

TRB 4:3 - Investigation 6 - Soil Profile

Summary

This activity will help students understand the components of soil.

Group Size

Large Groups

Materials

Pictures of construction sites

Small jar with narrow sides

Gravel (bedrock)

Soil sample from the bottom of a deep hole (subsoil)

Soil sample from a garden (topsoil)

- ["Soil Profile: the Layers of Soil"](#) (pdf)

Worksheet

- ["Soil Shake"](#) (pdf)

Worksheet

Additional Resources

Books:

The Amazing Earth Model Book: Easy-to-Make, Hand-on Models that Teach by D.M. Silver & P.J. Wynne (Scholastic Professional Books)

Background for Teachers

A normal soil profile consists of three layers: topsoil, subsoil, and bedrock. Topsoil is the top layer. It is generally looser than the lower layers. It is made up of the smallest grains of rocks and minerals. The topsoil layer is usually darker in color because it contains the most dead and decayed organisms. These provide nutrients that plants need for growth. This is where plants can absorb water, nutrients and air. Subsoil is the layer below the topsoil. It is usually lighter in color because it has less living and once-living organisms. It is denser and grittier than the topsoil. It sometimes has larger rocks or pebbles mixed with small particles. Minerals in this layer are not easy for plants to use. Plants grow poorly in subsoil. Bedrock is the lowest layer or the solid rock that lies underneath the soil. It is the parent material from which much of the soil originally formed. Bedrock can be within a few inches of the surface or many feet below the surface.

Intended Learning Outcomes

4. Communicate Effectively Using Science Language and Reasoning

Instructional Procedures

Invitation to Learn

Show the students a picture of a road cut or construction site. Ask them what the first thing is that construction workers do when they build houses or buildings. (Dig holes) Ask them if they have ever looked down in a deep hole. Does the soil on the sides and down at the bottom look the same as the soil on top? Why not? Discuss with them about the information in the Background (above). Explain what a profile is. Read the literacy about soil in the Student Reading.

Instructional Procedures

Review with students what they observed in their soil samples in the activity "What is in Soil?"

Tell them that is the kind of soil found on top. Record color, texture, and kinds of materials on

their profile log (dark, loose, moist, full of organic material).

Give students samples of subsoil. Have them examine it with a hand lens. They should make comparisons. Record color, texture, and kinds of materials on their profile log (light color, denser, grittier - more stones and pebbles, little or no organic matter).

Give students samples of bedrock (stones or gravel).

Have students place gravel in bottom of jar. Then a layer of subsoil. On top place a layer of topsoil.

Students should draw their soil profile model and label the parts. Record characteristics and kinds of materials found in each layer.

Extensions

Science-

Three Types of Soil (ILOs 1, 3, 4)

Soil Shake Activity as follows: The way a soil "feels" is called the soil texture. Soil texture depends on the amount of each size of particle in the soil. Sand, silt, and clay are names that describe the size of individual particles in the soil.

- Sand has the largest particles and they feel "gritty."
- Silt are medium-sized, and they feel soft, silky or "floury."
- Clay are the smallest sized particles, and they feel "sticky" and they are hard to squeeze.

Activity

Place samples of each type of soil in small bowls. Invite students to use their fingers to feel and compare the textures of each. Add water to the samples. Have students feel each sample. They should rinse their fingers between each test so as not to cross contaminate the samples.

Which soil holds water?

Cut the top off of three 2-liter bottles.

Invert the top and put inside the opening of the bottle.

Line each inverted top with cheesecloth.

Fill each top 1/2 full with a soil sample (clay in one, sand in another, silt in the third).

Pour water over each soil sample. (Make sure it goes through the soil and does not spill over the edges.)

Observe the speed the water goes through each sample. (It will pour through the sand. It will go more slowly through the silt. Very little may get through the clay.)

When it dries, notice what happens to each sample. (The sand is still loose. The silt sticks together but can easily be crumpled back into dust. The clay is hard.)

Show students samples of pottery made out of clay such as a flowerpot. Explain why clay works best when doing pottery compared to the other soil samples.

Soil Shake

Ask students why it would be important to know what kind of soil is in a garden. Tell them that one test that is done is called a soil shake.

Put a sample of soil in a jar.

Add water until 3/4 full.

Shake for two minutes.

Ask which particles would settle first and be on the bottom? (sand, or small rocks because it is the largest and heaviest)

Which would be on top? (clay)

Homework & Family Connection

Ask the students to do the soil shake at home with their own soil from around their yards. Have the students explain to their families about the three types of soil they see in the bottle and why they all fall at different times.

Determine through a family discussion if their soil is good for growing plants around their yards. Have parents explain to their children what they had to do to get good soil for growing plants around their yards.

Assessment Plan

Review with the students the soil profile.

Have them explain what each layer is made of.

Have the students explain why the subsoil won't grow plants well.

Have the students explain why the bedrock won't grow plants well.

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