

Go Glacier Go! _____

Levels



Grades K-4

Overview:

Students model how glaciers move like a liquid (not as a block of ice) and observe how the sides of glaciers move at different speeds.

Objectives:

The student will:

- identify and describe parts of a glacier; and
- observe how a glacier moves.

GLEs Addressed:

Science

- [3-4] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.
- [3] SD2.1 The student demonstrates an understanding of the forces that shape Earth by identifying and comparing a variety of Earth's land features (i.e., rivers, deltas, lakes, glaciers, mountains, valleys and islands)
- [4] SD2.1 The student demonstrates an understanding of the forces that shape Earth by observing models of how waves, wind, water, and ice shape and reshape the Earth's surface by eroding rock and soil.

Vocabulary:

glacier - a large mass of ice, snow, water, debris, and rock. Glaciers form from an accumulation of unmelted snow that turns into ice over a period of many years. (The original snow does not get a chance to melt.)

trough - any long, narrow depression in Earth's surface

Materials:

- Red paper
- Yellow paper
- Blue paper
- Strong spoon (one per group)
- Modeling clay
- Hole punch (one per group)
- Shampoo, Prell™ is recommended (one cup per group)
- Cups
- OVERHEAD: "Glacier"
- STUDENT INFORMATION SHEET: "Make a Glacier"
- STUDENT WORKSHEET: "Go Glacier Go!"

Activity Preparation:

1. Cover an area with plastic or paper in case of spills.
2. Cut the colored paper into strips to use for measuring.
 - a. Cut the red paper into 2-inch long strips.
 - b. Cut the yellow paper into 3-inch long strips.
 - c. Cut the blue paper into 9-inch long strips.

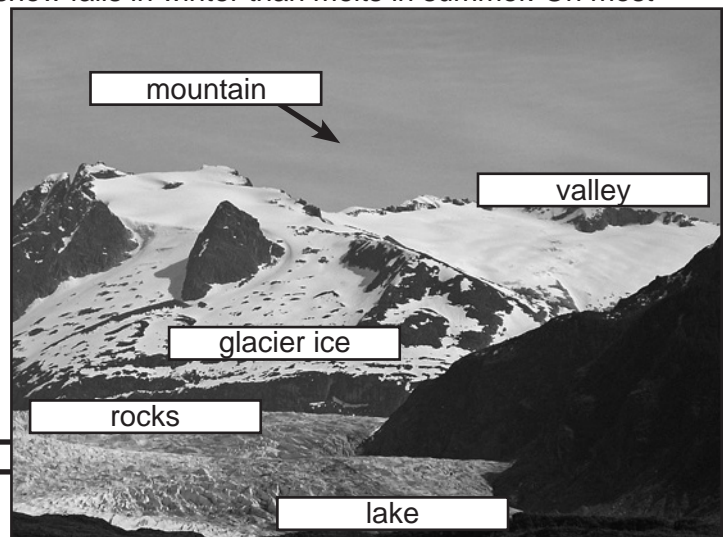
3. Divide shampoo into cups so that each group has one cup of shampoo.
4. Make an example of what the glacier outlined in the STUDENT INFORMATION SHEET should look like so students will see the size it needs to be when completed.

Teacher's Note: If students have experience measuring and cutting, you may wish to have them cut the strips of paper themselves.

Activity Procedure:

1. Display OVERHEAD: "Glacier." Ask students if they know what is in the picture. Identify the following land features: glacier ice, valley, mountains, and lake.
2. Ask students if they know how a glacier is formed. Explain that a glacier is formed when snow falls, does not melt, and accumulates (builds up) for many years. Glaciers can move slowly and may take many years to advance. They advance when more snow falls in the winter and accumulates than melts in the summer. Glaciers also recede by: 1) ice calving (falling off) into the ocean where they turn into floating icebergs and 2) simply melting on the surface.

Teacher's Note: Glaciers grow when more snow falls in winter than melts in summer. On most glaciers there is an area of net gain, and an area of net loss. High on a growing glacier, there is more snow falling in winter than melts in summer. Lower on the glacier, there is more melt than snowfall. If there is more loss than gain, then the glacier gets smaller. If the glacier ice did not move, the glacier would grow thicker at the top and smaller at the bottom. The flow of the ice moves the areas of net gain to the areas of net loss.



Critical Thinking: Wait Time Method.

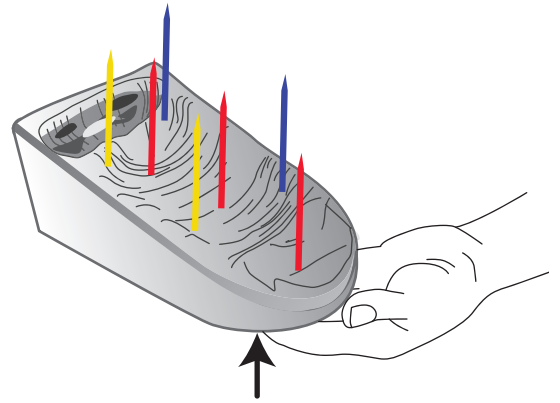
Explain that most of Alaska's glaciers are in the south of the state, not the north. Explain that in order to give students time to think about their answers you will not call on them for answers immediately. (NOTE: The wait time can be anywhere from 15 seconds to 5 minutes.) Ask students why there are less glaciers in the north than the south. When the time is up ask for a show of hands or select a student to answer. After students have responded and discussed, explain that there is less snowfall in the north of the state, even though it is colder. Glaciers are formed by snow, so less snow means less glaciers.

3. Tell students they will create a model of a glacier and observe how it moves.
4. Divide students into small groups.
5. Distribute the STUDENT INFORMATION SHEET: "Make a Glacier" and handout supplies to each group: a large ball of clay; a spoon; a red, yellow, and blue strip of paper; a hole punch; and approximately one cup of shampoo.
6. Guide students through the directions on the STUDENT INFORMATION SHEET. (NOTE: When completing STEP 3, the trough does not need to be smooth.)
7. As a class, discuss what happened with the dots and shampoo. Ask which color dot moved fastest, which color dot moved slowest, and why did one color move faster than another. Explain that different parts of glaciers move at different speeds and times depending on snowfall and heat from the sun.

Critical Thinking: Role Playing Method. Choose a starting point for students. Ask students to move very slowly and carefully like a rock that is coming down the valley of a glacier. Have them explain how they feel as they are moving.

Extension Idea: By adding this activity, students can collect data to support their observations of which part of the glacier moves fastest. Distribute three toothpicks and red, yellow, and blue markers to each group. Instruct groups to color each toothpick a different color.

Guide groups through the last step of the STUDENT INFORMATION SHEET, however, this time, ask students to place a toothpick in the model next to the dot of the corresponding color every 10 seconds until the dots have run to the bottom of the model. In this way, students can visualize the path of the dot. The dot with the least toothpicks is the one moving the fastest.



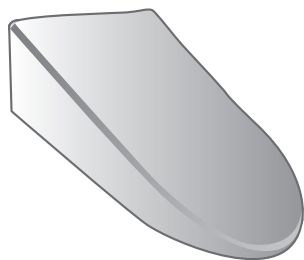
Answers:

The drawing should include a valley, mountains, glacier ice, lake, and rocks. These should be labeled.

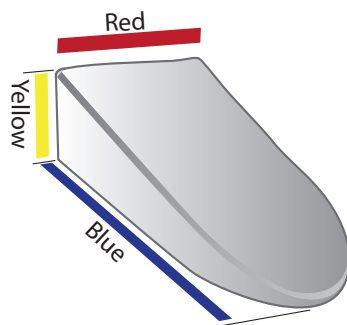
Make a Glacier

Student Information Sheet

Levels

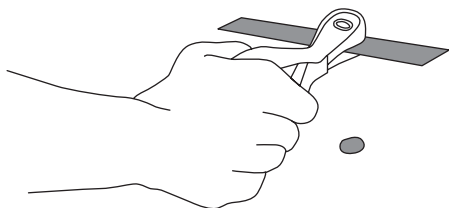


STEP 1: Make a ramp out of clay or Model Magic.

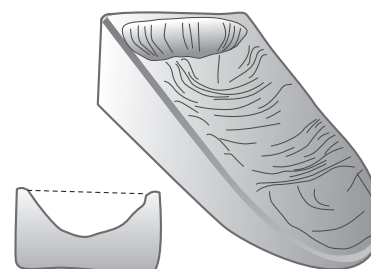


STEP 2: Make the top as tall as the yellow paper. Make width as wide as the red paper. Make the length as long as the blue paper.

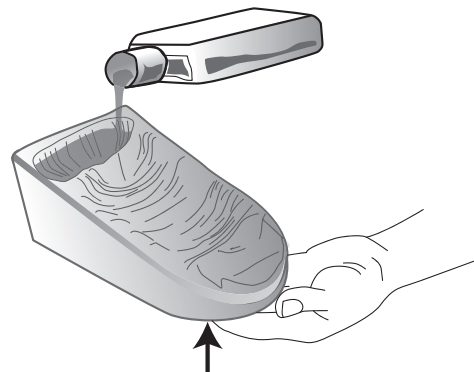
STEP 3: Dig a dent in the top with the spoon. Make a trough (valley) down the middle of the glacier model.



STEP 4: Punch one hole from each of the colored papers.

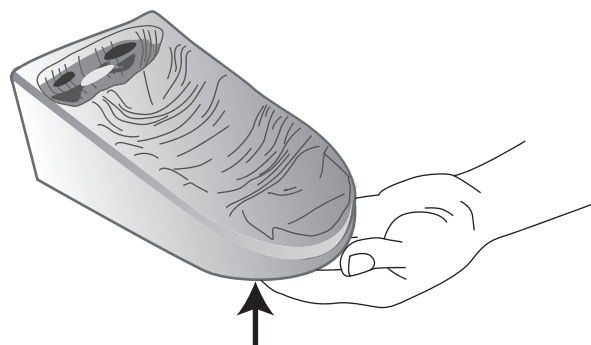


STEP 5: Tilt the glacier model up. Pour shampoo into the dent at the top. Fill it until it begins to overflow. Make sure the shampoo stays in the dent.



STEP 6: Place the dots into the shampoo.

STEP 7: Set the glacier model down. Let the shampoo flow to the bottom. Observe the dots.



Name: _____

Go Glacier Go!
Student Worksheet

Levels



Directions: With a partner, draw a picture of a glacier. Include and label the following things: valley, mountains, glacier ice, lake, moraine, and rocks.

