



# What is gravity?

KS2

KS3

Ages 7-14 ⌚ 4 min read

Gravity is the force of attraction between anything that has mass. Every single object in the universe pulls on every other object. You're pulling on this screen right now. The Moon is pulling on the oceans. The Sun is pulling on every planet in the solar system. Gravity is everywhere, always, in every direction.

The more massive something is, the stronger its gravitational pull. And the further apart two objects are, the weaker the pull between them. This is why the Sun's gravity keeps Earth in orbit even though it's 150 million kilometres away — the Sun is just *so* massive that its pull is still enormous at that distance.

Einstein described gravity in a way that completely changed how we picture it. Imagine space as a stretched rubber sheet. Place a heavy bowling ball on it — it creates a dip. Now roll a marble near it: the marble curves towards the dip, as if "attracted" to the bowling ball. That's gravity. Massive objects bend the fabric of space itself, and other objects follow those curves. Earth isn't being pulled towards the Sun so much as it's following the curved shape of space that the Sun's mass creates.

## Newton vs Einstein

Isaac Newton described gravity brilliantly in 1687 — he gave us the maths to predict planetary orbits, cannon trajectories, and falling apples with extraordinary precision. But he couldn't explain *what* gravity actually was. Albert Einstein did, in 1915, with his General Theory of Relativity: gravity is the curvature of space and time caused by mass. For most everyday purposes, Newton's simpler version works fine. For extreme situations — near black holes, GPS satellites — you need Einstein's version.

## Why does everything fall at the same speed?

Drop a feather and a hammer together on the Moon (no air), and they hit the ground at the exact same moment. Galileo worked this out in the 1590s — gravity accelerates every object equally, regardless of mass. A heavy boulder falls at exactly the same rate as a pebble. The reason feathers fall slowly on Earth is air resistance, not gravity.

On the Moon, with no atmosphere, the feather and hammer land together — NASA famously demonstrated this in 1971.

## **Is gravity a weak force?**

Compared to the other fundamental forces, gravity is extraordinarily weak. A small fridge magnet can pick up a paper clip against the gravitational pull of the entire Earth. But gravity's great advantage is that it has unlimited range and always attracts, never repels — which is why, at the scale of planets, stars, and galaxies, it dominates everything.