

Putting Down Roots

Summary

The adaptations of plant roots and leaves are compared and physical features that allow particular plants and animals to live in specific environments are observed.

Main Core Tie

Science - 4th Grade

[Standard 5 Objective 2](#)

Time Frame

1 class periods of 45 minutes each

Group Size

Small Groups

Life Skills

Thinking & Reasoning

Materials

For the Teacher:

Bring in an assortment of plants for the students to observe. For example: Cactus, Bean, Grass, Moss, Moss rose, Wildflowers, Ferns, and Aloe. Be sure to select plants from the desert as well as plants accustomed to human care. You may consider asking the students to bring a small plant with roots from their home.

For the Student:

- Pencils/crayons/colored pencils
- Paper or science journals
- Research materials

Background for Teachers

Most common plants found in Utah environments have had to adapt in order to survive. Many of these adaptations are physical features that help with living in a specific area. For example, desert plants have special adaptations that help them survive. Usually, the leaves of desert plants are small and have a thick, leathery, or waxy covering. This low surface area and covering seals in moisture and keeps plants from drying out. The prickly pear cacti have swollen stems. They store water to help them survive long droughts. Their roots cover large areas just below the surface of the ground that allow them to quickly absorb the water from infrequent rainstorms. The length of the root varies according to the needs of the plant and the conditions of the environment. The taproot of the mesquite plant can grow 40 feet down into the desert soil to reach water. This activity compares the leaves and root systems of plants from different environments, and has students pose questions to answer why plants have particular physical features.

Student Prior Knowledge

Students should have a knowledge of the environments located in Utah and understand their physical characteristics.

Intended Learning Outcomes

1. Observe objects and report observations.
2. Pose questions about objects and processes.
3. Report observations with pictures, sentences, and models.
4. Use observations to construct a reasonable explanation.

Instructional Procedures

Step 1. Arrange the class into small groups.

Step 2. Assign each group one or two plants to observe.

Step 3. Students are to draw the upper and lower structures of the plant, including the roots, if the plant can be taken from soil. Encourage them to pay careful attention to:

- the size and number of the leaves
- the width and length of the leaves, stems and roots
- the covering of leaves and stems
- the height of the plant
- the pattern of root growth.

Step 4. After their drawings are completed, have students predict which environment they believe the plant lives in. Then have students do research to find if their predictions were correct. They should give two reasons why the plant can live in this place, citing examples of physical features that allow particular plants to live in that specific environment. Ask questions such as:

- Does the plant need a lot of water, or does it have adaptations that allow it to survive with small amounts of water?
- Does the plant have protection against grazing animals?
- Are there unusual roots, leaves or stems that help the plant survive?
- Do the physical characteristics of the environment influence which plants survive best there?

Step 5. Each group should share their findings with the class. Display all the drawings and research findings next to each plant. Students could observe all the plants in the class for a few weeks, while studying Utah environments and the adaptations of organisms.

Step 6. Questions for class discussion:

Many desert plants have very shallow but long, spread-out roots. Why is this a good adaptation for the desert? [Large root systems allow plants to capture as much water as possible during the infrequent desert rains.]

Why can't deciduous trees like maples and elms grow in deserts or in alpine areas? [There is not enough water for them in those areas. Deciduous trees lose a lot of water through their leaves. They need a large water supply to survive.]

Many juniper trees that grow very high on mountains look a lot like juniper trees that grow in near the desert. Why? [Both the areas are characterized by very little water.]

Many desert and alpine plants have very small leaves and thick, protective coatings. What makes these good adaptations? [Prevents their leaves from losing water.]

Assessment Plan

Collect science journals or check drawings. Look for recorded observations, labeling and explanations of physical features of plants and their environments.

Have students create a scrapbook or collage for each environment that shows a collection of plants and animals.

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