

(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:

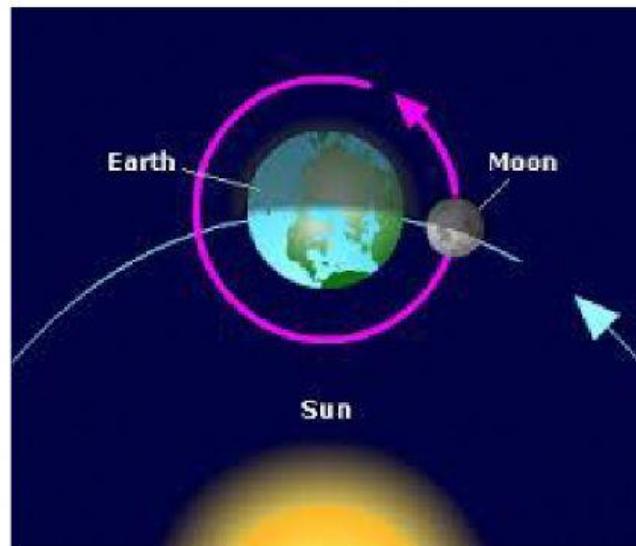
- Mars and Jupiter are visible
- Venus is easier to see at dawn or right before dusk
- They are some of the closest planets to us in our solar system

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:

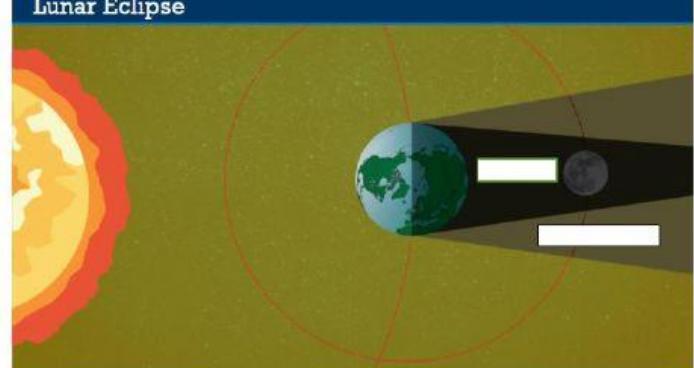
The distance to the Sun affects the Earth's orbit around the Sun	<input type="checkbox"/>	The Earth Rotates on its axis in 24 hours	<input type="checkbox"/>
The Earth's gravity and distance to the Moon affects the Moon's orbit	<input type="checkbox"/>	The Moon orbits the Earth in about 27 days	<input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

Lunar Eclipse

(2) Moon Phases



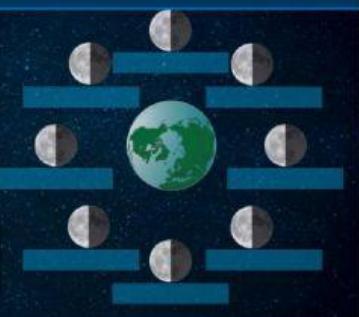
Lunar Eclipse



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



Mark UMBRA and PENUMBRA shadows!

Practice 3

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

Occurs at a full moon

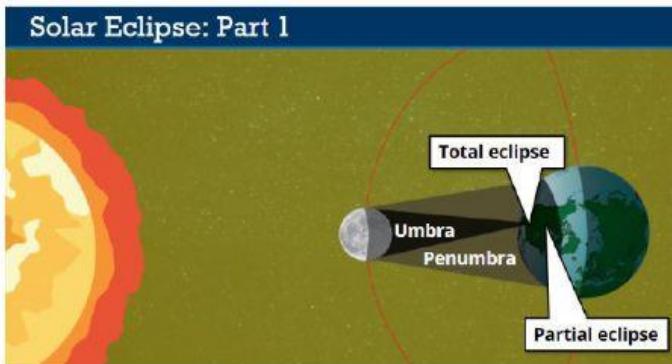
The Earth blocks light from the Sun reflecting off the Moon.

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)



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

Solar vs Lunar Eclipse

Solar Eclipse		Lunar Eclipse	
<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 every 300 years! 		<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 	

Final Practice

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

Solar Eclipse

Lunar Eclipse

Occurs during a Full Moon

Affects half of the Earth at one time.

Occurs during a New Moon

The Moon blocks the sunlight to Earth

1 Earth blocks the Sunlight to the Moon

3 Some light gets through our atmosphere and causes the object to look reddish

5 Covers a much smaller area on Earth at a time

7 The Moon is 400 times closer that helps completely block the light

2

4

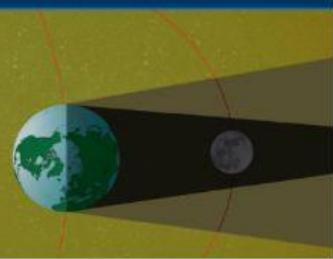
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8

Lesson Review

Lunar Eclipse

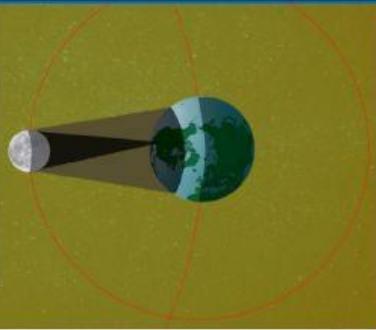
- Earth blocks the Sun from Moon
- During a full moon
- Half of Earth experiences it at one time
- It appears they happen more often but they do not
- The Moon's orbital tilt prevents it from occurring every month



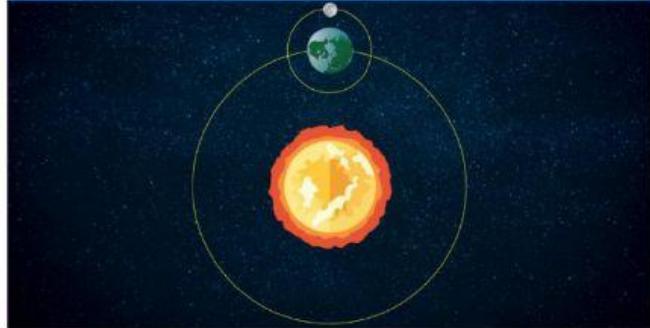
Lesson Review

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



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