What is the International Space Station?

KS2 KS3 Ages 7-14 ⏰ 3 min read

The International Space Station (ISS) is a large spacecraft and science laboratory orbiting Earth at about 400km altitude, travelling at roughly 28,000km/h. It completes one orbit every 90 minutes, meaning astronauts aboard see 16 sunrises and sunsets every single day. It has been continuously inhabited since 2 November 2000 — a crew of typically 6–7 people always on board.

How is it built?

The ISS was assembled in orbit over 13 years, from 1998 to 2011, through more than 40 assembly flights by US Space Shuttles and Russian Soyuz/Proton rockets. Individual modules were launched, connected by spacewalking astronauts, and gradually grew into the 109-metre-long, 73-metre-wide station it is today. The solar panel arrays alone span about the size of eight basketball courts. It is the most expensive object ever constructed, at approximately $150 billion.

Building the ISS in orbit is like constructing a skyscraper, but every individual piece has to be launched separately on a rocket from the ground, and then assembled by workers in spacesuits, floating in vacuum, working in 90-minute cycles of daylight and darkness, with no ability to pop to the hardware shop if anything's missing. Each connection has to be perfect — a single failed seal or junction in space can be fatal. That it works at all is a remarkable achievement of engineering and international cooperation.

What research happens there?

The ISS is a microgravity laboratory. In the absence of normal gravity, experiments can be conducted that are impossible on Earth: growing protein crystals in conditions where they form more perfectly than on Earth (useful for drug development), studying how muscles and bones respond to weightlessness (critical for long-duration spaceflight), observing how flames behave in zero gravity (relevant to fire safety on spacecraft), and observing Earth's surface, atmosphere, and weather systems continuously.

Why doesn't it fall?

It is falling — constantly. The ISS is in a state of continuous freefall around Earth. It moves so fast horizontally that as it falls, Earth's surface curves away beneath it at the same rate. It's the same physics as any orbit: go fast enough horizontally, and you miss the ground indefinitely. Occasional boosts from visiting spacecraft are needed to compensate for atmospheric drag (even at 400km, trace atmosphere slows the station gradually).