

Erosion and Deposition

No matter where you live, the land around you has unique features. Some parts of the land might be low or flat, and others might be high or sloping. Earth's surface has a great variety of natural features, or shapes, called **landforms**. Some landforms are the result of changes to Earth's surface by water, wind, or ice. A beach is one example. A trip to the beach is fun. One of the best parts is playing in the sand. And there is so much sand. Where did it all come from? Was it made right there, or did it come from some other place?

Much of the sand on the beach came from mountains. First, weathering happened. Water, wind, or ice slowly broke mountain rocks into smaller pieces. Next, **erosion** moved the small pieces of rock from the mountains to the beach. Erosion is the taking away of weathered rock. Pieces of weathered rock, or **sediments**, can be carried away by gravity, water, wind, or ice. Most of the sand shown here was carried to the beach by water flowing in rivers and streams.

As long as water keeps flowing, the bits of sand keep moving downstream. When the river enters the ocean, the water slows down. The sand settles to the bottom of the ocean. The settling of sediments is called **deposition**. Deposits of sand form beaches all over the world.

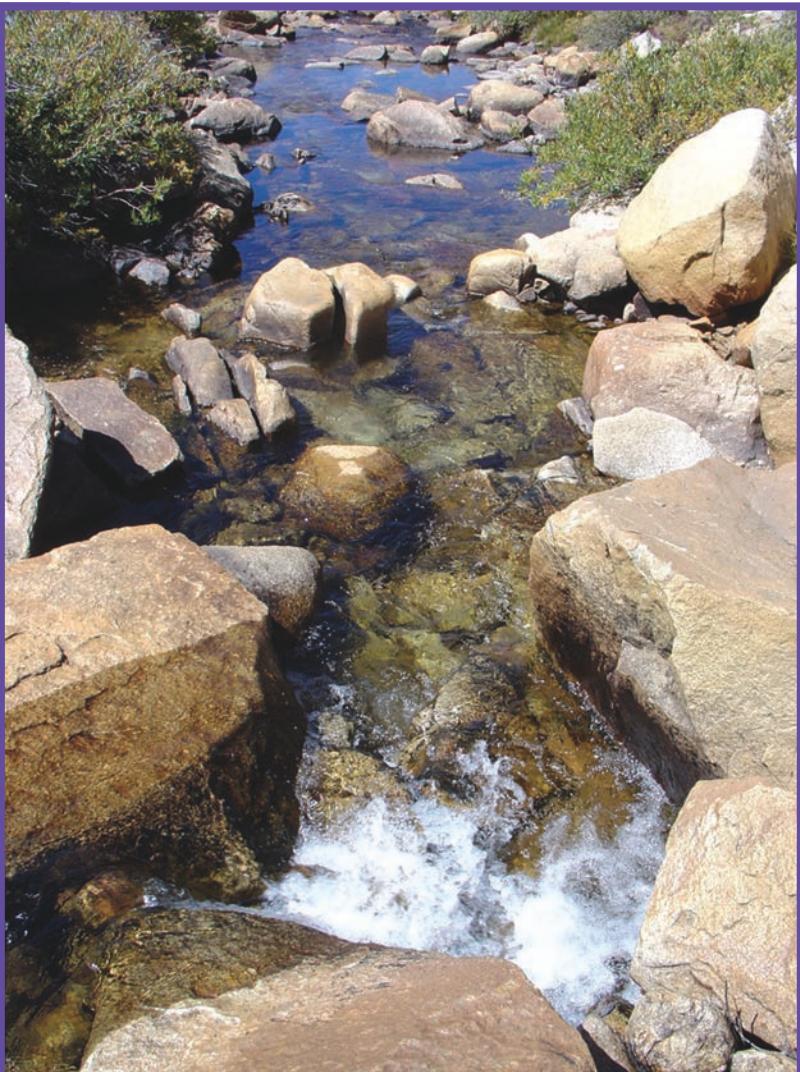
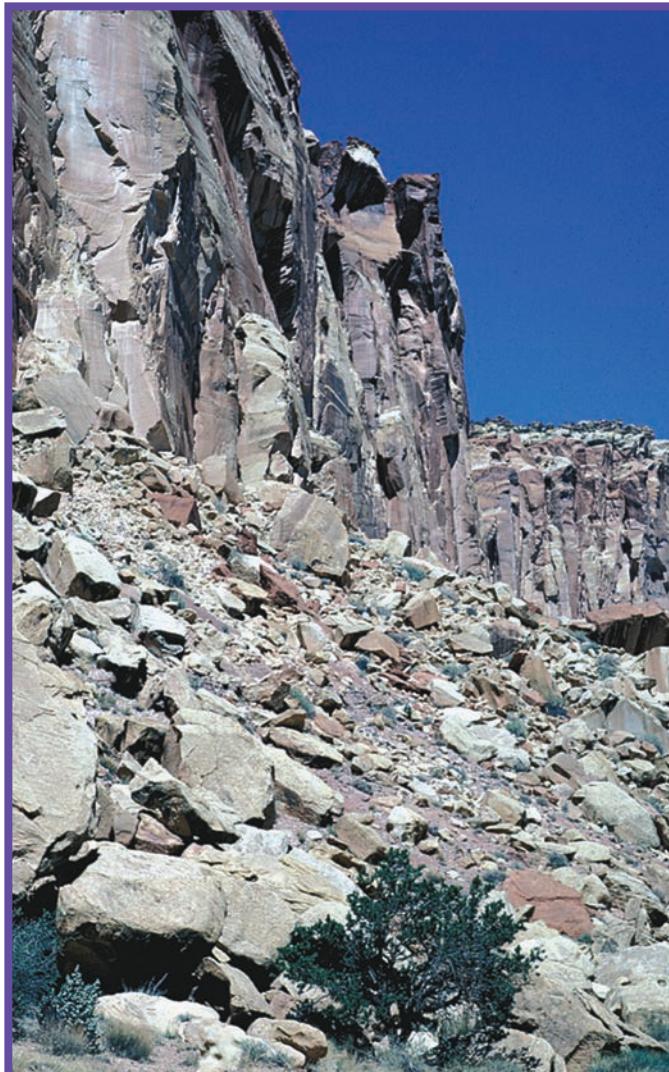
A beach



Erosion

Sometimes big chunks of rock fall off the sides of mountains. Gravity pulls rocks downhill. Other times landslides move rocks and soil downhill.

Rainwater moving over the ground erodes the broken rocks. Water **transports** rocks into creeks. Water flowing in creeks transports broken rocks downstream. The process of erosion continues.



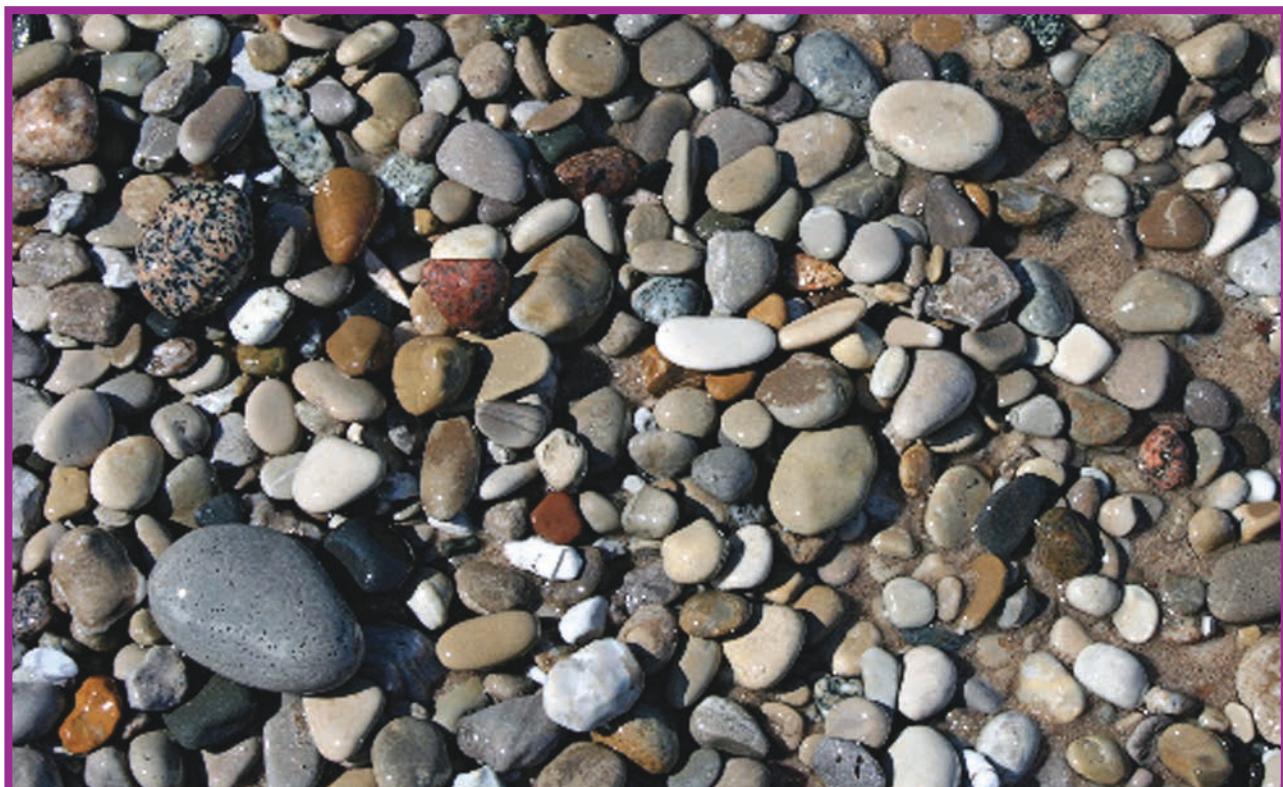
Cliffs high in the mountains

Weathered rock in a mountain creek

Strong river currents move rocks downstream.



Creeks flow into rivers. Rivers have strong currents. Rivers can carry many sizes of rocks. The rocks bang together and rub on the riverbed. This causes more weathering. The rocks break into smaller and smaller pieces. The smaller pieces are pebbles, gravel, sand, and **silt**. Erosion continues. The farther the rocks move in the river, the smaller they get. They also get smoother and rounder as they tumble along.



Smooth, round pebbles along a river

Deposition

When the water flowing in a river slows down, the rocks are deposited as sediments. Large rocks are the first to settle to the bottom. Powerful **flood** waters move rocks of all sizes, even large boulders.

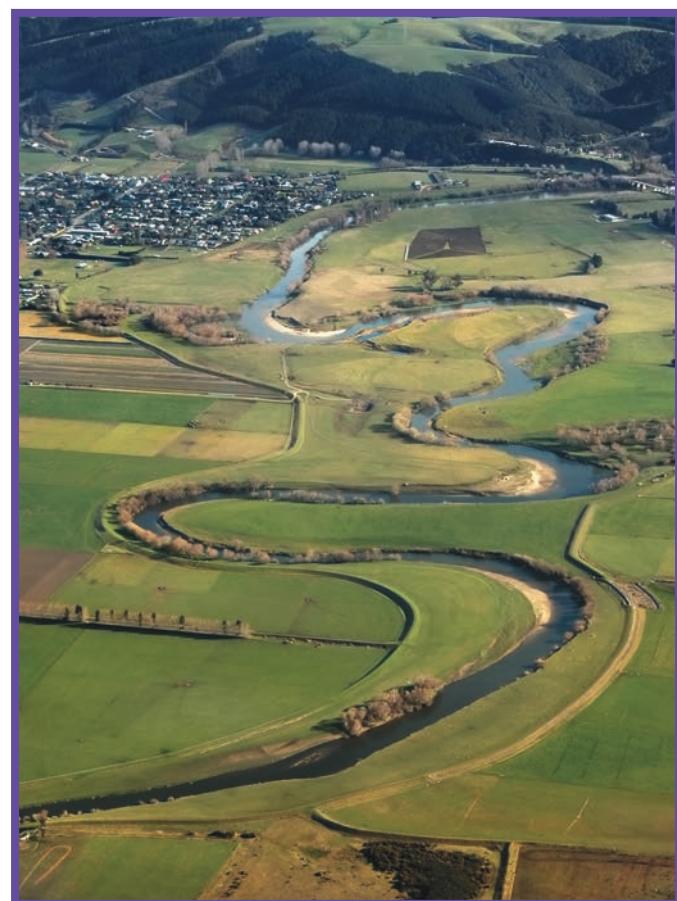
Where a river flows into a lake, a bay, or the ocean, the water slows down. Sand is deposited near the mouth of the river. The sand can form landforms such as sandbars, deltas, and beaches. Farther out are deposits of silt and clay.



Large and small sediments deposited after a flood



Can you see deposits of sand and silt where this river enters the lake?



Can you see meanders in the river?

Other Kinds of Erosion and Deposition

Water is not the only way sediments are eroded and deposited. Wind can cause erosion when it blows sand and silt from one place to another. Sometimes the wind blows hard enough to carry a lot of sand and dust. Wind can erode valuable farmland.

When the wind dies down, sand and dust are deposited far from their starting places. This is how landforms called **sand dunes** form. Monahans Sandhills in Texas and Great Sand Dunes in Colorado are two places where large sand dunes formed.

Great Sand Dunes National Park, Colorado



Strong winds move earth materials from one place to another.



Monahans Sandhills State Park, Texas





A U-shaped
valley eroded
by glaciers

Glaciers can cause weathering, erosion, and deposition as they flow very slowly down a canyon. Rocks can be frozen in glaciers high in mountain canyons. The frozen rocks scrape the floor and sides of the canyon. Glaciers weather and erode V-shaped canyons into U-shaped valleys.

Thousands of years ago in the Western United States, glaciers scraped down mountain valleys. They crushed rock beneath them. At the same time, glaciers covered much of the Midwest. These sheets of ice were over 1.5 kilometers (km) thick. They changed much of the landscape by weathering and eroding the surface and depositing the rock material in new places as they melted.

What happens when sand finally makes it to the ocean? Is that the end of the erosion and deposition story? Not quite. Waves erode beaches and deposit sand in different places all the time. As waves crash on the beach, sand continues to weather. Sand gets finer and finer. Sand abrades the rocks and cliffs along the ocean shore. Weathering, erosion, and deposition go on and on.



Sand deposited on a beach
around weathered rocks

Review Questions

1. Describe and give examples of erosion.
2. Describe and give examples of deposition.

Landforms Photo Album

Landforms Formed by Weathering and Erosion



Arch A curved rock that forms when chemical and/or physical weathering weakens the center, and the rock erodes.



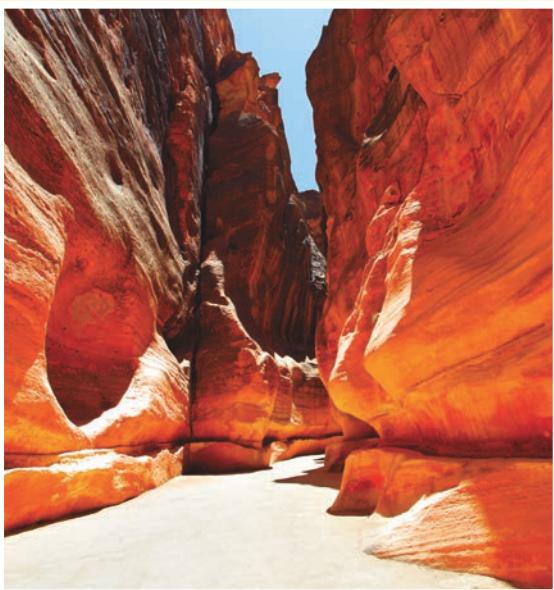
Arches can form on the land or near the coast where waves batter and erode the center of the rock.



Butte A hill with steep sides and a small, flat top. A butte is smaller than a mesa.



Mesa A single, wide, flat-topped hill having at least one steep side.



Gorge A narrow, steep-sided valley or canyon.



Valley A low area between mountains where a stream or glacier flows. Stream valleys are V-shaped. Glacier valleys are often U-shaped.



Hanging valley A valley floor above another valley floor. Glacial erosion causes hanging valleys.



Canyon A V-shaped gorge with steep sides eroded by a stream.



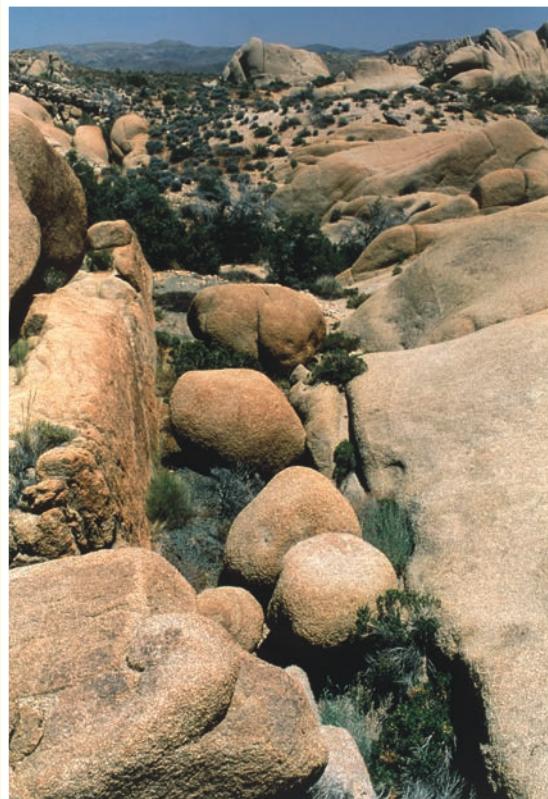
Meander A curve or loop in a river or stream. Meanders form when changes in the speed of a river cause sediment to be eroded in some areas and deposited in others.



Hoodoo A rock shaped like a mushroom or statue. Hoodoos are formed when weak rocks erode away and leave behind stronger rocks.

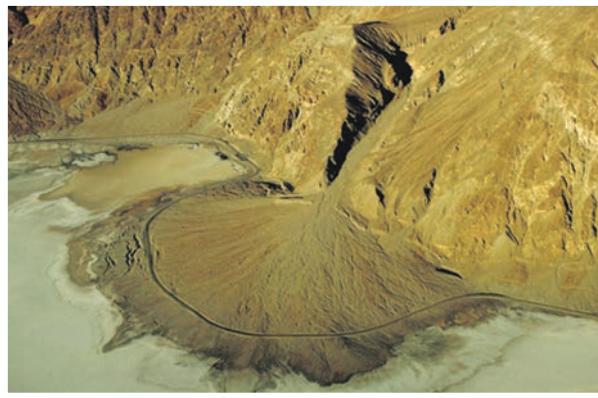


Exfoliation dome A dome formed when rocks like granite peel away at Earth's surface.



Spheroidal rocks Rounded rocks formed by physical and chemical weathering.

Landforms Formed by Deposition



Alluvial fan A fan-shaped deposit of rocks formed where a stream flows from a steep slope onto flatter land.



Beach An area made of sand and other sizes of rocks between the low-tide and high-tide levels at the coast or a lake.



Floodplain Land covered by water during a flood. Small particles, like sand and silt, are deposited on a floodplain.



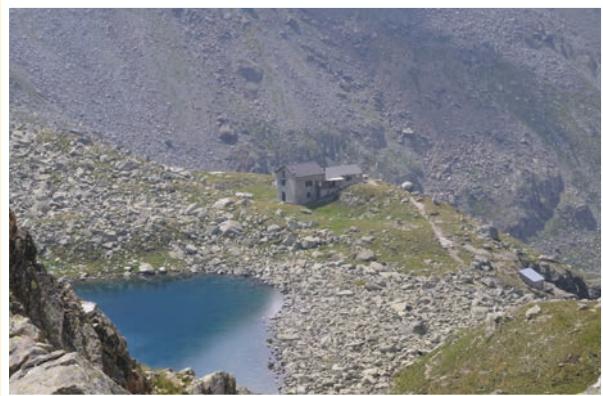
Delta A fan-shaped deposit of earth materials at the mouth of a stream.



Sandbar A long ridge of sand in shallow water, built up by river currents or ocean waves.



Levee A bank along a stream that may stop land from flooding. Levees can be natural or made by people.



Moraine The unsorted rocks and soil carried and deposited by a glacier.



Outwash plain A flat or gently sloping surface made of sorted sediments deposited by water from melting glaciers.



Plain A low area of Earth's surface that is often formed by flat-lying sediments.



Sand dune The sand deposited by wind in ridges, mounds, or hills.



Landslide The rapid downslope movement of earth material.



Slump A downward movement of a single mass of earth material.

Landforms Formed by Eruptions



Volcano A place where lava, cinders, ash, and gases pour out through openings in Earth's surface.



Caldera A hole that forms when the top of a volcano blows off or when the magma below the volcano drains away.



Cinder cone A volcano formed from a pile of cinders and other volcanic material blown out in an explosive eruption.



Composite volcano A volcano built by alternating eruptions of lava, cinders, and ash. Mount Rainier and the other volcanoes in the state of Washington are composite volcanoes.

Shield volcano A volcano built of very fluid lava. It looks wider than it is tall. Shield volcanoes created the Hawaiian Islands.



Landforms Formed by Crust Movements



Fault A break in Earth's crust where blocks of rock fracture and move. The San Andreas Fault has created a wide crack in Earth's surface.



Plateau A high, nearly level, uplifted area composed of horizontal layers of rock. The Colorado River has eroded the Colorado Plateau, forming the Grand Canyon.



Mountain A high, steeply sloped area where rock is uplifted along a fault or created by a volcano.

