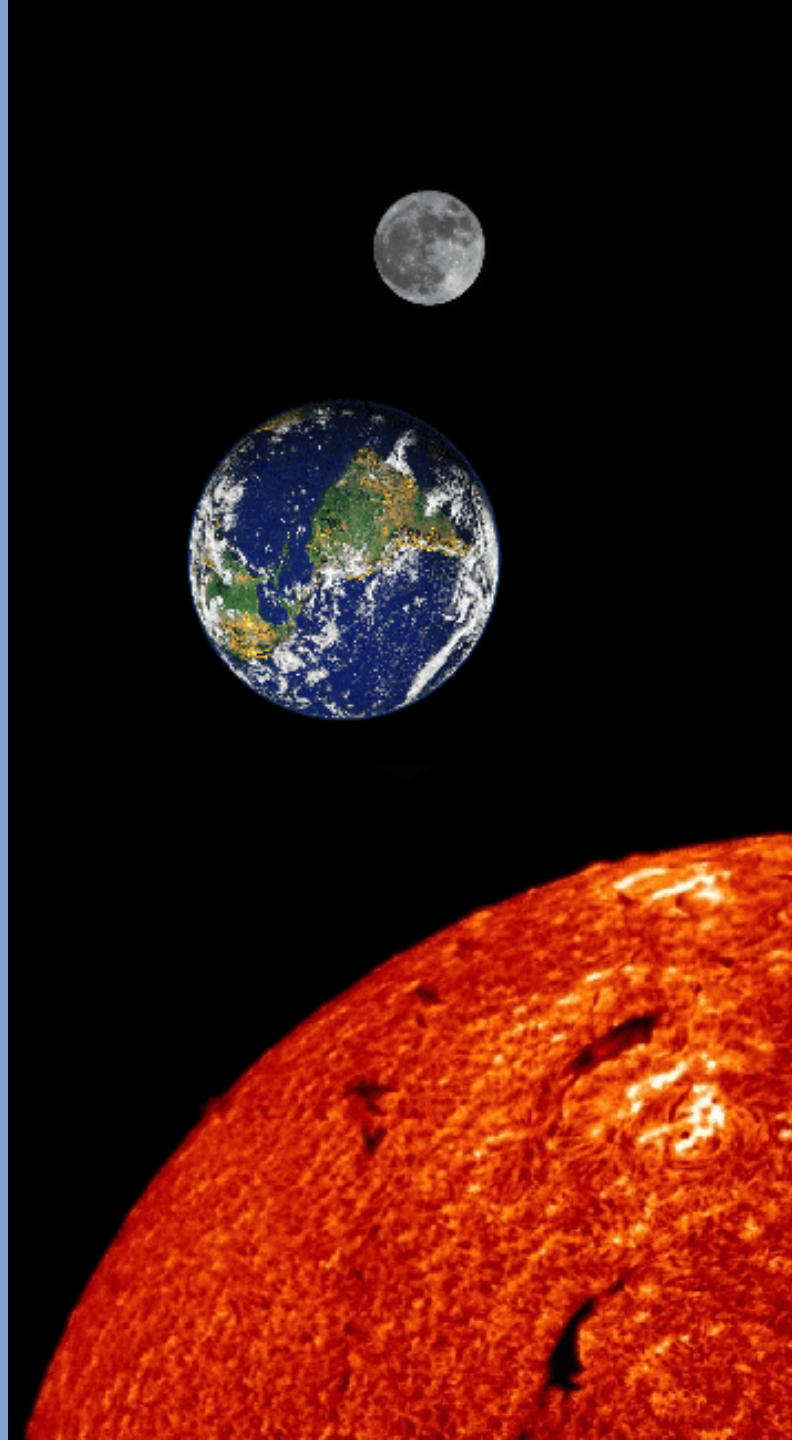
Essential Question:

How does the position of the sun, earth, and moon affect each other?

S6E2a. Demonstrate the phases of the moon by showing the alignment of the earth, moon, and sun.

S6E2b. Explain the alignment of the earth, moon, and sun during solar and lunar eclipses.

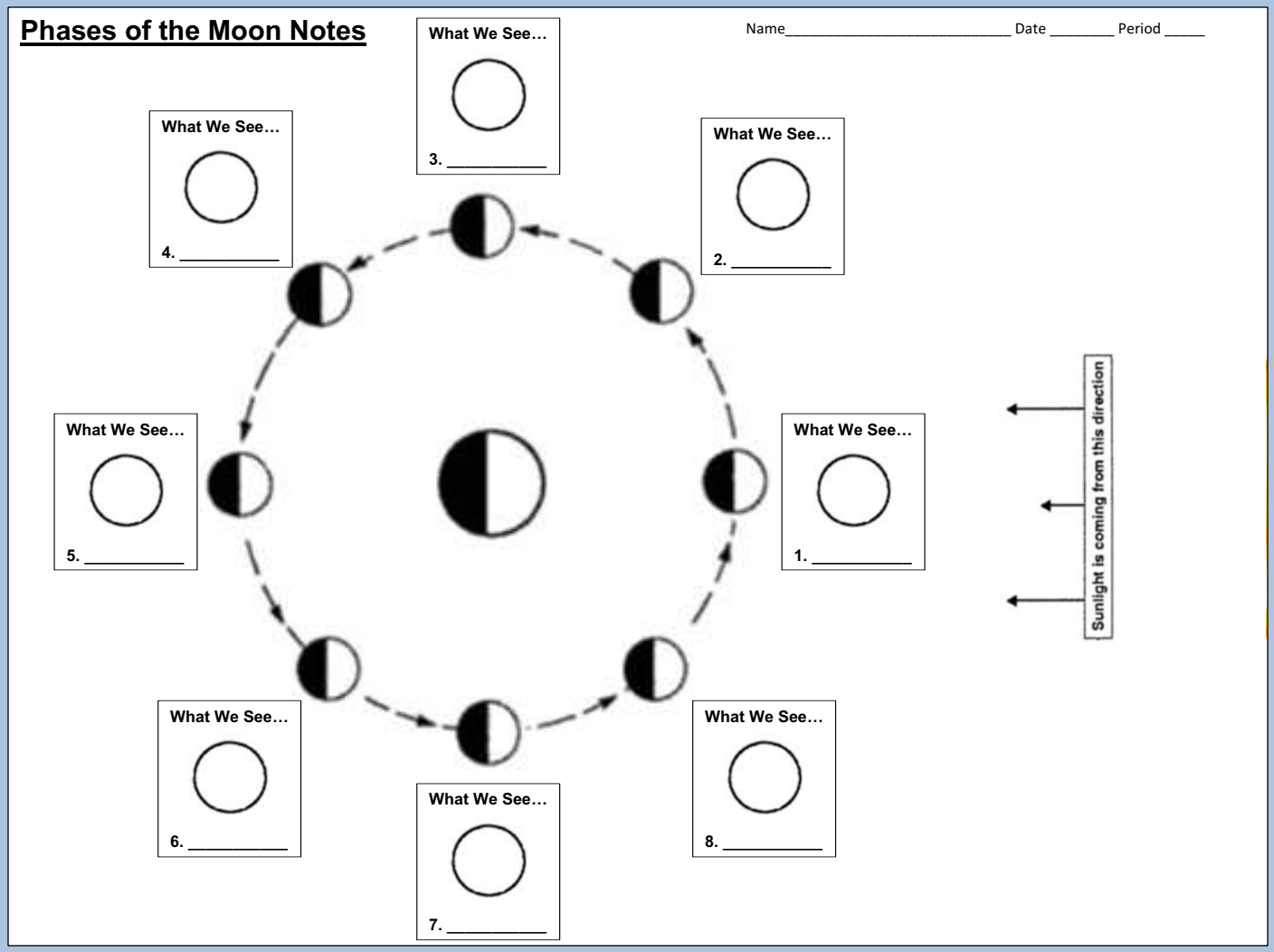


Activating Strategy

In your own words, describe why the moon looks different throughout the month.

Phases of the Moon

Use the Phases of the Moon Notes



Facts about Phases of the Moon

- The moon changes in position in the sky each day. It also changes in appearance from a full moon to a thin crescent. These changes are called phases.

- The moon orbits the Earth once in about 28 days, which changes the part of the moon lighted by the sun and how much of that part can be seen from the Earth – phases of the moon.

- The moon's light comes from the sun, and the sunlight is reflected off the moon's surface.

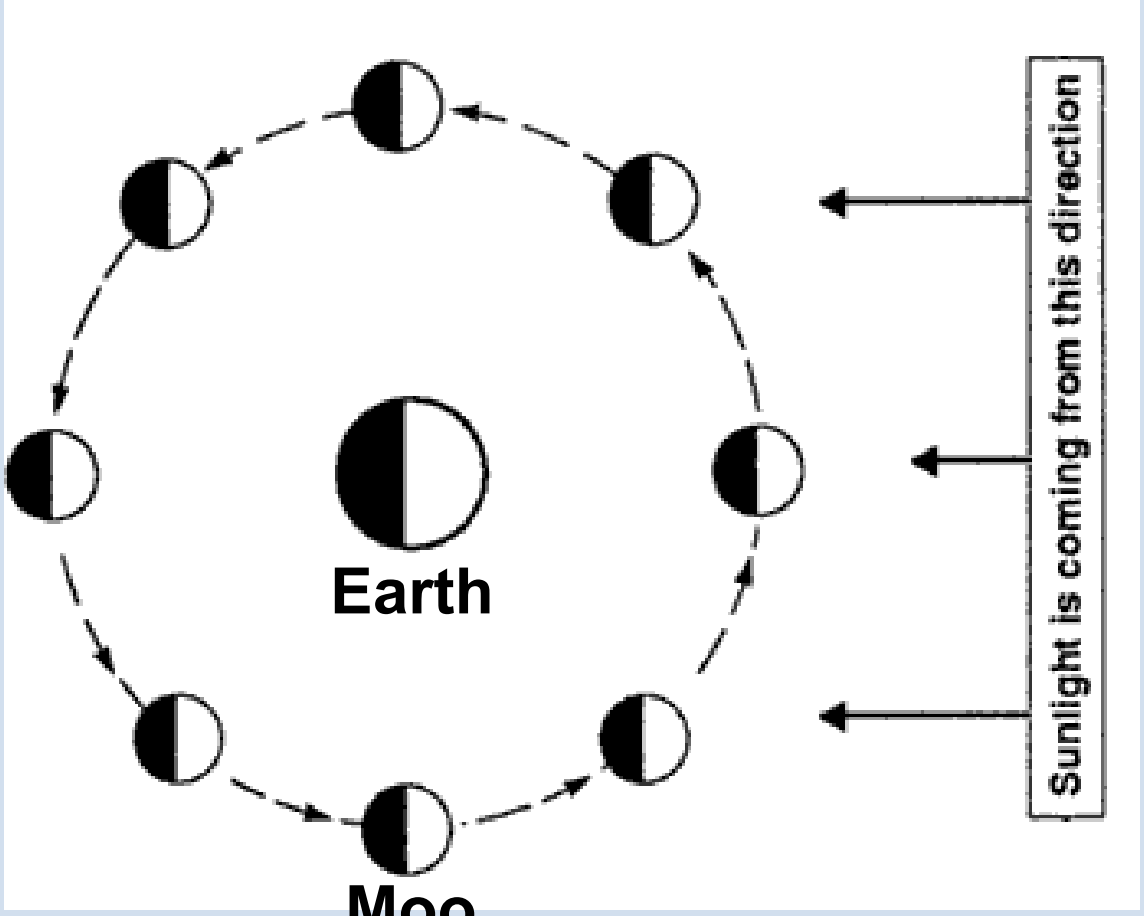
Why we see Phases….

http://ww2.valdosta.edu/~cbarnbau/astro_demos/frameset_moon.html

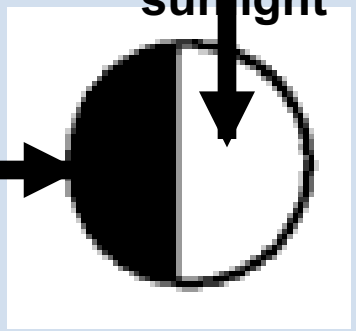
Facts about Phases of the Moon

- The moon's phases are caused by the part of the moon that reflects the sun and seen from our position on earth.
- The same side of the moon always faces the earth because the moon turns on its axis at the same rate as it revolves around the earth.
- The moon can be seen during the day during several of the moon's phases. The time and length of day that the moon can be seen varies with the phase of the moon.

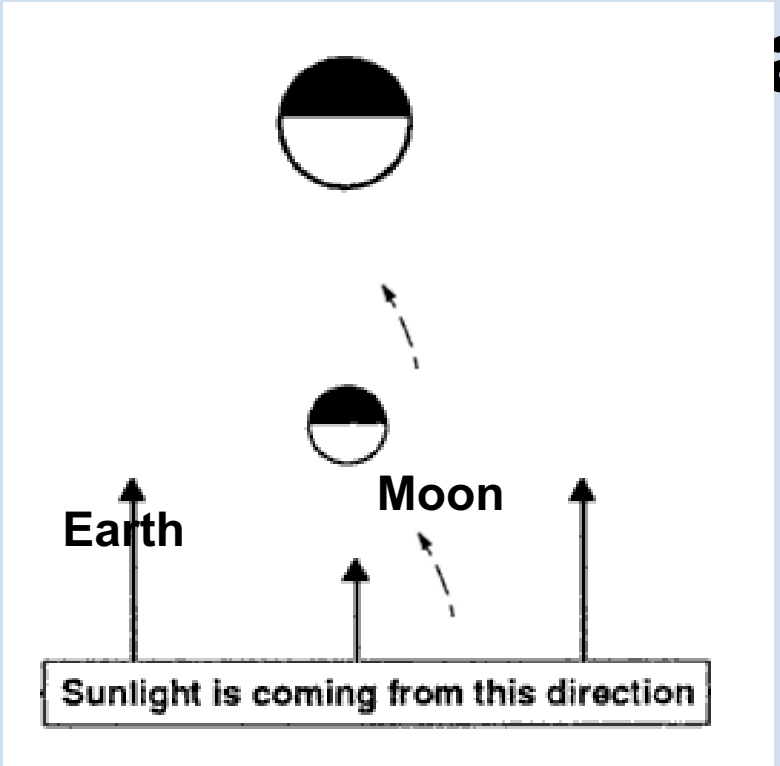
Phases of the Moon



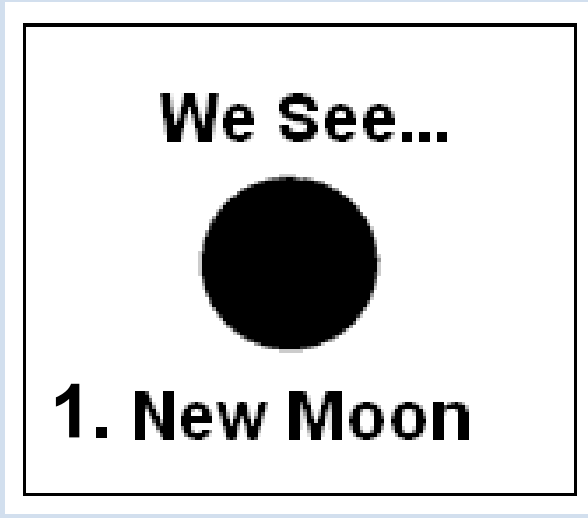
What does this symbol represent?



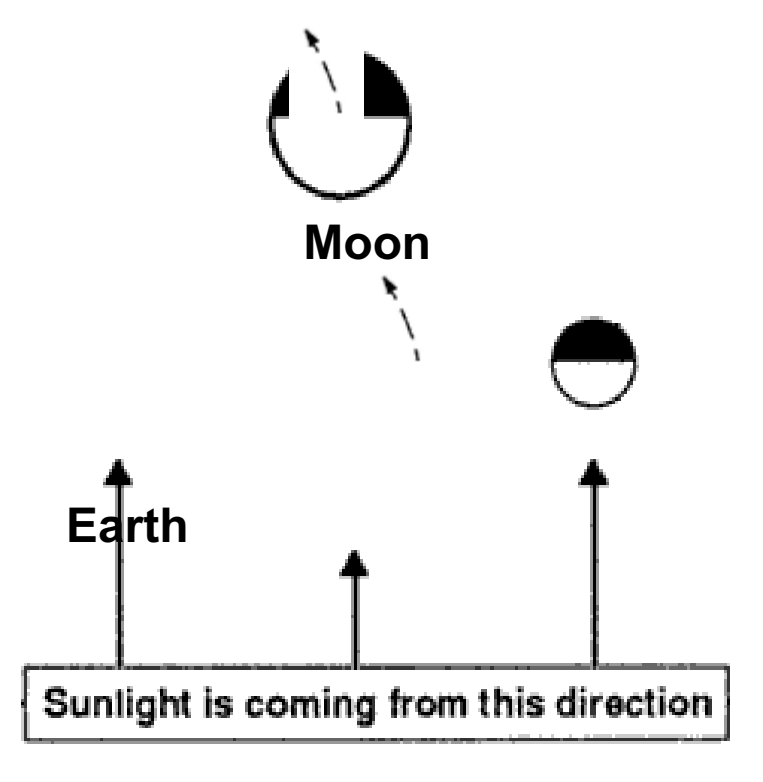
Position of the Sun, Moon, and Earth



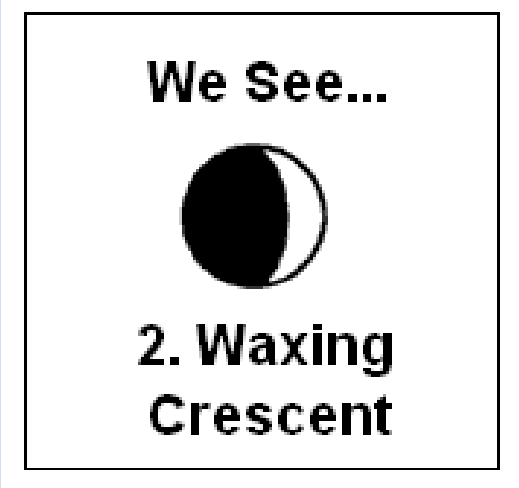
What We See from Earth



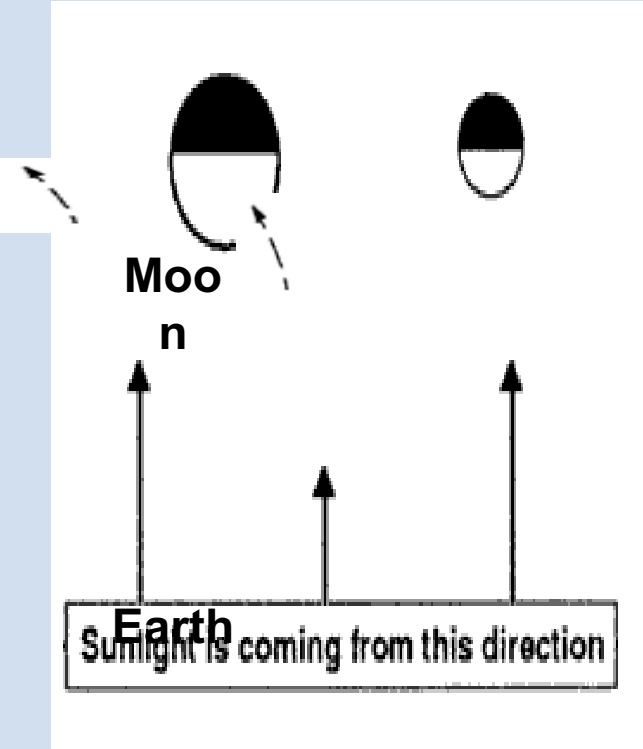
Position of the Sun, Moon, and Earth



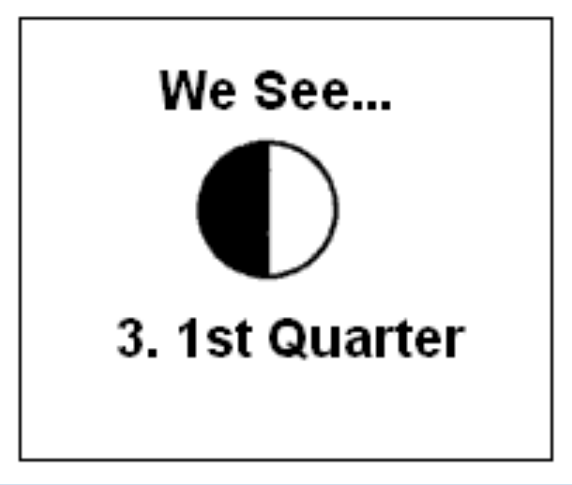
What We See from Earth



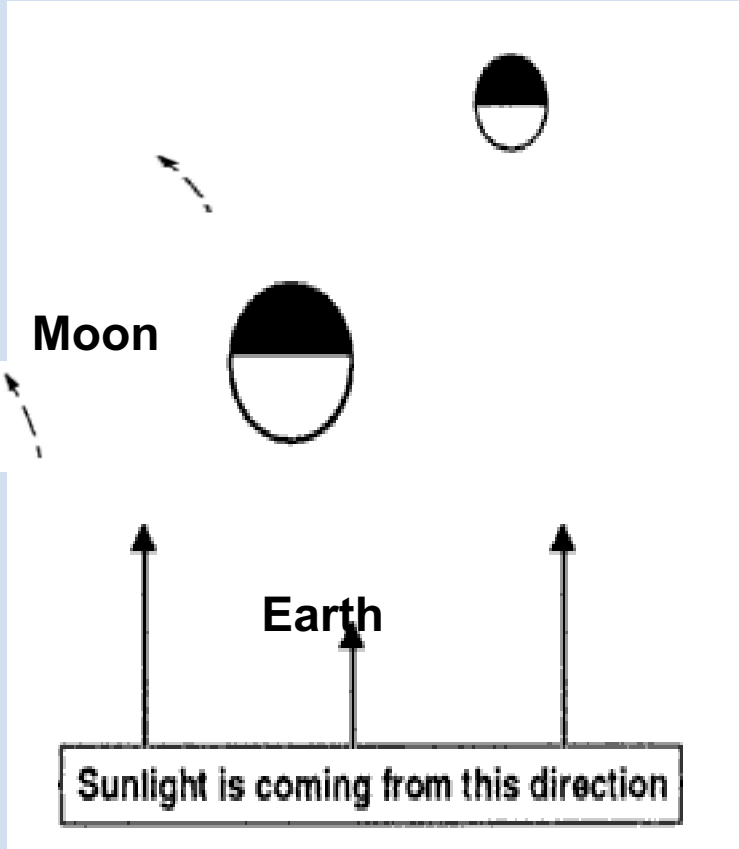
Position of the Sun, Moon, and Earth



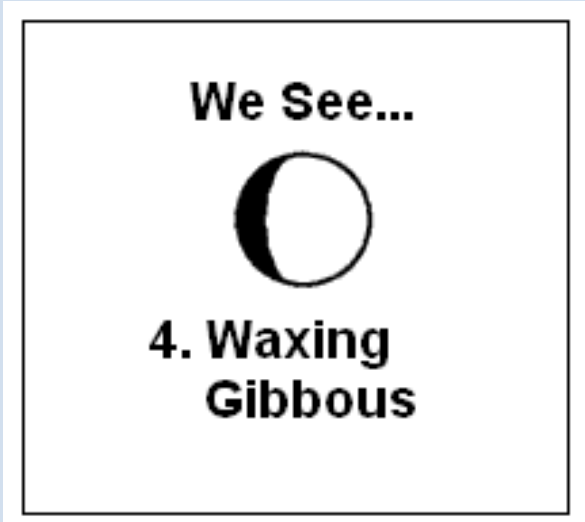
What We See from Earth



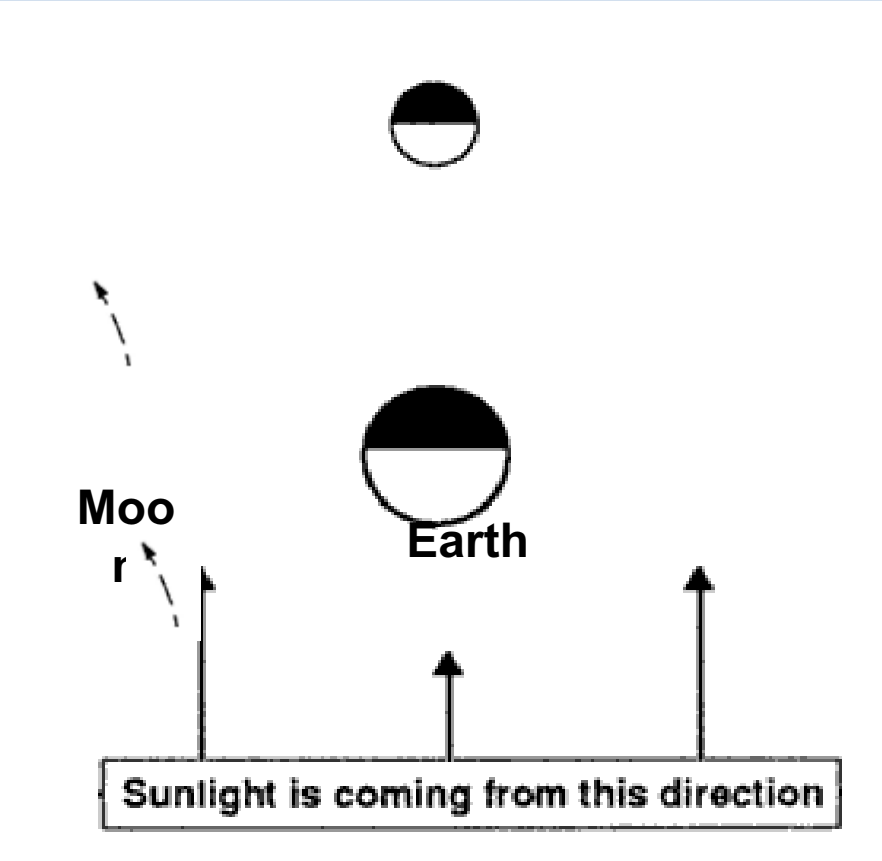
Position of the Sun, Moon, and Earth



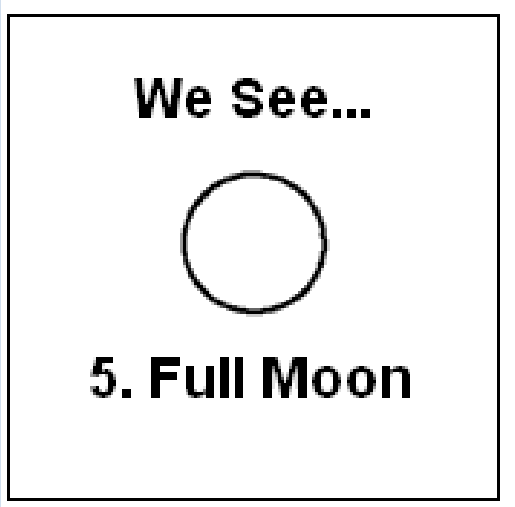
What We See from Earth



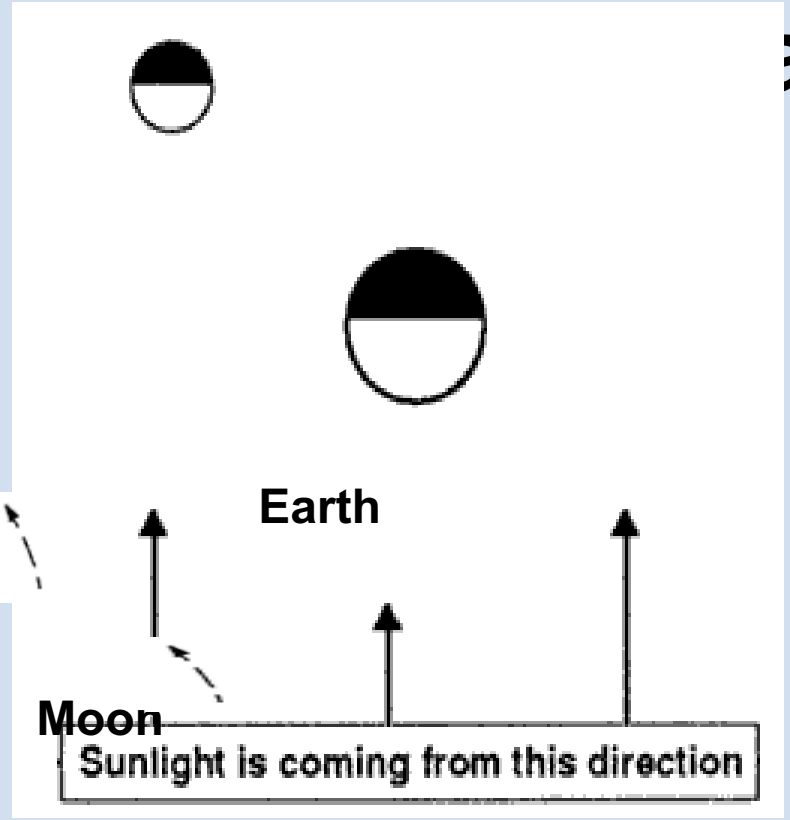
Position of the Sun, Moon, and Earth



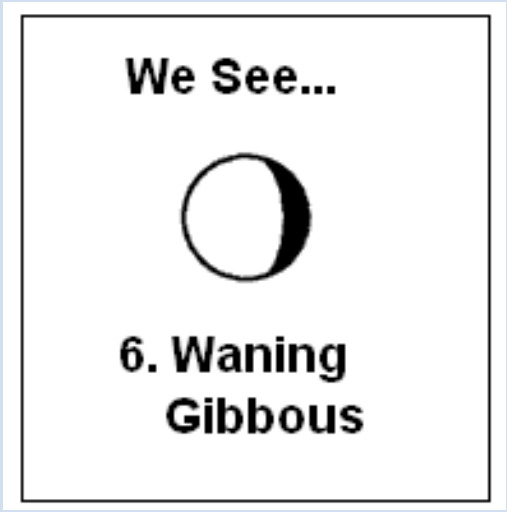
What We See from Earth



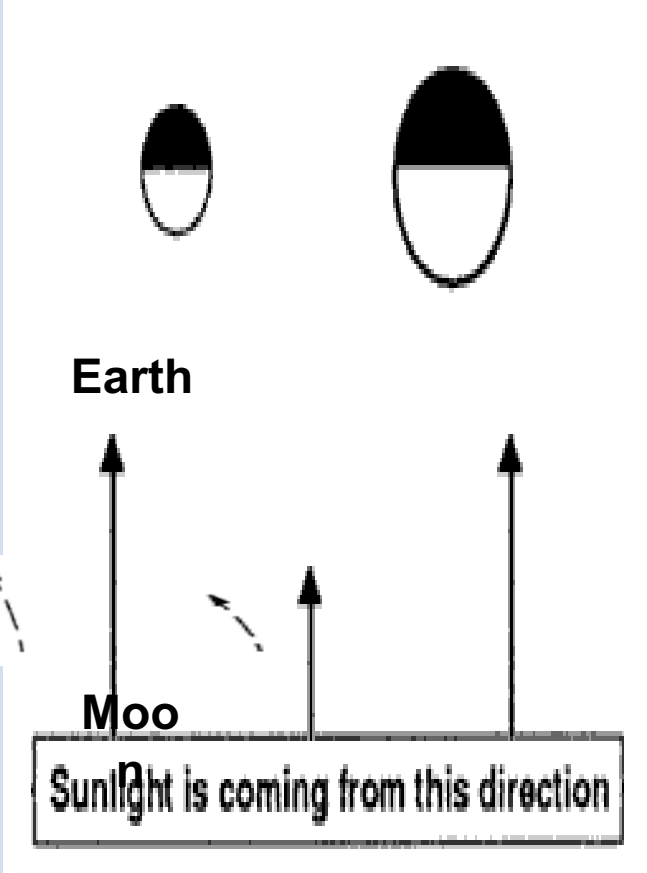
Position of the Sun, Moon, and Earth



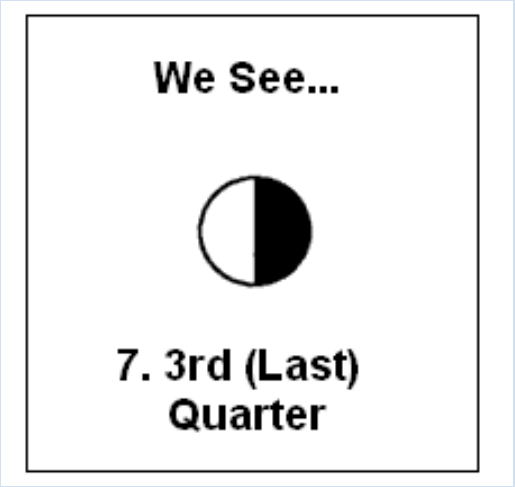
What We See from Earth



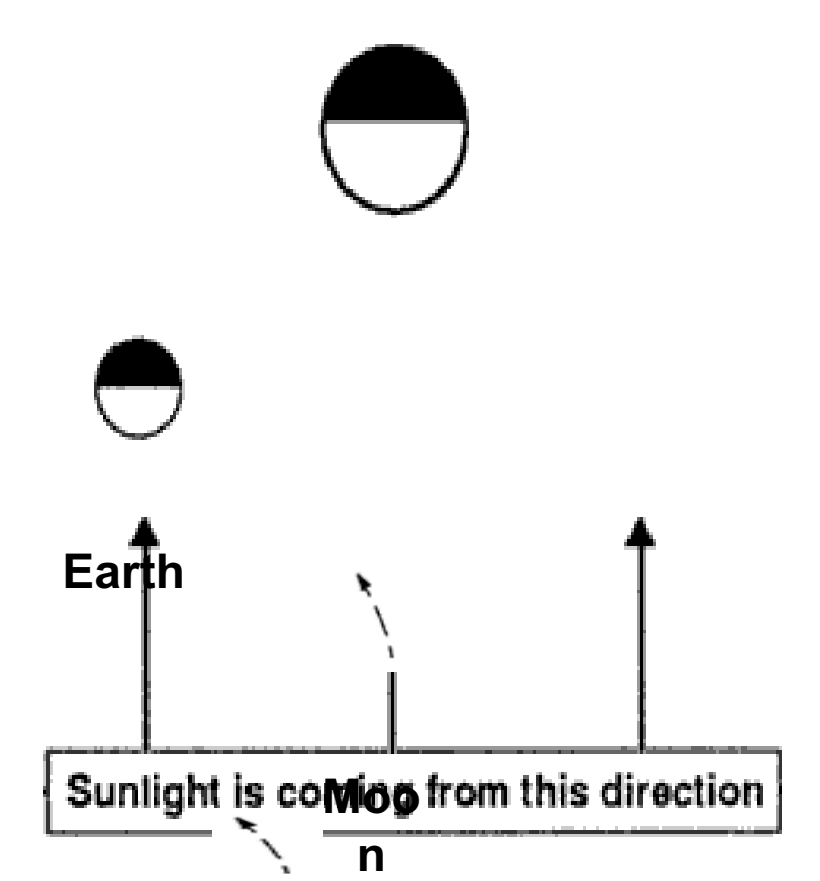
Position of the Sun, Moon, and Earth



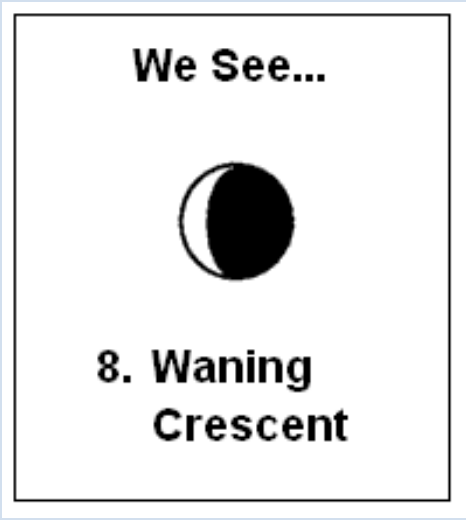
What We See from Earth



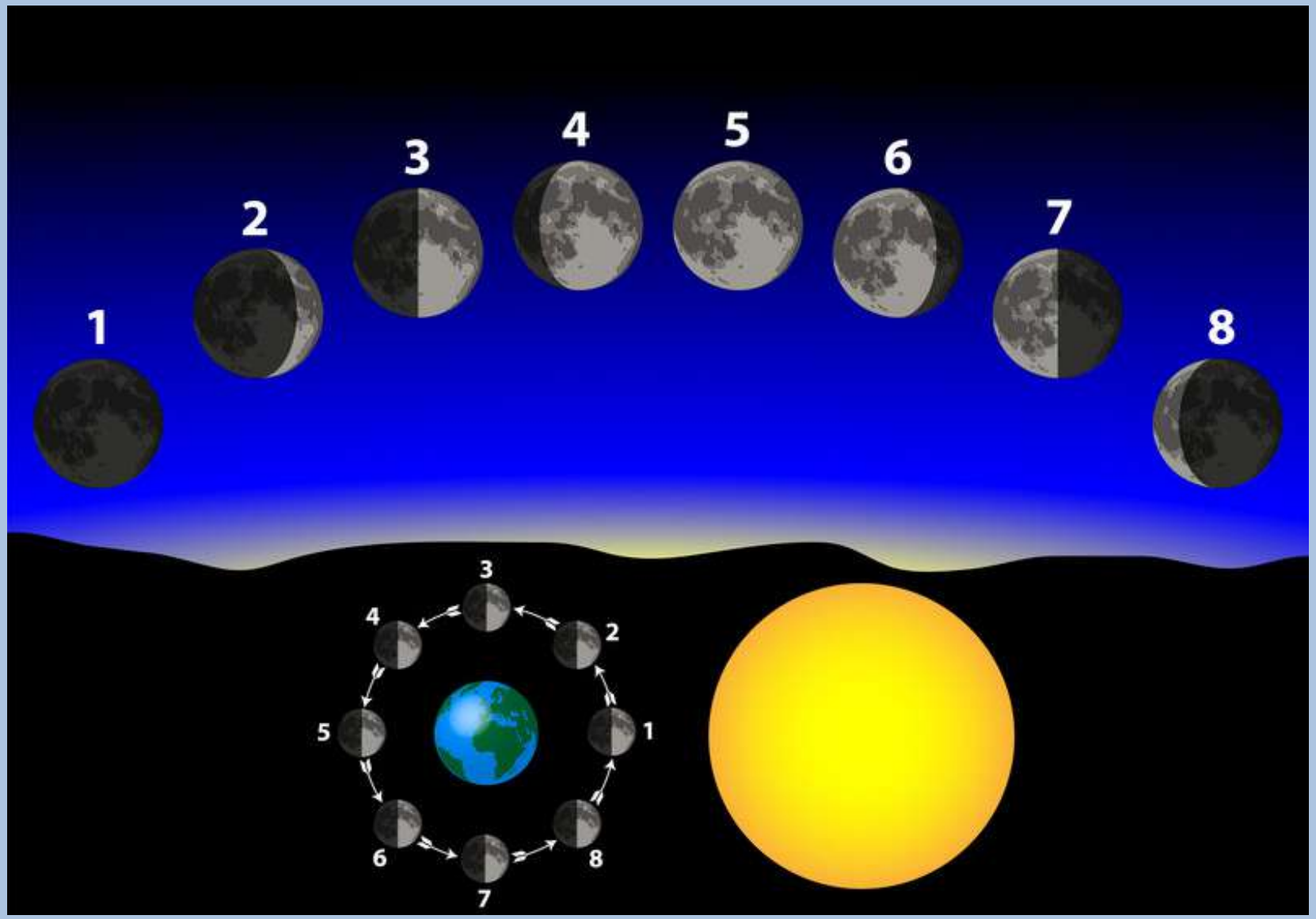
Position of the Sun, Moon, and Earth



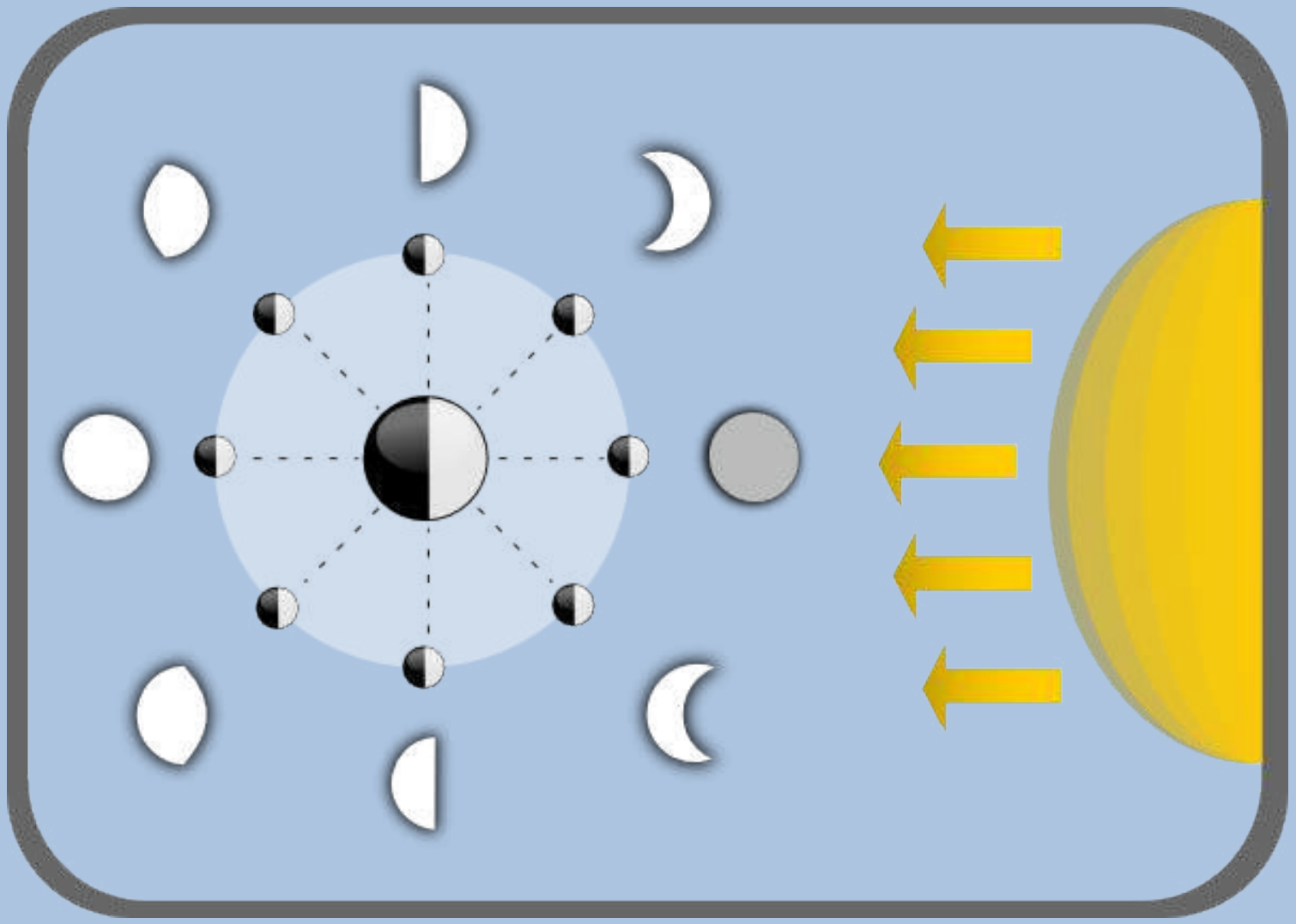
What We See from Earth



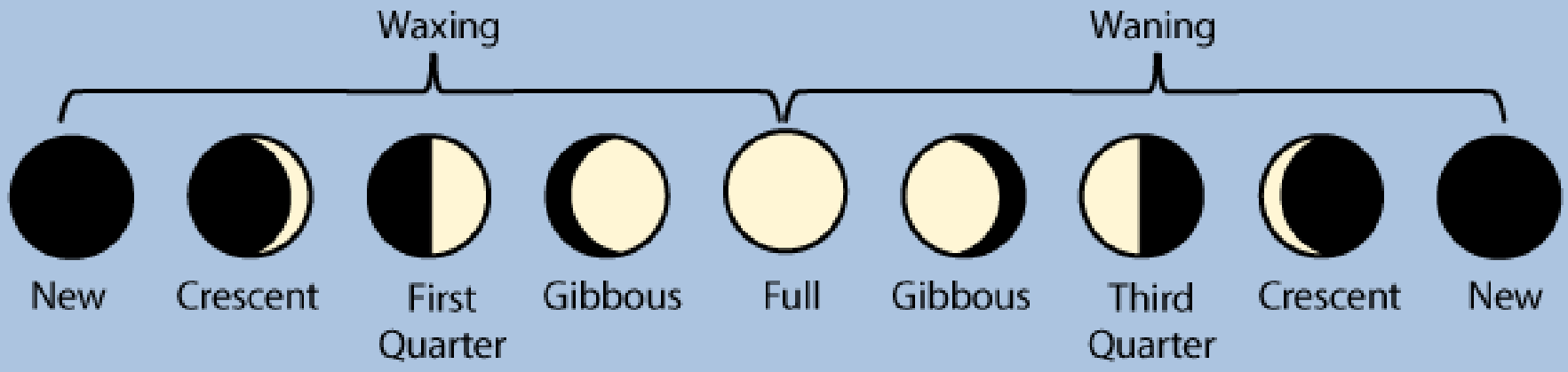
Other diagrams of Phase Changes



Other diagrams of Phase Changes



Phase Names Provide Clues



Waxing means to increase in size or grow larger.

In moon phases, what is increasing in size?

Waning means to decrease in size or grow smaller.

In moon phases, what is decreasing in size?

Animations of Moon Phases

http://web.archive.org/web/20060514142413/http://www.ioncmaste.ca/homepage/resources/web_resources/CSA_Astro9/files/multimedia/unit3/phases_moon/phases_moon.swf

http://www.harcourtschool.com/activity/moon_phases/

http://astro.unl.edu/naap/lps/animations/lps.html

http://astro.unl.edu/classaction/animations/lunarcycles/lunarphasequizzer.html

http://ww2.valdosta.edu/~cbarnbau/astro_demos/frameset_moon.html

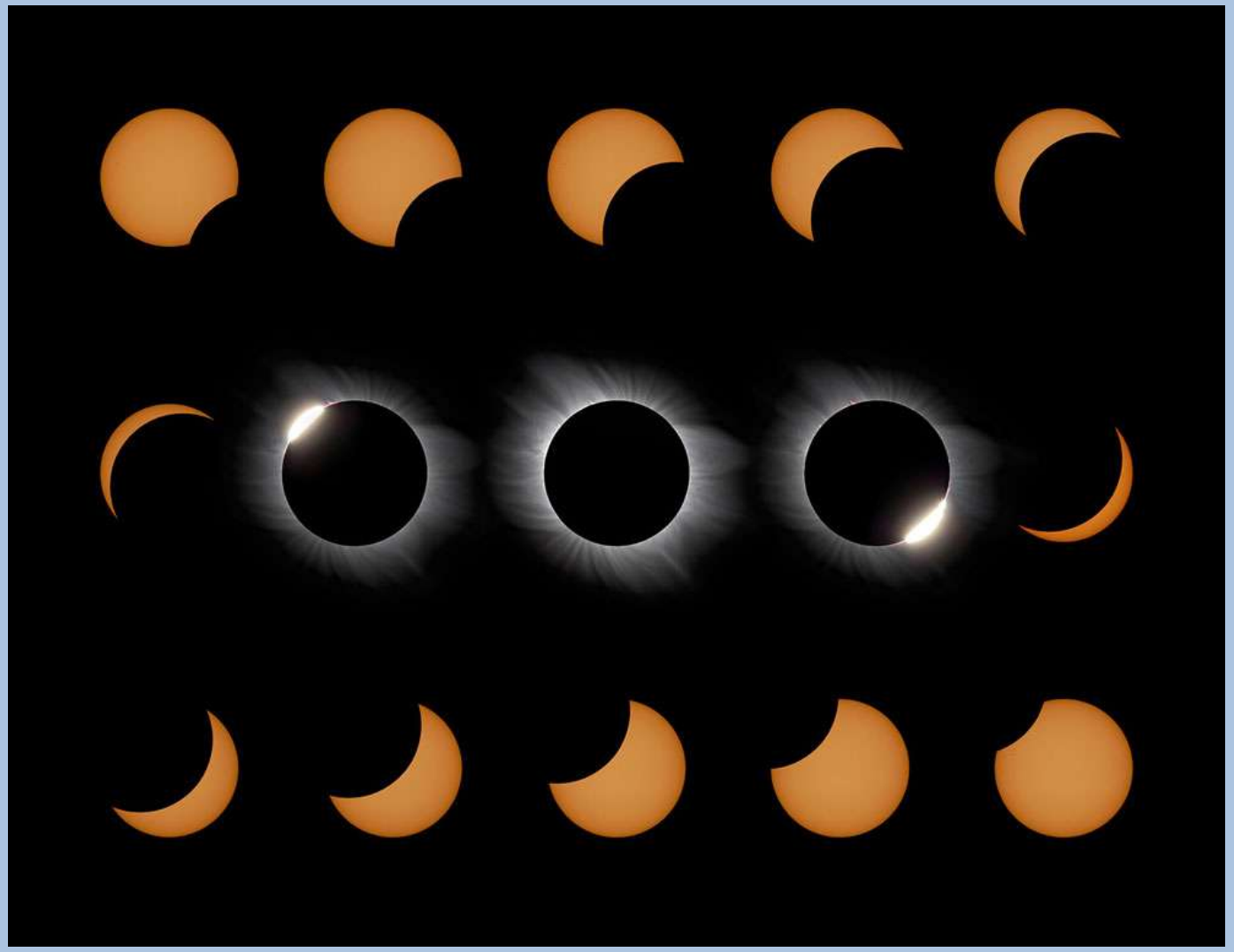
Suggested Activities [see resources]

- Moon Phases in Oreos
- Phases Flipbook
- Baseball Moon
- Phases of the Moon Calendar
- Phases of the Moon Wheel Review
- Several moon phase worksheets [remember it is not about learning the names with the type of phase; rather, it is about the location of the earth, sun, and moon in relation to the phases]

Phases Formative Assessment or Summarizer

[see resources]

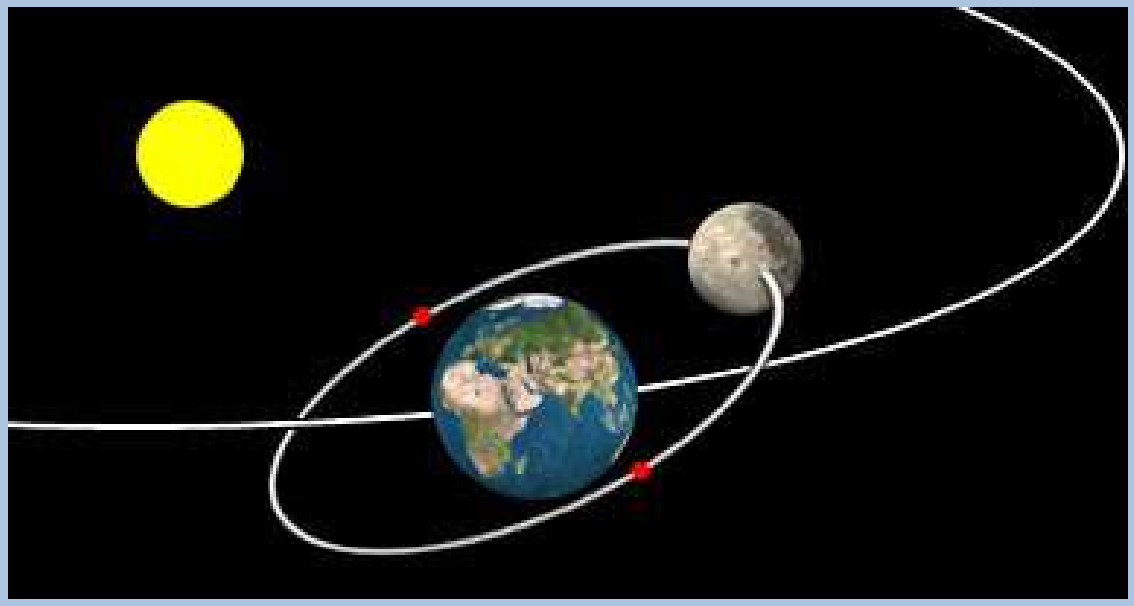
Eclipses

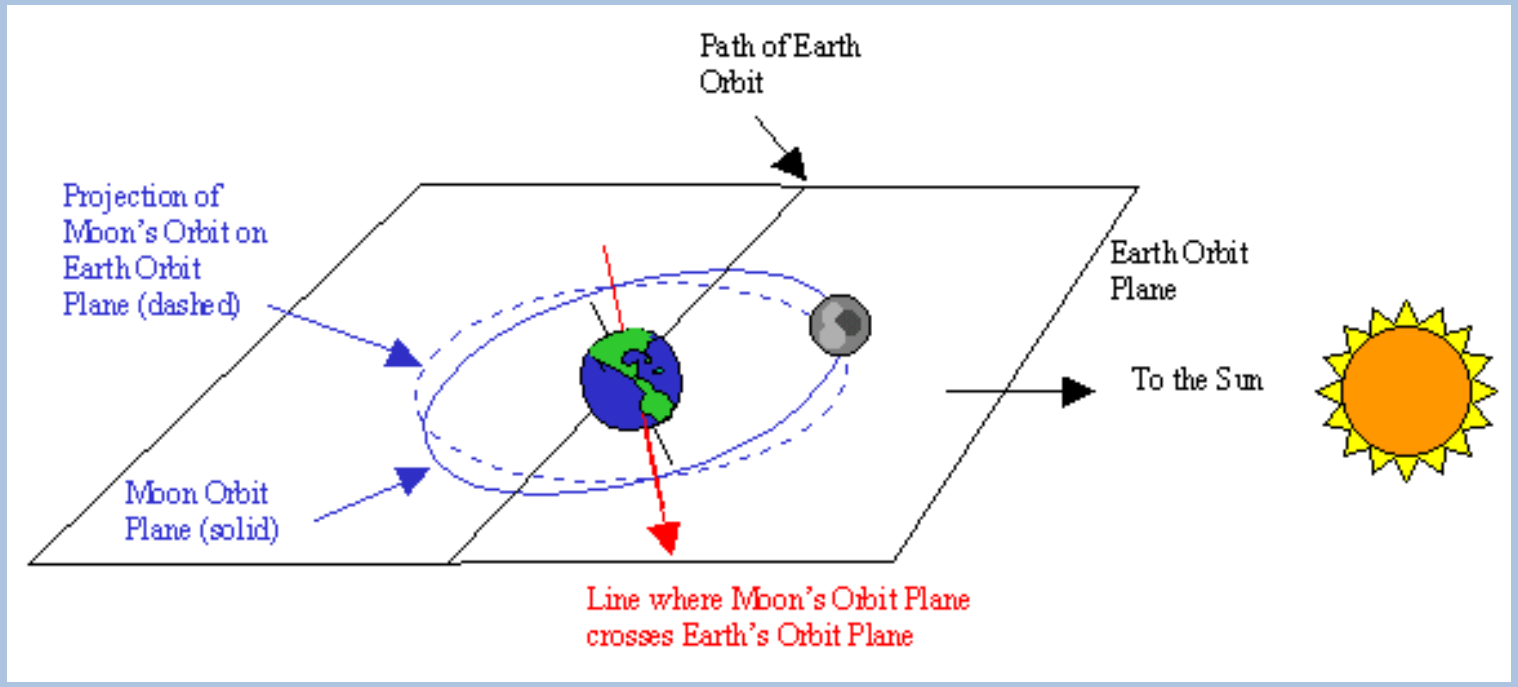


Activating Strategy:

What is an eclipse?

Why do we not have an eclipse every month?




Path of Earth Orbit
Projection of Moon's Orbit on Earth Orbit Plane (dashed)
Earth Orbit Plane
To the Sun
Moon Orbit Plane (solid)
Line where Moon's Orbit Plane crosses Earth's Orbit Plane

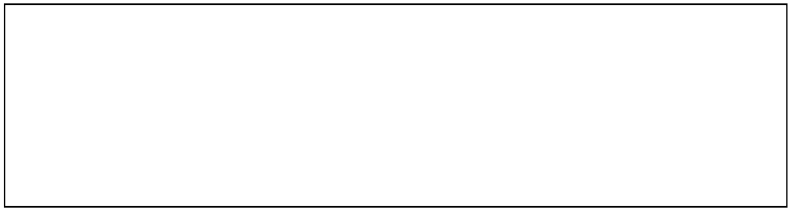
Use the Eclipse Notes

Eclipse Notes Name _____ Date _____ Period ____

1. Describe a solar eclipse. _____

_____

Draw a diagram illustrating the position of the Sun, Moon, and Earth during a solar eclipse.



2. Describe a lunar eclipse. _____

_____

Draw a diagram illustrating the position of the Sun, Moon, and Earth during a lunar eclipse.

3. Describe the difference between a solar eclipse and a lunar eclipse.

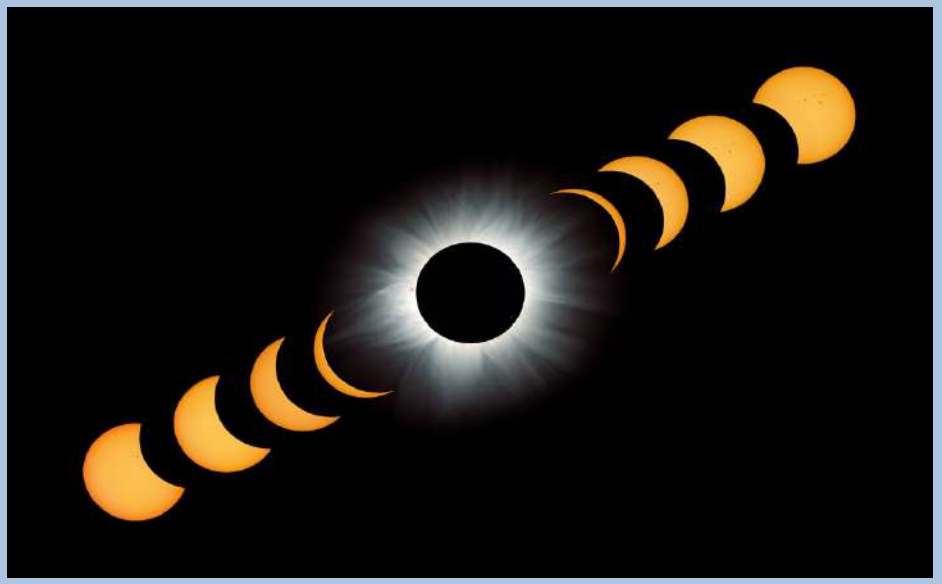
_____

_____

_____

There are two types of Eclipses:

Solar Eclipse

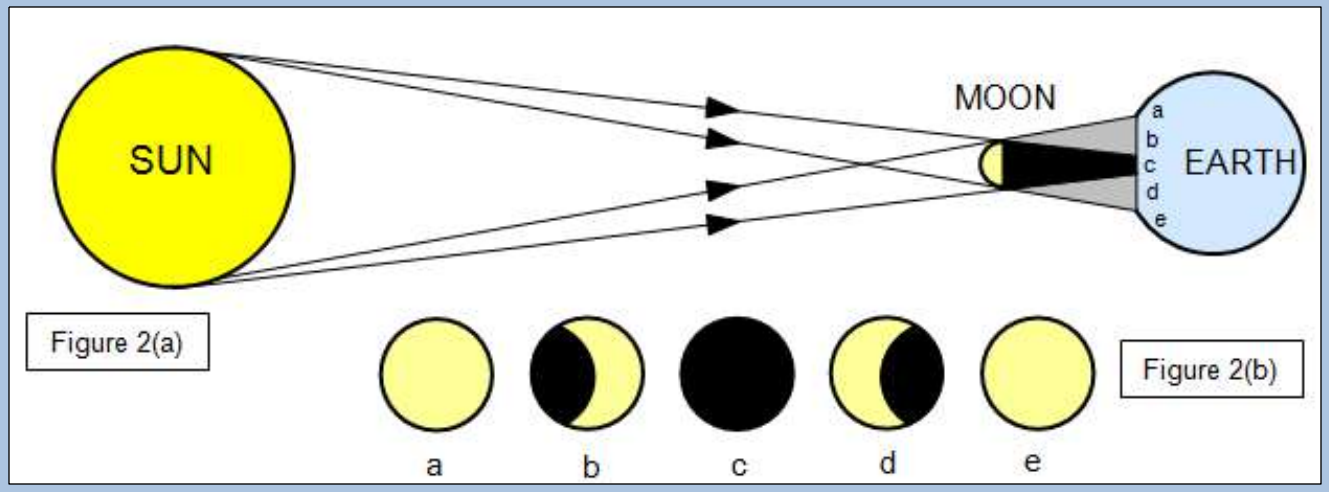


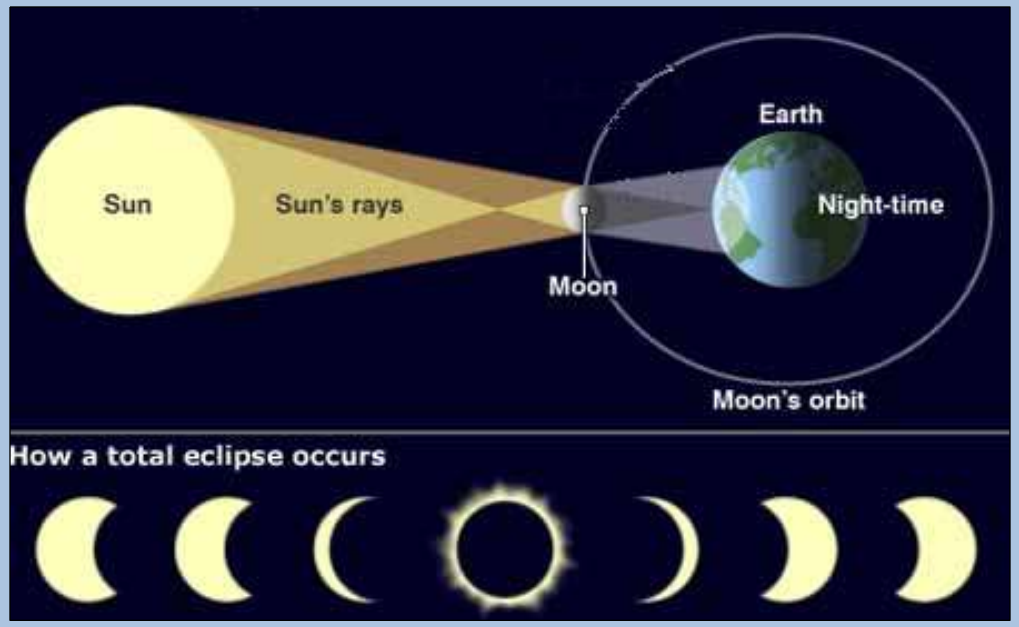
Lunar Eclipse

Solar Eclipse

- When its orbit around Earth takes the Moon directly between Earth and the Sun, the Moon blocks our view of the Sun in what we call a solar eclipse.
- In short, the moon passes between the Earth and Sun causing the Earth to pass through the Moon's shadow.
- Depending on where you are on Earth, you may experience a total eclipse or a partial eclipse.

Diagrams of a Solar Eclipse





Animations of a Solar Eclipse

http://ww2.valdosta.edu/~cbarnbau/astro_demos/frameset_moon.html

http://www.classzone.com/books/earth_science/terc/content/visualizations/es2505/es2505page01.cfm?chapter_no=visualization

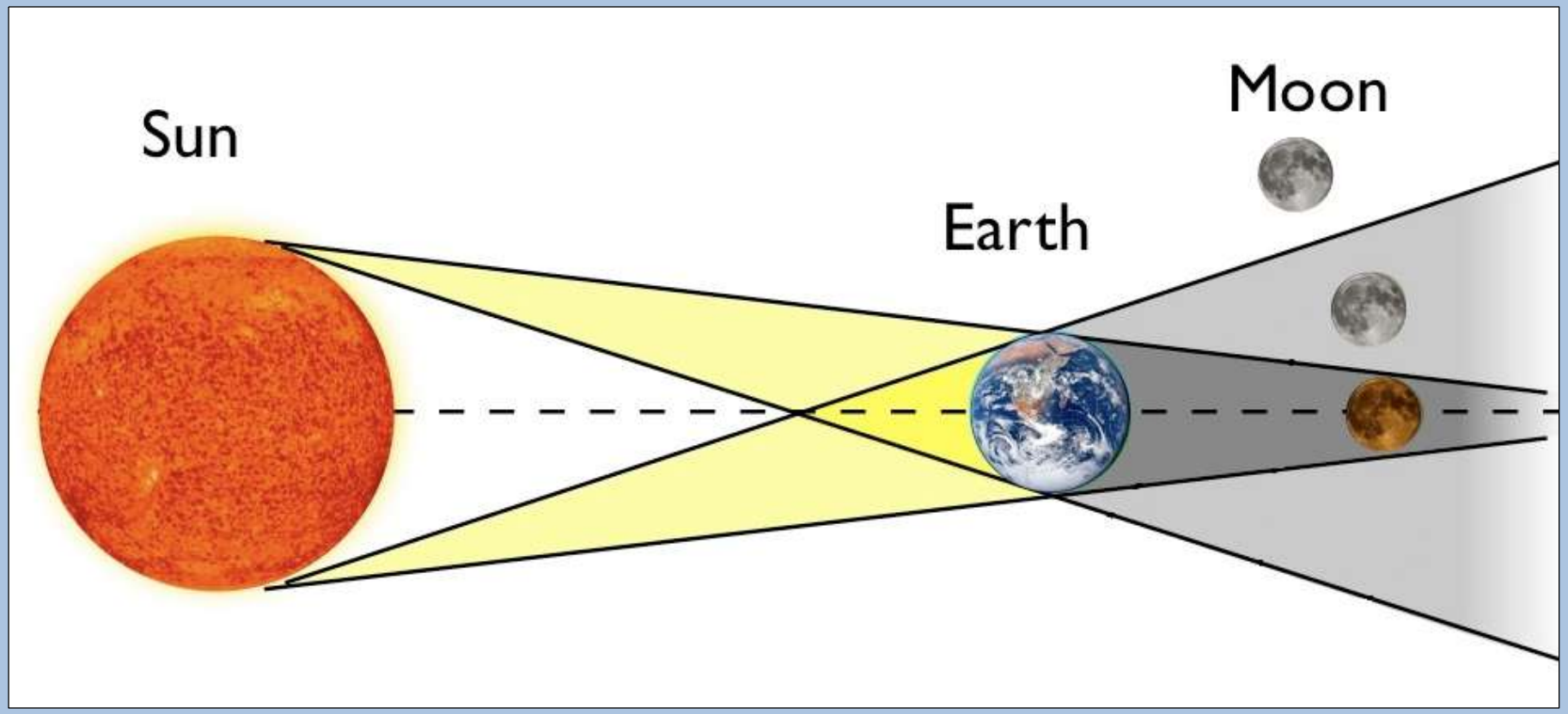
Lunar Eclipse

Lunar Eclipse

- A Lunar Eclipse occurs when the moon passes through the Earth's shadow.

- Depending on where the moon crosses Earth's shadow, the top or bottom will appear darker. The reddish color is from sunlight refracted by Earth's atmosphere onto the moon.

Lunar Eclipse



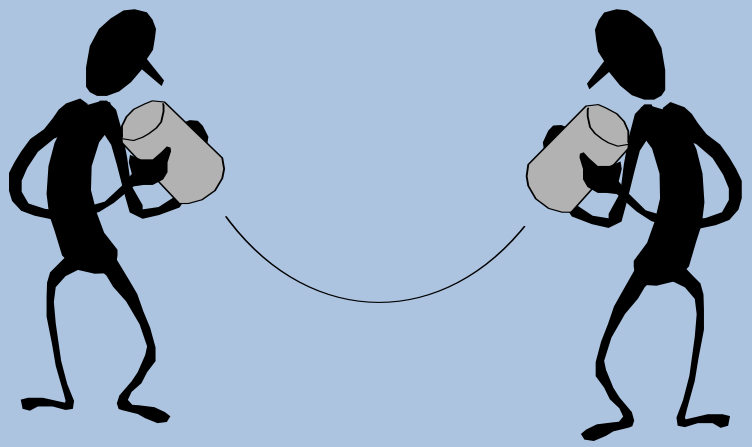
Video Clips and Animations of a Lunar Eclipse

http://www.neok12.com/video/Eclipse/zX027e52507b754877644063.htm

http://ww2.valdosta.edu/~cbarnbau/astro_demos/frameset_moon.html

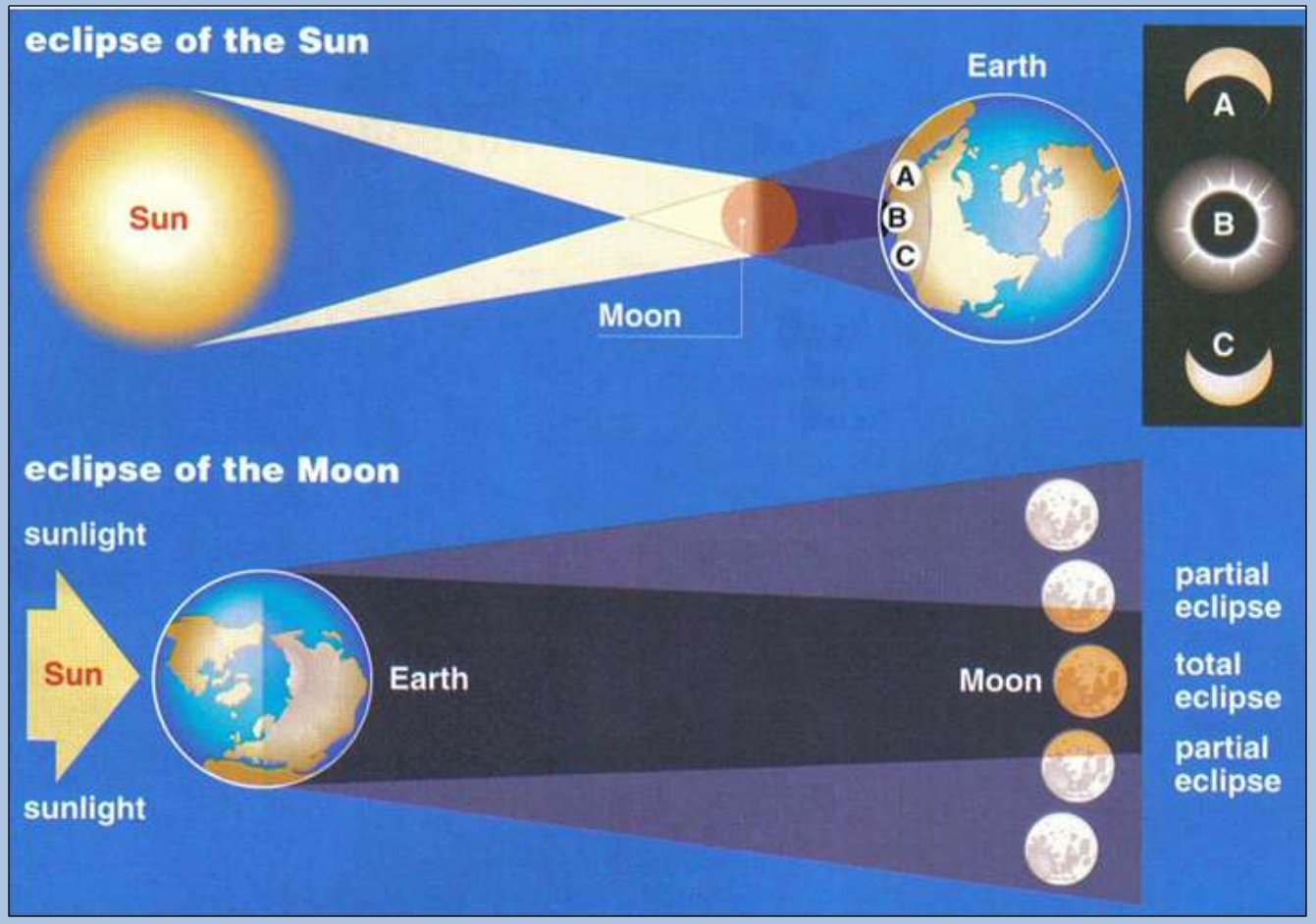
http://ww2.valdosta.edu/~cbarnbau/astro_demos/frameset_moon.html

Distributed Summarizing



With an elbow partner, describe the difference between a solar eclipse and a lunar eclipse.

Lunar Eclipses happen when the Moon passes through Earth's shadow, whereas solar eclipses happen when Earth passes through the Moon's shadow.

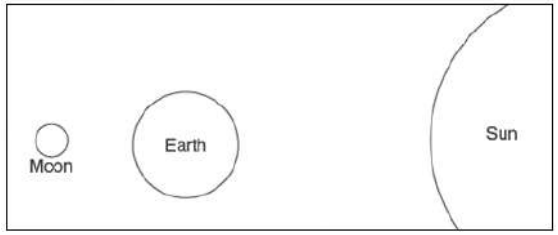


Summarizing Strategy

[see resources]

Name_____ Date _____ Period ___

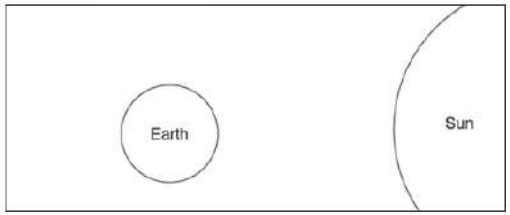
1. What causes the phases of the moon? _____



2. Based on the arrangement of the Earth, Sun, and Moon in the diagram above, which type of moon phase would most likely be seen from Earth? (S6E2a)

3. Based on the arrangement of the Earth, Sun, and Moon in the diagram above, which type of eclipse would most likely occur? (S6E2b)

4. In the diagram below, draw the location of the moon for a New Moon to be observed on earth.



5. In the diagram below, draw the location of the moon for a solar eclipse to occur.