

Physics

Activity 5 – Scattering of Light

Chapter – Human Eye & the Colorful World

Class: X

Duration: 15 minutes

Nature of activity: Group

Learning Outcome:

1. Students will be able to demonstrate that the scattering of a specific light takes place if the size of the particles of the medium is comparable to the wavelength of the light.
2. Students will also be able to conclude that due to scattering phenomenon, the path of light becomes visible.

What we have to do?

To demonstrate scattering of green laser light as it passes through a Dettol solution.

What do we require?

A trough, green laser light, water and Dettol solution.

What do we need to know?

Scattering is a general physical process where light is forced to deviate from a straight path by one or more paths due to particles of the medium through which they pass. Selective scattering (or Rayleigh scattering) occurs when certain particles are more effective at scattering a particular wavelength of light. Air molecules, like oxygen and nitrogen for example, are small in size and thus more effective at scattering shorter wavelengths of light (blue and violet). The selective scattering by air molecules is responsible for producing our blue sky on a clear sunny day.

How will you proceed?

➤ **Teacher's Activity**

Teacher will discuss the meaning of scattering of light and also guide students on how to perform the activity.

➤ **Student's Activity**

- Point green laser light towards the water solution and observe the color of water.
- Now prepare dettol solution by adding a few drops of dettol in water in a trough.
- Point a green laser light towards the Dettol solution and observe the color of Dettol solution.

What have you observed?

S. No.	Color of water as laser light passes through it	Color of Dettol solution as laser light passes through it
1		

What have you learned?

The green laser light undergoes _____ as it passes through a dettol solution. Hence we can say that the size of particles of dettol solution is _____ to the _____ of green color due to which this phenomenon takes place.

What more can we do?

1. Replace the green laser light with red laser light and find out if the same result is obtained.
2. Replace dettol solution by some other solution and repeat the experiment to find out the dependence of scattering phenomenon on size of the particles of the medium.

Extended Worksheet

1. Why sky appears blue as seen through the atmosphere?
2. Imagine you are an astronaut and you peep out through the window of the space station. What will the color of sky for you? Give reason for your answer.
3. Moon has no atmosphere of its own. Explain if the color of sky as seen from the moon will be blue or not?
4. You must have noticed that all the danger signals are painted red. Give reason for this observation.
5. It has been observed that sun appears red at the time of sunrise and sunset but appears white at the time of noon. What could be the possible reason for this observation? Explain your answer with the help of a diagram.

