Interactive Light Hunt- Part 2: Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Phet Simulator: Color Vision! Date: \_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_

**Part A: Single Bulb**

1. Go to the following: <https://phet.colorado.edu/en/simulation/color-vision> and click **Play**, then click **Single Bulb**.
2. When the simulator window opens, turn the flashlight **ON** by clicking the **red button** on the flashlight.
3. You should see a yellow light coming from the flashlight. Now, **JUST ABOVE** the flashlight, hit the option to use the **white colored bulb** instead of the yellow light on the left. You should notice the light change colors.
4. a) What color is being emitted ***from the flashlight***? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What color ***does the brain see***? (depicted by the thought bubble above the observer’s head) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Now, **JUST BELOW** the flashlight, switch the option from light beam (currently being displayed) to **light particles** on the right.
7. a) Study the particles of light leaving the flashlight. What colors do you see ***actually make up white light***?

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b) What is the ***abbreviation*** for these colors? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) What color ***does the brain still see***? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Turn ON the **filter color option** by clicking on the black circular switch down and to the left of the flashlight. If you do this correctly, you should see the **yellow** filter appear.
2. a) What colors are being emitted ***from the flashlight***? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) What color is able to ***pass through*** the YELLOW filter? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) Which colors are being ***absorbed by the filter***? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Change the filter color several times by sliding the indicator at the bottom. Summarize how filters affect white light:

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1. Switch from the **white colored bulb** to the **yellow colored bulb** above the flashlight. Notice you can now change the bulb color by *sliding* the control left and right. Experiment with changing the bulb color ***and*** the filter color several times. Do this until you feel you can predict what will happen each time you change the bulb and filter colors, then summarize what you’ve observed below:

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**Part B: RGB Bulbs**

1. Click on the **RGB Bulbs** tab at the very bottom of the simulator screen.
2. The three flashlights on the right represent how ***all screens*** (phones, computers, televisions, etc.) use the three basic colors of **Red**, **Green** and **Blue** to simulate all of the other colors in the visible spectrum!
3. Complete the chart below- make your prediction for how you will make each color ***BEFORE*** testing! **(\*Hint:** You may need to **slide each color between the 0-50% level** in order to make all of the colors!)

|  |  |  |
| --- | --- | --- |
| **Color** | **Prediction of how the R,G,B lights will be used to create each color** | **Actual findings!** |
| **Ex. Red** | Ex. 100% Red, 0% Green, 0% blue |  |
| **Orange** |  |  |
| **Yellow** |  |  |
| **Green** |  |  |
| **Blue** |  |  |
| **Indigo** |  |  |
| **Violet** |  |  |
| **White** |  |  |
| **Black** |  |  |
| **Brown** |  |  |

1. The following site allows you to see how creating colors with LIGHT is very different from creating colors with paint or dye. Go to the following site <http://www.omsi.edu/tech/colormix.php> and be sure to switch back and forth between Light and the Ink/Paint option at the bottom of the simulator window!
2. Think about how you can get the **color white from using light** versus how you can get the **color white from using paint or dye**. Now, think about how you can get the **color black from using light** versus from **paint or dye**. Using this, explain why we call coloring from light “***additive***” and coloring from paint or dyes “***subtractive***”.

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