



TEACHER GUIDE

WEATHERING & EROSION GRADES 3-5

COMMON MISCONCEPTIONS

- **Earth is the same today as it always has been and any changes to the Earth were sudden.**
There are many processes that cause Earth and Earth's surface to change. Some of these changes are abrupt, such as a natural disaster. Most changes occur over a very long period of time. This is the case with weathering and erosion. Also, these changes are not solely due to things within the environment such as weather-related events. Human activities like digging soil or driving cars on the road can all change Earth's surface over time.
- **Rock is so hard that nothing can break it.**
There are different types of rocks, and some of them break much more easily than others. For example, limestone and calcite are classified as soft rock, which means it can easily be broken down over time due to weathering. Even hard rocks can be broken by natural forces acting over thousands or millions of years.
- **Weathering is the same thing as erosion.**
Weathering is a process of breaking down of rock into smaller pieces. Erosion is the process of moving these pieces (called sediment) by wind, water, ice, and gravity.

SHAPING EARTH'S SURFACE

Weathering, erosion, and deposition are three processes that occur in a sequential order and work together to change landforms on Earth's surfaces. Landforms are constantly changing. This is because the surface is constantly being worn down, reshaped, and even built up by new sediments. In order to change Earth's surface or the shape of land, all three processes must work together (usually over thousands or millions of years).

WEATHERING

This involves the breaking down of large rocks and minerals into smaller and smaller pieces. Eventually these pieces are so small that they are called sediment. There are many different agents of weathering - these are simply ways that weathering can occur. Examples include water, ice, wind, gravity, acids, plants, animals, and even human activities. There are different types of weathering:

- Mechanical or physical weathering – this causes rocks to crumble. For example, water can sometimes seep into the cracks of a rock. If the water freezes due a drop in temperature the water will expand. When this happens it is now ice and the ice works as a wedge in the crack of the rocks. It will slowly widen the crack causing the rock to split.
- Chemical weathering – this happens when something changes the composition or makeup of rocks. For example, a weak acid called carbonic acid is formed when carbon dioxide from the air combines with water. This acid can slowly dissolve rock, which is a type of chemical weathering.

EROSION

This is a process that takes the weathered material formed during weathering and moves those sediments from one place to another. Erosion wears Earth's surface away. It does so mostly by the following agents: water, wind, ice, and gravity. All of those agents can carry sediment from where they were originally weathered to a new location.

DEPOSITION

This process occurs when the agents of erosion lay down sediment in a new location. Just like weathering and erosion, deposition will also change the shape of the land. Often deposition is referred to as the process of building up Earth's surface. This is because as sediment is carried, usually by wind or water, it is dropped in a new place. This deposition allows sediment to be added to existing land in an area. This deposition can cause the building up of hills or the formation of an island. This is the case with barrier islands - they are formed when waves (i.e. water) sweep sand into a new location and build it up over time to create an island.

BIG CHANGE

These processes can become so extreme over millions of years that they can lead to massive geologic changes. Flowing rivers can gradually erode their way through landscapes until they form massive valleys and canyons. The Grand Canyon was formed this way. Deposition from volcanic eruptions can, over time, build up massive mountains, and even form island chains like Hawaii. Plains are often found at the foot of mountains and are formed from erosion and deposition caused by rainfall and snow melt high in the mountains. Massive plateaus are the result of glacial erosion over long periods of time. From mountains and valleys to plains and plateaus, all of these landforms can be shaped by weathering, erosion, and deposition.

