



# Try This at Home Science: Moon Phase Mechanics

## Activity Overview:

Learn how Moon phases are created as it travels around the Earth.

## Materials:

- Round object
- Bright lamp or flashlight
- Open floor space
- Second person

## Try this!

1. Remove the lamp shade from your lamp and turn it on, or have another person hold a flashlight for you.
2. Stand facing the light source and hold the round object up at just above forehead height. You can also tilt your head slightly.
3. Observe.
4. Slowly spin on the spot holding the round object at the same height.
5. Observe.
6. Trade places with the other person and have them hold the round object at just above forehead height.
7. Walk around the person holding the round object.
8. Observe.

## What's happening?

As the Earth, your arm is holding the Moon much like how gravity holds the Moon in orbit around the Earth. The lamp is lighting up the surrounding space like the Sun. When the Moon is between you and the Sun, a shadow was cast on the back of your Moon simulating a New Moon. As you spun on the spot, your Moon was revolving around the Earth (you) simulating its orbit. The “shadow” on the Moon was created by the angle of the sunlight. The amount of sunlight that we see changes as the Moon changes its position. The lamp never moved, your Moon did, which is the same process that causes the different phases of the Moon we observe from the surface of the Earth.



### How does this relate to astronomy?

The Moon's position is locked, so we always see the same side, or half of the Moon's surface. Half of the Moon's surface is always illuminated by the Sun; however, we only see portions of that illuminated surface depending on where the Moon is in its orbit. We can observe other astronomical bodies, like Venus and Mercury, experiencing similar phases based on their relationship to Earth's orbit. This is helpful when determining the position of these astronomical bodies, and how we learned that the Earth was not the center of the solar system.



### Now try...

- Replace your round Moon with another 3D shape like a cone or cube and repeat the experiment. What do you notice?
- Change the height at which you hold the Moon and repeat the experiment. What do you notice? Did the phases observed change from the first run of the experiment?
- Add an astronomical body like a comet, additional planet, or even a second Moon, and repeat the experiment with multiple orbits. What did you notice? When the second astronomical body passed between your Moon and the Sun, or your Moon and you, what happened?

### Additional Information

Watch a how-to video for this experiment here:

<https://www.jpl.nasa.gov/edu/teach/activity/moon-phases/>

Check out a simulation of the phases of Venus

<https://astro.unl.edu/classaction/animations/renaissance/venusphases.html>

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