What Causes Beaches?

**Exploring Science**

 **A $3-Billion Finger in the Dike.** Do you remember a story about a brace Dutch boy? He saved the Netherlands by using his finger to plug a hole in a dike. Most of the Netherlands is below sea level. Dikes are walls that protect the land from the sea. A small leak in a dike can quickly erode into a large hole. In the story, the boy stopped this erosion until help arrived.
 Now there is a new twist to that old story. The Dutch have built a $3-billion barrier as large as an Egyptian pyramid. Its job is to protect the dikes from erosion by storm waves. In 1953, before the barrier was built, high storm waves crushed the old dikes. About 50 thousand houses were washed out to sea. Much precious farmland was lost, too. Today, with the clang of a steel gate, the Dutch can keep the sea away from the dikes. No holes can form from the erosion of the dikes. So the story of the brave Dutch boy can remain a story.

Why would a small hole in a dike erode into a larger hole?
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Beaches and Erosion**

 You have probably seen ocean waves. A wave is an up-and-down, or vertical, movement of water that travels through the sea. The combination of up-and-down with forward produces a circular movement in the water. Waves form far out from shore and come crashing in on the beach. Then the water flows swiftly back toward the sea.
 The driving force that moves a wave toward the shore is the wind. The stronger the win, the fast, and usually the larger, the waves. The faster the waves, the more erosion they can cause.
 As you have learned, moving water is a very important cause of erosion. Sometimes large waves erode the shoreline by carrying away sand or soil. Waves have pounded shorelines for millions of years. Why haven’t these waves washed away the entire continents?
 While waves do carry material away from the land, they also deposit material on the land. The water in an incoming wave may carry sand, seashells, or small rocks. When the wave hits the shore, some of the material is deposited. The weaker, outgoing flow of water removes light material from the shore. Gradually, the water washes away the finer grains of soil and sand. It leaves behind larger grains of sand. The waves have formed a sandy **beach**.
 During a storm, waves are larger and move faster than usual. Storm waves may carry away more material than they leave behind. A severe storm, such as a hurricane, may wash away an entire beach.
 Waves may build up one beach while eroding another beach. In most areas, the wind does not blow directly toward the shore. The waves hit the shore at an angle. As a result, a current is produced. A current is a horizontal movement of water in one direction. A current that moves parallel to the shoreline is called a **long shore current**. Long shore currents move sand along those beaches they flow beside. These currents often deposit sand on any part of the shore that sticks out into the ocean. The beach is built up at those places.

**Review**

1. Fill in each blank with the word that fits best. Choose from the words below.

Sand beach wave current erode clay circular long shore current horizontal

 Winds cause water to move in a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ motion called a wave. Waves can both build up and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the shoreline. Since waves take away small particles and leave \_\_\_\_\_\_\_\_\_\_\_\_\_\_, a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is formed. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can build up the shoreline by depositing more sand on a point of land that sticks out into the ocean.

1. Write T if a statement is true. If it is false, change the underlined word or phrase to make it true.
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_ A wave is a horizontal movement of water.
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_ Storm waves may erode a beach.
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_ Waves usually hit the shoreline at an angle.
	4. \_\_\_\_\_\_\_\_\_\_\_\_\_ A storm current deposits sand at one end of a beach.
2. Answer in sentences.

Why are many beaches sandy?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_