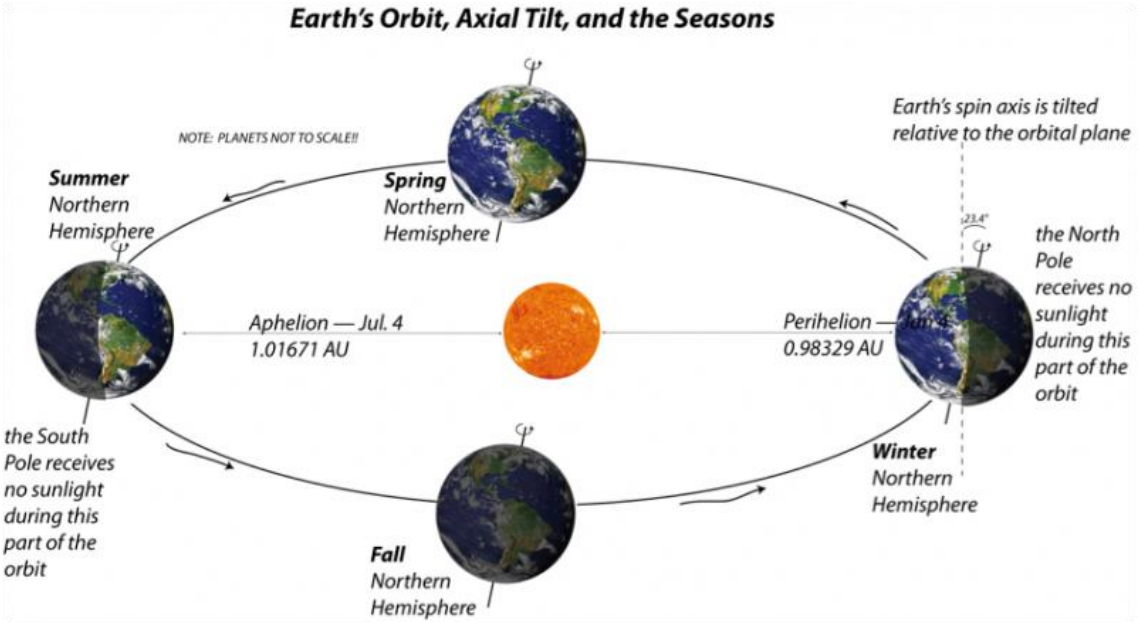
I. Earth Motions: Rotation vs. Revolution



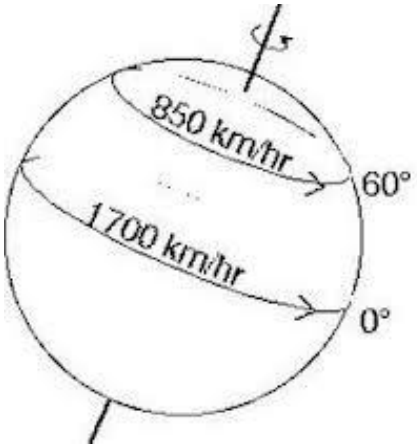
A. _____:

1. Earth spins on it's _____, the imaginary straight line through Earth between the North Pole and the South Pole

2. The axis of rotation is_____ 23 ½ degrees from a perpendicular to the plane of Earth's orbit.

3. The north axis always stays aimed towards the North Star (_____).

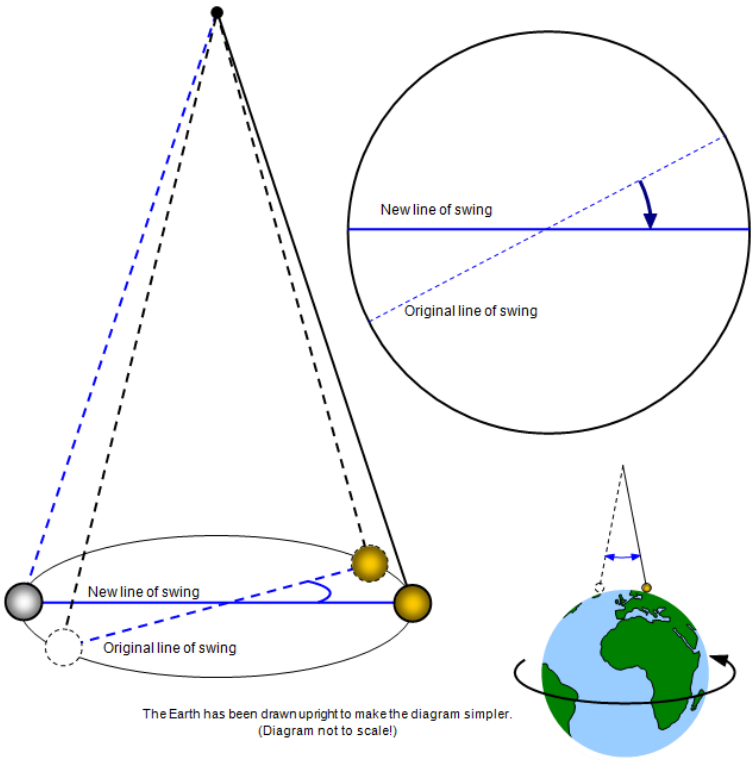
4. The Rate of Earth's Rotation



a. Earth makes one complete turn from _____ to every _____.
b. Angular Rate of Rotation: One complete rotation is equal to_____degrees in 24 hours or _____.
c. Linear Rate of Rotation: (See Rev. Book *Figure 9-17* on page 459)
   (1) Speed changes with _____ north or south of the equator.
   (2) The greater the latitude, the _____ the speed.
   (3) At the equator the speed is ~ 1,000 miles/hour or ~ 1,670 km/hour.

Evidence of Earth's Rotation

a. **<u>The Foucault Pendulum</u>** (pronounced foo-koe) See Rev. Book *Figure 9-18*, page 460



(1) Once set in motion, a free-swinging pendulum will continue to swing along the same path unless acted upon by an outside force due to _____.

(2) In 1851Jean Bernard Leon Foucault performed his third demonstration using the principal of a pendulum to prove that Earth rotates.

(3) A steel wire 220 feet long heavy weight (bob) of lead in copper at its end was suspended from the Pantheon in Paris.

(a) After a period of time it *appeared* that the direction of the pendulum's path had changed but no outside force had affected it.

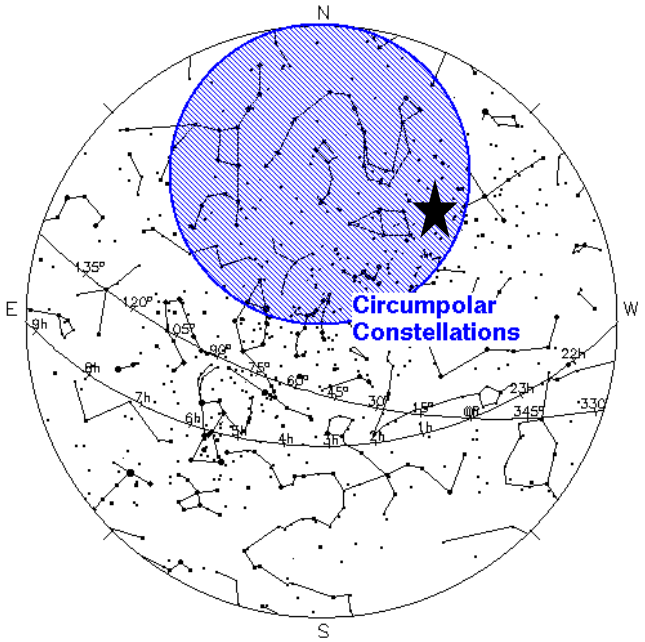
(b) He concluded

_____

_____

b. <u>Apparent Motion of Celestial Objects</u>

(1) Circumpolar Motion of Stars in the North Sky (See Rev. Book *Figures 9-8* & *9-9*, p. 446)



_____

_____

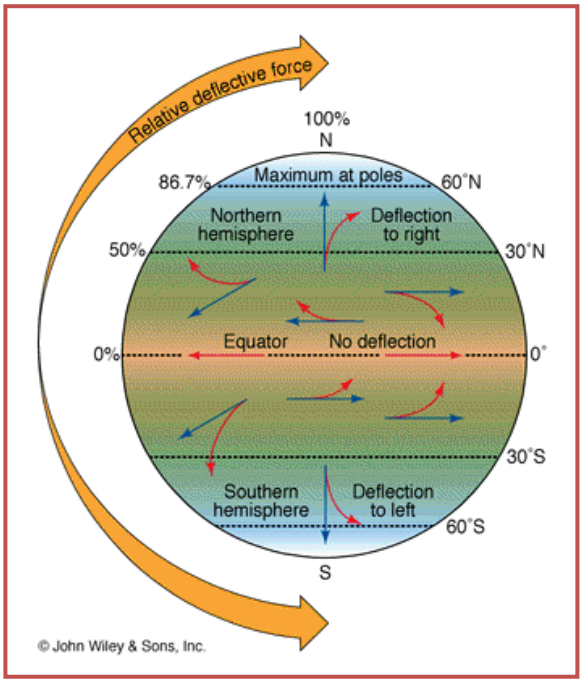
_____

(2) In the southern sky, the sun, the moon, stars, and planets appear to

_____.

(3) _____: When photographs of stars are taken in the night sky using long-term exposures they appear as streaks of light rather than points of light.

c. **The Coriolis** Effect



Objects moving over Earth's surface appears to be deflected from a straight path and curve.
This is due to the fact that Earth rotates at different speeds at different latitudes.

North Hemisphere deflection:

_____

Southern Hemisphere deflection:

_____

The Coriolis Effect is responsible for the curved path of:

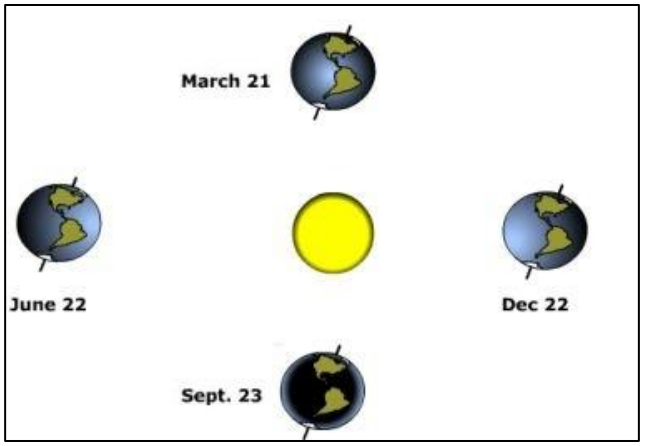
Planetary winds, curved winds in storms (vorticity), ocean currents

d. ALSO….**Observations from Space** (Obviously!!) ☺

B. <u>Revolution</u> (See Rev. Book *Figure 9-20*, page 467)

1. Revolution is the motion of Earth traveling around the_____ in it's _____ .

2. _____of Earth's axis: The position of Earth's axis is parallel to every other position of the axis.



   a. This is the cause of_____ on Earth.

   b. _____: When the hemisphere "leans"_____ the sun.

      (1) The apparent path of the sun is the _____.

      (2) The sun reaches it's _____ altitude for the year.

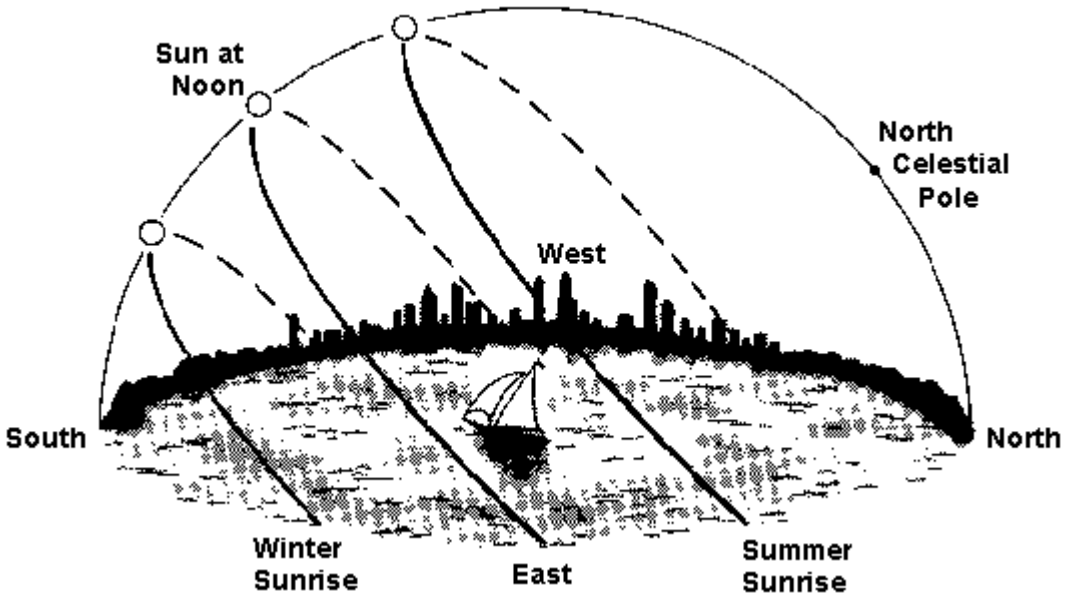
      (3) _____ period of daylight.

   c. _____: When the hemisphere "leans" _____ the sun.

      (1) The apparent path of the sun is the_____.

      (2) The sun reaches it's _____ altitude for the year.

      (3) _____ period of daylight.

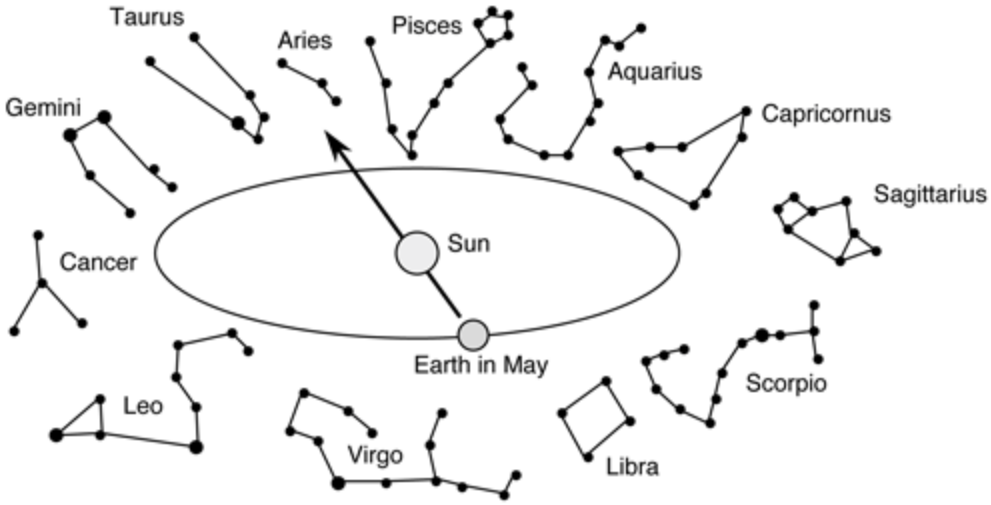


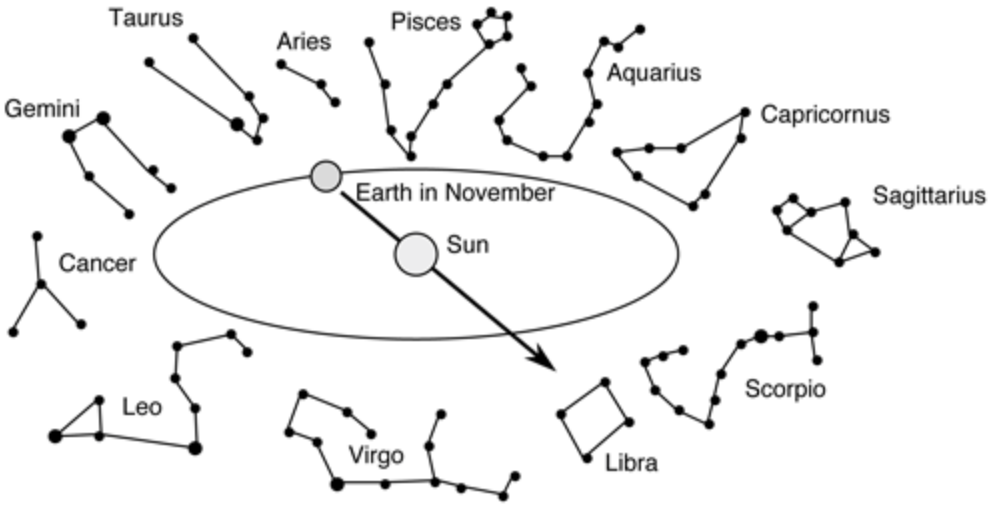
3. *Seasonal Change in Constellations*

   a. _____are groups of stars appearing to form _____.

   b. If Earth didn't revolve we would see the same constellations in the sky throughout the year.

   c. As Earth revolves, the night side faces a _____ part of the celestial sphere. As a result, there is a seasonal change in constellations observed.





As the Earth moves around the Sun, the Sun **appears** to drift among the zodiac constellations along the path called the **ecliptic.** The ecliptic is the projection of the Earth's orbit onto the sky.