Supergiant

I. Physical Characteristics

1. Define the term supergiant.

Supergiant - dying high-mass star that is very luminous

2. Supergiants are typically 300 **X -** 1,000 **X the size of the Sun.**

3. What causes the expansion of a High-Mass Main Sequence Star to become a Supergiant?

The high-mass star core contracts as it burns helium and sheds its outer layers. (hydrogen consumed)

4. What is the average temperature of a Supergiant?

3,500 - 20,000 kelvin

How does that temperature compare to the star as a High-Mass Main Sequence Star?

Much lower due to a lack of hydrogen fuel

5. How does the luminosity of a Supergiant compare to a High-Mass Main Sequence Star?

Extremely luminous (10,000 to million times brighter than the Sun)

II. Examples of Supergiants

1. List the constellations in which the following Superiants can be located.

1. Antares : Scorpius (The Scorpion)
2. Betelgeuse : Orion (The Hunter)
3. Deneb : Cygnus (The Swan)
4. Delta Cephai : Cepheus (The King)
5. Rigel : Orion (The Hunter)
6. LBV-1806-20 : Sagittarius (The Archer)

III. Existence & Fate of Supergiants

1. **What type of cosmic structures can Supergiant stars be located?** (Young Structures → Too short-lived!!)

   1. Open Clusters
   2. Spiral Galaxy Arms
   3. Irregular Galaxies

2. **What is the name of the largest discovered Supergiant star?**

   VY Canis Majoris

   How many times larger than the Sun is the Supergiant star? 1,420 x

   How far away is the star and in which constellation?

   3,900 light years Canis Major

3. **How long do Supergiant stars typically exist?**

   100,000 - 30 million years

4. **Supergiants can be classified according to any spectral class.**

   Circle One : (True) False

5. **Which region of the Hertzsprung-Russell Diagram do Supergiant stars occupy?**

   Top region (depending on spectral class)

6. **What are the two closest supergiant stars to the Sun?**

Name	Light Years Away	Constellation
Canopus	310	Carina (Southern)
Antares	550	Scorpius

7. **When does a High-Mass Main Sequence Star develop into a Supergiant?**

   - Once hydrogen fusion ceases.

8. **What will eventually happened to a Supergiant star?**

   - Develop into a supernova (exploding star)

9. **Supernova 1987A belonged to which type of Supergiant spectral class?**

   Blue