Class 8 **Lesson Plan**

NEW ERA SENIOR SECONDARY SCHOOL NIZAMPURA, VADODARA
Yearly Lesson planned 2025-2026.

MONTH	NO. OF DAYS	TITLE OF THE LESSON
April + May	24 +4	Light
June	17	Combustion and flame and fuel
July	24	Combustion and flame and fuel
		Force and pressure
August	25	Force and pressure
		Friction
Sept.	22	Friction
Oct.	19	Coal and petroleum
Nov.	12	Some Natural phenomena
Dec.	23	Some Natural phenomena
		Sound
Jan	24	Sound
		Chemical effects of electric current
Feb	21	Chemical effects of electric current
Mar	11	REVISION
Total days	223	

New Era Senior Secondary School

Class 8 Lesson plan 2024-25

L-16 Light Lesson plan 2024-25 Class 8

Month: April 2024.
No. of periods: 8
Topic: Light
Key points/concepts

1. Light is reflected from all surfaces.
2. Two laws of reflection are (i) The angle of incidence is equal to the angle of reflection. (ii) Incident ray, reflected ray and the normal drawn at the point of incidence to the reflecting surface, lie in the same plane.
3. Regular reflection takes place when light is incident on smooth, polished, and regular surfaces. Diffused/irregular reflection takes place from rough surfaces.
4. Image formed in a plane mirror is virtual and undergoes lateral inversion.
5. Two mirrors inclined to each other give multiple images.
6. Beautiful patterns are formed in a kaleidoscope because of multiple reflections.
7. Sunlight consists of seven colours. Splitting of light into its constituent colours is known as dispersion.
8. Important parts of the eye are cornea, iris, pupil, lens, retina, blind spot and optic nerve.
9. Visually challenged persons can read and write using the Braille system.

Competencies

Students will be able to

1. Identify and calculate the angles of incidence and reflection of a ray of light to illustrate the laws of reflection in real life.
2. Conclude the law of reflection and represent it by drawing a ray diagram identifying incident ray, reflected ray and the normal Illustrate with a line diagram.
3. Distinguish between reflection from a rough and a smooth reflecting surface to differentiate between diffused and regular reflection.
4. How images are formed in plane mirror and laterally invert when reflected from a mirror (the applications of the laws of reflection.)
5. Establish that light can reflect multiple time with a set of mirrors by constructing a kaleidoscope.
6. Compare and contrast between blind spot and field of view to explain how humans see object in the presence of light.
7. Prove dispersion take place when sunlight is allowed to pass through prism.
8. Describe various parts of human eye and identify their functions to explain how humans see object in presence of light.
9. Describe the braille system to explain visually impaired person can read and write.

Teaching aid: mentioned along with activities.

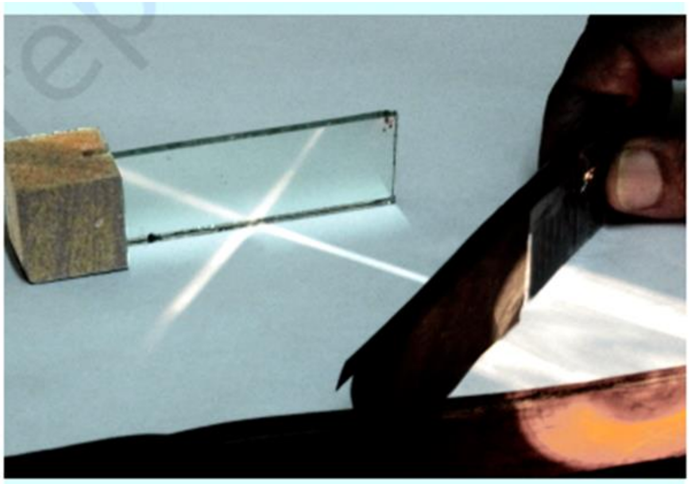
Methodology:

- Prove the laws of reflection of light using plain mirror.
- Prove that virtual image is formed in plane mirror.
- Regular reflection and diffused reflection.
- Multiple image formation using two plane mirrors.
- Formation of the visible light spectrum.
- Portfolio activities:
    1. Coloured, spinning wheel. 2. Making a Kaleidoscope 3. Making a periscope. 4. Persistence of vision activity

Laws of reflection of light from plain mirror Activity-1

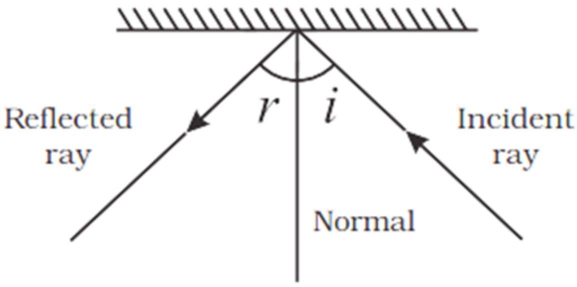
Aim: To prove that angle of incidence and angle of reflection are of equal measure
Material needed: Torch, a comb, sheet of paper pencil, protractor.

Procedure:
Fix a white sheet of paper on a drawing board or a table.
Take a comb and close all its openings except one in the middle.
You can use a strip of black paper for this purpose.
Hold the comb perpendicular to the sheet of paper. Throw light from a torch through the opening of the comb from one side.
With slight adjustment of the torch and the comb you will see a ray of light along the paper on the other side of the comb.
Keep the comb and the torch steady. Place a strip of plane mirror in the path of the light ray and observe.



Observations:
After striking the mirror, the ray of light is reflected in another direction.
The light ray, which strikes any surface, is called the incident ray. The ray that comes back from the surface after reflection is known as the reflected ray.
Draw lines showing the position of the plane mirror, the incident ray, and the reflected ray on the paper.
Remove the mirror and the comb. Draw a line making an angle of 90º to the line representing the mirror at the point where the incident ray strikes the mirror.
This line is known as the normal to the reflecting surface at that point.
The angle between the normal and incident ray is called the angle of incidence (∠i). The angle between the normal and the reflected ray is known as the angle of reflection (∠r)
Measure the angle of incidence and the angle of reflection. Repeat the activity several times by changing the angle of incidence. Enter the data in Table.

Sr. No.	Angle of incidence	Angle of reflection
1		
2		
3		
4		
5		



The angle of incidence and the angle of reflection are approximately equal. The angle of incidence is always equal to the angle of reflection. This is known as the law of reflection.

<u>Activity-2</u>

Aim: To prove that the incident ray, the normal at the point of incidence and the reflected ray all lie in the same plane.

Material needed: Torch, a comb, sheet of paper pencil, protractor.

Procedure:

Throw light from a torch through the opening of the comb from one side. Place a strip of plane mirror in the path of the light ray.

Use a sheet of stiff paper or a chart paper. Let the sheet project a little beyond the edge of the Table. Cut the projecting portion of the sheet in the middle. Look at the reflected ray.

The reflected ray extends to the projected portion of the paper. Bend that part of the projected portion on which the reflected ray falls and observe.

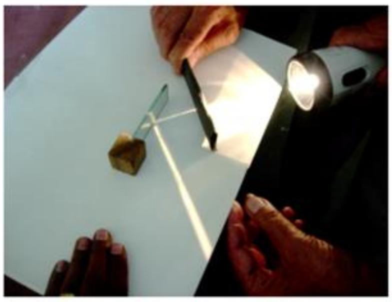
Bring the paper back to the original position and observe.

Observation:

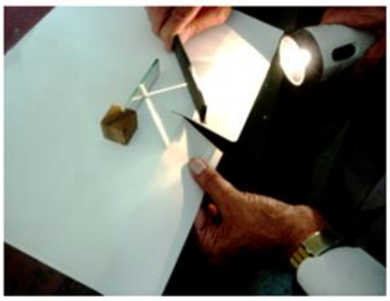
When the whole sheet of paper is spread on the table, it represents one plane.

The incident ray, the normal at the point of incidence and the reflected ray are all in this plane. When you bend the paper, you create a plane different from the plane in which the incident ray and the normal lie. Then you do not see the reflected ray.

Conclusion: The incident ray, the normal at the point of incidence and the reflected ray all lie



(a)



(b)

in the same plane. This is another law of reflection.

Recall the features of the image of an object formed by a plane mirror.

(1) the image formed in plane mirror is erect (ii)
(2) The size of the image is same as the size as the object

(3) The image appear at the same distance behind the mirror as the object was in front of it.
(4) Image cannot be obtained on a screen.

Activity-3

Aim: The image formed in plane mirror is virtual

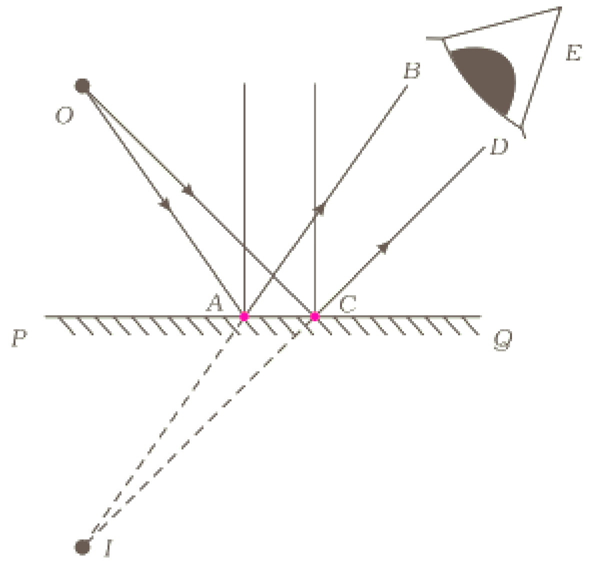
Material needed: Mirror and its holder, scale, pencil, a source of light(torch), plain paper.

Procedure:

1. A source of light O is placed in front of a plane mirror PQ.
2. Two rays OA and OC are incident on it.
3. Find the direction of the reflected rays using law of reflection.
4. Draw normal to the surface of the mirror PQ, at the points A and C.
5. Then draw the reflected rays at the points A and C.
6. Name the reflected rays, respectively. Extend them further.
7. Extend AB and CD backwards. They meet, mark this point as I.

Observation: For a viewer's eye at E, the reflected rays appear to come from the point I.

Conclusion: Since the reflected rays do not actually meet at I, but only appear to do so, we say that a virtual image of the point O is formed at I. An image cannot be obtained on a screen which is called as virtual image.



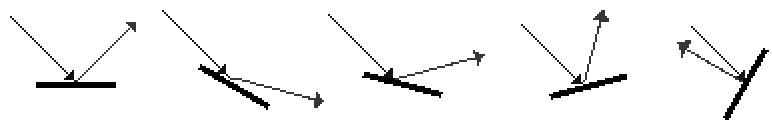
Regular reflection and diffused reflection

Objectives

Students will be able to

recognize that a rough, flat surface produces a diffuse reflection,
recognize that a smooth, flat surface produces a specular reflection,
recall that light rays travel in straight lines.

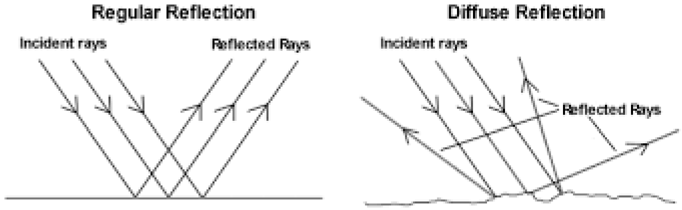
If the normal (perpendicular line to the surface) can be drawn at the point of incidence, the angle of incidence can be measured, and the direction of the reflected ray can be determined. A series of incident rays and their corresponding reflected rays are depicted in the diagram below.



The Law of Reflection is Always Observed
(regardless of the orientation of the surface)

Each ray strikes a surface with a different orientation; yet each ray reflects in accordance with the law of reflection.

The diffused reflection is not due to the failure of the laws of reflection. It is caused by the irregularities in the reflecting surface.



Eg. plane mirror or any other surface that produces a reflected image.

This is like any surface that we can see but does not reflect an image

Reflection from smooth surfaces such as mirrors or a calm body of water leads to a type of reflection known as regular reflection. Reflection from rough surfaces such as clothing, paper, and the asphalt roadway leads to a type of reflection known as diffuse reflection.

Feedback

1. If a bundle of parallel incident rays undergoing diffuse reflection follow the law of reflection, then why do they scatter in many different directions after reflecting off a surface?

Answer: Each individual ray strikes a surface which has a different orientation. Since the normal is different for each ray of light, the direction of the reflected ray will also be different.

2. Would it be easier to read from rough pages or glossy pages? Explain your answer.

Answer: It is much easier to read from rough pages which provide for diffuse reflection. Glossy pages result in specular reflection and cause a glare. The reader typically sees an image of the light bulb which illuminates the page. Magazines which use glossy pages are usually the type which people spend more time viewing pictures than they do reading articles as a glare is an intense regular reflected light which converge and form an image which is highly illuminated.

Multiple image formation using two plane mirrors.

Aim: to get multiple images by keeping the two plane mirrors at different angles.

Material needed: two plane mirrors, mirror stand, a coin, candle.

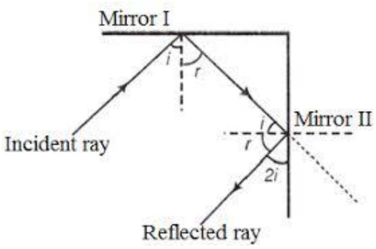
Procedure: Take two plane mirrors. Set them at right angles to each other with their edges touching.

To hinge them you can use adhesive tape. Place a coin in between the mirrors. How many images of the coin do you see?

Now hinge the mirrors using the adhesive tape at different angles, say 45º, 60º, 120º, 180º, etc. Place some object (say a candle) in between them.

Note down the number of images of the object in each case. Finally, set the two mirrors parallel to each other.

Find out how many images of a candle placed between them are formed.

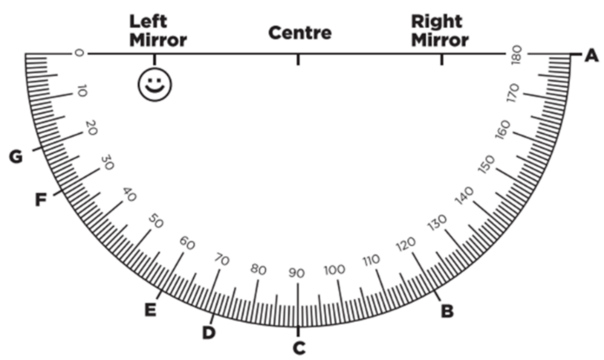


Sr NO.	Angle between mirror	Number of images formed
1	30^0	
2	60^0	
3	90^0	
4	120^0	
5	180^0	

No. of Images(n) = $\frac{360°}{angle\ between\ mirror(\theta)} - 1$

Procedure:

1. Colour the happy face on the Multiple Images handout so that it's easy to see. The happy face is the object you will be copying.
2. Place the two mirrors facing you, along the lines marked "left mirror" and "right mirror" The two mirrors should touch at the cross marked "centre," and the right side of the right-hand mirror should be touching point A. Start recording here.
3. Look into the mirrors. Beside point A in the table record the number of images of happy faces you see (including the one drawn on the page).
4. Move the right mirror so that it lies along an imaginary line between the centre point and point B. Now how many happy faces do you see? Record it in the table. beside point B.
5. Repeat your observations, moving the right mirror to points C, D, E, F and G, and taking note of how many faces you can see at each angle. What do you notice?



Formation of the visible light spectrum.

Procedure:

Get a plane mirror of a suitable size. Place it in a small bowl as shown in Figure.
Fill the bowl with water. Put this arrangement near a window in such a way that direct sunlight falls on the mirror.
Adjust the position of the bowl so that the reflected light from the mirror falls on a wall.
If the wall is not white, fix a sheet of white paper on it. Reflected light will be seen to have many colours.

Explanation:

The mirror and water form a prism, this breaks up the light into its colours, splitting of light into its colours is known as dispersion of light.

1. Draw a picture and write a description what you observe.
2. Write down the order in which the colours appear.
3. If you repeat the experiment, does the order of the colours change?
4. What do the different colours we see tell us about the composition of white light

Portfolio activities:

Colour spinning wheel.

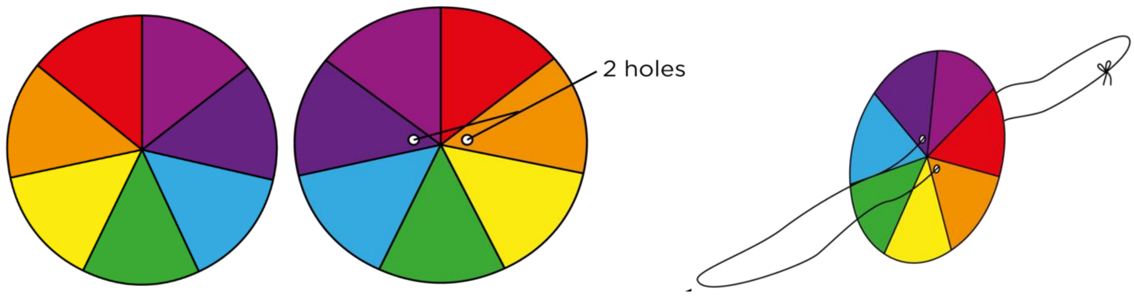
Material needed: white cardboard, coloured pens, or pencils (red, orange, yellow, green, blue, indigo, violet), string, scissors, round object.

Procedure:

Draw a circle on the cardboard. You can trace around a round object such as a cup or saucer to do this. Cut out the circle.

Now divide the circle into 7 equal segments. If you do not have indigo and violet colours, but just one purple pen or crayon, then you can divide the circle into 6 equal segments rather.

Shade in each segment a different colour, in the order red, orange, yellow, green, blue, indigo, violet (or just purple if you do not have indigo and violet).



Next, make two holes, one on either side of the centre as shown In figure Thread the string through the holes and tie it in a loop. Holding the ends of the loop in each hand, twirl the string over, like you would a skipping rope, so that the string twists. Once the string is tightly twisted, pull your hands apart, then bring them back together. Continue bringing your hands in and out and watch the circle spin.

What do you observe about the colour of the wheel as it spins faster?

Making a Kaleidoscope

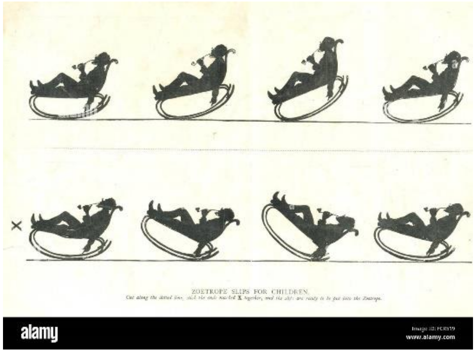
Making a periscope.

Persistence of vision activity:

The impression of an image does not vanish immediately from the retina. It persists there for about 1/16th of a second. So, if still images of a moving object are flashed on the eye at a rate faster than 16 per second, then the eye perceives this object as moving.

Stand facing a mirror and hold the disk in front of you. Be sure the disk is mounted on the pencil so that the horses are facing the mirror. Close one eye, then spin the disk and watch its reflection in the mirror through one of the slits. Concentrate your attention on one of the horses, and you will see it gallop! Try spinning the disk faster, then slower, then in the opposite direction. Compare your results.

Let water run slowly enough to produce a stream that breaks up into separate droplets as it falls. Place a black background behind the well-illuminated drops of water. Look through the spinning stroboscope and watch the water droplets fall in slow motion. Vary the stroboscope's speed and see if you can make the water droplets stand still or even look like they are moving upward.



Worksheet-1

Q1. Suppose you are in a dark room. Can you see objects in the room? Can you see objects outside the room? Explain.

Q2. Differentiate between regular and diffused reflection. Does diffused reflection mean the failure of the laws of reflection?

Q3: Mention against each of the following whether regular or diffused reflection will take place when a beam of light strikes. Justify your answer in each case.

(a) Polished wooden table

(b) Chalk powder

(c) Cardboard surface

(d) Marble floor with water spread over it

(e) Mirror

(f) Piece of paper

Q4: Describe an activity to show that the incident ray, the reflected ray and the normal at the point of incidence lie in the same plane.

Q5: State the laws of reflection. Q6: Fill in the blanks in the following:

(a) A person 1 m in front of a plane mirror seems to be _--------------- from his image.

(b) If you touch your _---------------- _ ear with right hand in front of a plane mirror it will be seen in the mirror that your right ear is touched with __--------------------- _.

(c) The size of the pupil becomes _----------------------- _ when you see in dim light.

(d) Night birds have _------------ _ cones than rods in their eyes.

Q6. Choose the correct option.

Angle of incidence is equal to the angle of reflection.

(a) Always

(b) Sometimes

(c) Under special conditions

(d) Never

Q7. Image formed by a plane mirror is.

(a) virtual, behind the mirror and enlarged

(b) virtual, behind the mirror and of the same size as the object

(c) real at the surface of the mirror and enlarged

(d) real, behind the mirror and of the same size as the object.

Q 8. What is the angle of incidence of a ray if the reflected ray is at an angle of 90° to the incident ray?

Q 9. How many images of a candle will be formed if it is placed between two parallel plane mirrors separated by 40 cm?