What is coral bleaching?

KS3 KS4 Ages 11-16 ⏰ 4 min read

Coral reefs cover less than 1% of the ocean floor but support about 25% of all marine species. They're sometimes called the rainforests of the sea — extraordinary hubs of biodiversity, colour, and life. They're also one of the ecosystems most acutely threatened by climate change. The mechanism that's destroying them is called coral bleaching.

What is a coral, actually?

Most people think of coral as a plant or a rock. It's neither — coral is an animal. Each coral polyp is a tiny creature related to sea anemones, with a mouth surrounded by tentacles. Millions of these polyps live together in colonies, building calcium carbonate skeletons that accumulate over centuries to form the vast reef structures we recognise.

Inside each polyp live microscopic algae called zooxanthellae. This relationship is the key to reef life: the algae photosynthesise, providing the coral with up to 90% of its energy and giving it its vivid colours. In return, the coral provides the algae with shelter and the nutrients from its waste. It's one of nature's most successful partnerships.

🌡️ Imagine you have a housemate who does all your cooking and keeps the house warm, and in return you give them a room and share your household waste for their garden. It works perfectly — until the house gets too hot. Your housemate can't cope with the heat and leaves. Suddenly you have no food and no warmth, and your house turns grey. That's what happens to coral when the sea gets too warm: the zooxanthellae leave, the colour drains away, and the coral starts to starve.

Why does bleaching happen?

Corals are extremely sensitive to temperature. An increase of just 1-2°C above the normal seasonal maximum, sustained for several weeks, is enough to cause bleaching. The stress makes the zooxanthellae toxic to the polyp, which expels them as a survival mechanism. Without the algae, the transparent coral tissue reveals the white calcium skeleton beneath — hence "bleaching."

A bleached coral isn't necessarily dead. If temperatures return to normal quickly enough, the algae can return. But if the warmth persists, the coral starves and dies, and the reef — which took centuries to build — begins to collapse.

How bad is it?

In 2024, the fourth global mass bleaching event was declared — the most widespread ever recorded, affecting reefs in every ocean basin. Australia's Great Barrier Reef has experienced five mass bleaching events since 2016. Some areas have lost more than half their coral cover. At current rates of warming, scientists project that virtually all coral reefs will experience annual bleaching conditions by the 2040s, which would be fatal for most of them.