

Investigation One – Weathering and Erosion

Standard II Students will understand that volcanoes, earthquakes, uplift, weathering, and erosion reshape Earth’s surface.
Objective 1 Describe how weathering and erosion change Earth’s surface.
Intended Learning Outcomes <ol style="list-style-type: none">1. Use science process and thinking skills2. Manifest scientific attitudes and interests3. Understand science concepts and principles

Standard II

Objective 1

Background Information

Two forces, weathering and erosion, are constantly at work wearing away the rocks that make up Earth’s crust. Weathering causes rocks to fragment, crack, crumble, or break down. Erosion loosens and carries away the rock debris caused by weathering. Over time these two forces, working together, can change the shape of the land.

Pre-Assessment/Invitation to Learn

Brainstorm all the ways the surface of Earth can change. Take the list and put into three categories: weathering, erosions, and other. Discuss these findings and how long they take in each category. Using pictures from the Internet site, www.askjeeves.com discuss that Earth’s surface has gone through weathering and erosion.

Instructional Procedure

Say to students: All kinds of rocks weather, but not in the same way or at the same rate. It all depends on the mineral composition of the rock, as well as where the rock is located. Here is a closer look at the way rock weathers through the water erosion process.

1. Separate the stones into three piles of five and put each pile onto a sheet of paper.
2. Label each can and jar “A”, “B”, and “C”, and put five rocks in each.
3. Fill can “A” half way with water and put in the stones from pile “A”. Do the same with pile “B”, and with pile “C”. Let the stones stand in the water overnight.
4. Pass the jar around to the students. Instruct them to hold can “A” in both hands and shake it hard about 10 times, each, about 1,000 shakes.
5. Remove the stones from can “A” and pour the water into jar “A”. Observe the stones and the water.
6. Using the same process, give can “B” about 300 shakes. Remove the stones and pour water into can “B”. Once again, observe the stones and the water.
7. **Do not shake can “C”.** Remove the stones and pour the water into jar “C”. Observe the stones and the water.

Materials

- 15 rough sandstone, limestone, or shale (sedimentary) rocks.
- Three same-size containers with lids (such as 32-ounce Gatorade bottles, wide mouth)
- Three clear cups or jars
- A pen, paper, and masking tape to label both the cans and the clear jars with A, B, and C.

8. Compare the three piles of stones and the three jars of water. Ask the students: “How do the piles of stones differ?” “Can you explain why?” “Which pile acted as a control group? Why?” “How do the jars of water differ?” “How does this show what happens to rocks and stones through the water erosion process?”
9. Let the three jars of water sit overnight. Have the class observe any differences or changes.
10. Explain that we have just learned the process of weathering. Erosion continues the work that weathering starts. It helps loosen particles and transport weathered material. Erosion by way of waves, wind, glaciers, gravity, running water, etc., causes change in geological features. Valleys, canyons, buttes, and arches are all examples. The main agent of erosion is running water. It probably does more to wear away the land than all the other geologic agents combined. Ice, wind, plants and animals also affect landscape.

Curriculum Extensions

- Fill an ice cube tray with sand and saturate it with water. Freeze it. Pop out the ice cubes and use them to replicate glacial movement down a valley. Slide the sand/ice cubes across a piece of shale or cardboard. Observe the scuffed surface. Use a regular ice cube as a control. (ILO 1)
- Have students fill a plastic film canister with water, close it, then freeze it. Students can see the ice pop the lid off the canister. (ILO 1)
- Fill a breaker to a certain measure with colored water. (Using colored water will help students see measurements better.) Freeze the water. Have students look at the measure line when the water is frozen. (ILO 1)
- Expand the Instructional Activity by using an acid such as vinegar or lemon juice to show chemical erosion. (ILO 1)

Assessment Suggestions

1. Students will go on a “Wear it Away Walk,” by walking outside in the Schoolyard and observing signs of erosion, weathering and deposition. Look for signs of erosion on hillsides. Look for loose rocks and soil at the bases of slopes. Observe any plant growth that slowed down erosion. Write down as many weathering and erosion observations as you can.
2. In a science journal, record 3 conclusions about weathering and erosion.

Reference to Assessment Section:

Unit Test	Multiple Choice	Constructed Response	Performance Test
1	1.2		Shaping the Land
2			

Resources

Web sites:

- <http://www.student.biology.arizona.edu/sciconn/earthscience/erosion.html>
- <http://harcourtschool.com>

Videos:

- All About Weathering and Erosion. Schlessinger, 2000
- Earth Alive. National Geographic, 1994
- Erosion – Earth is Change. GPN, 1992
- Erosion. Disney Education, 1998
- Glaciers – Nature’s Conveyor Belt. United Lea, 1994

Books –

- Downs, Sandra. When the Earth Moves. Brookfield, Connecticut: Twenty-First Century Books. ISBN: 0-7613-1412-1
- Gallant, Roy A. Glaciers. Danbury, Connecticut: Grolier Publishing. ISBN: 0-531-20390-5
- Jennings, Terry. Mountains. Thameside Press. ISBN: 1-931983-19-4
- Winner, Cherie. Erosion. Carol Rhoda Book, Inc. ISBN: 1-51505-223-7

Filmstrips –

- Weathering and Erosion. National Geographic Society Educational Filmstrips: Washington, 1983.