

CHAPTER NO: 11
LIGHT, SHADOWS AND REFLECTION
MODULE - 1/1

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LIGHT, SHADOWS AND REFLECTION

Light is a source of illumination and it helps us to see the objects present around us. Light from an object can move through space and reach our eyes. Once light reaches our eyes, signals are sent to our brain, and brain deciphers the information in order to detect the appearance, location and movement of the objects we are sighting at. Without light things cannot be seen.

The objects which emit light are called sources of light. Eg: Sun, Stars, Torch, Tube light, Bulb, etc.

The objects are classified into two groups on the basis of production of light: (i) **Luminous objects**: The objects which produce light of their own. Eg: Sun, Stars, Torch, Tube light, Bulb, etc. (ii) **Non Luminous objects**: The objects which do not produce light of their own. Eg: Table, Chair, Book, etc

TRANSPARENT, OPAQUE AND TRANSLUCENT OBJECTS

Types of objects: On the basis of the passing of light through the objects they are classified into:

Transparent objects: The objects which allow the light to pass through them are called transparent objects. Eg: Glass, Glass sheets, Water, Air, etc.



TYPES OF OBJECTS

Translucent objects: The objects which allow only a part of light to pass through them but not all the light, are called translucent objects. Eg: Thin paper, Oil paper, Grinded glass, etc.



TYPES OF OBJECTS

Opaque objects: The objects which do not allow the light completely to pass through them are called opaque objects. Eg: Walls, Books, Wooden plank, etc.



SHADOWS AND IT'S FORMATION

Shadow: When any opaque objects come in the path of light, they do not allow light to pass so they cast dark patches behind them. These dark patches are called shadows.

Formation of shadow: (i) All opaque objects cast shadows (ii) When an opaque object is kept in the path of light, it casts shadow which can be seen on a screen (iii) Shadows give us some information about the shapes of objects, however, some times shadows can also mislead us about the shape of the objects (iv) Shadows can be smaller than objects, equal or bigger than objects (v) The black colour of shadow is not affected by the colour of opaque objects.



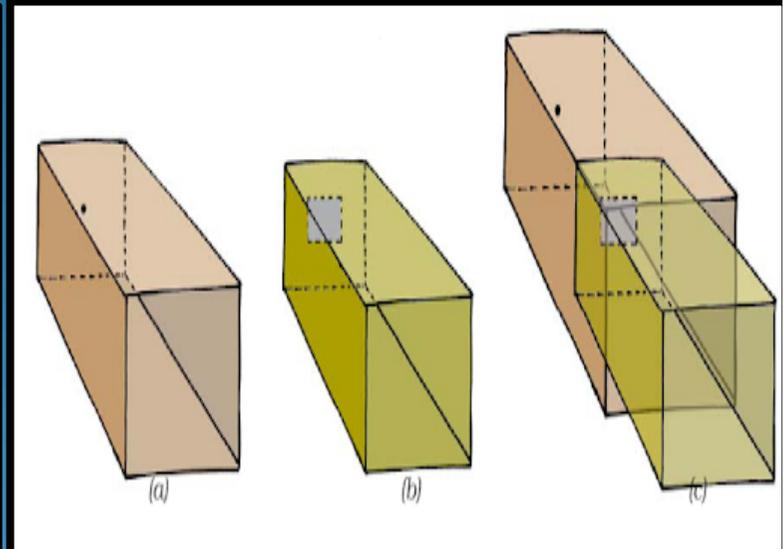
A PINHOLE CAMERA

It is a simple camera without a lens but with a tiny aperture (pinhole). Light from a scene passes through the aperture and projects an inverted image on the opposite side of the box.

The functioning of a pinhole camera is like that of a human eye because in a pinhole camera, the light passes via the pinhole of the camera to project an upside-down image onto the back of the box, while in the human eye, light passes through the lens to produce an upside-down image on the back of the retina.

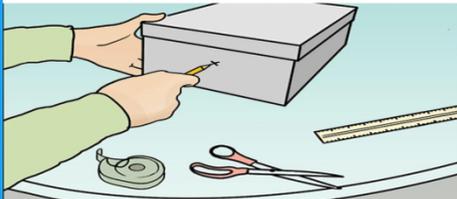
Uses of pinhole camera: We can project the image formed by a pinhole camera on a translucent surface for a real-time and safe observation of solar-eclipse. It is an useful device to observe the reflected image of a dazzling object.

Natural pinhole camera: When sunlight passes through the leaves of a tree, the gaps between the leaves act as the natural pinhole cameras. These natural pinholes cause nice round images of sun.



CONSTRUCTION OF A PINHOLE CAMERA

STEP ONE



Use the point of a sharp pencil to punch a hole in one of the shorter ends of the shoe box.

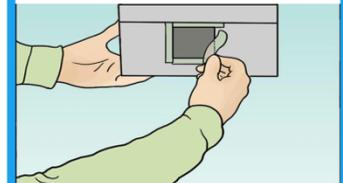
STEP TWO

Ask an adult to use an X-Acto knife to cut a square in the opposite end of the box, directly across from the hole. The square should measure 2 inches on each side.

STEP THREE

Use scissors to cut a square of wax paper that measures 3 inches (7.62 centimeters) on each side.

STEP FOUR



Place the wax paper directly over the square you cut in the box. Tape the edges of the wax paper to the box.

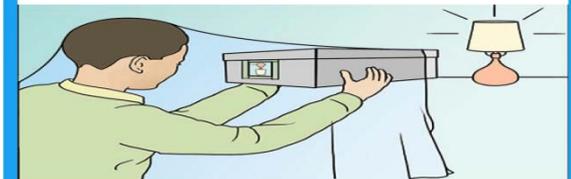
STEP FIVE

Take the camera box to a dimly lit room and turn on a lamp. Stand about 5 feet from the lamp.

STEP SIX

Cover your head and pinhole camera with a blanket. Be sure that the end with the wax paper is facing you and the end with the pinhole is facing the lamp.

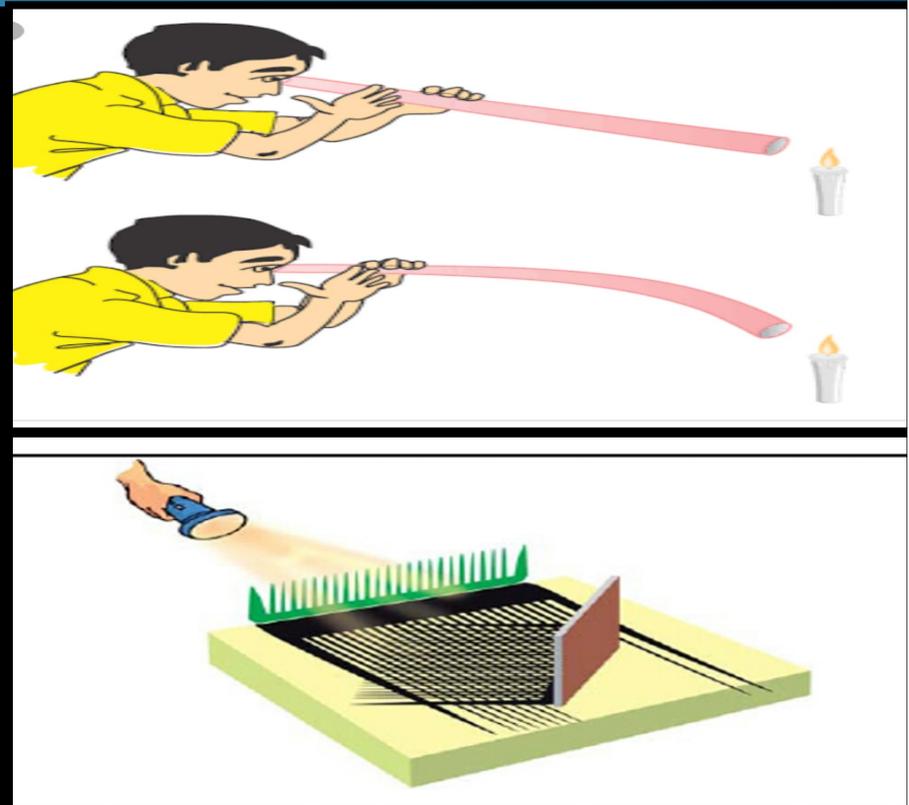
STEP SEVEN



Hold your pinhole camera at arms length from your face and aim it at the lamp. Keep it steady until you see an upside-down image of the lamp.

RECTILINEAR PROPAGATION OF LIGHT

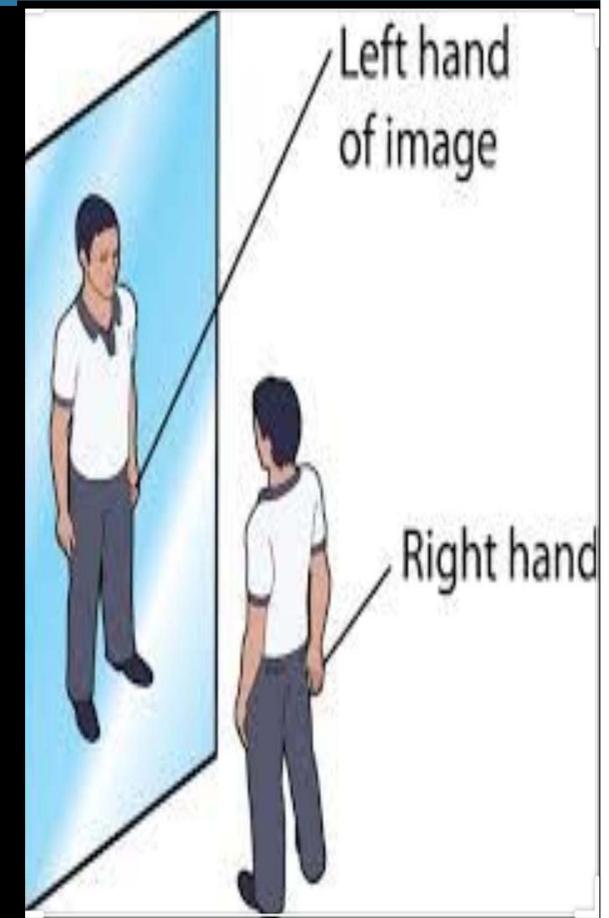
Light travels in a straight line, such property of light is called rectilinear propagation of light.



MIRRORS AND REFLECTIONS

A mirror is a glass sheet which has a polished surface and the other surface remains shiny, smooth and reflective.

Image formation by a plane mirror: Image formed by a plane mirror has the following characteristics: (i) Image is erect but laterally inverted (ii) Image retains the colour of the object (iii) Image is of same size as that



MIRRORS AND REFLECTIONS

Reflection of light: When a ray of light falls on a smooth, shiny, highly polished surface then it returns back in the same medium after striking it. This phenomenon is called reflection of light.





THANK YOU