

Mixing Colored Lights

What is color? How many different colors can be formed from a combination of only three colors? In this exploration, you will examine what happens when lights of three different colors are mixed.

Problem How can you produce a range of colors from three lights of different colors?

Materials

- sources of red, blue, and green light
- tape
- large sheet of white paper

Skills Observing

Procedure

1. Tape a large sheet of white paper to the wall.
2. Dim the room lights. Turn on the red light source and shine it on the large sheet of white paper. In the data table, record the colors you observe on the paper. **CAUTION:** *Do not touch lamps when they are on. They may be hot.*

DATA TABLE

Light Sources	Colors of Lights	Colors of Shadows
Red only		
Blue only		
Green only		
Red and blue		
Red and green		
Blue and green		
Red, blue, and green		

3. Place your hand between the light source and the paper. Record the color of your hand's shadow.
4. Repeat Steps 2 and 3 with the blue and then with the green light source.

5. Now turn on the red and blue light sources and allow their beams to overlap. Record your observations in the data table.
6. Place your hand in the overlapping beams of light. Note the colors of any shadows that your hand makes. Record your observations in the data table.
7. Repeat Steps 5 and 6 with the red and green light sources. Then repeat Steps 5 and 6 with the blue and green light sources.
8. Turn on all three light sources and allow their beams to overlap. Record your observations in the data table.
9. Place your hand in the overlapping red, green, and blue beams. Note the colors of any shadows that your hand makes on the white paper. Record your observations in the data table.

Analyze and Conclude

1. **Observing** What happened when two colored lights overlapped?

2. **Analyzing Data** How did the combination of two colored lights produce the shadows you observed?

3. **Applying Concepts** Explain how combining three colored lights produced the colors you observed.

4. **Drawing Conclusions** From the shadows you observed when using three colored lights, what can you conclude about how colors of light combine? Explain your answer.
