Erosion Simulation

Strand		Earth Patterns, Cycles, and Change
Topic		Erosion
Primary SOL	2.7	The student will investigate and understand that weather and seasonal changes affect plants, animals, and their surroundings. Key concepts include b) weathering and erosion of land surfaces.
Related SOL	2.1	The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which a) observations and predictions are made and questions are formed; b) observations are differentiated from personal interpretation; c) observations are repeated to ensure accuracy; g) conditions that influence a change are identified and inferences are made; j) conclusions are drawn; l) simple physical models are designed and constructed to clarify explanations and show relationships.

Background Information

Over time, the soil on the surface of Earth wears away because of weathering and erosion. Weathering is the gradual breaking down of rocks due to rain and other factors. Erosion happens when soil and rock particles are moved from one place to another, sometimes quickly due to a hurricane or flood and sometimes naturally over time. Both wind and water can cause weathering and erosion.

Land that is covered with plant life (grass, bushes, trees) has greater protection from erosion than bare land. The roots of trees and bushes hold the soil in place and prevent it from moving to other locations. Land that is along the water often erodes due to a lack of plant life.

Materials

- For each group: piece of cardboard (may want to cover the cardboard with plastic wrap to keep it from absorbing the water), container of dirt, square of cut grass (sod) (If you cannot get sod easily, you could use a green sponge or green felt to simulate the sod,) and a container of water

Vocabulary

weathering, erosion, soil

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Prior to beginning the lesson, gather the materials listed above and take students outside.
2. Ask students to think about a visit to the beach. Ask them what happens when they stand in the sand at the edge of the water (the sand moves). If desired, watch a video that shows erosion.
3. Talk with students about soil and sand moving from one place to another. Explain to students that this movement is called *erosion*. Discuss reasons it might be a problem for land to erode.
4. Challenge students to think of something that might help the soil not move. Guide them to mention plant life.
5. Explain that they are going to complete an experiment to see if soil erodes more when there is no plant life. Explain that the cardboard represents the land, and the water represents rain.
6. Divide students into groups. Ask students to work together to place a handful of soil on the cardboard and then hold it at a slight angle. Then have the students SLOWLY pour about ¼ of a cup of water down the cardboard. Direct them to watch the soil. Discuss what happened.
7. Next, have students place the square of grass (sod) on the cardboard, hold it at an angle and SLOWLY pour a ¼ cup of the water down the cardboard. Remind students to watch the soil under the grass. Compare what happened to the soil this time with what happened the first time.
8. Direct students to repeat the experiment to determine if the same thing happens.

Assessment

- **Questions**
  - What does erosion mean?
  - What happened to the soil without plant life on it?
  - What happened to the soil with plant life on it?
- **Journal/writing prompts**
  - Draw a picture of a riverbank before and after a flood. Explain how the flood caused erosion in the second picture.
  - Write a letter to the mayor of your town. Suggest ways he/she could prevent erosion along a body of water near you.
- **Other**
  - Ask students to write a summary of what happened during the experiment.
  - Listen as students complete the experiment and evaluate their use of the term erosion and how accurate their statements are.
  - Have students work as partners to share their ideas orally together, and then write and share out.

Extensions and Connections (for all students)

- Repeat the experiment with topsoil, sand, flowers, loose grass, etc.

- Guide students to complete Venn diagrams showing what happened to the soil with and without plant life.
- Have students use their fingers as “roots” to try to hold onto the soil as the water flows by.

Strategies for Differentiation

- Groups can become “experts” on an erosion experiment using materials other than sod (leaves, sand, loose grass, weeds, mulch, flowers, etc.) and model it for the class.
- Create cards with Venn diagram elements for sorting rather than writing.
- Teams of students create a video for the class explaining some aspects of erosion.
- Have students create a pictorial glossary.