

Name	
Per	Table <u>-</u>

How is a Star's Color Related to Its Temperature?

On a clear night you have surely noticed that some stars are brighter than others. But stars also have different colors. Rigel is blue, and Betelgeuse is red. Capella and our Sun are yellow. In this activity you will make your own Hertzsprung-Russell diagram. You will see how star brightness, color, temperature, and class are related.

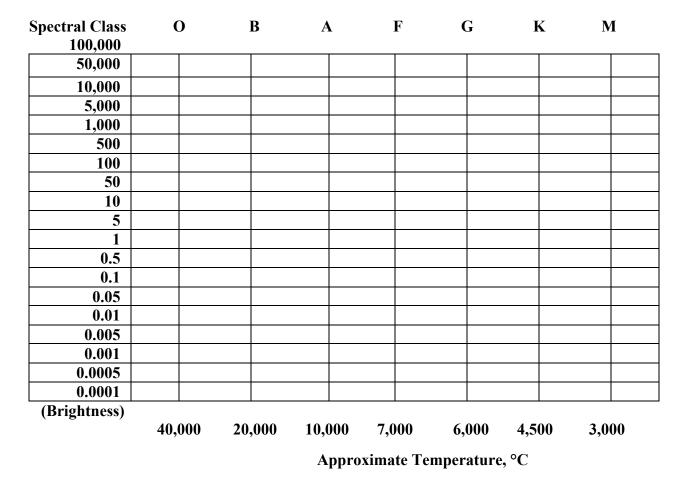
Materials: Colored pencils (red, orange, yellow, blue)

Procedure:

- 1. Study the star data chart below. Note that the sun, used as a standard of brightness, is given a value of 1. The brightness given for each other star shows how that star compares with the sun.
- 2. Using an X as a plot point, <u>plot the data</u> from the chart on the graph on the next page. Label the Sun plot only.
- 3. Stars with surface temperatures up to 3,500°C are red. Shade a <u>vertical</u> column from 2,000°C to 3,500°C a light red.
- 4. Shade other color columns as follows: Stars up to 5,000°C are orange-red; up to 6,000°C yellow-white; up to 7,500°C blue-white, and up to 40,000°C blue.
- 5. Look for patterns in your graph. Compare it to the H-R diagram supplied by your teacher.
- 6. Label the main sequence, the red super giants, and the white dwarfs.

Star-Brightness Data

Star-Drightness Data								
Star Name	Approx.	Brightness		Star Name	Approx.	Brightness		
	Temp °C	(Sun = 1)			Temp °C	(Sun = 1)		
Sun	5,300	1		Canopus	7,100	1,500		
Alpha Centauri A	5,500	1.3		Arcturus	4,200	90		
Alpha Centauri B	3,900	0.36		Vega	10,400	60		
Barnard's Star	2,500	0.0004		Capella	5,600	150		
Lalande 21185	2,900	0.005		Rigel	11,500	40,000		
Sirius A	10,100	23		Betelgeuse	2,900	17,000		
Sirius B	10,400	0.008		Achernar	14,000	200		
Ross 248	2,400	0.0001		Beta Centauri	21,000	3,300		
61 Cygni A	3,900	0.08		Altair	7,700	10		
61 Cygni B	3,600	0.04		Aldebaran	3,900	90		
Procyon A	5,200	7.5		Spica	21,000	1,900		
Procyon B	7,100	0.0005		Antares	3,100	4,400		
Epsilon Indi	3,900	0.13		Deneb	9,900	40,000		
				Beta Crucis	22,000	6,000		



Questions:

- 1. What is the <u>general relationship</u> between temperature and star brightness? (Hint: Main Sequence)
- 2. What relationship do you see between star color and star temperature?
- 3. How does the sun compare to the other stars on the main sequence?
- 4. What star class does our sun belong to?
- 5. A star is classified as being in <u>class B</u>. What is its color? Temperature?
- 6. We know <u>dwarfs</u> are small—smaller than our sun. How can they be so bright?