8-10 What landforms do ocean waves create?

Objective

Describe three shoreline features created by wave deposition.

Key Terms

longshore current: movement of water parallel to a shoreline

spit: long, narrow deposit of sand connected at one end to the shore

sand bar: long, offshore underwater deposit of sand parallel to a shoreline

Beaches A beach is an offshore stretch of land covered by sediment, sand, or pebbles. Waves carry rock particles and other material away from a shoreline. A beach is formed when sand and rock particles are deposited on a shoreline by waves.

Materials that form beaches may vary in size and color. Pebble beaches are found along some shorelines. Along the east and west coasts of the United States, weathered quartz forms white sand beaches. Weathered volcanic rock forms black sand. Hawaii has some black sand beaches. Some Florida beaches are made up of broken shells.

▲ **Figure 8-29** This black sand beach in Hawaii is made of weathered volcanic rock.

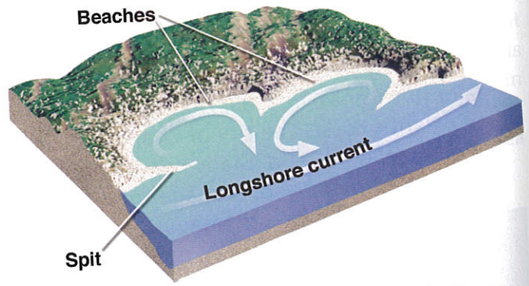
1 **EXPLAIN:** How is a beach formed?

Longshore Currents Waves do not usually move in a straight line to the shore. They come in to shore at an angle. A **longshore current** is a current formed as waves approach a beach at an angle. The current itself runs parallel to the shoreline. Longshore currents can carry sand away from the beach.

2 **DEFINE:** What is a longshore current?

Spits A curved or hooked deposit of sand on a shoreline is called a **spit.** One end of a spit is always connected to the shore.

How is a spit formed? A longshore current in the ocean carries sand in a direction parallel to the beach. The sand keeps moving in a straight line until the shoreline of the beach changes direction. Then, the sand is deposited at the spot where the beach curves, forming a spit. Sandy Hook in New Jersey and Cape Cod in Massachusetts are both examples of spits.



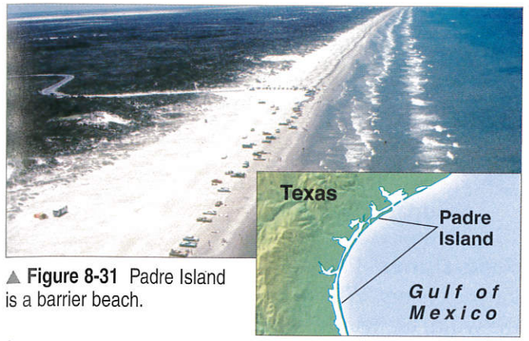
▲ **Figure 8-30** One end of a spit is always connected to the shore.

3 **DESCRIBE:** How is a spit formed?

Sand Bars Waves can carry a lot of sand away from an ocean shoreline. Most of the sand is dropped offshore. This deposit of sand builds up parallel to the shoreline.

A long, offshore underwater deposit of sand is called a sand bar. Sometimes, a sand bar completely crosses a bay, sealing it off from the open ocean. This type of sand bar is called a bay mouth bar.

If a sand bar reaches above the water, a barrier beach or island is formed. Miami Beach, Florida, and Padre Island in Texas are both built on barrier islands.



▲ **Figure 8-31** Padre Island is a barrier beach.

4 **DESCRIBE:** What is a barrier beach?

CHECKING CONCEPTS

1. A beach is formed when _____ and rock particles are deposited on a shoreline.
2. The material forming a beach may vary in size and _____.
3. Weathered _____ forms black sand.
4. A longshore current is formed when waves approach a beach at an _____.
5. A curved sand deposit that is connected to land is called a _____.

THINKING CRITICALLY

6. **EXPLAIN:** Why do some beaches appear different from other beaches?
7. **DESCRIBE:** How is a sand bar formed?

INTERPRETING VISUALS

Use Figure 8-30 to complete the following.

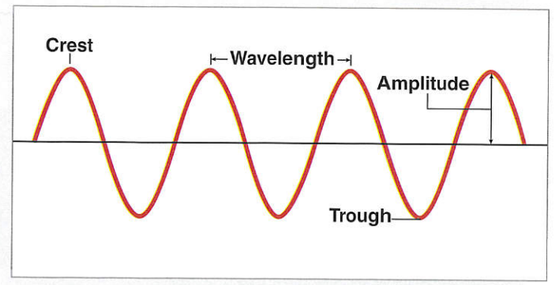
8. **MODEL:** Draw and label a diagram that shows the direction a longshore current is moving after it has formed near the shoreline.
9. **MODEL:** Draw and label a diagram that shows the relationship of a sand bar to a beach.

Integrating Physical Science

TOPICS: energy, waves

THE ENERGY OF WAVES

Energy is the ability to do work. Work is done when a force moves an object. The forces of wind and tide cause waves to form. These waves contain energy that can make objects move. Sand and pebbles are moved each time a wave breaks along the shoreline. The energy in waves is doing work.



▲ **Figure 8-32** Energy in waves

The waves in water move up and down to form crests and troughs. Half of the difference in height between the crest and the trough is called the amplitude. The greater a wave's amplitude, the greater the energy carried by it. A wavelength is the distance between two consecutive crests.

You can feel the energy in waves if you stand in the water when the surf comes in. This energy may have traveled across the ocean. The water itself does not travel all that distance. Only the pattern of motion in the wave makes the entire trip. When the waves reach shore, they pass most of their energy onto the land at the water's edge.

Thinking Critically What happens to the rocks on the shoreline when they are hit by the energy in waves?