# LIGHT

LIGHT is a form of energy. Light enables us to se objects from which it comes (or from which it is reflected).

We detect light with our eyes.

## Characteristics of Light:

Light always travel in straight line. This property of light is called rectilinear propagation of light.

Eg: Pinhole camera works on the principle that light travels in straight lines.

Light is the fastest mode of travelling.

Light travels with the speed of $3\times 10^8$ m/s or 3, 00,000 km/s (km per sec).

Light do not need a medium to travel. It can even travel in vacuum.



## Materials

### Transparent objects

- It allows light to travel or pass through them.
- We can see clearly
- Eg: Glass, Air, Water

### Translucent objects

- It allows only some light to pass through them.
- We cannot see clearly through such objects.
- Eg: Butter paper, oiled paper.

### Opaque objects

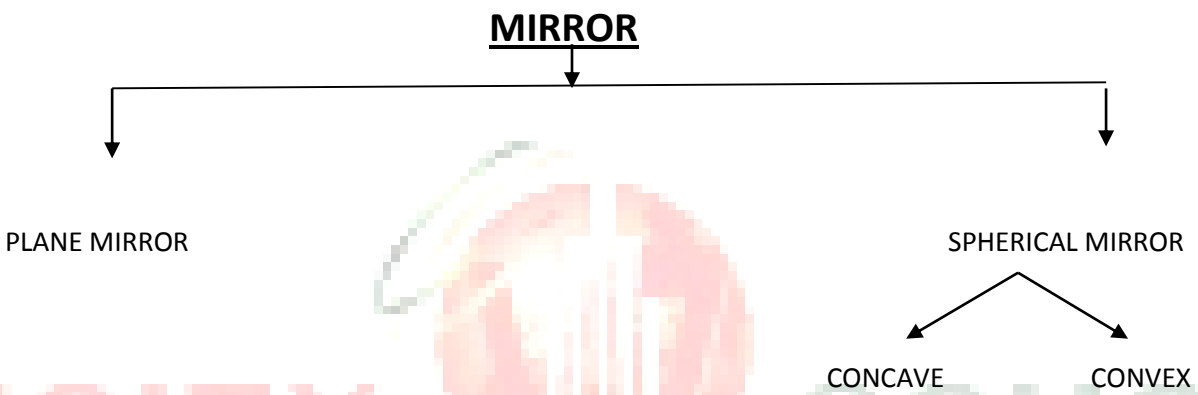
- It does not allow light to travel or pass through them.
- We cannot see anything.
- Eg: Wood, Metal

Shadows are formed when light is stopped by an object. Opaque objects always form shadows on the opposite side of the source of light.

# REFLECTION OF LIGHT

The process of sending back or bouncing back off light ray which falls on the surface of an object is called **REFLECTION OF LIGHT**.

The object having shiny, polished surface reflects more light than objects having unpolished, dull surfaces.






## PLANE MIRROR

It is a thin, flat and smooth sheet of glass having a shiny coating of silver metal on one side.

In case of plane mirror reflection of light takes place at the silvered surface inside it.

## CHARACTERISTICS OF GOOD MIRROR

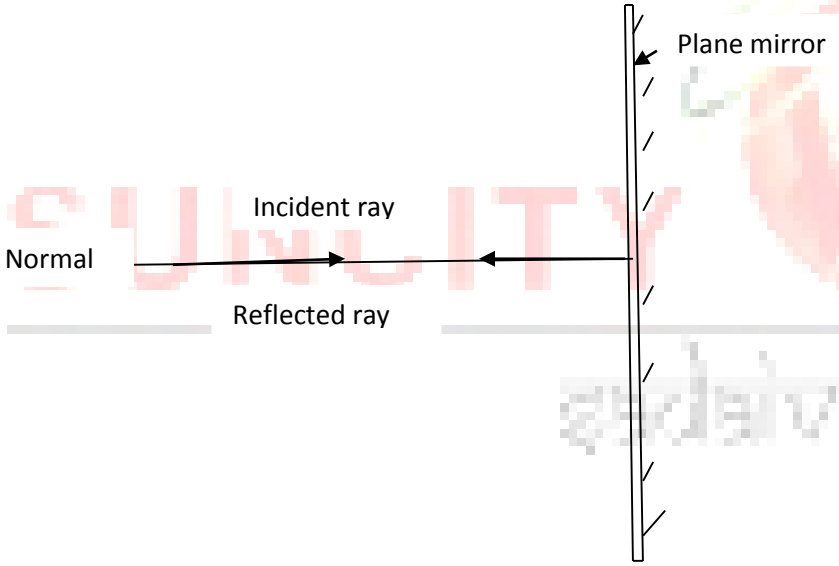
1. It should have smooth surface.
2. There should be no transmission of light.
3. There should be no absorption of light.
4. There should be maximum reflection of light.

# LAWS OF REFLECTION

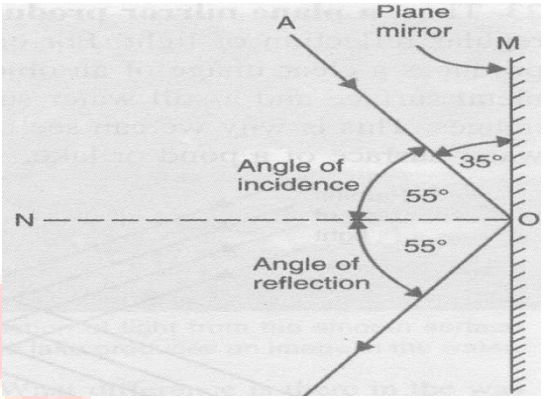
1. The incident ray, the reflected ray and the normal (at the point of incidence) all lie in same plane.
2. The angle of incidence is always equal to angle of reflection.

**NOTE**

- Angle of incidence is measured with respect to incidence ray and the normal drawn.
- A ray of light which is incident normally on a mirror is reflected back along the same path.



Q. An incident ray makes an angle of 35° with the surface of plane mirrors. What is the angle of reflection?




Angle of incidence = 90° – 35° = 55°

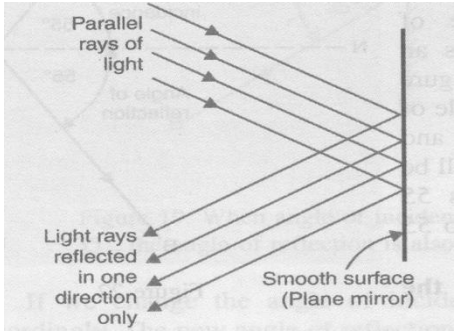
Angle of incidence = Angle of reflection (According to law of reflection)

Angle of reflection = 55°



## TYPES OF REFLECTION

*REGULAR REFLECTION*



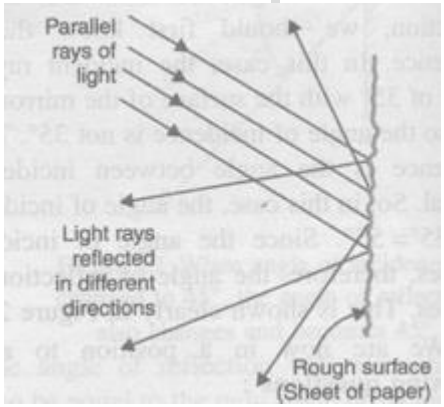

In **regular reflection**, a parallel beam of incident light is reflected as parallel beam in one direction.

Regular reflection occurs from smooth surfaces like that of a plane mirror.

A plane mirror produces regular reflection of light.

Eg: We can see our face in smooth polished metal object as well as in still water surface of pond or lake.

*IRREGULAR REFLECTION*




In irregular reflection, a parallel beam of incident light is reflected in different directions.

Irregular reflection takes place from rough surfaces like: paper, table, walls etc.

## IMAGE OF AN OBJECT

When we look into a mirror, we see the image of our face in it.

An **image** if formed when at least two light rays coming from an object meet (or appear to meet) after reflection from the mirror.

### *Types of images*

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**Real image**

- The image which can be obtained on a screen.

Eg: images formed on a cinema screen

- Real image is formed when at least two light rays coming from object actually meet at a point after reflection from mirror.
- Always formed by a concave mirror.
- Real image is always inverted.

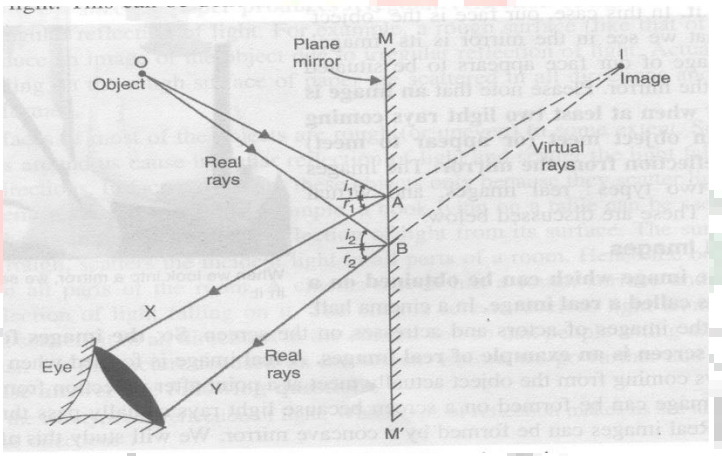
**Virtual image**

- The image which cannot be obtained on a screen.

Eg: images formed by a shaving mirror

- Virtual image is just an illusion. It really does not exist.
- Always formed by a plane mirror and convex mirror.
- Virtual image is always erect.

## FORMATION OF IMAGE BY A PLANE MIRROR






According to laws of reflection

***Angle of incidence = Angle of reflection***

Hence, when an object is placed in front of a plane mirror, its image is formed in the plane mirror.

### *CHARACTERISTICS OF THE IMAGE FORMED BY A PLANE MIRROR*

1. Image formed is always virtual.
2. Image formed is same distance behind the mirror as in front of the mirror.
3. Image is of same size as the object.
4. Image formed is erect.
5. Image is laterally inverted.

**LATERAL INVERSION** The right side appears to be left and left side appears to be right. Hence, side of object and its mirror image changes side.