

SALWAN PUBLIC SCHOOL, RAJENDRA NAGAR
CLASS – X
SUBJECT-SCIENCE
LESSON PLAN
CHAPTER 11: The Human Eye and the Colorful World

UNIT	CHAPTER : : The Human Eye and the Colorful World Periods required : 5-6 periods
CLASS TRANSACTION	Total: 6 periods (approx. 40 min each) Sub-Topic 1: Human Eye and Defects of vision Sub-Topic 2 : Atmospheric phenomena
PRE-REQUISITE KNOWLEDGE FOR THE COURSE	This lesson requires: 1. Knowledge of the parts of human eye. 2. Knowledge about the power of accommodation
LEARNING OBJECTIVES	Students will be able to: • Understand the defects of vision – Myopia and Hypermetropia and their correction. • Understand refraction of light through a glass prism. • Comprehend the phenomena of dispersion of light. • Apply the phenomena of atmospheric refraction to explain the twinkling of star, early sunrise and sunset etc. • Understand the concept of scattering of light. • Apply the phenomena of scattering of light to explain the color of sky, color at the time of sunrise and sunset etc. • Draw and explain the phenomena of rainbow formation in the atmosphere. SKILLS and COMPETENCIES 1) Analytical skills and Thinking skills (scrutinizing an observation) 2) Reasoning Skills 3) Attentiveness and Listening Skills 4) Drawing Skills 5) Critical thinking (Competitive evaluation of given information) 6) The ability to understand concepts (Inspecting and analyzing reasons for variation in established principles) 7) Teamwork and communication skills (working effectively with others) 8) Application Skill(Applying the knowledge gained in their daily life)

SUB – TOPIC 1	Sub-Topic 1: Human Eye and the defects of vision Periods Required : 2-3 periods
Pre- Requisite for the course	This topic requires knowledge of • Basic knowledge of the terms like refraction, convex lens, retina /screen, rules of refraction through a convex lens. • Knowledge about the bending of light when it passes through a

	convex or concave lens.
Learning Objectives	Students will be able to • List the various parts of human eye and state the function of each part. • Understand the defects of vision – Myopia and Hypermetropia. • Analyze the cause of each of the defect and the ray diagram of the defective eye. • Understand the use of appropriate lens to correct the defect and draw appropriate ray diagram. • Apply sign convention and calculate the power of the lens required to correct the defect.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	<u>Period 1</u> Transaction would proceed in the following manner- -The facilitator can spend first five minutes by helping the students to reckon the parts of human eye learnt by them in grade VIII .The teacher can ask following questions to revise the learnt concept Q1. Which part of the eye is called the window to the outside world? Q2. Which part of the eye controls the amount of light entering in the eye? Q3. Which part of the eye sends the signals to the brain? Students' answers will be analyzed and scrutinized with the help of a debate among students. Evidence-based activity demonstration Students will be further introduced to rest of the parts of the eye with the help of a model of a human eye from the Biology Lab .They will be asked observe the model and each student to list at least three parts along with their function in their classwork notebook. They can be now invited to share their observations. Now the teacher can introduce the defects of vision by comparing them on the following points : 1. Far sightedness / Near Sightedness 2. Definition 3. Cause 4. Position of Image in each case. 5. Correction of each defect Teacher can tabulate the above points to make the students understand the comparison between the defects. <u>Period 2</u> The teacher can recapitulate the previous taught concept in first five

	minutes by asking oral questions based on cause of defects and function of parts of eye. Guided Practice: Now the teacher can help the students to draw and practice the ray diagram of defective eye and its correction using appropriate lens with reference to page Number 189-190 of NCERT <u>Numerical Solving and Analysing Skills</u> The teacher will now proceed and teach the students to calculate the power and focal length of the appropriate lens required for correction of the defect. The facilitator can guide the students to keep the following points in mind while using sign convention and lens formula : 1. The distance of the object in the real world to be always taken as a negative numeral as 'u'. For example: for myopic eye the 'u' = negative infinity and for hypermetropic eye 'u' = -25cm. 2. The image distance 'v' = negative value of far point for myopic eye and 'v' = negative value of near point for hypermetropic eye. Now use lens formula $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ to calculate the focal length of the corrective lens. Use power = $\frac{1}{f}$ to find the power of the corrective lens.
Learning Outcomes	Students would be able to- -List all the parts of an eye and state the function of each part. -Realize the cause of each defect and the correction. - Solve the numerical based on lens formula and calculate the power of the lens required for correcting the defects.
Assessment	Discussion of topic and Guided Practice Continuously monitor student progress by asking oral questions related to defects of vision <u>Inquiry based learning</u> (Critical Thinking and Problem Solving): Students will do following question with the help of facilitator: 1. A person with a myopic eye cannot see objects beyond 1.2 m distinctly. What should be the type of corrective lens used to restore proper vision .Also calculate the power of the corrective lens. 2. The near point of a hypermetropic eye is 1 meter .What is the power of the lens required to correct this defect. The facilitator would take rounds and help the students in solving the questions. A short oral/written test will be taken to check proper assimilation of the topic discussed.

Self-Study, Assignments, Homework	NCERT Text book Back exercise Q6,8,9 2,3 on page 198 Extra Questions: 1. How do we see colours? 2. How does the minimum distance of distinct vision is affected by increasing age? 3. Define power of accommodation. 4. Draw a labelled diagram of human eye 5. What are bifocal lenses?
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SUB TOPIC 2	Dispersion of Light And Phenomena observed in atmosphere Periods Required : 2-3 periods
Pre- Requisite for the course	This topic requires the knowledge of refraction, different optical density of atmosphere, incident ray, refracted ray, angles of incidence and refraction.
Assessment of qualifying knowledge	Teacher can ask the students to perform the following task in order to check their previous knowledge : 1. Draw the path of light ray when it passes from a denser to rarer medium and vice versa 2. Label the incident ray, normal, refracted ray, angles of incidence and refraction in each case.
Objective	Students will be able to learn : 1. Trace the path of light ray when it passes through a glass prism 2. The phenomena of dispersion and how does that help to create rainbow 3. The phenomena of Atmospheric refraction and its effects 4. The phenomena of scattering of light in the atmosphere.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	<u>Period 1</u> Strategies used- Demonstration ,Observation ,Deduction and Conclusion Teacher can demonstrate the activity of tracing the path of light ray through a glass prism by taking the students for a visit to Science Lab and use the glass prism , all pins , Board etc. to demonstrate the procedure (Reference to Activity 11.1 ,Page 192of NCERT Textbook) Facilitator will ask few questions to arise the interest in the learners like: 1. Why the emergent ray has changed its path? 2. Is this phenomena observed anywhere else also? 3. Is the rectilinear propagation of light violated? 4. Draw the path of light in this case on paper in 2- dimension. Transaction would proceed in the following manner- Teacher will explain the path of light ray and its behavior when it travels from one medium to another

Guided Practice

The facilitator will ask each child to use the apparatus in the lab and trace the path of light through a glass prism.
She can take rounds and assist the students to observe the path of light through a prism.

Further she can introduce the phenomena of splitting of white light as dispersion and hence explain the rainbow formation in the atmosphere where each rain drop acts as a prism

She can refer to Figure 11.8 on page 194 of NCERT book

Lastly she will give training to students on how to draw the path of light ray when it passes through a water droplet

Teacher will finally give the definition of scattering of light in the class and will ask the students to explore more about it before the next period.

Recapitulation : 5 minutes

Oral test on the previous concept would be taken up.

Assignment :

To draw the path of light when it passes through a glass prism.
To draw and explain the phenomena of rainbow formation in the atmosphere.

Period 2

**Strategies used: Discussion of topic through Collaborative Learning:
15 min (Critical thinking)**

Teacher will take a quick recap of the various phenomena learnt so far in this topic like: Reflection, Refraction, Total internal reflection, dispersion, recombining of seven colors, Scattering of light etc. by taking a quick oral test.

Activity

Teacher will divide the class in groups of four and hand over a flash card to each group with the following content :

1. Figure 11.8 of NCERT
2. Figure 11.9 of NCERT
3. Figure 11.10 of NCERT
4. Figure 11.11 of NCERT
5. Figure 11.12 of NCERT

Teacher will now allow the group members to interact among

	themselves for five minutes and observe the diagrams on the flash card Their task is to relate their observations with the phenomena they have already learnt in this chapter (She can give the hint: Refer to the words used during the recap session in the beginning of the period.) Each group will send a representative to present their learnings. Teacher can now summarize that the phenomena like early sunrise and sunset, twinkling of star, apparent position of the star etc. are because of the atmospheric refraction as the atmosphere is made up of various layers of different optical densities. When light passes through these layers they bend continuously and changes its path hence creating these effects in the atmosphere. When light passes through any medium the individual colors of the white light scatter according to the particle size of the medium hence sky appears blue due to very small sized particle in the upper layers of atmosphere and red being the longest wavelength scatters the least and travels the maximum distance. Recapitulation : 5 mins Teacher can summarize the session by taking a quick oral test. Assignment : Back Exercise of NCERT Page 198 : Q10, 11
Learning Outcomes	Students would be able to- KNOWLEDGE- <i>Students will develop the ability to distinguish between scattering, dispersion and atmospheric refraction.</i> SKILLS and COMPETENCIES - <i>Students would be able to work</i> 1. Collaboratively and present their observations made in the lab. 2. And explain the applications of various concepts learnt.
Self-Study, Assignments, Homework	NCERT back Exercise : Q12,13 on page 198 Extra Questions : 1. Why is wavering of object is seen when they are seen through a turbulent stream of hot air rising above a fire or radiator? 2. How the color of scattered light depends on the size of the scattering particles? 3. Why do clouds generally appear white?