

Name: _____

Date: _____ Period: _____

Lab Activity: Classification of Stars

INTRODUCTION:

A star's actual brightness is related to its temperature and size. In the beginning of the 20th Century, two independent astronomers developed a graph of this relationship. This graph has been named the Hertzsprung-Russell (H-R) Diagram after these two scientists.

Stars are classified based upon their luminosity, color, temperature, and size. While the temperature of the star is related to its color, the apparent brightness varies with distance from Earth.

OBJECTIVE:

You will plot the location of stars on the H-R Diagram and determine some of their characteristics.

VOCABULARY:

Star -

Nuclear Fusion -

Hertzsprung-Russell Diagram -

Luminosity -

Kelvin -

Main Sequence -

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PROCEDURE A:

1. Using Data Chart A, plot and label each star's position on the Hertzsprung-Russell Diagram.
2. Using Data Chart B, lightly color in vertical bands on the Hertzsprung-Russell Diagram that represent the temperatures of the stars.
3. In the blank boxes provided on the H-R Diagram, label the location of the following groups of stars using your Earth Science Reference Tables: Main Sequence, Giant, Super Giants, and White Dwarfs.

DATA CHART A

Star	Temperature	Luminosity
Sun	5,700	1
Spica	25,000	50,000
Bellatrix	18,000	1000
Beta Centauri	21,000	1,000
Sirius	9,000	20
Vega	9,500	90
Alpha Centauri A	5,700	5
Pollux	4,700	75
Ross 248	2,500	0.0001
Proxima Centauri	2,800	0.001
Beta Carinae	9,500	100

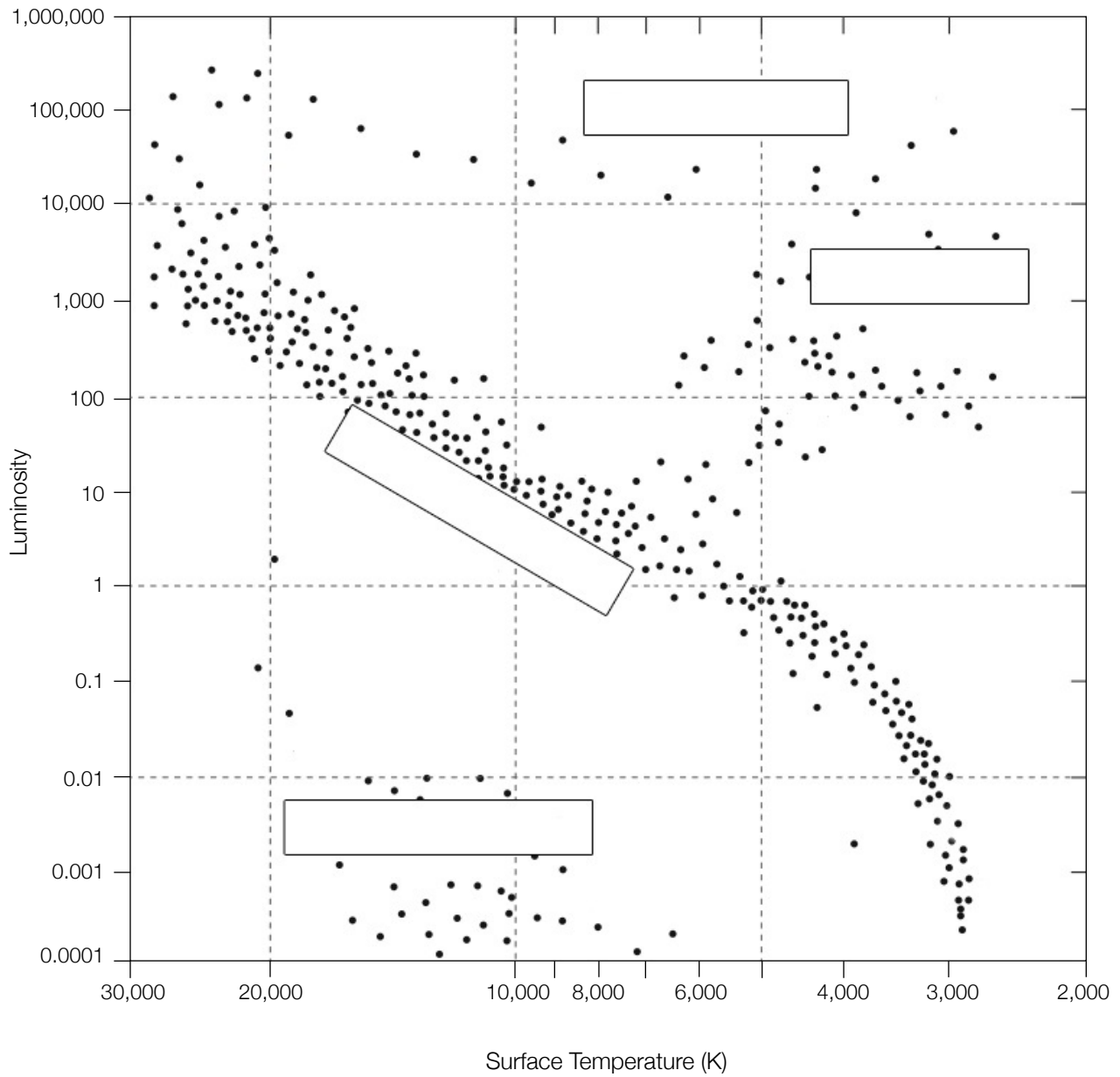
Star	Temperature	Luminosity
Aldebaran	4,000	500
Rigel	11,000	100,000
Deneb	8,800	900,000
Betelgeuse	3,200	100,000
Epsilon Indi	4,800	0.1
Polaris	6,000	5,000
Barnard's Star	3,100	0.005
Altair	7,500	10
40 Eridani B	18,000	0.01
Procyon B	8,900	0.001
Antares	3,200	7,500

DATA CHART B

Star Temperature	Star Color
2,000 - 3,500	Red
3,500 - 5,000	Orange
5,000 - 7,500	Yellow
7,500 - 11,000	White
11,000 - 30,000	Blue

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HERTZSPRUNG-RUSSELL DIAGRAM



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DISCUSSION QUESTIONS:

1. Describe the Sun in terms of luminosity, temperature, and color?
2. What is the relationship between star temperature and luminosity in the Main Sequence?
3. What would be the luminosity of a main sequence star with a temperature of 25,000 K?
4. How does a stars color change as its temperature increases?
5. Why do supergiant stars, such as Betelgeuse, have high luminosity?
6. Why do white dwarf stars, such as Procyon B, have low luminosities?

CONCLUSION: How can stars be classified using the Hertzsprung-Russell Diagram?