Earth Science

Earth and the Phases of the Moon

S4E2 Students will model the position and motion of the earth in the solar system and will explain the role of relative position and motion in determining sequence of the phases of the moon.

By Ms. D'Angelo

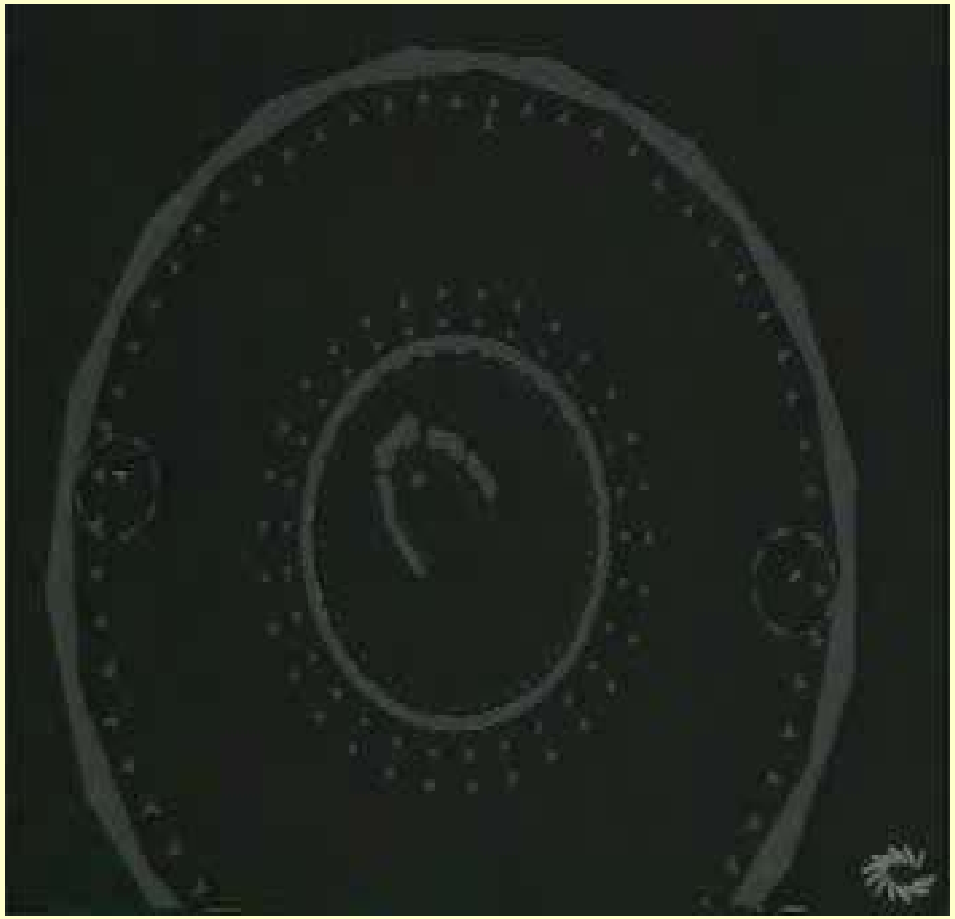
Day and Night Cycle of the Earth

- In the early morning, the sun rises in the east and in the evening sets in the west.
- The sun does not actually move.
- The sun appears to move because Earth is slowly spinning.
- It is this rotation of EARTH on its **axis** that causes the cycle of the day and night.
- As the Earth rotates, the Sun appears to rise, move across the sky, then set.
- As the Earth rotates on its axis, it revolves around the sun!!

Day and Night Cycle of the Earth

- Since Earth is a sphere, only one half of it receives light and heat at a given time.
- When you have day time, it is night time on the other side of the Earth.
- It takes 24 hours to spin around on its axis once. This is called day.
- It takes earth 365 days to rotate around the Sun. This is one year.

Day and Night Cycle of the Earth

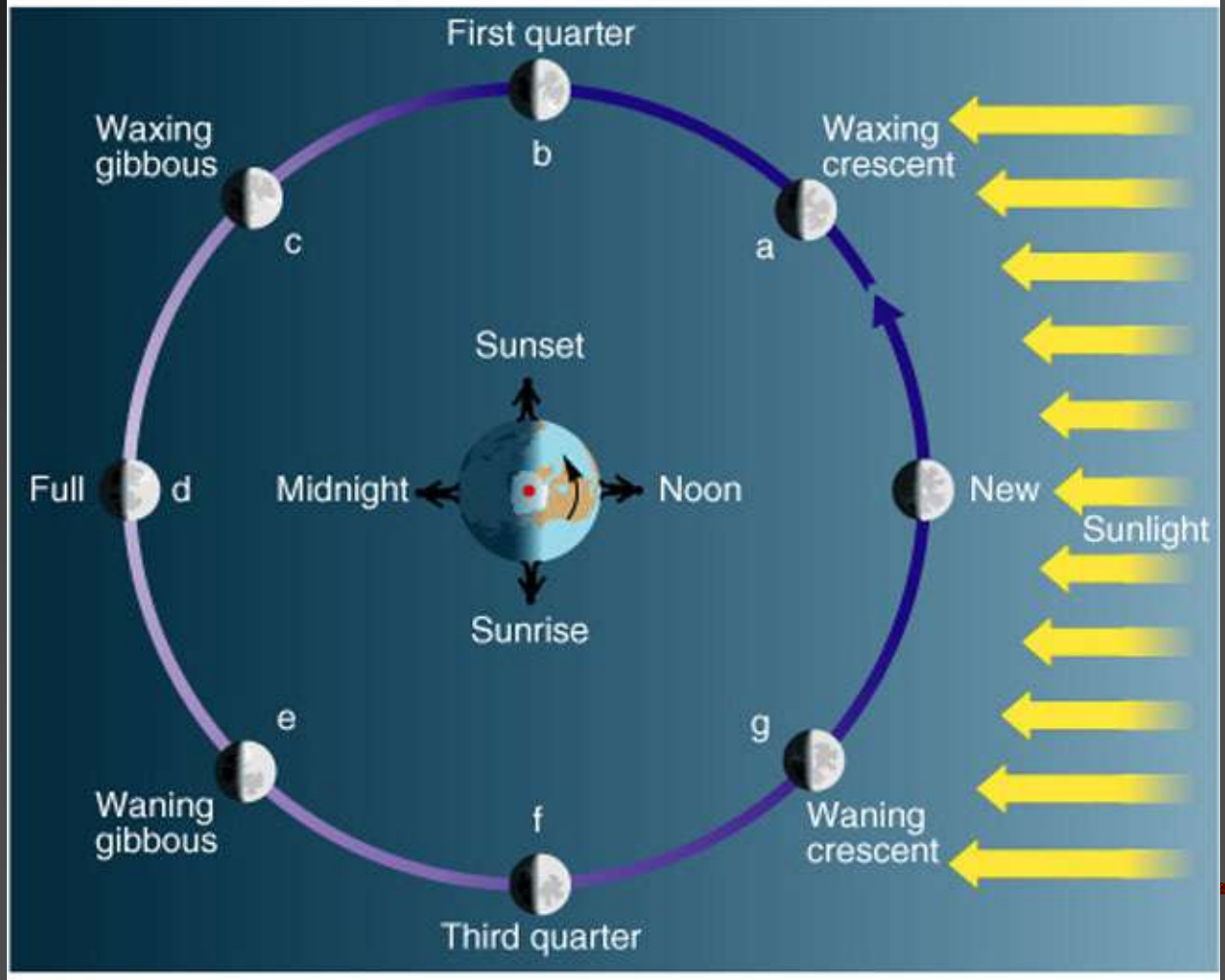


Moon's size relative to Earth

The Moon

- The Moon shines by reflected sunlight.
- The phases of the Moon are the result of varying viewing angles throughout the month.
  - A common misconception is that the phases of the Moon are caused by the shadow of the Earth.

a



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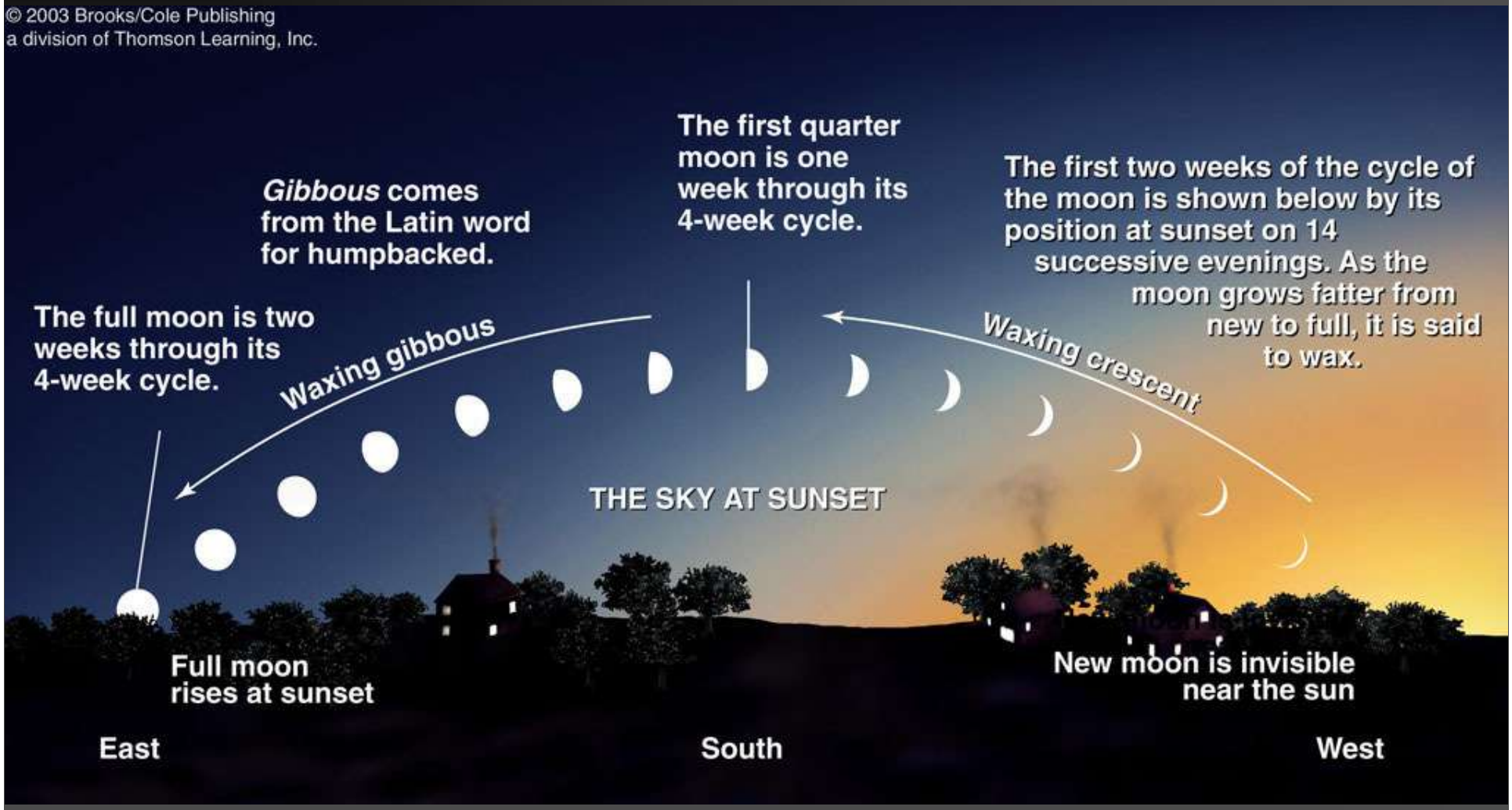
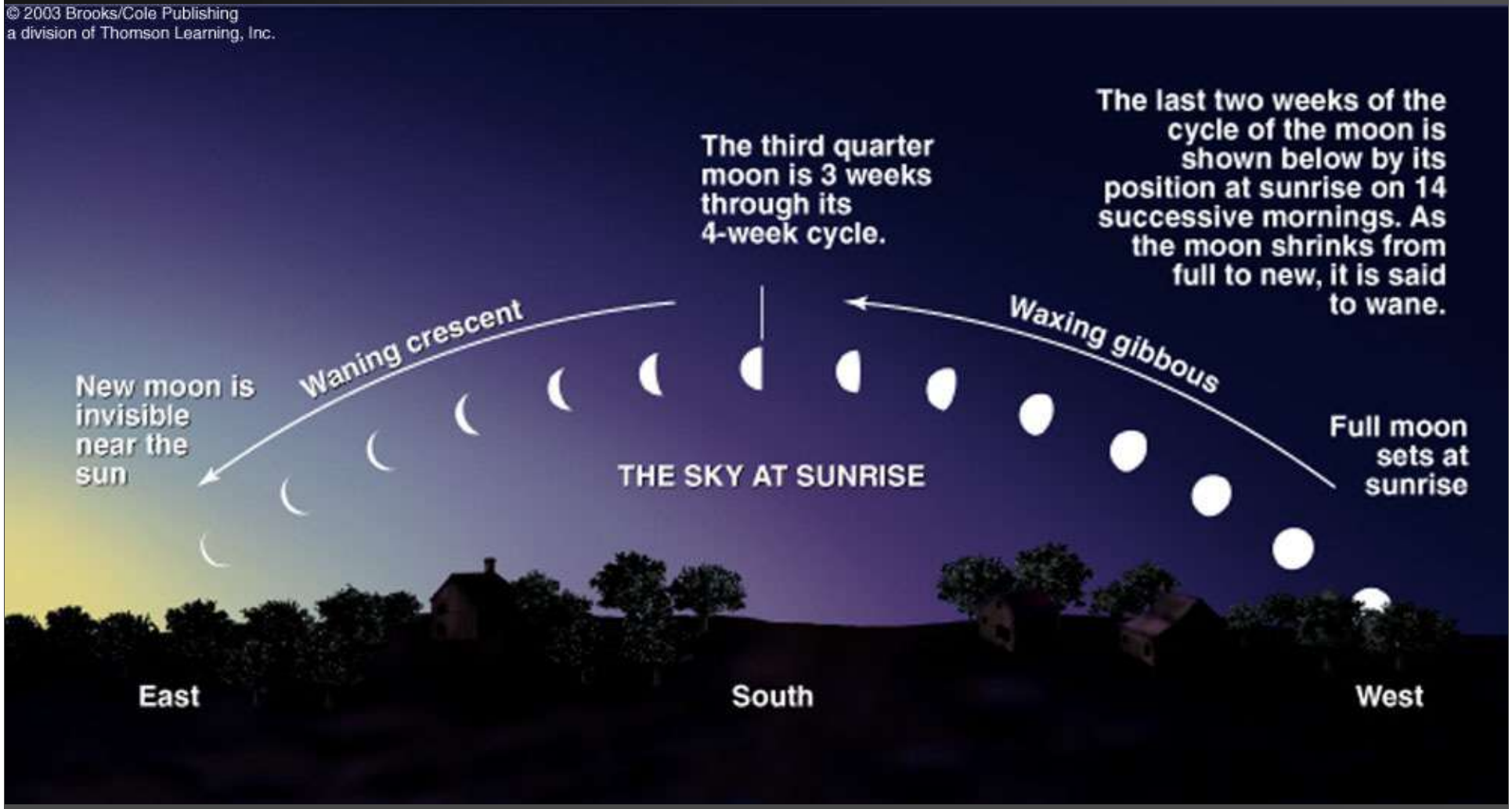
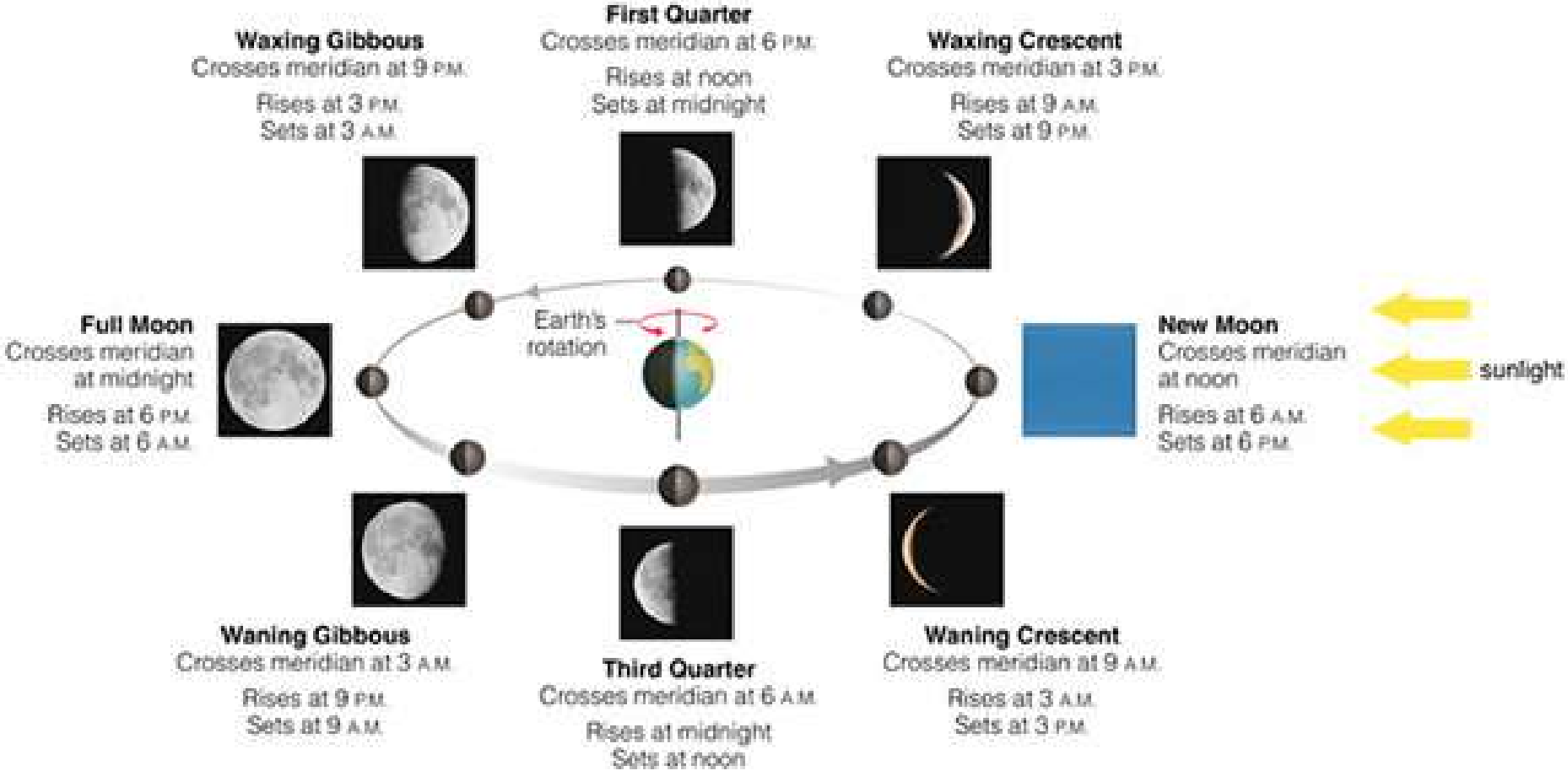
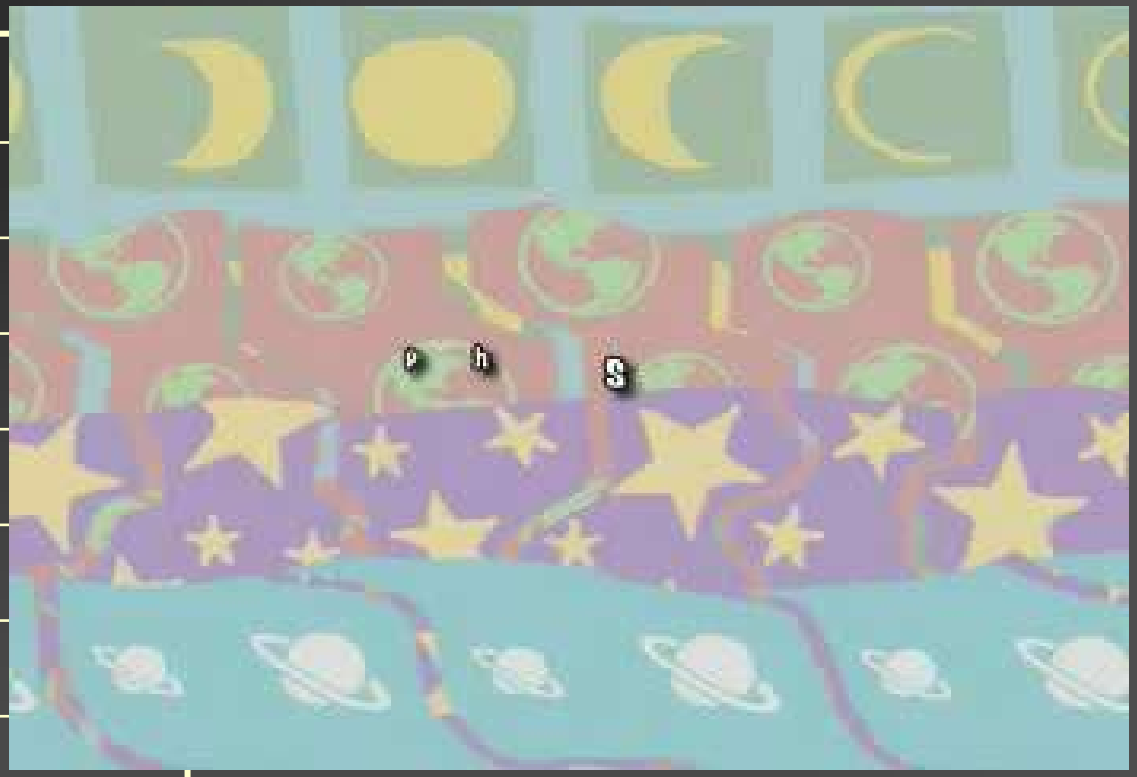





First Quarter
Crosses meridian at 6 P.M.
Rises at noon
Sets at midnight
Waxing Gibbous
Crosses meridian at 9 P.M.
Rises at 3 P.M.
Sets at 3 A.M.
Waxing Crescent
Crosses meridian at 3 P.M.
Rises at 9 A.M.
Sets at 9 P.M.
Full Moon
Crosses meridian at midnight
Rises at 6 P.M.
Sets at 6 A.M.
Earth's rotation
New Moon
Crosses meridian at noon
Rises at 6 A.M.
Sets at 6 P.M.
sunlight
Waning Gibbous
Crosses meridian at 3 A.M.
Rises at 9 P.M.
Sets at 9 A.M.
Third Quarter
Crosses meridian at 6 A.M.
Rises at midnight
Sets at noon
Waning Crescent
Crosses meridian at 9 A.M.
Rises at 3 A.M.
Sets at 3 P.M.

Phases of the Moon

Phases
New
Waxing Crescent
First Quarter
Waxing gibbous
Full Moon
Waning Gibbous
Third Quarter
Waning Crescent



Orbit of the Moon

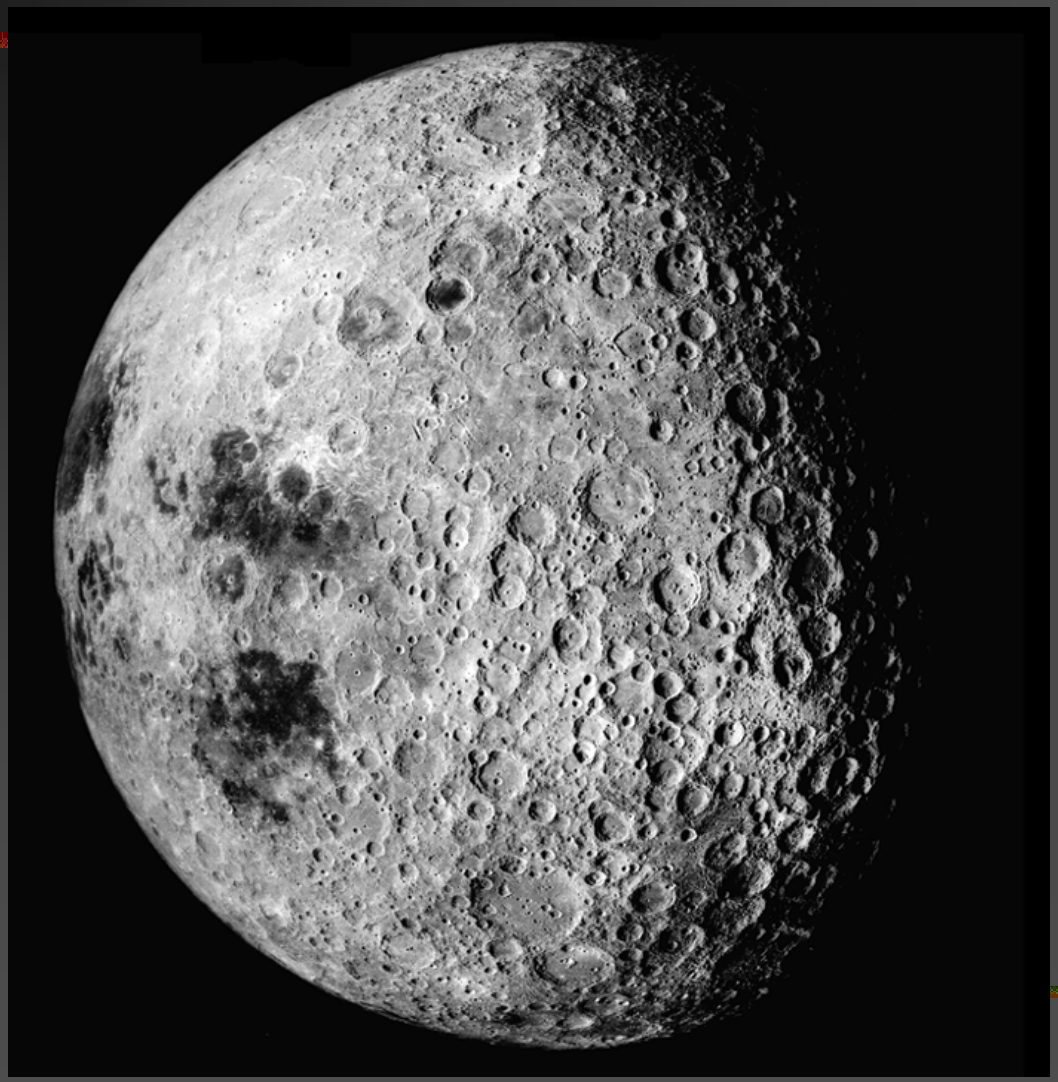
- The time it takes the Moon to go through its phases period 29.5 days.
- Do you think that the moon revolves around the sun or the Earth?

Rotation of the Moon

- The Moon always presents the same face towards Earth.
  - Another common misconception is that this means that the Moon does not rotate.
  - However, in order to keep the same face toward Earth, the Moon must rotate once every orbit.
  - The far side of the Moon is not dark, it gets just as much sunlight as the near side.

Near Side of the Moon

Far Side of the Moon



Why do we have seasons?

- The Earth's seasons are caused by the tilt of the Earth's axis.
- The Earth's axis is tilted. This tilting is what gives us the four seasons of the year - spring, summer, autumn (fall) and winter. Since the axis is tilted, different parts of the globe are oriented towards the Sun at different times of the year.
- Summer is warmer than winter (in each hemisphere) because the Sun's rays hit the Earth at a more direct angle during summer than during winter and also because the days are much longer than the nights during the summer. During the winter, the Sun's rays hit the Earth at an extreme angle, and the days are very short. These effects are due to the tilt of the Earth's axis.

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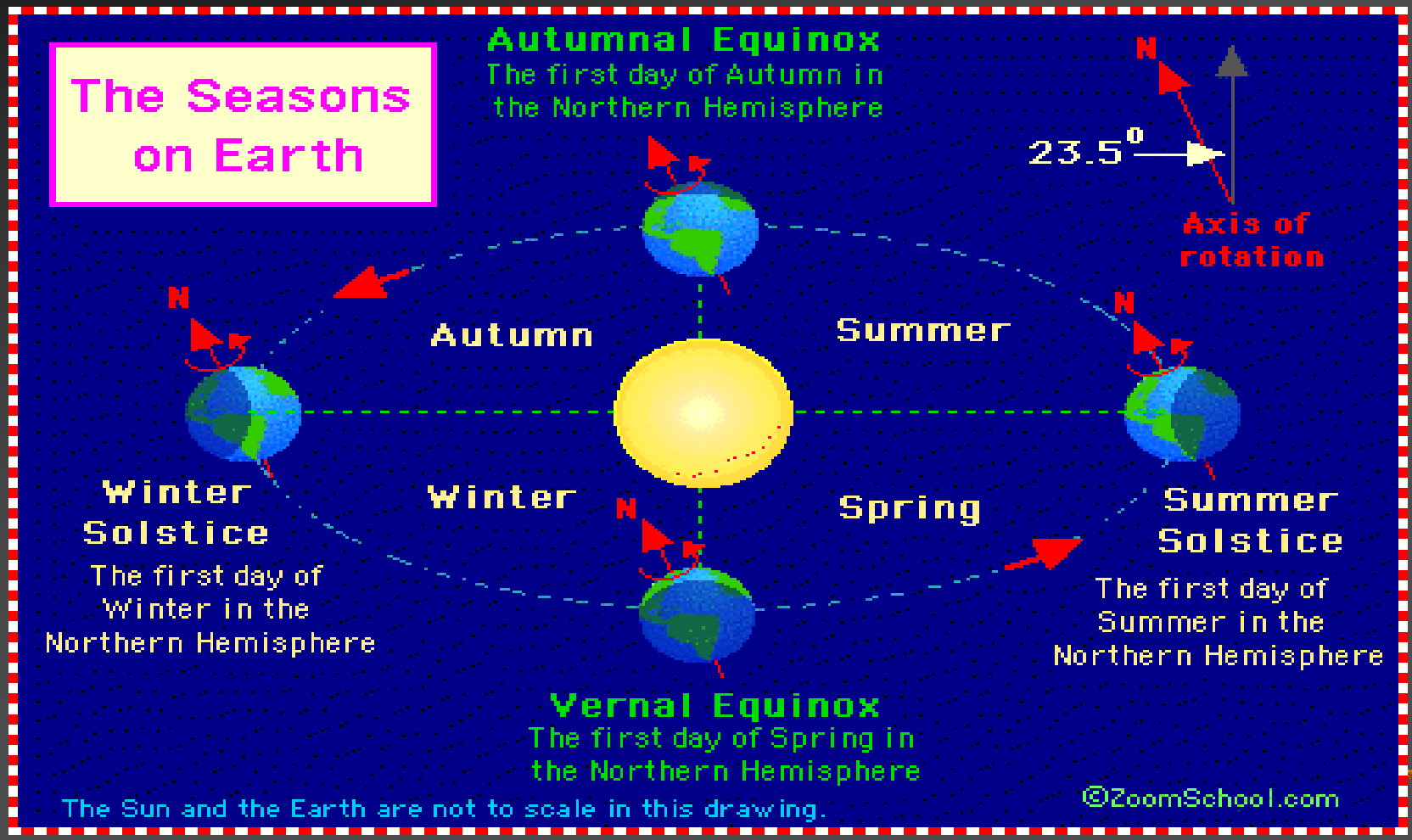

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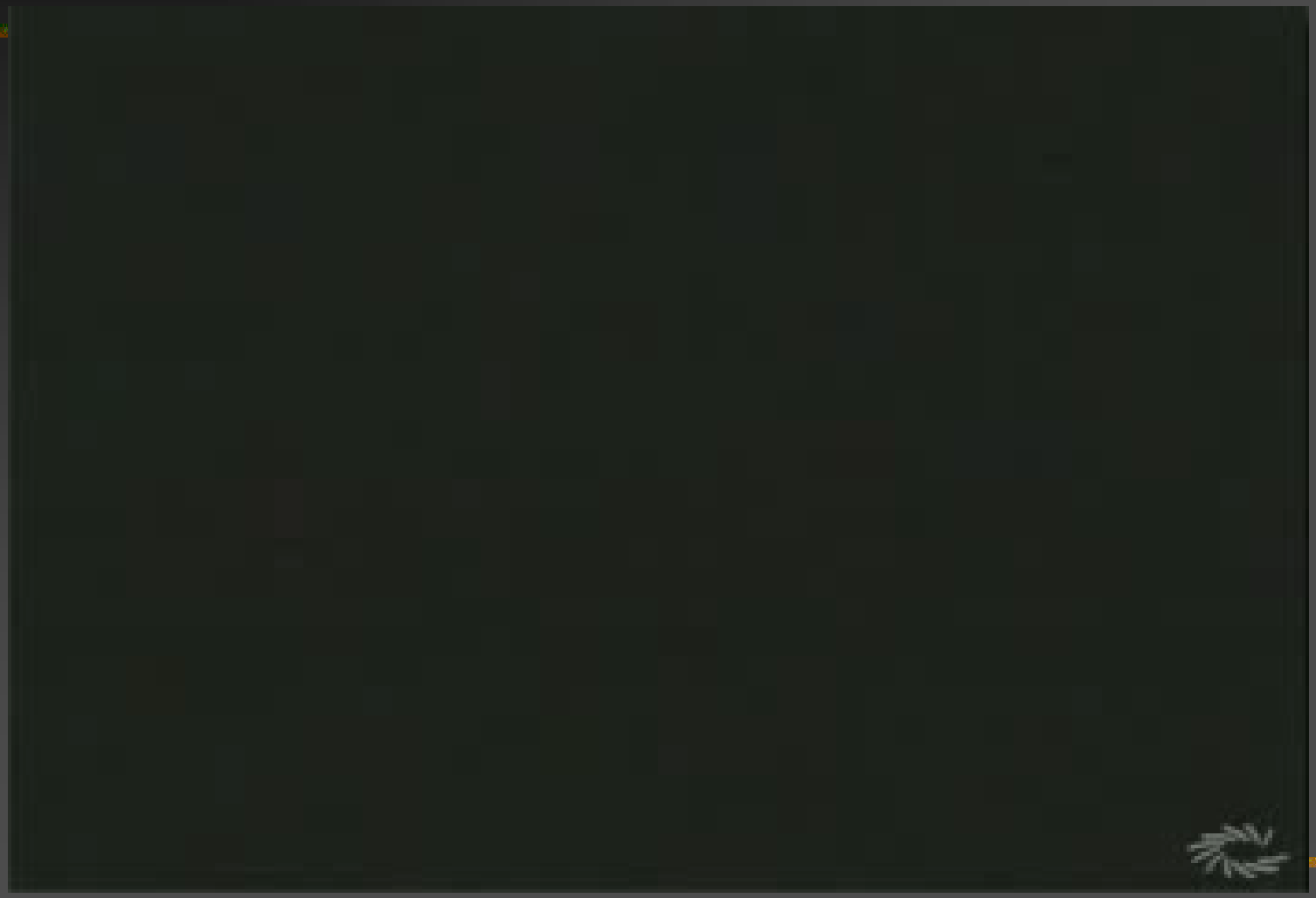
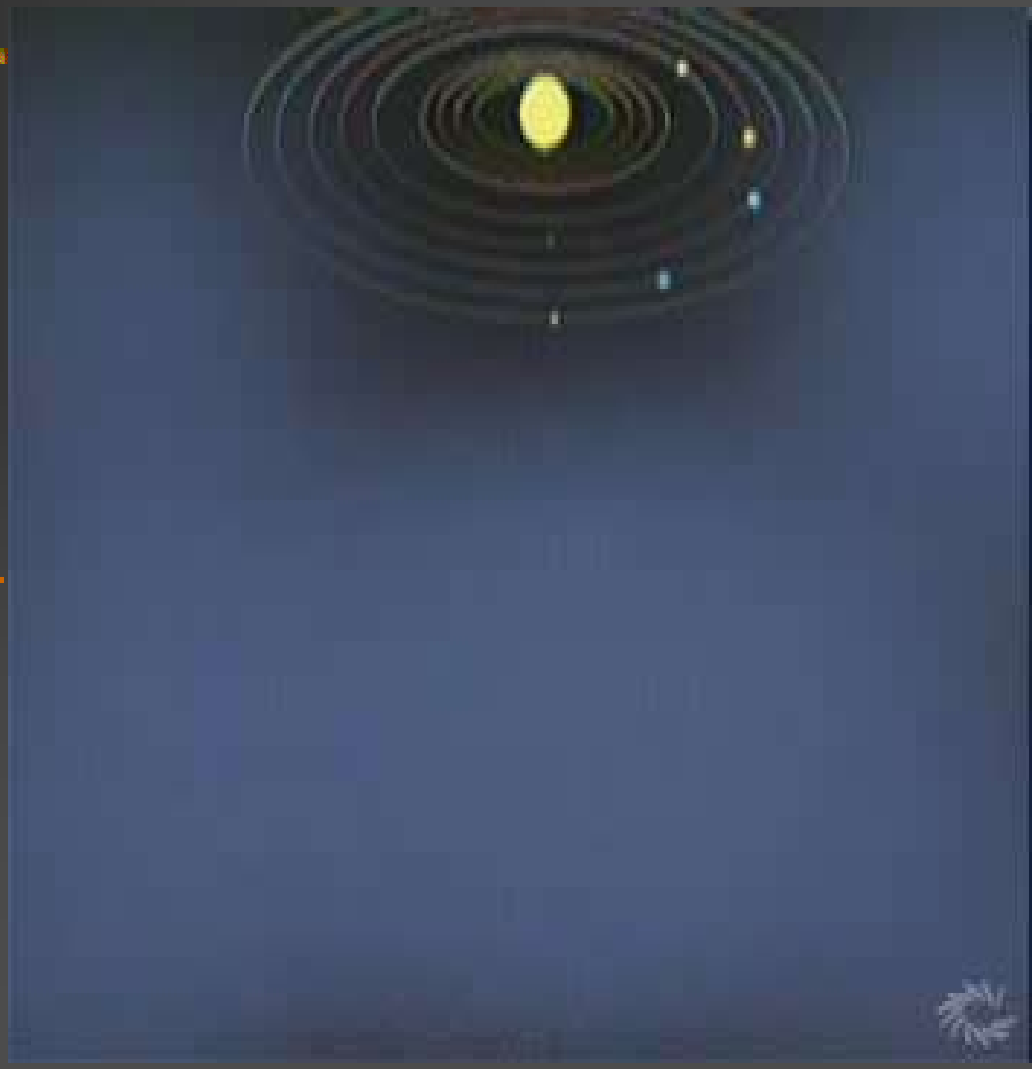


Size and order of the Planets from the Sun

- http://www.kidsastronomy.com/solar_system.htm
- http://www.kidsastronomy.com/the_planets.htm
- Weight and age on each planet



The Order of the Planets from the Sun

- Mercury — My
- Venus — Very
- Earth — Educated
- Mars — Mother
- Jupiter — Just
- Saturn — Sat
- Uranus — Upon
- Neptune — Nine
- Dwarfed Planet Pluto — Planets

Summary