

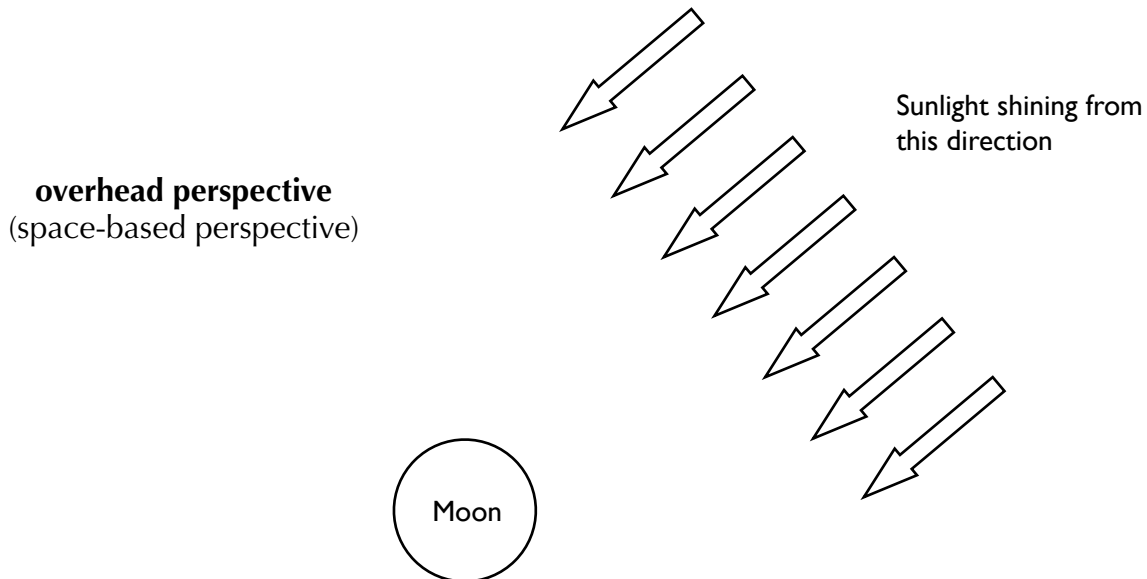
# MOON PHASES

## Session 1: The Four Steps

Note: Wait for instructions before you start answering the questions here!

### I. How is the Moon lit up?

- a. What do you think lights up the Moon? \_\_\_\_\_
- b. The diagram below shows an overhead view of the Moon. **Shade the part of the Moon** that you think will be dark (leave the lit part of the Moon white/unshaded).

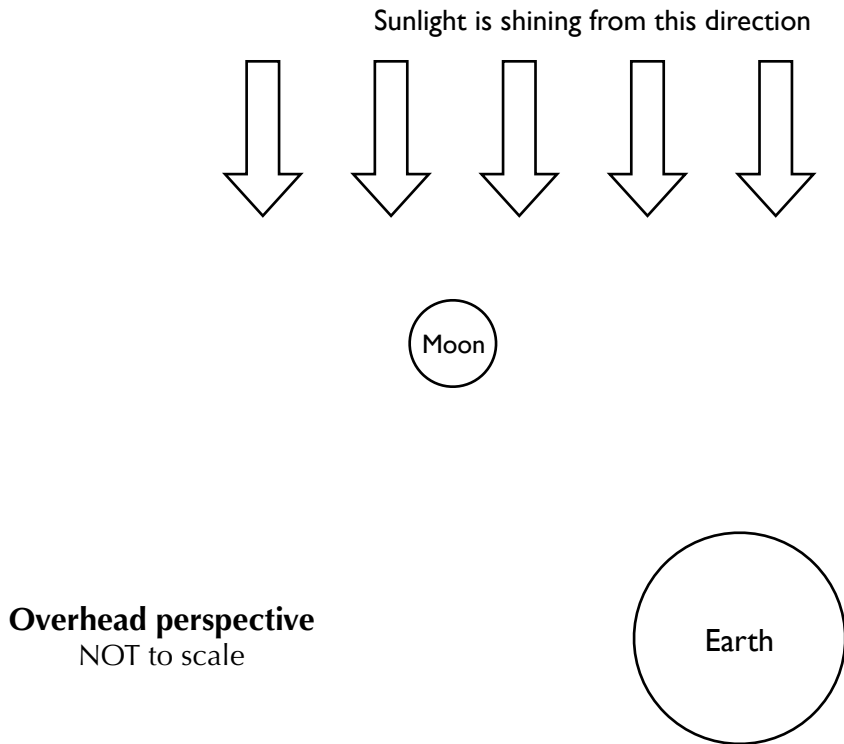


- c. How much of the Moon is lit at any time \_\_\_\_\_  
< write as a fraction >
- d. Why is the dark part of the Moon dark? (respond below)

---

---

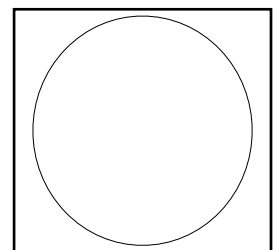
**2. Follow 4 STEPS to figure out the Moon's phase**



Overhead Perspective (space-based perspective)	
<b>Step 1</b>	<b>Shade</b> the part of the Moon (and Earth) that appears dark from overhead.
<b>Step 2</b>	<b>Draw</b> a line that divides the Moon into the halves facing Earth and facing away from Earth. <b>Label</b> the two sides of the Moon (“facing Earth” / “facing away from Earth”).
<b>Step 3</b>	<b>Describe</b> the side of the Moon facing Earth. <i>Circle one of the five choice below</i> ALL DARK   MOSTLY DARK   HALF-LIT/HALF-DARK   MOSTLY LIT   ALL LIT
Earth-Based Perspective	
<b>Step 4</b>	Use the overhead view above to imagine what the Moon looks like from Earth. <b>Predict</b> if the light is on the Moon’s left or right (when viewed from Earth’s Northern Hemisphere). <i>Circle one of the two choice below</i> LEFT   RIGHT

**Earth-Based Perspective:**

In the box to the right, **draw** what you think the Moon looks like from Earth (in the Northern Hemisphere).



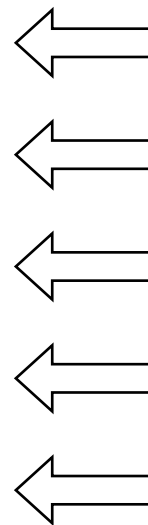
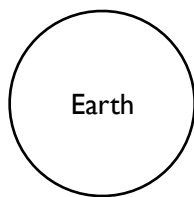
# MOON PHASES

## Session 2: The Missions

### Mission I

**Figure out** what the Moon in diagram A below looks like from Earth's Northern Hemisphere.

**Diagram A**  
Overhead Perspective  
NOT to scale

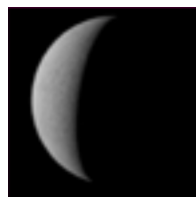
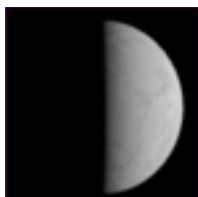
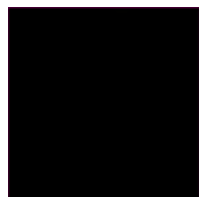


Sun is shining from this direction

Overhead Perspective (space-based perspective)	
<b>Step 1</b>	<b>Shade</b> the part of the Moon (and Earth) that appears dark from overhead.
<b>Step 2</b>	<b>Draw</b> a line that divides the Moon into the halves facing Earth and facing away from Earth. <b>Label</b> the two sides of the Moon ("facing Earth" / "facing away from Earth").
<b>Step 3</b>	<b>Describe</b> the side of the Moon facing Earth. <i>Circle one of the five choice below</i> ALL DARK   MOSTLY DARK   HALF-LIT/HALF-DARK   MOSTLY LIT   ALL LIT
Earth-Based Perspective	
<b>Step 4</b>	Use the overhead view above to imagine what the Moon looks like from Earth. <b>Predict</b> if the light is on the Moon's left or right (when viewed from Earth's Northern Hemisphere). <i>Circle one of the two choice below</i> LEFT   RIGHT

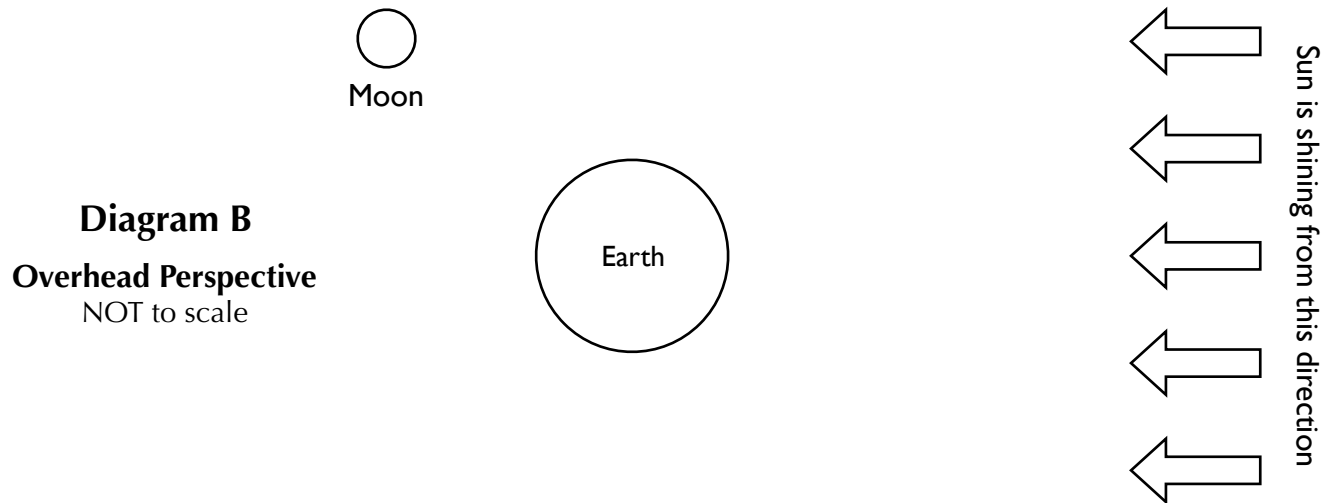
### Mission Completion | Earth-Based Perspective:

**Choose** what you think the Moon looks like from Earth (in the Northern Hemisphere)



## Mission 2

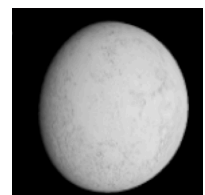
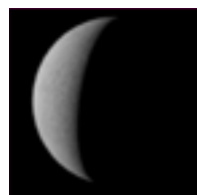
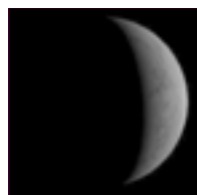
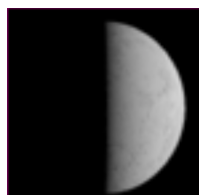
**Figure out** what this Moon in diagram B looks like from Earth's Northern Hemisphere.



Overhead Perspective (space-based perspective)	
<b>Step 1</b>	<b>Shade</b> the part of the Moon (and Earth) that appears dark from overhead.
<b>Step 2</b>	<b>Draw</b> a line that divides the Moon into the halves facing Earth and facing away from Earth. <b>Label</b> the two sides of the Moon ("facing Earth" / "facing away from Earth").
<b>Step 3</b>	<b>Describe</b> the side of the Moon facing Earth. <i>Circle one of the five choice below</i> ALL DARK   MOSTLY DARK   HALF-LIT/HALF-DARK   MOSTLY LIT   ALL LIT
Earth-Based Perspective	
<b>Step 4</b>	Use the overhead view above to imagine what the Moon looks like from Earth. <b>Predict</b> if the light is on the Moon's left or right (when viewed from Earth's Northern Hemisphere). <i>Circle one of the two choice below</i> LEFT   RIGHT

### Mission Completion | Earth-Based Perspective

**Choose** what you think the Moon looks like from Earth (in the Northern Hemisphere)



### Question 3

**Explain** how we experience a New Moon. How is it that a half-lit Moon could appear completely dark to someone on Earth?

---

---

---

---

---

---

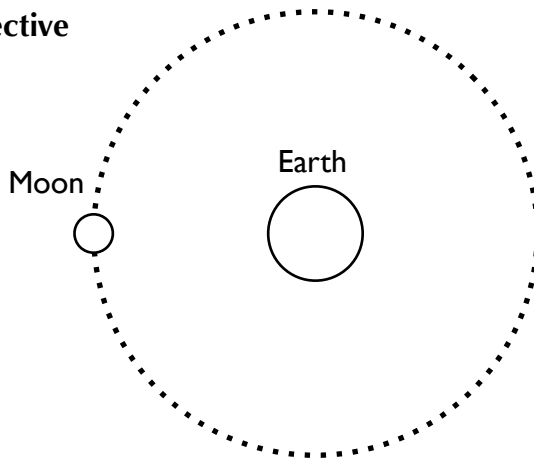
---

Sketch and label a diagram of an overhead view of the Sun, Earth and Moon to demonstrate your reasoning.

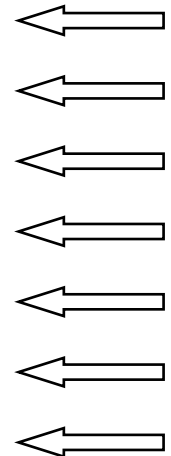
### Question 4

**Predict:** How will the Moon appear to a viewer on Earth when the Moon is in this position?

Overhead perspective  
NOT to scale



Sun is shining from this direction



Hint: The Moon's orbit has a slight tilt, so the Moon is almost always slightly above or below Earth compared to the Sun. When the Moon is above or below, sunlight does not get blocked by Earth.

In this position, a viewer on Earth will see the Moon as \_\_\_\_\_.  
< all dark / mostly dark / half lit-half dark / mostly lit / all lit >

This is known as a \_\_\_\_\_ moon.  
< new / crescent / half / gibbous / full >

# MOON PHASES

## Session 3: Eclipses

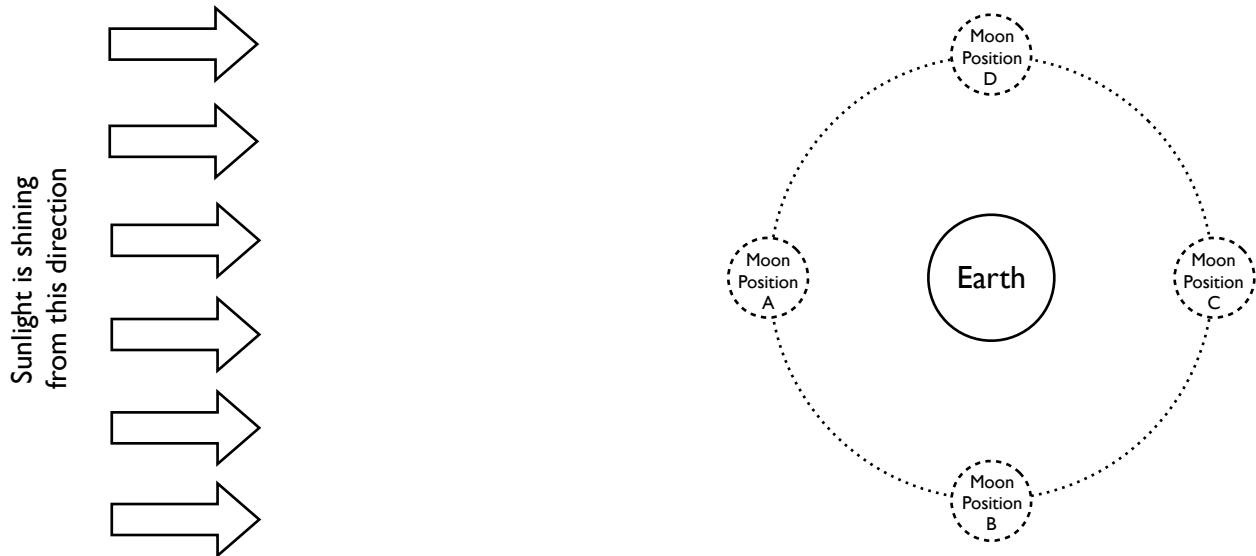
**Instructions:** You and your partner should **discuss your responses** to each question, then write your answers in your own packet.

### 1. Lunar or Solar Eclipse?

- a. During a **lunar eclipse**, something is blocking the \_\_\_\_\_ .  
< Sun / Moon >
  
- b. During a **solar eclipse**, something is blocking the \_\_\_\_\_ .  
< Sun / Moon >

### 2. Which positions?

This diagram shows an **overhead view** of the sunlight and Earth, with the Moon drawn at 4 possible positions. *NOTE: The diagram is not to scale!*



- a. Choose the Moon position that goes with a **Solar Eclipse**:    A    B    C    D
  
- b. What is the phase of the Moon when it is at the position you chose in **part a**?  
 At this position, the phase of the Moon is \_\_\_\_\_ .  
< new / crescent / half / gibbous / full >
  
- c. Choose the Moon position that goes with a **Lunar Eclipse**:    A    B    C    D
  
- d. What is the phase of the Moon when it is at the position you chose in **part c**?  
 At this position, the phase of the Moon is \_\_\_\_\_ .  
< new / crescent / half / gibbous / full >

