

Getting to Know: Sedimentary Rocks

If you've ever seen pictures of the Grand Canyon, you probably marveled at the deep canyons and layered rock formations. If you study the canyons, you can see distinct layers of rock. The Colorado River has slowly eroded the rocks of the area. It eventually created the canyons that provide us with a cross-section view of the rocks. The Grand Canyon is made of sedimentary rocks.

What are sedimentary rocks? Are there different types of sedimentary rocks?

Sedimentary rocks are rocks that form from the particles of other rocks when they are deposited, compacted, and cemented over time. Processes like weathering and erosion break down rocks into *sediment*. This sediment can then be deposited by glacial ice, wind, or water. Sediment is usually deposited in horizontal layers. Gradually, as more layers of sediment accumulate, they become compacted. Compaction causes dissolved minerals in the sediment to recrystallize. These minerals help cement the sediments together, forming sedimentary rocks. There are three main types of sedimentary rocks.



The rock formations at the Grand Canyon in Arizona are made of sedimentary rocks.



Misconception 1: *Because sedimentary rocks are usually deposited in horizontal layers, that must mean that the youngest layers are at the top and the oldest layers are on the bottom, right?*

It is true that sedimentary rocks are usually deposited in horizontal layers, and it is common for the youngest layers to be on the top. However, it's not always the case that the youngest layers are on top. That's because tectonic forces can sometimes cause sedimentary rocks to overturn or flip, making the oldest layers on top.

Tell me more about the three different types of sedimentary rocks.

The three main types of sedimentary rock are clastic, chemical, and organic. All three types form layers. The composition of the layers differs from type to type. *Clastic sedimentary* rocks are the rocks that form when sediments are deposited, compacted, and cemented together. The word *clast* means a piece of hard rock or the hard part of an organism (like a bone or a shell). Clastic sedimentary rocks include sandstone. It can be found at places in the Grand Canyon.

Chemical sedimentary rocks are the rocks that form when minerals that were once dissolved in water precipitate out of the solution. The minerals are then deposited as crystals. Chemical sedimentary rocks include chemical limestone. This rock forms at the bottom of the oceans. Gypsum is another example that forms as water evaporates out of shallow lakes.

Organic sedimentary rocks are those made from the fossilized remains of plants or animals. Organic sedimentary rocks are found in areas that once had an abundance of life. These rocks can be found in areas that once had ancient swamps.

What are some ways that sedimentary rocks can tell us about the past?



Fossils in sedimentary rocks can tell us about ancient life forms.

Sedimentary rocks are unique because they can help tell a story about the past. Sometimes the layers of sedimentary rocks contain fossils of extinct organisms, so they can tell us about the history of life on Earth. Sedimentary rocks can also contain traces of pollen. This can help us learn about the climate and environment of ancient Earth. Even if a plant's tissues are not fossilized, its pollen can be preserved in the fossil record. Fossil pollen helps scientists reconstruct the plant communities that lived in an area. These data are a valuable guide to ancient climates and environments.

Some sedimentary rocks have features that can help us understand how they formed. They can contain distinct layers, ripple marks, or mud cracks. They can also show *cross beds*. These are layers that form at right angles to the horizontal layers. Cross beds occur when unstable layers of loose sediment move. The top layers slide off the top of the pile of sediment. When the sediment becomes a rock, there are lines in the rocks that cross each other. It can be a challenge to learn what Earth was like millions of years ago. Sedimentary rocks can sometimes help provide answers to questions about the past.



Misconception 2: *Is it true that sedimentary rocks only contain fossils of plants or animals that once lived where the rock is presently found?*

You might think that remains of tropical organisms are only found in rocks near the equator or that remains of arctic organisms are only found near Earth's poles. However, that's not true! Sedimentary rocks can move from their original location as a result of tectonic forces. That means that today, you could find a sedimentary rock near the equator with fossilized remains of plants or animals that once lived near the South Pole!