

Michigan State University Extension

Tollgate Farm and Education Center

POWERFUL PLANTS AND THEIR PARTNERS

Big Idea: Students explore plant structure and function and what plants need to grow. Visiting the garden, greenhouse, orchard, pond area, and animal barn, students will investigate how plants depend on animals and insects for pollination and seed dispersal as we look at the interdependence of living things on the farm. Students will question, hypothesize, experiment, analyze data, conclude and question again as they experience hands-on lab activities.

Big Question: How do plants depend on their parts and on other living things to help them survive?

Michigan NGSS Performance Expectations:

1-LS1-1	Plants and/or animals use their external parts to help them survive, grow, and meet their needs
1-LS1-2	Plants have patterns in their behavior of parents and offspring that help offspring survive.
2-LS2-1	Plants depend on water and light to grow.
2-LS2-2	Plants depend on animals and insects for pollination and to move their seeds around.

Common Core ELA and Math Standards:

ELA-LITERACY.RI .1.6	Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.
ELA-LITERACY.SL .1.1a-c	Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. a. Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion). b. Build on others' talk in conversations by responding to the comments of others through multiple exchanges. c. Ask questions to clear up any confusion about the topics and texts under discussion.
ELA-LITERACY.SL .1.3	Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.

ELA-LITERACY.SL .2.1a-c	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups. a. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). b. Build on others' talk in conversations by linking their comments to the remarks of others. c. Ask for clarification and further explanation as needed about the topics and texts under discussion.
ELA-LITERACY.SL .2.3	Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.
Math.Content.1 .MD.1	Measure lengths indirectly and by iterating length units. ● Order three objects by length; compare the lengths of two objects indirectly by using a third object.
Math.Content.1 .MD.4	Represent and interpret data. ● Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
Math.Content.1 .OA.5-6	Add and subtract within 20. Work with addition and subtraction equations. ● Relate counting to addition and subtraction (e.g., by counting on 2 to add 2). ● Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$); using the relationship between addition and subtraction (e.g., knowing that $8 + 4 = 12$, one knows $12 - 8 = 4$); and creating equivalent but easier or known sums (e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$).
Math.Content.2 .OA.2	Add and subtract within 20. ● Fluently add and subtract within 20 using mental strategies. ² By end of Grade 2, know from memory all sums of two one-digit numbers.
Math.Content.2 .MD.1-4	Measure and estimate lengths in standard units. 1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. 2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen. 3. Estimate lengths using units of inches, feet, centimeters, and meters. 4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
Math.Content.2 .MD.10	Represent and interpret data. 10. Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems ⁴ using information presented in a bar graph.

Content Outcomes:

- Understand how plants use their internal and external parts to survive.
- Understand how plants use the world around them, including animals and insects, to survive.
- Understand adaptations of plants to the changing environment.
- Understand how plants compete for sunlight, water, and nutrients.

Rotations:

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|--|-------------|
| ● Growing in the Garden | Edu-Garden |
| ● Growing in the Greenhouse | Greenhouse |
| ● Plant Partners | Animal Barn |
| ● A Balancing Act | Orchard |
| ● 7 Fs of Seed Dispersal + Pollination | Pond Area |

Assessment:

Are students able to describe the structure and function of plants and what they need to grow?
Are they able to construct an argument for how plants depend on animals and insects for pollination and seed dispersal and how plants and animals and insects are interdependent?

Program Introduction: Welcome to the farm. Today we are going to explore the power of plants and what a plant needs to grow and thrive here on the farm. We'll imagine we are a plant and look at how we use our plant parts to survive and grow. We'll also look at how plants rely on other living things to help them survive and how other living things rely on powerful plants!

Tollgate would like to acknowledge that the land we are meeting on today is the original homelands of the Anishinaabe tribal nations. We owe a debt of gratitude to the people who first lived on this land. We honor and respect the many diverse indigenous peoples still connected to this land on which we gather.

Teacher Resources:

Background Information:

- [Garden with Kids](#) MSU Extension
- [Pollinators and Pollination](#) MSU Extension
- [Seeds and Seed Dispersal](#) MSU Extension
- [First Peas Teacher's Guide and Resources](#)
- [Exploring Plants](#)
- [From Seed to Flower](#)
- [What Parts are There to a Plant?](#)
- [How Does My Garden Grow? Writing in Science Field Journals](#)
- [Life Lab Science Exploration Units](#)

- [How Does a Seed Grow into a Plant?](#)

Children's Literature:

- [First Peas to the Table](#) by Susan Grigsby and Nicole Tadgell
- [Who will Plant a Tree?](#) by Jerry Pallotta
- [From Seed to Plant](#) by Gail Gibbons
- [The Vegetables We Eat](#) by Gail Gibbons
- [Seeds Move](#) by Robin Page
- [We are the Gardeners](#) by Joanna Gaines
- [Flowers are Calling](#) by Rita Gray

References:

- Growing in the Garden is adapted from [First Peas to the Table](#) by Susan Grigsby and Nicole Tadgell

CURIOSITY PHOTOS

Following are photographs and questions intended to inspire curiosity and wonder throughout the days leading up to your Tollgate visit.

How do plants grow?



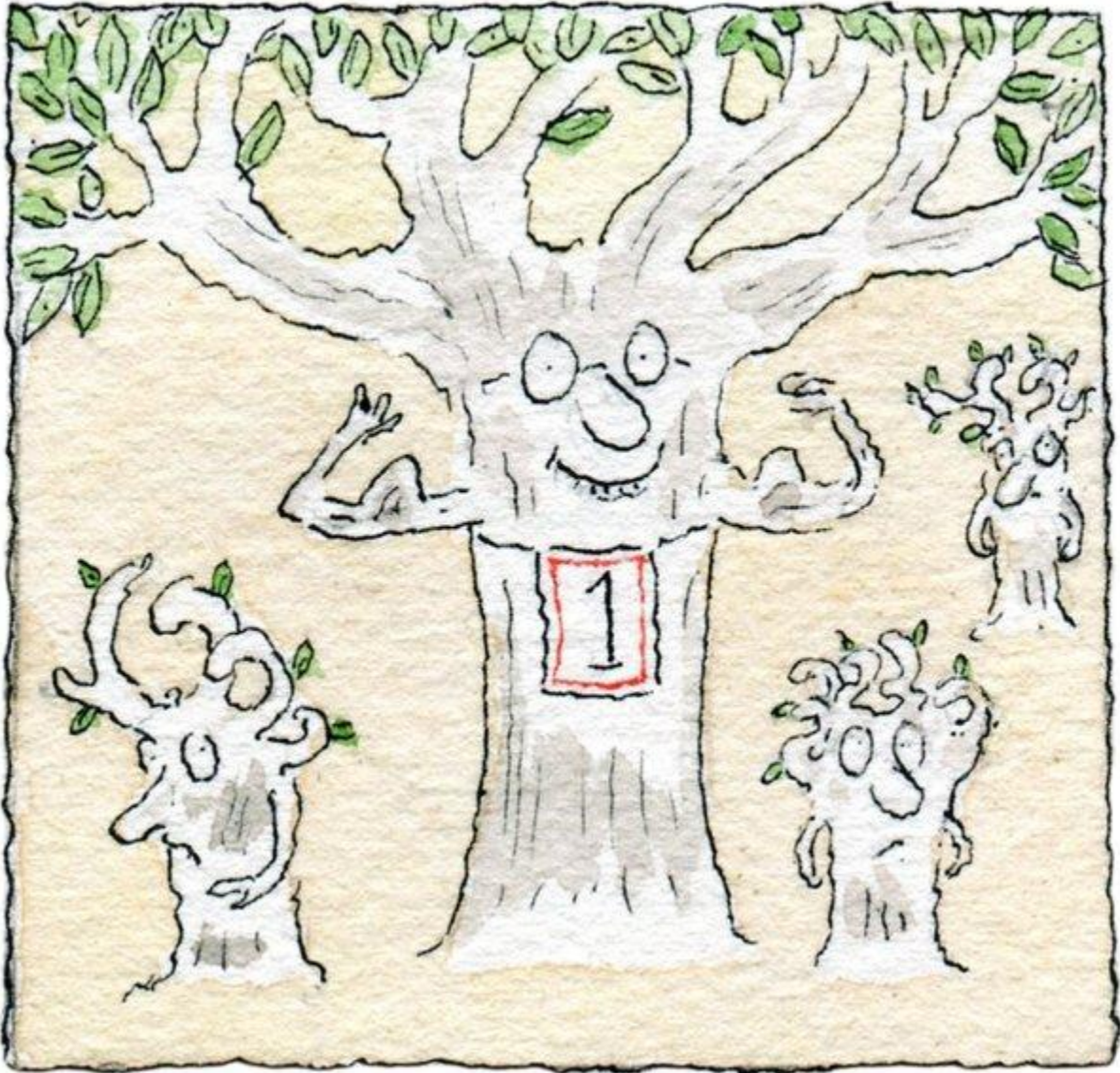
How do plants use water and light?



Who needs who?



Do plants 'get along' with one another?



Victoria Roberts

How do plants make more plants?



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