

Colored Objects

Goals

- To learn how colored objects appear in different colors of light.
- To learn how color printing is done.

Materials

- Light box
- Power supply
- Color filters (Red, Green, Blue, Yellow, Cyan, Magenta)
- Color cards (Red, Green, Blue, Yellow, Cyan, Magenta)
- Color newspaper pictures
- Magnifying glass

Procedure

1. Plug the light box into the power supply. For this experiment, you will use the end of the light box *without* the swinging doors.

Part I: Reflection of Red, Blue, and Green

2. Place the Red color filter in the slot.
3. Hold the Red colored card in the Red light. It should appear bright because red objects reflect red light. Record this in the table below by writing “Yes” in the square for the Red light and a Red object.
4. Hold the Blue colored card in the Red light. It should appear dark because blue objects absorb red light and do not reflect it. Record this in the table below by writing “No” in the square for Red light and a Blue object.
5. Repeat this for all the color combinations in the table below.

Object Color	Reflects Red Light?	Reflects Blue Light?	Reflects Green Light?
Red			
Blue			
Green			
Yellow			
Magenta			
Cyan			

Part II: Reflection of Yellow, Magenta, and Cyan

6. Place the Yellow color filter in the slot.
7. Hold the Red colored card in the Yellow light. What color do you see? Record the color you see in the table below.
8. Repeat this for all the color combinations in the table below. If the card appears to be dark, write "Black" in the table.

Object Color	Apparent color in Yellow light	Apparent color in Magenta light	Apparent color in Cyan light
Red			
Blue			
Green			
Yellow			
Magenta			
Cyan			

Part III: Color Printing

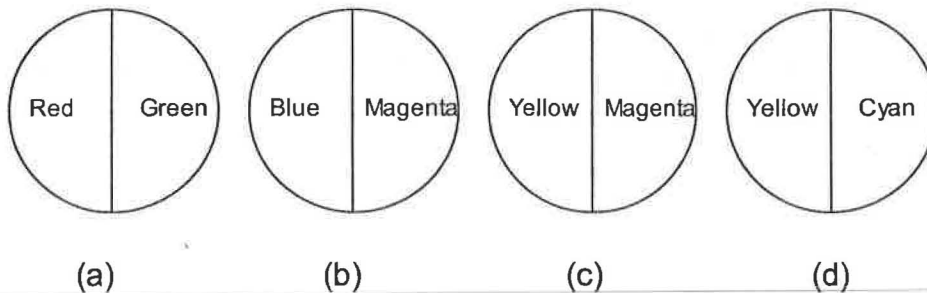
9. Use a magnifying glass to look at a color picture in a newspaper. Draw what you see under the magnifying glass.
10. Find an area in the picture that is green. Look with the magnifying glass and describe the colors of the dots you see.
11. Find an area in the picture that is red. Look with the magnifying glass and describe the colors of the dots you see.
12. Find an area in the picture that is red. Look with the magnifying glass and describe the colors of the dots you see.
13. How many different colors of dots are used to print the whole newspaper? List the ink colors you see under the magnifying glass.

Questions

14. For each of the following, explain the observed color. In your explanation, describe which primary additive colors are included in the light, and which colors the object reflects.

- a. A red apple appears to be red under white light.
- b. A red apple appears to be black under blue light.
- c. A yellow banana appears to be yellow under white light.
- d. A yellow banana appears to be red under magenta light.
- e. A yellow banana appears to be green under cyan light.
- f. A blue police car looks black under a yellow streetlight.

15. The objects below have the colors shown when they are viewed with white light.



- k. _____ Which object(s) will appear all black in blue light?
- l. _____ Which object(s) will appear all green in green light?
- m. _____ Which object(s) will appear all red in red light?
- n. _____ Which object(s) will appear half red and half black in red light?

16. You are a newspaper publisher. You have to make a color print of the picture below using only yellow, magenta, and cyan inks. Show what ink colors you would use in each region of the picture to produce the correct final colors.

