

## 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.

### 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.

## 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 ...?

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

### 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.

## 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.