

SCORE
(5 pts max)

ASTRONOMY 5
THIRD HOUR SESSION "G"

ACTIVITY: The Hertzsprung-Russell Diagram

NAME KEY-G

DATE

ID#

Note: Use your SC001/SC002 star charts and Starry Nights software as needed.

1. Label the horizontal and vertical axes, and indicate the units on the scales.
2. At the bottom of the chart, write the 7-letter spectral type sequence.
3. On the HR diagram on the next page, indicate the locations of the following:
— Main Sequence — Giants — Supergiants — White Dwarfs
4. What spectral type is plotted on the far _____ LEFT _____ of the HR diagram? What is the spectral type of the Sun?

O

G2

5. What luminosity class (or classes) includes _____ Supergiant _____ stars?

I

6. Stars with extremely _____ LOW LUMINOSITY _____ are plotted where on the HR diagram (top/bottom/left/right)?

Bottom

7. What is the name of the bright star found near RA= $14^{\text{h}} 15^{\text{m}}$ _____ and DEC= _____ $+19^{\circ}$ _____? What constellation is it in?

Arcturus

Boötes

8. Using Starry Nights, what is the temperature and luminosity of the star from question #7?

4106 K

1196 L_{sun}

9. Plot the star in question #7 onto your HR diagram. What kind of star (giant, supergiant, etc.) is it? Using the internet reference specified by your instructor, what is the star's spectral type (including luminosity class)?

GIANT

K0III

(Questions continue on back)

10. Where are on HR diagram (top-left, bottom-right, etc) are stars with the largest radii plotted?

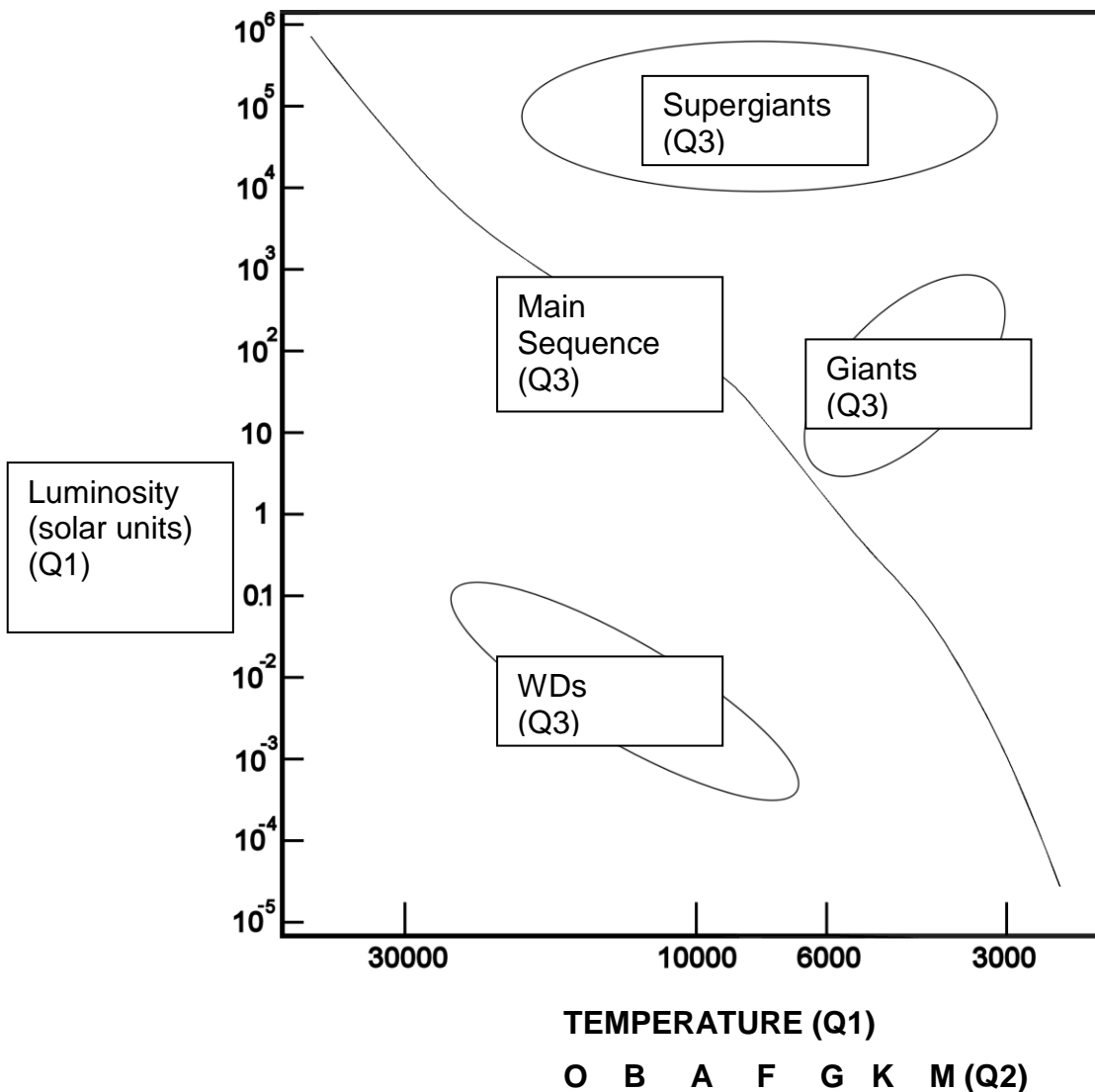
upper-right

11. Two stars, spectral types B5V and K5V are both in a star cluster, and are therefore about the same distance from us. Which will look brighter to us on the Earth? Which will look redder?

B5V	K5V
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12. Two stars are in the same cluster as question #11. One is spectral type K5V and the other is K5II. Which will look brighter to us?

K5II



Intro lecture:

- Cover the basics of an HR diagram, noting the Axes—Luminosity vs. Temperature.
- Spectral sequence OBAFGKM
- Luminosity classes: Main sequence (V), giants (II-IV), supergiants (I), white dwarfs. Mention subclasses.
- Stellar radii on HR diagram
- Remind them that in Starry Nights, double click on stars to get Luminosity and Temperature

Fill ins and question explanations

4. Left Right

5. Supergiant Giant Main Sequence

(answers: I, II-IV, V)

6. High Temperature High Luminosity Low Temperature Low Luminosity

7-9. Useful selections. I fully support using Wikipedia.

Star	Temperature (Starry Nights)	Luminosity (Starry Nights)	RA	Dec	SC (Wikipedia)
Capella	5419 K	420 L	5 ^h 17 ^m	46°	K0III
Alkaid	11235 K	212 L	13 ^h 47 ^m	49°	B3V
Phecda	8666 K	89 L	11 ^h 53 ^m	54°	A0V
Arcturus	4106 K	1196 L	14 ^h 15 ^m	19°	K0III

10. Largest Smallest

11. Any two spectral types, but both are main sequence stars, i.e., O V +G V

12. Two stars of same spectral type (A-M), but different luminosity classes, i.e., K V and K I