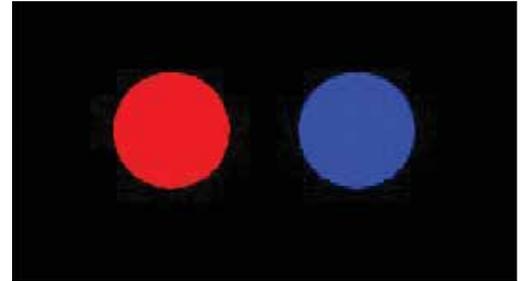


Interpreting Color and Temperature**E2:A2**

The stars in the night sky mostly appear white to the naked eye, but with the aid of a telescope, we see that stars can actually be quite colorful. The overall color of a star depends upon its temperature. Observing a star through different-colored filters and graphing its brightness at each wavelength allows astronomers to determine the star's color and temperature. Filters are also useful to astronomers for isolating line emission from specific chemical elements and for creating three-color composite images. In this activity, you will look at astronomical images through colored filters.

Part 1: The Color of Stars (https://ia.terc.edu/mod_02.html)

1. Look at an image of two circles—one red and one blue (like the ones on the right) projected onto a screen in your classroom.
Predict how each shape will appear when viewed first through a red filter and then through a blue filter.



2. Test your predictions by viewing the image through the red and blue filters. Carefully note the relative brightness of each shape when viewed through each filter.
Record your observations.

3. Look at an image of the constellation Orion projected onto a screen in your classroom. Predict how the image will appear when viewed through the red and blue filters.
Record your predictions.



4. Look at the projected image of Orion through each of the two colored filters.
Record your observations.

- *What differences do you notice between the two filter views?*
- *How does this compare to the appearance of the circles?*

5. Read FYI: *The Color of Stars* and FYI: *Filters in Astronomy*. Complete the reading guide and questions after reading.
When everyone has completed this, go on to #6.

6. Look at a Hubble Space Telescope image of a star field projected onto a screen in your classroom.

Can you identify a hot star, a cool star, and an intermediate-temperature star?

Use the colored filters to verify your identifications.



Part 2: Filters & Imaging (https://ia.terc.edu/mod_02.html)

1. Look at an image of the Cone Nebula projected onto a screen in your classroom.

Predict what the image will look like through each of the two filters.

2. Test your prediction by viewing the image of the nebula through your red and blue filters.

- *What differences do you notice between the two filter views?*



3. Explore how filters are used to create color images.

Go to <https://ia.terc.edu/eaglenebula/>

4. Examine the color image of the Eagle Nebula. Based on your knowledge of filtering, which of the black-and-white images do you think was taken through:

- a red filter?
- a green filter?
- a blue filter?

5. Apply a colored filter to each of the black- and-white images by clicking on the R, G, and B buttons below the images. Test various combinations of the filtered images to create a composite three-color image.

- *What combination reproduces the full-color image?*



Check out this site to learn how astronomers make color images using the Hubble Space Telescope:
http://hubble.stsci.edu/gallery/behind_the_pictures/meaning_of_color/index.php