

Rainbow Glasses

Introduction

Ever wonder how colors are visible to the human eye? This activity illustrates diffraction of visible light.

Materials

Rainbow Glasses
White light source

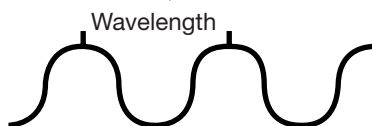
Paper
Pen or pencil (colored pencils or markers may be preferred)

Procedure

1. Put on Rainbow Glasses and look towards a light.
2. On a piece of paper, draw (or color) what is seen.
3. Answer the following questions:
 - a. Are the colors blended in a continuous band or are they each individual lines?
 - b. Are the colors the same as the colors of a rainbow? Are they in the same order?
 - c. Where do the colors come from?
 - d. How does a rainbow form?

Discussion

Visible light is part of the electromagnetic spectrum. The electromagnetic spectrum consists of all types of energy, e.g., radiowaves, infrared, visible light, ultraviolet, X-rays gamma rays, and cosmic rays. Since energy travels in waves, each type of energy has its own range of wavelengths. The distance between two crests on a wave is called its wavelength. A common unit of wavelengths is nanometers (nm). ($1 \text{ nm} = 10^{-9} \text{ m}$)



Visible light is actually only a small part of the electromagnetic spectrum. It has a wavelength range from 400–700 nm with each color having a specific wavelength range.

Sir Isaac Newton, during the late seventeenth century, was the first scientist known to study color in depth. He noticed that white light would spread out into a spectrum of colors or be defracted when it was passed through a prism. The spectrum could then be joined back again by passing it through a second prism.

The spectrum of visible light (with approximate wavelengths in nanometers) through a prism like the Rainbow Glasses is as follows:

Red	Orange	Yellow	Green	Blue	Violet
				Indigo	
700	647	585	575	491	424
					400

The colors of the spectrum are continuous and blended together. An easy way to remember the spectrum is by the acronym *Roy G. Biv* which comes from the first letter of each color, e.g., R = red, O = orange, etc.

The same spectrum is caused when sunlight is defracted by water in the atmosphere. When it rains and the sun is out, a spectrum or rainbow can form. The rainbow will have the same colors and in the same order as the spectrum seen through any prism or the Rainbow Glasses.

References

Modern Physical Science, Tracy, Tropp, Friedl, Holt, Rinehart and Winston, Publishers, 1983.

Handbook of Chemistry and Physics, 70th Edition, CRC Press, 1989–1990.

***Rainbow Glasses* are available from Flinn Scientific, Inc.**

Catalog No.	Description
AP1949	Rainbow Glasses

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.