Physics: PhET Simulation – Color Vision

Name _____

Hour _____

How to access: Google "PhET simulation color vision" and click on the first result. Click on **Run in HTML 5**. Answer the following questions while using the simulation.

Part I – Use the RGB Bulbs Tab

1) Each light has a color gradient. For the best results, slide the bar to the very top of each color. **Each color should be observed individually for this first part.** To stop the color, return the bar to the black location.

   a) What color is seen when the red light is on?

   b) What color is seen when the green light is on?

   c) What color is seen when the blue light is on?

2) For the next part we will investigate the effects of mixing two colors. Before you begin each part **be sure to make a hypothesis.**

   a) What color *do you think* the man will see when **red and green** are mixed together?

   b) Turn on the red and green, both to the very top of the color scale. What does the man *actually see*?

   c) Experiment with the degree of color. While doing this, make sure that both colors are in equal locations on the scale. What colors are observed? Do they still fit into the same color family as the color observed in 'b'?

3) Keep the red light on (to the top red location), and turn off the green. We will be looking at red and blue next.

   a) What color *do you think* the man will see when **red and blue** are mixed together?

   b) Turn on the red and blue, both to the very top of the color scale. What does the man *actually see*?

   c) Experiment with the degree of color. While doing this, make sure that both colors are in equal locations on the scale. What colors are observed? Do they still fit into the same color family as the color observed in 'b'?

4) Keep the blue light on (to the top blue location), and turn off the red. We will be looking at green and blue next.

   a) What color *do you think* the man will see when **green and blue** are mixed together?

   b) Turn on the green and blue, both to the very top of the color scale. What does the man *actually see*?

   c) Experiment with the degree of color. While doing this, make sure that both colors are in equal locations on the scale. What colors are observed? Do they still fit into the same color family as the color observed in 'b'?

5) Now we will be looking at mixing all three colors.

   a. What color *do you think the man* will see when **red, green and blue** are all mixed together?

   b. Turn on all three colors, all to the very top of the color scale. What does the man *actually see*?

6) Fill in the color diagram below. Provide the appropriate colors that you observed when each was mixed. You may use colored pencils if you wish.

RED

GREEN

BLUE
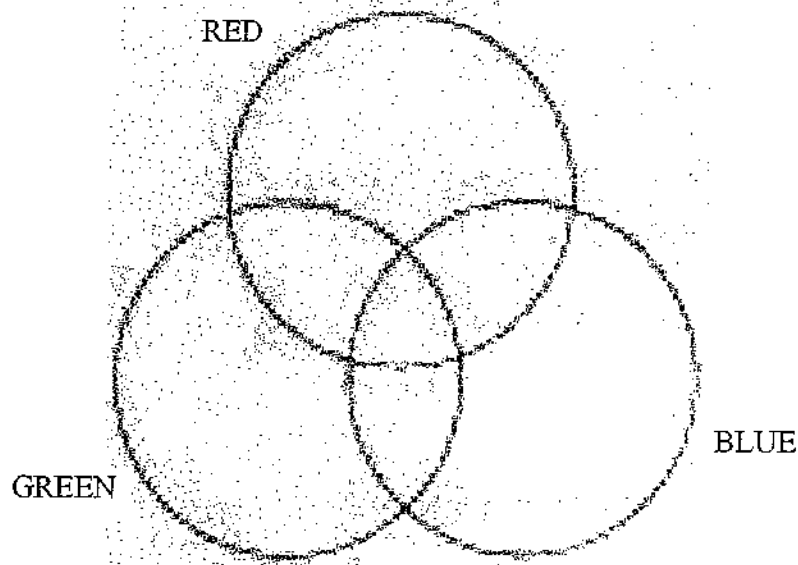
Part II – Use the Single Bulb Tab

1) Set the simulation to the following: **bulb type** – 'white', **beam** – 'photons', and **filter color** – 'off'.

   a) What is coming out of the bulb?

   b) What color light does the man see?

2) Set the simulation to the following: **bulb type** – 'white', **beam** – 'solid', and **filter color** – 'off'.

   a) What is coming out of the bulb?

   b) What color light does the man see?

3) In this activity light was represented in 2 ways – as a photon or as a solid. What explanation can you provide for the nature of light?