**Movements of the Earth:**

**Unit 4: Astronomy**

**Mini-Unit:** Astronomy Basics

**Goal 3: The student will demonstrate the ability to explain the role and interaction of revolution, rotation, and gravity on the components of the Sun-Moon-Earth system.**

Objectives – The student will be able to:

* + Explain how revolution, rotation and precession of the Sun-Moon-Earth System produce changes in the solar angle of incidence (altitude, azimuth) that result in seasons (solstices and equinoxes) and changes in the length of a day, month (sidereal and synodic lunar month), and year

**Textbook:** Unit 8, Chapter 27, pg. 667

The Rotating Earth:

Rotation: The spin of the Earth on its axis

* Takes about 24 hours for one complete rotation
* Results in night/day and the Coriolis Effect
* Earth titled on its axis

Revolution: The motion of a body that travels around another body in space; one complete trip along an orbit

* Takes 365 ¼ days for one full revolution around the sun
* The Earth’s orbit is a slight ellipse, rather than a perfect circle

Perihelion: The point in the orbit of a planet at which the planet is closest to the sun

Aphelion: The point in the orbit of a planet at which the planet is farthest from the sun

Measuring Time:

The Earth’s motion provides the basis for measuring time:

1. The day is determined by the time for one rotation divided by 24 units
2. The year is determined by the time of one revolution
3. Months were originally determined by the time between full moons, but since it was not a whole number, it was just put as roughly one twelfth of a year
4. Since the revolution around the sun is 365 ¼ days, we account for the extra time every four years during a leap year
5. Time zones determined such that the highest point of the Sun during the day is noon. Determined by 360 degrees in a sphere, divided by 24 hours, equals 15 degrees of rotation every hour, thus a new time zone every 15 degrees of rotation.
6. International Date Line marks the change of one day to another.

The Seasons:

The Earth is titled on the axis at 23.5 degrees and it takes 365 ¼ days to revolve around the Sun

When a hemisphere faces the sun, you get more direct insolation, thus summer. Angle of insolation is far more important than distance to the sun when determining the season.

Equinox: The moment when the sun strikes the Earth’s equator at 90 degrees, thus the hours of daylight and darkness are equal everywhere on Earth

* Autumnal Equinox (September 22nd or 23rd) marks the beginning of fall, vernal equinox (March 21st or 22nd) marks the beginning of spring

Solstice: The point at which the sun is as far north or as far south of the equator as possible

* Summer solstice (June 21st or 22nd) is when the Sun is directly about the Tropic of Cancer and the winter solstice (December 21st or 22nd) is directly above the Tropic of Capricorn