

## **Stellar Evolution – Notes**

**Interstellar Cloud** : cold, dark mass of gas (H & He) and dust particles (C, Si, O, Fe, ice)

**Protostar**: disk shaped system with a bulge in the center, formed when interstellar cloud is compressed by gravity. Contraction accelerates rotation (law of angular momentum) and flattens system

**Main Sequence Star**: Temperature rises to above five million Kelvin, compression ceases as star generates internal pressure to combat gravity through nuclear fusion; hydrogen fuses to helium in the core

**Red Giant**: star has used up all of the hydrogen in its core and begins to burn helium and other elements present, gas expansion cools the outer layers and the star glows red (cooler bodies radiate more strongly at red wavelengths)

## **Low Mass Star: From a red giant:**

- **Gas is ejected into space forming a cloud that slowly disperse called a Planetary nebula**
- **A tiny hot core with no energy supply remains called a White Dwarf**

## **High Mass Star: From a red giant:**

- **runs out of fuel to burn, begins to collapse which triggers an explosion called a Supernova**
- **core either becomes a tiny ball of neutrons called a Neutron Star or a Black Hole (a place where space flows inward as if down a drain and nothing , including light, can travel out**

# Solar Nebula Theory

- Theory that details the formation of a solar system
- Interstellar cloud flattens to a protostar, planetary nebula develops
- Condensation occurs as the nebula cools and through accretion (when particles stick together & clump up) planetesimals form
- Planetesimals collide and merge to form planets
- Through differentiation (condensing at different rates & settling out due to density), bodies near the center are rocky (silicates & iron condense) and bodies that are farther out are gaseous (carbon dioxide, nitrogen gas, ice condense)