

# PUTTING DOWN ROOTS

GRADE: 5-6

SUBJECT: Language Arts

AGRICULTURAL TOPIC: Horticulture

## AGRICULTURAL CONCEPT

A basic awareness of agriculture, what it entails and how it relates to everyone's needs for food and fiber.

## STUDENT SKILL

The student will expand vocabulary through word study, literature and class discussion.

## LEARNER OBJECTIVE

Students will relate the function of root words in the English language to the function of a plant's root system.

## STEP-BY-STEP INSTRUCTIONS

1. Challenge students to explain the function of a plant's roots. Share background information.
2. Ask students to brainstorm to find the meaning of the phrase "root word." Accept all reasonable answers.
3. Hand out student worksheets, and review root words. Ask students if they understand the relation between plant roots and root words. Read the directions together. Have students complete the student worksheets independently.

## BACKGROUND

**root**—A portion on the plant body bearing neither leaves nor reproductive organs but providing a growing point and functioning as an organ of absorption, a food reservoir, or a means of support.

Buried under the ground and mostly unseen is an important part of the plant—its roots. Roots have tremendous responsibilities. They absorb and conduct water to all parts of the plant; they absorb dissolved **minerals**; they store food; and they hold the plant in place in the soil. Each plant's root system has two kinds of roots. The primary root, sometimes called the **tap root**, penetrates the **subsoil** to absorb the water and **nutrients**. The tap root is very large because it stores sugars and other **carbohydrates** that the plant will need to survive. If the tap root is broken, the plant will usually die. The smaller roots, growing out from the primary root, are known as secondary roots.

We eat the roots of many plants, including sweet potatoes, radishes, carrots, beets and turnips. About two-fifths of the world's sugar comes from a root—the sugar beet.

The growth of roots is influenced by the Earth's gravitational pull and the presence of water. Roots will always grow downward unless there is a great abundance of water on the surface of the soil or near the surface. Plants can grow roots downward while sending out stems and leaves in the opposite direction, regardless of the position of the seed or cutting. This characteristic is called **geotropism** or **gravitropism**.

## RESOURCES

### *Books*

Bates, Jeffrey, *Seeds to Plants: Projects with Biology*, Watts, 1991.

Beller, Joel, *Experimenting With Plants: Projects for Home, Garden, and Classroom*, Arco, 1985.

Burnie, David, *Plant*, Eyewitness Books, Knopf, 1989.

Robbins, Ken, *A Flower Grows*, Dial, 1990.

Taylor, Barbara, *Green Thumbs Up! The Science of Growing Plants*, Random House, 1992.

### *Additional Resources*

“Rootview,” Hobar Publications, 1234 Tiller Lane, St. Paul, MN 55112 (clear acrylic plastic plant growth chamber allows students to view root growth in different settings, \$84.50).

### **EVALUATION**

A teacher’s answer page is provided.

### **RELATED ACTIVITIES**

1. Provide each student with a small zip-top sandwich bag, a damp folded paper towel and two or three lima beans which you have soaked overnight in water. Have students position the beans in the middle of the damp paper towel, place the towel in the plastic bag and press out all the air. The beans should be suspended in the center of the bag. Have students tape the bags to a classroom window, the side of a desk, or a wall. Ask students to predict which way the roots will grow. Supply felt-tip markers and long strips of construction or tag board paper, and ask students to write their predictions and tape them near their bags. Once the roots start to grow, have students rotate their bags. After the roots have started growing in a different direction, have students rotate their bags again. Will the roots ever be fooled and grow up?
2. Bring in a variety of root vegetables. Write the names of the vegetables on the board, and have students match the vegetable to its name. Invite students to sample the raw vegetables on a volunteer basis. Some common root vegetables include beets, carrots, sweet potatoes, radishes, turnips, rutabaga, parsnip.
3. In March or September, get permission from school administrators and maintenance personnel to plant radishes or some other easy-growing root plant. Have students dig and cultivate the soil in a school flower bed or a bed in an outdoor classroom. Give each student a fair amount of seeds. Have students use their fingers to draw their initials in the soil and carefully sprinkle the seeds in the indentations. Water carefully. In a few days small green letters will begin to appear. Lettuce is a leaf plant that can be used successfully in this activity.