

Light ▪ *Skills Lab*

Changing Colors

Stage lighting in theaters uses color filters to control the colors of light on stage. In this lab, you will study the effect of color filters on white light.

Problem

How do color filters affect the appearance of objects in white light?

Skills Focus

observing, inferring, predicting

Materials

shoe box

scissors

flashlight


removable tape

red object (such as a ripe tomato)

yellow object (such as a ripe lemon)

blue object (such as blue construction paper)

red, green, and blue cellophane, enough to cover the top of the shoe box

Procedure  *Review the safety guidelines in Appendix A.*

1. Carefully cut a large rectangular hole in the lid of the shoe box.
2. Carefully cut a small, round hole in the center of one of the ends of the shoe box.
3. Tape the red cellophane under the lid of the shoe box, covering the hole in the lid.
4. Place the objects in the box and put the lid on.
5. In a darkened room, shine the flashlight into the shoe box through the side hole. Note the apparent color of each object in the box.
6. Repeat Steps 3–5 using the other colors of cellophane.

Light ▪ *Skills Lab***Analyze and Conclude**

Write your answers on a separate sheet of paper.

1. **Observing** What did you see when you looked through the red cellophane? Explain why each object appeared as it did.
2. **Observing** What did you see when you looked through the blue cellophane? Explain.
3. **Inferring** What color of light(s) does each piece of cellophane allow through?
4. **Predicting** Predict what you would see under each piece of cellophane if you put a white object in the box. Test your prediction.
5. **Predicting** What do you think would happen if you viewed a red object through yellow cellophane? Draw a diagram to support your prediction. Then test your prediction.
6. **Communicating** Summarize your conclusions by drawing diagrams to show how each color filter affects white light. Write captions to explain your diagrams.

Design an Experiment

Do color filters work like pigments or like colors of light? Design an experiment to find out what happens if you shine a light through both a red and a green filter. *Obtain your teacher's permission before carrying out your investigation.*