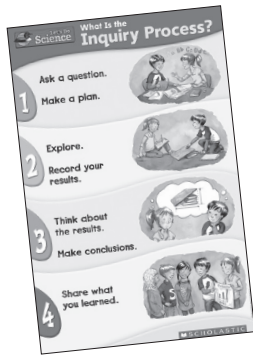
Allow students time to brainstorm ideas for how to find answers for their questions, then record their suggestions on the KWL chart.



Literacy Place Connection:

In *A Hot Day* (Guided Reading, Level C) the sun is making the farmer, the children, and the animals very hot. Discuss with students what the characters do to cool off.

CONSOLIDATE



Sun and Heat

Share with the class that science is a way of finding out about the world around us. Direct students' attention to the steps shown on the poster *What Is the Inquiry Process?* Point out that the inquiry process starts by asking a question. Read over the rest of the steps on the poster as a class, then guide a discussion of what these steps mean. Focus on the type of questions that can be explored through science inquiry by asking questions such as:

- **What are the students doing at the “Explore” step?**
- **What things might they be observing?**
- **Can we explore any of the questions on our KWHL chart by making observations?**

Model asking a question and planning an investigation for the class. Tell the class that the question you are going to investigate is:

- **Does the sun make the schoolyard warmer?**

Discuss how this question can be answered by observing something in the real world—how warm or cool an area is—by asking questions such as:

- **What might we observe to answer this question?**
- **What tool might we use to measure warmth?**
- **How could we make a record of that measurement?**

Tell students that you have made a plan to answer your question. (If students say that they already know the answer to the question, point out that they have made a prediction and that we can check their prediction using the inquiry process. Explain that, sometimes, a prediction is part of making a plan.) Begin by showing the class a thermometer, allowing each student to handle it directly. Explain that a thermometer is a tool that measures how hot or cold something is.

Place the thermometer in cold water and warm water, making sure that students see and understand the relationship between the height of the liquid and temperature, in qualitative terms. Point out the numbers on the scale and tell students that we measure temperature by reading the number beside the liquid. Explain that the number gets bigger when the temperature gets hotter.

Then, share that you plan to find out if the sun makes the playground warmer by observing the height of the liquid in the thermometer in a shady spot and in a sunny spot. (If students are ready, make the activity more open by challenging small groups to come up with their own question about the sun that they can investigate in the schoolyard using the thermometer.) Point to the step “Record your results” on the *What Is the Inquiry Process?* poster. Tell the class you plan to record your results by taping an index card to the thermometer and marking how high the liquid is in the shade and in the sun, using two different coloured markers. Demonstrate this for the students.

Before proceeding further, review any safety rules with the class, including any for going outside. Have students watch as you record the height of the liquid in the thermometer in a shady place and then a sunny place. You might have a volunteer mark the card instead. Prompt students to think about the inquiry process and make observations about heat and light from the sun, by asking questions such as:

- **Why are we doing this now?**
- **Why are we doing this in this way?**
- **Does it feel cooler or warmer in the shade? in the sun?**
- **Is it bright or dark? How do you know?**
- **What do you predict will happen to the height of the liquid in the thermometer here?**
- **How has the height of the liquid in the thermometer changed? What does this mean?**

Challenge students to observe other things that are different between the sunny and shady places (light level, shadows). Record these observations too, taking photographs if possible. If students are ready, have them decide where to take measurements elsewhere on the schoolyard. When measuring is completed, post the results in the classroom. Refer to the *What Is the Inquiry Process?* poster and point out the steps you have taken so far. Then, say that we now need to think about our results. Ask:

- **Do these results help me answer my question? How?**

Tell the class that now we will make a conclusion, which is an answer to the question we explored. As a class, brainstorm a conclusion and record it on the chart of the results. Finally, point out the last step on the poster (“Share what you learned”). Explain that when we communicate what we have learned, other people will know the answer to the question and how we found it out. Working in small groups, have students plan their own way to communicate the results and conclusion and then carry out their plans. Alternatively, have students brainstorm a conclusion in small groups. Then, have each group communicate their conclusion with the class and discuss their reasoning before having the class come up with a consensus conclusion.

If students have worked in groups to investigate their own question or are ready, make this activity more open by providing students with a thermometer taped to a white card, coloured markers, and a digital camera (optional) and challenge them to make their own plan to use these materials to find an answer to the initial question.

EXPLORE MORE

Life in the Dark

Invite students to work in a group and create a skit, a poster, or tell a story about what it would be like to live in a world without sunshine. Draw out students’ experiences of what it is like when the sun goes down early in the winter.

What Is It Like Outside?



Focus: Students will describe daily changes in temperature and weather.

Specific Curriculum Outcomes

Students will be expected to:

- 1.0 pose questions that lead to exploration and investigation [GCO 2]
- 2.0 pose new questions that arise from what was learned [GCO 2]
- 3.0 communicate using scientific terminology [GCO 2]
- 4.0 explore and investigate changes in heat and light from the sun [GCO 1/3]
- 5.0 follow safety procedures and rules [GCO 2]
- 6.0 devise ways to measure and record daily and seasonal environmental changes [GCO 1/3]
- 7.0 make and record observations and measurements [GCO 2]
- 8.0 communicate while exploring and investigating [GCO 2]
- 13.0 propose an answer to the initial question or problem and draw a simple conclusion [GCO 2]

NOTES:

Performance Indicators

Students who achieve these outcomes will be able to:

- describe daily changes in air temperature and light
- describe and predict weather
- draw a picture showing differences in light and heat in summer and winter

Attitude Outcome Statements

Encourage students to:

- recognize the role and contribution of science in their understanding of the world [GCO 4]
- consider their observations and their own ideas when drawing a conclusion [GCO 4]
- appreciate the importance of accuracy [GCO 4]
- show concern for their safety and that of others in carrying out activities and using materials [GCO 4]

Cross-Curricular Connections

English Language Arts

Students will be expected to:

- communicate information and ideas effectively and clearly, and to respond personally and critically [GCO 2]
- interpret, select, and combine information using a variety of strategies, resources, and technologies [GCO 5]
- create texts collaboratively and independently, using a variety of forms for a range of audiences and purposes [GCO 9]

Getting Organized

Program Components	Materials	Before You Begin	Vocabulary
• Science Card 3 • IWB Activity 3 • IWB Activity 4 • <i>What Is the Inquiry Process?</i> poster • IWB Activity 5 • Science Card 4 Literacy Place: • <i>Rain</i> (Read Aloud—Changes Inquiry Unit)	• index cards • students' Science Journals • thermometer(s) • coloured markers • masking tape or chalk • notebooks • pictures or videos of weather reports • digital camera (optional)	• Invite an elder, a family member, or a person who works on the sea to tell the class a weather-related story or myth related to your local area or cultural groups.	• cloudy • foggy • heat • noon • raining • shadow • snowing • sunny • weather • windy

Safety

- Provide students with shatterproof thermometers and supervise them closely when they handle the thermometers.
- Review school safety rules before students go outside for an investigation.

Science Background

- In general, the temperature at Earth's surface is lowest just before sunrise, rises in the morning, peaks in the late afternoon, and then decreases. After sunrise, the increase in sunlight gradually heats Earth's surface and its temperature increases. At noon, the sun's rays are most intense. However, it takes several hours for Earth's surface to heat up, so the maximum daily temperature is usually between 3–5 p.m. Changes in cloud cover and weather events can change this pattern on a particular day.
- The primary cause of weather is the uneven heating of Earth's surface and atmosphere by the sun's energy. This uneven heating is due to variations in the amount and location of incoming solar energy during the day-night and seasonal cycles, as well as Earth's tilt and differences in Earth's surface (e.g., land versus water). Weather changes as convection currents in the atmosphere and oceans redistribute the heat.

ACTIVATE

Weather



Add “weather” to the Word Wall. Ask students to tell you what the weather is like today. Then, show Science Card 3. Have students answer the title question: *What is the weather?* and name or describe the weather shown in each picture. Add weather terms to the Word Wall (for example, “snowy,” “rainy,” “windy,” “sunny”). Link to previous learning by asking questions about the pictures that are related to the seasons and the sun. For example, ask:

- **What season do you predict this is? Why?**
- **Does every day in that season have this weather?**
- **Do we get this weather in any other season?**

Ask students what they would wear in each type of weather and have them explain their answers. Offer funny, inappropriate clothing choices such as wearing a bathing suit in the snowstorm. Ask students if that is a good choice and why they think so. Connect students' responses to the question *How can you keep safe?* by asking what would be a better choice of clothing for this weather. Expand the discussion to include behaviours that contribute to safety, such as putting on sunblock or staying outdoors for only a short time.

Link the weather shown on Science Card 3 back to students' knowledge of the sun. Ask:

- **Is it bright or dark? Is it warm or cold?**
- **Where is the sun in this picture?**

Invite students to communicate any weather-related experiences they have had.

IWB Activity:

- Challenge students to match the weather photos with the corresponding weather words using Activity 3: *What's the weather?* (see the Teacher's Website).



Wild Weather

Invite an elder, a family member, or a person who works on the sea to tell the class a weather-related story or myth related to your local area or cultural groups. Students can share their understanding by acting out the story or drawing a picture to show the events. Alternatively, work as a class to create a story book relating the main points of the story. If possible, give a copy to the guest speaker to thank them.

CONNECT

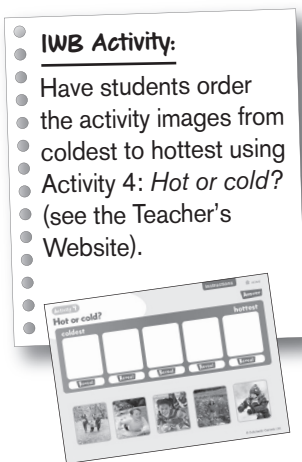
My Birthday Weather

Write the months of the year on index cards. Work with the class to put them in order using a chart or by attaching them to the wall.

Ask students to tell you the month of their birthday. Then, have them write the month on a piece of paper and draw a picture to show what the weather was like on their last birthday. Display students' drawings in the classroom, grouping them according to months. Tell students to look at all the drawings from a month of your choosing, then ask:

- Did everyone have the same weather on their birthday in this month?
- What kind of weather did most people have? Was it hot or cold? Was it bright or dark?
- What season is this month in?

Repeat for another month in a different season.



CONSOLIDATE

Does the Temperature Change Over a Day?

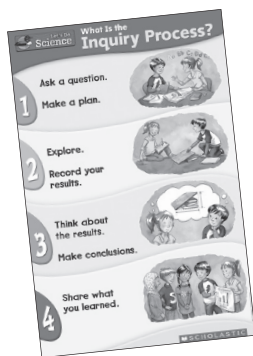
Tell students they are going to follow the inquiry process to answer the question:

- Is the temperature outside the same all day?

(If students are ready, invite them to ask their own question about the temperature outside and guide them in exploring it using a thermometer.)

Remind students of their experience with the inquiry process by having them look over their Science Journals or the posted results from the activity *Sun and Heat* (see pages 24–25). Review the steps on the *What Is the Inquiry Process?* poster. Tell the class that your plan to explore this question is to measure the temperature in the same spot in the schoolyard in the morning, at noon, and in the afternoon. Show the class a thermometer with a white card taped to it and three coloured markers. Ask:

- Who knows a way to record the results? Does anyone have other ideas?



As a class, brainstorm ways to record the results, reminding students that they will have three separate results. Alternatively, tell students that your plan is to mark the height of the liquid in the thermometer using a different colour for morning, noon, and afternoon.

Divide the class into small groups and provide a white card to each group. Have the students write their names on one side of the card. Then, tape the cards to a thermometer. (If you have only one thermometer, you can change cards during the activity.) Review any safety rules and go as a class to the schoolyard. Bring the thermometers, cards, markers, masking tape or chalk, notebooks, and/or a digital camera with you.

Allow each group to choose a location to measure temperature. Direct students to mark the location with masking tape or chalk. Choose and mark a location for yourself. If possible and safe, allow students to use a thermometer and mark the cards themselves. Otherwise, hold the thermometer for each group and have a volunteer mark the card. (Or, you may choose to take digital photos of the thermometer readings.) Measure and record your own data. As students are working, prompt observation of factors which affect the amount of sunlight by asking questions such as:

- **Where is the sun now? Are there any clouds?**
- **Do you notice anything about the light? Is it bright or dark?**
- **Is it warm or cool? Where does the heat come from?**
- **Is there shade in your location? Was there shade there before?**
- **Where is your shadow? Is it in the same place as before?**
- **What is the weather like now? Do you think it will stay the same all day?**

Challenge students to find a way to record their observations about the sun, shade, shadows and weather using the tools you brought with you (i.e., notebooks and/or digital camera). Have the students collect temperature data and related observations twice more during the day. Use a different colour of marker at each time.

Create a chart with the headings “Morning,” “Noon,” and “Afternoon.” Have each group communicate the temperature which is highest, lowest, and in the middle at their location. Record this on the chart, then ask questions such as:

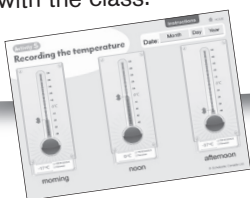
- **Was it warm or cool in the morning?**
- **What about the temperature at noon? Did the temperature go up or down?**
- **Did you observe any changes in the weather? How about shade?**
- **Did your shadow change during the day? How?**

As a class, brainstorm an answer to the initial question posed based on their results. Ask:

- **What conclusion can we make from our results? Can we answer our question?**

IWB Activity:

- You may choose to use Activity 5: *Recording the temperature* (see the Teacher's Website—clone this slide to make multiple copies) to help students to record their outdoor temperatures from the morning, noon, and afternoon. Print and compare the various temperature readings with the class.





During the discussion, ask students to explain how they arrived at their answer(s). Model and encourage generating new questions based on the exploration by asking questions such as:

- **I wonder if it is warmest in the afternoon in the summer, too?**
- **I wonder if we would have observed the same thing if the weather had [stayed the same/changed]?**
- **I wonder why my shadow changed?**
- **What do you wonder about now?**

Record students' new questions on the I Wonder Wall. As a follow-up, consider inviting students to explore their questions. Provide tools for measuring and recording, books, websites, and any other materials and resources as required.

Note: On a cloudless day without a weather change, the air temperature will be low in the morning, rise until around 3–5 p.m., and then fall and stay low until the next sunrise. Actual results will depend on local weather conditions, such as cloud cover. If students do not observe this temperature pattern, you might share previously prepared results from a cloudless day. You might also have students repeat the measurements on days with different weather to make further comparisons (e.g., a sunny versus a cloudy day).

Sun and Seasons

Direct students to create a drawing or collage that shows how the temperature and light change from winter to summer. As they are working, prompt students to consider the different types of weather they would expect in each season when thinking about the temperature. Make an art gallery of students' work in the classroom.

Predicting Weather

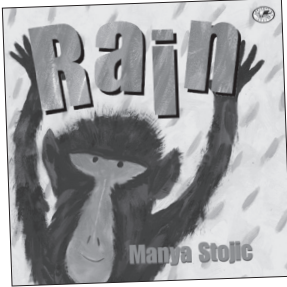
Tell the class that they are going to be a weather-person (meteorologist) on the news. Ask students to communicate their understanding of what a weather-person does. Share pictures or videos of weather reports and point out any charts that are used. Ensure students understand the basic factors that make up a weather report: temperature (qualitative only), precipitation (rain, snow, etc.), and general light (sunny, cloudy). Then, divide the class into small groups and tell students that each group is to predict the weather for tomorrow.

Circulate among the groups to provide guidance as needed. Ask:

- **How would you tell people about the weather we have today?**
- **Do you think the weather will be the same tomorrow as it was today? Why?**
- **What season is this? What other kind of weather might we get in this season?**

If possible, view as a class weather data from your school's weather station or online interactive weather maps.

Provide stationery items, scissors, glue, and other craft material to each group. Direct the students to decide how they will present their predictions to their classmates. Students may need guidance in assigning roles to create and present predictions.



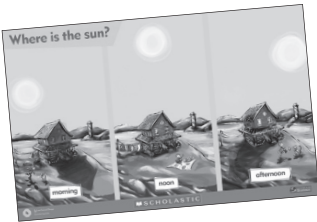
Literacy Place Connection:

Revisit or read *Rain* by Manya Sojic, in which various African animals describe how a thunderstorm transforms their environment. Discuss with the students what changes took place.

Ask:

- What was the environment like at the beginning of the story?
- How did it change after the rain came?
- What was it like at the end of the story?
- Do you think the rain will come again? How is this a cycle?

EXPLORE MORE

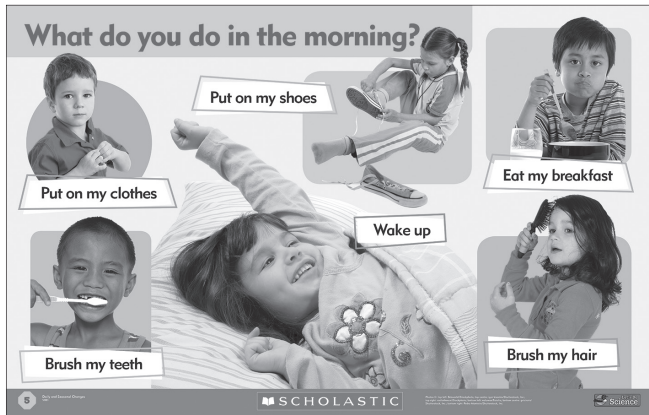


Follow the Sun

Working in small groups, have students use a digital camera to take pictures of the position of the sun relative to a schoolyard landmark from the same place throughout the day. The landmark can be any object against which the relative height of the sun can be judged. Before students take any pictures, ensure they understand they are not to look directly at the sun (you may prefer to take the photographs yourself). After each picture is taken, ask students to predict whether the sun will be higher or lower in the next picture. When all pictures have been taken or after viewing the card, have students describe how the position of the sun changed over the day. (If there is no visible sun, share Science Card 4 instead.) Guide students to consider how the sun's position in their photos or on Science Card 4 is related to heat and light by asking questions such as:

- When was the sun lowest? highest? Was it warmer or colder then?
- Do you see as well in the afternoon as you do at noon? Why?

What Is My Daily Cycle?



Focus: Students will describe, sequence, and group their daily activities in relation to the day-night cycle. They will observe and describe daily changes in weather.

Specific Curriculum Outcomes

Students will be expected to:

- 9.0 sequence or group materials and objects [GCO 2]
- 10.0 predict based on an observed pattern [GCO 2]
- 11.0 explore how changes in sunlight affect living things [GCO 1/3]

Performance Indicators

Students who achieve these outcomes will be able to:

- make weather predictions
- describe their daily routine
- identify daytime and nighttime activities

NOTES:

Attitude Outcome Statements

Encourage students to:

- show interest in and curiosity about objects and events within the immediate environment [GCO 4]
- be open-minded in their explorations [GCO 4]
- be sensitive to the needs of other people, other living things, and the local environment [GCO 4]

Cross-Curricular Connections

Math

It is expected that students will:

- demonstrate understanding of repeating patterns [1PR1]

English Language Arts

Students will be expected to:

- speak and listen to explore, extend, clarify, and reflect on their thoughts, ideas, feelings, and experiences [GCO 1]
- communicate information and ideas effectively and clearly, and to respond personally and critically [GCO 2]
- respond personally to a range of texts [GCO 6]

Getting Organized

Program Components	Materials	Before You Begin	Vocabulary
• Science Card 5 • BLM <i>My Day</i> • Science Card 6 • IWB Activity 6 • BLM <i>My Weather Report</i> • IWB Activity 7 • BLM <i>What Is Your Favourite Game?</i> • IWB Activity 8	• index cards or masking tape • three colours of sticky notes • index cards • icons, cut outs, or sketches that represent weather conditions • items or pictures of items related to seasonal sports (e.g., hockey puck, skateboard, bike, skis, ice skates, jump rope, in-line skates, baseball, basketball) • reference materials that report day lengths	• Prepare sets of cards from BLM <i>My Day</i> (enough for one set per group of five students). • Create index cards with icons, cut outs, or sketches to represent different weather conditions (sun, cloud, raindrop, snowflake, fog, wind) and/or weather related words (hot, cold, foggy, windy). • Invite an elder, grandparent, or other person with knowledge of traditional cultures to talk to the class about the types of games that were played in each season in their culture.	• afternoon • behaviour • evening • location • morning • pattern • today • tomorrow • yesterday

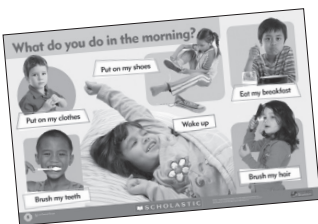
Science Background

- Humans have daily cycles, also called circadian rhythms or biorhythms. Circadian rhythms are predictable, repeating changes in bodily functions that follow a roughly 24-hour period, including body temperature, wakefulness, hunger, and elimination. Although caused by factors in the body, our circadian rhythms can be strongly affected by environmental factors, especially the presence of light.
- Many of our cultural conventions impact our circadian rhythms through changes in the timing of light exposure. These include travelling through time zones, shift work, and exposure to artificial light late in the day. Disruption in circadian rhythms is linked to jet lag, sleep disorders, obesity, diabetes, depression, and seasonal affective disorder.
- Earth's tilt causes a seasonal change in the number of hours of daylight. This difference is more pronounced as one approaches either pole. In the Northern Hemisphere, the days are shorter in the winter, when Earth is tilted away from the sun. Days are longer in the summer when Earth is tilted toward the sun.

Possible Misconceptions

Students may think that all the students in the class will have the same pattern of daily activities and may be surprised to find differences. Students may think that they get sleepy or hungry when they have used up all their energy by activity, rather than recognizing a regular pattern. They may also think that the timing of all daily activities is a matter of choice or is controlled by the time, since our society relies on tools such as alarm clocks and schedules.

ACTIVATE



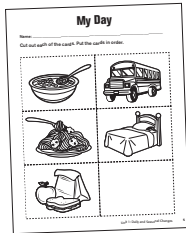
My Morning

On the board, make a table with each of the activities shown on Science Card 5 as headings: *put on my clothes*; *brush my teeth*; *put on my shoes*; *wake up*; *eat my breakfast*; *brush my hair*. Show Science Card 5 to the class and invite answers to the question: *What do you do in the morning?* Have students tell you the sequence in which they do these activities during a morning. Record students' answers in the table. Note any similarities and differences between classmates' routines. Then ask:

- **Do you always do these activities in the same order? Why?**

Remind students that the order that we do these things is also called a sequence. Ask for and/or share other examples of sequences of events (e.g., the order in which clothes are put on, the morning activities in your class).

CONNECT



My Day

Make copies of BLM *My Day* and cut out the cards. The class will work in groups of five; you will need to make one set of cards for each group. Keep the sets separated.

Divide the class into groups of five. Next to each group, put an index card or a piece of masking tape on the floor marked “morning.” Give a set of cards to each group, so that each group member has a different card. Hold a copy of BLM *My Day* in front of the class and ask for volunteers to describe what is on each card. Then, tell the students that you want each group to form a line behind the word “morning” so that their cards show the order in which they do the activities. Allow students time to agree on an order for their group.

Have the students sit down while remaining in line. Make a chart with headings 1, 2, 3, 4, and 5. When all the groups have formed their line, have the first student in each line call out the activity on their card. Record these in column 1. Repeat this for all the students in each line. Discuss any differences in the order of activities between groups. Invite students to give reasons for their choices.



Remind the class that when things are in an order, they form a sequence. Point to this word on your Word Wall, then add “yesterday,” “today,” and “tomorrow” to the Word Wall and ask students to put these in sequence. You also could introduce or review the days of the week at this time.

Have students stand up in their lines. Challenge them to rearrange themselves so that the line begins with something they do at noon. Ask students to describe the similarities and differences in the sequence. Ask:

- **Where is the person who was first now?**
- **Who else moved?**

Repeat this activity beginning with something they do in the evening. Finally, challenge students to arrange themselves to form a circle while keeping the order intact. When they have formed circles, tell students that the sequence has turned into a cycle. Remind students that the seasons also form a cycle. Ask:

- **Why are the seasons a cycle?**

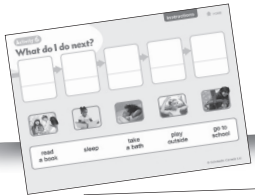
Morning, Afternoon, Evening

Share Science Card 6 with the class. Provide three different colours of sticky notes, one for morning, one for afternoon, and one for evening. Make a chart with three headings labelled *Morning*, *Afternoon*, and *Evening*. Ask the students to place a sticky note on each of the activities on Science Card 6 that is a morning activity. List the activities they chose on the chart and then remove the sticky notes from the card. Repeat for afternoon and evening.



IWB Activity:

- Have students sequence activities they do during the day using Activity 6: *What do I do next?* (see the Teacher's Website).



My Weather Report

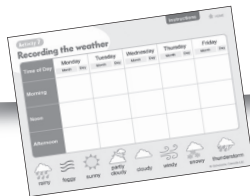
Write out three of the week. They give the weather that day the day of the week, the weather, and the time of the day.

Day of the Week	Weather	Time of the Day

Icons for weather conditions: sun, cloud, rain, snow, fog, wind, and combinations.

IWB Activity:

- You may choose to use Activity 7: *Recording the weather* (see the Teacher's Website—clone this slide to make multiple copies) to help students to record the weather for the morning, noon, and afternoon. Print and compare weather charts for various weeks with the class.



Review the chart with the class. Point out any activities that were placed in more than one group (e.g., reading, playing outside). If no activities were placed in more than one group by the students, choose activities from the list and prompt students to consider other groups in which they could be placed.

Tracking Weather

Tell students that you are wondering if the weather stays the same all day. Explain that you plan to find out by tracking the weather over several days. Create a weather chart with the following sections: *Morning*, *Noon*, and *Afternoon*. Challenge students to name some activities they usually do at these times that are part of their daily cycle. Alternatively, ask the class to suggest times they would like to track the weather. Create index cards with icons, cut outs, or sketches to represent different weather conditions, such as a sun, cloud, raindrop, snowflake, fog, wind, and/or weather-related words such as “hot,” “cold,” “foggy,” or “windy.” Show these to the class and ask the students to help you devise a way to use them to record the weather over the day. Make suggestions, such as using two snowflakes if there is a lot of snow, if necessary. Students can follow along by filling in BLM *My Weather Report* (or you might have students fill out the BLM in small groups instead). Challenge students to make a prediction. Ask:

- Do you predict that the weather will always stay the same all day or change?
- How do you know?

After students describe how they know, point out what type of evidence they used, such as direct observation or hearing reports from experts. Tell the class that there are many different ways to explore questions and that finding ways that work is part of the inquiry process. Work with the class to fill in the chart or the BLM over the day. Tell students that they will help you to track the weather during the day again tomorrow. Prompt consideration of other ways of exploring and viewing the world by asking:

- Does anyone know about how early Indigenous peoples predicted when the bad weather was coming? How could we find out?

CONSOLIDATE

What Is Your Favourite Game?

Draw a picture of your favourite outdoor game for each season.

Spring	Summer
Fall	Winter

IWB Activity:

- Challenge students to identify the season(s) when the sports are played outdoors using Activity 8: *Sports and seasons* (see the Teacher's Website).

Sports and seasons

winter	spring
summer	fall

When Shall We Play?

Display items, or pictures of items, related to seasonal sports such as a hockey puck, skateboard, bike, skis, ice skates, jump rope, in-line skates, baseball, or basketball. Allow students to explore freely, and encourage them to connect the sports to weather and the seasons by asking questions such as:

- When do you play this sport outside?
- Is there weather in which you can't play this sport?
- Is there a season you don't play this sport outside?

Guide students to notice how some sports and games can be played in more than one season and ask for explanations. Hand out copies of BLM *What Is Your Favourite Game?* to each student. Have students record their favourite game under the name of the season in which they play it outside. Students can choose more than one season. Then, direct students to exchange their work with a partner. Have partners explain to each other why they play their favourite game in that season. Alternatively, students can draw a picture or write the name of their favourite game for each season. Circulate as students work and ask for the rationale behind their choices. Student work can be posted in the classroom to share with classmates.

EXPLORE MORE

Longer or Shorter?

Ask students to predict whether the days will be shorter or longer next month and encourage them to give reasons for their predictions. Provide access to websites or printed resources that report day lengths. Have students work in small groups to find out if their predictions are correct. As they are working, wonder aloud questions such as:

- I wonder when the longest day is? the shortest day?
- I wonder if the days get longer or shorter in spring? in fall?

Have students communicate their findings orally with classmates.

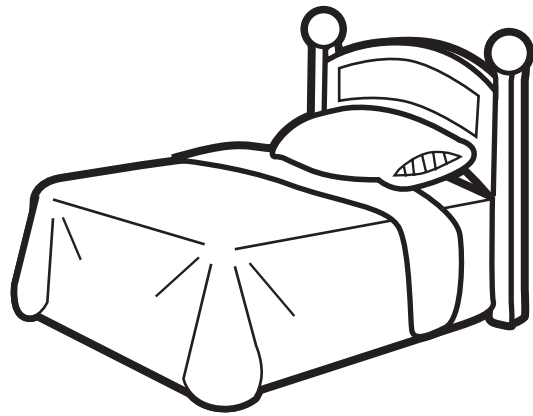
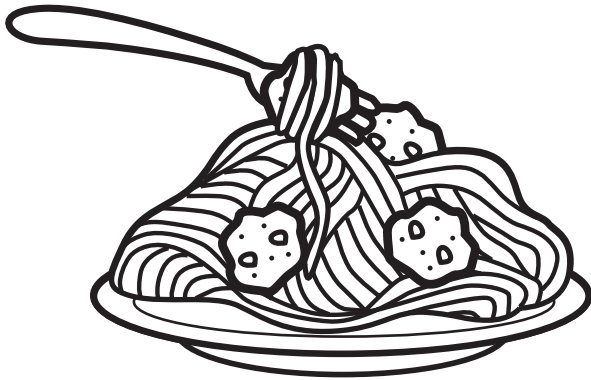
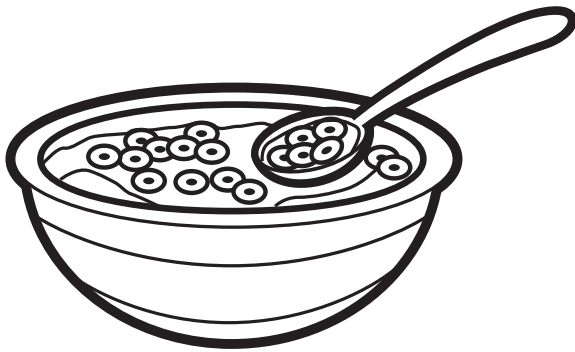
What Did You Play?

Invite an elder, grandparent, or other person with knowledge of traditional cultures to talk to the class about the types of games that were played in each season in their culture.

My Day

Name: _____

Cut out each of the cards. Put the cards in order.



My Weather Report

Name: _____

Write the days of the week. Then draw the symbols that describe the weather in the morning, at noon, and in the afternoon.

Day of the Week	Morning	Noon	Afternoon

 sunny	 partly cloudy	 cloudy	 rainy	 thunderstorm	 snowy
 windy	 foggy	 hot	 warm	 cool	 cold

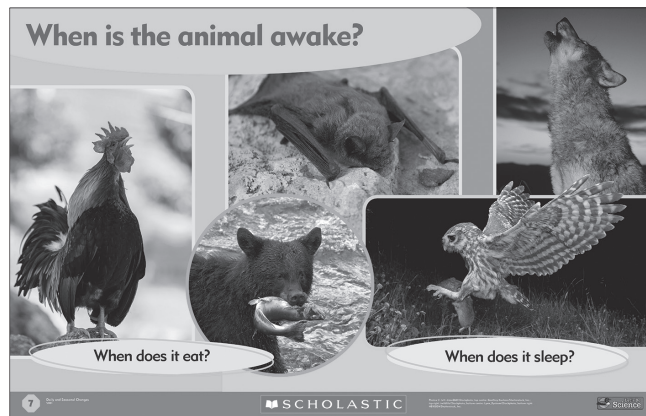
What Is Your Favourite Game?

Name: _____

Draw a picture of your favourite outdoor game for each season.

 Spring	 Summer
 Fall	 Winter

Do Animals and Plants Have Daily Cycles?



Focus: Students will investigate and describe daily changes in the characteristics, behaviours, and locations of animals and plants.

Specific Curriculum Outcomes

Students will be expected to:

- 11.0 explore how changes in sunlight affect living things [GCO 1/3]
- 12.0 investigate daily changes in the characteristics, behaviours, and location of living things [GCO 1/3]

Performance Indicators

Students who achieve these outcomes will be able to:

- identify daytime and nighttime activities of some animals and plants
- investigate and communicate the daily activities of a pet

NOTES:

Attitude Outcome Statements

Encourage students to:

- show interest in and curiosity about objects and events within the immediate environment [GCO 4]
- willingly observe, question, and explore [GCO 4]

Cross-Curricular Connections

English Language Arts

Students will be expected to:

- communicate information and ideas effectively and clearly, and to respond personally and critically [GCO 2]
- interpret, select, and combine information using a variety of strategies, resources, and technologies [GCO 5]
- using writing and other forms of representations to explore, clarify, and reflect on their thoughts, feelings, experiences, and learnings; and to use their imaginations [GCO 8]

Getting Organized

Program Components	Materials	Before You Begin	Vocabulary
• Science Card 5 (optional) • Science Card 7 • IWB Activity 9 • <i>What Is the Inquiry Process?</i> poster • BLM <i>My Pet's Day</i> Literacy Place: • <i>Daytime, Nighttime</i> (Shared Reading—Changes Inquiry Unit)	• time-lapse video of a morning glory or sunflower seedlings • reference materials related to diurnal and nocturnal animals	• Prepare a KWHL chart.	• daytime • living thing • nighttime • moon

Science Background

- The scientific group of *Anamalia* (animals) includes mammals, reptiles, birds, fish, and insects, among others.
- Plants and animals that are active during the day have diurnal cycles. Those that are active at night have nocturnal cycles.
- Some plants have flowers that bloom only at night, such as the Angel's trumpet, moonflower (a relative of the morning glory), and night phlox.
- Nocturnal animals that are local to Newfoundland and Labrador include: river otters, beavers, snowshoe hares, Canadian lynx, pine martens, little brown bats, great horned owls, and coyotes.

- Hamsters, cats, and rabbits are naturally nocturnal. As pets, they adapt to some degree to household routines. Cats and rabbits are usually most active at dawn and dusk.
- Not all nocturnal animals have good night vision. Owls have extremely good night vision and can hunt in complete darkness. Cats see equally well in darkness or light. Bats do not have good night vision, depending instead on echolocation to locate prey at night.

Possible Misconceptions

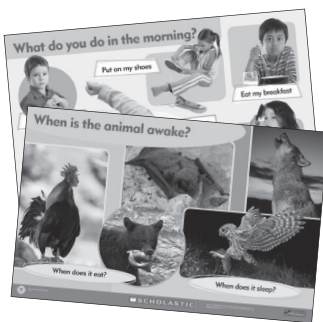
Students may believe that all animals eat and sleep at the same times of day that they do. They are likely to think that plants do not change throughout the day. Address these misconceptions by showing live webcam images of plants and animals that are active during the night.

ACTIVATE

A Day in the Life

Prompt student's recall of their daily cycles. (You may choose to show Science Card 5 again.) Then ask:

- **What other things do you do at about the same time every day?**
- **When do you get hungry?**
- **When do you get sleepy?**
- **Do you think animals do some things at about the same time every day, too?**



IWB Activity:

- Students can use IWB Activity 9: *When is it awake?* to sort the animals who are active in the daytime and those who are active in the nighttime (see the Teacher's Website).



Show students Science Card 7. Invite students to tell you what each animal is doing. Create a chart with the headings *Animal*, *Day*, and *Night*, and list the animals on Science Card 7 on the chart: rooster, bat, bear, wolf, owl. Divide the class into groups and assign one animal per group. Tell the class that each group is to discuss what their animal is doing and when their animal is doing that activity. When discussions are complete, have each group choose one member to report their answer to the class. Record answers in the chart and review them with the class. You may want to share these answers: roosters crow in the morning, bears feed during the day, owls are active during the night, wolves howl at night, bats sleep during the day.

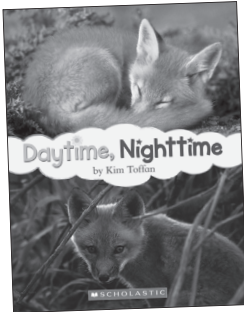
Daily Cycles and Plants

Begin a class discussion by asking:

- **Do you think a plant can do something every day?**
- **Do you think that a plant can sleep?**

After students have shared their ideas, share an online time-lapse video of a morning glory. Explain that these flowers are called morning glories because they open in the morning when they are in the sun, and then close back

up again when the sun goes down. Students might also view a time-lapse video of sunflowers following the sun throughout the day. (See Additional Resources on pages 74–75 for links to videos.)

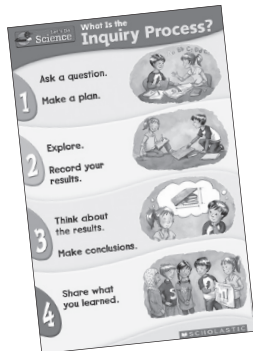
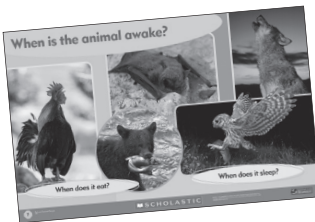


Literacy Place Connection:

Revisit or read *Daytime, Nighttime* by Kim Toffan with the students. Discuss the daytime and nighttime activities of the poppy flower and the various diurnal and nocturnal animals. Ask:

- What does [this plant or animal] do in the day that it doesn't do at night?
- Are all of the animals active at the same time of day?
- What do you do in the day that you don't do at night?
- Why are your activities different in daytime and at nighttime?

CONNECT



Animal Activities

Continue students' exploration of the animal activities shown on Science Card 7. Choose one of the animals (or hold a vote so the class can choose) and start a KWHL chart about its daily cycle by asking for answers to the questions: *When is the animal awake? When does it eat? When does it sleep?* Record students' ideas and any other questions they have, noting them in the chart. As a class, have the students choose one question from the Wonder column that they would like to explore. Students may work as a class or in groups. Review the steps on the *What Is the Inquiry Process?* poster. Support students in exploring the chosen question as independently as readiness allows. Encourage students to make predictions and plans for exploring the question they chose to investigate. Ask:

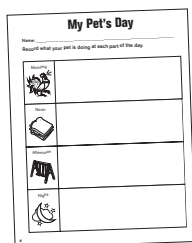
- Does the animal do this because the sun is out/not out?
- How could we find out?

Provide websites and printed resources related to diurnal and nocturnal animals as needed.

Tracking Weather

Complete the weather chart again over the day. You might have a volunteer help you and make a weather report to the class. Choose a different volunteer for each time on the chart. Have the class compare the new data to the observations of previous days. Ask:

- What do you notice? Is anything the same? Is anything different?



Point out or guide students to notice that when the sun is absent, there is less light and heat outside. For example, if it is overcast, ask students:

- **Where is the sun? Is it brighter or darker when we can see the sun? Is it cooler or warmer?**

When the chart has two days of weather data, assist students to notice any patterns, such as cooler temperatures in the morning. For example, you could ask:

- **What was the weather like today in the morning? Was it like that in the morning yesterday?**
- **Do you think the weather will be the same or different tomorrow? Why do you think that?**

What Does My Pet Do?

Ask students what they know about the daily activities of a pet (the class pet or their own). Inform the class that they are going to find out what things the pet does every day and when it does them—the daily cycle of the pet. Read aloud the steps on the *What Is the Inquiry Process?* poster and remind students that the inquiry process helps us to find out answers to our questions. Tell them the question they are going to investigate is *What is the daily cycle of my pet?* Prompt thinking by asking:

- **Does the pet sleep when you do?**
- **Does it get hungry when you do?**
- **When does it like to play the most?**

Encourage students to communicate their experiences and ideas about the pet's daily behaviour. Then, inform them that they will be exploring what the pet does and where it goes at different times during the day. Have students devise a way to test their ideas and record what they find out. Alternatively, hand out copies of BLM *My Pet's Day* for students to use.

Students should make observations over several days. If you have a class pet or a pet of your own, you might make a video of its nighttime activities to share with the class. Students might also enjoy viewing a webcam of an animal online.

As an alternative or extension, have students ask their own questions about activities that might be part of the daily cycle of their pet and to plan how to make and record observations. As they work, refer to the *What Is the Inquiry Process?* poster and ask questions such as:

- **What step are you doing now? What comes next? How will you do that?**

Each day, review students' observations as a class. Encourage students to connect their pet's activities to their own daily cycles and with the presence or absence of sunlight. Ask:

- **What did your pet do at the same time as you do? What things did it do differently?**
- **What things does it do at sunrise? when the sun is out? at sunset?**
- **What new questions do you have about your pet's daily cycle?**

CONSOLIDATE

Up All Night

Working in groups, have students brainstorm what would be different if their pet was awake only at night. Have students communicate their ideas by drawing a picture or telling a story.

EXPLORE MORE

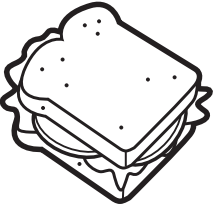
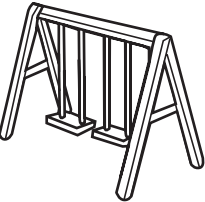
Explore a Local Animal

Provide videos, books, websites, or pictures of local nocturnal and/or diurnal animals. Invite students to follow the inquiry process to find out something they are curious about regarding the daily activities of one animal. Students could communicate their results by making a drawing, a poster, a bulletin board display, or by acting out the animal's activities.

My Pet's Day

Name: _____

Record what your pet is doing at each part of the day.

Morning 	
Noon 	
Afternoon 	
Night 	

How Do We Prepare for the Seasons?



Focus: Students will explore and describe human preparations for seasonal changes.

Specific Curriculum Outcomes

Students will be expected to:

- 15.0 investigate human preparations for seasonal changes [GCO 1/3]

Performance Indicators

Students who achieve these outcomes will be able to:

- describe an activity their family does to prepare for a seasonal change

NOTES:

Attitude Outcome Statements

Encourage students to:

- show interest in and curiosity about objects and events within the immediate environment [GCO 4]
- be open-minded in their explorations [GCO 4]
- be sensitive to the needs of other people, other living things, and the local environment [GCO 4]

Cross-Curricular Connections

English Language Arts

Students will be expected to:

- interact with sensitivity and respect, considering the situation, audience, and purpose [GCO 3]
- use writing and other forms of representation to explore, clarify, and reflect on their thoughts, feelings, experiences, and learnings; and to use their imaginations [GCO 8]

Getting Organized

Program Components	Materials	Before You Begin	Vocabulary
• Science Card 8 • IWB Activity 2 • BLM <i>Getting Ready</i> 1 and 2 Literacy Place: • <i>Camping at the Lake</i> (Shared eReading)	• reference materials related to seasonal changes for people working in the food industry (e.g., fishers and farmers)	• Arrange for a person who works with plants or animals to visit the class to talk about how their job changes with the seasons.	

Science Background

- Examples of seasonal cycles in animals include hibernation, timing of reproduction, hair loss or gain, and migration.
- Although humans lack pronounced biological seasonal cycles found in animals, we make many changes in activities related to the seasons. These seasonal changes are voluntary, in that they would not occur without a conscious decision on our part. These include changes in clothing, in the tools we use to control aspects of our environment (e.g., rakes versus snow shovels), and in air-temperature control (e.g., furnace versus air conditioner).

Possible Misconceptions

Students may confuse seasonal preparations with responses to daily weather. Seasonal preparations are activities we do in anticipation of the types of weather associated with a particular season (e.g., getting winter coats out of storage in the fall), whereas responses to the weather refer to daily needs (e.g., choosing among winter outerwear depending on the day's weather).

ACTIVATE



IWB Activity:

- Invite students to choose appropriate clothing for the season using
- Activity 2: *Dressing for the seasons* (see the Teacher's Website).

Dress for Success

Hold a brief discussion on the seasons as a review. Then, show students Science Card 8 and invite them to answer the question: *What season do you wear this in?* When students have answered, ask:

- Why do we wear it in that season?
- How does wearing it help us?
- What would happen if you didn't have it before that season?

Share with the class some of the items of clothing you purchase, get out, or put away to prepare for a change in seasons. Then, ask if anyone knows something else that their family does to prepare for the seasons (e.g., store firewood for winter; open up the cabin for summer).

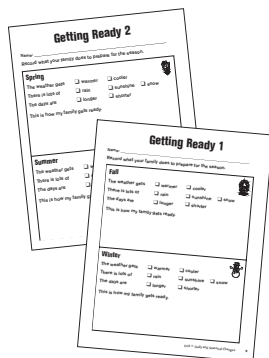
CONNECT

Tracking Weather

Continue to fill in the weather chart for the day. Students can collect and record all the data themselves and add it to the chart. As new data is added, ask about the amount of sunlight and the relative position of the sun in the sky. Guide students to notice that some weather hides the sun, and then lead a discussion of what that may affect. Ask students to predict the weather for the next time period on the chart, based on any patterns they have noticed.

Relate the weather data they are collecting to activities associated with the seasons by asking questions such as:

- What did you do this morning because it was [describe weather conditions]?
- How did doing that help you?

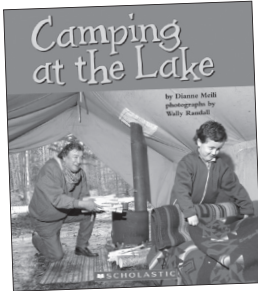


Preparing for the Season

Tell students that they will be finding out and sharing the things their family does to prepare for seasons changing. Hand out copies of BLM *Getting Ready 1* and *2*. Working on one season at a time, read each question on the BLM aloud and have students circle an answer. Direct students to write or draw in the space on the BLM something they or their family does to prepare for one of the seasons. Assign a season to students or allow them to choose one independently. Students might need to ask family members before completing the BLM pages.

Talk to an Expert

Arrange for a class visit by a naturalist, elder, hunter, farmer or any other person whose job involves working with plants or animals. Have them give a brief talk about how their job changes with the seasons and why. Provide time for students to ask questions. Students might report what they learned in a manner of their choosing (e.g., a poster, report, or skit).



Literacy Place Connection:

In *Camping at the Lake*, a Cree boy describes some of the things he and his grandfather bring along, and some changes in plants and animals they see on a camping trip in early spring. Read this text with the students and help them to find the signs of spring (*the loon has migrated north, the furry buds of the pussy willow are out; the rabbit has changed colour from white to brown*).

CONSOLIDATE

Create a Story

Have students write, tell, or act out a story about a family that didn't prepare for a season and what happened as a result.

EXPLORE MORE

Food and the Seasons

Provide access to resources related to seasonal changes in the activities of people who produce or catch food, such as fishers and/or farmers. Direct students in exploring how people in these fields prepare for and accommodate seasonal changes by wondering aloud what such a person does in a particular season. For example, ask:

- **What happens on a farm in the fall? Do you think a farmer does different things in the spring? What questions do you have about farming and seasons?**
- **Can we catch fish all year long? Does a fisher have to work differently in the spring and fall? What questions do you have about fishing and seasons?**
- **How did early Aboriginal people prepare for the seasons? How did they get food?**

Allow students to choose a field and a question they want to explore. Ensure their questions relate to seasons in some way while still allowing the students to follow their own curiosity.

Getting Ready 1

Name: _____

Record what your family does to prepare for the season.

Fall



- The weather gets ☐ warmer ☐ cooler
- There is lots of ☐ rain ☐ sunshine ☐ snow
- The days are ☐ longer ☐ shorter

This is how my family gets ready.

Winter



- The weather gets ☐ warmer ☐ cooler
- There is lots of ☐ rain ☐ sunshine ☐ snow
- The days are ☐ longer ☐ shorter

This is how my family gets ready.

Getting Ready 2

Name: _____

Record what your family does to prepare for the season.

Spring



The weather gets

☐ warmer

☐ cooler

There is lots of

☐ rain

☐ sunshine

☐ snow

The days are

☐ longer

☐ shorter

This is how my family gets ready.

Summer



The weather gets

☐ warmer

☐ cooler

There is lots of

☐ rain

☐ sunshine

☐ snow

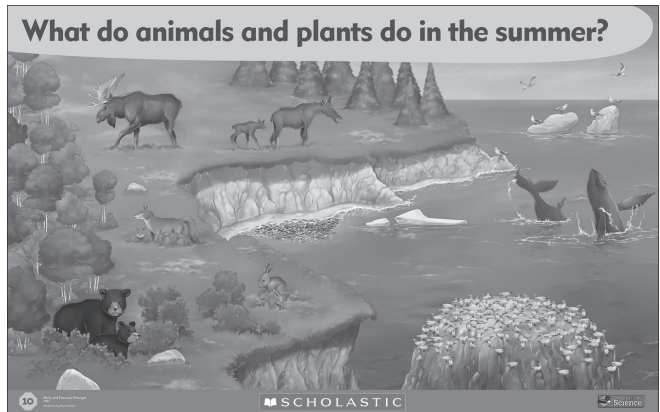
The days are

☐ longer

☐ shorter

This is how my family gets ready.

How Do Animals and Plants Prepare for the Seasons?



Focus: Students will explore seasonal changes in the behaviours, characteristics, and locations of animals and plants.

Specific Curriculum Outcomes

Students will be expected to:

- 14.0 investigate seasonal changes in the characteristics, behaviours, and location of living things [GCO 1/3]

Performance Indicators

Students who achieve this outcome will be able to:

- identify and describe seasonal changes in the behaviour, characteristics, and locations of some wild animals and plants

NOTES:

Attitude Outcome Statements

Encourage students to:

- willingly observe, question, and explore [GCO 4]
- work with others in exploring and investigating [GCO 4]
- be sensitive to the needs of other people, other living things, and the local environment [GCO 4]

Cross-Curricular Connections

English Language Arts

Students will be expected to:

- speak and listen to explore, extend, clarify, and reflect on their thoughts, ideas, feelings, and experiences [GCO 1]
- interpret, select, and combine information using a variety of strategies, resources, and technologies [GCO 5]
- use writing and other forms of representation to explore, clarify, and reflect on their thoughts, feelings, experiences, and learnings; and to use their imaginations [GCO 8]

Getting Organized

Program Components	Materials	Before You Begin	Vocabulary
• <i>First Snow in the Woods</i> (Read Aloud) • Science Card 9 • Science Card 10 • BLMs <i>Pond Life 1</i> and <i>Pond Life 2</i> • Science Card 1 (optional) Literacy Place: • <i>What Do You Do in the Cold?</i> (Shared Reading—Changes Inquiry Unit) • <i>Winter Animals Are Sleeping</i> (Guided Reading, Level E)	• reference material related to — seasonal changes in animals of Newfoundland and Labrador — seasonal changes in pond life — seasonal activities of people who work with animals • digital camera and printer (optional)	• Invite an elder to talk to the class about how life on the land changes with the seasons.	• characteristic • hibernation • migration

Science Background

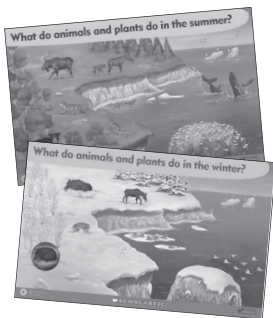
- The scientific group *Anamalia* (animals) includes mammals, reptiles, birds, fish, and insects, among others.
- Seasonal cycles in animals and plants are linked primarily to changes in day length. Day length is longest at the summer solstice (around June

For specific examples of seasonal changes, see the charts on pages 59–62 and 64.

21), decreases until the winter solstice (around December 21), and then increases to the next summer solstice.

- Common seasonal cycles in animals include reproductive activities, denning, metabolic activity, migration, hibernation, and coat changes. Seasonal cycles in plants include reproduction, leaf production, growth, and dormancy. Seasonal cycles help organisms survive seasonal environmental changes, and increase the chances that their offspring will survive.
- During hibernation, animals have a low body temperature and metabolic rate. Black bears can hibernate up to 100 days without eating, drinking, urinating, or defecating.
- Traditionally, the activities of Indigenous peoples who lived off the land followed a seasonal cycle. For example, they followed the migration of animals they hunted, often having winter and summer camps located accordingly. Many foods were available only seasonally, such as berries in the summer or salmon in the fall.
- In general, humans do not have strong biological seasonal cycles though some individuals do experience some seasonal changes, such as in hair thickness or appetite. Seasonal affective disorder, which is depression that appears in the winter and lifts by itself in the spring, is thought to be a disorder in a biological seasonal cycle. However, our artificial environment protects us from most cues to seasonal changes in the natural environment, such as changes in light and temperature. This may mean that we miss the environmental triggers that would regulate any biological seasonal cycles that do exist.

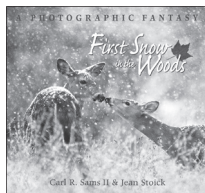
Possible Misconceptions



Students may think that changes in temperature, rather than in light, cause seasonal cycles in plants and animals. Address this in the general discussion of the changes depicted on Science Cards 9 and 10. Discuss how the changes begin before the season changes, much as we buy winter clothes before the first snow fall. Tell students that changes in light levels prompt these changes in living things. They may also believe that all animals migrate or hibernate in winter. Point out the herring gulls and red fox on Science Card 9 and Science Card 10 to challenge this view.

ACTIVATE

Read Aloud: *First Snow in the Woods*



Summary

With enchanting photographs and lyrical prose, this book tells the story of a fawn's first experience of seasonal changes from fall to winter.

Before Reading

ESL Note:

To help ESL learners develop appropriate vocabulary, begin the lesson with a picture walk of the text. Focus on the images for each page and discuss the various animals, plants, and weather depicted.



Show students the cover of *First Snow in the Woods* and ask:

- **What is the weather like in this picture? (*snowy, cold*)**
- **What season is this? (*winter*)**

Wonder aloud about how the deer survive winter:

- **I wonder how the deer stay warm.**
- **I wonder what they eat in the winter.**

Add these to the I Wonder Wall. Explain that the book has lots of information about what happens in a forest as winter comes and how the various animals prepare for winter. Provide prompts for discussion such as:

- **What is different in a forest in the winter compared to the summer?**
- **Do you think that deer prepare for the winter? How about other animals?**
- **Do you wonder about anything else about life in the forest when winter starts?**

Add students' questions to the I Wonder Wall. Ask them to listen as you read for any answers to their questions.

During Reading

As you turn to each new page, read the text and clarify any new vocabulary or concepts. Then ask students if they can tell what season it is. You may want to point out details that show or talk about seasonal changes. For example, you might ask:

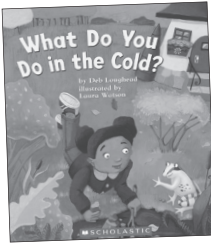
- **Is it summer, fall, or winter? What clues are there in this picture?**
- **Can you tell if it is warm or cool? How?**
- **What do you notice about the plants? When have you seen plants look like/do that?**
- **Are there any changes in the animals/birds/insects?**
- **What else do you notice?**

Take the time to stop and allow students to share their ideas and questions that arise on a particular page before moving ahead.

After Reading

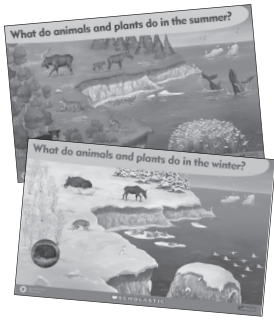


Have students work in small groups or individually to draw pictures showing how the fawn got ready for winter. Some students may prefer to illustrate another one of the living things shown in the book. Make the book available for students to refer to. Post students' work in the classroom and review it as a class, referring back to questions on the I Wonder Wall when possible.



Literacy Place Connection:

Revisit or read *What Do You Do in the Cold?* by Deb Loughead with the students. Discuss what the little frog finds out about the changes some animals, a tree, and a little girl go through to prepare for the winter. Create a chart together to show what each of the characters does to prepare for winter.



Winter and Summer

Show Science Card 9. Have students find animals and plants and then tell you what they know about each and what it is doing or what is happening to it in the picture. Ask about the season/month it happens. Wonder aloud why that happens. Let students give answers. Then, show them Science Card 10. Let students explore and find all the differences they can between the two cards. Record the differences in a chart with the headings *Summer* and *Winter*. As they work, ask questions such as:

- **Why do you think the plants and animals do different things in winter and summer?**
- **How do the plants and animals know when the seasons are changing?**
- **What else are you curious about?**



During the discussion, introduce and use the terms “characteristic,” “hibernation,” and “migration.” Add these to the Word Wall.

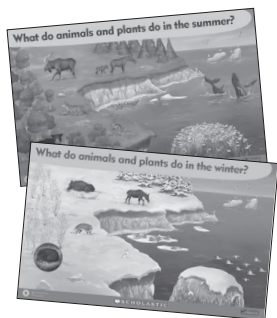
Seasonal changes for the living things shown on Science Cards 9 and 10 are noted in the chart below. (Changes shown on the Science Cards are in bold.)

Living Thing	Winter	Spring	Summer	Fall
Arctic Hare	white coat; active; digs holes in snow for warmth	moults winter coat and grows to brown or grey one; active; young are born (leverets)	brown coat; active; young grow and mature	moults winter coat and grows white one; active
Black Bear	hibernates; pregnancy and birth (every 2–3 years)	becomes active and leaves den with young	active; cubs grow (stay with mother 2 years); breeding season; gains weight for hibernation	gains weight and makes den for hibernation; begins hibernation; pregnancy
Black Spruce	keeps leaves (needles) but does not grow	keeps leaves (needles), new growth starts; male and female buds form	keeps leaves (needles), growth continues; seeds form and ripen in cones, cones drop	keeps leaves (needles), growth stops, seeds go dormant

Continued on next page...

Living Thing	Winter	Spring	Summer	Fall
Blueberry	dormant: no leaves, sap below ground	sap rises, buds form and open for new leaves and white flowers	full leaf, berries form and ripen, seeds in berries dispersed when eaten by animals and birds	leaves turn red and drop; sap falls
Capelin	feeds in deep ocean	feeds in deep ocean	moves inshore for spawning season	moves to deeper ocean; feeds
Grasses	dormant roots or seeds only (depends on species)	new leaves form or seeds germinate; may flower	full leaf, produces flowers (seed heads) and/or seeds; seeds may disperse	dies off or loses leaves and goes dormant; seeds disperse
Harp Seal	breeding season, pups are born on pack ice	migrates north with pack ice to Arctic Ocean	moults coats; feeds in Arctic waters	migrates south with pack ice to NL
Herring Gull	feeds anywhere food is abundant; eats fish, rodents, garbage	does not migrate; breeding season; feeds anywhere food is abundant; eats fish, rodents, garbage	feeds anywhere food is abundant; eats fish, rodents, garbage	does not migrate; feeds anywhere food is abundant; eats fish, rodents, garbage
Humpback Whale	feeds and breeds; gives birth	migrates north	moves inshore; feeds (especially capelin) and grows	migrates south
Moose	males shed antlers; males and females active; females may be pregnant; both have heavy winter coat	females give birth; males and females active; males and females moult winter coats and summer coats grow	males grow antlers and have full antlers without velvet by late summer; females raise young; active; have lighter summer coat	mating season; young leave mother; males and females moult summer coats and grow winter coats
Red Fox	no coat change; active; mating season; den for mating only; uses tail for warmth	no coat change; active; kits are born	no coat change; active; kits grow	no coat change, active; kits mature and leave
Northern Gannet	completes migration; feeds on fish by deep diving	migrates north to NL and Gulf of St. Lawrence	 nests and breeds on rocky outcrops and cliffs; feeds on fish by deep diving	migrates south to southeastern US
White Birch	dormant: no leaves, sap below ground	sap rises, buds form and open for new leaves and catkins (flowers)	full leaf, winged seeds (nutlets) ripen and are released	leaves turn yellow and drop, sap falls

CONNECT



Tracking Weather

Have students continue to fill in the weather chart over the day. Connect to seasonal changes by pointing to a plant or animal on Science Card 9 or Science Card 10 and asking:

- I wonder what this [plant/animal] would do in this weather?
- What do you know about what plants or animals do in [this season]?
- What do you wonder about plants or animals and the weather in different seasons?

Nature Gets Ready

Wonder aloud about seasonal changes in other animals and plants by saying something such as:

- I wonder how caribou get ready for changes in the seasons? Are they like moose?

Ask students to name any animals or plants they wonder about. Record students' suggestions on the I Wonder Wall. Alternatively, provide pictures or a list of species native to Newfoundland and Labrador and ask students which of these they would like to learn more about. The list could include: caribou, puffins, polar bears, tiger beetles, lupines, and pitcher plants. Seasonal changes for these animals and plants are:

Living Thing	Winter	Spring	Summer	Fall
Caribou	females shed antlers late winter; feed in heavy forest	gives birth; feeds and grows	feeds and grows	mating season; males shed antlers; mainland: migrates to heavy forest of Quebec and Labrador; Newfoundland: no migration
Lupin	dormant	begins growth; forms new leaves; flower buds	blooms and forms seeds; grows	sheds seeds; goes dormant

Continued on next page...

Living Thing	Winter	Spring	Summer	Fall
Tiger Beetle	larvae hibernate in underground burrows; at second instar (year one) or third instar (year two) larval stage tiger beetles have a two-year life cycle with four stages—first, second, third instar (larval stages) and adult	larvae break hibernation; hunts and feeds on other insects from their burrows; larvae at second instar continue to develop to third instar, in which stage they will hibernate the next year; larvae at third instar continue to develop into adults	larvae at third instar moults to adult stage and emerges (beetles); beetles mate; females lay eggs in shallow holes in soil; eggs hatch into first larval stage “doodlebug” which digs a burrow; both adults and larvae hunt and feed on other insects; adults usually found in sandy areas, especially near lakes and streams; very fast runners; can fly	adults die off; larvae at second instar continues to feed until they enter hibernation
Pitcher Plant	dormant	begins growth; forms new leaves; flower buds	blooms and forms seeds; grows	sheds seeds; goes dormant
Polar Bear	active (do not hibernate); pregnant bears den and give birth	active; migrate with pack ice; females with cubs leave dens; mating season	active; feeds and grows	active; migrates with pack ice
Puffin	lives and feeds in open ocean	migrates to breeding colony; beak, head feathers and feet change colour to give distinctive “clown” appearance	breeding season; feeds and grows	sheds feathers and part of bill, so face becomes dark (so different was once thought to be another species) migrates to open ocean

Divide the class into small groups, and assign or allow each group to choose one of the organisms to investigate. Provide pictures, books, websites, videos, or other sources that they may need. If students choose an animal that is a common sight around the school, plan an outing so that students might observe it themselves.

As students are working, model asking deeper questions. Ask:

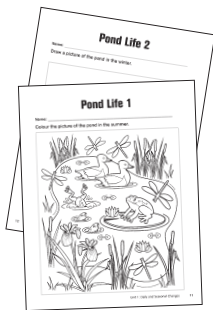
- **What things are different outside in this season?**
- **What do you think the [living thing] does differently in this season?**

Provide paper, pencils, and any other tools that students might use to record their research results, such as access to a printer or a digital camera.

Encourage students to come up with creative ways to communicate their findings. For example, students might dress up as an animal in two different seasons, act out an animal preparing a den for hibernation, create a dance to show falling leaves, or draw a picture.

A black and white illustration titled "Winter Animals Are Sleeping" showing a winter scene with snow-covered ground and trees. Various animals are depicted in hibernation or winter states: a turtle in a shell, a bear in a den, a chipmunk in a hole, a rabbit in a burrow, a squirrel in a nest, and a fox in a den. Callouts identify each animal and its winter state: "A turtle is sleeping in its shell", "A bear is sleeping in a den", "A chipmunk is sleeping in a hole", "A rabbit is sleeping in a burrow", "A squirrel is sleeping in a nest", and "A fox is sleeping in a den". The Scholastic logo is at the bottom.

Literacy Place Connection:
Winter Animals Are Sleeping (Guided Reading, Level E) shows some animals who hibernate and some who are active in the winter. Discuss with students any seasonal changes that take place for the animals who are active in the winter.



Pond Life

Divide the class into small groups. Hand out one copy of both pages of BLM *Pond Life 1* and *Pond Life 2* to each group. Tell the students that they are going to create pictures showing how some of plants and animals that live in the pond change from summer to winter. As they are colouring in the summer image, prompt thinking about season-specific aspects of characteristics, behaviour, and location by asking questions such as:

- **What does this [living thing] look like in the winter?**
- **Does any of these [living things] go somewhere else in the winter?**
- **Does any of these [living things] hibernate in the winter?**

Keep a record of students' ideas. When colouring is complete, review the ideas and ask:

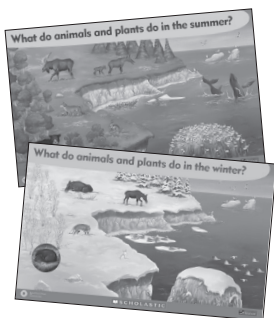
- **How can we find out which of our ideas is correct? Where would we get more information?**

Provide photographs, books, and/or access to websites that illustrate the winter adaptations of the living things in the summer pond drawing (i.e., ducks, fish, frogs, dragon flies, water lilies, irises, and cattails). Have students use this material to draw a picture of the same pond in the winter on BLM *Pond Life 2*. You might assign one organism to research per group member. Display the finished summer and winter images in the classroom, and discuss any differences.

Seasonal changes for plants and animals on BLM *Pond Life 1* are:

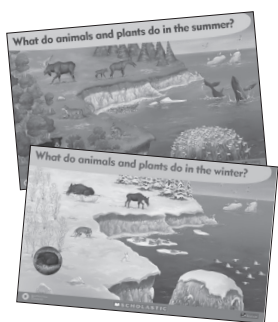
Living Thing	Winter	Spring	Summer	Fall
Blue Flag Iris	dormant; rhizomes remain under soil	produces new leaves; rhizomes (underground roots) spread	blooms; produces seeds; continues to spread via rhizomes	upper portions of plants die back; goes dormant
Common Cattail	dormant, usually still visible, brown rushes	breaks dormancy, grows leaves and flower heads	grows; produces seeds; produces new plants asexually	foliage dies; goes dormant; usually still visible, brown rushes
Fragrant Water Lily	dormant	breaks dormancy; grows leaves and flowers (blooms)	grows leaves and flowers (blooms); produces new plants asexually	foliage dies; goes dormant
Lake Trout (*Labrador only)	has very low metabolism; stays in deeper regions below ice; does not hibernate but does not need food; eggs hatch under ice; young feeds off yolk sac	eats and grows	eats and grows; spawning may begin late summer	spawning; females lay eggs
Mink Frog	tadpoles and adults hibernate, adults underwater usually on top of mud at pond bottom, tadpoles in water	wakes from hibernation as temperature increases; overwintering tadpoles become adults	breeding season; females lay eggs that become tadpoles	tadpoles and adults enter hibernation, adults underwater, usually on top of mud at pond bottom, tadpoles in water
Ring-Necked Duck	feeds	migrates north; breeding season	raises young; feeds	migrates south
Zigzag Darner Dragon Fly	nymphs may metamorphose into adults; feeds and grows	migrates north; breeds (eggs that hatch into nymphs that live in the water)	nymphs may metamorphose into adults; feeds and grows	migrates south; breeds

CONSOLIDATE



My Wild Animal

Have students communicate their learning about an animal (or plant), either from their own research or from Science Card 9 or 10, by creating an art project that shows what the animal does in at least two different seasons. For example, students might create a mobile, a drawing, or modelling clay models.



Spring and Fall

Post Science Cards 9 and 10 somewhere where students can see them clearly. If necessary, prompt recall of the characteristics of the four seasons by posting Science Card 1 as well. Point to either Science Card 9 or 10, then ask:

- **How would this scene be different if it showed the spring? How about the fall?**

Listen to students' responses and record their ideas and questions. Prompt deeper thinking by pointing to a specific organism and asking:

- **Are any characteristics of this [plant/animal] different in the [spring/fall]?**
- **Do any of these animals migrate in the [spring/fall]? Where do they go?**
- **Do any of these animals hibernate in the [spring/fall]? Why do you think so?**

Divide the class into small groups. Have each group choose one of the living things in Science Cards 9 and 10 and draw how it would change in the spring and the fall. Provide photographs, books, or websites for students to refer to.

EXPLORE MORE

Working With Animals

Challenge groups of students to brainstorm a job that involves working with animals, such as dog walkers, veterinarians, or a trapper. Provide reference materials (videos, books, websites) so that students can find out more about the job they are most interested in. Invite students to communicate their finding with the class in a manner of their choosing.

Life on the Land

Invite an elder to talk to the class about how life on the land changes with the seasons. Have students add ideas to the I Wonder Wall ahead of time. If necessary, start them off by adding things such as:

- **I wonder how the people who live on the land get ready for winter.**
- **I wonder what they do when the animals migrated?**
- **I wonder if they plant things in the spring?**



WRAPPING UP THE UNIT



Revisit any remaining questions posted on the I Wonder Wall and have students discuss answers in small groups or with a partner. If there are questions which cannot be answered at the time, these can remain on the I Wonder Wall for students to research independently. Discuss what the students have learned about the seasons; daytime vs. nighttime; the daily cycles of people, animals, and plants; and how people, animals, and plants prepare for the seasons.

Pond Life 1

Name: _____

Colour the picture of the pond in the summer.



Pond Life 2

Name: _____

Draw a picture of the pond in the winter.



Specific Curriculum Outcomes Checklist

Name: _____ Date: _____

Rating: 1 – not evident; 2 – with assistance; 3 – mostly on own; 4 – on own consistently

Specific Curriculum Outcomes	Rating and Observations
1.0 pose questions that lead to exploration and investigation [GCO 2]	
2.0 pose new questions that arise from what was learned [GCO 2]	
3.0 communicate using scientific terminology [GCO 2]	
4.0 explore and investigate changes in heat and light from the sun [GCO 1/3]	
5.0 follow safety procedures and rules [GCO 2]	
6.0 devise ways to measure and record daily and seasonal environmental changes [GCO 1/3]	
7.0 make and record observations and measurements [GCO 2]	
8.0 communicate while exploring and investigating [GCO 2]	
9.0 sequence or group materials and objects [GCO 2]	
10.0 predict based on an observed pattern [GCO 2]	
11.0 explore how changes in sunlight affect living things [GCO 1/3]	
12.0 investigate changes that occur on a daily basis in the characteristics, behaviours, and location of living things [GCO 1/3]	
13.0 propose an answer to an initial question or problem and draw a simple conclusion [GCO 2]	
14.0 investigate changes that occur in seasonal cycles in the characteristics, behaviours, and location of living things [GCO 1/3]	
15.0 investigate human preparations for seasonal changes [GCO 1/3]	

My Inquiry

Name: _____

My question:

My plan:

My results:

My conclusion:

How I will share what I learned:

Student Self-Assessment of Inquiry Process

Name: _____

Rating Scale  = Great  = Good  = Needs to be better

Step 1			
I asked a question.			
I made a plan.			
Step 2			
I followed my plan.			
I recorded my results.			
Step 3			
I thought about my results.			
I made a conclusion.			
Step 4			
I shared what I learned.			

Teacher Assessment of Inquiry Process

Name: _____ Date: _____

	1	2	3	4
Initiating and Planning				
• poses a question that leads to exploration or investigation				
• makes a prediction based on an observed pattern				
• makes a simple plan				
• selects and uses materials				
Performing and Recording				
• carries out the plan/follows a simple procedure				
• uses appropriate tools				
• makes observations				
• records observations and measurements				
• uses a variety of sources of information and ideas				
• follows safety procedures and rules				
Analyzing and Interpreting				
• sequences or groups materials and objects				
• proposes an answer to the initial question and draws a simple conclusion				
• poses new questions that arise from what was learned				
Communicating and Teamwork				
• communicates while exploring and investigating				
• communicates using scientific terminology				
• communicates procedure and result				
• responds to ideas and actions of others in constructing their own understanding				

Comments:

Inquiry Process Rubric

	Level 1	Level 2	Level 3	Level 4
INITIATING AND PLANNING	talks about things that are of interest makes guesses about the outcome of an inquiry with prompting, offers ideas for a procedure with prompting, identifies some materials which could be used to carry out the plan	asks simple questions about objects and events that are observable makes simple predictions about the outcome of an inquiry, but they may be hoped-for outcomes contributes ideas for a procedure, but they may not be complete identifies some materials which could be used to carry out the plan	uses observations to ask questions to investigate, but questions are not always realistic makes simple predictions about the outcome of an inquiry based on prior observations provides ideas for a simple procedure selects and uses materials to carry out the plan	uses observations and prior knowledge to ask questions to investigate makes thoughtful predictions about the outcome of an inquiry based on prior observations and knowledge provides clear, sequential steps for a simple procedure selects and uses appropriate materials to carry out the plan and explains reasons for choice
PERFORMING AND RECORDING	carries out the plan/ follows a simple procedure with prompting with prompting, uses some appropriate tools with assistance makes simple observations using senses with prompting, records observations and measurements gets information from a teacher-chosen source needs help to follow safety procedures and rules	carries out the plan/ follows most of a simple procedure selects and uses common tools makes some relevant observations using senses records observations and measurements which may be incomplete identifies some relevant information from familiar sources needs occasional prompting to follow safety procedures and rules	carries out the plan/follows a simple procedure selects and uses some appropriate tools makes relevant observations using appropriate senses records observations and measurements accurately identifies relevant information from sources of the same type follows most safety procedures and rules	carries out the plan/ follows a simple procedure, making adjustments as necessary selects and uses all appropriate tools makes relevant, detailed observations using appropriate senses records observations and measurements accurately in a variety of ways identifies relevant information from a variety of sources follows all safety procedures and rules and explains why they are needed

Continued on next page...

Inquiry Process Rubric (Continued)

	Level 1	Level 2	Level 3	Level 4
ANALYZING AND INTERPRETING	sequences or groups materials and objects based on simple teacher-chosen attributes describes what happened with prompting, identifies some new questions but they may not be about this inquiry	sequences or groups materials and objects based on a few simple attributes draws a simple conclusion based on observations, but may not link conclusion to the initial question identifies some simple new questions on the topic of this inquiry	sequences or groups materials and objects based on multiple attributes draws a conclusion based on observations which link to the initial question identifies some new questions on the topic of this inquiry that could be investigated	accurately sequences or groups materials and objects based on multiple attributes draws a conclusion based on observations and states if it supports or refutes their prediction identifies new questions on the topic of this inquiry and suggests how they could be investigated
COMMUNICATING AND TEAMWORK	willingly asks for help and accepts help from other group members understands some scientific terminology but rarely uses it with prompting, describes the result and some of the procedures with prompting, asks some questions related to new learnings	makes suggestions to group members as to what should be done understands simple scientific terminology, but does not always use it correctly communicates basic information about the result and most of the procedures asks some questions related to new learnings, but may not fully understand the information	communicates with group members, sometimes with problems usually uses scientific terminology appropriately communicates most of the information about the result and procedures asks some questions in order to understand new learnings	communicates and works effectively with group members consistently uses scientific terminology appropriately accurately communicates the information about the result and procedures asks clarifying questions in order to fully understand new learnings

Additional Resources

Non-fiction Books

- All about Owls*, by Jim Arnosky (Scholastic, 1999)
- Do Bears Sleep All Winter?: Questions and Answers About Bears*, by Gilda Berger, Melvin Berger (Scholastic, 2002)
- Kingfisher Readers Level 1: Seasons*, by Thea Feldman (Kingfisher, 2013)
- National Geographic Readers: Planet Earth Collection: Readers That Grow With You*, by National Geographic Kids (National Geographic Society, 2014)
- Scholastic Reader Level 2: Hibernation*, by Tori Kosara (Scholastic, 2012)
- Scholastic Reader Level 2: Night Creatures*, by Wade Cooper (Scholastic, 2008)
- Winged Migration: Round-the-world Journeys Of Incredible Birds*, The Junior Edition, by Guillaume Poyet (Chronicle Books, 2003)

Picture Books

- Farmer Joe's Hot Day*, by Nancy Wilcox-Richards (Scholastic, 2012)
- Let It Rain*, by Maryann Cocca-Leffler (Cartwheel Books, 2013)
- Let It Shine*, by Maryann Cocca-Leffler (Cartwheel Books, 2013)
- Tap The Magic Tree*, by Christie Matheson (HarperCollins, 2013)
- The Contest Between The Sun And The Wind: An Aesop's Fable*, by Heather Forest (August House, 2007)
- There are No Polar Bears Here!*, by Catherine Simpson, (Creative Book Publishing, 1995)
- Winter's Coming: A Story of Seasonal Change*, by Jan Thornhill (OWLKIDS, 2014)

Websites for Students

- Bill Nye the Science Guy—Bill Nye Explains Seasons
<http://youtu.be/KUU7IyfR34o>
- MIT K-12 Videos—Earth's Tilt 1: The Reason for the Seasons
<http://youtu.be/Pgq0LThW7QA>
- PBS Kids—The Cat in the Hat Migration Game (Game)
<http://pbskids.org/catinthehat/games/migration-adventure.html>
- Sisbro Studios—The Groundhog Song from First Snow in the Woods
<https://www.youtube.com/watch?v=UJjvAmj6AGw>
- timelapseberlin—Time Lapse of Morning Glory Blossom From Dawn Till Dusk
<http://youtu.be/PIRuRKIkqmM>
- Tom Smith—Sunflower Sprouts Follow the Sun
<http://youtu.be/EvX-HfFvAZg>
- TVO Kids—Jay and the Weather
<http://www.tvokids.com/shows/jaysweather>
- TVO Kids—Small Potatoes: Seasons
<http://www.tvokids.com/videos/seasons>

TVO Kids—Sticks and the Seasons (Game)
<http://www.tvokids.com/games/sticksandseasons>
TVO Kids—Stick Asks: Where Does the Sun Go at Night?
<http://www.tvokids.com/videos/sticksaskswheredoessungonight>
TVO Kids—The Magic Schoolbus Kicks up a Storm
<http://www.tvokids.com/videos/magicschoolbuskicksstorm>

Live Animal Webcams

Canada Webcam Network—Animal Webcams in Canada (Search)
<http://www.iwebcams.ca/animal.html>
Explore— Live Cams (various)
<http://explore.org/live-cams/player/tundra-buggy-lodge-south>

Websites for Teachers

AccuWeather—Interactive Weather Forecast Maps
<http://www.accuweather.com/en/ca/national/weather-forecast-maps>
Animal Fact Guide—Animal Facts
<http://www.animalfactguide.com/>
Canadian Geographic for Kids—Animal Facts (Search)
<http://www.canadiangeographic.ca/kids/animal-facts/animals.asp?region=nfld>
Day Length—Daylength Calculator by Location (Note: you have to allow your location for this link/activity to work.)
<http://day-length.com/>
Easy Science for Kids—Plants that Eat Meat
<http://easyscienceforkids.com/carnivorous-plants/>
Journey North for Kids—Tracking Seasonal Changes with Journey North
<http://www.learner.org/jnorth/KidsJourneyNorth.html>
Kidipede—Seasons
<http://scienceforkids.kidipede.com/physics/weather/seasons.htm>
Memorial University Botanical Garden—Educational Resources (Native Plants)
<http://www.mun.ca/botgarden/education/resources/index.php>
NASA Space Place—What Causes the Seasons?
<http://spaceplace.nasa.gov/seasons/en/>
Planet Science—Four Seasons
<http://www.planet-science.com/categories/under-11s/our-world/2010/09/four-seasons.aspx>
SunriseSunset—Interactive Daylength Calculator
<http://www.sunrisesunset.com/Canada/>
The Weather Network—Satellite-Radar Weather Maps
<http://www.theweathernetwork.com/maps/satellite-radar>
The Weather Network—Schoolday Weather Forecasts: Index by School
<http://www.theweathernetwork.com/forecasts/school-day/list/canl/all>

Dear parents and caregivers,

We are about to start an exciting new unit in science where we will be exploring daily and seasonal changes. Through a variety of hands-on explorations and investigations, your child will be developing an understanding of the seasons, the importance of the sun, and the daily and seasonal cycles of people and animals.

You can talk to your child at home about why seasonal-related clothes and other items are appropriate for certain seasons, and about what your family does to prepare for each season.

To ensure a wide range of experiences and make connections between this topic and your child's world, he/she may choose to bring one or more personal items to school for exploration during in-class activities. These items will be returned home once explorations are completed. To determine whether the item(s) is appropriate please contact me, your child's teacher.

Sincerely,