87 Rainbows Without Rain

Purpose

To observe and develop a hypothesis about the phenomenon of light interference

Required Equipment/Supplies

soap-bubble solution
wire frame for soap films
large, flat, rimmed pan (such as a cookie sheet)
oil
2 microscope slides or glass plates
2 rubber bands

Discussion

A rainbow is produced by the refraction and reflection of light from drops of water in the sky. Rainbow colors, however, can be produced in a variety of ways. Some of these ways will be explored in this lab activity.

Procedure

Step 1: Pour some of the bubble solution into the flat pan. Place the loop of the wire frame into the solution. Hold the frame in a vertical position. Look at the soap film with the room lights behind you, reflecting off the film.

1. List as many observations as you can of what you saw in the soap film.

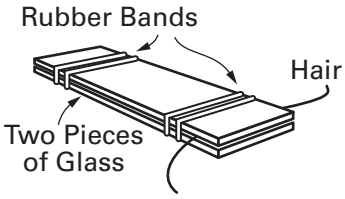
2. How would you explain these observations?

Step 2: During or after a rainfall, you may have noticed brilliant colors on a wet driveway or parking lot where oil has dripped from a car engine. To reproduce this situation, cover the bottom of the pan with a

thin layer of water. Place a drop of oil on the water, and look at the oil slick with various angles of incident light.

3. List as many observations as you can of the oil on the water.

4. How would you explain these observations?



Step 3: Make a very thin wedge of air between two glass plates or microscope slides. You can do this by placing a hair across one end between the two. Fasten both ends together with rubber bands. Try to observe small repeating colored bands in the air wedge.

5. List your observations.

6. How would you explain these observations?

Analysis

7. Summarize any patterns in your observations.