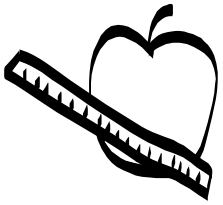


1: How to Make a Lake

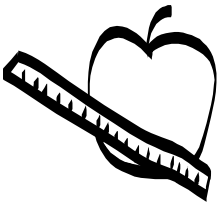
Based on the Michigan quarter reverse

OBJECTIVES

Students will explain the effects of glaciers on land and will draw conclusions about the formation of the Great Lakes.

MATERIALS

- 1 overhead projector (optional)
- 1 overhead transparency (or photocopy) of the Michigan quarter reverse
- 1 class map of the United States
- Copies of the Michigan quarter reverse
- Blue and green crayons and/or colored pencils
- Chart paper
- Markers
- Copies of an age-appropriate text that relates to glaciers, such as:
  - *Glaciers* by Larry Dane Brimmer
  - *Glaciers* by Roy A. Gallant
  - *Glaciers* by D.V. Georges
  - *Glaciers* by Wendell V. Tangborn
  - *Glaciers and Icebergs* by Jenny Markert
  - *Icebergs and Glaciers* by Seymour Simon
- Copies of the "What Did the Ice Do?" lab sheet
- Lunch trays (1 per pair)
- Plastic wrap
- Sand (1 cup per pair)
- Ice cubes (1 per pair)
- 1 timer (optional)
- Copies of the "All About Glaciers" research guide
- 1 Copy of the "All About Glaciers" key



How to Make a Lake

PREPARATIONS

- Make an overhead transparency (or photocopy) of the Michigan quarter reverse.
- Make copies of the Michigan quarter reverse (1 per student).
- Locate copies of appropriate texts that relate to glaciers (see examples under "Materials"; 1 per pair and 1 for teacher use).
- Prepare materials for the investigation.
- Make copies of the "What Did the Ice Do?" lab sheet (1 per student).
- Make copies of the "All About Glaciers" research guide (1 per pair).

GROUPINGS

- Whole group
- Pairs

CLASS TIME

Two or three 30- to 45-minute sessions

CONNECTIONS

- Science
- Social Studies
- Language Arts
- Art

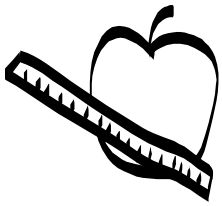
TERMS AND CONCEPTS

- Quarter
- Glaciers
- Procedures
- Reverse (back)
- Investigation
- Data
- The Great Lakes
- Hypothesis
- Conclusion

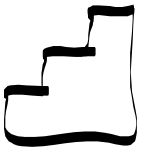
BACKGROUND KNOWLEDGE

Students should have a basic knowledge of:

- The scientific method
- Bodies of water



How to Make a Lake



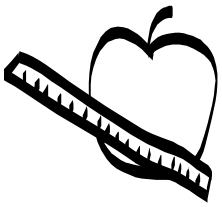
STEPS

Session 1

1. Describe the 50 State Quarters® Program for background information, if necessary, using the example of your own state, if available. Then display the transparency or photocopy of the Michigan quarter reverse. Locate Michigan on a classroom map. Note its position in relation to your school's location.
2. Distribute a copy of the Michigan quarter reverse to each student.
3. With the students, examine the design on this coin's reverse. Have the students point out the water and the land on this design. Instruct them to color the water blue and the land green on their copy of the coin design.
4. Ask students what this image tells us about the state of Michigan. Answers should relate to the idea that Michigan is mostly surrounded by water. As a class, orally generate a list of different types of bodies of water. Students should then identify any bodies of water that are close to their state or home town.
5. Give students a very basic introduction to the Great Lakes, explaining that they are five extremely large freshwater lakes. Explain that freshwater is not salty like the water that they'd find in the ocean, and that these lakes were formed by melting ice (called glaciers) about a million years ago.
6. With the entire group, create a K-W-L chart to examine what students **K**now and **W**ant to know about glaciers. Leave the **L**earn column empty for now.
7. Introduce students to the selected text about glaciers. As a group, preview the text and illustrations to generate observations about what is occurring at different points in the book.
8. Read the selected text to the class and attend to any unfamiliar vocabulary.
9. As a class, compete the **L**earn column of the K-W-L chart.
10. Explain that the following day you will be conducting a science investigation about glaciers.

Sessions 2 and 3

1. Review the K-W-L chart from session 1 and examine the Great Lakes on a map of the United States.
2. Ask the students how they believe the glaciers could have created the Great Lakes. Take ideas from students, listing them on the board.
3. Explain that you will be conducting a science investigation based on this question. Place students into teams of two, so that everyone has a lab partner.
4. Distribute a "What Did The Ice Do?" lab sheet to each student. As a class, read the procedure of the investigation.



Places We Live

5. Explain that a hypothesis is a guess that you will test to see if it proves to be true. Ask the students to develop a hypothesis about what they believe will happen during the investigation. Students should record their hypotheses on their lab sheets.
6. Model the basic procedure of the investigation for the students.
7. Direct the students to collect all necessary materials and begin their investigation. Alert them when it is time to record their observations at the 20 and 40 minute marks.
8. Distribute an appropriate children's text about glaciers and an "All About Glaciers" research guide to each pair. During the time interval between observations, students will read the text with their partners and record all important facts on their "All About Glaciers" research guide.
9. Regroup at the end of the investigation and discuss the results. As a class, discuss the information that the students discovered in their readings about glaciers. Referencing their "All About Glaciers" research guides, have students add any newly learned facts to the "L" column of the class K-W-L chart.
10. Based on their observations, how do the students think the Great Lakes were formed? Student responses should reflect the idea that glaciers moved and carved holes in the earth which held water.

ENRICHMENT/EXTENSIONS

- Ask students to produce a simple book describing how the Great Lakes were formed.
- Look at a world map to locate where other examples of freshwater lakes might have been created in this same way.
- As a class or in small groups, study other natural events and/or forces that changed the geography of the land. Have students create models to demonstrate these events.

DIFFERENTIATED LEARNING OPTION

If possible, take digital photos of the investigation at 5 minute intervals so that there is no rush for slower artists. This way artists can still take their time in completing their illustrations by referring to the photos. Referring to these photographs is also a good way to keep absent students from missing out on the investigation.

CONNECTIONS TO WWW.USMINT.GOV/KIDS

Have your students try some other coin-related investigations: find Science lesson plans on the United States Mint H.I.P. Pocket Change™ Web site at www.usmint.gov/kids/index.cfm?FileContents=/kids/teachers/Science_Summary.cfm. Read any of these plans by clicking on the Teachers' coin and selecting Lesson Plans. There you will find plans for not only Science but Math, Language Arts, and Social Studies as well.

NAME _____

What Did the Ice Do?

Lab Sheet

Problem: How could glaciers have created the Great Lakes?

Hypothesis: _____

_____

Materials:

1 lunch tray	2 sheets of plastic wrap
1 cup of sand	1 ice cube

Procedure:

1. Gather all materials.
2. Cover the lunch tray with plastic wrap.
3. On top of the plastic wrap pour the cup of sand into a mound.
4. Place the ice cube in the center of the sand mound.
5. As the ice melts, observe its effect on the sand. Draw pictures in the spaces below to show what happened at the beginning, middle and end of this experiment.

0 minutes	20 minutes	40 minutes

6. Write a conclusion where you explain the results you saw, and whether or not they support your hypothesis.

Conclusion: _____

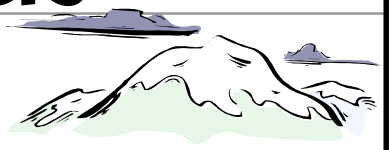
_____

_____

NAMES _____

All About Glaciers

Research Guide



Directions: As you read about glaciers, see if you can find the answers to any of these questions (you may not find all answers). Record your answers in the spaces provided.

1. What is a glacier? How do glaciers form? _____

_____

_____

_____

_____

2. Name two types of glaciers and explain each kind. _____

_____

_____

_____

_____

3. Where do glaciers exist today? _____

_____

_____

4. What is erosion? _____

_____

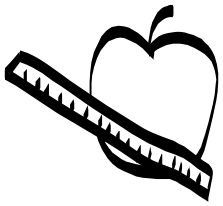
_____

5. List any facts that you didn't previously know about glaciers.

_____

_____

_____



All About Glaciers
Key

Directions: As you read about glaciers, see if you can find the answers to any of these questions (you may not find all answers). Record your answers in the spaces provided.

1. What is a glacier? How do glaciers form?

A glacier is a large mass of ice. They form when more snow falls in the winter than the amount that melts in the summer. The snow accumulates over time and compacts the bottom layers of snow into solid ice.

2. Name two types of glaciers and explain each kind.

Continental glaciers: These are glaciers which cover large portions of a continent such as in Greenland and Antarctica.

Valley glaciers: These are glaciers formed at the top of extremely tall mountains. The weight of the glacier causes the ice to flow down into valleys and rest there.

3. Where do glaciers exist today?

Glaciers exist on every continent except for Australia (however glaciers exist in other countries within Oceania, including New Zealand). There are only two continental glaciers however, those in Greenland and Antarctica.

4. What is erosion?

Erosion is the wearing down of the Earth's surface through natural causes, such as gravity, flowing streams and rivers, glacial movement, wind, and waves.

5. List any facts that you didn't previously know about glaciers.

Answers will vary.

Michigan Quarter Reverse