

Roots and Stems

Grade Level: Adaptable for K-4
Total Lesson Time: 30-40 minutes



Lesson Overview

This lesson follows the development of a plant from seed (Lesson One) to the emergence of the roots and stem. Students learn about the functions of roots and stems, as well as how these two plant parts are part of a healthy diet for people. The role-play and celery stalk dissection teach students how water and nutrients are circulated through plants.

Objectives

Students will:

1. Identify plant parts and their order of development (Science C.4.2, F.4.1, F.4.4)
2. Know the function of roots and stems (Science C.4.2, F.4.1, F.4.4)
3. Understand how plants collect and create nutrients people need (WI.N.A; Ecology/Environment E.4.1; Health A.4.3; Science C.4.2)

Preparation

1. Collect necessary materials listed.
2. Cut celery sticks for snack.
3. Stand other celery stalks in water with food coloring for 24 hours before activity. Red food coloring works best.

Procedure

Review

Review previous lesson. Ask students what they learned or what they remember. What are the four natural forces that help plants grow? Sun, Soil, Water, and Air. Repeat chant from “Journey of a Seed” lesson – “Sun, soil, water, air; everything we eat and everything we wear.”

Materials

Food

- Celery
- Cream Cheese
- Pretzels
- Craisins (Dried Cranberries)

Supplies

- Celery
- Food Coloring
- Paper plates for celery dissection
- Cups or containers for colored water and celery
- Plastic Knives
- Napkins/Paper Towels
- Xylem/Phloem Visual Aid

Suggested Books

‘Tops and Bottoms’ by Janet Stevens

Wisconsin Homegrown Lunch is a joint project of:



REAP Food Group:
www.reapfoodgroup.org

UW-Madison Center for Integrated
Agricultural Systems: www.cias.wisc.edu



Procedure

Introduction and Discussion

This discussion is intended to introduce students to the development and function of roots and stems. Using visual aids, either pictures or actual sprouted plant, ask students to identify the roots and stem. Discuss how roots grow down and stems grow up. Roots grow down into the soil to support the plant and collect water and nutrients from the soil. Stems grow up to support the branches and leaves, and to bring water and nutrients from the roots to the rest of the plant. To frame this discussion, use leading questions such as:

- How do all the nutrients get into the plant?
- What do roots and stems do for a plant?
- What do they do besides transporting water and nutrients? (Support)
- What characteristics do roots and stems have in common? (Support and pumping of water and nutrients to the rest of the plant.)

Role-play

Show students a visual aid of a cross-section of a stem that clearly exhibits the xylem and phloem. Introduce the xylem and phloem as the “pumps” that move nutrients around inside the plant. Student then participate in a role-play to portray the pulling of water and nutrients from the soil into the plant. We had students crouch down and shake their hands towards the floor to represent roots and begin the chant “Roots, roots, roots.” As they slowly stood up they threw their hands in the air, to represent stems, and shouted, “Yeah, stems!” Students enjoyed starting slow and progressively chanting faster.

Celery/Food Coloring Experiment

Divide students into groups of 4 and tell them they will be working as scientists to discover how the xylem in celery stems work. Have them put on their imaginary lab coats, gloves, and goggles. Ask them if they know what a hypothesis is. Clarify that a hypothesis is an educated guess. Now that they know what xylem do, can they develop a hypothesis to explain what will happen when celery stems are put in colored water? Allow students a couple minutes, in their groups, to discuss what they think will happen. After they have developed their hypotheses, write them on the board. You can lead them with questions such as: What will happen to the celery? What color will it turn? How far up will the color go? Will anything happen to the leaves? Give them some celery stalks that have been soaking in colored water over night. Was their hypothesis correct?

Give each student a plastic knife to cut the celery stalks in cross-sections. Start cutting small pieces off near the base and work your way up the stalk to see how far the food coloring traveled. Ask them to point out the xylem and phloem if possible. Review the hypothesis written on the board to see how well students did in making their guesses.

Give each group a couple fresh stalks of celery and some colored water. Have them put the celery in the water and leave it for the day. Students should periodically check the celery to see if the xylem is doing its job. Check again the next day.

Snack

We served celery sticks with cream cheese, pretzels, and craisins. Students made “insects” out of their snack foods before eating to honor insect helpers in the garden.

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