Fact sheet: the rock cycle

Earth’s rocks don’t stay the same forever. They are always changing from one form to another due to weathering, transportation, pressure and heat. We don’t see these transformations owing to the huge timescales involved but we make use of the materials they produce in the construction of our schools, houses and roads.

There is no set route around the rock cycle: sedimentary rocks are not all converted into metamorphic rocks before then forming igneous rocks. The transformations that happen depend on which conditions the rock is exposed to.

Processes in the rock cycle

- **Weathering** – Weather, plants, animals and chemical processes break rocks into smaller pieces.
- **Transportation** – The fragments of rock formed by weathering fall from the rock face and can be carried away by moving wind or water.
- **Sediment** – Small fragments of rocks and minerals, as well as the remains of plants and animals, are carried out to sea and deposited in layers.
- **Compaction and cementation** – As layers of sediment build up, water and air in the lower layers is squeezed out. Minerals dissolved in the water are left behind and act like cement, leading to the formation of sedimentary rocks.
- **Heat and pressure** – Deep in the Earth’s crust or at plate boundaries where tectonic plates collide, rocks are exposed to extreme heat and pressure.
- **Uplift** – Unbalanced forces in the Earth’s crust bring rocks from deep underground to the surface.
- **Sedimentary rocks** – Formed by compaction and cementation of sediment, sedimentary rocks may contain fossils of animals and plants trapped in the sediments as the rock was formed.
- **Metamorphic rocks** – Formed when high temperatures and pressures change the mineral structures in rocks without the rocks being melted completely.
- **Magma** – Underground, rocks are exposed to high temperatures and form molten and semi-molten rock called magma.
- **Lava** – When magma flows or erupts onto the Earth’s surface it is called lava. Under lava flows, rocks are exposed to less extreme temperatures and pressures but still enough to change their structure.
- **Igneous rocks** – Formed when molten rock cools and crystallises. Intrusive igneous rocks form deep underground when rock cools slowly. Extrusive igneous rocks form when molten rock erupts from a volcano.
The Giant’s Causeway

The Giant’s Causeway in Northern Ireland wasn’t really built by a giant but, in fact, was formed 50–60 million years ago from columns of basalt, an extrusive igneous rock. Although the mainly hexagonal shape of the columns is thought to be linked to the cooling and shrinking of successive lava flows on reaching the sea, scientists are still working on theories to fully explain the unusual structure.

Perfect for roofs

Slate is a metamorphic rock usually formed from mudstone. When exposed to heat and pressure the microscopic crystals of the minerals in the mudstone form parallel layers perpendicular to the compaction force. This makes it easy to split into thin sheets and perfect for roof tiles.

Did you know …?

Glass is made from liquid sand. Most beach sand is grains of silicon dioxide (or quartz). When melted then cooled it is transformed into glass.

Did you know …?

Igneous comes from the word ignis which means fire in Latin.

Stalactites and stalagmites

Limestone caves often contain columns of rock either hanging from the ceiling or coming up from the floor. Calcium and carbonate ions from the limestone dissolve in water passing through the ceilings of the caves. When the solution drips into the cave, the water evaporates to leave behind calcium carbonate either as a stalactite hanging from the ceiling, or as a stalagmite coming up from the cave floor.

Did you know …?

Geologists measure the hardness of rock using the Mohs scale, introduced in 1822 by Friedrich Mohs. It is based simply on one mineral’s ability to scratch another.