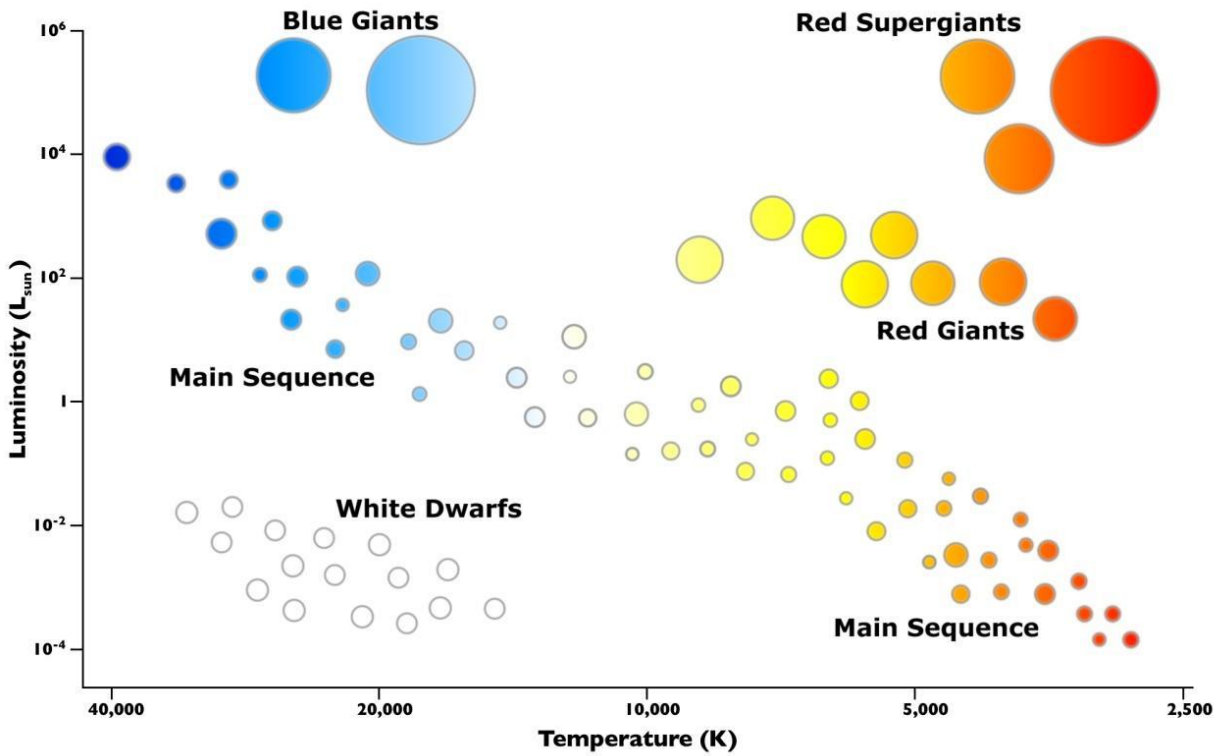
Name_____ Period _____

Properties of Stars

Background: YES YOU HAVE TO READ THIS PART!!

All stars are different. Some are small. Some are large. Every star is at a different stage in its life journey. Some have died and gone supernova, others are just dwindling white dwarfs that are cooling. Some stars are just being born in their nebulas. Some have turned into black holes or supergiants, etc.

If you graph all of the stars in our universe according to their brightness (absolute magnitude) and their temperature, they all fit into specific places on the graph *based on what type of star they are*. [For example, all of the supergiants would plot in the top right section while the regular young stars that are like our Sun (called "main sequence stars") plot in the center along a diagonal line based on their sizes.] This graph is given the name "Hertzsprung-Russell diagram," or "H-R diagram." Using this diagram/graph, you can analyze a star's properties and *you can figure out what stage of life a star is in based on where it plots on the graph.* Its color depends on its temperature. Blue ones are hotter and red stars are cooler.



In this exercise, you will construct an H-R diagram using data on the 20 stars that are nearest to our sun (Table 1) and the 20 stars that appear brightest in our sky (Table 2).
Then you will use the finished diagram to describe the properties and life cycles of stars and answer the questions on the next page.

***FYI**: In Tables 1 and 2, the unit used for distance is the parsec. A parsec is equal to 3.26 light-years. The Kelvin (K) is the unit used in the tables for temperature. (Kelvin uses the same scale as °Celsius but it starts at -273 °Celsius. Therefore, 273 Kelvins equals 0°Celsius)*

(Absolute magnitude means "brightness" or "LUMINOSITY."
The negative numbers are the brightest stars)

NEAREST STARS			
Name	**Distance (parsecs)**	**Temperature (K)**	**Absolute Magnitude**
Alpha Centauri	1.31	5800	4.4
Barnard's Star	1.83	2800	13.2
Wolf 359	2.35	2700	16.8
Lalande 21185	2.49	3200	10.5
Sirius	2.67	10400	1.4
Luyten 726-8	2.67	2700	15.4
Ross 154	2.94	2800	13.3
Ross 248	3.16	2700	14.7
Epsilon Eridani	3.3	4500	6.1
Ross 128	3.37	2800	13.5
Luyten 789-6	3.37	2700	14.9
61 Cygni	3.4	2800	7.5
Procyon	3.47	6800	2.7
Epsilon Indi	3.51	4200	7
Sigma 2398	3.6	3000	11.1
BD +43.44	3.6	3200	10.3
Tau Ceti	3.64	5200	5.7
CD -36.15693	3.66	3100	9.6
BD +5.1668	3.76	3000	11.9
CD -39.14192	3.92	3500	8.7

BRIGHTEST STARS AS SEEN FROM EARTH			
Name	**Distance (parsecs)**	**Temperature (K)**	**Absolute Magnitude**
Sirius	2.7	10400	4.4
Canopus	30	7400	-3.1
Alpha Centauri	1.3	5800	4.4
Arcturus	11	4500	-0.3
Vega	8	10700	0.5
Capella	14	5900	-0.7
Rigel	250	11800	-6.8
Procyon	3.5	6800	2.7
Betelgeuse	150	3200	-5.5
Achernar	20	14000	-1
Beta Centauri	90	21000	-4.1
Altair	5.1	8000	2.2
Alpha Crucis	120	21000	-4
Aldebaran	16	4200	-0.2
Spica	80	21000	-3.6
Antares	120	3400	-4.5
Pollux	12	4900	0.8
Fomalhaut	7	9500	2
Deneb	430	9900	-6.9
Beta Crucis	150	22000	-2.6

IMPORTANT HINTS FOR THE GRAPH ON THE NEXT PAGE

FYI:

- ***Temperature** is on the bottom. **The numbers get bigger as you go to the left** (opposite of a normal graph).*
- *The **Absolute Magnitude (or brightness/luminosity)** is on the left. **The numbers get bigger as you go down** (again…this is opposite of a normal graph)*

FYI (also):

- *The graph you will use has **uneven lines** and the numbers aren't spaced apart evenly (called a logarithmic graph).*
- *It **works the same as a normal graph still…just count the lines** in between each number and fit the numbers in between.*