



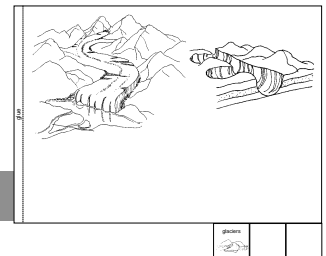
How do glaciers affect the land?

Lithosphere Concepts:

- There are two kinds of glaciers: valley glaciers which form in high mountain valleys, and continental glaciers which form on ice caps in frigid polar regions.
- Layers upon layers of compacted snow form glaciers.
- Glaciers move downhill because of gravity, their weight, and melting ice underneath them.
- As glaciers move, they erode the land, often creating a U-shaped valley with steep sides and a flat floor.

Vocabulary: glacier valley polar regions iceberg *moraines *eskers *arête

Read: *Lots of Science Library Book #18.*



Activities:

Land Features created by a Glacier – Graphic Organizer

Focus Skills: explaining a process, labeling parts

Paper Handouts: a copy of Graphic 18A

Landforms and Surface Features of Earth

Graphic Organizer: Glue Graphic 18A under the previous page of *Landforms and Surface Features of Earth*.

- ∞ Explain what you have learned about glaciers. Color the illustrations. Draw your own examples on the left page.
- ∞∞ Use the *Lots of Science Library Book #18* to label the illustrations. Write clue words about glaciers: *compacted snow, moves downhill, erodes the land, creates U-shaped valley with steep sides and flat floor.*
- ∞∞∞ Complete ∞∞. Research the *Fascinating Physical Features of Earth* examples from the *Lots of Science Library Book #18* or other examples of glaciers. Write a descriptive or expository paragraph about them on the left page. Research and list geographic locations of several valley glaciers on the left page.

A Glacier – Investigative Loop – Lab 18-1

Focus Skills: demonstrating a concept, applying information

Lab Materials: dirt plastic container for the freezer water

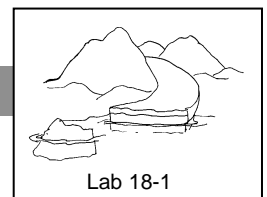
Paper Handouts: a copy of Lab Graphic 18-1 8.5" x 11" sheet of paper
Lab Record Cards Lab Book

Graphic Organizer: Make a Pocket Book and glue it side-by-side to the Lab Book. Glue Lab Graphic 18-1 on the left pocket.

Question: How does a glacier change land features?

Research: Read *Lots of Science Library Book # 18* and review the Question.

Procedure: Put 3" of water in the plastic container. Leave it in the freezer until it is completely



frozen. Create a slightly sloped hill of dirt about 5" deep, outside or in a large container. Place the frozen water on the top of the sloped hill, pushing it slightly into the dirt.

Observations: Observe the dirt closely before the ice is placed on it. Observe the slope on a regular basis. If it takes too long to melt, pour some water on the ice.

Record the Data: Label 2 Lab Record Cards "Lab 18-1." On one card, draw the sloped hill before the ice is placed on it. On the other card, draw the sloped hill after the ice has melted. Record any features of the dirt that you observed.

Conclusions: Review the Lab Record Cards and determine how the ice changed the sloped hill. Draw conclusions about glaciers' effect on land, based on this lab.

Communicate the Conclusions: On another Lab Record Card, explain your conclusions about this lab, or write a letter to someone explaining the lab and the conclusions.

Spark Questions: Discuss questions sparked by this lab.

New Loop: Choose one question to investigate further.

/// **Design Your Own Experiment:** Select a topic based upon this *Investigative Loop* experience. See page vii for more details.

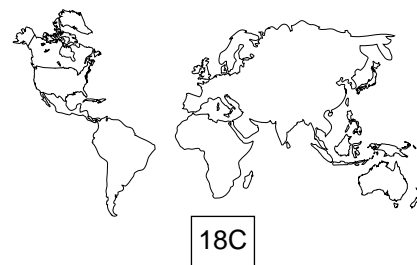
Fascinating Facts about Earth – Graphic Organizer

Focus Skill: map reading

Paper Handouts: a copy of Graphics 18B-C *Earth Shutter Fold Project*

Graphic Organizer: Cut out Graphics 18B-C and fold on the middle line so that the illustration is on the cover of each little book. Follow the directions below for the inside and glue it to the appropriate place on the world map inside the *Earth Shutter Fold Project*.

- /// Draw the cover pictures on the inside and color them.
- /// Copy information from the *Lots of Science Library Book* about the cover pictures.
- /// Write information about the cover pictures.



Experiences, Investigations, and Research

Select one or more of the following activities for individual or group enrichment projects. Allow your students to determine the format in which they would like to report, share, or graphically present what they have discovered. This should be a creative investigation that utilizes your students' strengths.



1. Investigate glacial deposits called moraines. Explain how Long Island was once a glacial moraine.



2. Draw and label a diagram of a glacier. Sketch land forms associated with glacial deposits: moraines, drumlins and eskers.



3. Explain why the majority of the world's lakes are in the northern hemisphere.



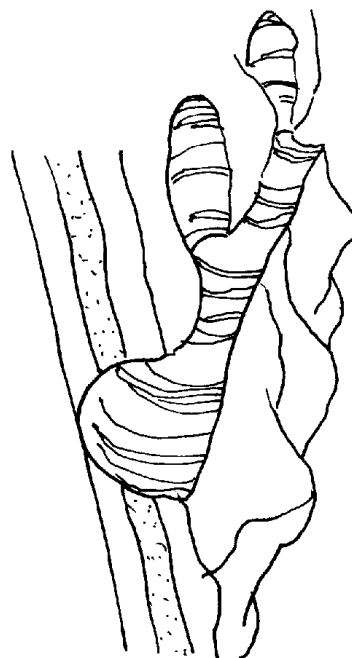
4. Investigate living organisms that have been preserved in ice. For example, the Ice Man and woolly mammoths.



5. Locate these famous glaciers on a map:
French and Swiss Alps glaciers: Mer de Glace on Mont Blanc, Aletsch Glacier near the Jungfrau.
Norway: Jostedal Glacier is the largest on the European continent.
North America: Malaspina Glacier on Yakutat Bay, Alaska.



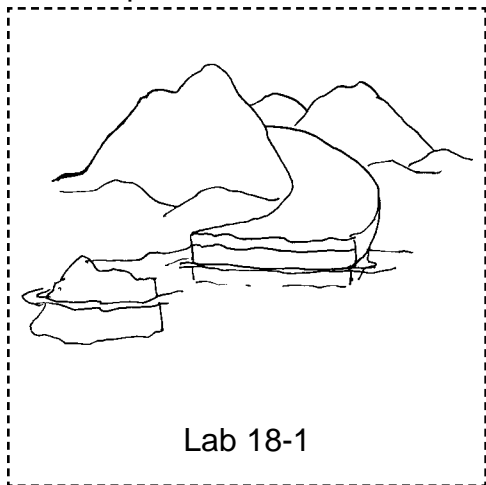
glue



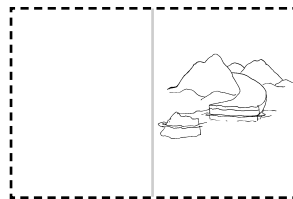
glaciers

Lab Graphic

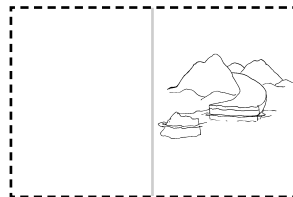
18-1



18B



18C

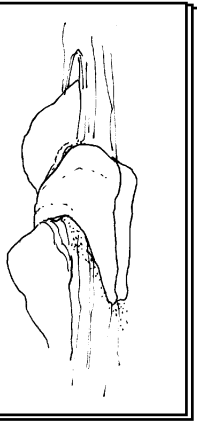




Fascinating Physical Features of Earth



The fastest-moving glacier is the Quarayag Glacier, in Greenland, moving 92 feet (28m) per day.

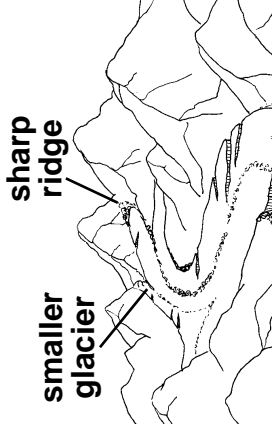


Glaciers are huge sheets of compacted snow and ice crystals found in high mountain valleys and polar regions. Glaciers contain about 75% of Earth's fresh water.

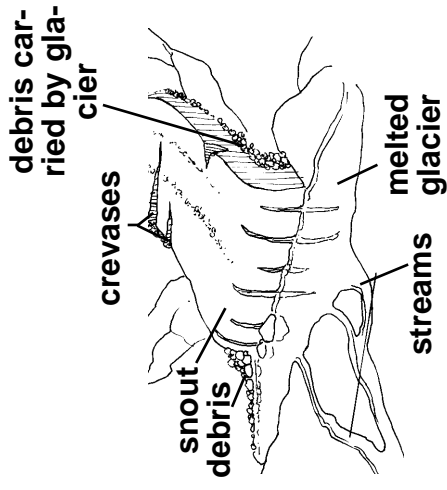


The second type of glacier, a continental glacier, forms on ice caps in the polar regions. Continental glaciers move in the summer when the ice and snow layers on their sides and bottom begin to melt. As these glaciers reach an ocean, huge blocks of ice break off into the water, creating icebergs.

Smaller glaciers often form and merge into larger glaciers. This creates a sharp ridge in the land.

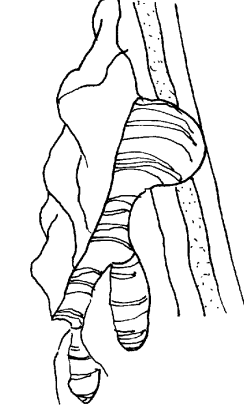


The sharp ridge is called an arête.



If the surrounding temperature is higher than normal, glaciers may melt early. As a glacier melts, it deposits large boulders and other debris that it has collected over time. Along the edges of a glacier, mounds of dirt and smaller debris are deposited. These areas are called moraines.

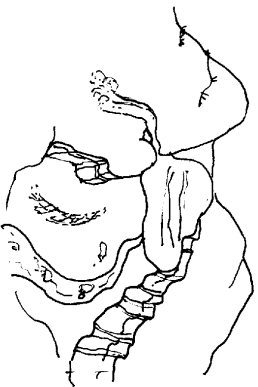
Long winding ridges called eskers are formed by moraine.





Glaciers move from a few inches to a few feet a day, depending on the slope of the mountain, the amount of snow that falls, and the size of the glacier. As a glacier moves, it erodes the land, creating a U-shaped valley with steep sides and a flat floor.

6 Lots of Science Library Book #18



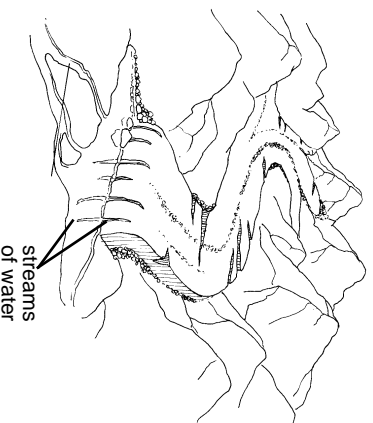
Sometimes a small lake is left behind in the glacier valley.

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As moving glaciers reach warmer lower altitudes, they melt, causing streams of water to move ahead of them.

The front of the glacier is called the snout.

8 Lots of Science Library Book #18



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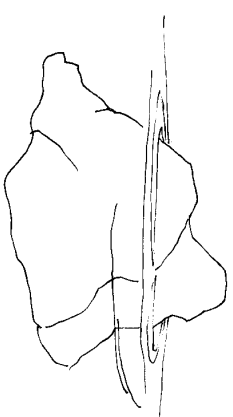
There are two kinds of glaciers: valley glaciers and continental glaciers. Valley glaciers are formed in high mountain valleys. When snow does not melt, it continues to build up over time. The weight and pressure of multiple layers of snow compacts forming glacial ice particles.

2 Lots of Science Library Book #18

Glaciers move downward like a slow-moving river of ice. They move because of gravity and their weight, and sometimes because of ice melting underneath them. As glaciers move, they collect all sizes of debris, from tiny rocks to huge boulders.

When a glacier moves because the bottom layers of ice are melting, it is called "basal slip."

4 Lots of Science Library Book #18

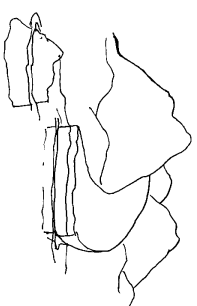


iceberg

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Fascinating Physical Features of Earth

The longest glacier is Lambert/Fisher Ice Passage in Antarctica. It is 320 miles (515 km) long.



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