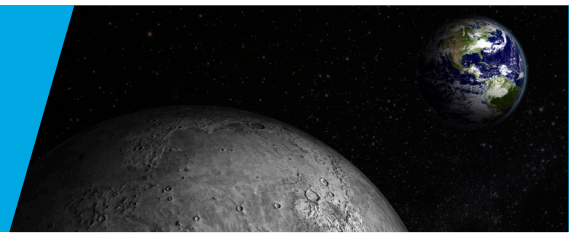


CURIOSITY AT HOME

GOING THROUGH A PHASE



A cycle is a repeating pattern. The movement of the Moon, Earth, and Sun cause a predictable cycle of Moon phases. Create a model of how the phases of the Moon, or a cycle, are created using objects and your own eyes to represent the Moon, the Sun, and the Earth.

MATERIALS

- A lamp (without a lamp shade) or other single source of light.
- Ball that you can balance in the palm of your hand (about 5 in diameter)
- Science notebook or paper
- Something to write with

PROCEDURE

- Turn on the lamp.
- Turn off all other lights in the room.
- Stand facing the lamp.
- With one arm outstretched and your palm flat, place the ball on the palm of your hand.
- Carefully observe where the light is hitting the ball. Where on the ball is the light not able to shine?
- Keeping your arm extended, slowly turn counterclockwise. Pay close attention to the light and shadows on the ball.
- Pause and make note of the light after turning 1/8 of the way around, so you stop at 45°, 90°, 135°, 180°, 225°, 270°, and 315°. You will have to raise your arm slightly above your head as you turn.
- As you finish turning around completely, does the light hitting on the ball look the same or different from when you started?
- In your science notebook, describe how the light and shadows on the ball changed as you turned around.



Show us how you're being curious! Share your results with us.



CURIOSITY AT HOME

GOING THROUGH A PHASE



EXPLORE MORE

Find two people to help you. The first person will represent the Sun, the second Earth, and the third will represent the Moon.

The Earth and the Moon both spin around their own imaginary pole or axis. This movement is called **rotation**. It takes the Earth about 24 hours, or one Earth day, to complete one rotation.

- To model rotation, start with the person representing Earth facing the Sun and then slowly turn clockwise until they are back at their starting position.

The Moon rotates slower, taking about 28 Earth days to complete one rotation around its axis.

- Have the person representing the Moon model one rotation, starting facing the Earth.

The Earth and the Moon also complete a movement called **revolution**. The Earth revolves in an orbit around the Sun, which takes about 365.25 days or one Earth year.

- Model Earth's revolution by having Earth move in a counterclockwise circle around the Sun until they are back at their starting position.

The Moon revolves in an orbit around the Earth, which only takes about 28 Earth days. This means the Moon's rotation takes the same amount of time as its revolution!

- Try modeling the Moon's rotation and revolution together. It is helpful to think of the circles for rotation and revolution as fractions. For each quarter of the rotation completed, the Moon should also complete a quarter of their revolution around Earth.
- As the Moon moves, have the Earth pay attention to the position of the Moon. Does the Earth ever see a different side of the Moon?



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CURIOSITY AT HOME

GOING THROUGH A PHASE



K-2 GRADE EXPLORATION

Some questions and exploration to explore together.

- Draw the different shapes you have seen when you have looked up at the Moon.
- Do you see the shapes you drew in the shadows as the light moved across the ball?
- If the ball is the Moon, and you are the Earth, what does the lamp represent in this model?
- Where do you think the light that makes the Moon shine comes from?



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CURIOSITY AT HOME

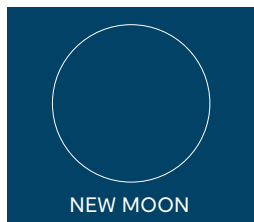
GOING THROUGH A PHASE



3–5 GRADE EXPLORATION

If the Moon starts as a full moon, throughout a lunar month (about every 28 days) the shape of the Moon changes, always returning to a full moon.

- Cut out the following phases of the Moon and put them in the order they are seen throughout a month. You will want to begin and end with the exact same shape.



- In this model, what does the lamp represent?
- In this model, what does the ball represent?
- In this model, what do you represent?
- Where does moonlight come from?
- How do you know that the phases of the Moon that we see in the sky will repeat?
- Look at the Moon to find out what phase it's currently in. If you can't see the Moon where you are, have an adult help you look up the current phase online. Draw a diagram of where the Earth, Sun, and Moon are in relation to each other based on this information.



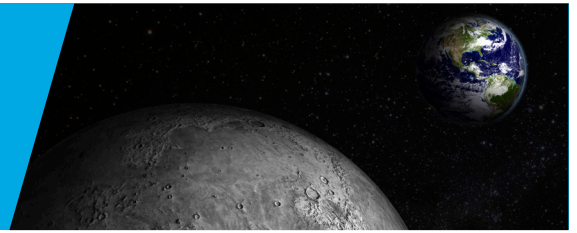
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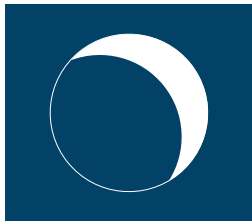
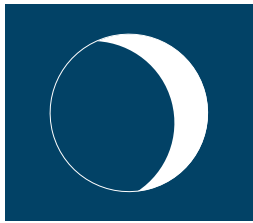
CURIOSITY AT HOME

GOING THROUGH A PHASE



6–8 GRADE EXPLORATION

- In this model, what does the lamp represent?
- In this model, what does the ball represent?
- In this model, what do you represent?
- A solar eclipse occurs when the Moon moves across the Sun to partially or fully block the Sun. Align the lamp or light source, and the ball, and you to create a solar eclipse.
- A lunar eclipse is when the Earth blocks the Sun from partially or fully reaching the Moon. Align the lamp or light source, the ball, and you to create a lunar eclipse.
- Compare a full moon to a lunar eclipse. How are the positions of the Earth and Moon different?
- A crescent moon can have many angles in the sky. Can you align the ball, lamp, and yourself to create the angle of the shape seen in these two images?



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