

In this activity, you will conduct a virtual laboratory to examine how different colors of light are created through the processes of color addition and subtraction.

**Virtual Lab: PhET Wave Interference**

You can access this simulation at: <https://phet.colorado.edu/en/simulation/color-vision>

**Part One: Color Addition**

a. Open the simulation and choose RGB Bulbs.

1. Why are the three bulbs colored red, green, and blue?

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b. Increase the intensity of the red light.

2. What color does the observer see?

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c. Increase the intensity of the green light to match that of the red light.

3. What color does the observer see?

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4. red light + green light = \_\_\_\_\_

d. Decrease the green light to zero, and increase the intensity of the blue light to match that of the red light.

5. What color does the observer see?

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6. red light + blue light = \_\_\_\_\_

e. Decrease the red light to zero, and increase the intensity of the green light to match that of the blue light.

7. What color does the observer see?

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8. blue light + green light = \_\_\_\_\_

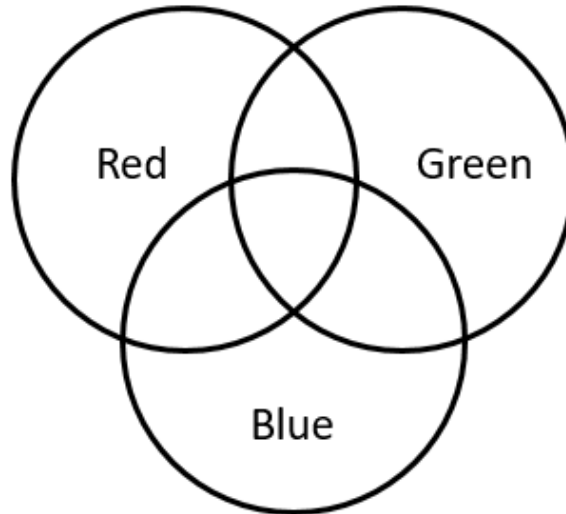
f. Increase the intensity of the red light to match that of the blue light and the green light.

9. What color does the observer see?

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10. red light + blue light + green light = \_\_\_\_\_

11. Complete the diagram below for light:



### Part Two: Color Subtraction

- Click on Single Bulb at the bottom of the screen.
- Click on the yellow bulb and the light beam.
- Filters work on the idea of color subtraction. All colors are subtracted except for the color that passes through the filter.
- Click on the filter button to turn on the filter.
- The initial setting is yellow light shown through a yellow filter.

1. What color does the observer see?

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f. Keep the color of the filter as yellow, and slide the color scale for the light back and forth.

2. What color does the observer see when the color scale for the light is on either side of yellow?

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g. Click on the white bulb to show white light through the filter.

h. Slide the color of the filter back and forth, from violet to red.

3. How does changing the color of the filter change the color that the observer sees?

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4. What does this result indicate about white light?

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5. Why does the observer perceive only the color black when the color of the light and the color of the filter are different?

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