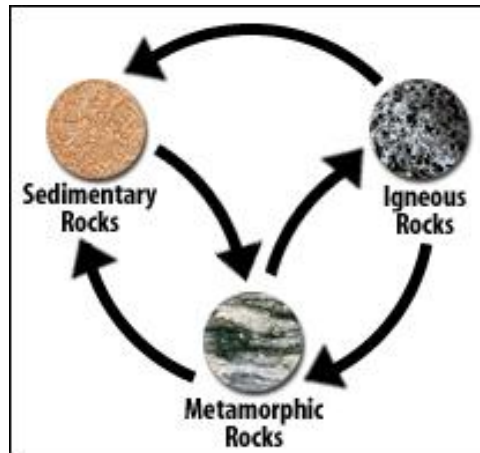


The Rock Cycle

The rock cycle is a natural process that occurs in and on Earth. It describes how Earth is always recycling rocks and how rocks continue to change from one type to another.

Magma is melted rock that is under the ground. It forms *igneous rocks* when it cools and hardens into a solid form. When magma erupts from volcanoes it is called lava. This is another type of igneous rock.



Sometimes rock from deep inside Earth gets pushed upwards to the surface. There, rain, wind, and ice break rocks into smaller pieces like sand and dust. These pieces are called sediments. They are moved by bodies of water such as rivers and build up in low-lying areas on Earth's surface such as lakes and oceans. Over time, sediments build up layers and layers, and the weight of all the layers puts pressure on the bottom ones. This pressure squeezes the particles of sediment together, forming *sedimentary rock*.

Other times both sedimentary and igneous rocks get buried deep in Earth. High heat and pressure change the rocks into a new type of rock called *metamorphic rock*. If the heat gets too intense the new rock will melt and become magma again. The Museum has examples of all of these rocks. Let's take a closer look at these three types.

Sedimentary Rock: Sandstone

One piece of sandstone in the Museum is a beautiful, red rock. Geologists collected it in New York's Catskill Mountains.



This sandstone, a sedimentary rock that was formed from the sediment sand, is from a layer of rock called the Old Red Sandstone formation. It has been around for 400 million years! Back when it formed there weren't any people, there were not even any dinosaurs! And all the continents, including North America, were just one single landmass called Pangaea.

Mountains formed on Pangaea. Some of the mountains formed what is now called the Appalachian Mountains. Other mountains became the Caledonian Mountains in Europe.

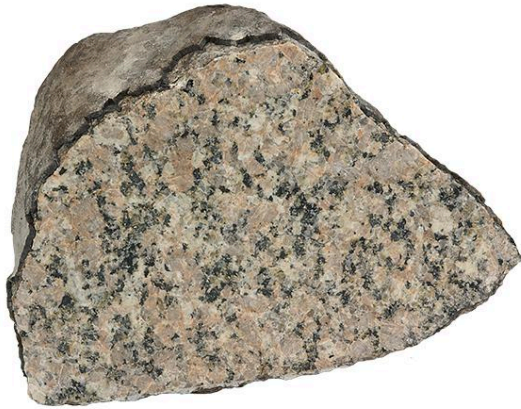
Sand and silt washed into the space between these two mountain ranges. Over time, these sediments formed layers. The layers grew thicker and pressure increased, causing the sand grains to cement together, forming a sedimentary rock. They became the Old Red Sandstone formation. The Old Red Sandstone is red because its cement contains a small amount of iron that turns a rusty color when it is exposed to water and air.

Two hundred million years ago, as Earth's surface continued to change, Pangaea broke apart into the smaller continents we see today. The Old Red Sandstone layer broke into two sections that were moved apart along with the continents and separated by the Atlantic Ocean. One section ended up in Europe. The other section ended up in North America.

Geologists collected the pieces from each section and reunited them at the American Museum of Natural History. Now, they are on display in the Gottesman Hall of Planet Earth.

Igneous Rock: Granite

Granite is a type of strong, sturdy rock often used in buildings. The one in the Museum also has a special story and gives us clues about Earth's history.



Two billion years ago, this granite started as molten rock called magma. Over thousands of years and deep within Earth, the magma cooled into a solid. In fact it cooled so slowly that large crystals had time to grow in it. Over millions of years the slow movement of Earth's crust brought the granite near the surface. Wind and water wore away the rocks above it. About 20,000 years ago, during the last ice age, a giant glacier, moving across the land, picked up a boulder of the granite along with a lot of other pieces of rock, and carried it out over the middle of the Atlantic Ocean. The glacier then melted and all of the rocks it contained, including the granite boulder fell out, and sunk to the deep-sea floor.

The sea floor is covered in layers of sediment. This igneous boulder slowly became covered by a thin layer of black sediment. Even so, it looks nothing like the rock around it because it formed from magma deep within Earth.

Geologists on a ship in the Atlantic Ocean were collecting rock samples from the ocean floor. They were surprised to find a piece of granite that far from land! They collected it and brought it back to the Museum to show us its long and fascinating story.

Metamorphic Rock: Deformed Conglomerate

This rock has been through it all. Like many rocks, this metamorphic rock has changed from one form to another over millions of years. This rock is called a deformed conglomerate.



A conglomerate is a sedimentary rock made up of large round pebbles that were cemented together with smaller sediments. But this “deformed conglomerate” is no normal conglomerate. To find out more about this rock’s history, geologists examine it closely to investigate how the rocks that make up the pebbles formed, and what happened to them after they came together to become a conglomerate.

Like the granite, the pebbles within the deformed conglomerate began as igneous rocks formed from magma deep within our planet. Over time, these rocks traveled to Earth’s surface and broke up into small pieces. Some pieces, about the size of an egg, ended up in a stream with other sediments like sand and silt. They were rounded by the moving water and became smooth. These pebbles built up into thick layers, along with smaller sediments. They cemented together to form a new kind of rock, a conglomerate.

But the story doesn’t end there. After many more years the conglomerate rock became buried deep within Earth again. (This happened when part of Earth’s crust collided with another part, which caused mountains to form.) Exposed to high temperatures and pressure deep underground, the rock was squeezed and stretched in different directions, causing the wavy patterns. Even the harder igneous pebbles were crushed and stretched out. This is how the conglomerate rock became “deformed” — a metamorphic rock called deformed conglomerate.

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