# Chapter Twenty: The Sun-Earth-Moon System
## Lesson 1: Earth's Motion

Earth is in constant motion, spinning in space and traveling around the Sun.

- The nearest star to Earth is our Sun.
- The Sun is about 150 million kilometers (93,000,000 miles) from Earth.
- The Sun's mass is more than 300,000 times greater than Earth's mass.
- Nuclear fusion happens on the Sun – when nuclei atoms combine
    - Core is at 15,000,000 $^{o}$C (27,000,032 $^{o}$F)
    - Surface is at 5,500 $^{o}$C (9,932 $^{o}$F)

**Orbit:** the path an object follows as it moves around another object

**Revolution:** the motion of one object around another object

- Earth's revolution is 365.24 days or 1 year

The Sun's gravity pulls on Earth…this explains why we orbit the Sun.

- The pull of the Sun's gravity keeps Earth revolving around the Sun in a nearly circular orbit.
- If we were to lose the Sun's gravity, Earth would fly off into space in a straight line.

**Rotation:** a spinning motion

- **Rotation axis:** the line on which an object rotates
- Earth rotates in a counterclockwise direction from west to east
    - 1 complete rotation of Earth takes 24 hours.
    - This rotation gives Earth its day and night
    - Even though the Earth rotates from west to east, it appears the Sun moves across the sky from east to west.
        - Think of you on a merry-go-round. As you spin in one direction, it appears the people are moving in the opposite direction.

Earth's Tilt

- Earth's tilt is at 23.5$^{o}$
- Earth's tilt is always in the same direction by the same amount
- Because of the tilt of the Earth, we get our 4 seasons.

    - We are closer to the Sun during the winter and farther from the Sun in the summer (page 726 – Figure 2)

**Solstice:** a day when Earth's rotation axis is the most toward or away from the Sun

- December Solstice
    - December 21 or 22
        - Northern Hemisphere is experiencing winter
            - The north end is tilted away from the Sun
- June Solstice
    - June 20 or 21
        - Northern Hemisphere is experiencing summer
            - The north end is tilted toward the Sun

**Equinox:** a day when Earth's rotation axis is leaning along Earth's orbit, neither toward nor away from the Sun

- September Equinox
    - September 22 or 23
        - There are 12 hours of daylight and 12 hours of darkness
        - Northern Hemisphere is having autumn
- March Equinox
    - March 20 or 21
        - There are 12 hours of daylight and 12 hours of darkness
        - Northern Hemisphere is having spring

The Sun's apparent path through the sky in the northern hemisphere is lowest on the December solstice and highest on the June solstice.