

# 6th Grade Science

Essential Question: How does light reflect from the moon?

CW: Moon's Phases Lab

HW: No HW

# Agenda

## 1. Moon's Phase Lab

# Quiz

**If it is not cloudy, everyone on Earth sees the same phase of the moon during the same 24 hour period.**

- True
- False
- Don't know

**It takes approximately 27 days for the moon to go through all its phases once.**

- True
- False
- Don't Know

The part of the moon we can't see during a phase is caused by the moon's shadow.

- True
- False
- Don't know

## The moon is only visible at night

- True
- False
- Don't know

The same half of the Moon is in darkness all the time - there is a dark side of the Moon

- True
- False
- Don't Know



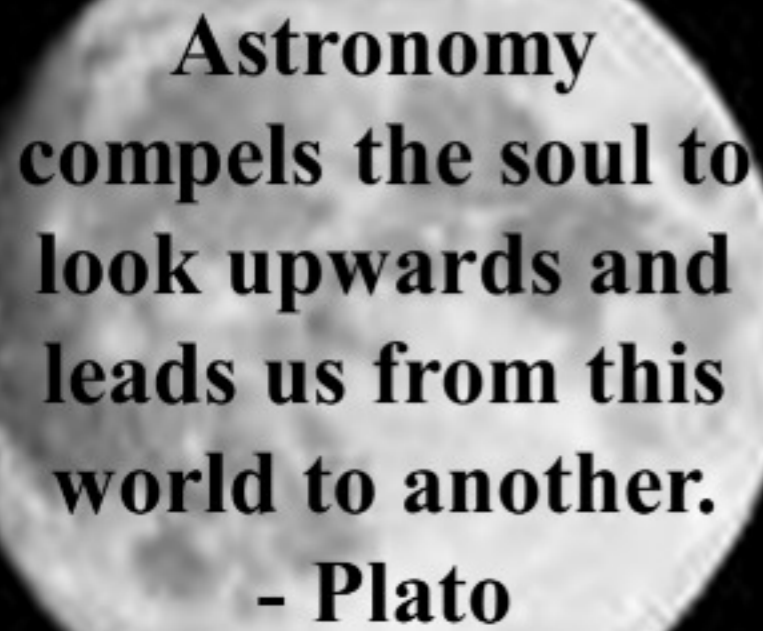
# Phases of the Moon



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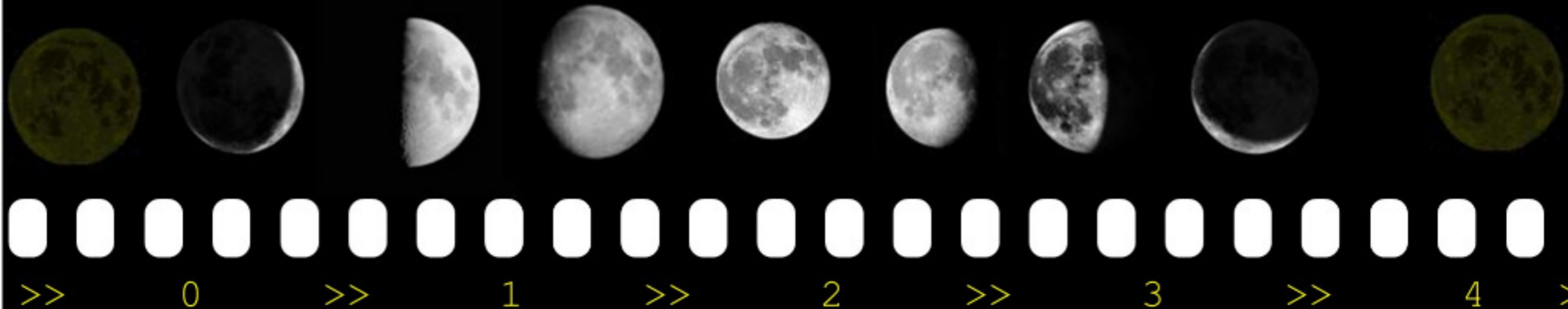
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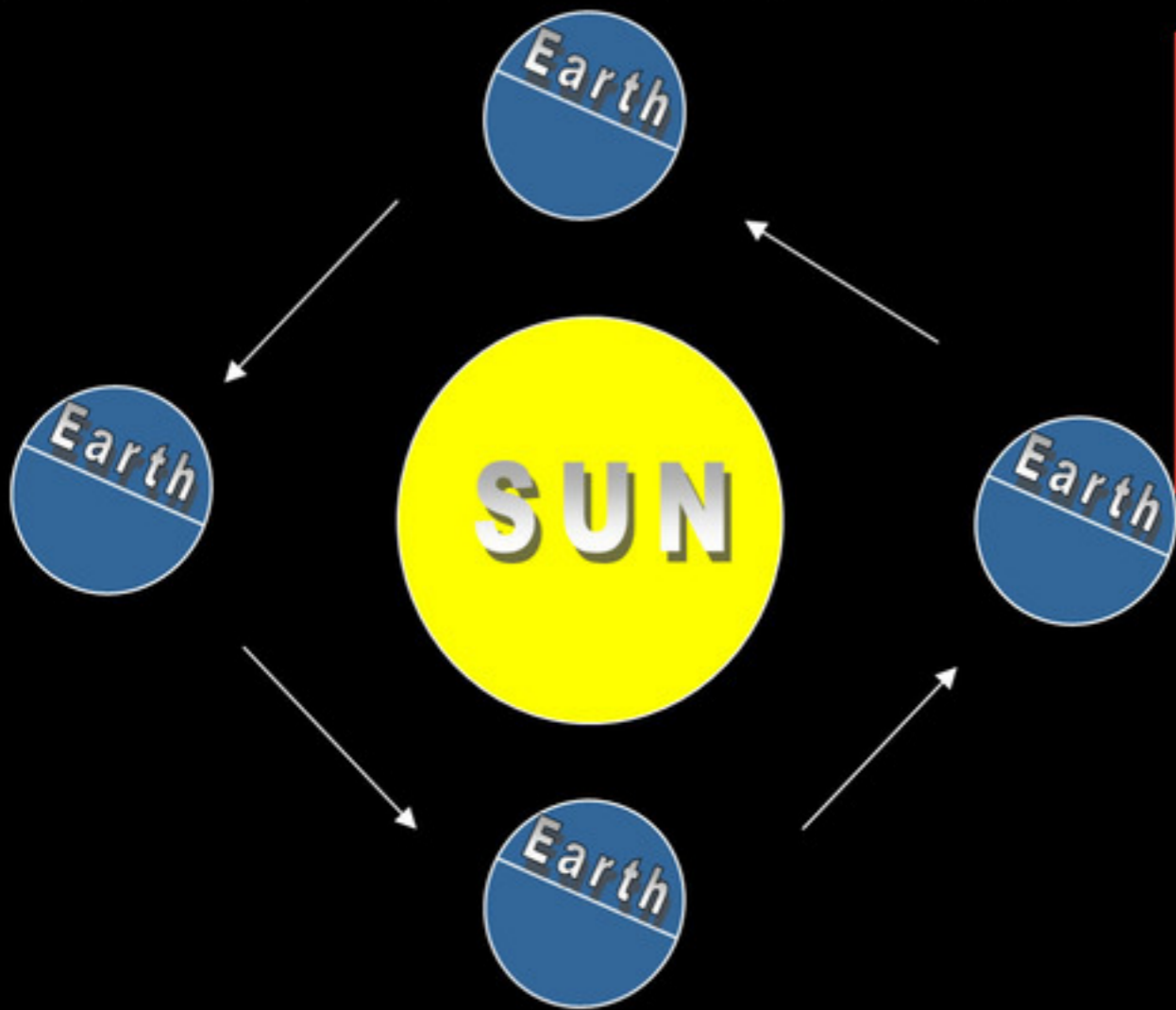


**Astronomy  
compels the soul to  
look upwards and  
leads us from this  
world to another.  
- Plato**

Since humans have walked the earth, we have stared at the changing moon with wonder. But what really causes the appearance of the moon to change so drastically ?

The answer has to do with the position of not just moon but the sun and the earth as well. This is also what causes eclipses and tides.

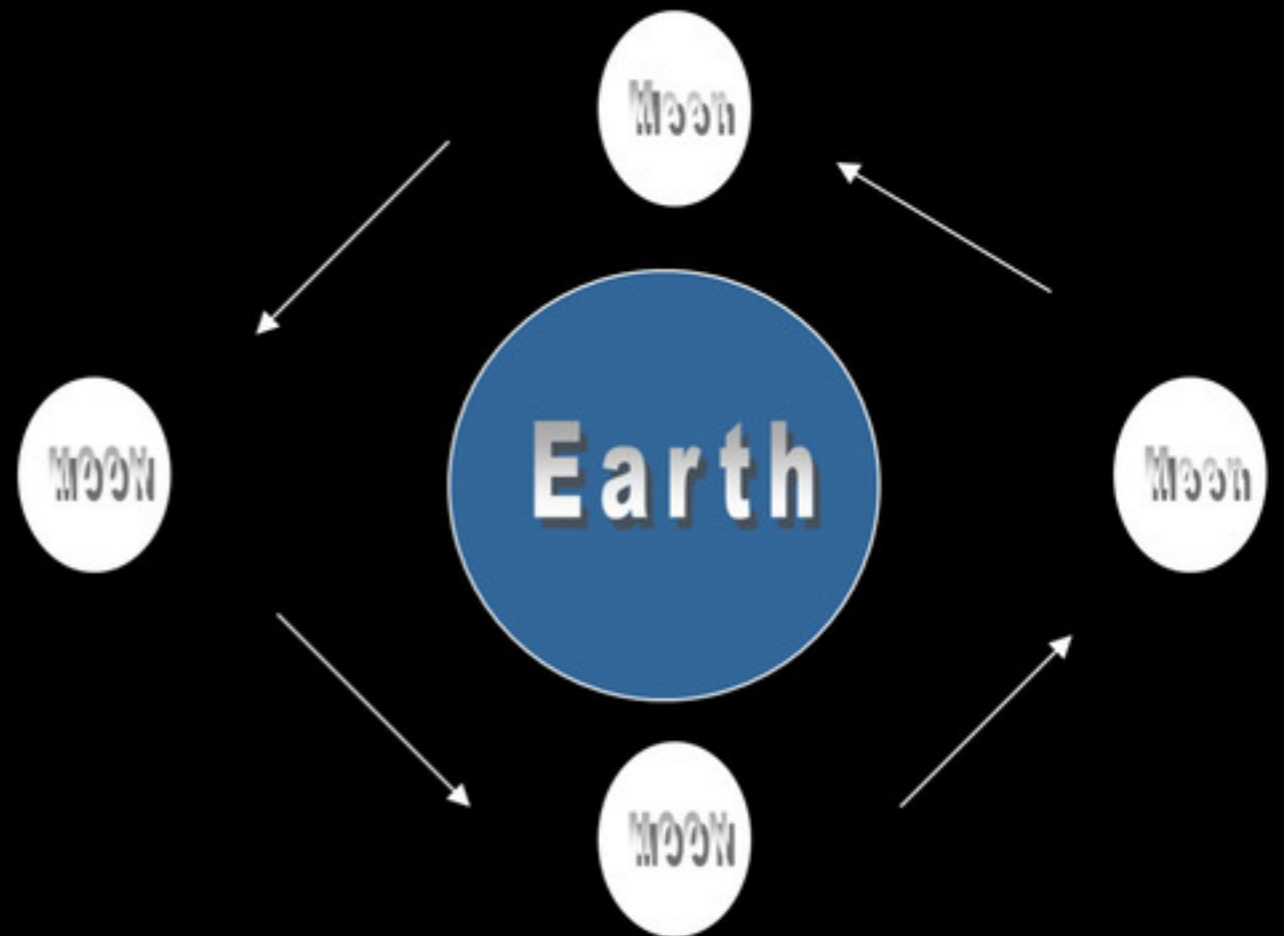


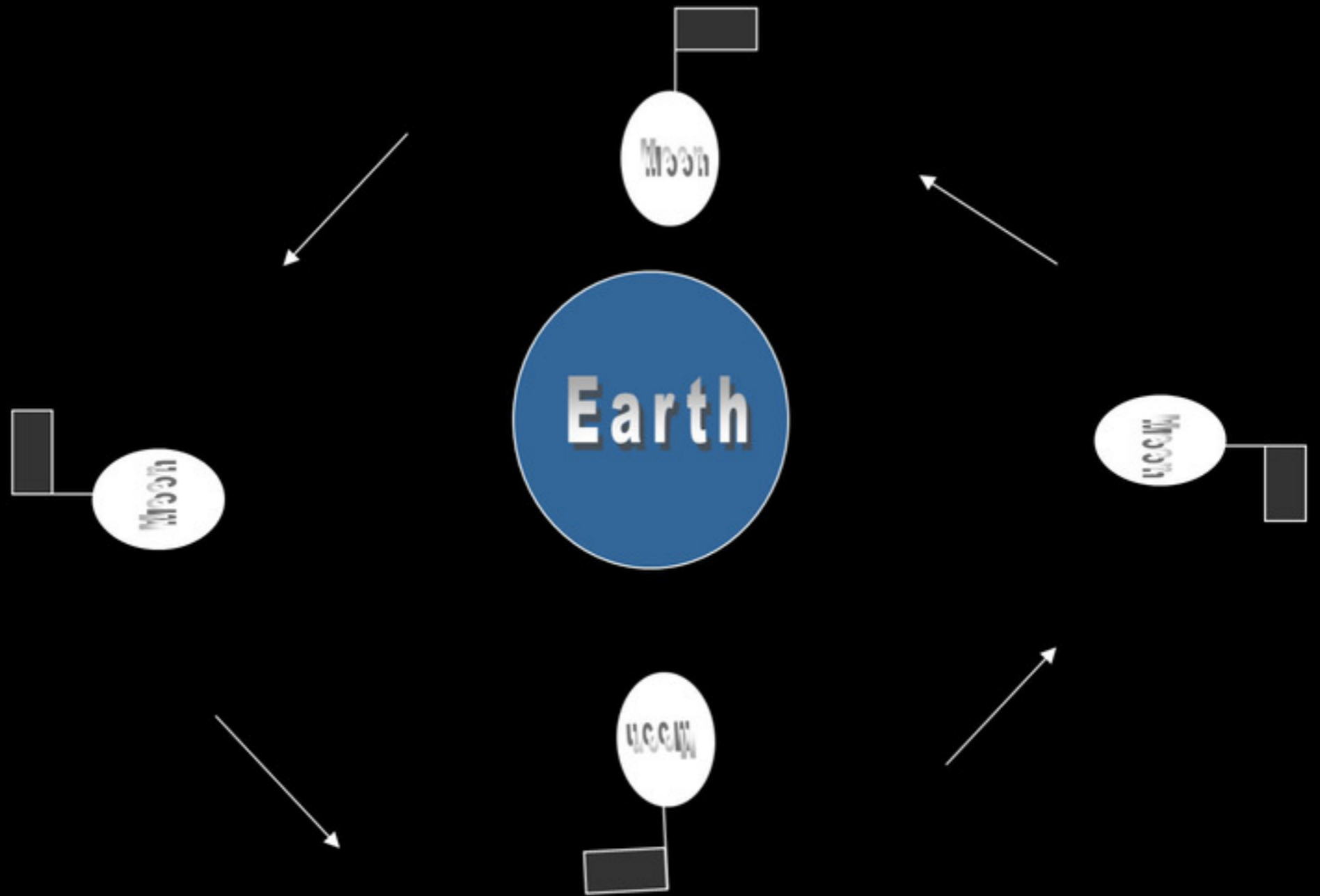


Remember that the sun is the center of our solar system and the Earth is revolving around the sun as the year goes by and rotating on its axis.



But at the same time, the moon is revolving around the earth and rotating on its own axis.

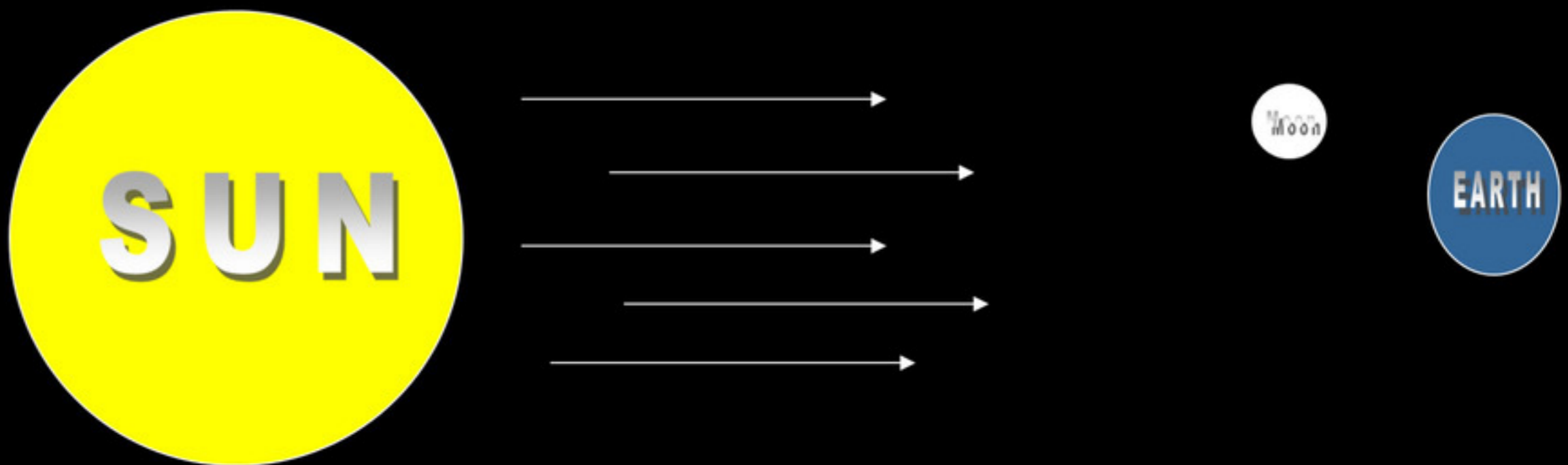




The moon revolves around the earth approximately every 28 days. Its rotation is also approximately 28 days. So the same side of the moon is always facing the earth.

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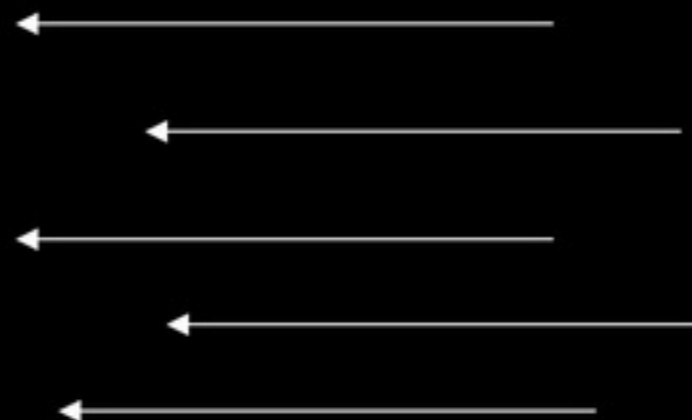
The Moon does not give off its own light but reflects light from the sun. Half of the moon that faces the earth is not always the half that is being lit by the sun.



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# NEW MOON

The light from the sun is hitting the side of the moon facing away from the Earth.



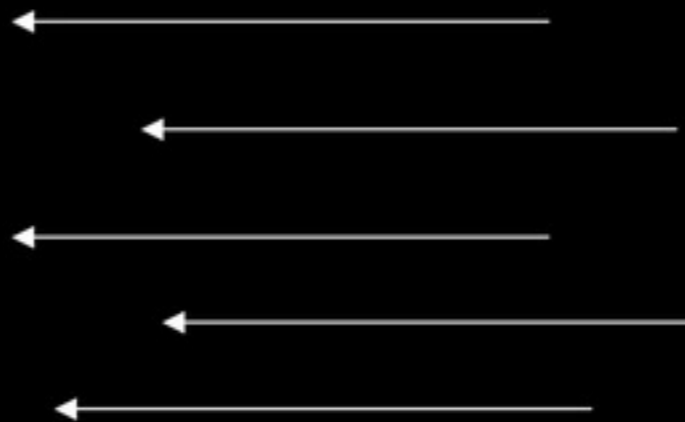
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# FIRST QUARTER MOON



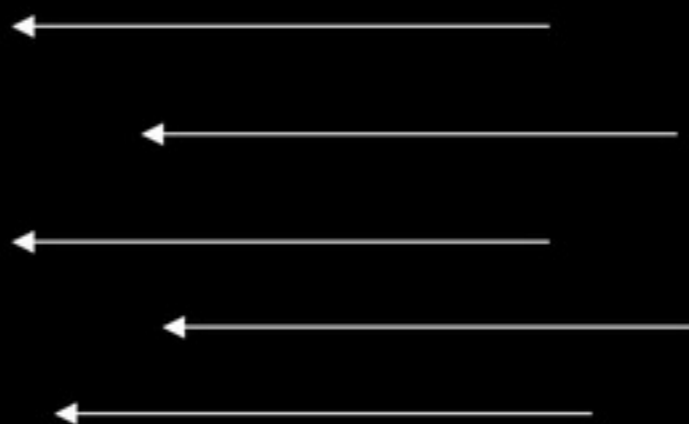
Approximately one week later, we see half of the lighted side of the moon. This is called a first quarter moon.



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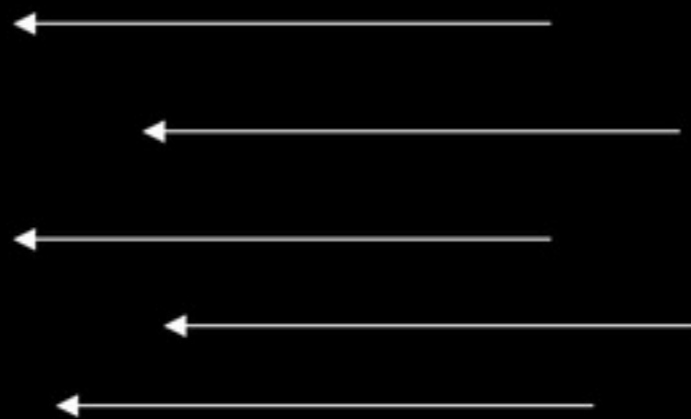
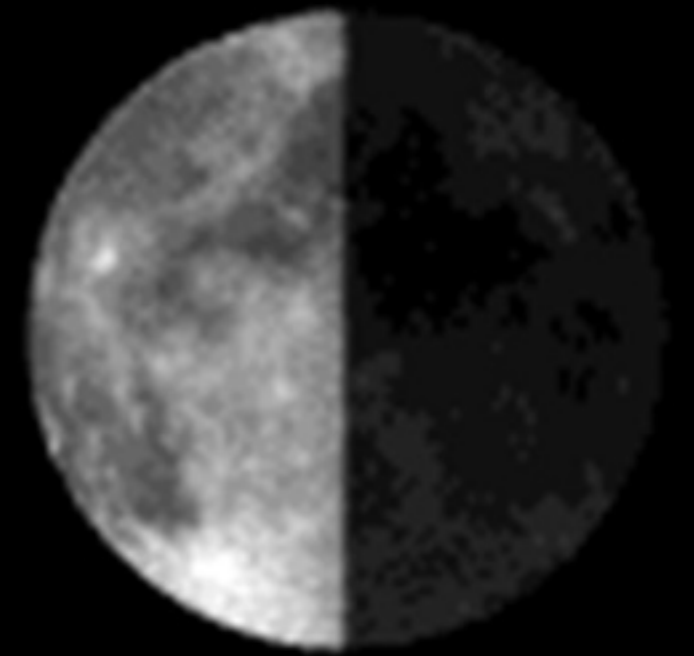
# FULL MOON

Two weeks after the new moon, a full moon appears. The entire lighted side of the moon is facing earth.



# THIRD QUARTER MOON

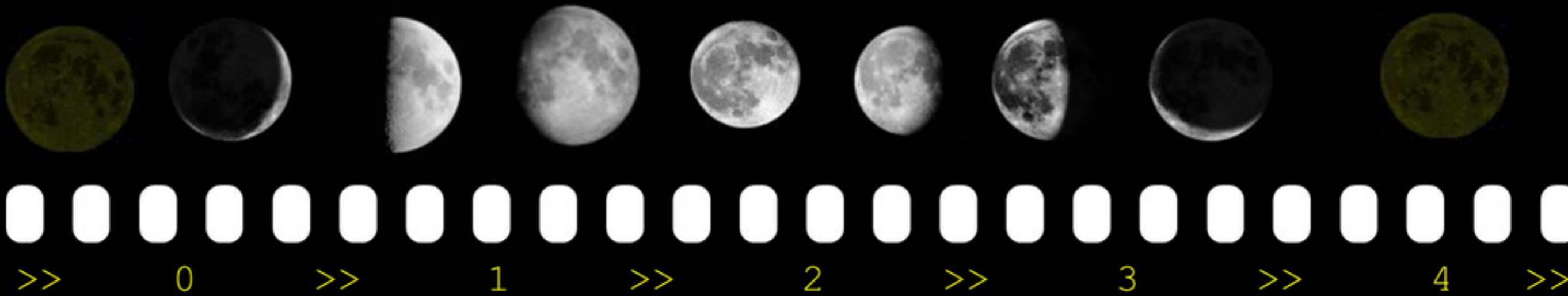
Three weeks after the new moon, a third quarter moon appears. We can see half of the lighted surface of the moon from earth.



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Four weeks after the new moon, another new moon appears and the cycle starts again.





Gibbous means to be humpbacked

First Quarter Moon

Waxing means to grow

Waxing Gibbeous



Waxing Crescent

Full Moon



In between each of the quarter phases are other distinct phases.



New Moon

Waning Gibbous



Third Quarter Moon



Waning Crescent

Waning means to decrease

>> 0 >> 1 >> 2 >> 3 >> 4 >>

# Procedure

- 1. Stand with the moon in your hand, arm outstretched, so the moon is in position 1 on the diagram. Hold the moon somewhat low to simulate the tilt in the moon's orbit.
- 2. Have a partner shine the flashlight on the moon
- 3. Observe and record any part of the moon that you, as Earth, see lit up at the first position.

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# Procedure

- 4. Move the moon to position 2 on the diagram. Be sure the moon is held a little higher than position #1.
- 5. Make sure the flashlight is shining on the moon at position #2 (it may have to move a bit to the right or left.)
- 6. Observe and record any part of the moon that you, as Earth, see lit up at the second position.

>> 0 >> 1 >> 2 >> 3 >> 4 >>



# Procedure

- 7. Continue moving the moon around in its tilted orbit, making observations and recording how much of the moon is lit up at each of the eight positions on the diagram. (At position 5, you will need to be sure the moon is above your head so the flashlight can reach it.)

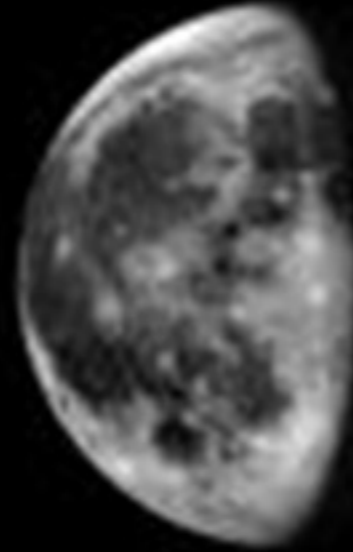


# Prediction

- **Prediction:** Using words AND diagrams, answer the testable question as best you can.
- *Starting with a new moon, how does the portion of the moon we see from Earth change as it orbits Earth?*

Can you name each phase when they aren't in order?

The Earth is just too small and fragile a basket for the human race to keep all its eggs in.  
Robert Heinlein



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1

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2

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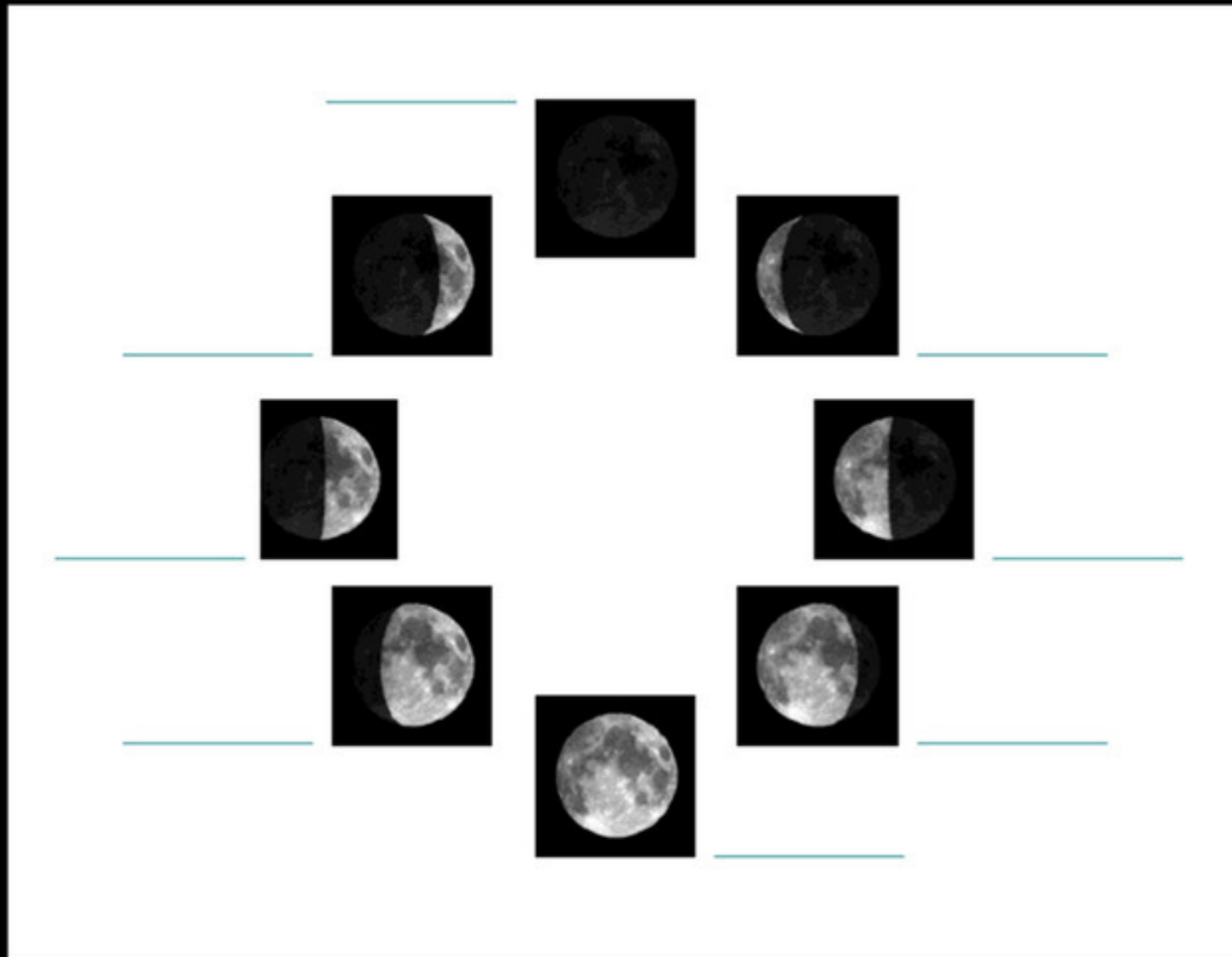
3

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4

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Can you name each phase when they are in order?



# Quiz

**If it is not cloudy, everyone on Earth sees the same phase of the moon during the same 24 hour period.**

- True
- False
- Don't know

**It takes approximately 27 days for the moon to go through all its phases once.**

- True
- False
- Don't Know

The part of the moon we can't see during a phase is caused by the moon's shadow.

- True
- False
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**The moon is only visible at night**

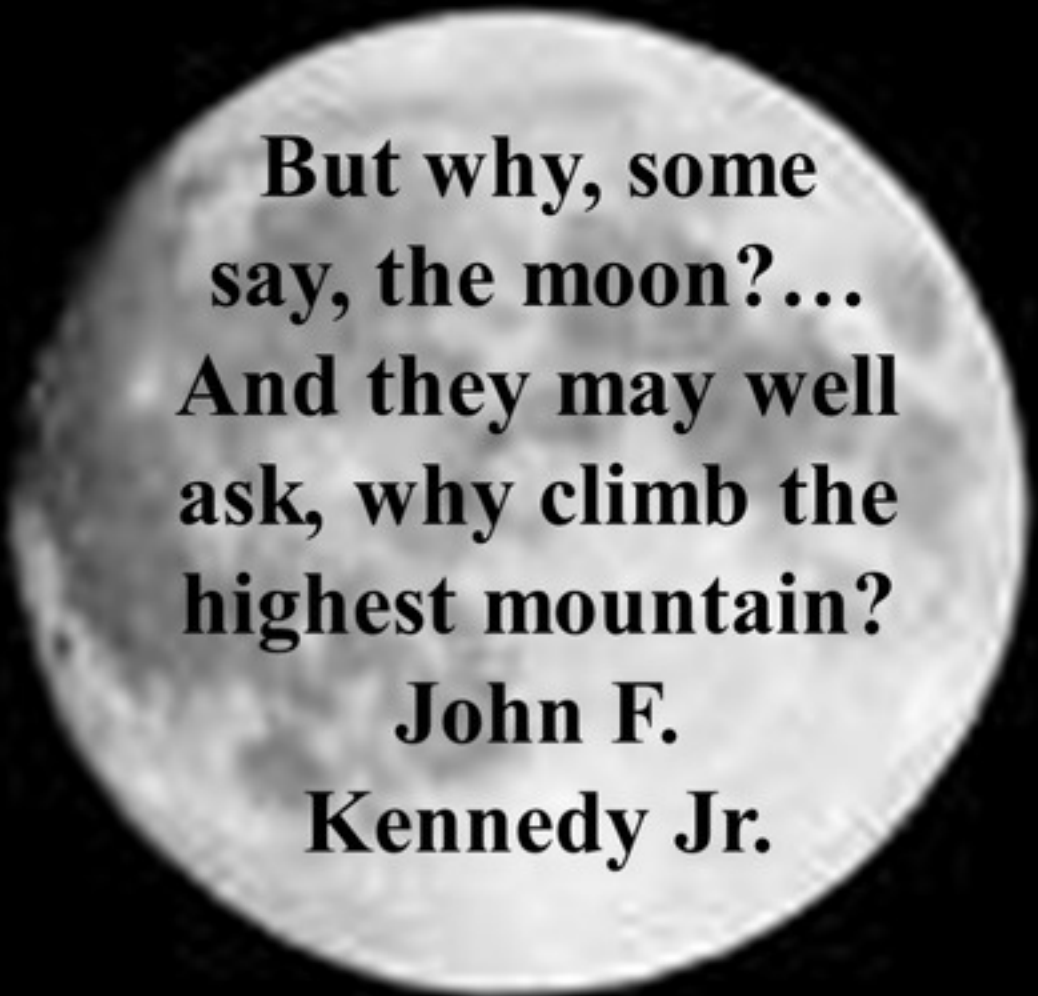
- True
- False
- Don't know



The same half of the Moon is in darkness all the time - there is a dark side of the Moon

- True
- False
- Don't Know

# Moon Phases and Tides



But why, some  
say, the moon?...  
And they may well  
ask, why climb the  
highest mountain?

John F.  
Kennedy Jr.

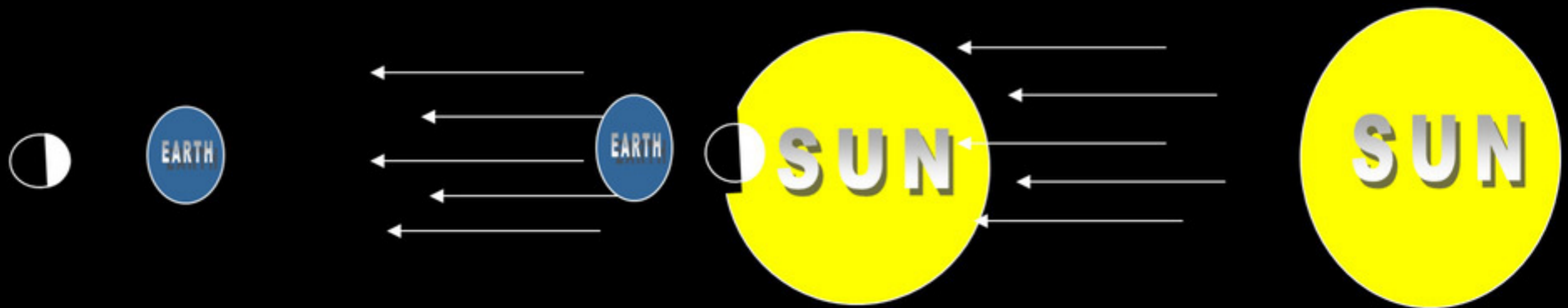
- There are two high tides and two low tides each day.
- Tides are caused by the pull of both the sun and the moon on the Earth.
- Changes in the positions of the Earth, sun, and moon affect the height of the tides throughout the month.

# SPRING TIDE

What's our new frontier out there, and it's everybody's business to know about space.

Christa McAuliffe

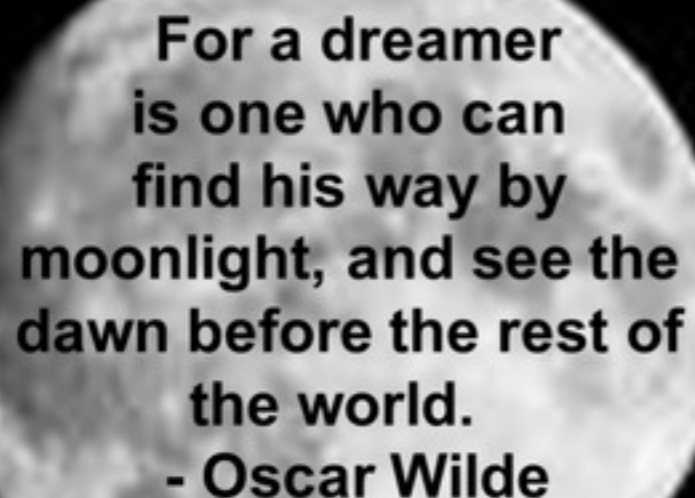
- Caused when the earth, moon, and sun are in a straight line
- The combination of the gravitational pull of the sun and moon cause the ocean of the Earth to Bulge.
- Spring tides occur during new and full moons.
- Spring tides have the greatest range between high and low tides. Really high, high tides and really low, low tides.
- Named from an Old English term meaning to jump -- NOT FROM THE SEASON



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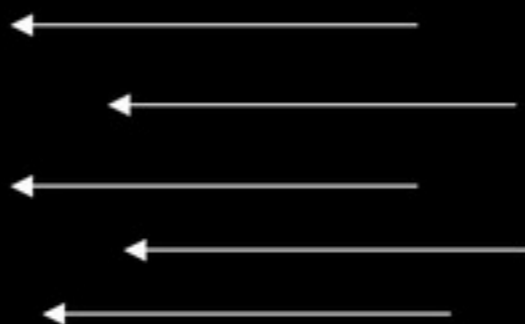


# NEAP TIDE



For a dreamer  
is one who can  
find his way by  
moonlight, and see the  
dawn before the rest of  
the world.  
- Oscar Wilde

- When the earth, moon, and sun are at a right angle
- Occur during first and third quarter moons.
- Produce the least range between high and low tide.



Surely the stars are images of love.

- Philip James Bailey

Video on tides



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# ECLIPSES

Shoot for the moon. Even if you miss, you'll land among the stars.

•A solar eclipse is when an object in space casts a shadow from the sun on another object in space.

•A lunar eclipse occurs when the Earth blocks the sunlight from reaching the moon.



**Question: Why do lunar eclipses occur only during full moons?**

**Answer: That is the only time that the earth comes between the moon and sun.**

**Question: Why don't we have a lunar eclipse every full moon?**

**Answer: The tilt of the moon's orbit is 5° different than the earth**

**Question: Why does the full moon appear to be red during certain times of the year?**

**Answer: The light from the sun gets bent as it passes through our atmosphere causing it to appear red.**

# SOLAR ECLIPSES



There are no passengers on spaceship Earth, we are all crew.  
Marshall McLuhan

Occurs when the moon passes between the Earth and sun, blocking the sunlight from reaching Earth.

Total solar eclipses are visible on Earth for only a few hundred miles wide. A lunar eclipse visible for at least half the earth.

