

## Learning Objectives

- 1) Realize that soil is the loose material that covers the earth. Soil consists of pieces of rock, decaying plants and animals, water, and air.
- 2) Understand that weathering and erosion contribute to soil production. In both processes, rocks are broken down into smaller pieces. It should be noted that erosion can be destructive, moving soil from an area that needs it to another location. Trees prevent erosion because their roots hold the soil in place.
- 3) Know the properties and the composition of the different kinds of soil.
  - a) Sand is made from tiny bits of rocks. Sand starts out as part of a large rock, usually granite, and is turned into smaller bits of rocks called quartz. The quartz is then turned into sand. Sand is very coarse and does not hold water very well.
  - b) Humus is made out of decaying plants and animals. Humus has a dark color and is light and moist in texture. It contains a lot of nutrients.
  - c) Clay is made from very small rocks (smaller than sand). Clay comes in many different colors like tan, red, or gray. Clay can hold a lot of water. Also, clay is rather dense; therefore, it does not contain many air spaces.
  - d) Loam soil is a mixture of sand, humus, and clay. Loam is lightweight, dark in color, and slightly moist. Also, loam contains many air spaces.
- 4) Understand why loam is the best soil in which to grow plants. Since loam is a mixture of the three other soils, it contains the right amount of nutrients, air spaces, and water to support plant life. Sand is too coarse; it does not hold water well and plant roots have trouble holding onto it. Though humus has a lot of nutrients, it does not hold water well enough to support plant life. Clay may hold a lot of water but it has very few air spaces, it holds too much water, and it is too slippery for plant roots to grow.
- 5) Realize that the earth has layers of soil. The bedrock layer is the hard rocky layer of the earth. Subsoil

contains a mixture of sand, pebbles, and clay. The topsoil is the very top layer of soil, composed of a mixture of the many kinds of soils. Plants can grow easily in topsoil.

- 6) Know that certain animals, like the earthworm, make the earth's soil enriched enough to support plant life. Earthworms dig tunnels in the ground, which allows air to permeate the soil. The tunnels that worms make also mix the soil. Since earthworms eat soil and dead organic matter, they leave waste products behind called castings. These castings contain many important nutrients that plants need to survive.
- 7) Understand that soil has many uses. Many animals, including rabbits, marmots, and ground squirrels use soil for shelter. Worms use soil for both shelter and food. Soil is used to grow crops, such as the grains, fruits, and vegetables that people eat.

## Suggested Activities

### 1) Before viewing the video

- a) Go outside and look at the soil on the playground or anywhere on campus. The teacher can collect samples to take into the classroom. Have the students bring sandwich bags of soil from their yards at home for further comparison and discussion.

### 2) After viewing the video

- a) Have five pans of different kinds of soil: sand, humus, loam (from a garden store), clay (from a craft store), and dirt. Have a sixth pan with large and small rocks. Let students take turns feeling each type of soil and have them record their reactions. Have a pan of water and towels at the end of the row of pans. Later have the students feel a pan of soil with their eyes shut and see if they can identify it.
- b) If you can get a piece of decomposed granite that is still in rock form, show it to the class. Then stomp on it, creating soil, to show that soil is made from rocks broken into small pieces. Look at sand under a magnifying glass; it is composed of tiny rocks.
- c) Get a tea strainer and some sand, clay, and dirt. Put these soils into the strainer one at a time and shake

them. See what goes through the strainer and observe it through a magnifying glass. What does it look like?

- d) Put some sand, clay, potting soil, and dirt into individual pots. Plant grass seeds in each one and keep the seeds moist. See what happens. Have the students decide why the seeds won't grow in clay or sand.
- e) Make a cross section of typical soil layers on the earth's surface. Get a large plastic mayonnaise jar from the school kitchen. Put large rocks in first to simulate the bedrock layer. Add smaller rocks followed by clay and topped with sand to act as the subsoil. For the topsoil, mix dirt, pieces of leaves, tiny twigs, seeds, and decaying plant material. Have the students decide what to put and where to get it.
- f) Put sand, clay, and dirt into separate clear glasses or test tubes. Using food coloring, die some water a visible color like red, green, or blue. Have a stopwatch handy and pour the water into each soil one at a time, timing how long it takes for the water to reach the bottom of the soil. When doing the experiment with the clay, stop after five minutes, it might never permeate the clay completely. This experiment will show the students how well each type of soil holds water. The longer it takes for the water to reach the bottom, the better it holds water.

## Vocabulary

**Erosion** – Erosion is the movement of soil from one area to another by water and wind. Erosion also occurs when rock is broken down into very small pieces.

**Weathering** – Weathering is the breaking down of rocks into smaller pieces by water or through contact with plants.

