What is an asteroid?

KS2 KS3 Ages 7-14 ⏰ 4 min read

About 4.6 billion years ago, a vast cloud of gas and dust began to collapse under its own gravity, forming the Sun and, eventually, the planets. But not everything became a planet. Millions of chunks of rock and metal that never quite coalesced into a planet still orbit the Sun today. These are asteroids.

What are they made of?

Asteroids vary enormously. Most are rocky — silicate minerals similar to the material of Earth's crust. Others are metallic, composed of iron and nickel. A smaller group are carbonaceous — dark, carbon-rich objects thought to contain water and organic compounds, making them scientifically fascinating as potential records of the early solar system's chemistry. Asteroids range from house-sized to hundreds of kilometres across; the largest, Ceres, is about 940 kilometres in diameter and is now classified as a dwarf planet.

🧱 When builders construct a house, they use bricks that are carefully shaped and fitted together. Asteroids are like the leftover rubble from building the Solar System — the bricks that never got incorporated into any structure, still scattered around the building site four billion years later. They're not failed planets; they're the bits left over after the planets were already built.

Where are they?

Most asteroids sit in the **asteroid belt** between Mars and Jupiter. Jupiter's enormous gravity prevented these objects from ever clumping together into a planet. They mostly stay in the belt — but gravitational nudges from Jupiter and other planets occasionally push them into orbits that cross Earth's path. These are called Near-Earth Asteroids, and there are over 30,000 known ones.

Could one hit us?

Yes — and it has happened, repeatedly, throughout Earth's history. The most famous was 66 million years ago: a 10-kilometre asteroid struck what is now Mexico's Yucatán

Peninsula, triggering wildfires, blocking sunlight for years with debris, and causing the mass extinction that wiped out the non-avian dinosaurs.

The good news is that we're now actively tracking potentially hazardous asteroids, and in 2022 NASA's DART mission demonstrated for the first time that we can actually change an asteroid's orbit by ramming a spacecraft into it. We currently know of no large asteroids on a collision course with Earth in the foreseeable future. If we did discover one, we now have at least one tool to deal with it.