

Class-6 Ch 11: Light, Shadows and Reflections

Introduction

Light is a form of energy which helps us in seeing objects. When light falls on an object, some of the light gets reflected. The reflected light comes to our eyes and we are able to see an object.

Sources of Light

luminous	A body which emits light by itself. It can be natural like sun or artificial like electric bulb.
nonluminous	A body which does not emits light by itself.

Transparent/Translucent/Opaque

transparent	If we are able to see clearly through an object, it is said to be transparent like water, glass
Translucent	If we are not able to see clearly through an object, it is said to be translucent like butter paper
opaque	If we cannot see through an object at all, it is an opaque object like wood

Formation of shadows

When an opaque object is placed in path of light, a dark portion is formed on the opposite side of the object on the screen. This dark portion is the shadow. (1) The size of shadow depends on the distance of source of light and on the angle at which the light rays fall on the object.

(2) If the source of light is closer to the object, a larger shadow is formed than when the source of light is far from the object.

(3) The shadow can be seen only on a screen. The ground, walls of the rooms, a building, or other such surfaces act as a screen for the shadows you observe in everyday life

(4) Shadows sometimes gives lot of information about the object.

(5) Shadows are black in colour and this is not changed by the colour of the opaque objects. So a red and yellow rose will have same black shadows.

A Pin-Hole Camera

How to prepare it

(1) Take two boxes so that one can slide into another with no gap in between them. Cut open one side of each box.

(2) On the opposite face of the larger box, make a small hole in the middle.

(3) In the smaller box, cut out from the middle a square with a side of about 5 to 6 cm.

(4) Cover this open square in the box with tracing paper (translucent screen).

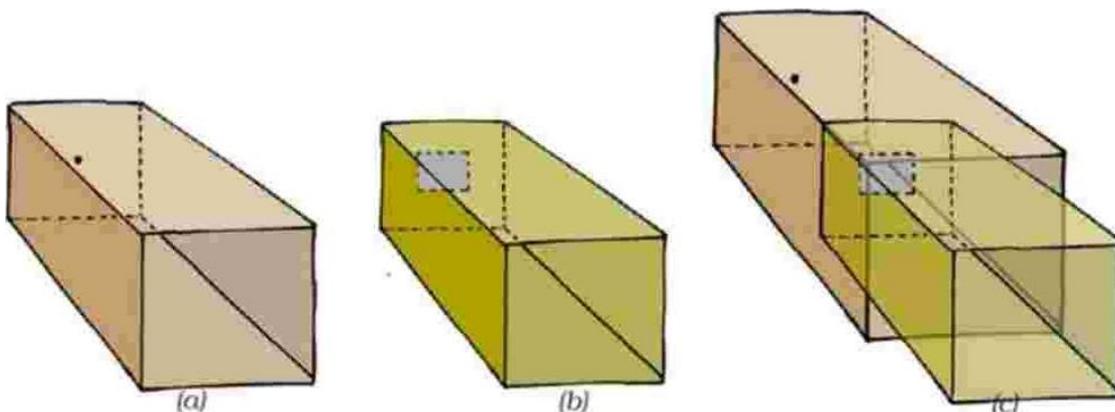
(5) Slide the smaller box inside the larger one with the hole, in such a way that the side with the tracing paper is inside. Now it is ready to use

How to use it

(1) Hold the pinhole camera look through the open face of the smaller box. You should use a piece of black cloth to cover your head and the pinhole camera.

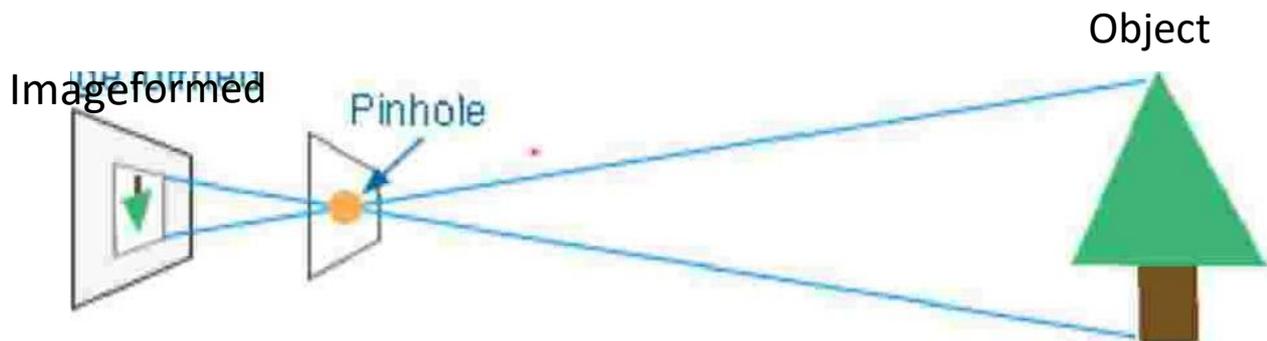
(2) Now focus on the object you want to capture in the camera. Make sure that the objects you wish to look at through your pinhole camera are in bright sunshine.

(3) Move the smaller box forward or backward till you get a picture on the tracing paper pasted at the other end



How the Images looks like through pin-hole camera?

Upside down (inverted) images are formed. Image in a pin hole camera is real , inverted and smaller in size.



Natural Pin-hole Camera

When we pass under a tree covered with large number of leaves, we notice that small patches of sunlight under it. These circular images are, in fact, pin hole images of the Sun. The gaps between the leaves, act as the pin holes. These gaps are all kinds of irregular shapes, but, we can see circular images of the Sun. This is called Natural Pin-Hole Camera

Rectilinear Propagation of Light

Light travels in the straight line and this is called rectilinear propagation of light

Two important terms in this regard

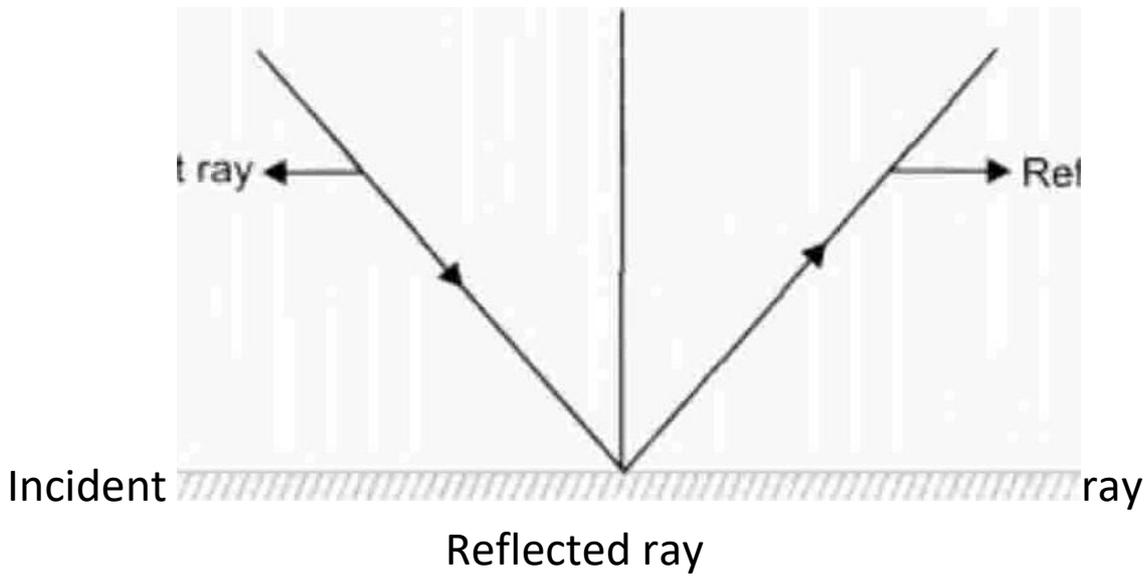
(1) Ray of Light: It is the path along which light travels in the given direction. Now as we know light travels in the straight line. We can represent ray of light by straight line with direction arrow



(2) Beam of light: A bunch of ray of light in the given direction



Reflection of light: When a ray of light falls on a smooth and polished surface, light returns back in the same medium. It is called reflection.



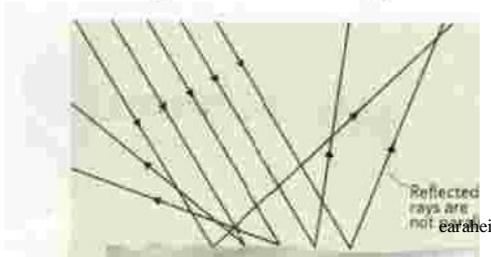
Reflection by a plane mirror

Reflection Surfaces

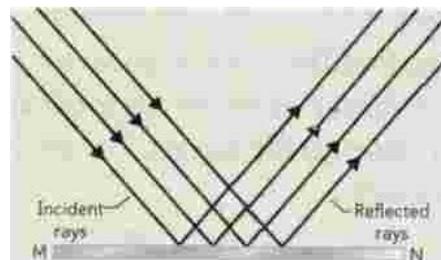
We say light is reflected when it bounces off a surface. Reflection of light helps us to see most of the things around us.

Reflection of light by a surface depends on the nature of the surface. A rough and bumpy surface (also called an irregular surface) reflects a parallel beam of light incident upon it in different directions (Fig. 13.5). A good example of a rough surface is bark of a tree and blanket. This kind of reflection is called diffused reflection.

A smooth surface (a highly polished surface) reflects a parallel beam of light incident upon it in one direction. (Fig. 13.6). A good example of a smooth surface is a mirror. When you stand in front of a mirror, you can see yourself in the mirror. This is called your image.



called



your image.

Fig. 13.5 Reflection from a rough surface

Fig. 13.6 Reflection from a smooth surface

Image formation by Plane Mirror

The image formed is erect, same size and laterally inverted. It retains the same colour as the object
Lateral Inversion

The right side of the object appears to be the left side of its image and vice-versa