Light & Color

**Background**

We have done some work with light. We know what is meant by reflect, refract, diffract and absorb. In this activity, you will look at color, light, and colored filters.

**Getting to the site**

1. Log on to your computer and go to PHET Simulations
2. Go to Color Vision Sim (Do NOT use the HTML version. The man should be older and wearing a white shirt)

**Part I.**

1. Select **RGB Bulbs** at the top left
2. Move the colored sliders to create the listed colors.
3. Create the colors listed so the guy can “see” them
4. Check only the slider(s) you need to use to create the specified color.

|  |  |  |  |
| --- | --- | --- | --- |
| **Color** | **Red Slider** | **Green Slider** | **Blue Slider** |
| **Red** |  |  |  |
| **Green** |  |  |  |
| **Blue** |  |  |  |
| **White** |  |  |  |
| **Black** |  |  |  |
| **Grey** |  |  |  |
| **Violet** |  |  |  |
| **Hot pink** |  |  |  |
| **Orange** |  |  |  |
| **Aqua** |  |  |  |
| **Lt. Green** |  |  |  |

**Question Part I**

1. Are there any color that you cannot create using red, green and blue light? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If your answer is yes, show your teacher.

1. Why were the colors of the lamps used in this activity only red, blue and green?  
   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. This means that white light contains \_\_\_\_\_\_\_\_\_\_\_\_\_\_ colors!

**Part II**

1. Stay on the same page, but this time click on Single bulb
2. Be sure under “beam view”, you have “solid” clicked
3. Click on “white light.” You may also try using photons.
4. Use the filters and lights to see what the guy at the right will “see”

|  |  |
| --- | --- |
| **Filter color** | **Color seen** |
| Orange |  |
| Red |  |
| Blue |  |
| Green |  |
| Violet |  |

**Questions Part II**

1. When the filter is on red, why does the guy see only red? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Based on your answer above, explain how color filters work?

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**Part III**

1. Stay on the same page, but this time click on Single bulb
2. Be sure under “beam view”, you have “solid” clicked
3. Click on “Monochromatic”
4. Use the filters and lights to see what the guy at the right will “see”

|  |  |  |
| --- | --- | --- |
| **Bulb** | **Filter** | **Color Seen** |
| Green | Green |  |
| Red | Green |  |
| Violet | Blue |  |
| Yellow | Blue |  |
| Blue | Red |  |

**Wrap Up Questions**

1. What is the difference between white light and the light that was mono-chromatic? (hint: mono means “one” and chromatic means “color”) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Basically no matter what monochromic color, you can only see it when you use that filter. Why?\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. After doing this activity, please explain how red tinted sunglasses work. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_