

METAMORPHIC ROCK

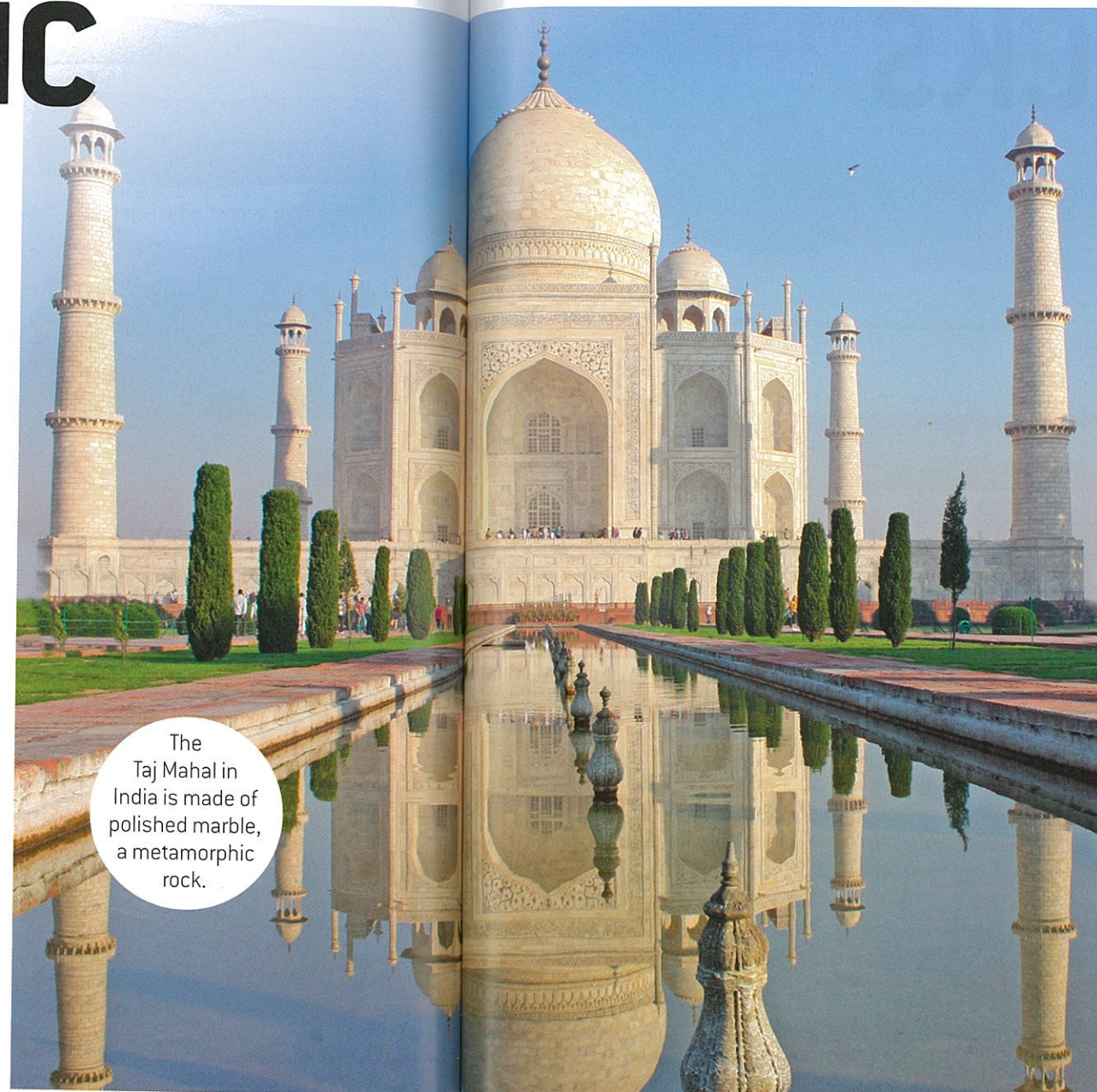
Metamorphic rock is formed when igneous, sedimentary or older metamorphic rocks are changed by intense heat and pressure inside the Earth.

Rocks can be changed from one type into another over millions of years. Metamorphic rock forms when igneous, sedimentary or older metamorphic rocks are heated or squeezed (or both). This can cause them to change into a new type of rock. The name refers to the metamorphosis (meaning 'change in form') of the rock.

The high temperatures and pressure needed to change rocks occur only beneath the Earth's surface. The temperature increases by around 25 degrees Celsius for each kilometre below the Earth's crust.

The intense heat and pressure change the rocks into ones with different physical and chemical **properties**. For example, shale (a sedimentary rock) can be changed under heat and pressure into slate. Slate is stronger than shale and does not absorb water. These properties make slate ideal for floor and roof tiles.

Metamorphic rocks are stronger than the rocks they were formed from because the intense pressure and temperature fuse the particles together.



granite (igneous rock)

When granite is subjected to high heat or pressure, it can change into the metamorphic rock known as gneiss.



gneiss (metamorphic rock)



limestone (sedimentary rock)

Marble is formed when limestone is placed under extreme temperature and pressure.



marble (metamorphic rock)

The rock cycle

Rocks in the landscape around us do not seem to change over our human lifetime, but they are always changing. Our lives are very short compared to the history of rocks on Earth. Over millions of years, rocks change from one type into another and back again in an ongoing cycle.

The minerals that form rocks are always being recycled by the Earth. James Hutton, who is considered by many as the founder of geology, came up with the idea of the **rock cycle** in the 1700s. The cycle is driven mainly by **erosion** above ground, and heat and pressure below ground.

For example, magma can erupt from a volcano and cool to form igneous rocks. These rocks can be broken down into particles by the weather, and later deposited and then pressed together to form sedimentary rocks. The sedimentary rocks can be buried deep in the Earth and subjected to intense forces to form metamorphic rocks. These metamorphic rocks can be melted beneath the Earth's surface to form magma. The magma can erupt and then cool to form igneous rocks, beginning the cycle again. This example is just one of the many pathways that rocks can take around the rock cycle.



LOOK IT UP

erosion the carrying away (by water, wind etc.) of particles of the Earth's surface that have been worn away by weathering

metamorphic rock a type of rock formed when igneous, sedimentary or older metamorphic rocks are heated or squeezed

property a characteristic, quality or feature that distinguishes something from other things, e.g. the properties (characteristics) of a mineral

rock cycle a concept explaining how the three rock types (igneous, metamorphic and sedimentary) are related to each other and how they change from one type to another over time

CHECK IT OUT

- 1 Into which three groups are rocks classified?
- 2 What two things can cause rocks to change form and become metamorphic rocks?
- 3 Describe the differences between:
 - a gneiss and granite
 - b marble and limestone.
- 4 Which properties of slate make it an ideal material for flooring and roofing?
- 5 Look at the diagram of the rock cycle.
 - a How do igneous rocks become metamorphic rocks?
 - b How do metamorphic rocks become igneous rocks?