What would happen if the Sun disappeared?

KS3 Ages 11-14 ⏰ 3 min read

The Sun disappearing is physically impossible, but as a thought experiment, it's a vivid way to understand just how dependent everything is on that one star 149 million kilometres away. The effects would happen in a very specific sequence.

The first 8 minutes: nothing obvious

Light takes about 8 minutes to travel from the Sun to Earth. For 8 minutes after the Sun vanished, we'd still see it — the light already on its way would continue arriving. Then, all at once, the sky would go dark. Not gradually — the light would simply stop.

Minutes to hours: darkness and cold begins

With no sunlight, photosynthesis immediately stops. The atmosphere begins radiating its heat into space. Surface temperatures start dropping. Most of Earth would plunge below freezing within days. The oceans, with their enormous thermal mass, would retain heat longer, but they'd start freezing at the surface within weeks.

The Sun is like the central heating boiler for the entire Solar System. Earth is a room in the building. The room has some insulation (the atmosphere) and some thermal mass (the oceans), so it doesn't cool instantly when the boiler shuts off. But eventually, the room drops to the temperature of the outside — in this case, the near-absolute-zero of deep space. There's no other heat source. The boiler is not coming back on.

Days to weeks: collapse of the food chain

Without photosynthesis, plants die. Without plants, herbivores starve. Without herbivores, carnivores follow. The entire food chain collapses within weeks to months. Humans could survive longer on stored food and, theoretically, hydrothermal energy sources (geothermal heat from Earth's interior still exists without the Sun). Some deep-sea ecosystems around hydrothermal vents would survive indefinitely — they run on Earth's internal heat rather than sunlight.

Days: orbital chaos

Without the Sun's gravity, Earth would immediately stop following its circular orbit and shoot off in a straight line into space — at about 30km per second. Within 2 billion years or so, it might drift into another star system, but by then all surface life would be long gone. The Solar System as we know it would dissolve within years as planets scattered on diverging trajectories.