

Name: _____ Date: _____

Student Exploration: Phases of the Moon

Vocabulary: axis, crescent, First Quarter, Full Moon, gibbous, illuminate, Moon phase, New Moon, orbit, revolve, rotate, Third Quarter, waning, waxing

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

1. A **Moon phase** is what the Moon looks like from Earth at a particular time. In the space below, draw a few pictures of different Moon phases, based on what you have seen before.

2. About how often does a Full Moon happen? _____

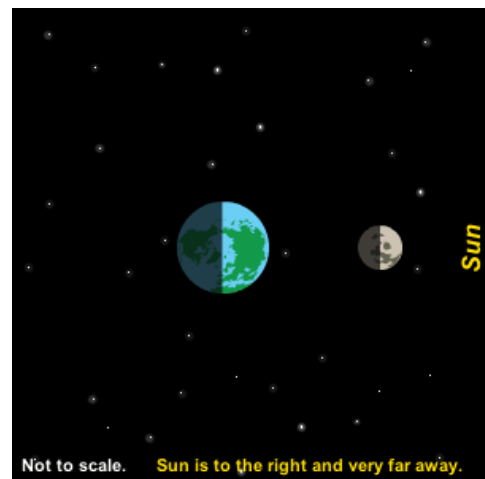
Gizmo Warm-up

1. In the *Phases of the Moon* Gizmo™, click **Play** (▶). What do you notice about the motion of the Moon?

The path that the Moon takes is called its **orbit**. The Moon is **revolving** around Earth.

2. What do you notice about the motion of Earth?

This motion is called **rotation**. Earth rotates on its **axis**, a straight line connecting the North Pole to the South Pole.

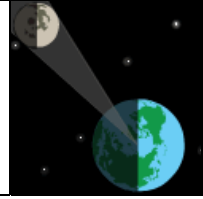


3. Where would you have to be to see the view shown above? Explain.

Activity A:
Moon phases

Get the Gizmo ready:

- Click **Reset** ().



Question: Why do we see phases of the Moon?

1. Brainstorm: Why do *you* think we see phases of the Moon?

2. Run Gizmo:

- Click **Play**. As the Moon goes around Earth, notice what the Moon looks like on the right side of the Gizmo. (This shows what an observer on the North Pole would see.)
- Turn on **Show view area** to see which part of the Moon is visible from Earth.

3. Observe: How does the Moon's appearance change as the Moon revolves around Earth?


4. Analyze:

A. Look at the overhead view of the Moon and Earth. How much of the Moon is always lit up, or **illuminated**, by the Sun? _____

B. Can we always see the same amount of the illuminated side of the Moon from Earth?

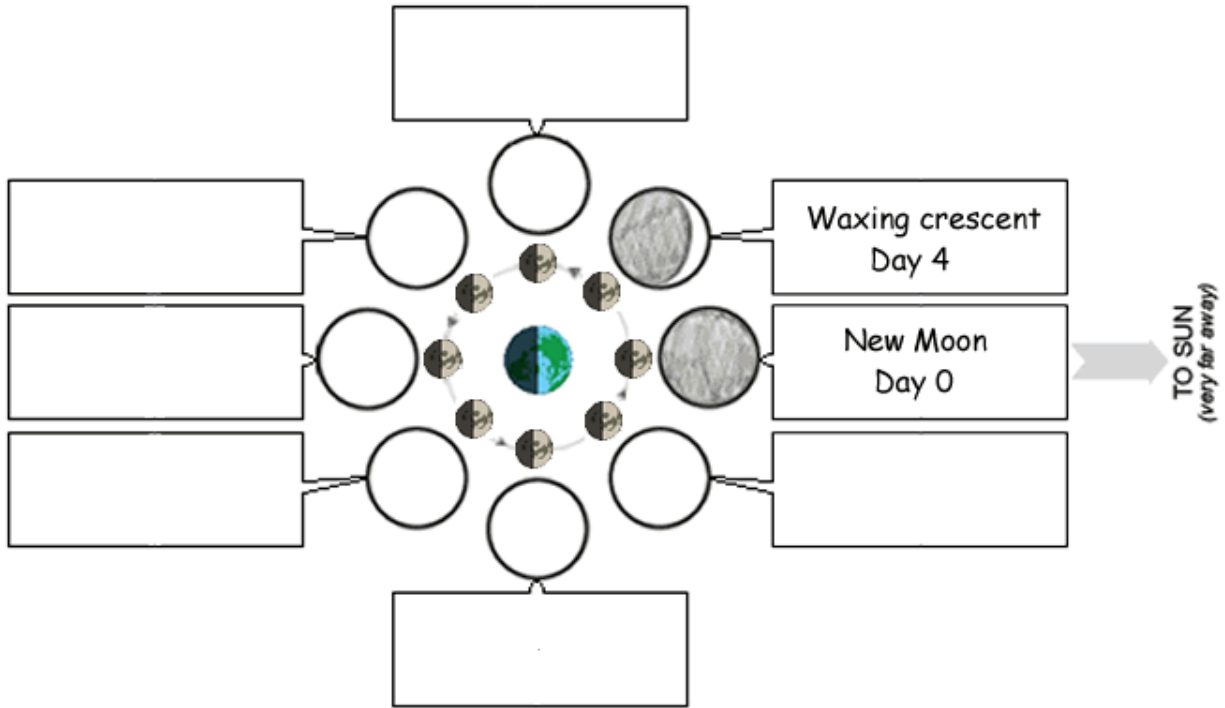
Explain. _____

5. Think and discuss: Based on your observations, why do we see Moon phases?


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|---|---|---|
| Activity B: Name that phase! | <u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> Click Reset. |  |
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Goals: Learn the names of Moon phases and when they occur.

- Run Gizmo: Click **Play**. When you are ready to fill in part of the diagram below, click **Pause** (⏸). Click **Play** to continue.
- Observe: Fill in the diagram below. Sketch what the Moon looks like and write the phase name and day below your sketch. (The first two are done for you.)



- Think and discuss: **Waxing** means “growing” and **waning** means “shrinking.”
 - Seen from the North Pole, which side of a waxing Moon is illuminated? _____
 - Which side is illuminated when the Moon is waning? _____
 - Suppose you saw a crescent Moon. How would you know if it was waxing or waning? _____

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| <p>Extension:</p> <p>The Man in the Moon</p> | <p><u>Get the Gizmo ready:</u></p> <ul style="list-style-type: none"> • Click Reset. • Turn on Show flag. |  |
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Question: If you look closely at the Full Moon, you may notice dark areas that look a bit like a face. This is known as “The Man in the Moon.” Does this side of the Moon always face Earth?

1. Form hypothesis: Do you think we always see the same side of the Moon? _____

2. Run Gizmo: Click **Play**. The flag helps you notice how quickly the Moon is rotating. Click **Pause** when the flag has rotated in a full circle, showing that the Moon has rotated once.

3. Observe: Where does the flag point as the Moon revolves around Earth? _____

4. Draw conclusions: Do we always see the same side of the Moon? How do you know?

5. Observe:

A. How long did it take for the Moon to go around Earth?

B. How long did it take for the flag to rotate once in a full circle?

6. Analyze: What do you notice about these two periods of time?

7. Think and discuss: Suppose the Moon rotated on its axis just as quickly as Earth. Would we still always see the same side of the Moon from Earth? Explain.

