

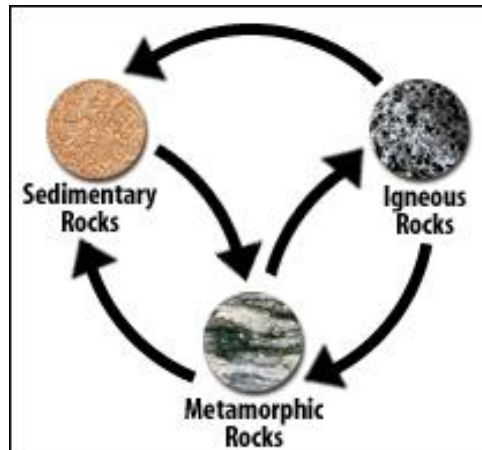
# The Rock Cycle

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.

Melted rock has a different name depending on where it's found. When it's

underground, it's called

magma, and when it erupts from volcanoes, it's called lava. As magma and lava cool, they harden into **igneous rock** of various types.



Although you probably think of solid rock as stiff and unmovable, it actually moves and churns, especially deep inside Earth. Sometimes underground rock gets pushed upwards to the surface. There, rain, wind, and ice break rocks into smaller pieces like sand, dust, and other types of sediment. They are moved by bodies of water, such as rivers, and settle in low-lying areas on Earth's surface, such as lakes and oceans. Over time, sediments build up in many layers. The weight of all the layers puts pressure on those at the bottom, squeezing the particles of sediment together to form **sedimentary rock**.

Sometimes both sedimentary and igneous rocks get buried deep in Earth, where high heat and pressure change them 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

Museum geologists collected this beautiful example of red sandstone in New York's Catskill Mountains. (It may not be the brightest red, but it's redder than most rocks.)



A sedimentary rock that was formed from the sediment sand, it's from a layer of rock called the Old Red Sandstone formation. It has been around for 400 million years, before there were people—or even dinosaurs! Back then, all the continents, including North America, were just one single landmass called Pangaea.

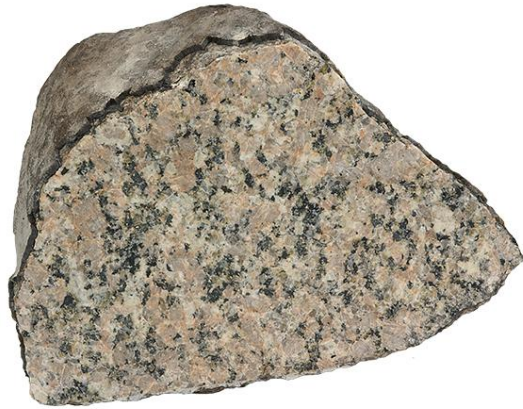
As rock within Earth churned and moved, mountains formed on Pangaea, including what are now called the Appalachian Mountains in eastern North America and the Caledonian Mountains in Europe. Sand and silt washed into the space between these two mountain ranges, forming layers over time. As the layers grew thicker and pressure increased, the sand grains became cemented together into a sedimentary rock, the Old Red Sandstone formation. The Old Red Sandstone is reddish because its cement contains a small amount of iron, which 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 in North America.

Geologists collected 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 example 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**. Deep within Earth, it cooled into a solid over thousands of years—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, where wind and water wore away the rocks above it. About 20,000 years ago, during the last ice age, a giant glacier moved across the land. It picked up a boulder of the granite along with a lot of other pieces of rock and carried them 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 floor of the deep sea. There, 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 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, a deformed conglomerate, has changed from one form to another over millions of years.



A conglomerate is a sedimentary rock made up of large round pebbles that were cemented together with smaller sediments.

But this specimen is no ordinary conglomerate. To find out more about its history, geologists examine it closely to discover how the rocks that make up the pebbles formed and what happened to them after they came together.

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. There the moving water tumbled them all together, scraping, sanding down, and smoothing out the sharp edges. These rounded pebbles built up into thick layers, with smaller sediments filling in the spaces between them. 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, or deformed. This is how this rock became a metamorphic rock called deformed conglomerate.

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