

# Chapter 10

## Beyond Planet Earth

# Phases of the Moon

- New Moon
- New Crescent
- First Quarter
- New Gibbous
- Full Moon
- Old Gibbous
- Last Quarter
- Old Crescent

# Eclipses

- **Solar Eclipse**

Sun>Moon>Earth

Need to say that the Moon's shadow falls on the Earth.

- **Lunar Eclipse**

Sun>Earth>Moon

Need to say that the Earth's shadow falls on the Moon.

# Tides

- Tides are caused by the Gravity of the Moon and Sun.
- There are always 2 High tides and 2 Low tides every day
- When the Moon and Sun are in a parallel line, Gravity is strongest and we have “Spring Tide” This occurs on Full moon and New moon phases.
- When the Moon and Sun are at 90 degrees to each other, the Gravity waves partially cancel each other out and we have the lowest of low tides and lowest of high tides. These are called the “Neap tides”
- Tide Calendars are used by people that work with respect to the Oceans, i.e. Dock Workers.

# Geometry of Orbits

- **Ellipse:** Geometric form that is formed by drawing a line around two points in the center of the Ellipse.
- **Foci:** The plural of the two focus points
- **Eccentricity:** Use ESRT page 1
- **Major Axis:** Large “diameter” of an Ellipse
- **Minor Axis:** Small “diameter” of an Ellipse

# Kepler's Laws of an Ellipse

- Planets orbits are Eccentric, they make the shape of an Ellipse.
- Equal times of orbit sweep out equal areas.
- The closer to the Primary Focus the faster the velocity. Also the farther the distance from the Primary Focus the slower the velocity.

# The Solar System

- Use ESRT page 15, Planet information is shown on the data chart.
- Earth's Moon is the last row of the data chart on ESRT page 15.
- Venus is the planet that has the most carbon dioxide which is a greenhouse gas. Thus, Venus is the hottest planet in our Solar System.
- Earth is the planet with the most water on its surface.
- The Asteroid belt is located between the planets of Mars and Jupiter.
- Meteors
- Comets
- Compared to Planets, Comets have a much greater eccentricity.

# Our Sun

- Nuclear Fusion: Energy forms when two Hydrogen atoms combine and form Helium plus “Sunlight, Insolation, Electromagnetic Energy”
- Gaseous Sphere composed primarily of Hydrogen, Sun’s density is 1.4 grams per cubic centimeter
- Sun’s Electromagnetic Energy is approx. composed of: 45% Visible Light, 45% Infrared (heat) Energy, and 5% Ultra Violet Energy

# Universe

- Largest of all sets
- Billions of Galaxies in our Univers
- Billions of Stars in our Milkyway Galaxy
- Our Sun is just one star in our Milkyway Galaxy. Our Sun is a main sequence star.
- Red Shift: Spectroscope analysis provided evidence that our Universe is expanding

# Beyond Planet Earth

- Distance is measured in Light Years: distance that light travels in one years time at the speed of  $3.0 \times 10^8$  meters per second.
- When top viewing the Milkyway Galaxy our Sun is approximately at the 7-8PM position, assuming one super imposes a clock dials over the image of the Milkyway Galaxy.