1. Two stars appear to have the same brightness, but one star is three times more distant than the other. How much more luminous is the more distant star?

2. The double star system Albireo has one yellow star and one blue star. What do we know about the relative temperatures of these stars based on their observed colors? What do we know about their relative sizes? Please briefly explain your answers.

3. To know some properties of a star, you must first know its distance. For other properties, knowledge of distance is not necessary. For each of the following properties, please place them into one of those two categories: size, temperature, color, chemical composition. Briefly state your reason for each.

4. Sirius, the brightest star in the sky, has a parallax of 0.379 arcsec. What is its distance in parsecs? In light years?

5. How can an astronomer look at the HR diagram of a star cluster and estimate its age?

6. When the Sun becomes a white dwarf with a radius of \( \sim 10^4 \) km, what will be its luminosity when it is a temperature of \( 10^8 \) K? of \( 10^6 \) K? Express your answer in units of Solar luminosities.

7. Our galaxy has about 50,000 stars of average mass (0.5 Solar masses) for every main-sequence star of 20 Solar masses. But one 20 Solar mass star is about 10,000 times more luminous than the Sun and one 0.5 Solar mass stars is only 0.08 times as luminous as the Sun.
   a. How much more luminous is a single massive star than the total luminosity of the 50,000 less massive stars?
   b. How much mass is in 0.5 Solar-mass stars compared to 20 Solar-mass stars?
   c. Which stars - lower mass or higher mass - contain more of our galaxy’s mass and which produce more of the galaxy’s light?

8. Go to: [www.galaxyzoo.org](http://www.galaxyzoo.org). Click on "Story" and read. Be sure to read until the end, so that you learn what dataset you will be looking at. Then go back to the home page. Click on "Science" and read. For your classifications to be recorded as part of the project: Sign up for account. Then log into your account. Click on “Classify” and click on the blue “Help” button to get an idea of how to classify. The classify at least 20 galaxies. Write a few sentences about your experience classifying the galaxies.