

The Moon is Getting Farther From Earth: What Will Happen in the Future?

The distance to the Moon actually changes over the course of a month as it orbits Earth. This change is why some full moons appear slightly larger than others.

Every year, the Moon moves 3.8 cm (1.5 inches) farther from Earth. Scientists measure the distance to the Moon by reflecting lasers from mirrors placed on it by space probes and astronauts.



By measuring the time it takes light to travel from Earth to the Moon and back, scientists can accurately measure the distance to the Moon and how that distance changes.

The distance to the Moon actually changes over the course of a month as it orbits Earth. The Moon is typically 239,000 miles (385,000 km) from Earth, but its orbit is not a perfect circle and varies by about 12,400 miles (20,000 km) as it orbits Earth. **This variation is why some full moons appear slightly larger than others—they are called supermoons .**

The motions of the Earth and Moon have many interesting consequences, and studying how they move over time can help us better understand how each object has changed over the 4.5 billion years since the Earth and Moon formed.

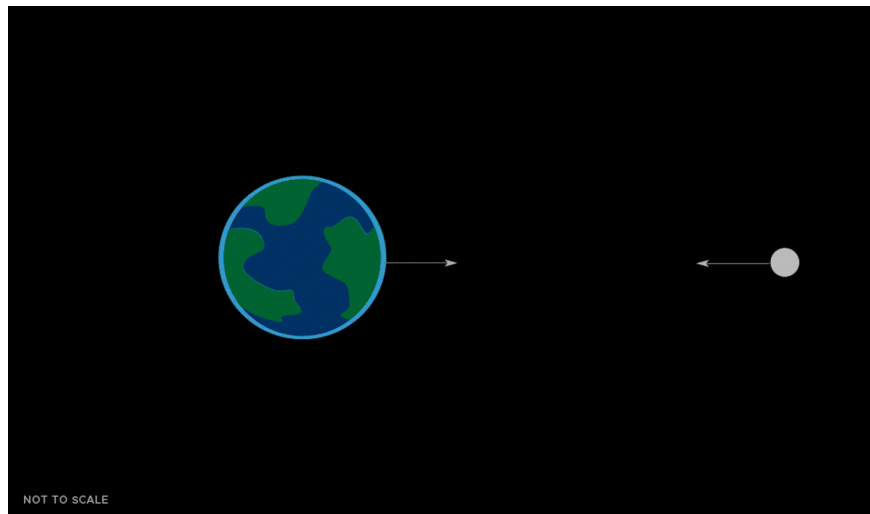
Tidal force

So, why is the Moon moving further away from Earth? It's all because of tides.

Tides result from the difference in gravitational pull between two objects. The gravitational pull exerted by the Moon is about 4% stronger on the side of the Earth facing the Moon than on the opposite side of the Earth facing away, because gravity weakens with distance.

This tidal force causes the oceans to ripple in two masses toward and away from the Moon. This is because the gravitational force that the Moon exerts on Earth is not just an average force that is the same everywhere.

The Moon's gravity is strongest on the side closer to Earth, causing a mass of water to gravitate toward the Moon. Gravity is weaker on the opposite side of Earth, causing another mass of water to gravitate more slowly toward the rest of Earth.



As the Earth rotates, these bulges move and continue to move toward the Moon due to its gravity. In New York City or Los Angeles, the water level can change by about 1.5 meters due to these tidal bulges.

The tidal bulges aren't perfectly aligned with the Moon – they 'lead' the Moon a little bit as the Earth spins and pulls them forward. These bulges also exert a gravitational pull on the Moon. The bulge closer to the Moon not only pulls the Moon toward the center of the Earth, but also moves it forward a little bit in its orbit – like the thrust of a sports car going around a corner.