Vanishing Coast: Erosion

Levels

Grades K-4

Overview:

Students learn about erosion by observing two classroom demonstrations and listening to an Elder share local history.

Objectives:

The student will:

- identify erosion from a series of pictures;
- listen respectfully to an Elder; and
- relate information from a story.

Materials:

- Plastic bottle, 1-liter or larger
- Beaker
- Aluminum roasting pan
- Soil
- Water
- 2 Styrofoam™ cups
- Map of Alaska
- STUDENT WORKSHEET: “Erosion” (Level I)
- STUDENT WORKSHEET: “Erosion” (Level II)

Whole Picture:

A long time ago, people on Alaska’s coast lived in different places depending on the season. They would have different camps along the coastline that were good spots to catch fish, seals, walrus, or whales. When they were done fishing, they would move, often to a more sheltered area away from the ocean. Not too long ago, most villagers decided to live in one place, where stores, post offices, and schools were located. Some of these villages were on the sites of old camps, often right next to the water. In places like Shishmaref, the villages were built on islands made of sand, sometimes with a core of frozen sand and ice. When high winds from storms whip up the ocean, big waves can crash into the shore and eat some of the sandy shoreline and thaw the frozen ground underneath. In Shishmaref, this has caused some houses to tip into the ocean (when nobody was inside). The villagers of Shishmaref and other villages are now thinking of moving to places farther away from the ocean, but it will be expensive for them to move. Some think that storms hit their villages worse now, because the sea ice forms later in the year and melts earlier than it used to.

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] SA2.1 The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by answering “how do you know?” questions with reasonable answers.
- [4] SA2.1 The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by supporting the student’s own ideas with observations and peer review.
- [4] SD2.1 The student demonstrates an understanding of the forces that shape Earth by observ-

ing models of how waves, wind, water, and ice shape and reshape the Earth's surface by eroding rock and soil.

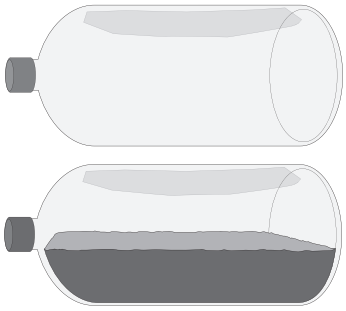
Vocabulary:

erosion - the process of wearing away by the action of water, wind, or glacial ice

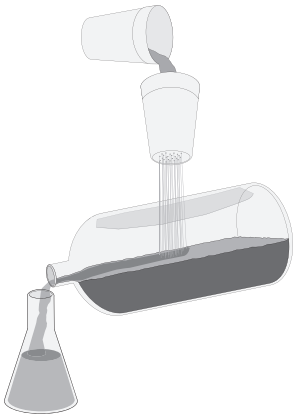
Teacher's Note: Coastal erosion is affecting Alaska's coasts, area residents, structures, and wildlife. A warming Arctic is impacting the rate of erosion along Alaska's coast. Sea ice, which once protected the coasts from fall storms, is less present in the fall months than it once was. Without the ice, the waves crash directly onto the beach, increasing erosion. Several coastal communities have used sea walls and other man-made barriers to hold back erosion, however, these measures serve only as temporary measures since wind and waves wear away at these barriers as well as the coasts themselves.

Activity Preparation:

1. Invite a local Elder to visit the classroom and share with students how the coastline has changed physically in their memory.
2. Prepare snacks and beverages for the Elder and make sure he or she has adequate transportation to and from the classroom.
3. Lay the plastic bottle on its side and cut a section from it so that it forms a trough. Fill the bottom of the bottle with soil.
4. Punch several holes in the bottom of one of the Styrofoam cups and fill the other one with water.
5. Fill one side of the roasting pan with soil or sand.

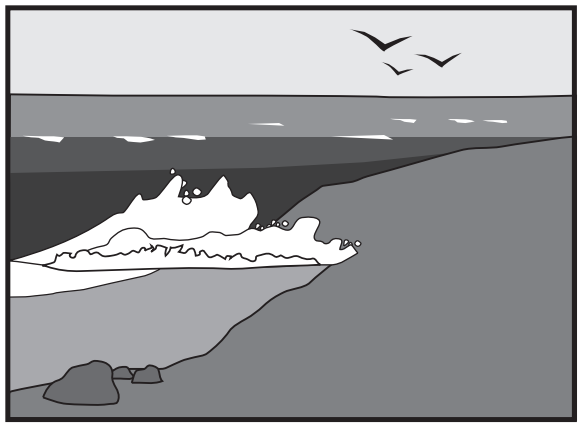


Activity Procedure:



1. Show students a map of Alaska. If necessary, explain that the blue parts of the map are water (*ocean, lakes, rivers, etc.*) and the other colors represent land.
2. Explain that each dot on the map represents a city. Ask students how many people live by the ocean. Explain that most of Alaska's residents live near the ocean and rely on the ocean for food and other materials.
3. Ask for a student volunteer. Hold the bottle at an angle (less than 45°) so that the spout is facing downward. Place a beaker at the bottom of the spout to catch runoff. Make sure the cap is off.
4. Instruct the student to pour water slowly into the bottle for several minutes. The student will need to position the cup with holes over the bottle, then pour the water into the cup. After the beaker is half full with water, stop and ask students what happened.
5. Ask students if the soil washed off with the water. (*yes*) How can they tell? (*The water should be darkened from the soil.*)
6. Ask students if they know what erosion is. Explain that erosion is the removal of dirt and soil from Earth's surface by water and wind. Erosion at the coast is the most dramatic, changing the beach every day.
7. Explain that erosion along the coast wears away the beach. As water washes against the beach it slowly erodes, or wears away, the beach, changing the coastline. Sea ice has protected the beach

from much of this erosion. However, sea ice along the coast is appearing less and less each year, resulting in more and more erosion.



8. Remind students that this process of soil washing away with water is called erosion and that water erodes the beach with the action of the waves.
9. Place the aluminum roasting pan filled with dirt in a central location so that all students can watch the demonstration. Pour a few inches of water in the opposite side of the pan.
10. Tilt the pan back and forth so that the water forms small waves against the soil. Ask students if the soil erodes (*it may or may not*). Continue tilting the pan, but faster, so that the waves splash faster against the soil. Ask students to describe what changed. Did the soil erode faster or more than the first time? (*yes*) As a class, discuss the difference.
11. Welcome and introduce the Elder to the classroom. Explain that students are learning about erosion. Invite the Elder to share stories of how the coasts have changed as a result of erosions, storms, and human activity.
12. Thank the Elder for his or her time.
13. Ask students to recall some of the things that the Elder told them about. List student ideas on the board.
14. Distribute the STUDENT WORKSHEET: "Erosion" and assist students as necessary. Ask Level I students to dictate their answers to Question 2 to an older student or classroom aide.

Answers:

STUDENT WORKSHEET: "Erosion" (Level I)

1. B (see picture at right)
2. Answers will vary.

STUDENT WORKSHEET: "Erosion" (Level II)

1. A) removal of soil and sand from Earths surface by water and wind
2. B (see picture at right)
3. Answers will vary.

Name:_____

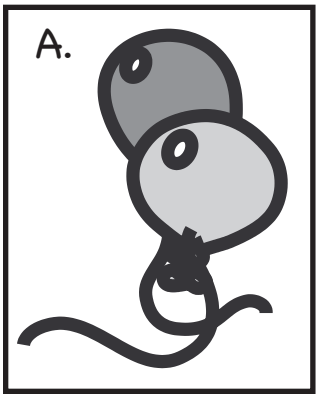
Level I

Erosion

Student Worksheet

1. Circle the picture that shows erosion.

A.



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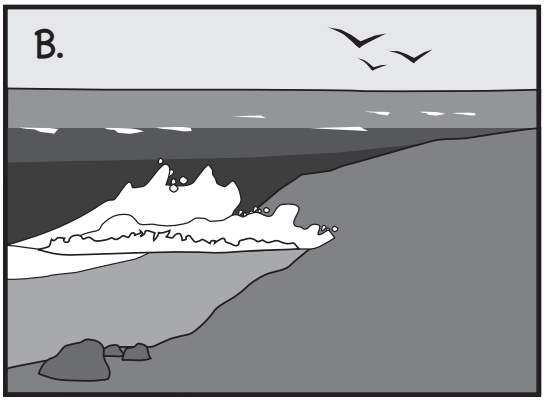

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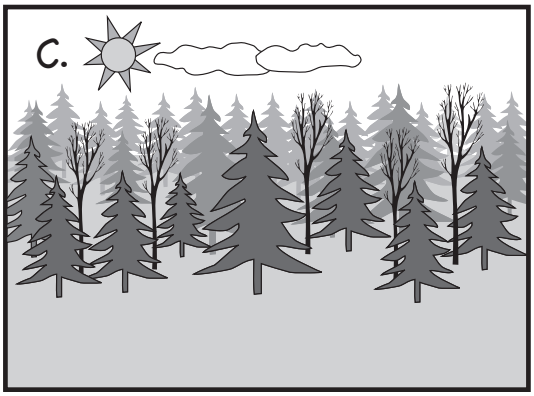

D.

2. What is one thing that the Elder said changed along the coast?

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Name:_____

Level II

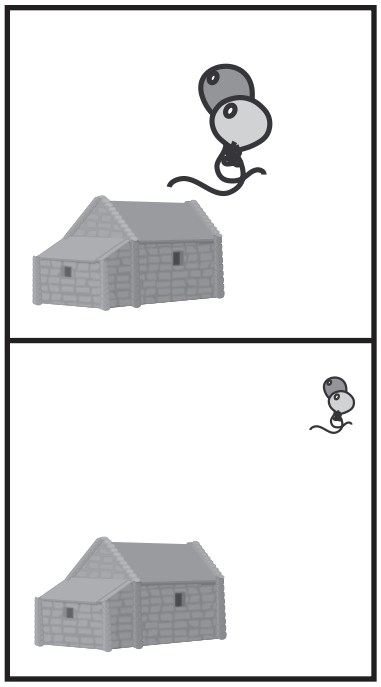
Erosion

Student Worksheet

1. What is erosion?
   - A. removal of soil and sand from the Earth's surface by water and wind
   - B. rain and storms
   - C. using machines to dig a ditch

2. Circle the set of pictures that shows erosion.

A.



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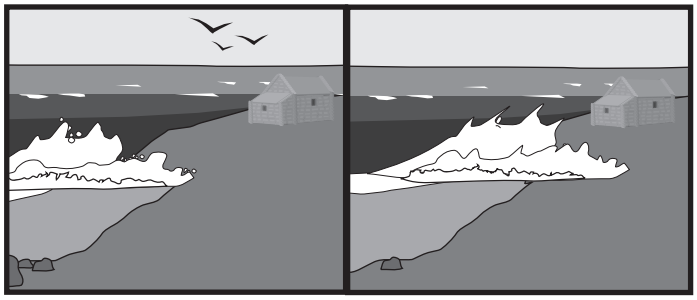

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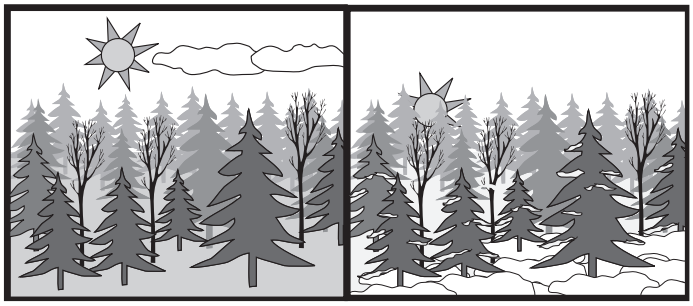

3. Describe one thing the Elder said changed along the coast.

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