

Look Out, Below!

Objective

Students will learn about the layers of soil and use various materials for building models of soil profiles. Students will experiment with growing beans in various layers of soil. Students will conduct experiments to demonstrate soil compaction. Students will experiment with the extraction of minerals from rocks.

Materials

- soil samples from various locations
- plastic bags
- magnifying glasses
- clear containers
- glue
- heavy paper
- clear plastic cups
- breakfast cereal, some crushed, some whole
- shredded coconut
- 1/2 gallon milk
- plastic spoons

Procedures

1. Read and discuss background and vocabulary.
2. As a class, students will build a soil model in an aquarium or large jar.
 - Divide students into groups.
 - Assign each group responsibility for one of the soil levels described in the background information.
 - Each group will research the soil layer for which it is responsible before gathering the necessary materials. Students may gather their own materials or use materials you provide— shredded dry leaves or grass clippings, a bowl of gravel or small pebbles, sand and potting or garden soil.
3. Photocopy the student worksheet provided with this lesson on heavy construction paper, and hand them out to your students.
 - Provide students with a variety of media found in the classroom or the home to represent the layers of soil. For example, actual grass clippings and leaves may be used for the organic layer; shavings from the pencil sharpener might represent topsoil and rough textured cloth can represent bedrock. Encourage students to come up with their own ideas for representing the different layers.
 - Students will glue the media in the appropriate spot on the soil profile worksheet.
4. Provide materials for students to build edible soil profiles.
 - Explain that the plastic cup represents the parent material, the whole

Oklahoma Academic Standards

GRADE 5

Physical Science: 1-1.Life
Science: 2-1; Earth Science:
2-1, 3-1

cereal represents the subsoil and the crushed cereal represents the topsoil. Sprinkle coconut on top to represent grass or other plant material.

—Students should wash their hands before making their own soil profiles.

—As you pour milk, explain that water moves through the soil in much the same way that milk moves through the cereal.

5. Students will grow beans or some other hardy plant in soil that represents each of the three soil levels.
 - Use clean, cardboard milk cartons from the cafeteria, and fill one with garden or potting soil, one with sand or clay and one with gravel or stones.
 - Provide each plant with the same amount of water and light.
 - Students will record their observations.
6. Divide students into groups. Each group will pour a small amount of garden or potting soil onto paper.
 - Students will spread the soil out and let it dry.
 - Provide each group with a hand lens. Students will separate the soil particles by size and color.
 - Students will write paragraphs in which they report what they learned about topsoil.
7. Students will work in groups to conduct the following experiment.
 - Fill two jars half full with water.
 - Label one jar “water” and the second jar “carbon dioxide.”
 - Take a straw and blow air into the jar labeled “carbon dioxide.” Your breath will provide the carbon dioxide.
 - Fill a third jar half full with vinegar and label it “vinegar.”
 - Put a limestone rock in each jar, and put one limestone rock aside for a reference.
 - Wait one day, and look at the jars
 - Students will discuss what they see.
8. Soil needs air spaces in it for plants to grow well. The spaces let water and air move through the soil. Soil that is compacted has been pressed together so the soil does not have many air spaces and has become hard for plants to grow in. Students will use the following activity to demonstrate soil compaction.
 - Fill a coffee can or flower pot (large enough to get your fist in easily) with soil from the school yard.
 - Measure the number of inches from the bottom of the jar to the top of the soil. Write the number down.
 - Now take your fist and push the soil down hard. Measure the number of inches again. Subtract the second number from the first to find how much air space you have removed by compacting the soil.

Name _____

Soil Profile


