Erosion and Deposition

For Grades 3-5

Britannica Note:

Erosion involves the carrying away of bits of rock and soil from their original location. Deposition is the end result of the process. For example, sandy beaches, estuaries, sand bars, spits, deltas, and lagoons are the results of deposition.

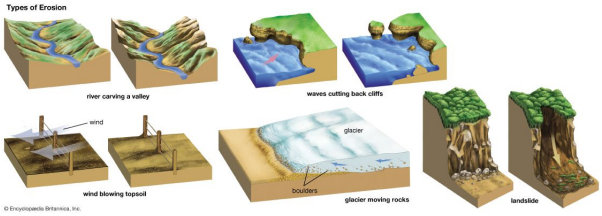
This Pack contains:

4 ARTICLES
2 IMAGES
1 VIDEO

ARTICLE

erosion

Water, wind, and other natural forces cause rocks and earth to wear away. These forces also move bits of rock and earth to new places. This movement changes the shape of the land. These processes are called erosion.



Water, wind, glaciers, and gravity all can change the land through the processes of erosion.

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Erosion, Weathering, and Deposition

Weathering is the wearing away of rock at its location. Erosion involves the carrying away of rock and earth from its orginal location. The two processes transform rock at Earth's surface.

Encyclopædia Britannica, Inc.

Erosion is related to weathering, which is a natural process that slowly breaks apart or changes rock. Once the rock is affected by weathering, the process of erosion causes bits of rock and earth to be carried away from their original location.

Deposition is the end result of the process. A river may carry away bits of rock and earth and then deposit them farther downstream. For example, sandy beaches, estuaries, sand bars, spits, deltas, and lagoons are the results of deposition. Erosion, weathering, and deposition therefore work together to change existing landforms and create new landforms.

Types of Erosion

River water picks up and moves mud, pebbles, and larger rocks as it flows downstream. These particles rub against the riverbed and wear away more rock and soil. This kind of erosion helped to carve the Grand Canyon in the southwestern United States. Over millions of years the swiftly moving waters of the Colorado River carried away bits of earth and rock from the land. Little by little the constant rush of water dug a canyon out of a flat stretch of ground.

The pounding of ocean waves against land also causes erosion. The waves constantly move pebbles and sand on beaches. The particles rub against each other and against the rock along the coast. Over time the water and the particles wear down rock into more sand. The water then carries the new sand away.

Like waves, wind constantly carries sand and other small bits of earth from one place to another. Wind forms sand dunes and changes their shape. It also blows soil off dry farmland. As wind throws sand and soil at rock, the shape of the rock slowly changes.

The huge masses of ice called glaciers also cause erosion. Glaciers scrape away parts of the rocks and the earth below as they creep down mountain valleys. They carry this material along with them. Glaciers can even move boulders as big as houses. When the glaciers melt, the moved rocks and earth stay behind.

A landslide shows how gravity helps erosion. Wind and rain can weaken the sides of mountains and hills. Gravity then causes soil, mud, and rocks to tumble down.

Dangers of Erosion

Erosion can be very harmful to farmland. Crops depend on rich soil for healthy growth. But this top layer of soil is thin. Wind and flowing water can sweep it away.

Farmers use several methods to slow down erosion. They plant trees around farmland to block wind. They also cut terraces, or ledges, into sloping land. Water gathers on the terraces rather than rushing down the slope and carrying away the soil.

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ARTICLE

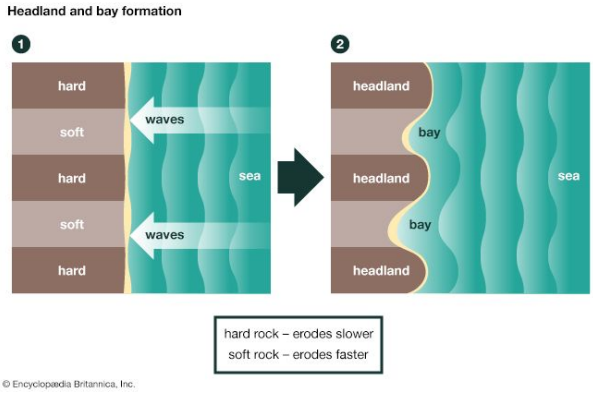
coast

> *Britannica Note:*
>
> See the section called "How Coasts Are Formed" in this article.

The area where the sea and land meet is called a coast. The coasts of the world measure about 193,000 miles (312,000 kilometers) in total. Coastal areas are also known as shores and seasides. They form unique habitats where a range of animals and plants survive in a challenging environment.

There are many different types of coast. They may be sandy, rocky, muddy, or covered in shingle. Some have steep cliffs that are buffeted by waves, while others are broad stretches of land that alternate between being wet and dry as the tides go in and out.

How Coasts Are Formed



Headlands and bays are features of coasts that are formed by erosion. Waves wear down different types of rocks at different rates. Softer rocks wear away more quickly than harder rocks. Bays form where the waves erode soft rocks, but headlands are left as land that juts out into the water.

Encyclopædia Britannica, Inc./Patrick O'Neill Riley

Coasts have changed over millions of years. They are affected by geological events such as volcanic activity, ice ages, and changes in sea levels. Two other factors that affect the shape and type of coast are erosion and deposition.

Erosion

Water, wind, and ice cause erosion by wearing away rocks or soil. At the coastline waves force pockets of air against rocks, which expand and explode, causing damage to the rocks over time. The continual force of waves against rocks and soil also wears them down, breaking them up into smaller and smaller fragments. Water that gets trapped in cracks and crevices can freeze in cold weather. When the weather warms up, the water expands, forcing the cracks to open wider. Plants, animals, and humans can also cause coastal erosion.

Sea arches, like this one in Dorset, England, are formed by wave erosion.

© Photos.com/Getty Images

Erosion at the coast can result in the formation of features such as sea caves, arches, bays, and coves. It can also cause the destruction of land and homes when cliffs fall into the sea.

Deposition

Deposition is the laying down of materials, such as rocks, stones, gravel, sand, and mud. As rivers reach the shoreline they widen and lose much of their energy. When this happens, the load of materials they have been transporting is dropped to the bottom of the river bed or in the sea. Sandy beaches, estuaries, sand bars, spits, deltas, and lagoons are the result of deposition.

Animals and Plants

The living organisms that inhabit coasts form part of a special ecosystem. These animals and plants have to cope with extreme weather conditions of wind and rain, salty water, tides, and waves. For this reason many coastal organisms do not live anywhere else.

Rocky shores are high-energy habitats where waves pummel the coast, making it difficult for animals to live there. However, when the tide goes out, rock pools provide sanctuaries for small crabs and soft-bodied animals such as sea anemones. Shelled animals, such as mussels and barnacles, attach themselves firmly to the rocks and can withstand the biggest waves. Jellyfish and shells can sometimes be found washed up on the shore, particularly after a storm at sea.

Seaweed, such as brown kelp and bladder wrack, are common at coasts. Sea lettuce forms a bright green slimy carpet on smooth rocks. Multicolored lichens cover exposed rocks above the waves.

On sandy beaches lugworms live beneath the water. Their holes and worm casts are the only signs of their presence when the tide goes out. In drier zones—such as sand dunes and clifftops—spiky marram grass, sea lavender, and pink thrift grow.

Sea birds often roost in coastal areas, and the nests of terns and plovers can be found on rocky shores. Herring gulls, black-headed gulls, redshanks, and common terns are among the many types of birds that visit coasts in search of food. Large birds, such as the peregrine falcon, build their nests on cliff faces.

Fossils

The erosion of a coast can have unexpected benefits. When the land is worn away, fossils may be uncovered. Fossils are the remains of plants and animals that lived in the area millions of years ago. Fossils of ammonites and other marine animals can be found on the Northumbrian and Dorset coasts of England, for example. The soft cliffs of East Anglia and the Isle of Wight have been eroded to reveal many ancient remains of animals that lived long ago, including dinosaurs, woolly mammoths, and sharks.

Coasts and People

Over thousands of years, coasts have proved to be good places to live. Human ancestors are known to have set up their homes by the sea. The water is full of life, such as fish and shellfish, so it provided a plentiful source of food. Caves and cliffs offered shelter from the weather and from predators such as wolves.

Coastal Settlements

Many coastal areas began to develop and change about 15,000 years ago as the Ice Age was drawing to an end. The ice melted, sea levels rose, and people were able to move north. They began to inhabit caves, often near the shore. The United Kingdom’s oldest-known dwelling was discovered by archaeologists at a cliff edge at

Howick, in Northumberland. The people who lived there, about 9,600 years ago, collected flints from the coast to make their tools.

Travelers and Invaders

Living by the sea enabled people to trade with travelers from overseas. Coastal communities have since maintained strong links with other countries. They often have diverse cultures and foods, which reflect the wide variety of peoples that have visited their shores.

The Normans built Bamburgh Castle on the coast of Northumberland, England, so they could defend their country against foreign invaders.

Photos.com/Jupiterimages

Unwelcome visitors, such as invaders, may also make their first appearance at coastal areas. For this reason, Britain’s coasts are peppered with castles and other military buildings. For hundreds of years these buildings provided a first line of defense against invasions. Dover Castle in southeast England was built on land that has been occupied as a defensive site since the Iron Age, at least 2,400 years ago. Bamburgh Castle in Northumberland was built by the Normans following their invasion in 1066. Pendennis Castle in Cornwall was built by King Henry VIII to defend England against invasion by the Spanish and the French.

Changing Coastlines

Coasts are continually changing as a result of the movement of the plates that make up Earth’s crusts (*see* plate tectonics). In the long term, sea levels rise and fall because of this movement. Scientists have also predicted that changes in climate caused by global warming will cause sea levels to rise. An increase in marine pollution is also affecting coasts and their delicate ecosystems.

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ARTICLE

delta

Britannica Note:

Deltas are the result of deposition.

In ancient times Greek merchants who sailed to Egypt noticed that the Nile River branched into two streams before flowing into the sea. The sea and the river's branches enclosed a piece of land shaped like a triangle. The Greeks called that land a delta because it resembled the fourth letter of the Greek alphabet (Δ). Now the term delta is used for any plain made up of material deposited by a river at its mouth.

A number of small branches of a river can be seen in this delta in the Lapland area of the Arctic.

© sanderstock/Fotolia

Rivers often carry a lot of soil, sand, and other material. When the flow of a river slows at its mouth, some of that material settles. Over the years the material builds up to form a delta. The surface of a delta is almost level, and the river usually flows across it in a number of small branches.

Deltas have been important to people since prehistoric times. The soil of a delta is usually ideal for farming. Major civilizations developed in the deltas of the Nile, Tigris-Euphrates, Indus, and Huang He rivers. More recently, scientists have discovered that the rocks of some deltas hold large amounts of oil.

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ARTICLE

weathering

Britannica Note:

Weathering and erosion are related. Weathering involves the breaking apart or changing of rock. Erosion involves the carrying away of bits of rock and soil from their original location.

Weathering is a natural process that slowly breaks apart or changes rock. Heat, water, wind, living things, and other natural forces cause weathering.

Weathering created an arch of rock on the coast of England.

© David Mzareulyan/Fotolia

Limestone slabs cover the land in an area of Ireland called the Burren. The slabs are separated by channels formed by water over very long periods of time.

Serinde

Over many years, weathering can shape rock into unusual formations. Weathering is responsible for many rock arches and hoodoos (lumpy columns), such as those found in Utah's Arches and Bryce Canyon national parks. Weathering also has shaped the slabs of limestone in the Burren in Ireland.

Weathering and Erosion

Weathering is the wearing away of rock at its location. Erosion involves the carrying away of rock and earth from its orginal location. The two processes transform rock at Earth's surface.

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Weathering is related to erosion, which is the wearing away of rock and earth by natural forces. However, erosion generally means that bits of rock and earth are carried away from their original location. By contrast, weathering leaves the main area of rock in place.

Types of Weathering

Water that freezes inside cracks in a rock may widen the cracks.

Jennifer Booher/Alamy

The forces that cause weathering may be physical, chemical, or biological. Often, weathering results from a combination of forces.

Physical forces include changes in temperature or pressure, freezing or moving water, and wind. An increase in temperature may cause rock to expand. As the rock cools, it contracts, or shrinks. The expanding and contracting may cause the rock to crack and break apart. If heavy material on top of a rock is removed (by a glacier, for example), the pressure on the rock decreases. The release of pressure may cause the rock to split. Water that freezes inside cracks in a rock may widen the cracks. Particles carried by water or wind may slowly scrape away a rock’s surface.

In chemical weathering, the minerals that make up the rock are changed. Water usually is involved in chemical weathering. Elements in the water may react with the minerals in the rock. The minerals may break down or form different minerals.

The roots of plants may reach inside rock openings. Over time, they may push apart sections of rock.

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Biological weathering results from the actions of living things. The roots of plants may reach inside rock openings. Over time, they may push apart sections of rock. Lichens grow on rock surfaces or within cracks. They may wear down rock or etch patterns on its surface.

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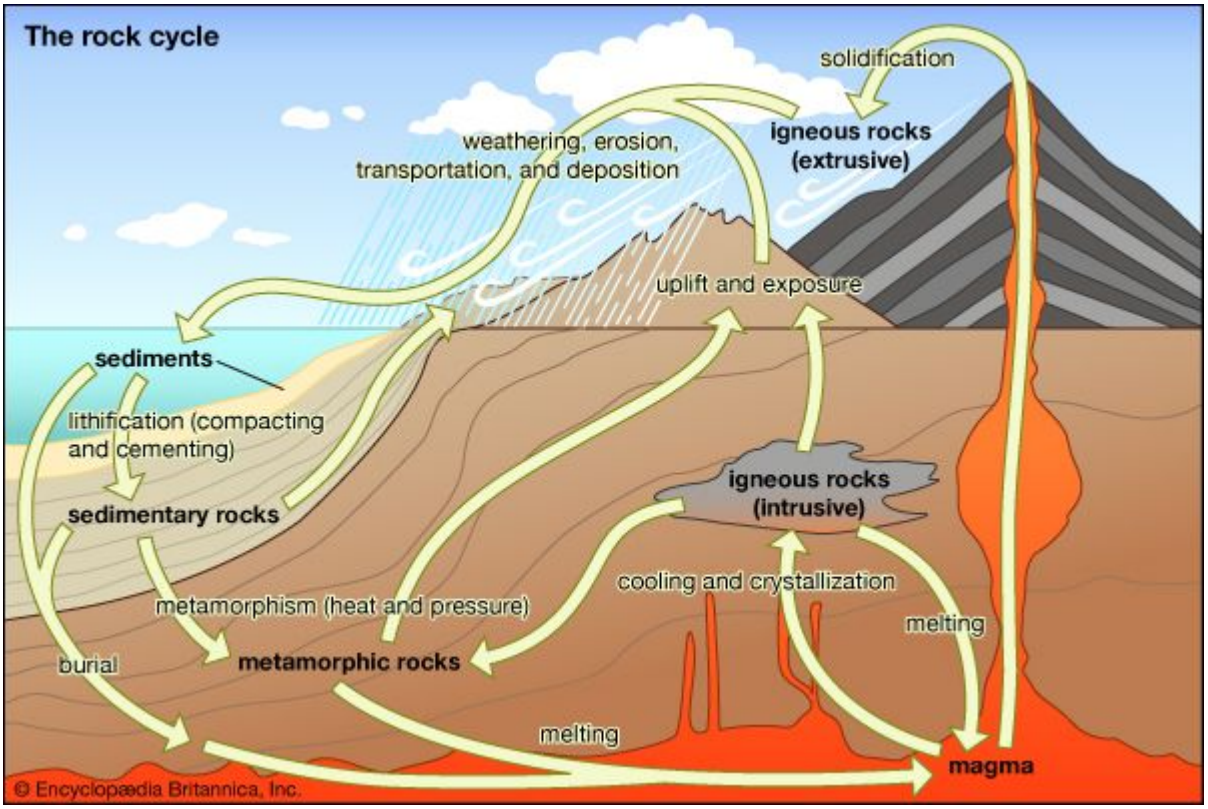
IMAGE

rock cycle

Britannica Note:

Erosion and deposition are part of the rock cycle.



A diagram shows the different ways that rock can change from one type to another in the rock cycle. It can take many millions of years for these changes to happen.

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Citation (MLA style):

Rock cycle. Image. *Britannica LaunchPacks: Erosion and Deposition*, Encyclopædia Britannica, 23 Mar. 2025. packs.eb.com. Accessed 4 May. 2025.

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IMAGE

crop rows

Britannica Note:

Careful planting methods help protect topsoil from erosion.

Soil is one of Earth's most valuable natural resources, providing the minerals and water needed for plant growth. However, only a thin layer of soil, called topsoil, can support plant life. Careful planting methods help protect topsoil from erosion.

© Photos.com/Jupiterimages

Citation (MLA style):

Crop rows. Image. *Britannica LaunchPacks: Erosion and Deposition*, Encyclopædia Britannica, 23 Mar. 2025. packs.eb.com. Accessed 4 May. 2025.

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VIDEO

weathering and erosion

Video Transcript

Weathering and erosion are natural processes that change rock at or near Earth's surface. Weathering slowly breaks apart or changes rock at its location. It gradually wears away a rock formation, such as a cliff or a boulder. Erosion, on the other hand, involves the transportation of broken rock away from its original location. The movement of the broken rock can gradually change the shape of the land over which it travels. When the

broken rock is finally deposited in a new location, a new landform, such as a sand dune, may form. Together, weathering and erosion contribute to the breaking down and rebuilding of landforms on Earth's surface over long periods of time.

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Weathering and erosion. Video. *Britannica LaunchPacks: Erosion and Deposition*, Encyclopædia Britannica, 23 Mar. 2025. packs.eb.com. Accessed 4 May. 2025.

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