

LIGHT-REFLECTION AND REFRACTION

CONCEPT OF REFLECTION OF LIGHT

Light is a form of energy which can be reflected either by a plane mirror or spherical mirror. Depending upon the type of mirror used for reflection of light the use of reflecting surface also varies.

Light: Light is an external cause responsible for sensation of vision.

Reflection: The phenomenon by which a ray of light changes the direction of propagation when it strikes a boundary between different media through which it cannot pass is described as the reflection of light.

Laws of Reflection:

The incident ray, the reflected ray and the normal at the point of incidence lie in the same plane. The angle of incidence is equal to the angle of reflection.

Concave Mirror:

Concave mirror is a spherical mirror whose reflecting surface is towards the centre of the sphere of which the mirror is a part.

Convex Mirror:

Convex mirror is a spherical mirror whose reflecting surface is away from the centre of the sphere of which the mirror is a part.

Centre of Curvature (C):

Centre of curvature (C) is the centre of the sphere of which the spherical mirror forms a part.

Radius of Curvature (R):

Radius of curvature (R) is the radius of the sphere of which the mirror is a part.

Linear Aperture:

Linear aperture is the distance between the extreme points on the periphery of the mirror.

Pole:

Pole is the midpoint of the aperture of the spherical mirror.

Principal Axis: Principal axis is the straight line passing through the pole and the centre of curvature of a spherical mirror.

Principal Focus: The rays of light parallel to the principal axis of a mirror after reflection, either pass through a point (in the case of a concave mirror) or appear to diverge from a point (in the case of a convex mirror) on the principal axis and this point is referred to as the principal focus of the mirror.

Focal Length: Focal length is the distance between the pole and the focus of a mirror. Focal length of a mirror is equal to half the focal length of the mirror or $f = R/2$.

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Magnification: Magnification is the ratio of the height of the image to the height of the object.

The following table gives the position, size and nature of the image formed in a concave mirror corresponding to different positions of the object and the use of concave mirror.

Position of the object	Position of the image	Nature and size of the image	Use
A. At infinity	At the focus	Real, inverted and diminished	Used by ENT surgeons and dentists
B. Beyond the centre of curvature	Between the focus and the centre of curvature	Real, inverted and diminished	Used in solar cookers
C. At the centre of curvature	At centre of curvature	Real, inverted and same size as object	Used as an erecting mirror in terrestrial telescopes
D. Between the focus and centre of curvature	Beyond the centre of curvature	Real, inverted and magnified	Used in hospitals and clinics to see the internal parts of the body
E. At focus	At infinity	Real, inverted and magnified	Used in search lights and in head lights of motor cars
F. Between the pole of the mirror and the focus	Appears behind the mirror	Virtual, erect and magnified	Used as a shaving mirror