

Why does the Moon have phases?

Leader's Role	Participants' Role (Anticipated)
<p>MATERIALS: 1" polystyrene balls on sandwich picks or toothpicks (representing Moon)</p>	
<p><u>To Do:</u> This must be done outside in the daytime when both the Moon and the Sun are in the sky. This will be the case in the morning a few days after full to a few days after last quarter and in the afternoon a few days before first quarter to a couple days before full. Point to the Moon or ask, "Who can find the Moon?" Once the visitors are looking at the Moon: <u>To say:</u> Why does the Moon look like it does right now? Why does the Moon appear to change shape? Why does the Moon have phases? OR: Would you like to find out a way to show why the Moon has phases? <u>To do:</u> Hand out Moon balls.</p>	<p>Visitors point.</p> <p>Guesses.</p>
<p>Optional: Have participants take a couple minutes and use the Moon ball to try to show why the Moon looks like it does.</p>	
<p>Misconception Alert: Many people believe the Moon's phases are caused by the Earth's shadow. Others think it is clouds passing in front of the Moon.</p>	
<p><u>To say:</u> This ball will represent the Moon. Your head is the Earth. And the Sun, well, where is the Sun? Where is the real Moon? And the real Earth?</p>	<p>Over there. Points. Below our feet.</p>
<p><u>To Say</u> (if you've already talked about the Earth's shadow): Just like the Earth, the Moon has a shadow too. Where is your Moon ball's shadow? Where is it nighttime on your Moon?</p>	<p>Points to dark side of their Moon ball.</p>
<p>Short Version: <u>To say:</u> Face South. Look for the real Moon. Hold your moon just below the real Moon. How much of your moon is lit up compared to the real Moon?</p>	<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>Whoa. It's the same amount.</p> </div> </div>

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<p><i>To say:</i> Now put the Moon in orbit (<i>demonstrate by turning to your left, making sure the move the Moon counterclockwise around your head</i>) and watch how the phase of the Moon changes.</p>  <p>Make a full Moon. Make a last quarter Moon.</p> <p>Bring it all the way back around and line it up again with the real Moon.</p> <p>So why does the Moon have phases?</p> <p>Sure – the dark area is the shadow side of the Moon – where the Sun is not shining. The lit side of the Moon will always be pointing in the direction of the Sun!</p>	<p>The Sun is shining on the Moon and the Moon is orbiting us.</p>

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<p><i>Presentation Tip:</i> If the Sun is within about 20 degrees of the horizon, you and your visitors can orbit the Moon in a level plane even with the horizon and make the phases look right.</p> <p>If the Sun is much higher in the sky, or if you want to make the Moon ball's orbital path around your head to be more like the real Moon's orbit around Earth, you'll need to adjust the way you orbit the Moon ball around your head. For example, if you orbit the Moon ball level with the horizon when the Sun is high in the sky, you'll never get a full Moon, since the Moon ball needs to be on an almost straight line on the opposite side of your head from where the Sun is.</p> <p>You might want to say: "We want to make our Moon ball go around our head in the same way the real Moon orbits the real Earth." Then demonstrate this for your visitors: Face south and imagine a hula hoop encircling your head. Mentally line up the imaginary hoop such that the real Moon and Sun are aligned at points along the hoop. Note that the imaginary hoop is at a considerable angle compared to the horizon. Then imagine tracing the hoop with your Moon ball. The phases on your Moon ball will look more convincing.</p>	

