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## **Class 6<sup>th</sup>**

## **CHAPTER 8**

# **LIGHT SHADOW AND REFLECTION**

**Light is a form of energy. Light is needed to see things. We cannot see an object in the darkness of night. We need a source of light to make the object visible.**

## **SOURCES OF LIGHT**

**An object which gives out light is called a source of light. The various sources of light around us are: Sun, Stars, Electric bulb, Tube-light, Kerosene oil lamp, Candle, Torch and Firefly (Glow-worm).**

### **Natural and Man-Made Sources of Light**

**All the sources of light can be divided into two groups: natural sources of light, and man-made sources of light.**

**(i) Those sources of light which occur in nature as such are called natural sources of light. The sun is the best natural source of light.**

**(ii) Those sources of light which have been made by man are called man-made sources of light. Electric bulb, tube-light, kerosene oil lamp, candle and torch, are all man-made sources of light.**

## **Luminous and Non-Luminous Objects**

**An object which gives out its own light is called a luminous object. The sun, other stars, burning candle, lighted electric bulb, lighted torch and firefly (jugnu) are all luminous objects.**

**An object which does not give out its own light is called a non-luminous object. The table, chair, book, book-rack, flower-pot, moon, earth and other planets, etc., are all non-luminous objects. This is because they do not give out their own light.**

## **TRANSPARENT, TRANSLUCENT AND OPAQUE MATERIALS**

### **Transparent**

**Those object that allow light to pass through them completely are called transparent object, e.g. polythene, water, air, glass, etc.**

### **Translucent**

**Those objects that allow light to pass through them partially are called translucent. E.g. butter paper, tissue paper, sheet of white cotton, clouds, etc.**

## **Opaque**

**Those objects that do not allow light to pass through them are called opaque. E.g. cardboard, book, notebook, pen, etc.**

## **LIGHT TRAVELS IN STRAIGHT LINES**

**If we shine a torch on a dark night, we will see that the beam of light produced by torch travels straight into darkness. This observation shows that light travels in straight lines.**

**If we place an object in the path of light, a shadow is formed behind the object. The formation of shadow by a source of light also suggests that the light travels in straight lines. This is because if light could bend and travel in curved lines, then it would have reached behind the object and hence no shadow could have been formed. It cannot bend to make us see around a corner. Our inability to see things behind a wall also shows that light travels in a straight line.**

## **PINHOLE CAMERA**

**It is a device that forms a photograph on a screen. It can be made with simple materials and can be used to image the sun and brightly lit objects.**

**The image in a pinhole camera has the following characteristics:**

**(i) The image in a pinhole camera is inverted (upside down) as compared to the object.**

**(ii) The image in a pinhole camera is real (because it can be formed on a screen).**

**(iii) The image in a pinhole camera is of the same colour as the object.**

**(iv) The image in a pinhole camera can be smaller than the object, equal to the object or bigger than the object.**

### **A Natural Pinhole Camera**

**The pinhole camera effect can be observed in everyday life. On a sunny day, when we pass under a tree covered with a very large number of leaves, we often see bright circular patches of light on the ground (under the tree). These bright circular patches of light are the pinhole images of the sun.**

### **SHADOWS**

**When an object is placed in front of a source of light, it produces a shade (dark area) behind it. The 'shade' cast by an object is called its 'shadow'. Shadows are formed when light is stopped by an object.**

**We require three things to observe a shadow:**

- (i) A source of light**
- (ii) An opaque object (to obstruct the path of light), and**
- (iii) A screen on which the shadow can be seen.**

**The shadow of an object has the following characteristics:**

- (i) The shadow of an object is erect.**
- (ii) The shadow of an object is real.**

**(ii) The shadow is always black.**

**(iv) The shadow can be smaller than the object, equal to the object or bigger than the object.**

## **REFLECTION OF LIGHT**

**When light falls on the surface of an object, the object sends the light back. The process of sending back the light rays which fall on the surface of an object, is called reflection of light.**

## **IMAGE OF AN OBJECT**

**When we look into a mirror held in our hand, we see our face. What we see in the mirror is actually a 'reflection' of our face and it is called 'image' of our face.**

**There are two types of images that can be formed with light: real images and virtual images.**

### **1. Real Images**

**The image which can be obtained on a screen is called a real image. Real image is formed when light rays coming from an object actually meet at a point after reflection from the mirror. Real images can be formed by a curved mirror known as concave mirror.**

### **2. Virtual Images**

**The image which cannot be obtained on a screen is called a virtual image. A virtual image can be seen only by looking into a mirror.**

## **Characteristics of Image formed by a Plane Mirror**

- 1. The image formed in a plane mirror is virtual.**
- 2. The image formed in a plane mirror is the same distance behind the mirror as the object is in front of the mirror.**
- 3. Image formed on the plane mirror is of the same size as that of an object.**
- 4. The image formed in a plane mirror is erect or upright. It is the same side up as the object.**
- 5. The image in a plane mirror is laterally inverted (or sideways reversed) with respect to the object.**

## **Uses of Plane Mirrors**

- 1. Plane mirrors are used at home to view ourselves**
- 2. Plane mirrors are used in making periscopes.**
- 3. Plane mirrors are fixed on the walls of certain shops (like jewellery shops) to make the shops look bigger.**