

## **ACTIVITY 2.5: Soil Lesson Part II**

### **Testing the soil- The Shake, Water Retention and More**

**Overview:** Students will collect soil samples and identify that soil is a complex mix of several organic components, sand, and clay. They will identify the soil types as clay, sandy or loamy soil. They will draw conclusions of soil typed based on their findings.

**Lesson Background:** What is soil? Soil is a living, dynamic resource that grows the food we eat. It is made up of different materials such as leaves, pine cones, grasses, small sticks, rocks (that have been broken down over time into tiny grains by wind and rain), decayed plant and animal material (organic matter) and numerous species of living organisms. Soils are home to millions of organisms and it is used to feed the world's population. Soil is important for plant growth because it provides many of the nutrients and holds water for the plant. Plants and soil also need sunlight, water, nutrients, earthworms, bacteria and time. Time is a key ingredient for soil. It takes 50-100 years to make an inch of topsoil, imagine that the topsoil we see today started when our grandparents were babies. Talk with the students about the importance of soil in our lives... all of our food comes from soil!

**Key Vocabulary:** soil, hummus, clay, and sand

**Soil:** The upper layer of earth, where plants grow.

It is a complex mixture of rocks, minerals and organic matter.

**Humus:** the organic component of soil

**Clay:** A stiff, sticky particle of earth

**Sand:** Loose Granular substance made from the erosion of rocks. Found in deserts, beaches and riverbeds.

**Loam:** a fertile soil containing equal portions of hummus, clay and sand

#### **Instructions:**

1. Have the students work in groups of 2-4.

**Grade Level:** 3<sup>rd</sup> Grade and Beyond (can be adapted for younger grade levels)

**Objective:** Students will understand that 1) soil is comprised of many things, including living organisms, and 2) that soil is categorized as sand, clay or loam.

**Subject Area/ CO State Standards:** Earth and Life Science

**Method:** Students will collect various soil samples and make observations and conclusions as to what type of soil they collected.

**Materials:** plastic bags, small hand shovel, paper plate, pencil/pen, and notebook (for recording observations and conclusions.) watering can, Mason Jars for Soil Shake

2. Each group has 5 minutes to collect a small soil sample from a designated area outside their school (the garden, a tree bed, the playing field, etc.) in a small plastic bag, using a small hand shovel or trowel.
3. After each group has collected their samples all groups will meet back in the garden with their soil samples in hand. Designate an area for each group to pour their sample onto their paper plate and carefully examine all of the materials in the soil.
4. Write down the following questions on a poster board or dry erase board big enough for the students to see and ask students to record their answers on one piece of paper per group.
  - E. What is the color of the soil? (Dark brown, light brown, reddish-brown, etc.)
  - F. How does it feel? (Gritty, sandy, smooth, etc.)
  - G. What kinds of things can be seen in the sample? (Leaves, small twigs, rocks, worms, paper, plant/food materials, animal material etc.)
  - H. What is the texture of the soil? Is it soft, or does the sample have hard clumps?

### **Testing Your Soil:**

#### Part I: Water Retention

1. With the various soil samples put one sample at a time in a strainer and hold it over a garden bed. Pour the same amount of water over the each type of soil to test how well it absorbs the water. Measure the amount of soil drained.

#### Soil Type Based on Water Drainage Only:

- Sandy soil has the largest particles and water permeates the soil easily. Water will run through sandy soil. (MOST WATER DRAINED)
- Clay soil has the smallest particles. Clay holds the most water, but it holds it so tightly it makes it hard for the water to reach the plant roots. (LEAST WATER DRAINED)
- LOAM is the mix of both of these soils and makes the water most readily available to the plants. (AVERAGE WATER DRAINED)

#### Part II: Testing Plant Health in Soils:

In the classroom, garden or greenhouse, have the student's plant flowers or vegetables in each of the soil samples. Record how often the plants are watered. Monitor the growth and development of the seeds or plants in the 3 different soil types (sand, clay or hummus). Ask students to determine which soil was the best environment for plant growth and why they believe this to be true.

#### Part III: The Soil Milkshake

1. Using the various soil samples, add a quart size mason jar filled ½ way with soil. The soil should be relatively moist before adding to jar.
2. Next, add water to the mouth of the jar.
3. Let soil settle- 45 minutes to overnight, before reading the results.
4. Ask students about the observations. What settled to the bottom? What materials rose to the top? What was the color of the water? What is the composition of soil, silt and clay in the soil?

Other Complimentary Lesson Plans include: Soil Lasagna, Compost Building and the handout on worm castings.