Why do we have seasons?

KS2 KS3 Ages 7-14 ⏰ 3 min read

Here's something that trips most people up: Earth is actually *slightly closer* to the Sun in January than in July. So why is January freezing and July boiling (if you're in the UK, "boiling" means 22°C and everyone loses their mind)?

The answer is **tilt**. Earth spins on an axis — an imaginary pole running through the North and South Poles. That axis isn't straight up and down; it leans at about 23.5 degrees. And as Earth travels around the Sun over a year, that tilt means different parts of the planet get hit by sunlight at different angles.

Shine a torch straight down onto a table. You get a bright, concentrated circle of light. Now tilt the torch so it hits the table at an angle — the same amount of light spreads over a much bigger area, so any one spot gets less of it. That's exactly what happens in winter: sunlight arrives at a shallow angle, spreads over more ground, and delivers less heat per square metre.

Why is summer warmer?

In summer (for the Northern Hemisphere, that's June to August), the North Pole is tilted *towards* the Sun. Sunlight hits at a steeper angle — more concentrated, more heating power per square metre. The days are also longer, so the ground has more hours to absorb heat. In winter, the North Pole tilts away, sunlight arrives at a shallow angle, and days are short. Less heat, shorter days — winter.

What about places near the equator?

At the equator, sunlight always hits at roughly the same steep angle all year round, so there's not much temperature change between seasons. Instead, equatorial regions tend to have wet and dry seasons — driven by shifting wind and rain patterns — rather than hot and cold ones.

What are the solstices and equinoxes?

The **summer solstice** (around 21 June in the UK) is the longest day — Earth's North Pole is tilted as far towards the Sun as it gets. The **winter solstice** (around 21

December) is the shortest day — tilted as far away as possible. The **equinoxes** (March and September) are the two points where neither pole is tilted towards or away, and day and night are roughly equal length across the whole planet.

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