

(1) Solar and Lunar Eclipses TUTORIAL

Objective: By the end of this tutorial, you should be able to explain: how solar and lunar eclipses occur and the differences between them

Prior Knowledge

Planets:

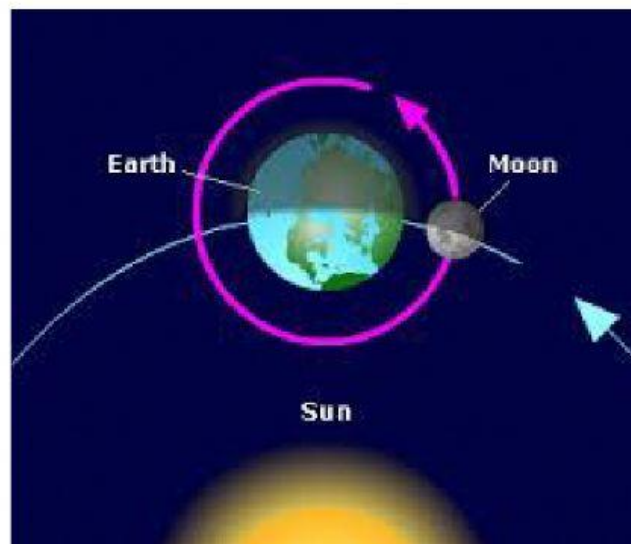
- Mars and Jupiter are visible
- Venus is easier to see at dawn or right before dusk
- They are some of the closest planets to us in our solar system

Gravity:

- A force of attraction between two objects
- Mass is one factor that determines gravitational pull
- The more massive an object the greater the gravitational pull
- Distance between objects is also a factor
- The closer an object is to another, the greater the gravitational pull between the objects

Sun, Earth, Moon System

- Orbit: The path an object takes when it revolves around another object
- Revolve: The movement of an object around another
- Rotation: Spinning of an object on its axis
- One rotation = one day
- Earth: one rotation in 24 hours
- Moon: orbits the earth in about 27 days



Practice 1

Select all true statements regarding the Sun, Moon and Earth system:

The distance to the Sun affects the Earth's orbit around the Sun	The Earth Rotates on its axis in 24 hours
<input type="checkbox"/>	<input type="checkbox"/>
The Earth's gravity and distance to the Moon affects the Moon's orbit	The Moon orbits the Earth in about 27 days
<input type="checkbox"/>	<input type="checkbox"/>

(2) Moon Phases



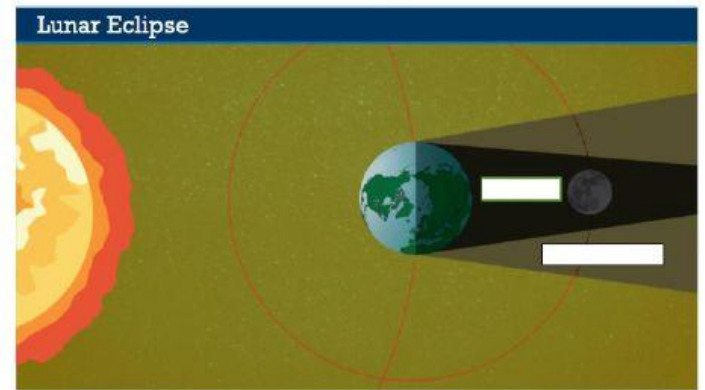
Practice 2

Match the phase names to the phase location. Drag the names onto the locations in the Moon's cycle that represent that phase. Click submit when finished.

- | | | | |
|---|----------------|-----------------|---|
| 1 | Third Quarter | First Quarter | 5 |
| 2 | Waning Gibbous | Waxing Crescent | 6 |
| 3 | Full Moon | Waning Crescent | 7 |
| 4 | Waxing Gibbous | New Moon | 8 |



Lunar Eclipse



Mark UMBRA and PENUMBRA shadows!

Practice 3

Which of these describe a lunar eclipse? Choose all statements that apply.

Occurs at a full moon

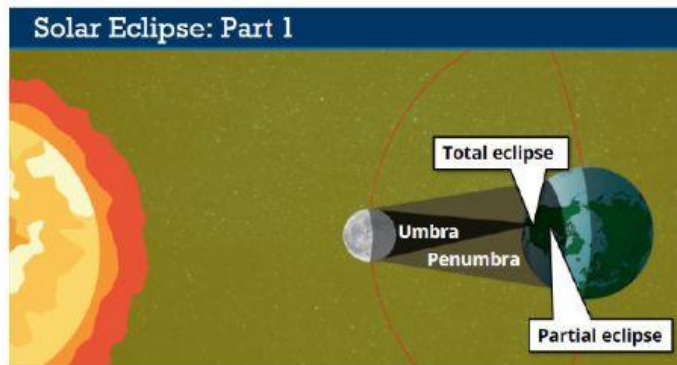
The Earth blocks light from the Sun reflecting off the Moon.

When the Moon blocks the Sunlight from hitting the Earth.

A Lunar eclipse doesn't occur every month because of the tilt of its orbit.

The Moon is about 400 times closer to us than the SUN!

(5)



Solar vs Lunar Eclipse	
<div><p>Solar Eclipse</p></div> <ul style="list-style-type: none">• The Moon blocks the sunlight to the Earth• Only a small area on Earth is affected.• During a New Moon• Occurs about every 18 months in different areas• One area might only get to experience a total solar eclipse about once ever 300 years!	<div><p>Lunar Eclipse</p></div> <ul style="list-style-type: none">• The Earth blocks the sunlight to the Moon.• During a Full Moon• Half of the Earth experiences a lunar eclipse at a time.• Lunar eclipses happen regularly but not once a month. This is affected by the tilt of the Moon's orbit as we orbit the Sun.• Some light does get through our atmosphere to the Moon- causes a reddish hue of the Moon

Practice 4

Match the descriptions that help describe a solar eclipse.

Solar Eclipse		The reason the Moon is able to block out the Sun during a solar eclipse	1
Penumbra		A section where no light is able to shine. This area experiences a total solar eclipse.	2
Umbra		The Moon blocks the sunlight from reaching the Earth	3
The moon is 400 times closer than the Sun.		A shadow where a portion of light still is visible. This type of shadow causes a partial solar eclipse.	4

Final Practice

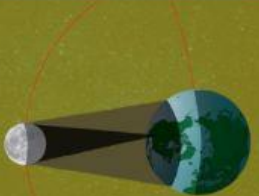
Drag the descriptions for lunar or solar eclipse to the appropriate box.

Solar Eclipse		Lunar Eclipse	
1 Occurs during a Full Moon	3 Affects half of the Earth at one time.	5 Occurs during a New Moon	7 The Moon blocks the sunlight to Earth
2 Earth blocks the Sunlight to the Moon	4 Some light gets through our atmosphere and causes the object to look reddish	6 Covers a much smaller area on Earth at a time	8 The Moon is 400 times closer that helps completely block the light.

Lesson Review

Solar Eclipse


- Caused by the Moon blocking the light from reaching Earth.
- The penumbra is the lighter shadow caused by partial blockage
- Umbra is the total blockage of the sunlight
- Happens during a new moon
- Happens regularly but does not often happen in the same location
- A total solar eclipse covers a very small area



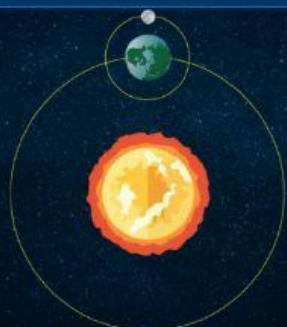
Lesson Review

Lunar Eclipse

- Earth blocks the Sun from Moon
- During a full moon
- Half of Earth experiences it at one time
- It appears they happen more often but they do not
- The Moon's orbital tilt prevents it from occurring every month



Lesson Review



The Earth revolves around the Sun and the Moon revolves around the Earth!