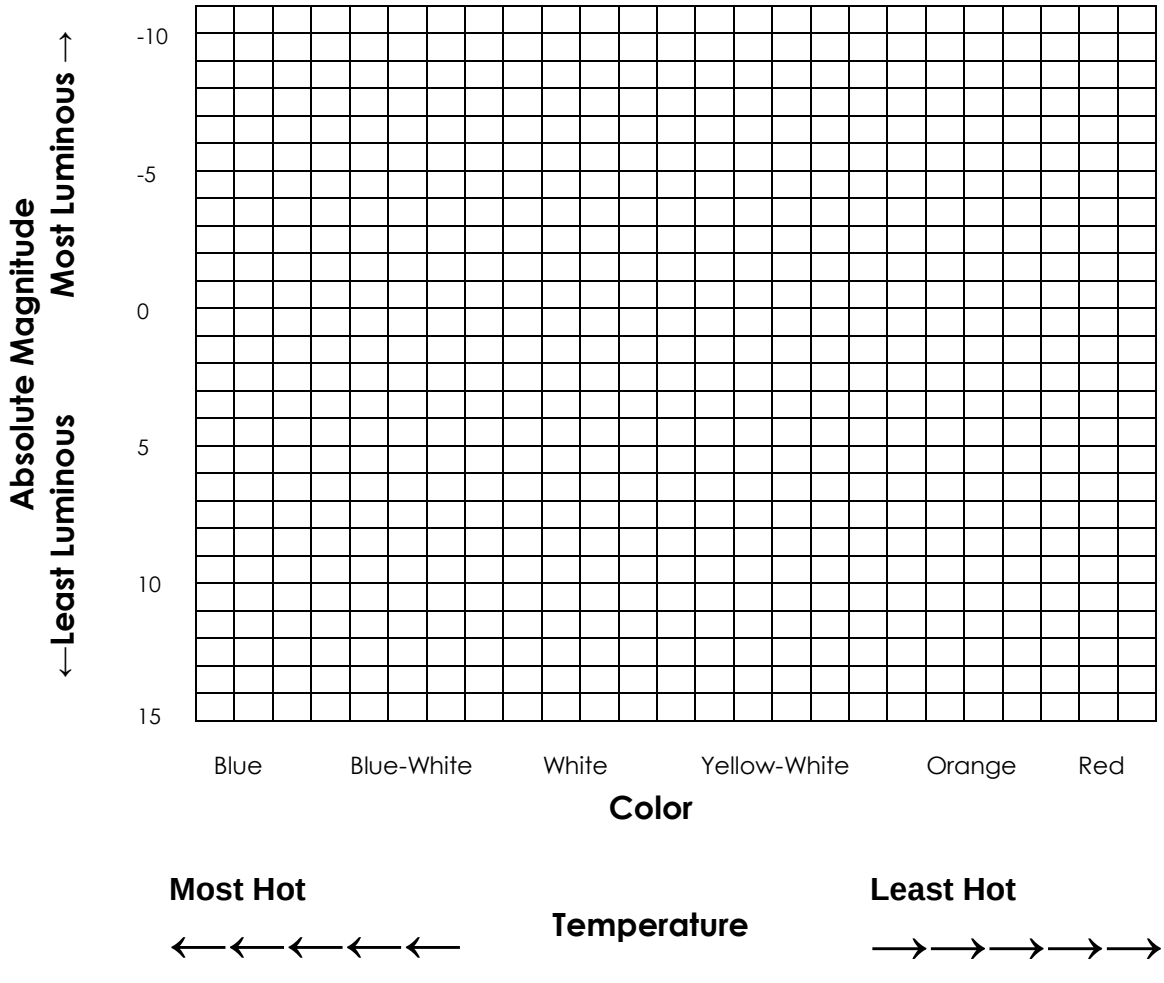
Measuring the Stars & The H-R Diagram - *HONORS* Name:_____

Making a Hertzsprung-Russell Diagram

A Hertzsprung-Russell diagram, or H-R diagram, is made by plotting on a graph the color and absolute magnitude of stars. The color tells us the temperature of each star's surface. The absolute magnitude tells us the luminosity, or true brightness, of each star: **THE LARGER THE ABSOLUTE MAGNITUDE, THE SMALLER THE LUMINOSITY**. The most luminous stars have absolute magnitudes that are ***negative*** numbers.

Star	Color	Absolute Magnitude
1. Sun	Yellow-white	5
2. Sirius	Blue-white	1
3. Epsilon Eridani	Orange	6
4. Rigel	Blue	-7
5. Betelguese	Red	-6
6. Barnard's Star	Red	13
7. Capella	Yellow-white	-1
8. Deneb	Blue-white	-7
9. Spica	Blue	-3
10. Aldebaran	Orange	-1

DIRECTIONS: Using the table above, plot the following points of stars on the H-R Diagram below by ***WRITING THE STAR NUMBER*** in the appropriate box. Then ***COLOR*** that star box with its appropriate color as outlined by the color scheme in the table above.



DIRECTIONS: Use the above introduction and your notes to answer the following questions:

1. List all of the stars from the table on the previous page that are main sequence stars.

2. List all of the stars from the table on the previous page that are giant stars.

3. What two variables does the H-R diagram compare?

4. On your star reading guide, the H-R diagram plots absolute magnitude and ***temperature***. On this assignment, the H-R diagram plots absolute magnitude and ***color***. Both graphs look very similar. ***What is the relationship between color and temperature?*** In other words, which colors represent hot temperatures, which colors represent cold temperatures? Include an ***EXAMPLE*** in your answer from the table on the previous page.

5. **EXPLAIN** why it is possible to relate the temperature of a star to its luminosity, or brightness.

6. Based on your knowledge of stars and the H-R Diagram of stars, ***PLACE A LARGE SQUARE*** where the white dwarfs would be found on the H-R diagram on the previous page.

7. Which of the following stars are most likely to become a supernova? ***(circle one):***

   Betelgeuse Sun Spica Capella

8. Read the H-R diagram table from the previous page ***(focus on color and absolute magnitude),*** and list ***ALL*** of the characteristics of the Sun from the table ***(be specific):***

9. What star serves as a ***standard*** of comparison against which luminosity of other stars is measured?

10. How does the brightness of white dwarfs relate to that of the Sun?

11. How do white dwarf stars differ from stars in the Main Sequence?

12. **DESCRIBE** the general trend between temperature and luminosity that the Main Sequence stars show.

13. Why do giant stars differ from stars in the Main Sequence?

14. Why is measuring the luminosity of stars difficult?

15. **DESCRIBE** how size of a star is related to its brightness or luminosity. How is its size related to its surface temperature?