Why is the sky blue?

KS2 KS3 Ages 7-14 ⏰ 3 min read

Sunlight looks white or yellow, but it's actually made up of every colour in the rainbow all mixed together. Red, orange, yellow, green, blue, indigo, violet — all of them, all at once.

When that light travels through space, all those colours travel together just fine. But the moment it hits Earth's atmosphere — the thick blanket of air around our planet — things get interesting.

Air is full of tiny gas molecules, mostly nitrogen and oxygen. When sunlight crashes into these molecules, the light scatters — it bounces off in all directions. But here's the key: different colours scatter differently. Blue light has a short, wiggly wavelength, which means it bounces and scatters far more than the other colours. Red light has a long, lazy wavelength and mostly just cuts straight through.

Imagine throwing a bag of mixed-size balls at a chain-link fence. The tiny balls bounce off in every direction and fly all over the place. The big footballs just push straight through. Blue light is the tiny ball — it bounces everywhere, filling the whole sky. Red light is the football — it keeps going.

Because blue light is scattered in every direction across the whole sky, no matter where you look up, some of that scattered blue is heading towards your eyes. That's why the sky looks blue.

So why are sunsets orange and red?

When the sun is setting, its light travels through a much thicker slice of atmosphere to reach you — all the way across the horizon rather than straight down from above. By the time it gets to you, all the blue has scattered away and disappeared. What's left? The reds and oranges — those long-wavelength colours that refused to scatter. That's your sunset right there.

Why is the sky on Mars a different colour?

Mars has a very thin atmosphere made mostly of carbon dioxide, with loads of rusty iron-dust floating in it. That dust scatters red light in the same way our air scatters

blue. So the Martian sky is a pinkish-butterscotch colour during the day — and turns blue at sunset. Opposite to us. Funny old universe.