

STEM from Home

The Colourful World

Can you imagine life without colours? Colour is a daily mystery we all swim in. Take the example of red. It is the colour of our own blood but also lobster – a delicacy for the elite! Red signifies anger and also love. Such associations make colours interesting and brings uniqueness to the entire concept. It is hard to envisage a world without colours simply because so many colourful things surround us. One such attractive colourful display is the Rainbow. Have you ever wondered how you see seven fascinating colours in a rainbow? Violet. Indigo. Blue. Green. Yellow. Orange. Red. Why only these seven colours? There are several folklores trying to figure out what is there at the end of the rainbows, but let us focus on the science aspect here! A rainbow is an excellent demonstration of the phenomenon of ‘Dispersion of Light’ and proves that visible light is composed of distinct colours, each associated with a range of wavelengths.

In this STEM Pack, you will use an online simulation to understand dispersion of light through prism as part of the Main Activity. In the Bonus Activity, you will conduct an experiment using the concepts of dispersion to show the recombination of spectrum of light. The Challenge Activity “Find the Mix” will instigate your mind to think and come up to the solution using your understanding of the concept of additive mixing of colours.

Main Activity: Create your own Rainbow!

Introduction: In this activity, you will learn about the conditions of Rainbow formation by creating your own rainbow. Step by step instructions are given below.

What Will You Need

A device with Internet connectivity, capable of opening a web page or YouTube video.

Materials to make your own rainbow:

1. Water in a clear glass
2. Flashlight
3. Tape
4. White Paper (to be used as screen)

Follow these steps:

1. Lay your sheet of white paper on a flat surface.
2. Put two pieces of tape to cover the flashlight leaving a small opening for a thin beam of light to pass.
3. Place the glass of water on the sheet of paper.
4. Show the flashlight through the glass of water.

Weblink: [Let's Get Started](#)

What Will You Learn:

1. What happens when white light passes through a water drop or a prism.
2. Splitting of white light into spectrum is termed as Dispersion.
3. Conditions required for Dispersion.

Let's use simulation to understand more about the phenomenon of Dispersion.

Weblink: [Access the simulation](#)

Bonus Activities

Activity 1: Newton's Disc (Reverse Rainbow)

Introduction:

In this activity you will construct a Newton's Disc to show the recombination of a spectrum to get white light.

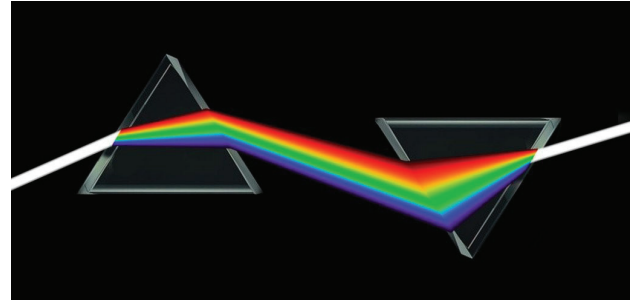
What You Will Need

1. Marker Pens of seven rainbow colours
2. CD
3. Cardboard
4. Gluestick
5. Thread/String
6. Pen
7. White Paper
8. Scissors
9. Toothpicks

Weblink : [Let's Get Started](#)

What You Will Learn

1. The concept of recombination of spectrum into white light.

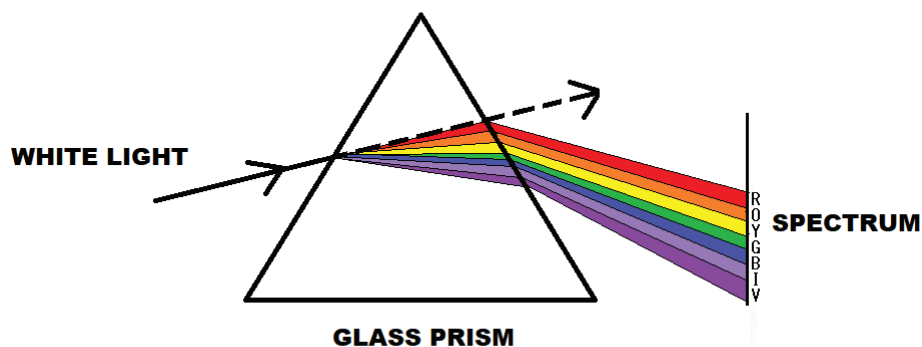


2. When the Newton's Disc is rotated at high speed, it appears white suggesting the white light comprises of seven colours.

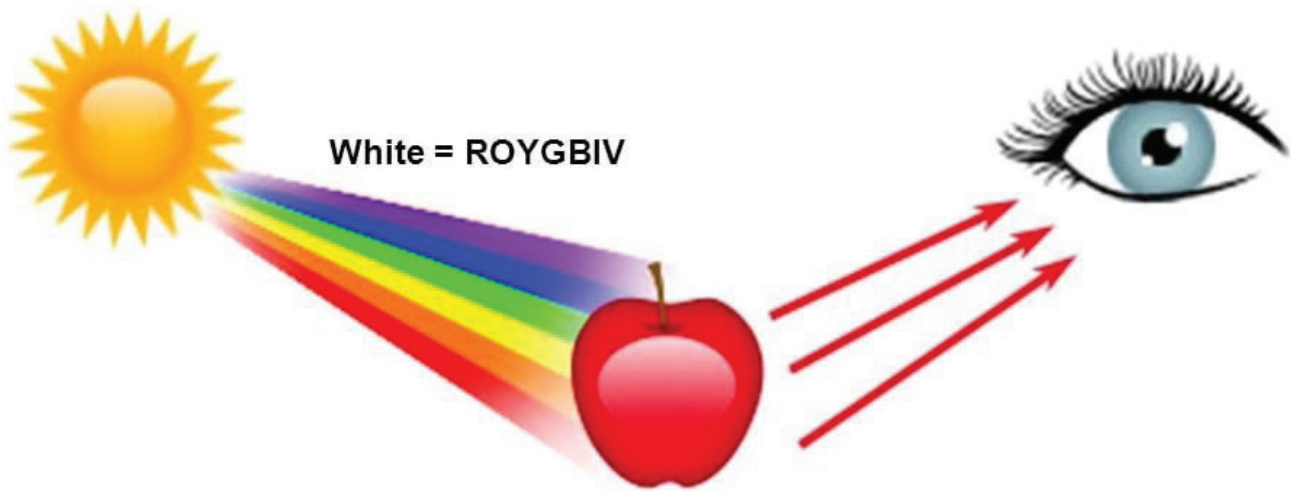
Challenge Activity: Find the Mix?

Do you know why an apple appears red? Or Why sunflower appears yellow?

Actually, the human eye and brain together translate light into colour. Light receptors within the eye transmit messages to the brain, which produces the familiar sensations of colour. Thus, red is not "in" the apple. The surface of the apple is reflecting the light in a certain wavelength we see as red and absorbing all the rest. An object appears white when it reflects all wavelengths and black when it absorbs them all.



Red, Green and Blue are the additive primary colours of the colour spectrum. Combining balanced amounts of red, green and blue lights also produces pure white light. By varying the amount of red, green and blue light, all of the colours in the visible spectrum can be produced.



color of opaque objects = light reflected

Your Challenge:

Anaya was a student of Grade- 6 studying in a public school. There was Annual day celebrations at her school. She was sitting in the school auditorium along with her parents, eagerly waiting for the dance performance. The stage was illuminated with bright lights of different colours. Anaya was surprised to see that the dancer's beautiful dress was changing colours. This happens due to [additive mixing of coloured lights](#).

Your challenge is to first find a way to separate only one coloured light out of the spectrum then use the concept of additive mixing of colours to make the following coloured lights

- Magenta
- Cyan
- Yellow

Given Materials:

- 3 torches with white light
- Cellophane sheet or Filter (red, blue, green)
- White Paper to be used as screen

Your final submission can be presented digitally using [docs](#) or [presentations](#) software.