Garden Lesson: Plant Adaptations

Season: Fall

Grades: 4, 5 and 6

Ohio Science Concept

- 4th Grade: Earth's Living History- Environmental change
- 5th Grade: Light, sound and motion: Force and motion
    - Interactions within ecosystems: organisms perform a variety of roles in an ecosystem
- 6th Grade: Rocks, minerals and soil: Formation of rocks and soil

Science Inquiry and Application

- Communicate observations and ask questions about the natural environment
- Employ simple equipment and tools to gather data and extend the senses.
- Use appropriate mathematics with data to construct reasonable explanations.

Next Generation Science Standards

- 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior and reproduction.
- 5-PS3-1: Use models to describe that energy in animals' food (used for body repair, motion and to maintain body warmth) was once energy from the sun.
- MS-LS1-6: Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

Objectives

Students will…

- Observe and document plant structures with artistic and mathematical details
- Learn and practice proper weeding technique while investigating different root structures
- Use senses of sight, smell and taste to compare and contrast plant parts of different species

Materials

- Introduction: plant with visible roots, stem and leaves
- *Observe Station*: collected fallen leaves, crayons, paper, clipboards, pencils, rulers
- *Explore Station*: roots to taste (radishes, carrots), leaves to taste (lettuce, spinach), napkins, clean hands
- *Garden Station*: trowels, "Different Root Types" handout, hand lenses, (gloves are optional)

Overview

In this lesson, students build a deeper connection with their school garden by identifying and examining the roots and leaves of plants growing in the garden. Students also enjoy the edible nature of roots and leaves that are freshly harvested from the fall garden! At the Observe Station students investigate leaf structures and functions while creating leaf rubbings detailed with measurements. At the Explore Station students experience harvesting and tasting crops growing in the garden while identifying the plant part being eaten. At the Garden Station students examine different root systems and practice proper weeding techniques. Questions and ideas branching from how the plant parts contribute to plant survival and how they change in different seasons are investigated at each station.

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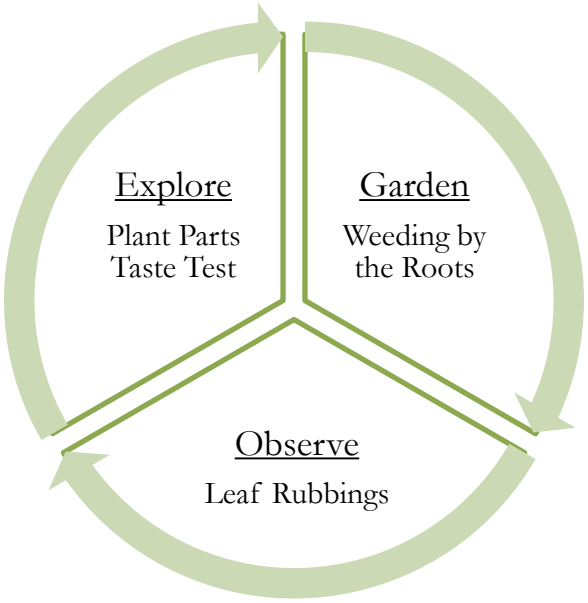
5 minutes Introduction

- Welcome & review expectations
- What are the different parts of the plant? What do plants need to survive? How do the different parts help the plant survive? Do plants impact their environment? How?
- Break into three groups for station time

20 minutes Station Rotation (5 minutes per station + 1 minute for transition)



Observe: Leaf Rubbings

Materials: collected fallen leaves, crayons, paper, clipboards, pencils, rulers

- Ask the students to explain why leaves are important; what do they do for the plant? What is happening to the leaves on the trees in fall?
- Pass around a variety of collected fallen leaves and point out the difference in shape, size and texture
- Demonstrate how to put the leaf under the paper and rub with a crayon to create the image on the paper; allow the students to collect three leaves from the garden and create their own leaf rubbing work of art
- Show students how to measure the height and width of each leaf and write their measurements next to the leaves

Explore: Plant Parts Taste Test

Materials: roots to taste (radishes, carrots), leaves to taste (lettuce, spinach), napkins, clean hands

- Review the parts of a plant and ask students to explain why each part is important (roots: take in water, nutrients, and minerals from the soil, provide support for the plant/leaves: turn sunlight into sugars for energy)
- Ask students to list fruits and vegetables they enjoy and to say which part of the plant it comes from
- Pass around the roots and leaves for tasting, encouraging the students to use their senses to describe how each smells, feels, looks and tastes

Garden: Weeding by the Roots

Materials: trowels, "Different Root Types" handout, magnifying lenses, (gloves are optional)

- Review what roots do for the plant to help it survive & show the handout with different types of root systems
- Demonstrate how to pull weeds and have students to examine the roots

5 minutes Conclusion: What Can You Do?

- While you collect the materials, ask the students to give ideas on how they can help the garden as the seasons change
- Ask if the students have any questions

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of Greater Cincinnati

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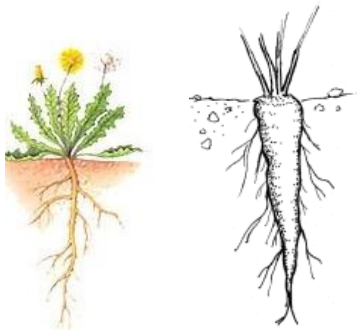
Different Root Types Handout

Adapted from: Life Lab Science Program

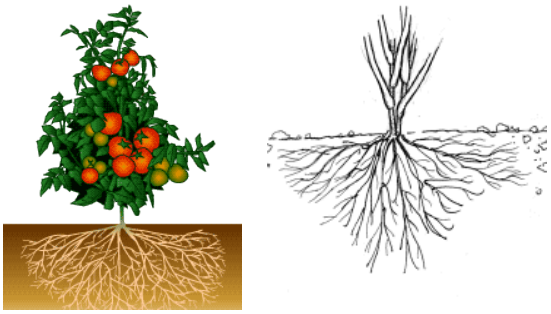
Tap Roots

- Plants with tap roots have one big, long root.
- Plants with tap roots will not be knocked over by the wind or animals.
- Plants with tap roots can reach nutrients and water deep in the soil.



Fibrous Roots

- Plants with fibrous roots have many small roots.
- If animals eat the leaves and stem of a plant with fibrous roots, some of the roots will stay behind to start growing again.
- Plants with fibrous roots can gather many nutrients and water from the top layer of the soil.



Food Storage Roots

- Plants with food storage roots have one main root that grows long and wide.
- Plants with food storage roots keep animals above ground from eating the food they make.
- Plants store food in their roots to use during the winter, when there is little sunlight and the plants can't make very much food.
- Food storage roots are actually a type of tap root!