

Moon, Sun, Comets, Asteroids

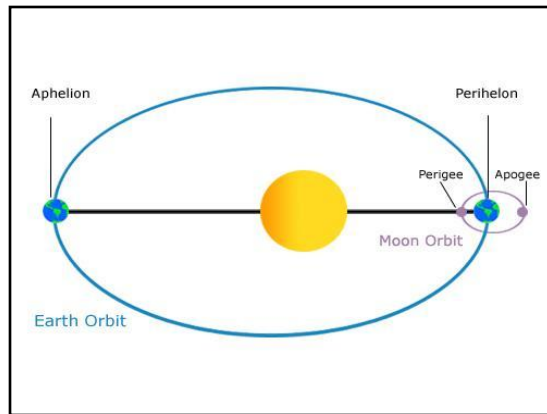


Moon Formation

- **Simultaneous Formation Theory:**
 - Earth & Moon formed at **same** time
 - ~4.6 billion years old
- **Impact Theory:**
 - Mars-sized object **collided** with Earth then **broke** apart

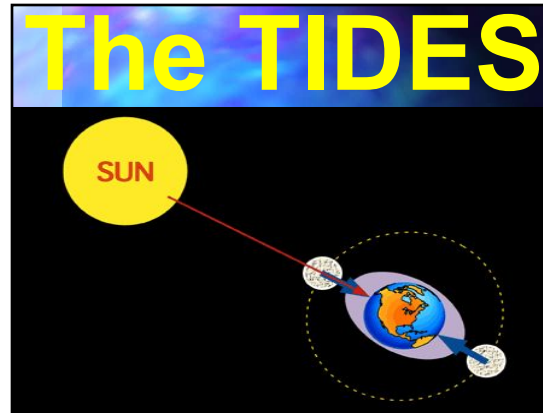
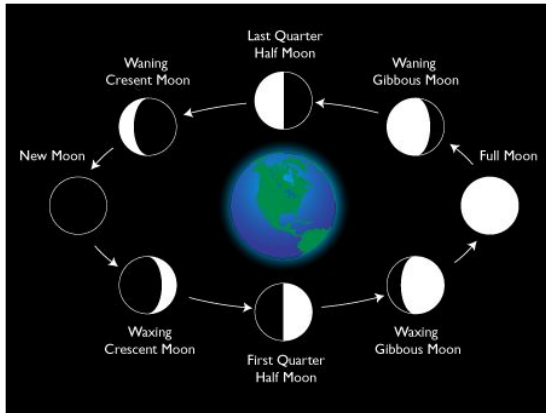
Dark Side of Moon

- Far side of Moon is **NEVER** visible from Earth!
 - **WHY?!?**
- **Synchronous Rotation:**
 - **Same rotation** time as Earth as Moon **orbits** Earth



Moon Phases

- Moon moves **counterclockwise** around **Earth** (eastward)
- **Phases of Moon:**
 1. New Moon
 2. Waxing Crescent
 3. 1st Quarter – half moon
 4. Waxing Gibbous
 5. Full Moon
 6. Waning Gibbous
 7. 3rd Quarter – half moon
 8. Waning Crescent



What Causes Tides?

- Gravitational interaction of Earth, Moon, and Sun
- Gravity of Moon has **STRONGER** effect on oceans than Sun because Moon is **CLOSER** to Earth
- 2 high & 2 low tides** daily

How the Moon Works Tidal Effects

High Tide Side
Caused by the pull of the moon on the Earth's oceans.

GRAVITATIONAL PULL

Low Tide Side
Caused by the pull of the moon on the solid mass of Earth, pulling it away from the water on the opposite side.

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SPRING TIDES

- Earth, Moon, and Sun in **straight** line
- Combined** gravity of Sun and Moon creates **very** high/low tides (**2 weeks**)

The diagram shows Earth (a blue and brown globe) on the left, the Moon (a small grey circle) in the center, and the Sun (a large yellow circle) on the right. Arrows point from Earth to the Moon and from the Moon to the Sun, indicating they are in a straight line.

NEAP TIDES

- Sun, Earth, and Moon **perpendicular**
- Gravitational pulls **cancel** one another
 - Results in **weak** high/low tides

The diagram shows Earth (a blue and brown globe) on the left with the Moon (a small grey circle) below it. An arrow points from Earth to the Sun (a large yellow circle) on the right, indicating a 90-degree angle between the Earth-Moon line and the Earth-Sun line.

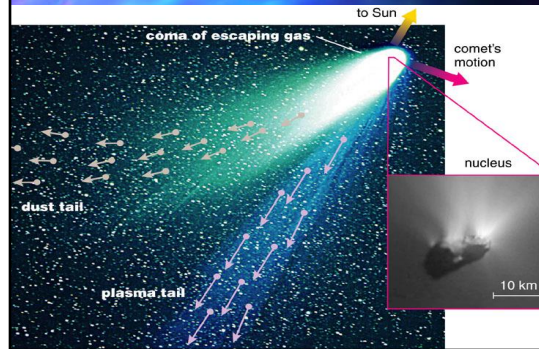


Comet Formation

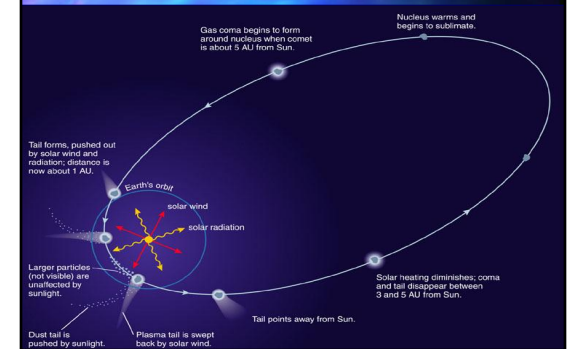
- Icy counterparts of **asteroids**
- Most remain **frozen** in **outer** solar system



Comet Structure



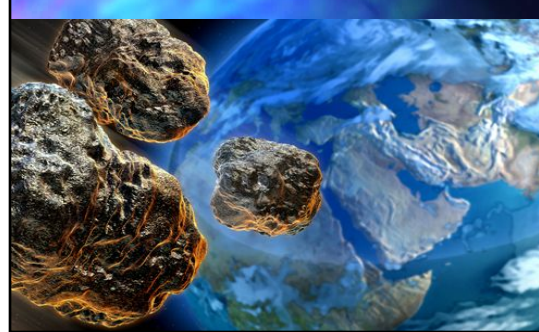
Comet's Orbits



Comet Showers



ASTEROIDS



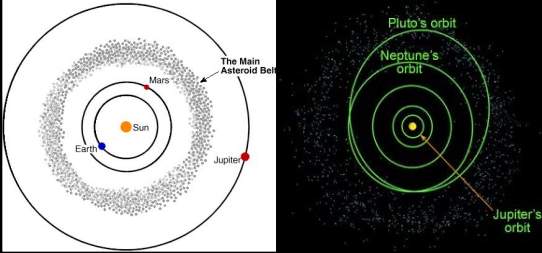
Asteroid Formation

- Left-over **rocky** particles that failed to form a planet
- Influenced by **Jupiter's gravitational pull**



Asteroid/Kuiper Belt

- **Asteroid** – Between *Mars/Jupiter* – Rocky
- **Kuiper** – Beyond *Neptune* – Icy particles



METEOROID

- **Smaller** version of *asteroids* in *space*



METEOR

- **Meteoroid enters** Earth's **atmosphere**

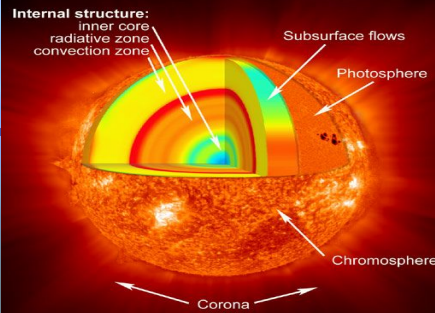


METEORITE

- **Meteor contacts** Earth's **surface**

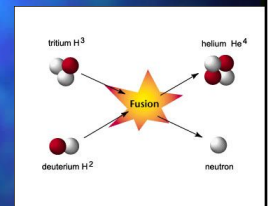


The SUN



Nuclear Fusion

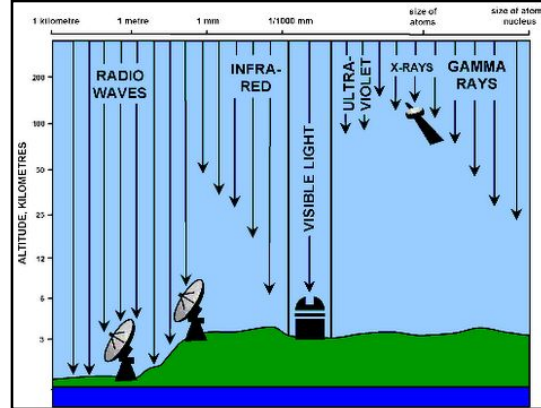
- **Definition:**
 - **Hydrogen** atoms **combine** to produce **Helium** in addition of **HEAT**
- Occurs at Sun's **CORE**



Energy from Sun

■ Electromagnetic Radiation:

- **Energy** with wave-like behavior that travels through **space**
- **Gamma Rays** – Used to kill cancerous cells
- **X-Rays** – Internal body imaging
- **Ultraviolet** – Cause of skin sunburn
- **Visible light** – Visible color spectrum
- **Infrared** – Invisible and thermal heat sensing
- **Radio Waves** – Communication/electronics



Energy from Sun

■ Earth is Protected from Sun's Rays:

- 1) **Magnetosphere**
- 2) **Earth's Atmosphere**
- 3) **Stratospheric Ozone (Ozone Layer)**

