



STAGE 3: BECOMING PLANT EXPERTS

In this stage, students will become plant experts! Students will have the opportunity to discuss where their food comes from (food origins), learn plant characteristics, basic needs, how they get energy from the sun, and environmental conditions affecting them. Planting seeds, tracking their growth and accounting for plants needs will give them an opportunity for real-life application!

Lesson 1 - Where Does Our Food Come From?

Lesson 2 - Parts of a Plant

Lesson 3 - What a Plant Needs to Grow

Lesson 4 - Planting Your Seeds (CORE LESSON)

Lesson 3: What a Plant Needs to Grow

Learning Goals

- Notice that plants have distinct characteristics.
- Identify the things the same and different about types of plants.
- Understand that plants need certain things to grow.
- Let's discuss! There are environmental conditions that may threaten plants and animals.

Materials Needed

- Lesson Slides



Time Frame: 40min

Curriculum Expectations

Science & Technology Curriculum Strand B Life Systems

- B1.3 Assess the benefits and limitations of locally grown food
- B2.1 Describe the basic needs of plants, including the need for air, water, light, heat, nutrients, and space, and identify environmental conditions that may threaten plant survival
- B2.3 Describe changes that different plants undergo in their life cycles
- B2.4 Describe ways in which a variety of plants adapt and/or react to their environment and to changes in their environment
- B2.5 Demonstrate an understanding that most plants get energy directly from the Sun through the process of photosynthesis, which involves the absorption of carbon dioxide and the release of oxygen

Strand E Earth and Space Systems

- E1.1 Assess the importance of soils for society and the environment
- E1.2 Assess the impact of human activity on soils, and describe ways in which humans can improve the quality of soils and/or lessen or prevent harmful effects on soils
- E2.2 Identify different substances that are commonly added to, or absorbed by, the soil, and describe their effects on soil health
- E2.5 Identify various strategies used to maintain and improve soil health in Ontario

Strand E Earth and Space Systems

- Understand the basic needs of plants, including grains.
- Learn about environmental conditions that may threaten plants and animals.

Media Links (embedded in the slides)

- Photosynthesis: <https://www.youtube.com/watch?v=xuivYRmIACM>
- How fertilizers work: https://www.youtube.com/watch?v=W6E_MyVjQX4



STEMterprise Teaching Notes

<p>Slide 5: Learning Goals</p>	<p>Notice that plants have distinct characteristics.</p> <p>Identify similarities and differences among various types of plants. You may want to focus on what you're growing in the classroom.</p> <p>Understand the basic needs of plants.</p> <p>Discuss examples of environmental conditions that may threaten plant and animal survival.</p>
<p>Slide 6: Recap Activity</p>	<p>As a group, make up two truths and a lie about where plants come from or where seeds come from.</p> <p>Present your two truths and a lie to the other groups to see if they'll make a mistake.</p>
<p>Slide 7: What Do Plants Need?</p>	<p>Just like humans, plants need certain things to grow and be healthy.</p> <p>Ask the children if they can think of anything plants need.</p> <p>Create a list on the Wonder Wall or a whiteboard (the answers are on the next slide)</p>
<p>Slide 8: What Do Plants Need?</p>	<p>We are thinking about plants and about the ingredients that we'll grow for our granola bars.</p> <p>This lesson will guide us through the conditions that farmers think a lot about! These conditions they can account for or do something about to help their plants grow.</p>



<p>Slide 9: Light</p>	<p>Talk through the presentation to explain the conditions plants need in more detail:</p> <p>Plants need light to grow and be healthy.</p> <p>Plants are amazing! They can turn sunlight and water into food in their leaves during a process called photosynthesis.</p> <p>We also need sunlight to help our bodies make Vitamin D to keep us healthy.</p>
<p>Slide 10: Photosynthesis</p>	<p>This short video is a fun introduction to the following slides.</p> <p>https://www.youtube.com/watch?v=xuivYRmlACM</p>
<p>Slide 11: Photosynthesis</p>	<p>Sunlight is absorbed by the cells in the plant's leaves. Some of the cells contain chlorophyll, a compound that traps sunlight and starts the process of photosynthesis.</p> <p>Plants need water and carbon dioxide for photosynthesis. Water is made of one atom of hydrogen and two atoms of oxygen. Photosynthesis removes the hydrogen and leaves only oxygen.</p> <p>The hydrogen atoms are mixed with carbon dioxide from the air to make sugar the plant needs as food.</p> <p>At the end of the photosynthesis process the leftover oxygen is released into the air. Oxygen is the gas humans and animals need to breathe.</p>



**Slide 12:
Water**

Just like us, plants need water. Without the right amount of water, plants cannot grow and be healthy.

At the very start of a plant's life, it needs water to make it start to grow into a little seedling.

Once the seedling has grown some roots, the plant needs water to take up the nutrients out of the soil.

What are nutrients? Nutrients are the chemical elements plants need to grow. Plants have primary and secondary nutrients.

Primary nutrients are oxygen, nitrogen, phosphorus, potassium, and carbon.

Secondary nutrients are calcium, sulfur, iron, zinc, and copper.

**Slide 13/14
Not Enough Water**

Discussion: What do you notice about these pictures?

Water is very important to farmers. If there is not enough rain, their crops will not grow properly.

Some farmers irrigate (water) their crops during the growing season. Others rely on rainfall to get enough water for their plants to grow. Here in Ontario, most farmers rely on rain.



<p>Slide 15/16: Too Much Water</p>	<p>Ask students what they think will happen if plants have too much water.</p> <p>Too much water is also a big problem for farmers.</p> <p>Flooding or heavy rainfall can affect the health of soil because it washes away some of the soil particles and nutrients that plants need to grow and be healthy. Flooding can also drown plants in the fields so they can not grow.</p>
<p>Slide 17/18: Heat</p>	<p>Ask the children to think about how they feel when it gets cold. Just like us, plants need a suitable temperature to be healthy. They will not start to grow from seeds if their environment is not warm enough.</p> <p>The soil and air need to be warm enough for plants to start to grow- about 10°C - 14 °C.</p>
<p>Slide 19: Nutrients</p>	<p>Plants take their nutrients from the soil so it is very important that farmers keep their soil healthy. We will learn all about this later in the project.</p> <p>When dissolved in water, these nutrients get absorbed by a plant's roots.</p> <p>If a plant can't get the nutrients it needs from the soil, fertilizer can help. Fertilizer provides plants with essential nutrients and helps them grow faster.</p>



<p>Slide 20: Nutrients</p>	<p>Gardeners use fertilizer spikes or water additives.</p> <p>Farmers apply fertilizer using sprayers or spreaders pulled by tractors.</p> <p>Plants take their nutrients from their soil, so it is very important that farmers keep their soil healthy.</p>
<p>Slide 21: Nutrients</p>	<p>This video explains how fertilizers work. There are different types of fertilizers.</p> <p>https://www.youtube.com/watch?v=W6E_MyVjQX4</p>
<p>Slide 22: Check In!</p>	<p>Turn to your partner and recap:</p> <ul style="list-style-type: none"> • What are six basic needs of a plant to grow? • What are nutrients and how do plants get them? <p><i>Hint: We discussed two ways.</i></p>
<p>Slide 23/24: ACTION: Grown in Ontario</p>	<p>Explain that different plants need different temperatures, which is why we can grow some foods in Ontario but not all plants.</p> <p>Some plants need different conditions such as a different climate. For example, bananas need a tropical climate.</p> <p>Explain: Eating food grown in Ontario is one way we can care for the environment. When food doesn't have to travel very far to reach our plates, it takes less fuel, reducing air pollution.</p>



<p>Slide 25</p>	<p>Explain: Eating food grown in Ontario is one way we can care for the environment.</p> <p>Lead a discussion about the benefits and limitations of eating food grown locally.</p> <p><i>Tip!</i> When food doesn't have to travel very far to reach our plates, it takes less fuel, reducing air pollution. We can't grow all crops here because of temperature, soil type, etc. If we only ate local, we would have less access to a range of different fruits and vegetables. It is also a way to support the farmers in your community.</p>
<p>Slide 26: Check In - What's Next</p>	<p>Tell students - Next lesson we will be growing our granola bar ingredients from seed! So get ready to plant!</p>

Assessment Resources. Coming soon!

Please check the STEMterprise webpage at <https://goodineverygrain.ca/ontario-farming-stemterprise/>