What are exoplanets?

KS2 KS3 Ages 7-14 ⏰ 3 min read

An exoplanet is any planet orbiting a star other than our Sun. For most of human history, we had no idea whether they existed. Other stars were too far away to see any planets — even the nearest star is over 4 light-years away. Then in 1992, the first confirmed exoplanet was discovered. By 2025, we've confirmed over 5,700, with thousands more candidates.

How do you find a planet you can't see?

You can't photograph most exoplanets directly — they're tiny and lost in the glare of their star. Instead, astronomers use clever indirect methods.

The transit method: When a planet passes in front of its star (from our viewpoint), it blocks a tiny fraction of the star's light — typically less than 1%. By measuring the regular dip in brightness, astronomers can detect the planet and work out its size and orbital period. NASA's Kepler telescope used this method to find thousands of planets.

Imagine watching a lamp across a field at night. You can't see the moth flying in front of it — but every time it passes, the lamp dims very slightly and then brightens again. By timing those dips precisely, you could work out the size of the moth and how often it circles the lamp. The transit method does exactly this, but with planets and stars instead of moths and lamps — and the "dimming" might be just 0.01% of the star's light.

What kinds of planets have been found?

All sorts. "Hot Jupiters" — gas giants orbiting incredibly close to their stars, completing an orbit in just a few days. "Super-Earths" — rocky planets larger than Earth but smaller than Neptune. "Mini-Neptunes." Some rocky planets orbiting in the "habitable zone" — the range of distances where liquid water could exist on the surface. A few bear a striking resemblance to Earth in size and temperature.

Have we found life?

Not yet, and not for lack of looking. The James Webb Space Telescope is analysing exoplanet atmospheres for chemical signatures that might indicate biological activity. Finding oxygen, methane, and water together in an atmosphere — gases that shouldn't co-exist without something continually replenishing them — would be a very strong hint. So far: no confirmed biosignatures. But we've only meaningfully analysed a tiny fraction of candidates.