# The Rock Cycle



The Earth is an active [planet](http://www.sciencelearn.org.nz/About-this-site/Glossary/planet). Earthquakes shake and volcanoes erupt. Sections of the [crust](http://www.sciencelearn.org.nz/About-this-site/Glossary/crust) are on the move. Mountains push up and wear down. These and many other processes contribute to the rock cycle, which makes and changes rocks on or below the Earth’s surface. The Earth is 4.6 billion years old, but you won’t find rocks that old because they have been recycled into younger rocks.

Rocks are made of minerals, which are made of specific chemical [elements](http://www.sciencelearn.org.nz/About-this-site/Glossary/element). For example, the [mineral](http://www.sciencelearn.org.nz/About-this-site/Glossary/mineral) [quartz](http://www.sciencelearn.org.nz/About-this-site/Glossary/quartz) is made of the elements [silicon](http://www.sciencelearn.org.nz/About-this-site/Glossary/silicon) and [oxygen](http://www.sciencelearn.org.nz/About-this-site/Glossary/oxygen). The rock called [granite](http://www.sciencelearn.org.nz/About-this-site/Glossary/granite) consists mostly of the minerals quartz, [feldspar](http://www.sciencelearn.org.nz/About-this-site/Glossary/feldspar) and mica.

There are three main types of rock – [igneous](http://www.sciencelearn.org.nz/About-this-site/Glossary/igneous), [sedimentary](http://www.sciencelearn.org.nz/About-this-site/Glossary/sedimentary) and [metamorphic](http://www.sciencelearn.org.nz/About-this-site/Glossary/metamorphic).

**Igneous rocks**

[Magma](http://www.sciencelearn.org.nz/About-this-site/Glossary/magma) is a hot mix of melted minerals, and igneous rocks are formed when it cools. Cooling can happen quickly above ground to form volcanic rocks such as [basalt](http://www.sciencelearn.org.nz/About-this-site/Glossary/basalt), [rhyolite](http://www.sciencelearn.org.nz/About-this-site/Glossary/rhyolite) and [andesite](http://www.sciencelearn.org.nz/About-this-site/Glossary/andesite). Cooling can also happen slowly below the surface to form what are called plutonic rocks, such as granite.

**Sedimentary rocks**

On the surface of the Earth, the processes of [weathering](http://www.sciencelearn.org.nz/About-this-site/Glossary/weathering) and [erosion](http://www.sciencelearn.org.nz/About-this-site/Glossary/erosion) can break down any rock into small pieces called [sediments](http://www.sciencelearn.org.nz/About-this-site/Glossary/sediments). These sediments are carried away by water or wind and dumped somewhere else. The pebbles, sand and mud you find at the beach are sediments from broken down rock, transported there from somewhere else. Over a very long time, layers of sediment build up at the bottom of seas and lakes, squeezing water out of the layers beneath. [Chemicals](http://www.sciencelearn.org.nz/About-this-site/Glossary/chemicals) then cement the sediments into sedimentary rocks such as [sandstone](http://www.sciencelearn.org.nz/About-this-site/Glossary/sandstone) and [mudstone](http://www.sciencelearn.org.nz/About-this-site/Glossary/mudstone). The remains of dead animals and plants often get trapped in sediments and can get turned into fossils by the same processes that turn sediments into rock.

Not all sedimentary rocks are made from broken pieces of other rocks. For example, [limestone](http://www.sciencelearn.org.nz/About-this-site/Glossary/limestone) can be formed from the build-up of dead marine organisms on the sea floor or by chemical processes causing minerals to precipitate out of water.

**Metamorphic rocks**

The Earth’s crust is constantly, but slowly, on the move. Enormous forces push up, tilt, fold and break rocks. These processes can heat and squeeze any type of rock enough to change their structures. Such changes are called metamorphoses, and the resulting rocks are called metamorphic rocks. [Marble](http://www.sciencelearn.org.nz/About-this-site/Glossary/marble) is an example of a metamorphic rock – it is squashed and heated limestone. You may have come across the word [metamorphosis](http://www.sciencelearn.org.nz/About-this-site/Glossary/metamorphosis2) before, because it is used to describe other types of change, such as a caterpillar changing into a [pupa](http://www.sciencelearn.org.nz/About-this-site/Glossary/pupa) and then a butterfly.

**Activity 1: Graphic organizer**

*Use the following words to draw a graphic organizer of the rock cycle.*

|  |  |  |
| --- | --- | --- |
| Sedimentary Rock | Igneous Rock | Metamorphic Rock |
| Melting | Heat and Pressure | Weathering and erosion |
| Melting | Weathering and erosion | Cooling |
| Heat and Pressure | Weathering and erosion | Compacting and cementing |

**Activity 2**

|  |  |
| --- | --- |
| kindsofrockstitle*Research the answers to this word search* |  |
|  |  | **Across**  **2** Rocks that form as a result of cooling magma (7) **5** A metamorphic rock formed from limestone. (6) **6** A metamorphic rock formed from shale. (5) **8** A rock with hardness '1' on the Moh's scale. (4) **11** Rock formed when magma cools at the Earth's surface. (6) **12** A scale used to measure the hardness of rocks. (4) **14** A smooth, glassy, black igneous rock. (8) **16** A sedimentary rock composed of large chunks of other rocks cemented together. (12) **17** A metamorphic rock formed from sandstone. (9)  |
| **Down**  **1** Rocks that are formed as a result of deposits from weathering and erosion. (11) **3** Hot liquid rock that is exposed at the surface. (4) **4** A type of intrusive igneous rock with large crystals. (7) **5** Rocks made when other rocks are subjected to intense pressure and heat. (11) **7** A sedimentary rock that is sometimes formed by deposits of shell fragments. (9) **9** A sedimentary rock that is formed from sand deposits. (9) **10** A rock with hardness '10' on the Moh's scale. (7) **13** Hot liquid rock. (5) **15** A sedimentary rock formed from clay deposits. (5)  |  |