**4.2 PROPERTIES OF VISIBLE LIGHT STATIONS** Name:

Date:

Block:

**Station 1: Primary and Secondary Colours:**

1. Obtain 4 small beakers and fill them individually with each colour.
2. Find a source of white light (your phone flashlight will work well).
3. Hold one beaker up against the light and verify that you can see its colour.
4. Hold another beaker directly in front of the first beaker. Record your observations as your data.
5. Reverse the beakers. Record your observations.
6. Repeat steps 3-4 for all combination of beakers.
7. \*Attempt to make white light by combining the light of blue, red and green – this works best with three light sources shining through the beakers and converging in the middle.

**Data/Observation/Results:**

Fill in the table with the colour, and colour them accordingly.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Blue | Red | Yellow | Green |
| Blue |  |  |  |  |
| Red |  |  |  |  |
| Yellow |  |  |  |  |
| Green |  |  |  |  |

Answer the following in **full, complete sentences**.

a)Using the words “absorb” and “transmit,” explain briefly what happened in this lab with regards to the light & colour.

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b)Which colours make up white light? Name two ways we can observe the separation of white light.

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c)Why does a green shirt look green?

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1. Why does a blue hat look black when it is in a dark room?

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**Station 2: Prisms Activity**

1. On a whiteboard, set up a prism and shine the light through it (as in Figure 4.14 on p. 147). The purpose of this activity is to see how a prism causes white light to split into a spectrum.
2. Trace the prisms and use pencil crayons (or just label with letters ie. Red = R) to show the spectrum produced. (Sketch below)
3. Use another prisms to try to recombine the colours, producing white light again.

Prism Sketch :

1. Tidy up the materials.
2. How does a prism separate light into different colours ?

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1. What colour has the :

Longest wavelength? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Shortest wavelength? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Highest Frequency? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Lowest Frequency? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Station 3: Colour Vision**

1. Log on to your computer
2. Go to the following website: <http://phet.colorado.edu/index.php>
3. In the Search area, type in “Colour Vision” and click “Go”.
4. Click on the application that says Colour Vision
5. Click “Run now.”

**What to Do?**

**Using the first tab, “RGB Bulbs”:**

1. Raise the dial to the top for the red bulb. What colour does the man see? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Next, lower the red dial to the bottom and raise the green dial to the top. What colour does the man see? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Next, lower the green dial to the bottom and raise the blue dial to the top. What colour does the man see? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Now, raise the green dial along with the blue dial. What colour does the man see? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Lower the green dial to the bottom and raise the red dial, so that the red and blue dials are both to the top. What colour does the man see? \_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Lower the blue dial to the bottom and raise the green dial, so that the red and green dials are both to the top. What colour does the man see? \_\_\_\_\_\_\_\_\_\_\_\_
7. Finally, raise the blue dial so that all three dials, blue, red and green, are all to the top. What colour does the man see? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Using the second tab, “Single Bulb”:**

1. Leave **Bulb Type** set at “White”, and **Beam View** at “Photons”. Click **Beam View** to “Solid”. What colour(s) make up the white light (to the left of the filter)?

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1. Leaving the filter colour set on yellow, what colour of light is transmitted through the filter? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Slide the filter colour so that it is set on red, what colour of light is transmitted through the filter? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What colour of light do you think will be transmitted through a blue filter? \_\_\_\_\_\_\_\_\_\_\_. Slide the filter colour so that it is set on blue to test your prediction. What colour of white light is transmitted through the filter? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Slide the filter colour back to yellow. Switch the **Bulb Type** set to “Monochromatic”. Leave the bulb colour set to yellow. What colour of light is transmitted through the filter? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Leave the filter colour set to yellow. Change the bulb colour to green. What colour of light, if any, is transmitted through the filter? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Change the filter colour to green. What colour of light is transmitted through the filter? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. What can you infer about how the colour of the filter affects the colour of light that passes through the filter?

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