The Moon

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- The Phases of the Moon
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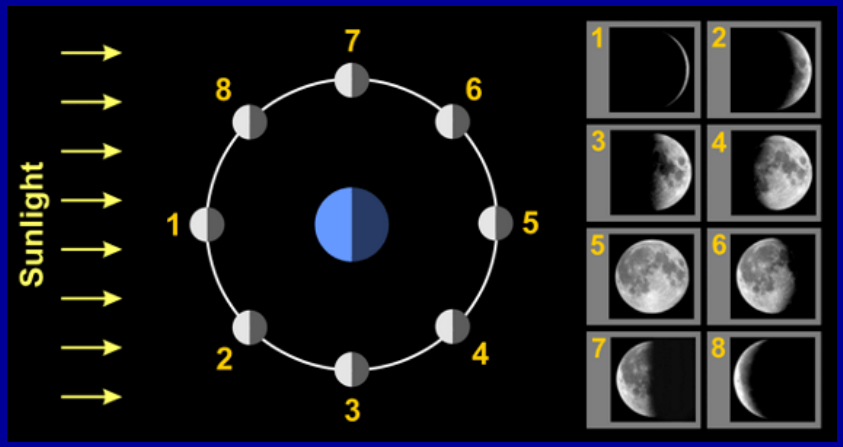
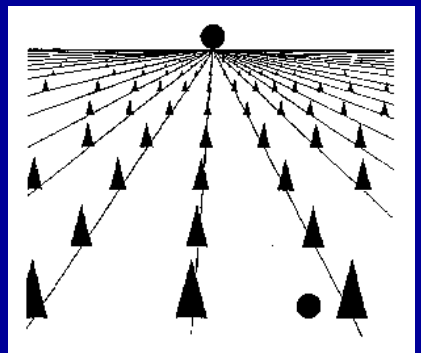




What if we didn't have The Moon?

Within a group, answer the following questions

1) What does the Moon do for us?

2) Why is it important?

3) What would happen if we didn't have a Moon?

4) How did the Moon form?

If we had no Moon

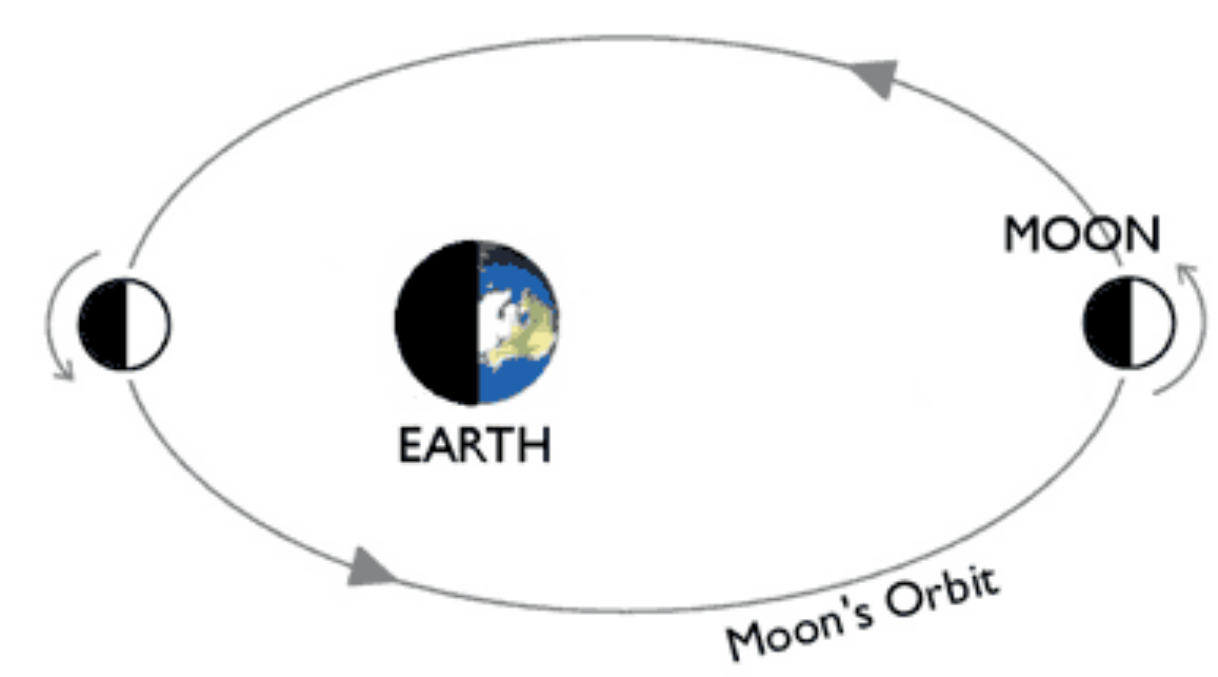
- Please keep those questions in mind as we proceed through the lesson.

Moon Stats

- **<u>The average distance from the Moon to the Earth is 384,404 km.</u>**
- Diameter of the Moon is 3475.9 km = 27% diameter of the Earth (12756 km)
- Mass is 1.23% of Earth.
- Volume 2.04% of the Earth.

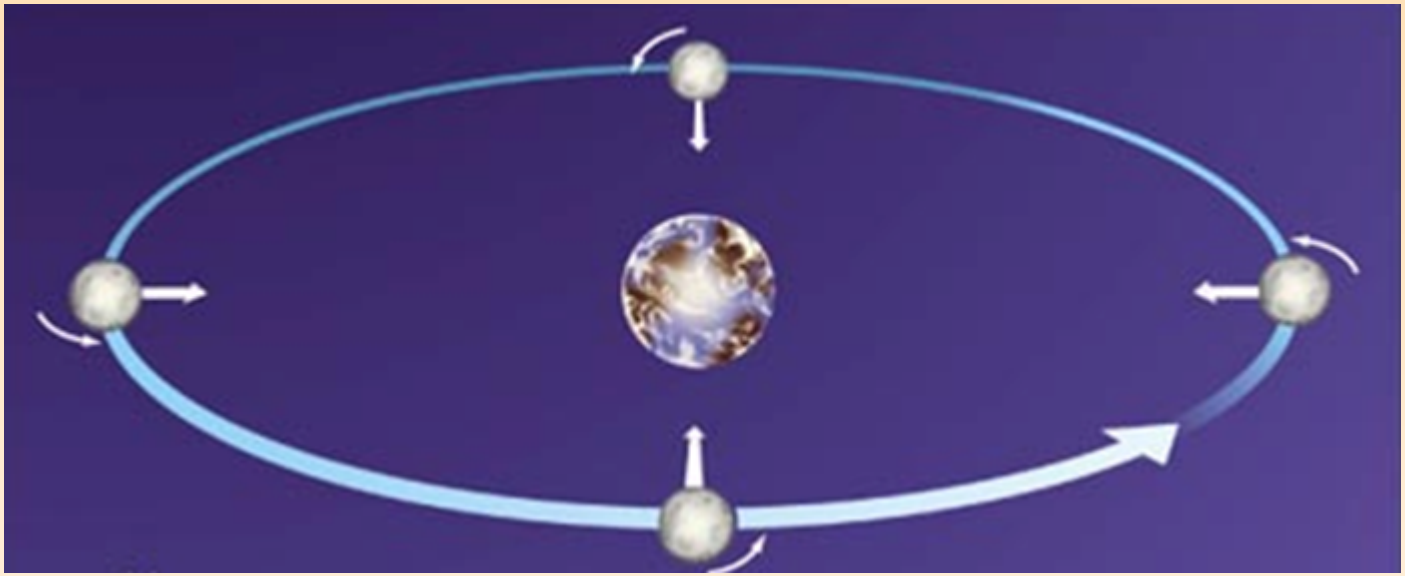
Orbit of the Moon

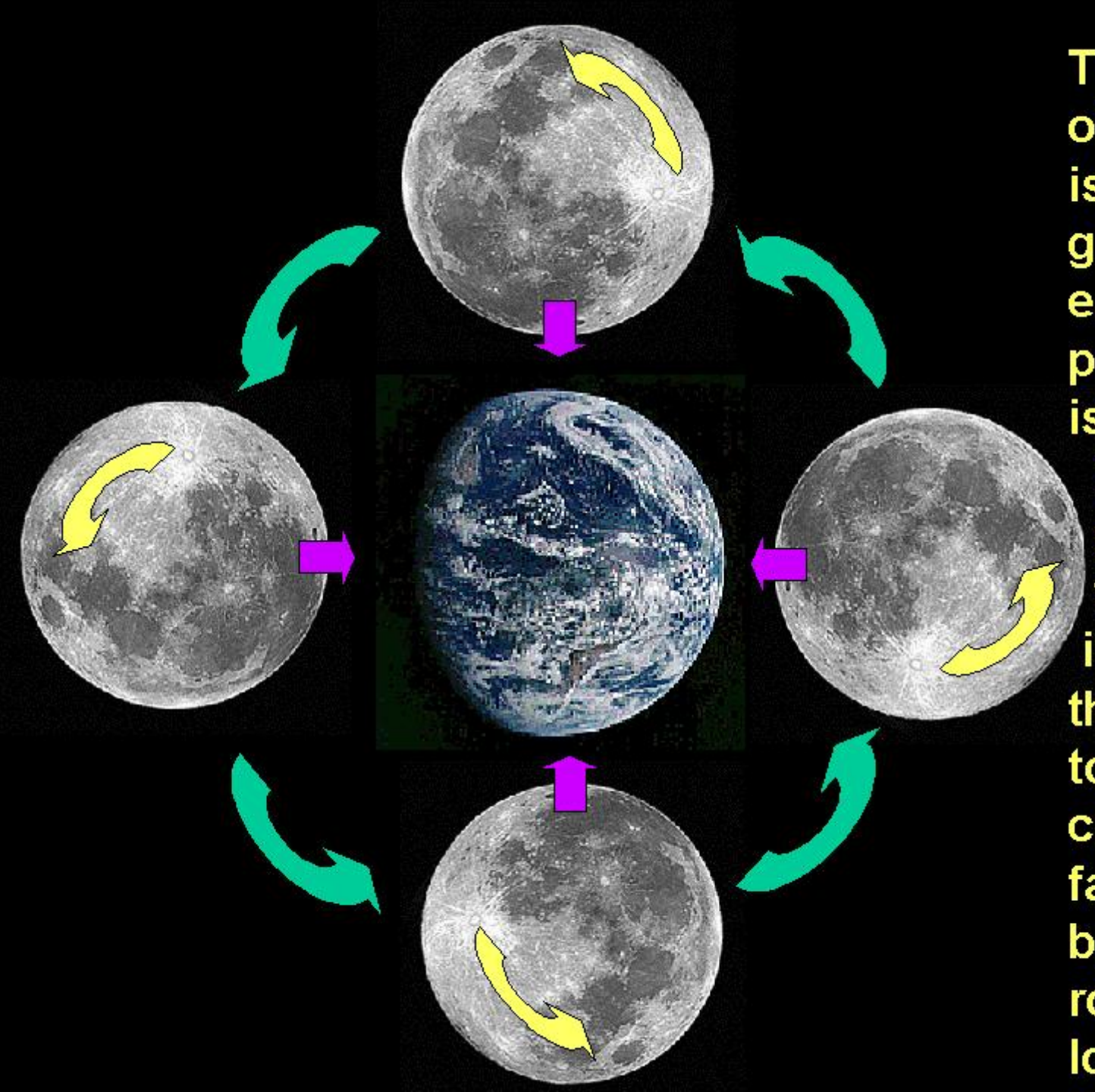
- **It takes the Moon 27.3 days to orbit the Earth**



Rotation of the Moon

- The Moon always presents the same face towards Earth.
  - **In order to keep the same face toward Earth, the Moon must rotate once every orbit.**





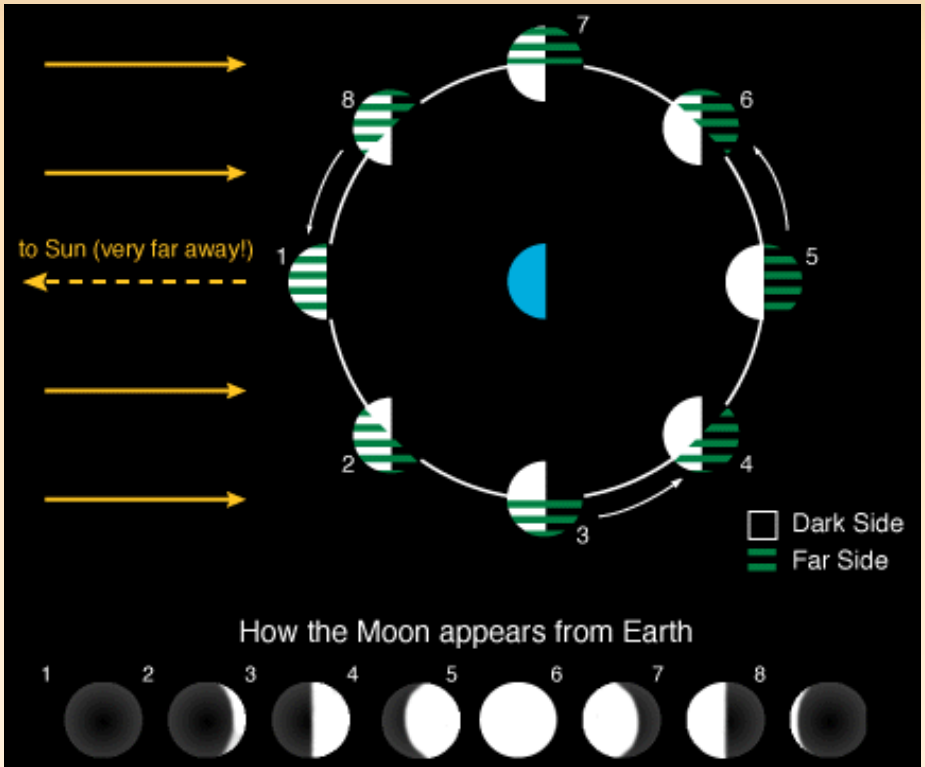
The rotation of the moon is locked by gravity to the earth, so its period or “day” is the same as its orbital period around the earth. Thus, it always keeps the same face toward us; we cannot see the far side except by launching a rocket and looking back.

Misconception: Dark Side of the Moon

- **<u>The "Dark Side" of the Moon should really be called the "Far Side."</u>**
  - The far side gets just as much light as the near side. For example, during a new moon, the near side of the Moon is dark, and the far side of the Moon is fully illuminated!

The Faces of the Moon

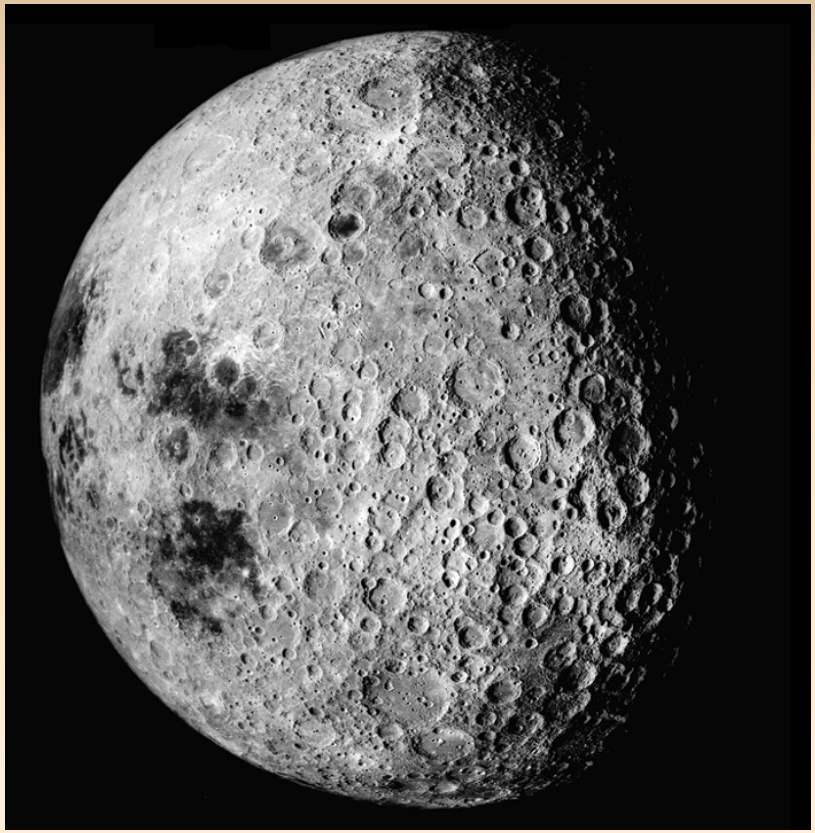
- Since we are always seeing the same side of the Moon, the Far Side must receive the same amount of sunlight as the Near Side.



The Faces of the Moon

The near side of the Moon (what we see)

The far side of the Moon (what we don't see)



What causes the phases of the Moon

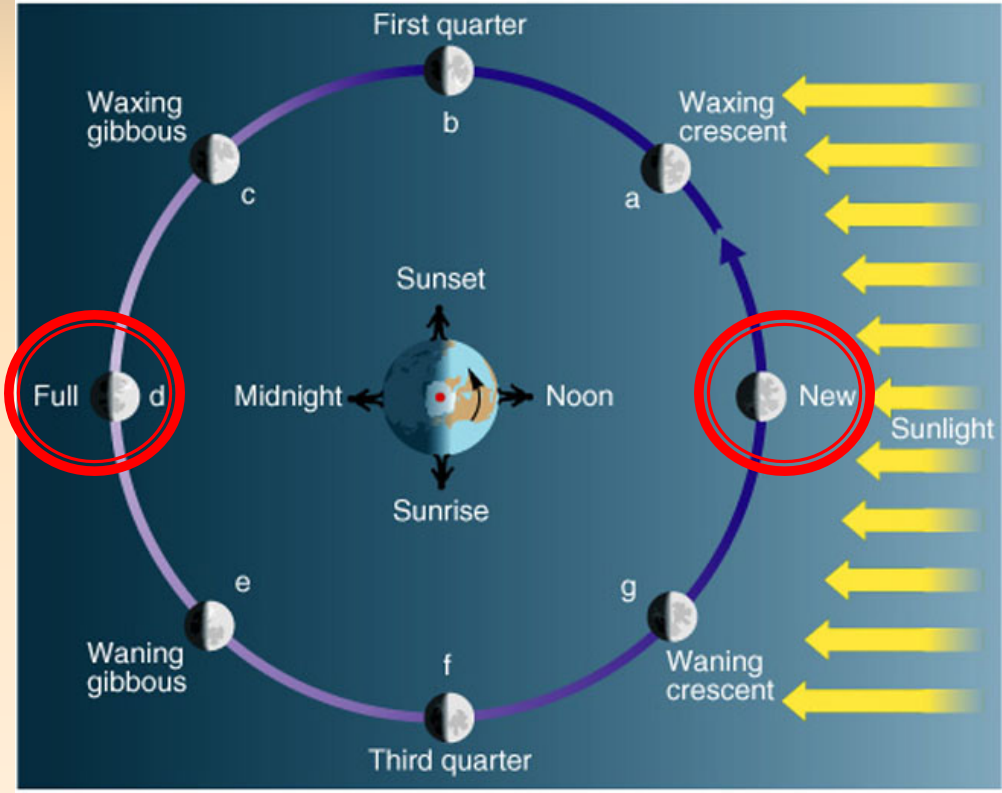
- A common misconception is that the phases of the Moon are caused by the shadow of the Earth. They are not.

- The phases of the Moon **are the result of changing viewing angles throughout the month.**

The Phases of the Moon

- We can only see the part of the Moon which has been lit up by the Sun.
- At New Moon, the part lit by the Sun is facing away from us
  - **We can't really see it**
- At Full Moon, the part lit by the Sun is facing towards us
  - **We see the whole thing**
- **Everything in between is the result of us seeing a portion of the lit side**

a



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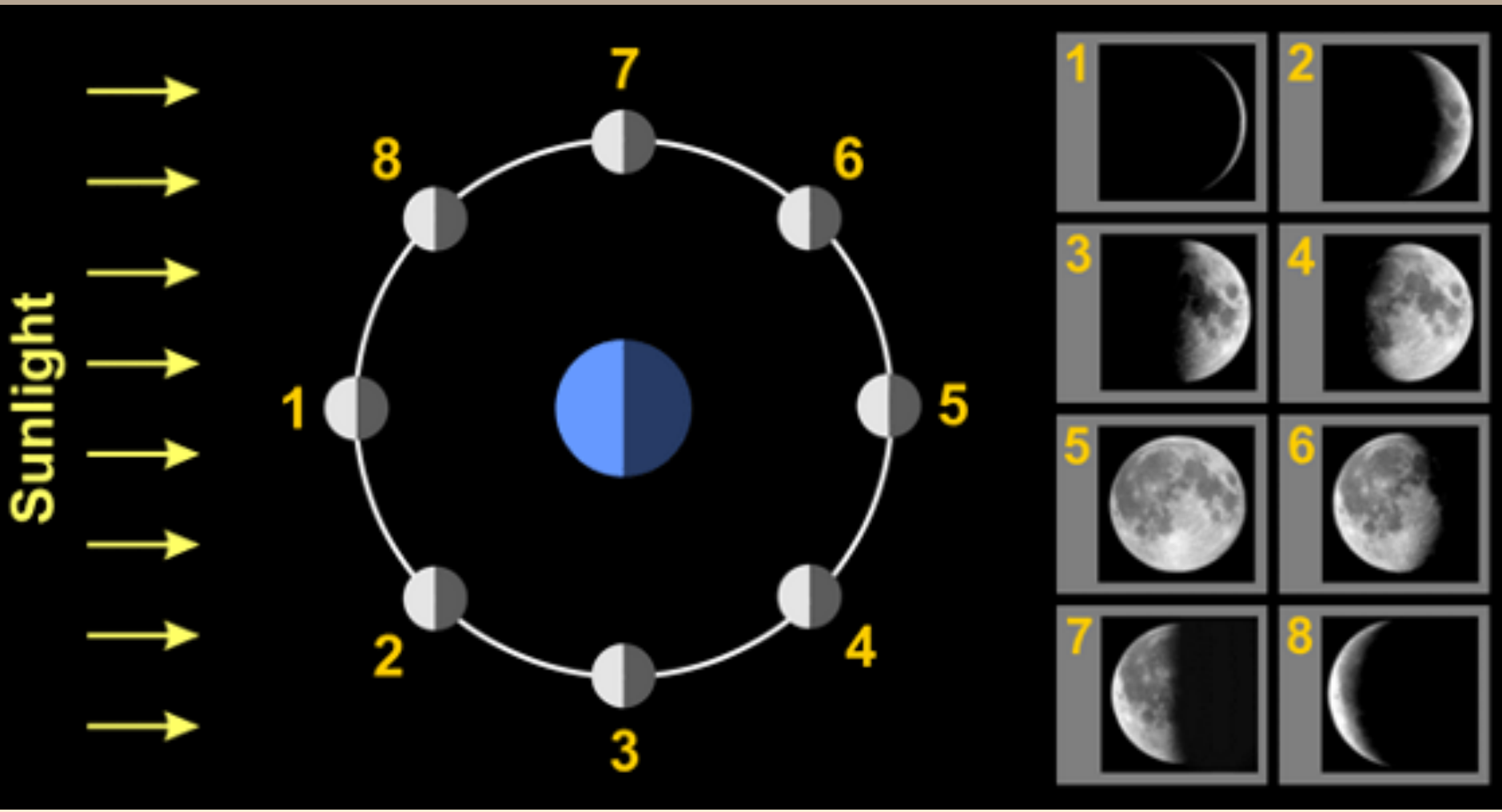
The Phases of the Moon

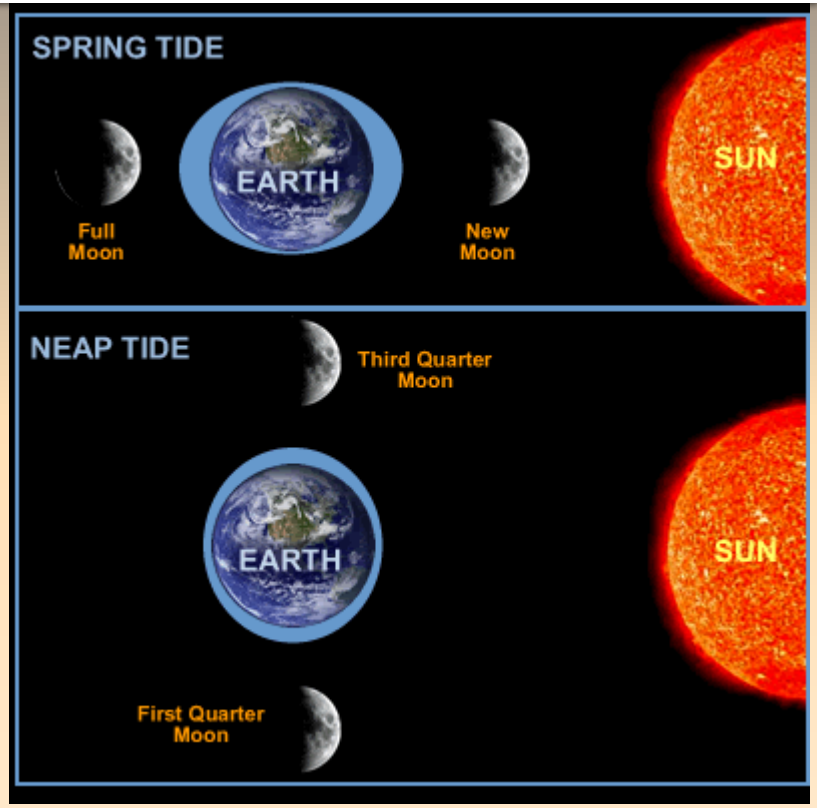


How the Moon Affects the Tides

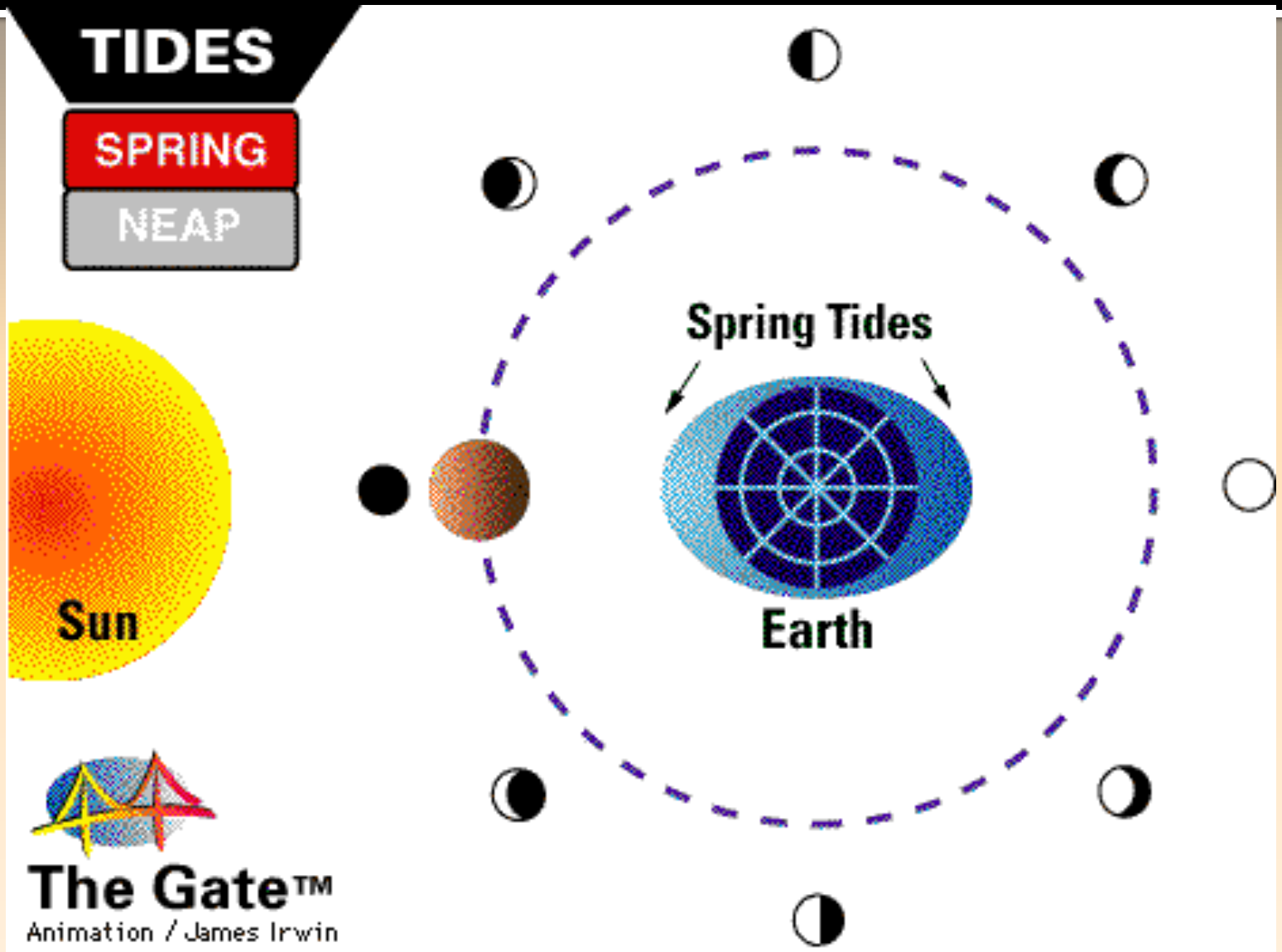
- Tides (tidal bulges) are caused by gravity pulling on the bodies of water the Earth
- There are 2 gravitational bodies that affect the tides - the Sun and the Moon.
- **The Moon is much closer to the Earth so it has a much greater influence upon the tides.**

How the Moon Affects the Tides

- When the Moon, Sun and Earth are in line (full and new Moons), the gravitational pull is added
  - called a spring tide
- **When the Moon and Sun are at right angles to each other, the effects partially cancel out**
  - called a neap tide
- There are always a tide at either end of the Earth



The Tides


TIDES
SPRING
NEAP
Spring Tides
Sun
Earth
The Gate™
Animation / James Irwin

The Size of the Rising Moon

- Many people believe the rising moon is larger than when the Moon is high overhead (50-100% larger).
  - The effect is almost entirely an illusion although when the Moon is closest to Earth in its monthly orbit, it appears ~11% larger. The rest is in your head!

- Which is bigger? Click the image and scroll down

The Moon Illusion

- Which circle is larger?
- They are both the same size! Measure it for yourself.