

**Title:** Seeing in Color!

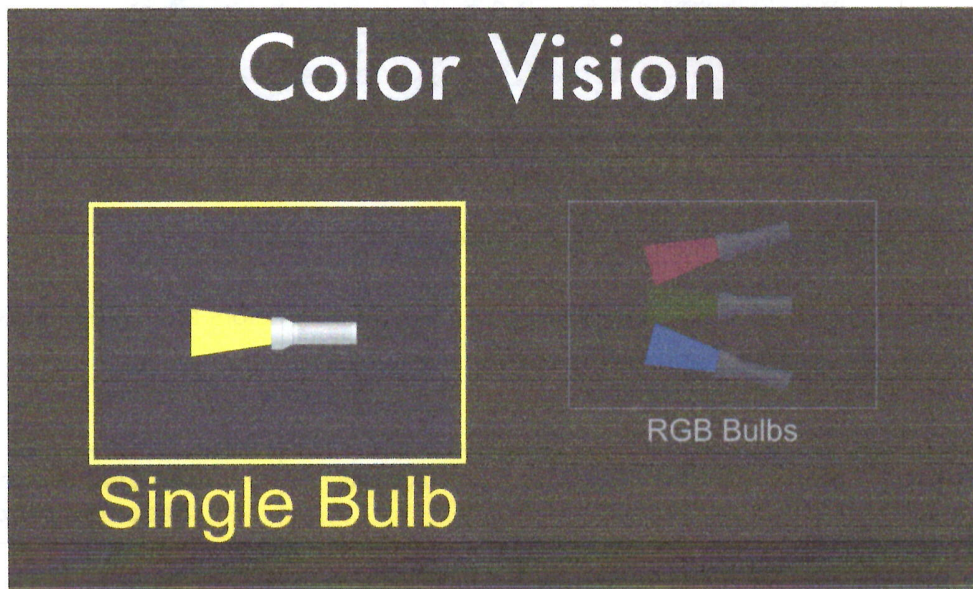
**Instructions**

In this activity, we will be using the deflection of RGB bulbs to determine what color a person sees when different combinations of light are used. You will be working between this document and the simulation.

**Simulation Link**

[https://phet.colorado.edu/sims/html/color-vision/latest/color-vision\\_en.html](https://phet.colorado.edu/sims/html/color-vision/latest/color-vision_en.html)

This screen will appear:



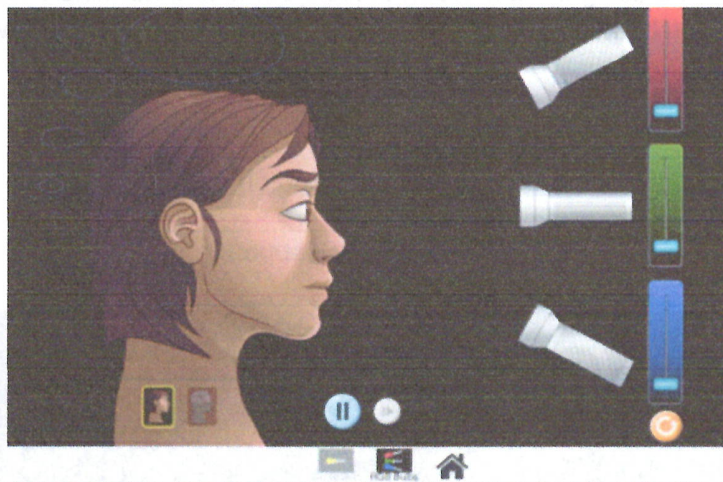
Select RGB bulbs by double clicking.

**Exploration Phase**

1. Briefly explore this simulation.
2. Have different combinations of red, green and blue light entering the person's eyes.
3. Observe the different colors that are perceived by the human based on the combination of colors (the circles above the human's head represents what color he is seeing).
4. Notice the pause, frame by frame, and reset buttons.

### Explanation Phase

**Aim:** Students will investigate how the primary colors interact to create perceived colors in the human eye.



When different amounts of light are applied, a person will see a specific color.

Predict the secondary color a person will see when two primary colors are raised. Make sure that both colors are raised to the maximum level.

Primary Color	Primary Color Added	Predicted Perceived (Secondary) Color
Red	Green	
Green	Blue	
Blue	Red	

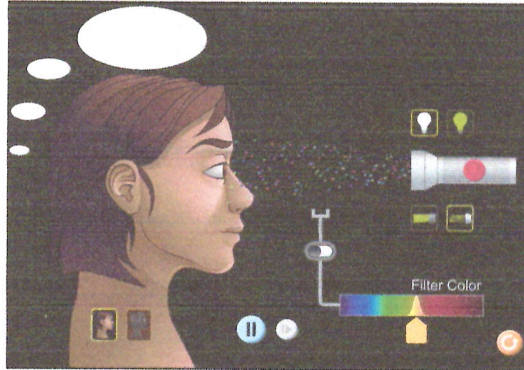
Now test your predictions!

Primary Color	Primary Color Added	Perceived (Secondary) Color
Red	Green	
Green	Blue	
Blue	Red	

How were your predictions similar or different to your actual results?

### Application Phase

Now go to the Single Bulb phase of the simulation, and select the white bulb and light particles options. Your screen should look like this:



1. What color(s) is actually being emitted from the flashlight?
2. What color is being perceived by the human eye?

Turn on the filter color option by clicking the switch, and a yellow filter should appear in between the flashlight and the human.

3. Now what color is the human eye perceiving from the flashlight?
4. What colors are being absorbed by yellow filter and what colors are passing through?
5. Change the color filter a few times by sliding the arrow along the bottom. Summarize how the filter affects what is seen from the white lightbulb.
6. In your own words, create a rule explaining how color is seen through a colored filter?

To complete this chart, you will be using **RGB bulbs**. Fill in each missing box by using the percentage of each color needed to attain the listed color. The first one is completed for you.

COLOR	Red Slider Position	Green Slider Position	Blue Slider Position
Orange	100% (1/1)	50% (1/2)	0% (0/1)
Brown			
Gray			
Pink			
Violet (darker than magenta)			
Black			

### Questions

#### RGB bulbs

1. What are the primary colors of light?
2. What color does a person see when all of the sliders are all the way up?
3. Why do we call coloring from light emitted from a flashlight "additive" color?

You have seen the light!! Congratulations!!

