**Life cycle of a star**

**\_\_Nebula\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** clouds of gas and dust.

**\_\_\_Protostar\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** The attraction of gravity causes particles in the cloud to move towards each other. As they run into each other, they become hot and more dense.

**\_Main sequence star**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: The core temperature rises to about ten million Kelvin, hot enough to convert hydrogen into helium (nuclear fusion). These stars make up about 90% of the stars in the universe. They are of average age (like our sun)

\_\_\_**Red Giant\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** All the hydrogen is used up and has formed helium. The core contracts, the energy produced from the Hydrogen fusion cause the outer layers to expand.

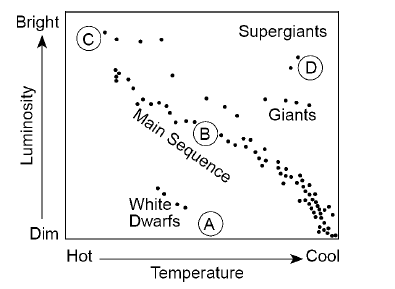
\_**White Dwarf\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** Core is made of carbon. Temperature and pressure no longer support outer layers. Giant star collapses.

\_\_\_**Supernova\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** A massive star becomes so unstable it collapses on itself. The infalling material bounces off the Iron core, the material explodes outward. All that remains is a \_\_**neutron star\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**\_\_Black hole\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** Results of a supermassive star imploding (20x’s sun’s mass or more). Similar to a supernova; however, the star’s pressure is so great it keeps collapsing in on itself. Gravity is so strong that not even light can escape!

Draw the star cycle below:

Summary: Stars are formed when gas and dust in inner stellar nebula begin to gravitate toward each other. As gas and dust come together, they collide and heat up – expanding the cloud, adding additional Hydrogen and dust to the eventual star. The cloud then cools and condenses once again – gas and dust collide and heat up, expanding the cloud again…. This process continues over and over until the heat of friction becomes high enough for fusion to occur…. Bam!!!! A star is born.



**How to read an H-R diagram.**

* What is the connection between temperature and luminosity?

Main sequence: as temperature increases, so does luminosity.

Giant stars: as temperature increases, luminosity stays the same…. This is the same for white dwarfs, red giants and supergiants.

* What is the connection between luminosity and size?

As luminosity increases, size increases. In fact, size is the reason luminosity increases.

* How is color related to a star’s temperature?

Cooler stars = red/orange

Hotter stars = Blue/white

Last thought on the universe: From large to small: Superclusters, galaxy clusters, galaxies, Stars, Solar Systems

* Superclusters: made of galaxy clusters.
* Galaxy clusters: made of galaxies
* Galaxies: made of billions of stars which have solar systems