

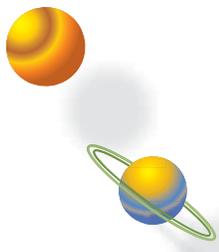
FYI: The Hertzsprung-Russell Diagram**E3:R4b**1. Read FYI: *The Hertzsprung-Russell Diagram*

As you read use the spaces below to write down any information you find especially interesting. Also define the bold terms used in the text. If you run across any other words that you don't know the meaning of, write those down and ask your teacher to help you with them.

Word/Term	Definition/Question
Periodic Table	How did Dimitri Mendeleev first group the known elements back in 1893?
Good classification systems...	...allow their users not only to _____ what is _____, but such systems also lead to the development of new _____ and the _____ of new knowledge.
Luminosity	What do astronomers mean when they use the term luminosity ? (In other words, luminosity is a “fancy” word for what?)
Hertzsprung-Russell Diagram	The Hertzsprung-Russell Diagram is a graph of stars _____ vs. _____. Which is on the vertical (up & down) axis?
Where do you find these on the HR Diagram?	Main Sequence - White Dwarfs - Supergiants - Giant Stars -
Extra space for additional words or interesting information.	

1. Examine the HR-Diagram in Fig. 2-12. Check mark the boxes that apply to each of the these stars:

Star	Main Sequence	Dwarf	Giant	Supergiant	Red	Blue	Yellow
Aldebaran							
Betelgeuse							
Proxima Centauri							
Rigel							
Sirius							
Sirius B							
Sun							



FYI The Hertzsprung-Russell Diagram

In 1893, Dimitri Mendeleev published a paper that described an orderly grouping of the known elements of the day based on their chemical properties. It is now known as the **periodic table**. Subsequently, as new elements have been discovered, and in some cases created, each one fits a row or column of the periodic table. In fact, the initial ordering of elements helped chemists and physicists in predicting the nature and chemical properties of elements that were originally missing from the sequence. Good classification systems allow their users not only to organize what is known, but such systems also lead to the development of new patterns and the discovery of new knowledge.

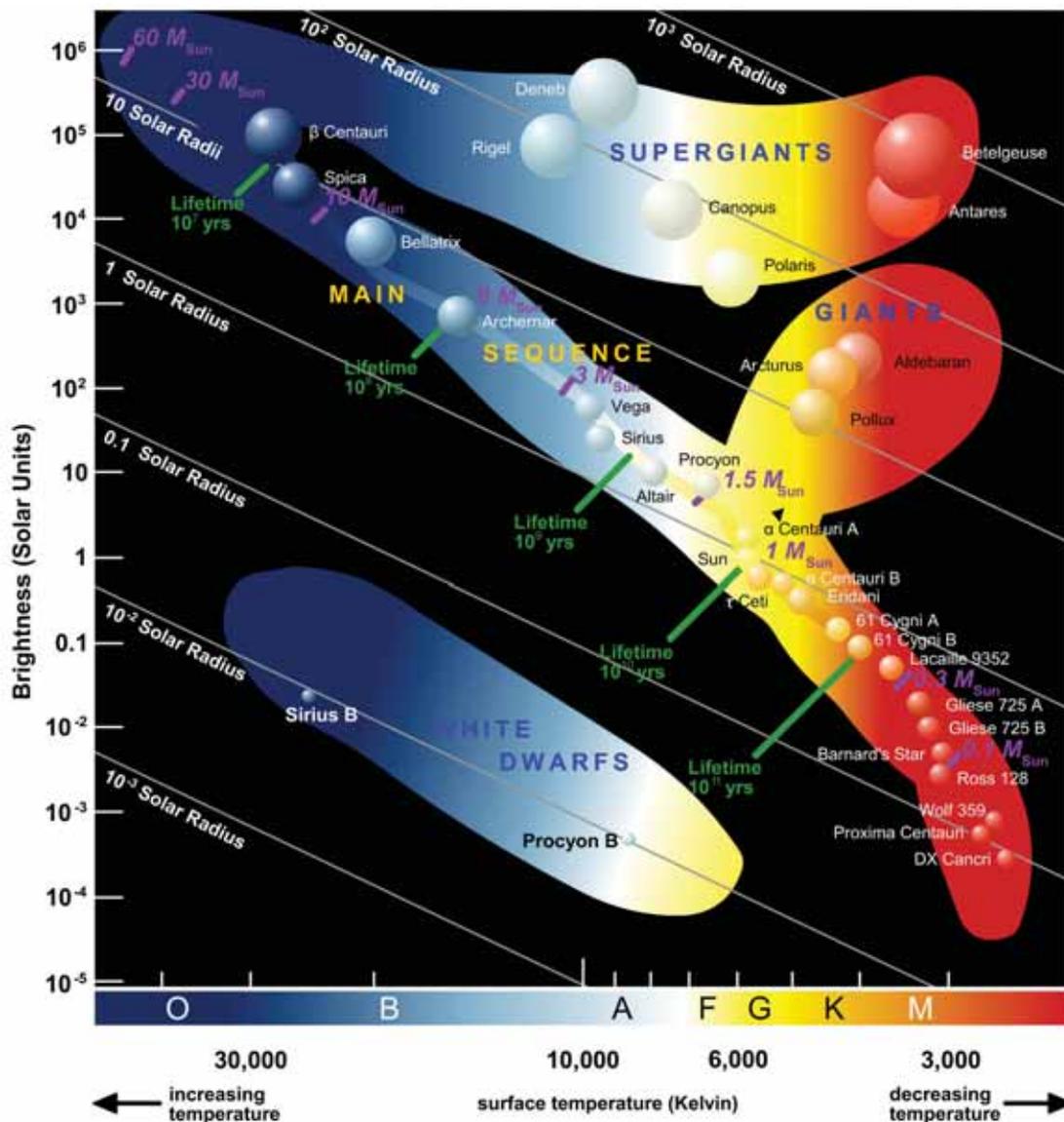


Figure 2-12: The Hertzsprung-Russell diagram, which classifies and categorizes stars

A similar organizational system has been developed to classify stars. In the beginning of the 20th century, Danish astronomer Ejnar Hertzsprung and American astronomer Henry Norris Russell discovered that when they compared the **luminosity** of stars with their temperatures, many patterns emerged. The graph of luminosity vs. the temperature or spectral class of stars is now known as the **Hertzsprung-Russell (H-R) diagram** in honor of the two cofounders. Once a star's position is known on the H-R diagram, the star's temperature, approximate size and mass, color, age, spectral type, and life story can be determined.

Stars fall into four major regions of the H-R diagram. Most stars lie on the **main sequence**, which is a band stretching from the upper left (hot and bright stars) to the lower right (cool and dim stars). There is a smaller number of stars in the other three regions: **white dwarfs** are hot but compact and dim stars in the lower left of the diagram; **supergiants** are large and very bright stars in the upper right; and **giant stars** are large and bright, but not quite as bright as supergiants, so they appear just below the supergiant region on the H-R diagram.

The H-R diagram is also a snapshot of stars at different stages of their lives. A star's position on the graph reveals its relative age. An analogy can be made between the ages of stars on the H-R diagram and the ages of the people in a large urban or suburban neighborhood. If you line up everyone from such a neighborhood, most people will be between the ages of 5 and 75. Very few will be one year old or less, or over 80 years of age. Stars displayed on the H-R diagram have a similar distribution. Most of the stars spend most of their lives on the main sequence (mature adults) and, in general, stars on the upper left of the diagram are young, while stars on the lower right are old.