

UNIT 4

Reflection of Light

07/12/2020 – Class 33

Activity 1

Discussion

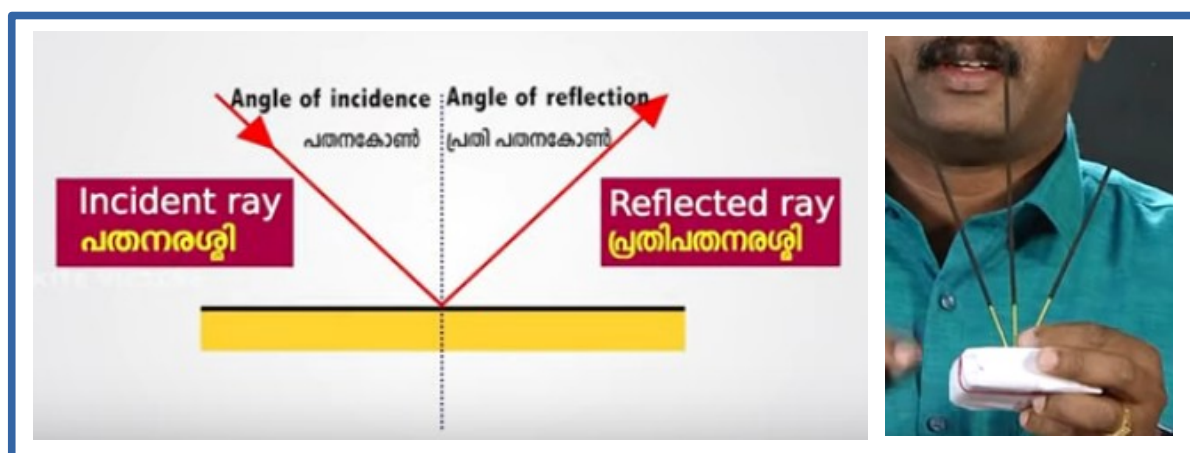
- Which form of energy is required to see objects? **Light.**
- Which phenomenon of light is helpful for seeing objects? **Reflection of light.**
- How can you see an object? **When the light is reflected from the object, reaches our eyes.**
- What you mean by reflection of light? **Light falling on the surface of an object comes back to the same medium.**

Reflection of Light

Light falling on the surface of an object comes back to the same medium.

Activity 2

Observe the reflection of light from a smooth surface.



Discussion

- What is the incident ray? **The ray of light that falls on the surface.**
- What is reflected ray? **The ray of light that is reflected from the surface.**
- What is normal? **An imaginary line drawn normal to the reflecting surface at the point of incidence.**
- The angle between the incident ray and the normal is called? **Angle of incidence (i)**
- The angle between the reflected ray and the normal is called? **Angle of reflection (r)**
- What is the relation between the angle of incidence and angle of reflection? **They are equal.**
- Are the incident ray, reflected ray and normal to the mirror at the point of incidence in the different planes? **No, they are in the same plane.**

Laws of Reflection

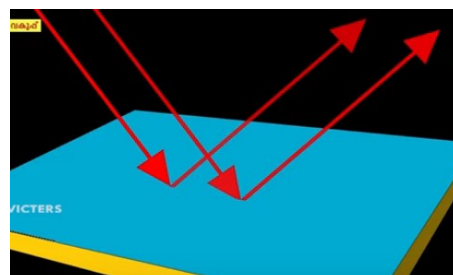
When light is reflected from a smooth surface, the angle of incidence and angle of reflection are equal. The incident ray, reflected ray and normal to the surface are in the same plane.

Activity 3.a

Observe the reflection.

Discussion

- What is the peculiarity of the reflecting surface? **Polished surface.**
- What is the peculiarity of the incident rays? **They are parallel to each other.**



- What is the peculiarity of the reflected rays? **They are also parallel to each other.**
- This type of reflection is called? **Regular reflection.**

Regular reflection

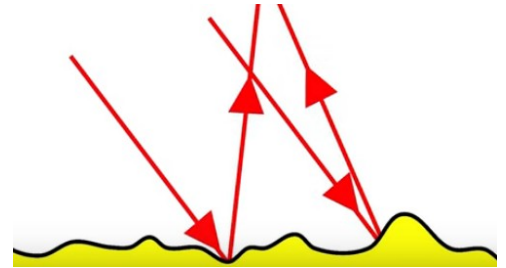
If parallel rays of light which falls on a plane of smooth surface get reflected back as parallel rays, then it is regular reflection.

Activity 3.b

Observe the reflection.

Discussion

- What is the peculiarity of the reflecting surface? **Rough surface.**
- What is the peculiarity of the incident rays? **They are parallel to each other.**
- What is the peculiarity of the reflected rays? **They are not parallel to each other.**
- This type of reflection is called? **Irregular reflection. (scattered reflection)**
- Which type of reflection happens, in the dust particles of the atmosphere? **Scattered reflection.**



Scattered reflection

When light falls on a rough surface, it undergoes an irregular reflection. This is scattered reflection.

Activity 4

Discussion


- Surface of the mirrors are, rough or polished? **Polished.**
- What about the surface of your text book? **Rough.**
- Which surface can form an image, mirror or your text book? **Mirror.**
- Why? **In mirrors light undergo regular reflection. But in the surface of text book scattered reflection taking place.**





Inference

Image is formed due to the regular reflection of light.

Activity 5

What are the characteristics of an image formed by a plane mirror?

Activity	Observation
<p>Two lighted candles (one is big and other is small) are placed in front of a plane mirror.</p> 	<p>Size of the image formed on the mirror is, same as that of the object.</p>
<p><u>Inference</u></p> <p>The images formed in a plane mirror are of the same size as that of the object.</p>	

<p>Moved the mirror away from the objects (candles).</p> 	<p>Images are also moved away from the mirror.</p>
<p>Moved the mirror closer to the objects.</p> 	<p>Images are also moved nearer to the mirror.</p>
	
<p style="text-align: center;"><u>Inference</u></p> <p style="text-align: center;">The distance from the mirror to the object and the image from the mirror are equal.</p>	
<p>Raise your right hand in front of the mirror.</p> 	<p>Left hand of the image is raised.</p>
<p style="text-align: center;"><u>Inference</u></p> <p style="text-align: center;">The interchange of the left and right sides in the image of an object in a plane mirror is called lateral inversion.</p>	
<p>Can you form the image on a screen, by using a plane mirror?</p>	<p style="text-align: center;">No</p>
<p style="text-align: center;"><u>Inference</u></p> <p style="text-align: center;">By using a plane mirror, we can't form the image on a screen. So the image formed by a plane mirror is virtual and erect.</p>	




Conclusion

Characteristics of image formed by a plane mirror.

1. Same size.
2. The distance from the mirror to the object and the image from the mirror is equal.
3. Shows lateral inversion.
4. Image is virtual.
5. Erect image.

Activity 6

Can you increase the number of reflections by increasing the number of mirrors? If yes how many images can we see at a time by using two mirrors?

Activity	Observation
Two plane mirrors are arranged in such a way that, their edges are in contact with an angle of 180° between them. A lighted candle is placed in front of the mirrors. 	Only one image is formed on the mirror.
Mirrors arranged with an angle of 120° between them. 	Two images are formed on the mirrors.
Mirrors arranged with an angle of 90° between them. 	Three images are formed on the mirrors.

Discussion

- Why more images are formed, when two mirrors are used? **Due to the multiple reflection of light.**
- What happens to the number of images formed by the mirrors, when the angle between them is decreased? **Increased.**
- Can you form an equation to find the number of images formed? **Number of images (n) = $(360 / \theta) - 1$, where 'θ' is the angle between the mirrors.**

Angle	Images
180	1
120	2
90	3

Inference

$$\text{Number of images } n = \frac{360}{\theta} - 1$$

Assignment

1. How many images will be formed if the mirrors are arranged at 30° ?
2. What should be the angle of the mirrors for the formation of five images?