



# What is a comet?

KS2

KS3

Ages 7-14 ⌚ 3 min read

A comet is a small, icy body — mostly water ice, frozen gases, and dust — that formed in the outer Solar System billions of years ago, left over from the disc of material that became the planets. Most comets spend their time in two regions far beyond the planets: the Kuiper Belt (beyond Neptune) and the much more distant Oort Cloud.

When something perturbs a comet's orbit — the gravity of a passing star, or Jupiter's gravity — it can fall inward towards the Sun on a long, elliptical orbit. That's when things get interesting.

A comet is like an ice cube left in a hot car. Most of the time it sits in the deep freeze of the outer Solar System, perfectly preserved for billions of years. But as it falls towards the Sun and heats up, the ice starts to turn directly to gas (sublimation). That gas, and dust dragged with it, streams away from the nucleus — not behind it like a car exhaust, but always directly away from the Sun, pushed by solar radiation and the solar wind. This is the tail — which always points away from the Sun regardless of which direction the comet is travelling.

## What's the nucleus like?

Comet nuclei are typically small — a few kilometres across — and surprisingly dark (darker than coal), coated in organic compounds. The "coma" is the fuzzy atmosphere of gas and dust that surrounds the nucleus as it heats up. A comet can actually have two tails: a bright, curved dust tail, and a straighter, fainter ion tail.

## Famous comets

Halley's Comet is probably the most famous — visible from Earth roughly every 75 years and recorded in historical sources going back over 2,000 years. Its 1066 appearance is depicted in the Bayeux Tapestry. It was last visible in 1986 and returns in 2061. The European Space Agency's Rosetta mission (2014) actually landed a probe on Comet 67P/Churyumov-Gerasimenko — sending back extraordinary images of the nucleus surface.

