



# Color Mixing Demo:

P2-9550

## ASSEMBLY AND USE:

The Color Mixing Demo is powered with 3 AA batteries.

- **Batteries:** Flip the switch on the box back to 4.5V. The box comes with 3 AA batteries. Use a screwdriver to open the battery compartment and replace the batteries when necessary.

## EDUCATIONAL OBJECTIVES:

- To learn the primary additive colors and how they add.
- To learn the complementary colors.

## STUDENT OPERATION:

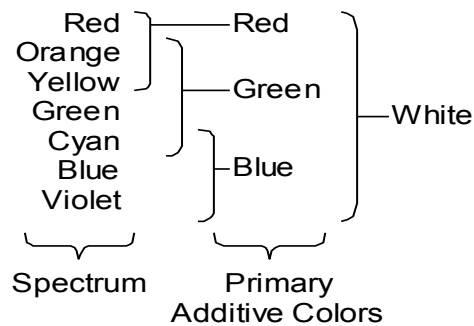
Flip the front switch up. The three primary colors may now be individually adjusted with the dials. Colors are best observed in a darkened room.

1. **Color Addition – 2 colors:** Turn on 2 colors at a time and observe the color that results where the 2 primary colors are cast together. Ask students to relate the results to their knowledge about paint (pigment) mixing.
2. **Color Addition – 3 colors:** Turn on all 3 colors and adjust the dials until the center (where all 3 colors are cast together) is white. Relate this to the reverse action – splitting white light into components with a prism.
3. **Complementary colors:** With 2 lights on, observe the center portion of the screen. Turn on the third light. Notice the combinations of two colors that, when cast together, produce white light (i.e. yellow and blue). These are known as complementary colors.

4. **Other colors:** Use the dials to adjust the lights to form other colors students know, such as orange and pink.

## CONCEPT OVERVIEW:

The spectrum formed by rain and prisms show many colors, but there are specific regions of interest. The following figure shows the colors, the regions of interest, and the overlap of the regions.



This figure suggests that white light is made up of red, green, and blue light and that other colors are the result of mixing various amounts of these colors.

## PRIMARY ADDITIVE COLORS:

From the previous figure, you can see that red and green overlap to form yellow or orange. Green and blue overlap to form cyan. We can write this in short hand notation simply as:



Orange is also made by combining red and green, but with a higher proportion of red to green.

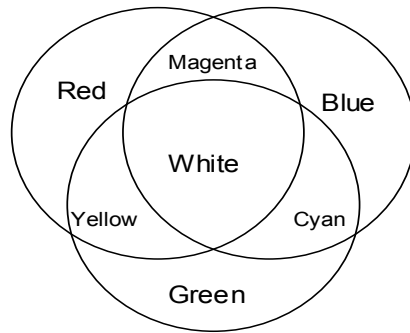
Notice that the red and blue regions of the spectrum do not overlap. The red is at one end (long wavelength) of the visible spectrum, and the blue is at the other end (short wavelength) of the visible spectrum. If we add these two colors, the result is a color that does not appear in the spectrum, magenta (hot pink).



The three primary additive colors comprise the entire spectrum. If we add all three colors, the result is white.



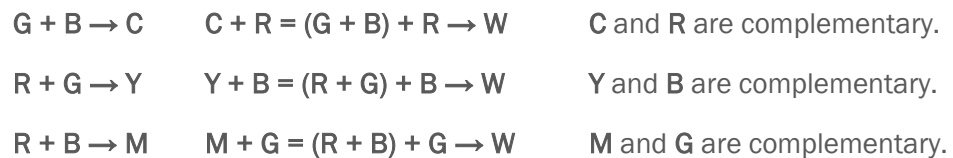
The combinations of the primary additive colors can be summarized with the following diagram:



## COMPLEMENTARY COLORS:

Complementary colors are two light colors that add together to produce white.

Cyan is made of green and blue, so if red is added to cyan the result should be white. Cyan and red are complementary colors since they add to give white. The complementary colors are summarized below:



Notice that in the addition of light diagram above, R and C are opposite each other with W between. Each color in the figure is directly opposite its complement, with white between.

## RELATED PRODUCTS:

**Light Box and Optical Set (P2-9561).** Conduct experiments involving refraction, reflection, color, and color mixing with one complete kit.

**Color Addition Spotlights (P2-9700).** A color addition demonstration for large groups.

