

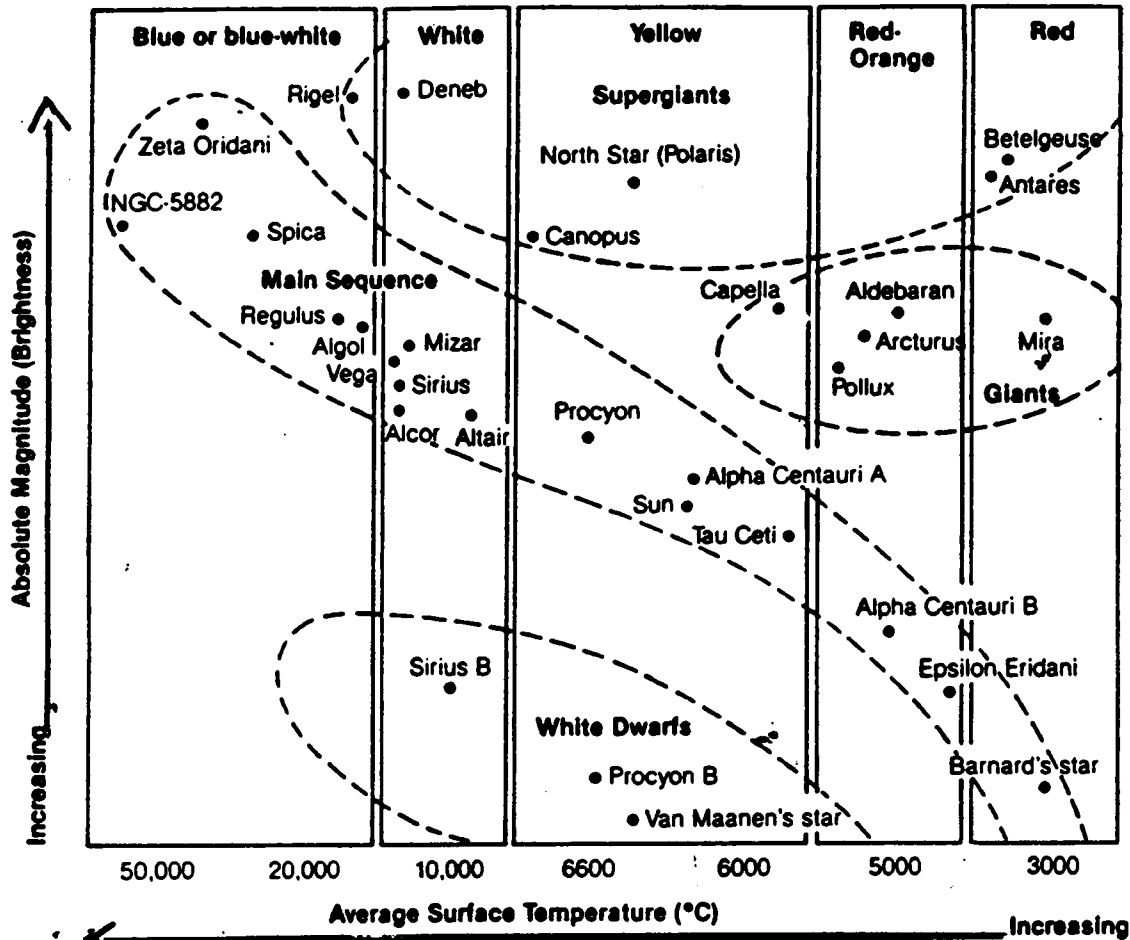
H-R Diagram

The Hertzsprung-Russell diagram is actually a graph that illustrates the relationship that exists between the average surface temperature of stars and their *absolute magnitude*, which is how bright they would appear to be if they were all the same distance away. Rather than speak of the brightness of stars, the term *luminosity* is often used. Luminosity is a measure of how much energy leaves a star in a certain period of time. The luminosity of stars is affected by temperature and size.



STEP 1 Color the different sections of the H-R diagram with the appropriate color.

The Hertzsprung-Russell Diagram



STEP 2 Answer the following questions using the H-R Diagram.

1. What is plotted on the vertical axis of the graph? _____
2. What is plotted on the horizontal axis? _____
3. Find the **MAIN SEQUENCE** group of stars. [dashed lines around this group] What does the H-R diagram tell us about the relationship between magnitude and temperature for the main sequence stars?

10 pts for this page

4. Name a star that is very dim and red. _____

5. Compare our sun to Alpha Centauri A in terms of brightness, color, and surface temperature.

6. Describe the ways in which Barnard's star and Antares are alike. _____

7. Describe three features of the star Deneb. _____

8. How would you classify the star Deneb? _____

9. If you walked out on a clear night to look for the star Aldebaran, what clues would you use to help identify it? _____

10. Would the surface temperature of the stars classified as white dwarfs be generally higher or lower than that of stars classified as supergiants? _____

11. What is the color of the stars that have the highest surface temperature? _____

12. What is the color of the stars that have the lowest surface temperature? _____

13. List the colors of the stars from the color of the hottest star to the color of the coldest star.

hot _____

cold _____

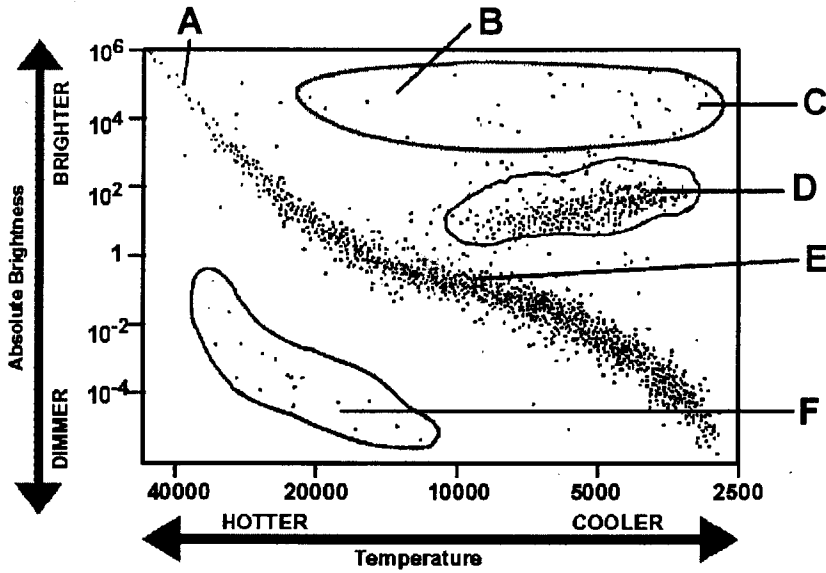
14. NOTE: 90% of all stars are classified as main sequence stars.

What is our sun classified? _____ What is Betelgeuse classified? _____

15. How is it possible for white dwarfs to have a lower luminosity than the sun even though the sun is much cooler than the white dwarfs? _____

Name _____

1. Use the H-R diagram below to answer the following questions.



- a. Which letter corresponds to a sun-like star? _____
- b. Which letter corresponds to a blue supergiant? _____
- c. Which letter corresponds to a white dwarf? _____
- d. Which letter corresponds to a red supergiant? _____
- e. Which letter corresponds to an old star that was once a sun-like, main sequence star? _____

2. Write a summary paragraph on why the H-R diagram is useful to astronomers?
[key words: color, wavelength, energy, mass, temperature, brightness]

3. Which would make a better scientific study?

A) an H-R Diagram plotting data for 100 stars

B) an H-R Diagram plotting data for 1000stars

4. Why? Explain your reasoning.