

Great Glaciers!

Purpose

Students will give examples of some changes in Earth's surface that are abrupt, such as earthquakes and volcanic eruptions, and some changes that happen slowly, such as uplift and wearing down of mountains and the action of glaciers.

Materials

For the teacher: chalk, chalkboard, freezable tray, pictures of areas transformed by glaciers (e.g., fjords, Glacier Bay in Alaska, Greenland)

For each student: pencil, science journal, safety goggles

For each group of students: 2 plastic cups, angular gravel, tap water, plastic wrap, tape, paper plate, smooth piece of wood, baking soda, vinegar

Activity

A. Pre-Activity Preparation

Add two spoons of baking soda to a cup for every group.

B. Glacial Effects

1. Ask students to brainstorm changes that occur on Earth's surface very quickly and changes that occur very slowly.
2. Have students write their ideas down in their science journals.
3. Discuss the movement and action of glaciers with students and inform them that they are going to make a model of a glacier.
4. Divide students into groups and pass out one empty cup, gravel, plastic wrap, and tape to each group.
5. Have students label their cups and then fill their cups halfway with gravel and cover the gravel with water.
6. Direct students to tape the plastic wrap tightly over the top of the cup. Instruct students to bring their cups to the front of the room, quickly invert them, and place them on the tray.
7. Place the tray in the freezer over night.
8. The next day, pass the frozen glaciers, a paper plate, and a smooth piece of wood out to each group.
9. Tell students to peel the plastic wrap off of the glacier.
10. Remind students that glaciers move in one direction slowly over the land. Have students simulate the movement of a glacier by scraping their model glacier slowly over the wood in one direction.

(continued)



INCORPORATING **TECHNOLOGY**

Have students take a guided tour through the anatomy of a glacier or solve glacial mysteries using satellite photos by visiting the Web site http://www.asf.alaska.edu:2222/intro_begin.html and clicking links such as *Glacier Anatomy*.



connecting across the **curriculum**

English/ Language Arts

Have students watch *The Shape of the Land* (Discovery Channel School) and write an essay about three ways land can be transformed over time.

Standards Links 7.3.3, 7.3.4

Activity (continued)

11. Instruct students to observe the pattern the glacier left on the wood.
12. Have students sketch the pattern on a piece of paper and write a paragraph describing the pattern created on the wood. Encourage students to relate their model glaciers and the marks they left on the wood to the actual movement of glaciers over land.
13. Remind students that in reality, glaciers are huge pieces of ice that can move over landforms as they form or melt. Ask students to predict how a glacier would change land as it moves.
14. Give each group a picture of land that has been transformed by a glacier. Have students sketch the land and write a description of how they think the land changed.
15. As a class, discuss how glaciers scrape away huge amounts of sediment as they form and deposit the sediment back as they recede. Explain that glaciers are even powerful enough to carve out huge channels called fjords.
16. Explain that there are other slow changes in the surface of Earth including continental drift, uplift, and erosion.


C. Volcanic Changes

1. Remind students that changes in Earth's surface can also occur very quickly. Discuss how volcanic activity is one example of something that can quickly change the surface of the earth.
2. Give each group a cup with baking soda and inform the students that they will use the reaction between baking soda and vinegar to simulate the fast action of a volcano.
3. Have students put on their goggles, carefully add vinegar to their cups, and observe the reaction. Ask students to discuss how the reaction was similar to volcanic eruptions.
4. Direct students to compare the effects of volcanoes to the effects of glaciers in their journals. Remind students to include a description of how quickly each occurs.
5. Ask students to brainstorm other ways the surface of the land can be transformed (e.g., earthquakes, avalanches, etc.).


Classroom Assessment

Basic Concepts and Processes

As students observe their glaciers and volcanoes, ask questions, such as the following:

 Give an example of a fast and a slow change in land forms.

 How do glaciers transform the surface of the land?

 How do you know?