

# Soil Resource Leader Guide

*See the student datasheet answer key that is with this guide.*

## Objectives

Students will:

- A. Identify the three kinds of soil particles (clay, silt and sand) and their physical properties.
- B. Understand what makes western Oregon soil productive for growing trees.
- C. Conduct experiments to demonstrate human impacts on soils (erosion and compaction) and effects on tree growth.

## General Directions

This station shares time with the Water station, so the time you have with the students on this session is cut in half (usually between 20-30 mins). On a typical day, you will do this station 8 times (2 times per session).

*Before the students arrive, familiarize yourself with the station and its resources for teaching. Also, review the attached students datasheets to familiarize yourself with the answers- you will help them complete their workbooks.*

When the students arrive, divide them into two groups (half go to Soil and half go to Water). At the halfway point, your group will move from Soil to Water, and the leader at the Water station will send his/her group to Soil.

During your instruction, help them complete the questions on their datasheets.

## Sample Lesson (for 25 min session)

### Introduce soil type and structure (5-7 mins)

- Have the students feel the samples of clay, silt and sand to gain a sense of structure in the soil boxes.
- Have them perform a finger test to analyze a soil sample from the site and guess about the type most dominate here. (Gritty, not plastic = sand; smooth and slick or somewhat grit and sticky = silt, and smooth and plastic, very sticky = clay)
- Encourage them to notice the soil's color and smell.
- Observe the soil jar to see what particles settle first and last. Discuss why the heavy particles settle first. Have students label the layers on their worksheet.
- Observe the humus boxes and the "Soil is Alive" box, and let students touch and explore to identify and record three non-mineral components.
- *Have students complete corresponding questions in their datasheets (see key).*

### Demonstrate concerns relating to erosion and teach how to protect soil from such damage (5-7 mins)

- *Do an experiment:* Choose two areas of ground, one with bare soil and one with vegetation. Have two students sprinkle "rain" over each area and watch for the plants' effect on the water's speed, the run-off on each slope, the appearance of the run-off and the water's impact on the contour of each slope.

- Discuss student's observations, making sure they understand that erosion is an ongoing natural process. Ask them for ideas on how to protect soil from excess erosion and maintaining water quality.
- *Have students complete corresponding questions in their datasheets (see key).*

Demonstrate concerns relating to compaction and teach how to protect soil from such damage (5-7 mins)

- *Do an experiment:* Place a bottomless coffee can over an area that has been protected from soil disturbance. Compact a nearby spot by stomping on it. Discuss the types of management activities (hiking, trails, roads heavy equipment, etc.) that might cause compaction. Place a second coffee can over this spot. Fill the cans with water and time how long it takes for each to empty. While timing, ask the students to think about the effects of compaction: Changes soil structure by (1) reducing air spaces; (2) restricts movement of water; and (3) reduces productivity.
- Then, explore ideas on how to protect soil from compaction: (1) Designated skid trails; (2) having equipment operate over slash; (3) avoiding wet weather soil disturbance; (5) limiting hikers; (6) choosing correct equipment.
- *Have students complete corresponding questions in their datasheets (see key).*