Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_

**Interactive Light and Color Lab - PHET**

Part 1 - Single Bulb

1) Go to Google Classroom - Science Class. Open the PHET - Color Vision link

2) When the website opens, Click **Single Bulb**, 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**? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 b) What **color does the brain see**? (depicted by the bubble above the person's head) \_\_\_\_\_\_\_\_\_\_\_\_\_

 c) Why does the brain see that color? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5) Now, **JUST BELOW** the flashlight, switch the option from light beam to **light particles** on the right.

6) Study the particles leaving the flashlight. What colors do you see that **actually make up white light?**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is the abbreviation for these colors? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What color does the brain still see? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Why didn't the color change? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7) Turn on the color filter option by clicking on the black circular switch down and to the left of the flashlight. If you do correctly, you should see the yellow filter appear.

8) What colors are being **emitted** from the flashlight? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What color is able to **pass through** the yellow filter? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Which colors are being **absorbed** by the filter? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9) Change the filter color several times by sliding the indicator at the bottom. Summarize how the filter affect white light.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10) Select the yellow bulb to complete the table below. Fill in the missing box by using the color filter and colored light bulb.

|  |  |  |
| --- | --- | --- |
| **Color of Light** | **Color of Filter** | **Color Observed** |
| Red | Yellow |  |
| Red | Magenta (purplish) |  |
| Blue | Blue |  |
| Yellow | Red |  |
|  | Green | Green |
| Yellow |  | Yellow |

11) Switch to the **white light bulb** and change the filter a few times. How was the color you saw changed?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12) Using filters to a get a color is called subtractive coloring. Why do you think it might be called this?

Hint: think about what regular white light is.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Now click on the RGB Bulbs icon at the bottom of the screen**

13) What are the primary colors of light? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

14) What color does the person see when the sliders are all the way up? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15) Leave the red and green sliders up and turn the blue off. What is the color? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16) Now turn the green off and blue back to the maximum. What is the color? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17) Turn the red off and green back to the maximum. What is the color? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18) The colors you just made are complimentary colors to the primary ones, meaning they are blends. Now try to make the following colors based on sliding the power levels of each color to the correct position. Record your results in the table below. You can use percentages or fractions to estimate the power level.

|  |  |  |  |
| --- | --- | --- | --- |
| **Color** | **Red Slider Position** | **Green Slider Position** | **Blue Slider Position** |
| Orange | 100% or (1/1) | 50% or (½) | 0% or (0/1) |
| Brown |  |  |  |
| Gray |  |  |  |
| Black |  |  |  |
| Violet |  |  |  |