



WILD WATER



BENCHMARK AND TASKS

SC.D.1.2.4 The student knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features.

- The student investigates how waves, wind, water, and ice shape and reshape the earth's surface by eroding rocks and soil in some areas and depositing them in other areas to form new features.
- The student experiences how some changes in the earth's surface are due to slow processes, such as erosion and weathering; and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.

KEY QUESTION

How can running water change the land?

BACKGROUND INFORMATION

Weathering and **erosion** are constantly changing the earth's surface. Weathering breaks rocks into smaller pieces which can be carried away through erosion. Erosion is the movement of small fragments of earth by moving water, wind, and glaciers. When moving water, ice, wind, or gravity drops a load of sediment in a new place, the process is called **deposition**.

Running water is one of the main causes of erosion. It continually changes the earth's surfaces. One-fourth of the annual precipitation falling on the continents runs off into the ocean. Rivers carry rocks and soils, eroding the hills and mountains and carving out valley and canyons.

MATERIALS

Per group

1 cookie sheet or shallow pan
1 Styrofoam cup
masking tape
1 metric ruler
mixture of dirt, clay, gravel, sand, and water in a 10 oz. cup
1 book (approx. 1-2 inches thick, covered to avoid damage)
1 metric measuring cup
200 mL water
1 sharp pencil or a pin for punching holes
newspaper
construction paper (1 sheet per student)

several craft sticks
grass or other vegetation (optional)
markers or crayons

Teacher

pictures of the Grand Canyon
Erosion, Lola M. Schaefer,
Benchmark Education Co.

TEACHING TIPS

1. Prepare a mixture of dirt, clay, gravel, sand, and water – enough so each group can have 10 oz. of the mixture. (The clay sticks together and is heavier than the other materials but eventually breaks up and will become part of the mixture.)
2. Each group should have 10 oz. of the mixture, moist enough to be molded easily.
3. Cover the work area with newspapers and/or work outside.

ENGAGE

1. Choose students to pick up certain items (e.g., books, chairs) in the classroom, carry them somewhere else in the room, and deposit them. Call on different students to do this several times. Use the terms, “pick up, carry, and deposit (put down),” since this is the terminology you will use when discussing how the earth is constantly changed by the movement of rocks and soil.
2. Ask:
How did we change the way our classroom looked?
How is this similar to the way nature changes the way the earth looks?
Have you ever built a sand castle at the beach? What happened to the sand castle after you built it? How did the sand castle change? What caused it to change?

EXPLORE

1. Cover tables with newspaper. Distribute materials to small groups.
2. Have each group turn the 10 oz. cup of soil mixture upside down in one end of the shallow pan and mold it to form a hill. Have students use the covered book to elevate the pan by placing it under the same end.
3. Show students how to fold a sheet of construction paper into three sections and label them Before Rain, First Rain, and Second Rain. Have students draw a “before” picture to illustrate the molded hill setup before continuing the activity.
4. Have students use a pin or a sharp pencil point to poke three holes in the bottom of a Styrofoam cup. (Caution them to use only the point, so that the holes are not too large.) Have students cover the holes with tape.
5. Instruct each group to fill the Styrofoam cup with 200 mL of water. Ask students to predict what will happen to the dirt when they hold the cup of water over the hill and remove the tape.
6. Tell students to hold the cup of water about 30 cm above the hill and pull the tape off so it rains on the hill.
7. In the second section of the construction paper, have students draw what the pan and the hill looked like after the “first rain.”
8. Tell students *not* to rebuild the hill, but to predict what will happen to the hill if there is a second rain. Once they have predicted, they should make it rain again. Ask students to draw the results in the third section of the construction paper.
9. Rebuild the hill, but this time cover the hill with grass, moss, or other vegetation and/or craft sticks to see how this affects erosion. Then repeat the same process as above.

EXPLAIN

Discuss erosion by asking:

What happened to the hill when it rained?

Which particles were carried the farthest down stream?

What is the process called when moving water, wind, or gravity drops a load of eroded sediment in a new place? (Explain to students that scientists call this process deposition.)

What might help the dirt stay on the hill during the rain?

How did vegetation affect the erosion?

What would happen if it rained harder or for a longer period of time?

What, besides moving water, might cause erosion? (wind, ice, gravity)

EXTEND/APPLY

1. Take students for a walk outside. Ask them to look for places where the results of water erosion can be seen (e.g., rain spouts, outdoor water faucets). Ask students what they think might have caused the erosion they observe and if anyone has any ideas how more erosion in that location might be avoided in the future.
2. Show pictures of the Grand Canyon and discuss how the Colorado River formed the canyon over a long period of time.
3. Share the book, *Erosion*.

EXTENSION

Ask students to observe excavation sites, gardens, the beach, and holes after a rainfall to see the effects of erosion.

ASSESSMENT

Have students compose a written response to the Key Question: *How can running water change the land?*