How do volcanoes work?

KS2 KS3 Ages 7-14 ⏰ 4 min read

The Earth isn't solid all the way through. Beneath the thin rocky crust we live on, there's a layer called the **mantle** — thousands of kilometres of rock so unimaginably hot that it behaves more like an incredibly thick, slow-moving liquid than solid rock. And deeper still, the **core** reaches temperatures of up to 5,000°C — hotter than the surface of the Sun.

All that heat needs to go somewhere. One of the ways it escapes is through volcanoes.

What causes magma to rise?

Deep in the mantle, rock is kept solid by the crushing pressure of all the rock above it. If that pressure decreases — because tectonic plates are being pulled apart, or a plate is sinking and displacing material upwards — the rock can melt into **magma**. Magma is less dense than solid rock, so it rises, like a bubble of oil in water, working its way up through cracks and weaknesses in the crust.

Shake a can of fizzy drink. The pressure inside keeps the gas dissolved in the liquid. When you open the can, the pressure drops suddenly and the gas rushes out explosively. Magma contains dissolved gases too. When it rises and the pressure drops as it approaches the surface, those gases — mostly water vapour and carbon dioxide — expand violently. That's what makes volcanic eruptions explosive. A volcano with low gas content flows gently; one with high gas content can detonate like a bomb.

Where do volcanoes occur?

Most volcanoes sit along the boundaries between tectonic plates — the enormous chunks of crust that float on the mantle and slowly move around. At divergent boundaries (where plates pull apart), magma wells up to fill the gap — this is how Iceland formed. At subduction zones (where one plate dives under another), the descending plate releases water into the mantle, lowering its melting point and creating magma — this is what rings the Pacific Ocean in the "Ring of Fire."

What's the difference between lava and magma?

Same stuff, different location. While it's underground, it's called **magma**. The moment it exits the volcano, it becomes **lava**. Lava flows can reach temperatures over 1,200°C and can travel at speeds from a slow walk to — in extremely fluid types — as fast as a car on a motorway. Over time, cooled lava builds up into new rock, which is why volcanic islands exist at all.