

Glaciers & Erosion

4th Grade

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Benchmarks & Objective:

ES-8: Describe how wind, water, and ice shape and reshape Earth's land surface by eroding rock and soil in some areas and depositing them in other areas producing characteristic landforms (e.g. dunes, deltas, glacial moraines)

Materials:

- Science journals
- Metal pans (2)
- Glacier (chunk of ice formed within a small plastic bowl)
- Pebbles (various colors)
- Clear plastic bag (large enough to completely enclose both metal pans)
- Wooden paint stirring sticks or equivalent
- Aluminum foil

Target Concept:

Slow erosion processes make take years or longer (e.g. a glacier moving along land). This lesson will encompass multiple days so as to simulate the slow movement of and erosion from a glacier. The students will observe what happens as the ice slowly moves and melts. This is intended to introduce the concept of erosion and allow the students to make some initial observations and ask some initial questions.

Initial Introduction:

This lesson is intended as an introduction and as such is given on the same day as the pre-test. Time will at most allow review of some vocabulary words. Besides the vocabulary, there is no additional introduction.

Procedure:

Day One

1. Take both metal pans and attach them, with one at a slight angle (the larger the angle the faster your glacier will move).
 - a. Home depot has thin, metal bar with pre-drilled holes. These would be perfect for joining the pans. Be sure, however, that the bolts do not stick up much higher than the pan.
 - b. You may also be able to use Duct Tape instead of bolts.
2. With the pans joined, use the aluminum foil to completely cover the pans. This will keep the melting water from leaking from the join point of both pans and help guide the water to the flat pan (i.e. flowing downhill to a lower elevation).

3. Spread the various colored pebbles on the pans, leaving some open space at the far end of the flat pan.
 - a. The pebbles should be placed in a striped pattern width-wise on the pans.
4. Place the pans near a window and somewhere they will not be bumped.
5. Place a few books under the tilted pan as support.
6. Place the wooden paint stirring rods on either side of the flat pan and standing (these will keep the plastic bag out of the way so that the glacier may move freely).
7. Place the glacier at the top of the tilted pan.
8. Carefully place the plastic bag around the pans and tie off the end (this will minimize evaporation from the system).
9. Ask the students to make guesses on what the system will look like throughout the experiment.

Day Two and on

1. Over the next few days have the students observe the system and compare to their guess as to what it would look like.
2. Once the glacier is completely melted remove the bag and discuss the system's final configuration.

Target Observations:

1. Glaciers melt and as they do water is deposited.
2. The movement and melting of glaciers will alter the landscape over a long time period and those changes are an example of erosion & weathering.
3. The various colored bands should mix to some extent as the "glacier" moves down the pan. The students should be able to make the connection between the mixing of bands and erosion by glaciers.

Final Target Concept:

Erosion and weathering occur over short and long time periods. The movement and melting of glaciers is an example of slow erosion. Glaciers can also create new bodies of water (e.g. the Great Lakes).

Summary & Discussion:

The teacher should review the relevant vocabulary (e.g. erosion, weathering, melting) and ensure that the students make the connection between the mixing of the bands and erosion. They should also see how melting glaciers shape the landscape by creating new bodies of water.