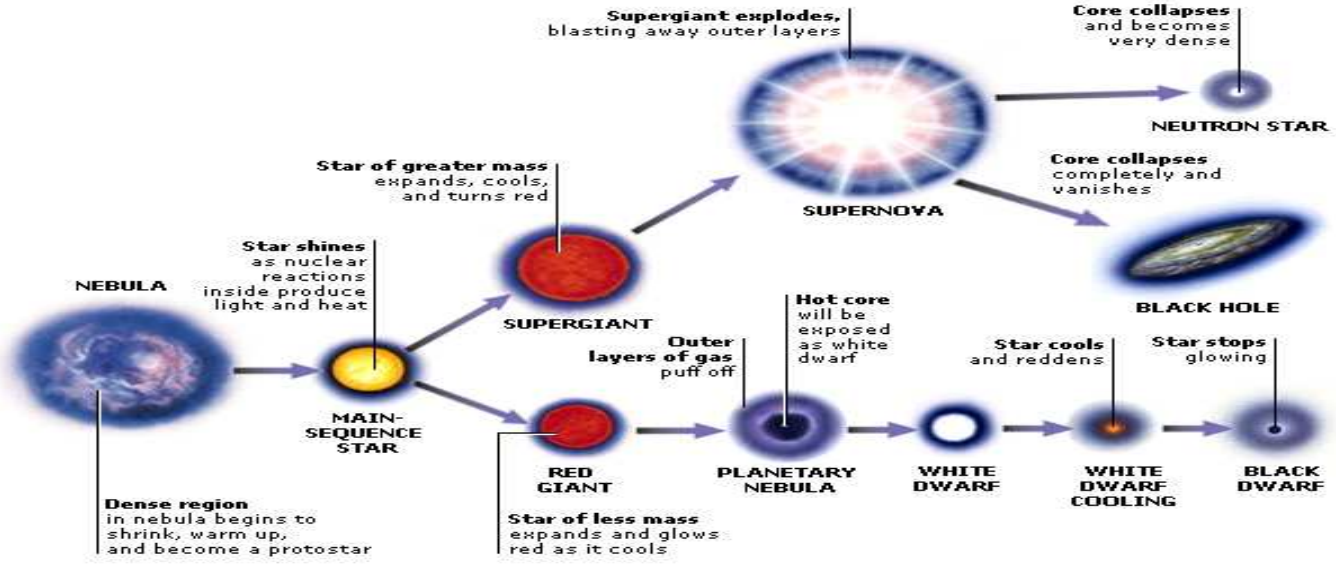
Life Cycle of a Star

Text Reference: Pages 296-301.

Learning Goal: I can describe the life cycle of various types of stars.

All stars start as a Nebula. A nebula is a _____.
Gravity can pull some of the gas and dust in a nebula together. Once the core begins to glow, the contracting cloud is called a _____. A protostar is the earliest stage of a star's life. Once nuclear reactions generate enough energy for the star to "shine" from the outside, the star "turns on" and is known as a main-sequence star. Our Sun is currently a main sequence star. When a main sequence star begins to run out of _____ fuel, the star becomes a _____ or a _____, depending on its mass.



After a low or medium mass or star has become a red giant the outer parts grow bigger and drift into space, forming a cloud of gas called a planetary nebula. The blue-white hot core of the star that is left behind cools and becomes a _____. The white dwarf eventually runs out of fuel and dies as a _____.

After a high mass star becomes a red supergiant, it often will suddenly _____. The explosion is called a _____. After the star explodes, some of the materials from the star are left behind. This material may form a _____. The most massive stars become _____ when they die. The gravitational pull of the large amount of mass that remains is so strong that it pulls all nearby materials into its core. Eventually, the gravity becomes so strong that nothing can escape, not even light.

Characteristics of Stars

There are many different types of stars, and by comparing a few of their characteristics, we can find out more about them.

1. **Colour and Temperature (see pg. 301 - Fig 8.11)**
   The colour of stars tells us something about their temperatures. Blue coloured stars are the hottest and red are the coolest. Our Sun is _____ in colour and medium temperature at around _____ Celsius.

2. **Types of chemicals in the star (see pg. 281-283)**
   Scientists use spectroscopes to look at stars. The spectrum of a star can tell us:

   - What Elements are in the Star
   - How much of those Elements are in the Star
   - The direction the star is moving

   Try Q 3&4 from the Lab on pg. 304

   Mystery Star A is made up of the Elements: _____

   Mystery Star B is made up of the Elements: _____

3. **The brightness of the star**
   We can also compare the brightness of stars with one another to find out more about the stars. Brightness of stars viewed from Earth depends on both their actual brightness (luminosity) and how far away they are from Earth. There are two ways that we can describe the brightness of stars:

   Apparent magnitude - refers to how bright a star appears from Earth. How bright it "appears" to be. For example: the Sun has a high apparent magnitude compared to Vega. But, we know that the Sun isn't actually as bright as Vega. It just "appears" to be brighter because it is much closer to us.

   Absolute magnitude - refers to how bright a star actually is. To do this, it needs to be measured from a standard distance. This is difficult to do from Earth and uses math, but is considered to be a more accurate measure of measuring brightness. For example: we know the Sun has a relatively low absolute magnitude compared to most other stars because it is only a medium sized star, and in its midlife. Larger, newer stars have higher absolute magnitudes.