Name _____ Date _____
Period _____ Lab _____

THE HERTZSPRUNG-RUSSELL DIAGRAM

Astronomers use two basis properties of stars to classify them. These two properties are luminosity and surface temperature. Luminosity usually refers to the brightness of the star relative to the brightness of our sun. Astronomers will often use a star's color to measure its temperature. Stars with low temperature produce a reddish light while stars with high temperatures shine with a brilliant blue-white light. Surface temperatures of stars range from 3000 degrees Celsius to 50,000 degrees Celsius. When these surface temperatures are plotted against luminosity, the stars fall into groups. Using data similar to what you will plot in this activity, Danish astronomer Ejnar Hertzsprung and US astronomer Henry Norris Russell independently arrived at similar results in what is now commonly referred to as the HR diagram.

Purpose: To make a Hertzsprung-Russell diagram.

Procedure:

1. Plot the stars listed in the data table at right on the graph paper provided.
2. Draw a circle around each grouping of stars on your graph.
   How many groups did you circle? _____
3. Label the following on your graph: main sequence, red giants, white dwarfs, supergiants.
4. Circle the dot representing the sun. What type of star is the sun? _____

STAR	LUMINOSITY (X SUN)	SURFACE TEMPERATURE (X 1000°C)	STAR	LUMINOSITY	SURFACE TEMPERATURE (X 1000°C)
1. Orion	10,000	20	2. Betelgeuse	20,000	3
3. Polaris	6	5.9	4. Achernar	2,000	24
5. Antares	1,000	3	6. Aldebaran	100	4
7. Spica	800	25	8. Ceti	.1	4.5
9. Vega	40	12	10. Sirius A	20	11
11. Procyon A	50	6.9	12. Sun	1	5.7
13. Regulus	1,000	18	14. Procyon B	.004	6.6
15. Lacaille	.02	4.5	16. Altair	.01	9
17. Sirius B	.01	8	18. Alpha Centauri	1.6	5.7

Conclusions:

5. How many types of stars are shown on the HR diagram? _____
6. How do the brightness and temperature of the sun compare with those of other stars?

_____

_____

_____

7. What is the relationship between luminosity and temperature for stars on the main sequence?

_____

_____

_____

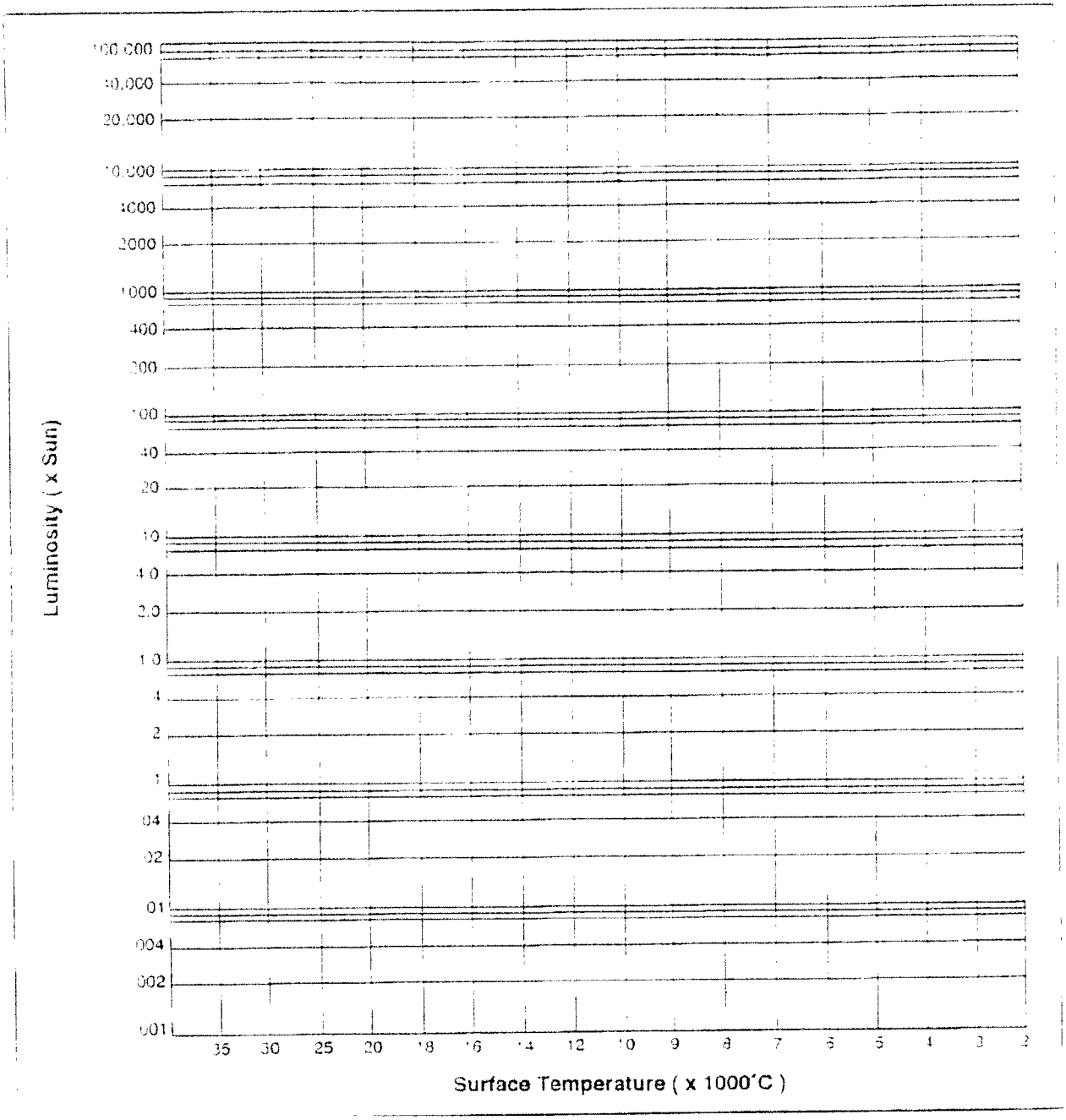
8. Is there a relationship between mass and luminosity for stars on the main sequence?
   _____ If so, state the relationship.

_____

_____

NAME _____

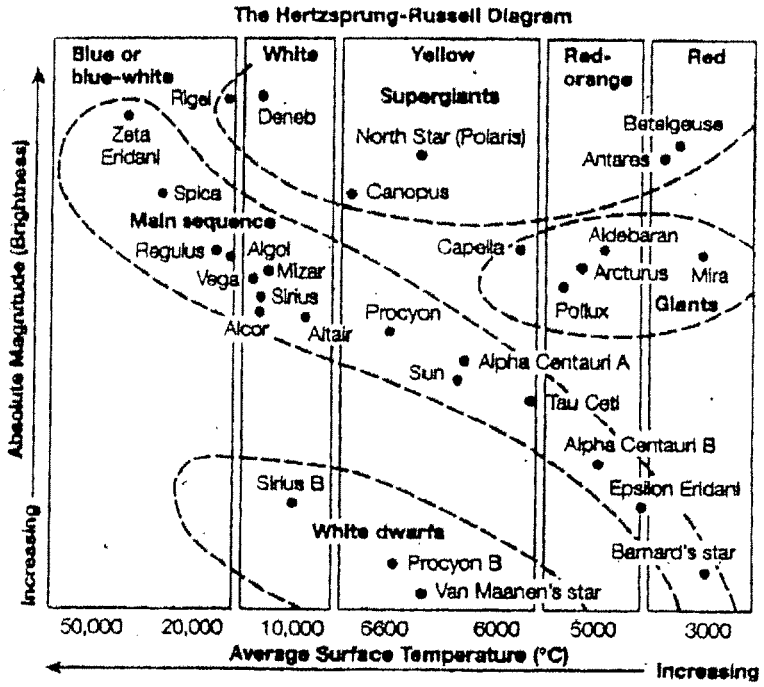
HERTZSPRUNG-RUSSELL DIAGRAM



Worksheet:
H-R Diagram

Name _____
Date _____
Period _____ Table _____

Use the diagram to the right to answer the following:



Most stars belong to this category:

_____ 1.

Which star is the brightest white dwarf?

_____ 2.

Which star is hottest supergiant?

_____ 3.

What color is Deneb?

_____ 4.

What temperature is Sirius B?

_____ 5.

_____ 6. This star is a red **Giant.**

_____ 7. What temperature is Bernard's Star?

_____ 8. Which star is the dimmest (least bright) on the chart?

_____ 9. What category is the hottest star on the chart?

_____ 10. What color are the coolest stars?

_____ 11. What category of stars is hot but not very luminous?

_____ 12. If you know a stars color, you can determine it's _____.

_____ 13a. The H-R Diagram is based on what two criteria?

_____ 13b.

Looking at the Main Sequence category, state a relationship between these two criteria:

14. _____

_____