



Turn the Tides

It's complicated trying to explain **why** tides occur on Earth. Many people don't realise **the way** tides occur and how a high tide on one side of the Earth is matched by another high tide on the opposite side of the Earth.

The high tide closest to the Moon tends to be taller than the matching high tide on the other side of the Earth (which is a little flatter). About six hours later in the same area, a low tide occurs and the water level drops.

Tides are easiest to see as the rising and falling water levels along a beach. They are mostly caused by the Moon almost 384 000 kilometres away from the Earth and are partly caused by the gravitational pull of the Sun as well. The Moon has a greater gravitational effect, because it is closer to Earth than the Sun.

As the Moon orbits Earth every 27.3 days, it 'pulls' on the Earth, causing a gravitational pull (or tidal force). At high tide, water moves further up the shore and the ground rises 10 to 30 centimetres (although you can't feel it rise under your feet).

Tides occur slightly ahead of the Moon's orbital path because the Earth rotates faster than the Moon orbits. This tidal bulge slows down the Earth's rotation and drives the moon further away.

More Information

Phil Plait's Bad Astronomy Misconceptions about Tides

<http://www.badastronomy.com/bad/misc/tides.html>

New Scientist The Last Word

Tides are caused by the Moon and the Sun and contain a lot of energy, but where does it all come from?

<http://www.newscientist.com/lastword/article.jsp?id=lw548>

New Scientist The Last Word

Can anyone explain in simple and common-sense terms why there is simultaneously a high tide on both sides of the Earth?

<http://www.newscientist.com/lastword/article.jsp?id=lw55>

Myths about gravity and tides article from *The Physics Teacher*. 37, October 1999, pp. 438-441.

Requires Adobe Acrobat Reader to view.

http://www.jal.cc.il.us/~mikolajsawicki/tides_new2.pdf

Stanford Solar Center – What is the Sun and the Moon's relationship to the Earth tides?

<http://solar-center.stanford.edu/FAQ/Qtides.html>

Scientific American Ask the Experts 21 October 1999

The Moon's Rotation and Revolution

http://www.sciam.com/print_version.cfm?articleID=0000976C-7D8F-1C72-9EB7809EC588F2D7