

How Weathering Affects the Earth's Surface

2nd Grade

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Benchmarks:

SLC 15: Identify evidence and show examples of changes in the earth's surface

Purpose:

This lesson is designed to help students identify the effects of weathering on the environment by erosion. Day two will help students understand what a fossil is and how fossil records show how the earth's surface has changed over time.

Materials:

Day 1:

- 6 ounce paper cups (enough for each student)
- Large cups or bowls (enough for each student)
- One bag of potting soil
- One bag of potting soil mixed with pebbles, leaves, sticks, grass, and mulch (or any combination of them)
- Rulers
- Water

Day 2:

- Plaster of Paris
- Clay (enough for each student to have a small piece)
- Wax paper (to limit messiness)
- Shells
- Water

Day 1

Initial Demonstration:

Fill a plastic tub with some sand. Tilt the tub and pour water on the sand so that the sand is washed away. Have students make observations.

Target Observations:

- The sand was washed away by the water.

Discussion:

What is it called when stuff, like sand, is washed or moved like this? What are some other ways this can happen?

Target Model:

-Erosion is the process by which weathered material is moved from one place to another
-There are 5 major agents of erosion—gravity, wind, waves, running water and glaciers:

1. Gravity can cause soil and rocks to move down a slope.
2. Wind can carry sand, dirt, and dust from one place to another.
3. Waves can move sand, rocks and shells onto and off of a beach.
4. A glacier is a moving river of ice and snow that can also carry away large amounts of rocks and soil. Glaciers form in places where the temperature is cold for most of the year. As a glacier moves down a slope, gravel and rocks freeze into the ice at the bottom and scrape against the bedrock causing pieces to be carved away, sometimes making very large grooves.
5. Running water is the largest agent of erosion and can carry large amounts of soil and rocks. It includes rivers, streams, and runoff (rain water that flows along the earth's surface).

Demonstration:

Before class, mark the small cups with a line about halfway, and another line a couple of centimeters from the top. Poke 5 or 6 holes (diameter~1.5 cm—you may have to experiment) in the bottom of the small cup.

Divide the class into pairs. Give one cup of each size to each student. Have one student in each pair fill their small cup to the first line with potting soil. Have the second student fill their small cup to the first line with the mixture of potting soil, leaves, sticks and pebbles. Have each group make (and write) a hypothesis about what they think would happen if they filled the rest of the cup with water.

Have each student hold their small cup of soil over their large cup while the you pour water up to the top line of each cup. Tell them to make observations about what happens and write them down. When all of the standing water has drained from the cups, have the students measure the lowest part of the soil in their cup and compare it to the lowest part of the soil in their partner's cup.

Target Observations:

- The first cup drained faster
- The first cup lost more soil
- The first cup had a bigger “hole” in the soil

Discussion:

Bring the class back together and discuss their observations. Did they agree with their hypotheses? Which cup lost more soil? Which cup drained most quickly? Which cup had the lowest point? Why do you think that is?

Compare the cup with just potting soil in it to a slope that has been cleared of all vegetation. What would happen if it rained a lot? Compare the second cup with a slope full of trees, bushes, grass and rocks. What would happen to that slope if it rained? What roll might a plant's roots play in erosion?

Target Model:

-Erosion is the process by which weathered material is moved from one place to another

-There are 5 major agents of erosion—gravity, wind, waves, running water and glaciers:

1. Gravity can cause soil and rocks to move down a slope.
2. Wind can carry sand, dirt, and dust from one place to another.

3. *Waves* can move sand, rocks and shells onto and off of a beach.
4. A *glacier* is a moving river of ice and snow that can also carry away large amounts of rocks and soil. Glaciers form in places where the temperature is cold for most of the year. As a glacier moves down a slope, gravel and rocks freeze into the ice at the bottom and scrape against the bedrock causing pieces to be carved away, sometimes making very large grooves.
5. *Running water* is the largest agent of erosion and can carry large amounts of soil and rocks. It includes rivers, streams, and runoff (rain water that flows along the earth's surface).

-*Bare land promotes erosion.*

-*Land with rocks, trees, grass and other plants helps to prevent erosion.*

-*Roots of trees and other plants help prevent erosion.*

Demonstration:

Go out to the playground at your school and look for signs of weathering and erosion. If time and weather permit, bring the class outside and show them some examples of weathering. What might cause these things? What about the cracks in the pavement? Where do these come from?

Target Observations:

- Water and wind can wash away parts of the pavement, wash away the paint
- Large cracks can be caused by water getting into very small cracks or holes and freezing. When water freezes, it expands and increases the size of the cracks.

Day 2:

Initial Demonstration:

Bring in some rocks with fossils in them and pass them around to the class. Ask the students to make observations.

Discussion:

What is a fossil? How might they form? How long do they take to form? Why are they important to scientists? What is a scientist that studies fossils called? Paleontologists have figured out what dinosaurs looked like from using fossil records. Do you think this was easy? (A helpful analogy: imagine putting together a 500-piece jigsaw puzzle upside-down or without looking at the box!)

Target Model:

-Erosion is the process by which weathered material is moved from one place to another

-There are 5 major agents of erosion—gravity, wind, waves, running water and glaciers:

6. *Gravity* can cause soil and rocks to move down a slope.
7. *Wind* can carry sand, dirt, and dust from one place to another.
8. *Waves* can move sand, rocks and shells onto and off of a beach.
9. A *glacier* is a moving river of ice and snow that can also carry away large amounts of rocks and soil. Glaciers form in places where the temperature is cold for most of the year. As a glacier moves down a slope, gravel and rocks freeze

into the ice at the bottom and scrape against the bedrock causing pieces to be carved away, sometimes making very large grooves.

10. *Running water* is the largest agent of erosion and can carry large amounts of soil and rocks. It includes rivers, streams, and runoff (rain water that flows along the earth's surface).

-Bare land promotes erosion.

-Land with rocks, trees, grass and other plants helps to prevent erosion.

-Roots of trees and other plants help prevent erosion.

-Fossils are rocks with imprints of animals or plants in them.

-Fossils can be remains of ancient plants and animals or signs left behind by plants or animals (such as footprints, imprints or burrows) that have hardened in rock over time and turned to stone.

-Fossils can take millions of years to form.

-Scientists dig for fossils because they can tell us what life was like millions of years ago.

-Scientists who study fossils are called paleontologists.

Procedure:

Tell the class that we are going to make our own "fossils". Give each student a small piece wax paper and a small piece of clay. Have them each pick out a small shell that they would like to make into a fossil. Instruct them to make an imprint of the shell in the clay and carefully remove the shell.

Mix the Plaster of Paris and water (per instructions) and pour (or spoon, whichever is more appropriate) the mix into the impression made by the student's shell and tell them to leave it alone until it dries. Once the plaster has dried completely, the students can "dig" their fossils.