What is space debris?

KS2 KS3 Ages 9-14 ⏰ 2 min read

Since the first satellite was launched in 1957, humans have sent thousands of objects into orbit. We don't always bring them back. The result is that Earth is now surrounded by a cloud of rubbish — broken satellites, discarded rocket stages, fragments from collisions, even a spatula that a spacewalking astronaut accidentally let go of. All of it orbiting at tremendous speed. All of it a hazard.

How much is up there?

The European Space Agency estimates there are around 36,500 objects larger than 10 centimetres in orbit, about 1 million between 1 and 10 centimetres, and over 130 million pieces smaller than that. Most of this is **space debris** — sometimes called "space junk" — objects with no purpose, on no controlled flight path, just endlessly circling the Earth.

Imagine a busy motorway where cars don't have steering or brakes and travel at 28,000 kilometres per hour. Every smash creates more broken pieces, which become new hazards that cause more smashes. That's the situation building in orbit — and unlike a motorway, you can't clear up the wreckage easily.

Why it's dangerous

In orbit, even a tiny object becomes a serious threat. A 1-centimetre fragment travels at around 28,000 km/h — roughly eight times the speed of a bullet. At that speed, a small piece of paint can crack a spacecraft window. A larger fragment could destroy a satellite entirely or, in the worst case, endanger astronauts on the International Space Station.

The ISS regularly performs **debris avoidance manoeuvres** — firing its engines to dodge tracked fragments. It's happened dozens of times.

The Kessler syndrome

The nightmare scenario is called **Kessler syndrome**, named after a NASA scientist who described it in 1978. If debris density gets high enough, collisions start creating

more fragments, which cause more collisions, which create more fragments, in a runaway chain reaction. Eventually, certain orbital altitudes could become so full of shrapnel that they're unusable — not just for new satellites, but potentially trapping us on Earth for centuries.

What's being done about it?

Several companies and space agencies are developing ways to clean up debris — using nets, harpoons, magnets, or robotic arms to capture and de-orbit large fragments. The UK-built RemoveDEBRIS satellite tested some of these methods. Progress is slow, partly because international law makes it legally complicated to touch another country's satellite — even a broken one.

Free for educational use