Stage 1 - Becoming a Plant Expert

In this Farming STEMterprise project we will meet cross-curricular challenges with students by growing their own ingredients, developing a new food, setting up a granola bar business, and calculating finances in real-life context.

Stage Overview:
Introduction to the project and challenge to design, develop and make a new granola bar product. Students will become plant experts to understand how to grow and harvest the plant ingredients for their granola bar businesses. Cross-curricular objectives include Science and Technology and Health and Physical Education.

Learning Objective:
- To discuss where food comes from.
- To explore the many roles of plants in our lives.
- To identify and describe the major parts of plants, including root, stem, flower, leaf, seed, and fruit, and describe how each one's contribution to the plant's survival within its environment.
- To explore key ingredients of granola bars.

Materials Needed:
- *Flowering Plant Diagram* (two for each group)
- Plant information sheets (one per group)
- Non-fiction books on plants/access to the internet
- Post-it notes
- *My Research Notes - Parts of the Plant* (optional)

Time Frame: 1.5 hours

Curriculum Connections: These lesson plans are mapped to curriculum objectives. Find all the details on page 5.

Presentation Notes

Slide 3: Wonder Wall	• Ask students to consider what they would like to know about their food and where it comes from. • Ask them to write down their question(s) and add it to the Wonder Wall or in their notebooks. Explain that we will answer their questions during the project.

Slide 4: One is Different	• Share the three photos of food (milk, oatmeal, and tomatoes). Have students talk in pairs and explain which is different from the others. • Take feedback and explain that there are many possible answers. It could be milk is the different one because it comes from a cow, whereas the other food ingredients can be grown from plants.
Slide 5: Where Does Our Food Come From?	• Explain: During this project, we will learn about grain, a special type of plant we use for food. Grains are ingredients in many foods. Which of the three foods on the previous slide is a grain food? • Oatmeal is made from oats, a kind of grain. Farmers plant oat seeds in soil, and once the plants are grown and ready to be harvested, they harvest them with a large machine called a combine harvester (or "combine"). • Ask students to think of other foods made with oats, such as granola bars.
Slide 6: Introduction to the Challenge	• Ontario farmers grow many types of grains. Oats grown in Northern Ontario are best suited to making granola or snack bars. But oats grown in Southern Ontario are better for other uses. Eating food made with locally grown ingredients means our food does not have to travel as far to reach our plates. Ask the students how this helps the environment. • Set the scene: Ontario children are bored with their current snack choices. They need an exciting, innovative new option. In this project, they will design a brand-new granola bar to fuel our bodies for learning! • Explain: Students will learn how to set up a granola bar business. Perhaps they will grow up to become entrepreneurs with businesses of their own! • Step One is to become a plant expert specializing in grain.
Slide 7: Grains Research	• Ask students to name as many types of grain as they can. Share the full list of grains grown in Ontario in the PowerPoint presentation. • Give each business group a type of grain to become experts in and allot five minutes to research food products that contain their grain. • Allow another five minutes to research the health benefits of eating grains. • Give each group one minute to summarize their findings for the rest of the class.
Slide 8 - 12: Grains	• Share the PowerPoint presentation slides to learn more about the grains grown in Ontario.

Slide 13 - 14: Activating Prior Learning: Vertical Relay	• Explain: We must know how to grow, nurture, and harvest the plant ingredients we need for our granola bars. • Display the unlabelled flowering plant diagrams around the classroom/ outside space (one for each business group). • Ask students to stand in a line in front of their group's diagram. • Explain: When you say "go," they will label the diagrams with any information they already know. • Each child may add one piece of information before passing the pen to the next child (like a relay baton), and going to the end of the line. Encourage students to work as a team and help each other. • Explain: This is a race and the teams are competing to be first to label the whole diagram correctly with as much information as possible. Be clear that it does not matter if they do not know the answers yet. They will know them by the end of the lesson. • Allow time for the business groups to share their answers with the rest of the class. Address any misconceptions and share the names of the parts of the plant in the presentation.
Slide 15: Plant Research	• Explain: We are going to learn even more about the jobs that each part of a plant does. • Give each business group an area to focus on during their research (root, stem, flower, leaf, seed, and fruit). • Challenge the groups to research the functions of their part of the plant and some of their uses using several sources (e.g. nonfiction books, the internet, and the information sheets provided. • Give each group a different colour of Post-it notes. Ask them to write each new fact on a Post-it note and run to the other end of the classroom/outside area to stick it on a display. • They will need to work as a team to ensure facts are not repeated. Suggest each student use different source of information as they can. • Explain: The challenge is to collect as much good quality information as they can. The Post-it notes will create a visual demonstration of which teams have been most successful.
Slide 16: Presenting the Research	• Once teams have collected enough research, give each team two minutes to summarize and present their findings for the rest of the class. • To reinforce the learning, you could ask the students to visit the display they have created and make their own notes on all parts of the plant using the facts their peers have found.

Slide 17 - 21: Parts of the Plant	• Use the PowerPoint presentation slides to cover the functions of the basic parts of the plant. Address any misconceptions identified during the research and vertical relay tasks.
Slide 22: Progress Check: Vertical Relay	• Repeat the vertical relay activity. • This time, the students should be able to complete the activity more confidently using what they have learned. • Encourage them to fill the diagrams with all their learning from the lesson.
Slide 23: Wonder Wall Recap	• Refer back to the students' Wonder Wall questions. Have they answered any of them yet? If they have, ask them to add the answer in a different color. • Refer to the Wonder Wall regularly during the project. Allow time for students to add the answers they have discovered and more questions.

Curricular Connections:

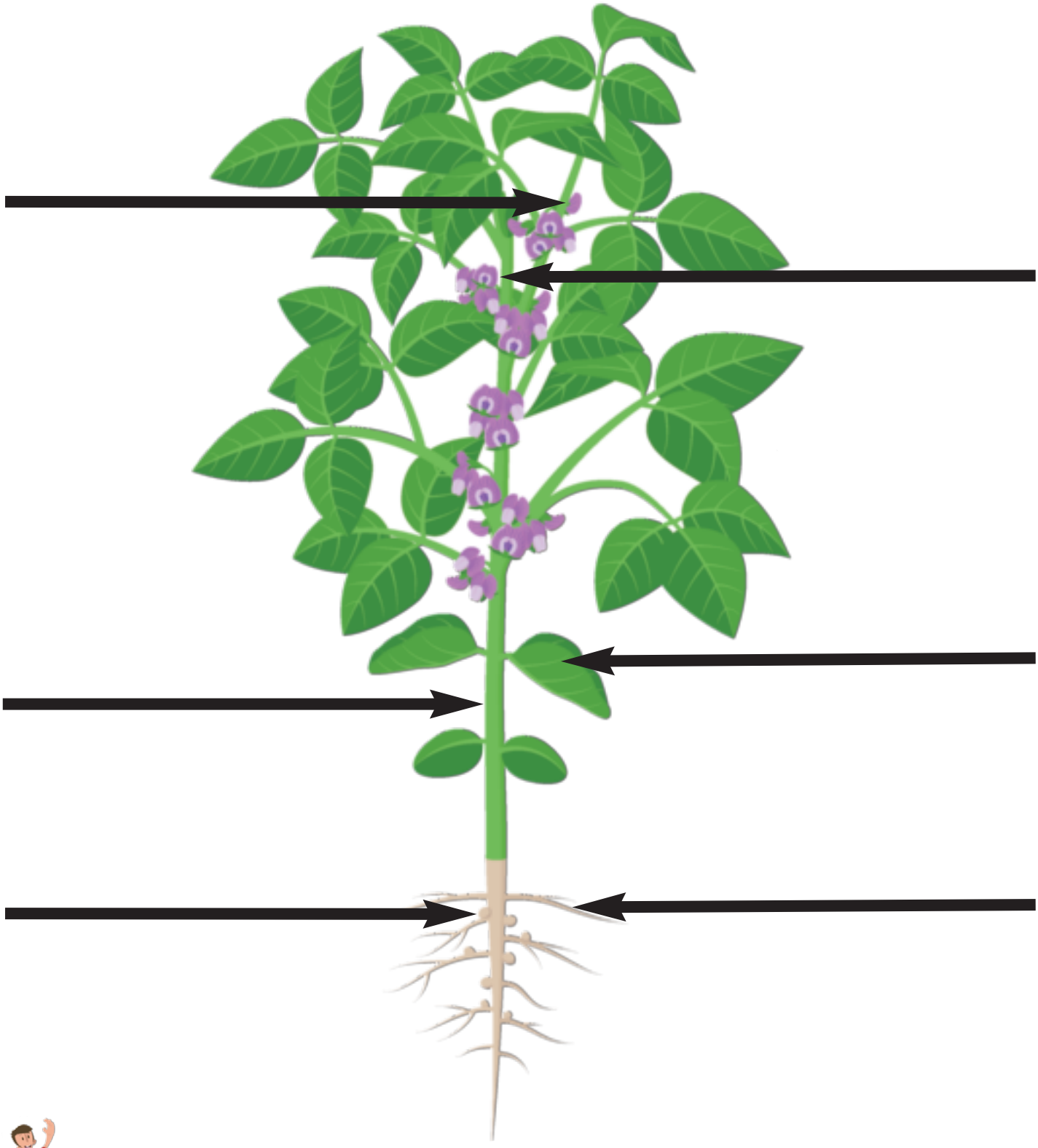
Science and Technology Curriculum: Life Systems – Growth and Changes in Plants

- **B1.1** assess ways in which plants are important to humans and other living things, taking different perspectives into consideration, and identify ways in which humans can protect native plant species and their habitats.
- **B2.2** identify different parts of plants, including the root, stem, flower, stamen, pistil, leaf, seed, cone, and fruit, and describe how each part contributes to plants' survival within their environment.
- **3.7** describe the different ways in which plants are grown for food (e.g., on farms, in orchards, greenhouses, home gardens).

Health and Physical Education

- **D1.1** demonstrate an understanding of how the origins of food (i.e., where the food is grown, harvested, trapped, fished, or hunted; whether and how it is processed or prepared) affect its nutritional value and how those factors and others (i.e., the way we consume and dispose of food) can affect the environment.
- **D3.1** explain how local foods and foods from various cultures (e.g., berries, curries, chapatis, lychees, kale, lentils, corn, naan, wild game, fish, tourtière) can be used to expand their range of healthy eating choices [A1.6 Thinking].

Flowering Plant Diagram



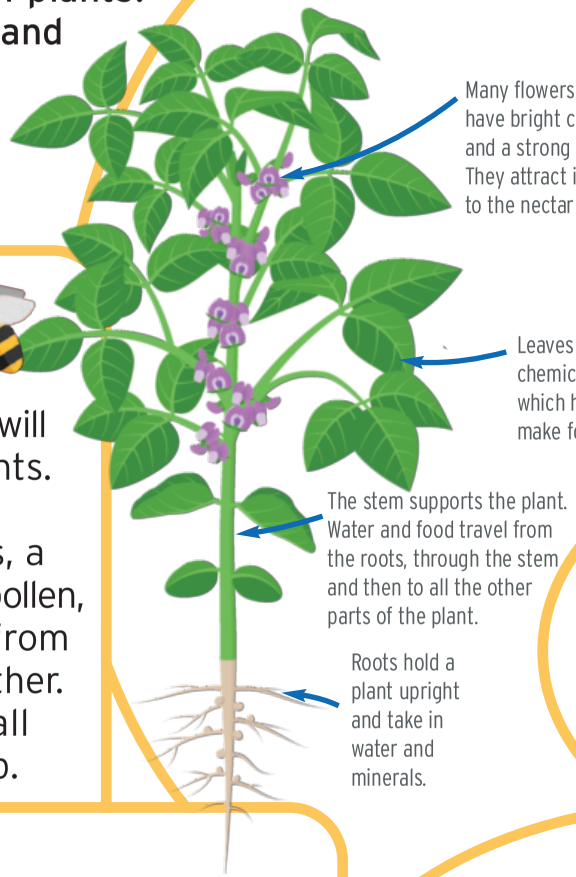
My Research Notes - Parts of the Plant

Directions: Use this grid to keep track of your knowledge and new facts about parts of the plant.

Leaves Function: Uses:	**Leaves** Function: Uses:	**Leaves** Function: Uses:
Leaves Function: Uses:	**Leaves** Function: Uses:	**Leaves** Function: Uses:

About Plants

The largest group of plants! They include trees and flowers. Their main parts are the flowers, leaves, stem and roots.



Inside a Flower

Flowers help make seeds, which will grow into new plants.

To make the seeds, a yellow dust, called pollen, has to be carried from one flower to another. The wind and small animals do this job.

Looking at leaves

Leaves contain a green chemical which absorbs sunlight to help make food. When leaves die, the green chemical fades away and they change colour.

Fruits

When the petals fall off, flowers grow into fruits.

Fruits contain seeds that can grow into new plants.

Stems

Stems hold the leaves above the ground. There are lots of different types of stems, for example strawberry plant stems grow along the ground and ivy plant stems grow along other plants.

Roots

Hidden underground, the roots hold the plant firmly in the ground. Water and dissolved minerals enter the roots through the tiny root tips. The more roots a plant has, the more water and minerals it can take up.

Making Food

Green plants use the sun's energy to make food in their leaves. They turn water and minerals from the soil and carbon dioxide gas from the air into sugar. Sugar is food for plants. This process is called photosynthesis.

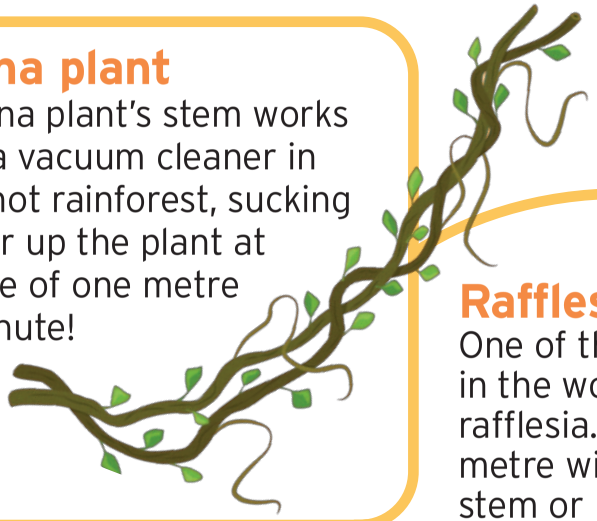
Sunlight

Plants are arranged to get as much sunlight as possible. The greater the amount of sunlight each leaf receives, the more sugar the plant can make.

Amazing Plant Facts from Around the World

Liana plant

A liana plant's stem works like a vacuum cleaner in the hot rainforest, sucking water up the plant at a rate of one metre a minute!



Rafflesia plant

One of the largest flowers in the world is the gigantic rafflesia. It grows up to one metre wide and has no stem or leaves!

Monkey Flower

A monkey flower is like an airport runway. The flower's markings show the bees where to land and find the tasty nectar. These markings are only visible to bees!

Redwood Tree

Redwoods are the world's tallest trees. They can grow up to 111 metres tall- that's taller than the Statue of Liberty!

Baobab tree

An African baobab tree has a bulging trunk that can grow up to 15 metres wide. This tree is also very useful. People eat the fruit and the flowers and they make cloth and paper from the leaves and roots!