

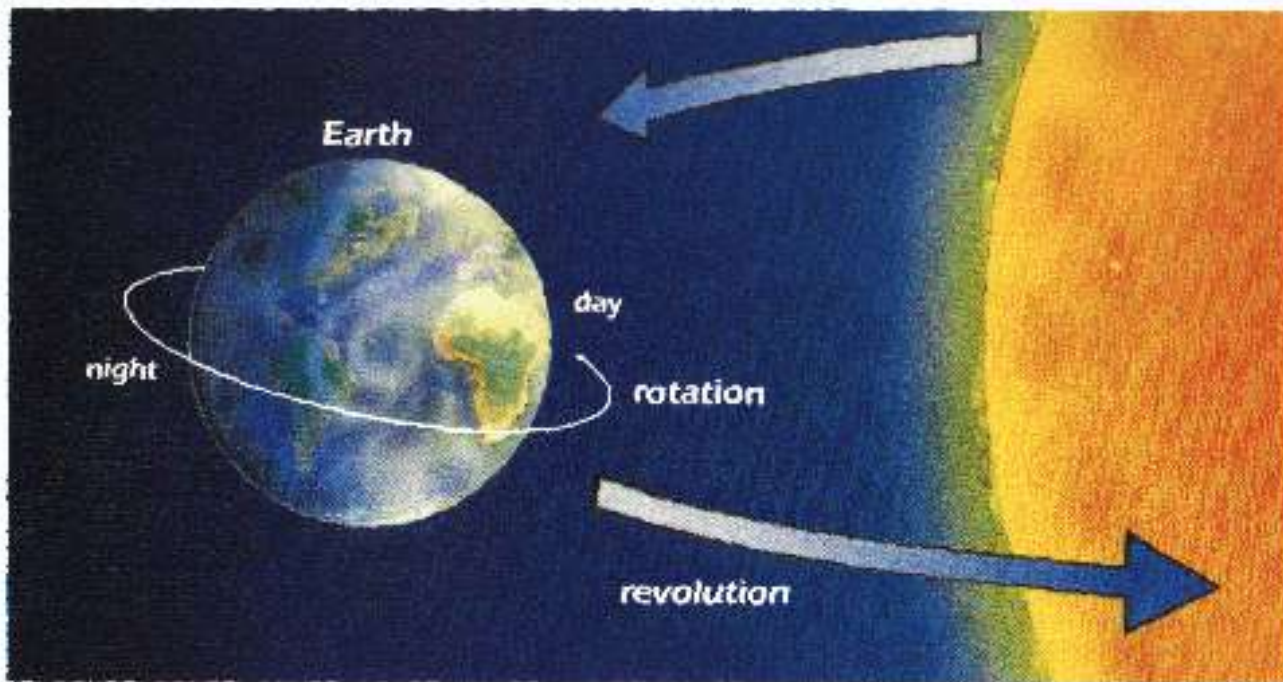


The Cycles of the Sun

Astro Pages18-22

Earth and Space Science

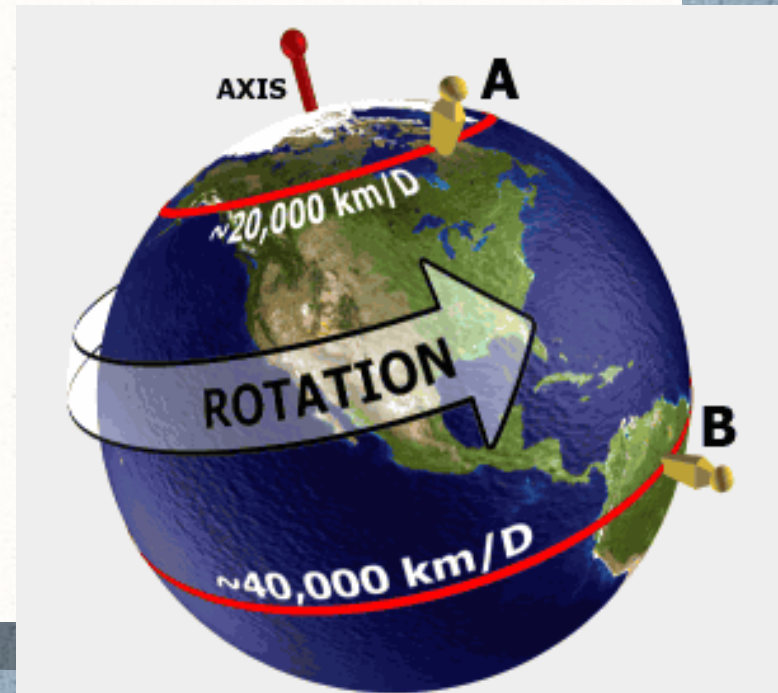
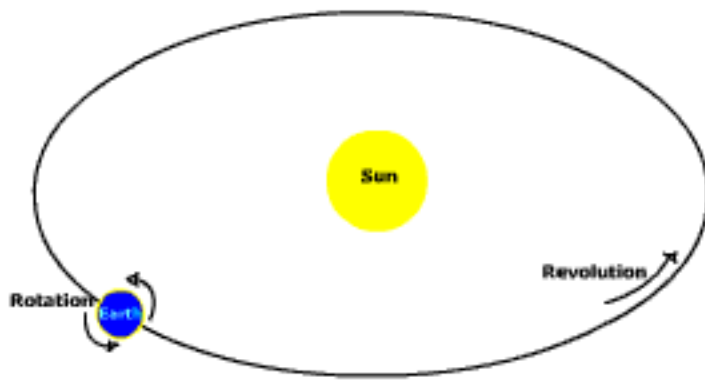
- o The Earth is always moving.
- o Earth rotates on its axis once every 24 hours, producing day and night.
- o Earth revolves around the sun once every 365.26 days. our year.



Earth rotates on its axis as it revolves around the sun.

o **Rotation** – the motion around an axis passing through the rotating body

o **Revolution** – orbital motion around a point located outside the orbiting body



The Annual Motion of the Sun

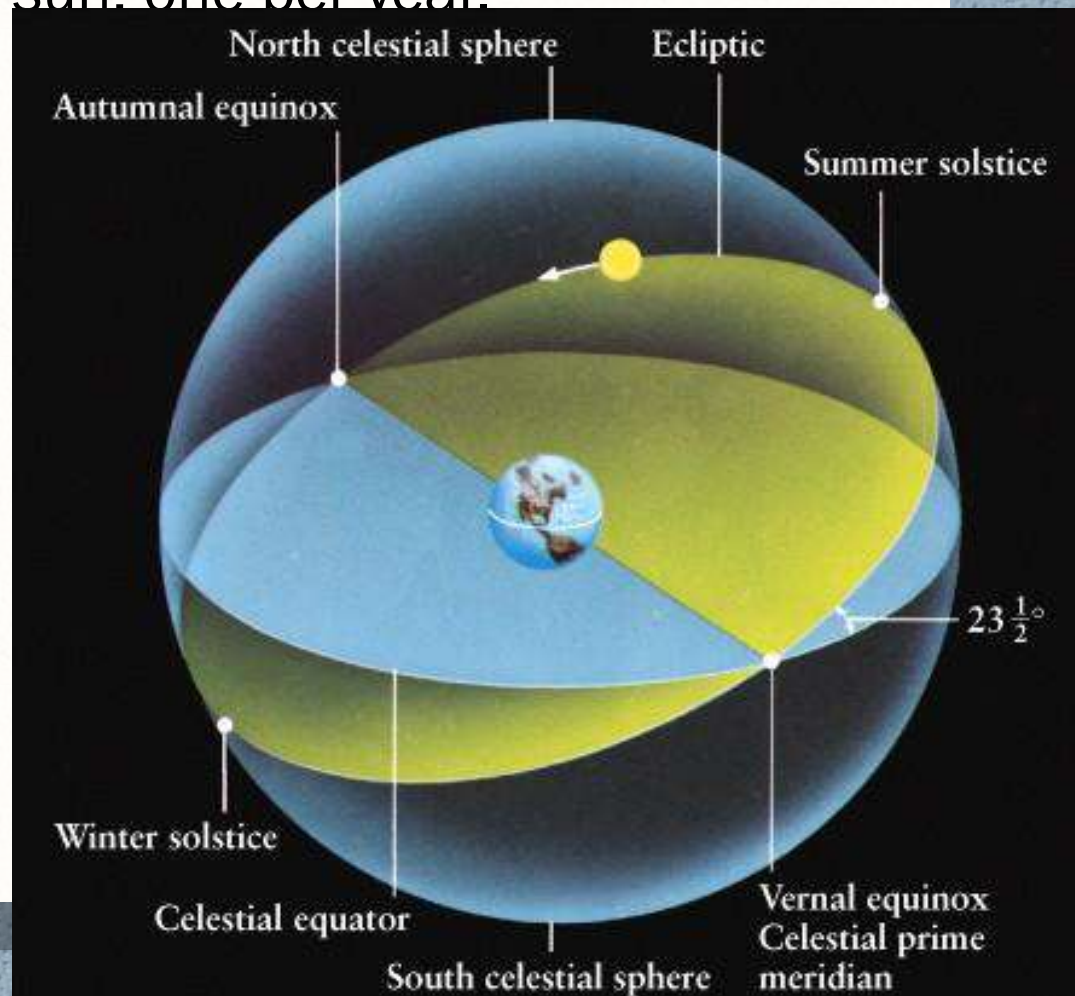
- o The sky is filled with stars all the time, but during our day, the sun's brightness dominates the sky and overpowers the light coming from these other stars.



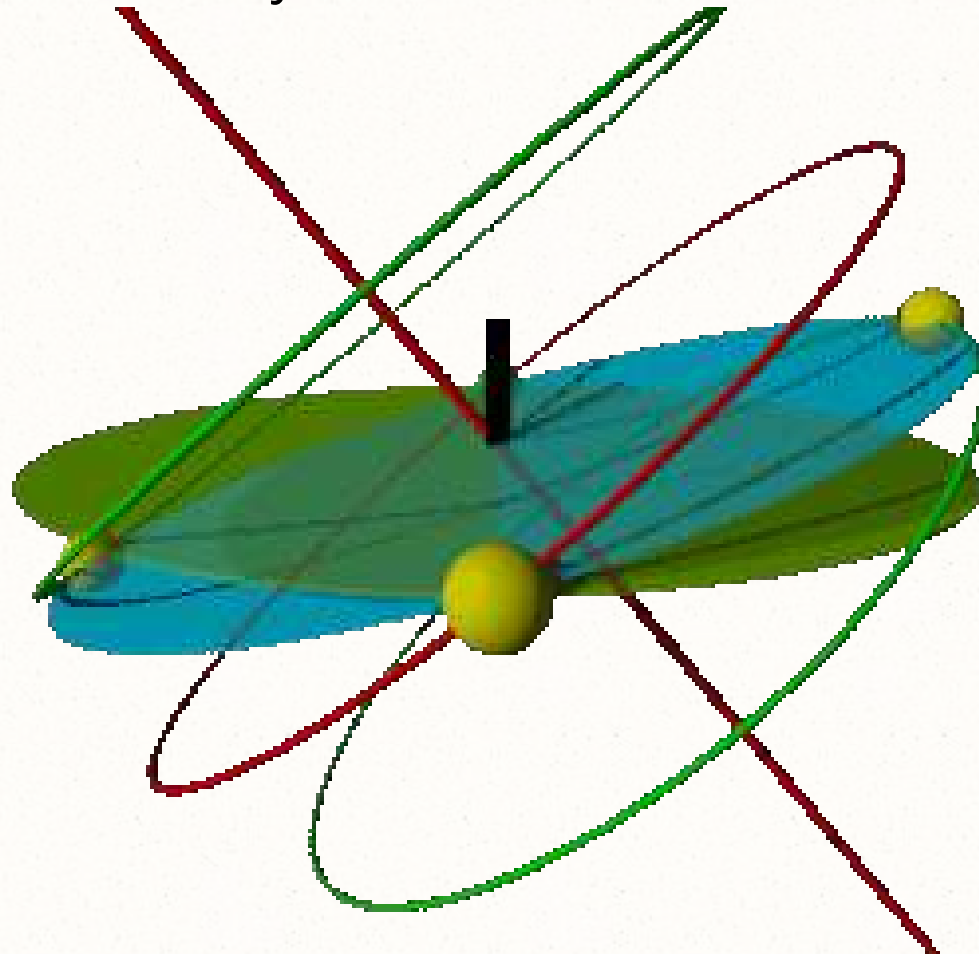
- o If the sun were dimmer, you would be able to see other stars during the day, and you would notice the sun appear to move slowly eastward relative to the background stars.
- o The apparent motion is caused by the Earth's revolution around the sun.



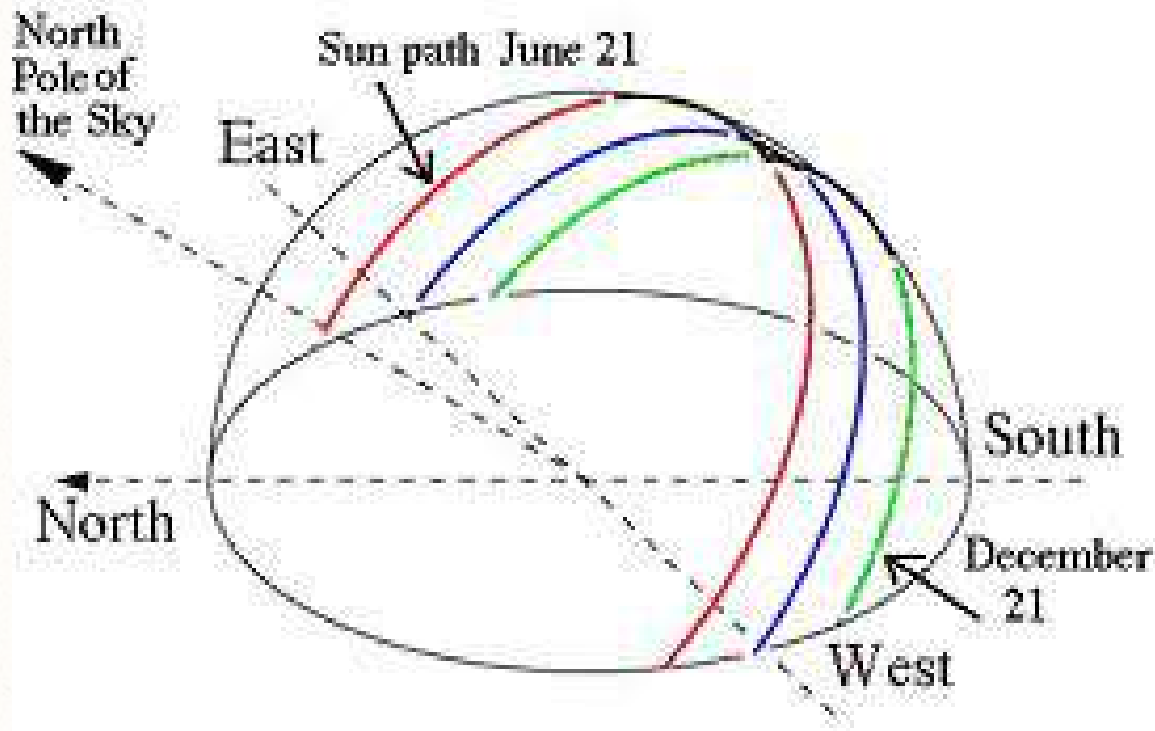
- o Our point of view from Earth is constantly changing, as we orbit our nearly circular path around the sun, one per year.
- o The sun's apparent path of motion (moving eastward) follows a line called the ecliptic.



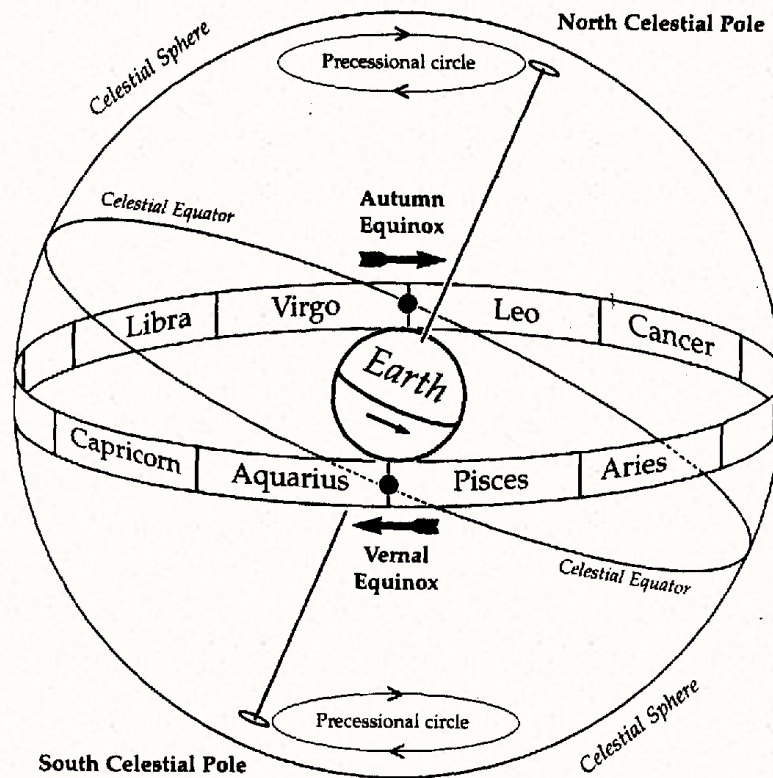
Ecliptic – the apparent path of the sun around the sky



- o If you reference the celestial sphere model, and think of it as a great big screen, then the ecliptic would be the shadow cast by the Earth as it orbits the sun.



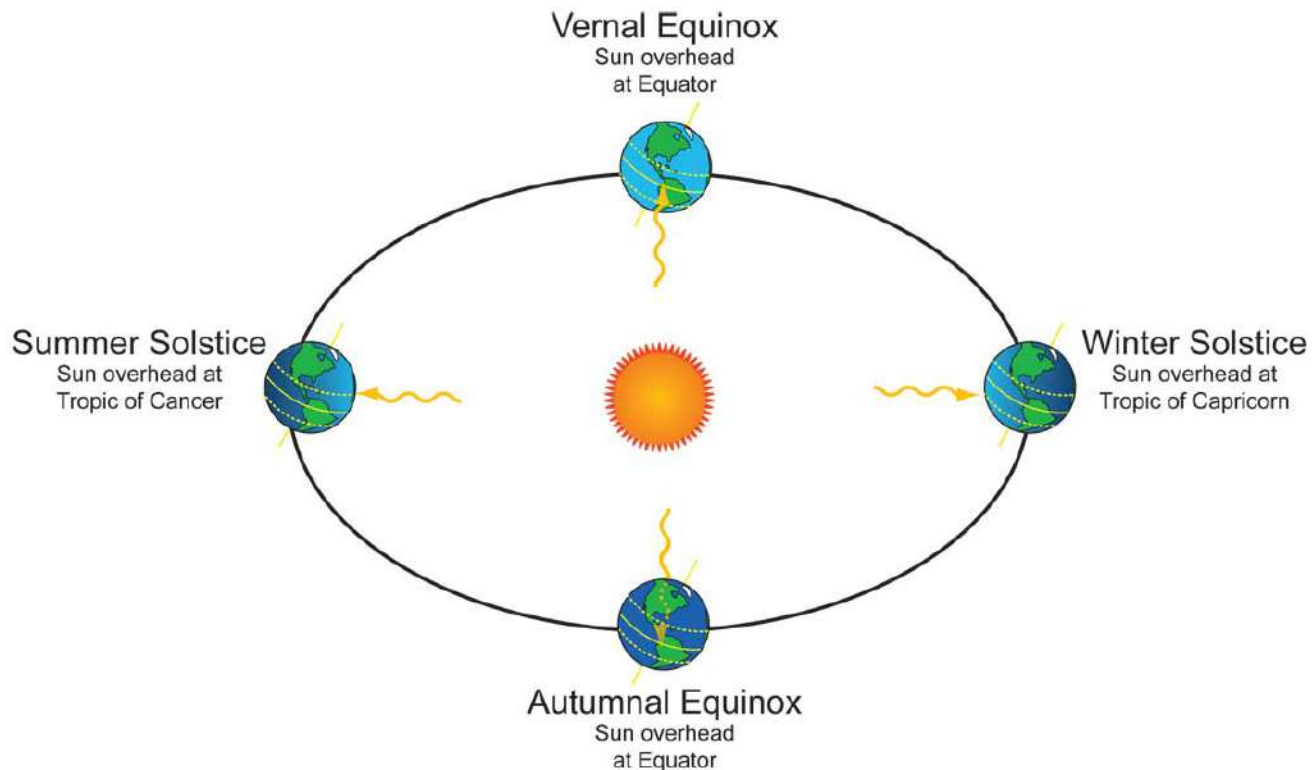
- o Another way to think of it would be that the ecliptic is the projection of the Earth's orbit on the celestial sphere.



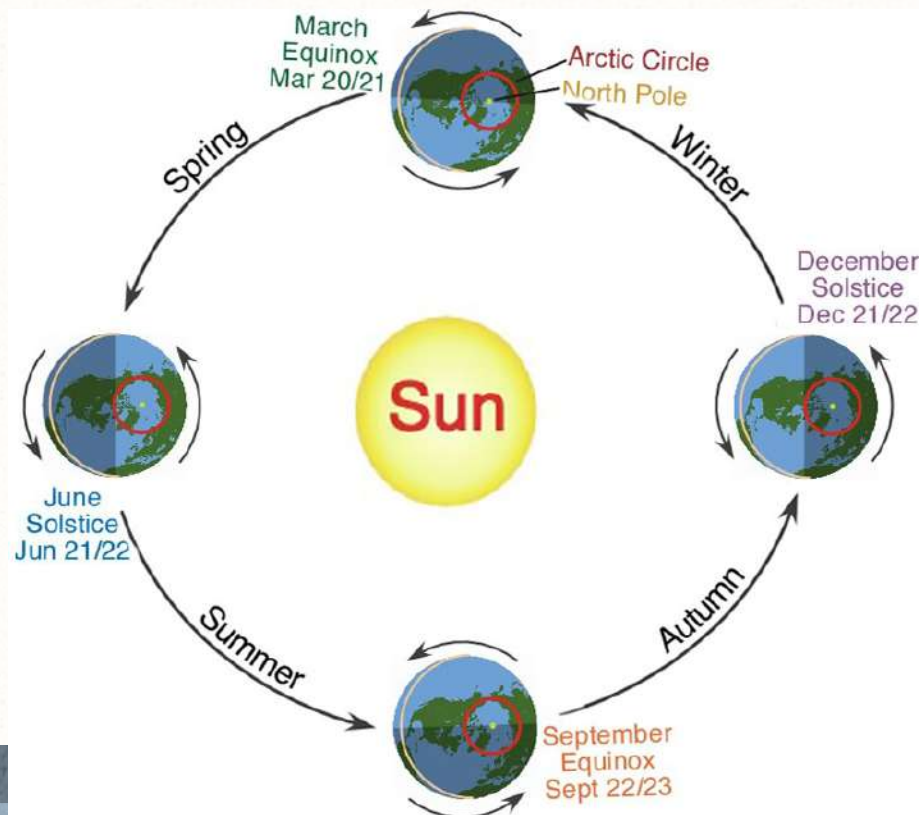
The Seasons

- Our seasons are directly caused by two separate factors that must combine to cause the seasons.
- 1. The Earth's revolution around the sun.
- 2. The tilt of the Earth on its axis (23.5°).

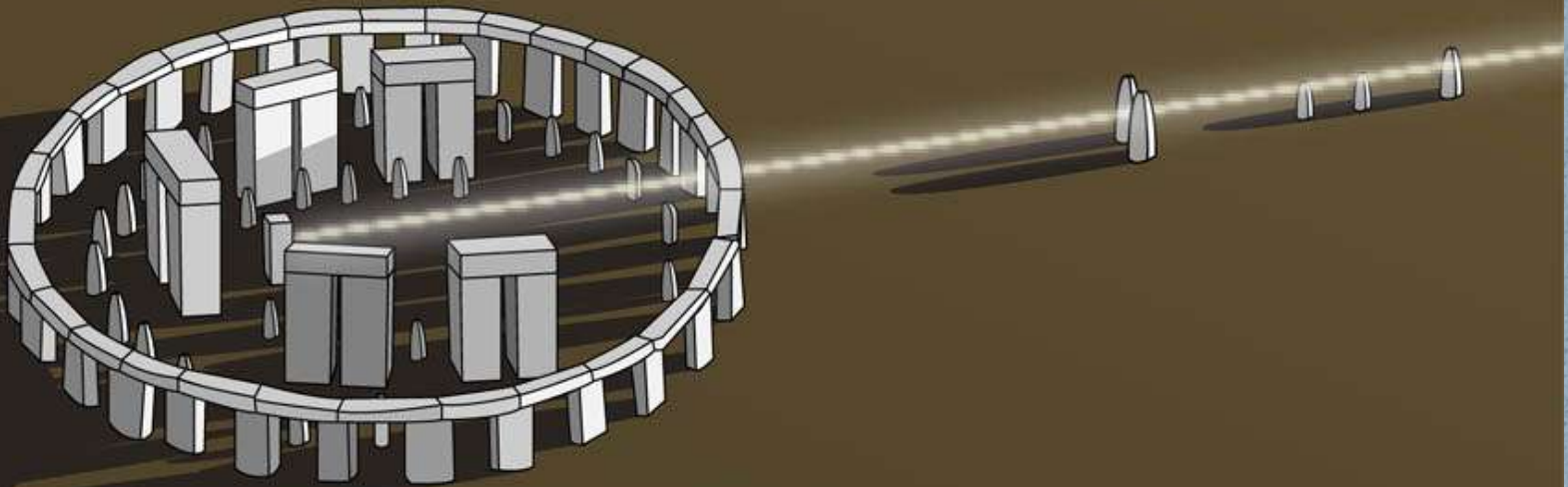
- o There are two important principles to remember when talking about the cause of the seasons.
- a. Since the orbit is nearly circular, the distance to the sun does not vary enough to make our seasons.



b. The tilt of the Earth on its axis directly causes the seasons. As the Earth's hemispheres tilt toward or away from the sun, that hemisphere receives more or less direct solar energy during that part of the year.



- o The seasons are important for cycles of growth, both plant and animal, and have been used for all of human history to mark the planting and harvesting of crops.



o In addition, the signs of the zodiac have been used for fortune telling (astrology) as the stars, and planets move across the sky. The zodiac is a “circle of animals” and used to be a major part of ancient astronomy.



o The zodiac is centered along the ecliptic, and is still used in many cultures.

The ecliptic is an excellent place to look for the planets Mercury, Venus, Mars, Jupiter, and Saturn, which will appear as bright stars in the sky.



o In the morning and evening, are excellent times to see Mercury and Venus. These are called the morning and evening stars.



- **Evening star** – any planet visible in the sky just after sunset
- **Morning star** – any planet visible in the sky just before sunrise



Where do we go from here?

- Our lab activity will be focused on the seasons and the cycle of the moon, so more information will be coming from there.

