

# Sandstone

## Chapter 6

**S**andstone is created in a two-step process. The first step is the accumulation of sand-size sediments brought in by rivers or wind. Layers of sand accumulate in lakebeds, ocean basins, and deserts. The accumulation of layers of sand occurs when sand settles out of water as it slows down. The wind picks up sand and moves it along the surface of the Earth. The sand is rolled or bounced by the wind when the surface of the land is in a dry area.



Double O Arch in Arches National Park

Most sand is quartz because it is hard, durable, and almost insoluble. Some sandstones also contain feldspar minerals or significant amounts of silt and clay. Quartz sandstone is a rock that contains at least 95% quartz. Less than 5% of the matrix is clay or silt that collects between the individual grains of sand.

### **Formation of sandstone**

Sandstones form by compaction and cementation. Compaction caused by the weight of overlying sediments presses down on the grains of sand, packing the grains closer and closer together. Ground water containing minerals flows through the sand grains.

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The minerals crystallize between the sand grains cementing them together.

The grain size in sandstone is typically between 0.0625 mm to 2 mm in size. Sediments smaller than this are clays that fill in the spaces around the sand grains.

### **How sandstone becomes a solid rock**

The layers of sand accumulate and deepen over long periods of time. Quartz (silica) and calcite (calcium carbonate) are two minerals that crystallize between grains of sand. The quartz and calcite binding the grains of sand together form sandstones.

Softer sandstones that react to acids are cemented together with calcite. Sandstones cemented together with quartz create hard and durable rocks.

### **Minerals color sandstones**

Most sand grains in sandstone are light-colored quartz. Sandstones come in a variety of colors due to other minerals that formed in the sandstone. The other minerals (impurities) color the quartz sand grains.

The most common colored sandstones are various shades of red when iron oxide (rust) stains the sand particles. Hematite (HEM-ah-tite) is an iron oxide, that commonly produces reddish colored sandstone. Light purple sandstones are colored by manganese. The most common colors of sandstones are tan, brown, yellow, red grey, pink, white, and black.



Layers of sandstone showing cross-bedding, at Angel's Landing Trail in Zion National Park in Utah  
Roy Luck

# Creating Sandstone

## Activity 6

### Introduction

Quartz sandstone is a sandstone consisting of more than 95% light colored quartz clasts. Greywacke is a dark colored sandstone with dark-colored minerals and clay. In this activity you will create a sandstone rock with alternating layers of quartz sandstone and greywacke.



Layered sandstone

### Materials

- Light and dark colored sand
- Small box, tinfoil
- Glue
- Paper cup

### Directions

1. Cut a piece of tinfoil large enough to go on the inside of the small box that you will use for a mold.
2. Line the inside of the box so you can add your layers of sand.
3. Mix together 2-parts glue to 1-part water in a paper cup until thoroughly blended.
4. Grease the inside of the container tinfoil in the container so you can remove the tinfoil after the sandstone is dry.

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