



Explaining the Phases of the Moon

About the activity:

This hands-on activity has been adapted from the Lawrence Hall of Science Planetarium Activities for Success Shows programme. [Find the original here.](#)

The activity requires a dark room and bright light source (or to go outside on a sunny day), and for everyone to have a light-coloured ball on a stick.

The ball might have a diameter anywhere from about 4-10 cm. Polystyrene balls are perfect, or maybe try a small fruit! Alternatively, you can try using your fist.

The activity is a very effective way to explain the phases. Be aware that young children are very often unable to accurately imagine the view from Earth in moon-phase diagrams or Earth/Moon models.

What to do:

To see the reason the Moon appears in its various phases, you're going to make a working model that shows relationships between the Earth, Sun, and Moon.

You need a bright light source in a dark room, or – even better – you can use the real Sun if it's a clear sunny day.

- Pretend that this light is the Sun.
- Pretend that your head is the Earth.
- Now all you need to complete the model is your model Moon.

1. Hold your Moon so that it is directly in front of the Sun.

Does your Moon look dark?

At this time of month, in reality, the Moon is so dark that you could not see it at all.

But the Moon doesn't stay in one place; it orbits (goes around) the Earth.

2. Slowly move your moon to your left, and slightly orbit of the Moon around the Earth (your head) until you can see a small part of it lit by the (sun)light.

You can now see a Crescent Moon

3. Continue the Moon in its orbit, moving it slowly to the left, until half of it is lit up.

This is a Quarter Moon. Notice that the Sun is setting, moving out of view to the side.

4. Continue moving your moon in its orbit until most of it is lit up.

This is a Gibbous Moon.

5. Now try to hold your moon in a place where it is fully lit as a Full Moon.

At first you will probably find out your head is getting in the way, and your Moon is in its shadow. This is what happens during an eclipse. You need to move the the Moon up or down out of the Earth's shadow to get a full Moon.

The Moon is really much further away from Earth than this, and orbits on a tilt, so it doesn't normally pass through the Earth's shadow.

6. What do you think happens as the Moon continues in its orbit?

Try slowly moving your moon the rest of the way in its orbit. Go slowly through a couple more orbits so you can observe the complete cycle of the phases.

In reality, it takes about one month for our Moon to complete such a cycle (29.5 days, to be exact; if you are feeling silly you could think of it as a "Moonth").

The real Earth and Moon

If your head represents the Earth, your Moon should be about a quarter as wide. On that scale, the light bulb (Sun) should be about 2.5 km (1.5 miles) away and your arm would have to be 6 m (20 ft) long to hold your Moon ball at the proper distance from your head!

Find more resources and information from National Astronomy Week at

<https://astronomyweek.org.uk/>

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