

TOPIC: The human eye and the colourful world

Pre-Content/content Post-Content	Learning outcomes/Objectives	
	General	Specific
Pre-Content Working of human eye, eye defects and corrective lenses, power of accommodation, near and far point. Content Refraction through glass prism, angle of deviation, Dispersion of light, spectrum, atmospheric refraction, total internal reflection, scattering of white light. Post Content Conceptual of dispersion, atmospheric refraction and scattering.	Students will be able to: - develop an understanding on the working of human eye and the defects of vision. - discuss the phenomenon of Dispersion in detail. - comprehend the applications of atmospheric refraction. comprehend the phenomenon of scattering of light in the atmosphere and its implications.	Students will be able to: - comprehend the structure of human eye and the defects of vision. perform experiment to observe refraction of light through glass prism. observe phenomenon of dispersion. infer the meaning of spectrum. analyse the reason for rainbow formation. comprehend the atmospheric refraction. - reason out: why star appear to twinkle, why planet are seen at apparent position, why sunset is advanced and sunset is delayed. analyse reason for the scattering of white light. illustrate why sky appears blue. explain why danger signals are always painted red.

Home Work /Assignments

NCERT questions are discussed in the class and also given as the home task

Worksheets can be given as homework.

AND PROGRESS

Class X

Month- November

Teacher's Activity	Student's Activity	Teacher's observation and Remedial
Teacher will: demonstrate the experiment to show deviation of light as it passes through glass prism. explain the concept of dispersion of white light through prism. demonstrate an activity to explain the concept of Total Internal reflection. Introduce the concept of atmospheric refraction by discussing "if air is a medium with non-uniform density or uniform density?" provide various situation based questions to students to answer to discover definition and applications of atmospheric refraction. explain the concept of scattering of light through atmosphere with the help of situation based questions like: Why sky appears blue, why danger signals are always red etc. <u>Annexure 11(A)</u> demonstrate an activity to explain the concept of scattering of light. provide challenging questions and worksheets to students for solving.	Students will : perform the experiment, record their observations and infer the result. apply the concept to understand rainbow formation. perform the activity and use the concept to comprehend rainbow formation. identify air as a medium with non- uniform density having layers with different refractive indices. apply and discuss amongst each other to illustrate: advanced sunrise and delayed sunset, twinkling of stars and apparent position of planets. comprehend the concept and try to find out answer to the given situation based questions. <u>Annexure 11(a)</u> perform the activity and conclude that the particles of colloidal solution scatter light. solve the questions by applying concepts and formulae.	

Teaching Aids: NCERT, Internet access, glass prism, Activity kits prepared by the teacher.

Methodology/Innovative: Demonstration, Hands On activity, Discussion, experimentation, presentation and Lecture.

Interdisciplinary Links: Optics, Mathematics, English

HOD

Coordinator

Vice-Principal

Principal

Annexure 11 A, (a)- Scatter the light .

Subject	Science
Class	X
Chapter/Unit	Chapter 11-The human eye and the colourful world
Topic	Scattering of light
Time	20 Min
Nature of Activity	Pair work

What will I learn (Learning Outcome)?

To demonstrate an activity to show that particles of colloidal solution scatter light which is known as Tyndall effect.

Skills: Analyzing and Creating

What I have to do?

To verify that as light passes through milk ,it is scattered by the colloidal particles of milk .

What do I require?

A glass, water, milk (few ml), a red laser light.

What do I need to know?

As a light of particular wavelength passes through a medium having particles of size comparable to the wavelength of light, then the light is scattered in that medium. Scattering of light by colloidal solution is known as Tyndall effect. Due to scattering the path of light becomes visible, for example when sunlight enters a dark room full of dust particles, it scatters and its path becomes visible.

➤ **Teacher's Activity**

Teacher will :

1. discuss the properties of colloidal solutions and the property of scattering of light.
2. will explain the steps of the activity.
3. ensure that each participant in pair performs the activity .

How will I proceed?

➤ **Students activity**

1. Take a glass of water and pass red light through it
2. Observe water from the side of the glass
3. Put few drops of milk, stir it and pass red light through the milk solution
4. Observe the solution from the side of the glass.

What have I observed?

Put a tick in front of the correct option in the below table:

s.no	Case	The light is scattered or not
1	Light through glass of water	
2	Light passed through milk solution	

What have I learnt?

- When the light is passed through water in a glass, the path of the light is
- When the light is passed through milk solution, the path of the light becomes

What am I curious to learn?

- I will try to perform the same experiment with a different colloidal solutions(like a solution of Sodium thiosulphate to which Hydrochloric acid is added drop wise.).
- I will also find out if there are any colour changes when Hydrochloric acid is added to Sodium Thiosulphate solution.

Let me evaluate myself

Q.1 What is Tyndall effect?

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Q.2. Give two more instances of Tyndall effect.

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Q.3. The molecules of oxygen and nitrogen are more effective in scattering of light. Why?

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Q.4. Why clouds appear white , though sky appears to be blue?

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Q. 5. Some clouds appear white, some appear grey and some appear black. Explain how scattering of light by the clouds results in three different colors?

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