



Why does the Moon affect the tides?

KS2

KS3

Ages 9-14 ⌚ 3 min read

The Moon is 384,000 kilometres away. It has no atmosphere, no weather, and no obvious connection to our oceans. Yet every single day, it pulls billions of tonnes of seawater back and forth across the planet. How?

Gravity at a distance

The Moon has gravity, just like Earth. It's weaker than Earth's, but it still reaches us. The key thing about gravity is that it gets *stronger the closer you are* to the source. So the side of Earth facing the Moon feels a slightly stronger gravitational pull than the centre of Earth, and the centre feels a stronger pull than the far side.

This difference in pull — not the pull itself, but the *difference* across Earth's diameter — is called a **tidal force**. It stretches Earth slightly in the direction of the Moon. And since water is liquid and can move, it bulges out towards the Moon.

Imagine holding a water balloon by the middle. Your hands squeeze the sides in, which pushes the top and bottom out. The Moon's tidal force does something similar to Earth: it squeezes Earth's equator and stretches it towards and away from the Moon. Water flows into those stretched bulges, creating high tides. The areas at the sides get low tides.

Why are there two high tides per day?

Here's the counterintuitive bit: there's a bulge of water on the side of Earth facing the Moon, but there's *also* one on the opposite side. On the far side, the tidal force actually pulls water *away* from the Moon — because the Moon's pull on that side is weaker than the average, so the water effectively gets left behind as the rest of Earth is pulled towards the Moon.

As Earth spins, most places rotate through both bulges every 24 hours — giving two high tides and two low tides per day.

Does the Sun affect tides too?

Yes — the Sun also exerts a tidal force on Earth, though it's about 46% as strong as the Moon's despite the Sun being much more massive (because it's so much further away). When the Sun and Moon line up at new moon and full moon, their forces combine and you get extra-high "spring tides." When they're at right angles, the forces partly cancel out into gentler "neap tides."