**Colors of Astrophysical Objects**

In this exercise, you will use color filters to determine physical properties of astrophysical objects using a series of images. View each image through the red, green, and blue filters to answer the questions.

**Image 1: Omega Centauri (Globular Cluster)**

The stars that come through the brightest when looking through the red filter are the red stars, and the same is true for the blue and green filters.

1. Describe how the red, green, and blue stars are distributed in the cluster. You may make a sketch if you prefer.
2. The blue stars are the youngest and the hottest stars. The green stars are cooler, smaller, and older. The red stars are the oldest of all and are red giants, which is a dying star. Which stars are located closest to the center—young, old, or dying stars?
3. Why do you think different types of stars are distributed differently throughout the cluster? (no wrong answer)

**Image 2: Cygnus X (Giant Molecular Cloud)**

Green represents the hottest dust which hides newly forming stars, while red is tracing the cooler dust.

1. Using the red and green filters, describe how the two types of dust are distributed throughout the image. You may make a sketch if you like.
2. What objects come through most brightly using the blue filter?
   1. Based on what you learned about colors of stars in Image 1, would you say these are old or young stars?
   2. Is there a lot of dust around these stars?
3. Based on the distribution of blue stars, hot dust (hiding forming stars), and cooler dust, hypothesize how molecular clouds might form stars. (no wrong answer)

**Image 3: M82 (Galaxy)**

1. In this image, green represents the light from stars, blue is the light from very hot gas, and red is the light from dust. Describe how each of these things is distributed in the image. You may make a sketch if you like.
2. The blue filter is actually an X-ray image. X-rays are extremely energetic and require high temperatures to produce. Based on this knowledge, what is the hottest part of the galaxy?
3. Describe what you think is happening in this image and why. (no wrong answer)

**Image 4: Hubble Ultra Deep Field (Galaxies)**

1. Describe some of the shapes of galaxies that pop out with each color filter. You may sketch the galaxies if you prefer.
2. The bigger galaxies are located closer to us while the smaller galaxies are located further away (and further back in time). How does the size of the galaxies correspond to their colors?
3. Blue galaxies are younger than red galaxies. Do you think that galaxies primarily formed in the past (and therefore would be further away from us), or that many galaxies are still formed today? Why?