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# Grade 1 Learning Experiences: Seasonal Changes

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


## Experience 1: How Do Living Things Adapt to Seasonal Changes?

This series of learning experiences will introduce students to seasonal changes from a scientific approach as they observe changes in the weather throughout the school year (with opportunities to connect to other science strands and other curriculum expectations). Students will engage in the driving question “How Do Living Things Adapt to Seasonal Changes?” through a provocation activity to get them to share what they already know about the four seasons and what they wonder about seasonal changes. Students will then engage in the Engineering Design Process by designing and constructing a variety of devices to collect information about the weather that will contribute to a classroom indoor/outdoor weather station. The goal of the weather station is to help students observe, track and monitor the weather throughout the school year so they can witness firsthand the seasonal changes and how it impacts the world around us. A variety of extensions and cross-curricular opportunities will allow teachers to customize these experiences to suit their students' needs and learning styles while allowing for authentic assessment for, as, and of learning.

In the real world, scientists and engineers need to record their thinking and keep records of their scientific processes and engineering designs for several different reasons. In these experiences, students will be using a science journal to track their scientific thinking as they emulate scientists and engineers while learning to make predictions, record processes, and observations, and draw conclusions about scientific phenomena. The journal will also be used during STEM investigations as a place for solving solutions to real-world problems (brainstorming, describing plans, and drawing designs for prototypes) and will be an evidence-based source of assessment information

[Long Range Plan Grade 1 - Model 2](#)

Overview of learning experiences – why these activities	<p>In this learning experience, students will have the opportunity to participate in the Engineering Design Process by planning and designing a variety of devices to collect information about the weather that will contribute to a classroom indoor/outdoor weather station. Students will start by activating their prior knowledge through a gallery walk activity about the seasons. By the end of the experience, students will have a rough plan of their weather-tracking device and what materials they will need to construct it.</p> <p>These learning experiences link to the <a href="#">Long Range Plan Grade 1 - Model 2 2</a>, found in September.</p>
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<p>Prior Knowledge / Prior Skill Set(s)</p>	<p>Teachers may wish to use or introduce a science journal for students to record their questions, observations, designs and to communicate their learning/ideas. If this is the first activity in which the students will be using a science journal, consider a modeled or shared approach to completing the journal until the students can complete a journal activity on their own. The journal can then be used as a form of assessment throughout the lesson series. Teachers may use their own journal template or use <a href="#">Appendix B: Science Journal Entry</a>.</p> <p>Students should be familiar with the four seasons and the various types of weather that their community experiences (i.e., rain, snow, thunder, lightning, wind, cold, hot). Consider a vocabulary or weather station bulletin board for students to refer to throughout the lesson series.</p>
<p>Strand A - <a href="#">STEM Investigation and Communication Skills</a></p>	<p> <b>A1.1</b> use a scientific research process and associated skills to conduct investigations</p> <p> <b>A1.2</b> use a scientific experimentation process and associated skills to conduct investigations.</p> <p> <b>A1.3</b> use an engineering design process and associated skills to design, build, and test devices, models, structures, and/or systems.</p> <p> <b>A1.4</b> follow established health and safety procedures during science and technology investigations, including wearing appropriate protective equipment and clothing and safely using tools, instruments, and materials.</p> <p>  <b>A1.5</b> communicate their findings, using science and technology vocabulary and formats that are appropriate for specific audiences and purposes</p> <p> <b>A2.2</b> identify and describe the impacts of coding and of emerging technologies on everyday life</p> <p> <b>A3.1</b> describe practical applications of science and technology concepts in their home and community, and how these applications address real-world problems</p>

	<p><b>A3.2</b> investigate how science and technology can be used with other subject areas to address real-world problems</p> <p><b>A3.3</b> analyze contributions to science and technology from various communities</p>
Overview / Big Ideas/Fundamental Concepts	<p>Throughout the course of a year, living things in our province experience four seasonal changes and have a variety of ways to adapt to them. In this learning experience, students will share what they know and wonder about the four seasons. Students will then brainstorm and plan ideas to find a solution to the driving question, “How Do Living Things Adapt to Seasonal Changes?”. Students will have to track, monitor, and observe weather, nature, and the world around them using a scientific classroom Weather Station.</p>
Learning Goals / Success Criteria	<p>Students will design and build a weather station to track seasonal changes. The station can include a variety of tracking tools or devices that will monitor and observe information such as temperature, wind direction, and precipitation.</p> <p>The success criteria template (see <a href="#">Appendix A: Co-Created Success Criteria</a>) can be used as a starting point when collaborating and co-creating learning goals based on curricular expectations.</p> <p>Further evidence for assessment can be observed through</p> <ul style="list-style-type: none"> <li>● Scientific Journal</li> <li>● Student Conferences</li> <li>● Nature Walks</li> <li>● Presentations</li> <li>● Peer Discussions</li> </ul> <p><b>Ministry of Education Key Points:</b></p> <ul style="list-style-type: none"> <li>● STEM Skills &amp; Connections</li> <li>● Research &amp; Experimentation Processes</li> <li>● Engineering Design Process</li> <li>● Hands-On Experiential Learning</li> <li>● Coding</li> <li>● Contributions to Science and Technology</li> </ul>
Learning Experience(s)	<p>When it comes to understanding Earth systems and our changing world, our best resource is nature itself. During these learning experiences, students will immerse in the scientific experimentation</p>



**A1.3, A1.5, A3.1,  
A3.2**

process and the engineering design process as they create their own weather station to determine the seasonal changes in our world and how living things adapt to them. In this learning experience, students will begin to share what they know about seasonal changes and ask questions. They will also discover ways to monitor, observe and track weather. Students will strategize and build a prototype to contribute to the weather station. The prototype should be a device/tool that will collect measurable data about the weather to provide solutions and evidence to their questions, and the driving question, “How Do Living Things Adapt to Seasonal Changes?”

### ***Minds On***

#### **What the Teacher Does:**

1. Place four pieces of chart paper around the classroom. Each chart paper represents a season (Fall, Winter, Spring, and Summer). Record the name of each season plus an image that represents that season on each piece of paper (i.e., “Fall” with the image of a leaf.)
2. Arrange the students into four groups, each group receives one marker and is assigned one chart paper.
3. Explain to the students that each group is going to share what comes to mind about that season on the paper, without talking\*. They can write or draw their ideas on chart paper and pass around the marker within their groups but cannot share them aloud. Each group gets four minutes during their first season.
4. After the four minutes, ask the groups to rotate to the next season.
5. When students approach the next chart paper that has other groups' ideas on it, explain to them that they can either add a brand new idea or put a checkmark next to an existing idea that they agree with, without talking. Groups will spend two minutes with each of the remaining three seasons.
6. After each group has visited each chart paper, students are welcome to complete a gallery walk to see what was added to each chart paper. At this point, students are welcome to speak aloud to one another about what they noticed and wonder about each season. During the gallery walk, observe, and assess what students already know about the seasons, and what they are wondering about.

\*We ask students to complete this activity silently not only so they can focus on their ideas but also because it forces them to add as much detail as possible to the chart paper so others can understand their ideas.

***What the Students Do:***

Application:

- The use of knowledge and skills to make connections within a familiar context.
- Making connections between various contexts.

Communication:

- Communication for different audiences and purposes in oral, visual, and/or written forms.
- Expresses ideas and information in visual and/or written forms.

**Assessment for Learning Opportunity:** The Minds On activity is designed to allow students to share what they understand about the seasons and weather changes. During the activity observe what students add to the chart paper. Use the checklist (see [Appendix A: Co-Created Success Criteria](#)) to record observations and evaluate students.

**Action**

**What the Teacher Does:**

Bring students back together as one group and share with them what the teacher noticed about their ideas within the four seasons. The teacher may want to point out that within every season, people and nature make changes to prepare and withstand the weather. Perhaps some ideas on the chart paper prove this (i.e., leaves falling off trees, winter clothing, winter tires, etc.).

1. Explain to students that in Canada we have four seasons, therefore our environment must have ways to change and adapt to those four seasons.
2. Share the driving question with the class “How Do Living Things Adapt to Seasonal Changes?” Ask the students “What are some ways that we can find answers to this question?” then record their answers. (Possible Responses: Observe the weather, observe nature, track, or record the weather, read about the seasons, etc.)

3. If possible, share with the students a local weather broadcast. It can be the radio, a recording, or a live broadcast.
4. Explain to students, “Scientists called meteorologists study the weather so they can predict what the weather will be like throughout the day or week. They report the weather to us so we can prepare ourselves for it. They use many scientific tools and devices to study, monitor, and track the weather. Perhaps, we will need to be like meteorologists to solve our driving question”.
5. Explain to students that they will begin to plan and design ideas in their science journals of how they can study, track, or monitor the weather at school just like a meteorologist.
6. Share a visual of the Engineering Design Process with the students. Explain that professional problem solvers like engineers, meteorologists, and scientists follow a special process when solving problems, called the Engineer Design Process. Then explain that students will begin that same process today, where we are generating ideas and selecting an idea to prototype.
  - [Engineering Design Process](#)
7. Arrange the students into groups/partners to strategize some ideas. Distribute [Appendix B: Science Journal Entry](#) or any journal entry page. They can draw, write, paste, and record their ideas and what materials they might need.
8. Model the expectation of what brainstorming, designing, and planning might look like. Perhaps, demonstrate an example of designing/planning to make an anemometer.
9. Inform students that they will have the opportunity to share their favorite idea with the class.
10. Observe and assess the ideas that students generate and take note of any recurring ideas. Feel free to guide them and direct their ideas to tools/devices that already exist (i.e., thermometer, weather chart, rain gauge, weathervane, etc.). Refer to the DIY Weather Station link under “Additional Supporting Resources” for ideas.

**What Students Do:**

Thinking & Investigating:

- Use of initiating and planning skills and strategies.
- Use of critical/creative thinking processes, skills, and strategies.

Communication:

- Expression and organization of ideas in oral, visual, and/or written forms.

Application:

- proposing courses of action to deal with problems relating to our changing world.

**Assessment for Learning Opportunity:** While students participate in the gallery walk and action activity, take note of their conversations, and what they orally share about what they notice and wonder. Use the checklist ([Appendix A: Co-Created Success Criteria](#)) to record observations and evaluate students.

### **Consolidation**

#### **What the Teacher Does:**

1. Invite the students back as a group.
2. Invite one person from each group to share their favourite idea. Probe students to share what materials they would need, how they would acquire materials, and can their idea withstand the weather if it's for outside?
3. After each group has shared, welcome students to orally provide feedback on what ideas they liked and/or what questions they might have.
4. Inform the students that to use all these ideas to track and monitor the weather we are going to have to put them together to create a weather station that can be used throughout the year to monitor seasonal changes.

#### **What Students Do:**

##### Communication:

- expression and organization of ideas in oral, visual, and/or written forms.

##### Application:

- proposing courses of action to deal with problems relating to our changing world.

**Assessment AS/FOR/OF Learning Opportunity:** Students have the opportunity to share their thinking and provide one another feedback on their ideas and solutions. The students' science journal pages can be used as an example to assess student thinking, application, and communication. Be sure to check in with students during the action portion of the experience to allow them to share their ideas orally in case their recordings are unclear.

	<p>The entire final product that students contribute to the weather station can be an assessment of learning. Students should be able to articulate how their product/invention/tool tracks weather and seasonal changes and are encouraged to make changes to make it better, if need be, as it is a component of the Engineer’s Design Process. As students continue to track and monitor the weather and seasonal changes, give them opportunities through the student science journal, and class discussions to communicate their own discoveries, conclusions, and understanding.</p>
<p>Science and Technology Expectations</p>	<p><b>E. Earth and Space Systems</b></p> <ul style="list-style-type: none"> <li>- E1.1 assess the impact of daily and seasonal changes on human outdoor activities and identify innovations that enable people to engage in various activities year-round.</li> <li>- E1.2 assess the ways in which daily and seasonal changes have an impact on society, the environment, and living things in the natural environment.</li> <li>- E2.4 describe and compare the four seasons in terms of the weather, including precipitation and temperature in their local area.</li> <li>- E2.5 describe changes in the appearance or behaviour of living things that are adaptations to seasonal changes.</li> <li>- E2.6 describe how humans prepare for, and respond to, daily and seasonal changes.</li> </ul> <p><b>C. Matter and Energy</b></p> <ul style="list-style-type: none"> <li>- C2.6 describe seasonal differences in how we use energy and in the forms of energy we use.</li> </ul> <p><b>D. Structures and Mechanisms</b></p> <ul style="list-style-type: none"> <li>- D2.6 describe purposes for everyday objects, including structures</li> <li>- D2.8 identify sources in nature of some common materials that are used to make various objects, including structures.</li> </ul>
<p>Science and Technology Vocabulary</p>	<p><b>Season:</b> a part of the year based on changes in weather. Seasons are the result of the Earth’s orbit and position around the sun.</p> <p><b>Spring:</b> is a season after winter and before summer. The weather is warmer, the days become longer, and it rains more often.</p> <p><b>Summer:</b> the season after spring and before fall. Summer is the hottest of the four seasons and the days are the longest.</p> <p><b>Fall/Autumn:</b> the season after summer and before winter. Fall is also known as Autumn. During the Fall, the temperature begins to cool down</p>



	<p>and the days become shorter.</p> <p><b>Winter:</b> the season after Fall/Autumn and before spring. It is the coldest season of the year. The nights are longer, and the days are shorter.</p> <p><b>Temperature:</b> a measure of how hot or how cold something is. We can measure temperature by using degrees Celsius.</p> <p><b>Thermometer:</b> a device used to measure temperature.</p> <p><b>Meteorologist:</b> a scientist who studies processes in the earth's atmosphere that cause weather conditions.</p> <p><b>Precipitation:</b> water that falls to the earth as rain, sleet, hail, mist, or snow.</p> <p><b>Wind:</b> is the movement of air on the Earth's surface. The most powerful wind happens during storms. Changes in the temperature of air, land, and water cause wind.</p> <p><b>Brainstorming:</b> a discussion, list, or picture to create many ideas and solve problems.</p> <p>*Teachers are encouraged to provide an image for each science term to support learners at all levels.</p>
Equipment and Materials	<ul style="list-style-type: none"> <li>● Science Journal and/or Journal Handout (see <a href="#">Appendix B: Science Journal Entry</a>)</li> <li>● Chart Paper (4 pages)</li> <li>● Markers</li> </ul>
Timeline and Preparation	<p><b>Minds On (10-15mins)</b></p> <p><b>Action (30 mins)</b></p> <p><b>Consolidation (10-15mins)</b></p> <p><b>Preparation: (5-10mins)</b></p> <p>To prepare for this learning experience gather the required materials, record the seasons on each chart paper and have the science journals prepared by printing off the handout.</p> <p><b>Next Steps</b></p> <p>To prepare for the next learning experience, collect recycled materials, and stationery that students may use for the weather station. (i.e., plastic cups, dixie cups, straws, elastic bands, rulers, etc.). Decide on a designated area outside for the weather station, some items like a rain gauge will need to be placed somewhere that is not covered. Keep an area inside the classroom/school to record or track that data each day as a model for the student journal (refer to <a href="#">Appendix C: My Daily Weather Tracker</a> handout).</p>

<p>Safety Considerations</p>	<p><b>What does the teacher do?</b>          Ensure there is enough space for students to walk around during the Minds On activity and gallery walk and that the floor is free from items that students can trip on. Remind students that markers are meant to be used on chart paper only.</p> <p><b>What do the students do?</b>          Be mindful of their space while rotating from one chart paper to another and responsibly use the marker on the chart paper.</p> <p>Refer to these safety resources:</p> <ul style="list-style-type: none"> <li>• <a href="#">Safety in Elementary Science and Technology (STAO)</a></li> <li>• <a href="#">Safe Activity Foundations in Education Document (SAFEdoc) Science and Technology, Grades 1-8 (OCTE)</a></li> <li>• <a href="#">Ontario Curriculum Program Planning – Health and Safety</a></li> </ul>
<p>Opportunities For Assessment</p>	<p>According to the Ministry of Education Growing Success Document (2010) assessment is about improving student learning:</p> <p><b>Assessment FOR Learning:</b> Occurs frequently and in an ongoing manner during instruction, while students are still gaining knowledge and practicing skills and is used by teachers to monitor students’ progress towards achieving the overall and specific expectations, so that teachers can provide timely and specific descriptive feedback to students, scaffold next steps, and differentiate instruction and assessment in response to student needs.</p> <p><b>Assessment AS Learning:</b> Occurs frequently and in an ongoing manner during instruction, with support, modeling, and guidance from the teacher and is used by students to provide feedback to other students (peer assessment), monitor their own progress towards achieving their learning goals (self-assessment), make adjustments in their learning approaches, reflect on their learning, and set individual goals for learning.</p> <p><b>Assessment OF Learning:</b> Occurs at or near the end of a period of learning, and may be used to inform further instruction and is used by the teacher to summarize learning at a given point in time. This</p>

	<p>summary is used to make judgements about the quality of student learning on the basis of established criteria, to assign a value to represent that quality, and to support the communication of information about achievement to students themselves, parents, teachers, and others</p> <p><b>NOTE:</b> The assessment in the learning experiences are intentionally assessment for learning and assessment as learning. The assessment modality is intentionally conversations and observations. This is to help move away from only product based assessment. Throughout the learning experiences students will have many opportunities to demonstrate their understanding through doing, talking and engaging in self-assessment. By collecting assessment for/as learning data teachers can be responsive and provide meaningful feedback. Teachers have been provided with assessment tools to collect evidence of student learning. Assessment opportunities are embedded throughout the learning experiences.</p> <p>Please use the following links for further reference:  <a href="https://www.dcp.edu.gov.on.ca/en/assessment-evaluation">https://www.dcp.edu.gov.on.ca/en/assessment-evaluation</a>  <a href="https://www.edu.gov.on.ca/eng/policyfunding/growsuccess.pdf">https://www.edu.gov.on.ca/eng/policyfunding/growsuccess.pdf</a></p>
<p>Instructional Strategies and Adaptability</p>	<p>This learning experience makes use of a variety of instructional strategies. The teacher may wish to adapt or change the strategy as indicated in the instructions section of this document.</p> <p>The teacher may wish to give students multiple options of how they can communicate their ideas in their science journal (i.e., draw pictures, take a picture and add it to the journal, use a digital journal, record voice memos, etc.) The teacher may also need to scribe ideas or journal for students who require extra support.</p> <p>Some students may benefit from having the vocabulary and definitions on a handout sheet with images, so they are able to see and refer to them on a bulletin board.</p>
<p>Additional Supporting Resources</p>	<p><b>Weather Station Ideas:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Inventors of Tomorrow – Weather Station for Kids</a></li> <li>• <a href="#">Inventors of Tomorrow – DIY Weathervane and Anemometer</a></li> </ul> <p><b>Meteorologist Connection:</b></p>

	<ul style="list-style-type: none"> <li>• <a href="#">Inventors of Tomorrow – Weather Chart</a></li> </ul> <p><b>Weather Report for Kids:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">The Weather Network Whiz Kids Academy</a></li> </ul> <p><b>Read Alouds:</b>  <a href="#">“On the Same Day in March: A Tour of the World’s Weather”</a>  By: Marilyn Singer</p> <p>“<a href="#">The Weather Girls</a>” By: Aki</p> <p><a href="#">Appendix A: Co-Created Success Criteria</a>  <a href="#">Appendix B: Science Journal Entry</a>  <a href="#">Appendix C: My Daily Weather Tracker</a></p>
<p>Cross-Curricular Opportunities</p>	<p><b>The Arts</b>  Visual Arts: communicate feelings and/or ideas about the seasons</p> <p><b>Mathematics</b>  Geometric and Spatial Reasoning: describe their final product/invention as they design and plan it.</p> <p><b>Language</b>  Oral Communication: communicate ideas and brainstorm strategies with teachers and peers.</p> <p>Writing: record ideas, record the procedure for the plan, label designs, and make a list of materials.</p>
<p>Future Opportunities / Next Steps</p>	<p>After students have completed the design for their final tool/invention for the weather station, they can begin to build and construct it in the next learning experience.</p> <p>Teachers can extend this learning experience by giving students more time to finalize their designs by researching devices that already exist to track the weather by scientists and meteorologists.</p> <p>Teachers can also inform students’ families of the weather station project and invite them to participate by providing recycled materials, other weather devices or items they have at home that could support the project.</p>



## **Appendix A - Co-Created Success Criteria**

Name: \_\_\_\_\_

**Co-Created Success Criteria – Grade One: How Do Living Things Adapt to Seasonal Changes?**

**Knowledge and Understanding**

<b>I Can:</b>	<b>Not Yet</b>	<b>Met</b>
Build a tool/device for the weather station by following the safety procedures for science.		
Describe changes in appearance or behaviour of living things that are adaptations to seasonal changes.		

**Thinking**

<b>I Can:</b>	<b>Not Yet</b>	<b>Met</b>
Identify and plan strategies to gather information to assess the impact on society, the environment, and living things in the natural environment.		
Use creative thinking processes, skills, and strategies to solve a learning task.		

## Communication

<b>I Can:</b>	<b>Not Yet</b>	<b>Met</b>
Express and organize my observations to communicate my understanding (using pictures, words, or verbally) to my peers and my teacher.		
Justify and prove my conclusions and solutions.		

## Application

<b>I Can:</b>	<b>Not Yet</b>	<b>Met</b>
Apply the engineer's design process to build a device/weather station that can withstand external forces using the techniques I have learned.		
Transfer my knowledge and skills to solve real-world problems by making connections between other subject areas.		



Descriptive Feedback:

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## **Appendix B: Science Journal Entry - Plan/Design**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Science Journal Entry: Plan/Design

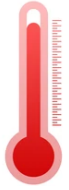
My Ideas (Draw, Write, Record, Paste, etc.)



What I Need (Draw, Write, Record, Paste, etc.)



## **Appendix C: My Daily Weather Tracker**



Hot



Snow



Thunder & Lightening



Rain



Light Rain



Dry



Windy



Fair

# MY DAILY



Breeze

Date:



Cold



Sunny



Partly Cloudy



Cloudy



Foggy



No Wind