



Sedgwick Museum
of Earth Sciences

Investigating rocks in the classroom

Some ideas for hands-on activities for KS1-3

Children are captivated by vicious volcanoes. Be creative and try using rocks and how they are formed in your teaching across the curriculum as a way to embed scientific enquiry into other tasks.

Here are a few suggestions of simple ways of working with rocks in the classroom, as well as some useful background information to support your subject knowledge.

What is rock?

Rock is a solid naturally occurring substance made of minerals.

The minerals may be large enough to see with the naked eye or microscopic. Basalt is composed of mineral grains, but these are too small to see and the rock often looks dull and grey as a result.

Some rocks are made from several different types of mineral. Granite is made from feldspar, quartz and often mica or hornblende. The crystals in granite are usually visible to the naked eye and it is possible to see their colours and whether or not they sparkle. Sometimes rocks are formed from just one mineral. Limestone is made entirely from grains of the mineral calcite.

Scientists who study and investigate rocks are called Petrologists. This comes from "Petros", the Greek word for rock.

Useful rocky vocab:

Rock is a scientific term for the material that the Earth is made from, as defined above. It can also refer to a sample of that material- a rock.

Stone is used to describe types of rocks that are quarried and used in construction ie building stones.



Different types of rock

Rocks are divided up into three families by the earth processes that led to their formation. The families of rocks are subdivided again into many different rock types by the minerals or grains that they are formed from.

Igneous rocks

These are rocks that start out as molten magma (molten material inside the Earth) or lava (molten material that erupts on to the Earth's surface). The name comes from the Latin word *igneus* which means "of fire". The melt contains lots of different chemicals that crystallise out as it cools down. The minerals that form will depend on what was in the melt, as well as how hot it was, how quickly it cools down, and whether it cools down inside the Earth or on the surface! Igneous rocks are usually made of interlocking crystals of one or more types of mineral, though the crystals may be too small to see without a microscope.

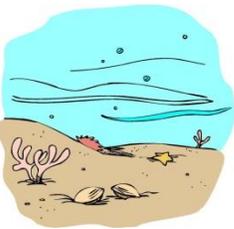


95% of the Earth's rocky surface is made of igneous rocks.

Some igneous rocks form thick layered sequences of rocks where each layer represents a different lava flow from an erupting volcano.

Some examples of igneous rocks are granite, basalt, obsidian, larvikite, pegmatite and carbonatite.

Sedimentary rocks



These rocks are formed from sediment such as sand or mud which is itself formed by the weathering and erosion of other older rock. They are often formed by or in water, or by the action of wind or ice.

Some sedimentary rocks are formed from or contain the remains of the hard parts of many different types of animal and from plant material. These are called fossils.

Sedimentary rocks are usually made from individual grains of one or more types of rock, mineral or biological material which are stuck together by sediment "glue" – fine mud or silt particles – and minerals that have grown in the tiny spaces between the grains after they were deposited. They can be very soft and crumbly, or quite hard and solid depending on how much they have been compacted (squashed) and how well the grains are stuck together. The range of chemical and physical processes that transform soft sediment into rock are known as *lithification*. Some sedimentary rocks also form when water evaporates

Sedimentary rocks are usually deposited in layers which geologists call *strata*. The study of these layers is called *stratigraphy*, and this is how early geologists such as Adam Sedgwick started to work out the difference in age between different rocks and the fossils in them.

Some examples of sedimentary rocks are sandstone, mudstone, shale, clay, gritstone, limestone and peat.



Metamorphic rocks

These rocks form when existing rock is exposed to extreme heat or forces (stretching or squeezing) - not enough to melt it completely but enough to make some or all of the minerals chemically and physically unstable so that they quite literally metamorphose (change) into new forms. These rocks are usually formed of interlocking crystals and are quite often stripy in appearance. These stripes are sometimes contorted into folds- which can be a few millimetres to hundreds of kilometres in scale- mountains! Not all mountains are made completely from metamorphic rocks, but they are often found in the same parts of the world. Some types of metamorphic rocks are formed as a result of large meteorites hitting the Earth's surface.



Some examples of metamorphic rocks are gneiss, schist, marble, coal and slate.

All of these rock types are constantly being changed, reworked and recycled by the set of global processes called the Rock Cycle. Any rock type can become any other rock type!

The Rock Cycle

When molten magma rises through the Earth's crust, it cools and crystallizes to form an igneous rock, for example granite. If the granite is then exposed to weathering and erosion on the Earth's surface, the quartz crystals in contains may become sand. This can be washed along river systems or blown by the wind and ultimately may be deposited on land or in the sea. The sand can gradually harden as it is compacted by the weight of more sediment above it, and form sandstone, a sedimentary rock. If the sandstone is heated and pressurized, it might be changed into quartzite, a metamorphic rock. It is even possible (although rare) for that quartzite to be exposed to enough heat to melt it and then crystallize, turning it back into an igneous rock. This set of processes can change any rock type into any other. It is called *the Rock Cycle*.

