Light Energy

- Light travels only in a straight line in all directions.
- This phenomenon is called the **rectilinear propagation of light**.
- Light emanating from a source (bulb) travels in all directions.
- The formation of image in a pinhole camera is a proof of **rectilinear propagation** of light.
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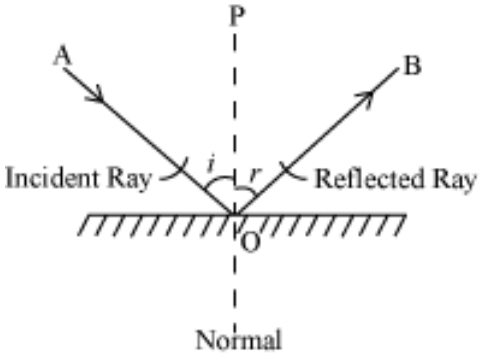
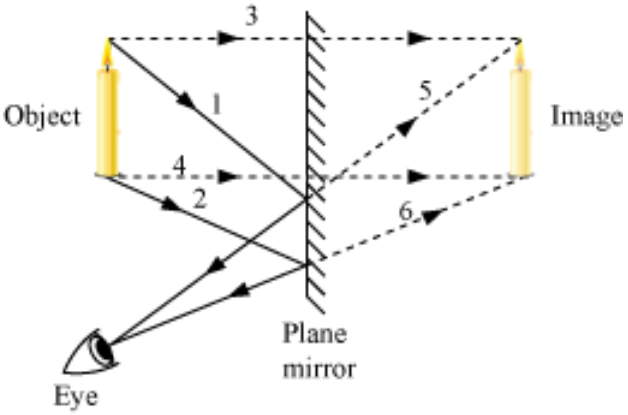
Medium	Speed of light (in m/s)
Air/ Vacuum	$3\times \times 10^8$
Water	$2.25\times \times 10^8$
Glass	$2\times \times 10^8$

- Reflection of light makes things visible.



(a) *i* (Angle of incidence) = *r* (Angle of reflection)
(b) AO, OP, and OB lie on the same plane.

- **Laws of reflection:**
  - The angle of incident is equal to the angle of reflection
  - The incident ray, the normal at the point of incidence and the reflected ray all lie in the same plane.
- **Image formation by a plane mirror**

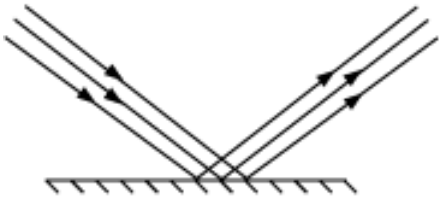


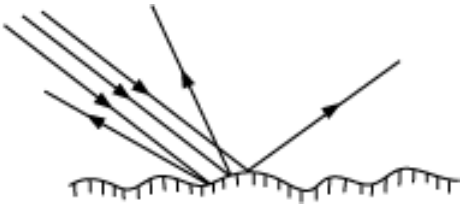
Left part of the candle appears on the right and its right part appears on the left. This is known as **lateral inversion.**

- **Characteristics of images formed by plane mirror**
  - virtual and erect
  - same size as of object
  - laterally inverted
  - image distance and object distance are same and perpendicular from mirror
- Virtual images are those images which cannot be obtained on screen. But there are some images which can be obtained on screen. Such images are called real image.

- **Uses of plane mirror**
  - It is used as a looking glass.
  - It is used to increase the effective length of an optician's room.
  - In periscope, two parallel plane mirrors are inclined at 45 degrees with vertical walls such that they are facing each other.
  - In kaleidoscope, three plane mirrors are inclined with each other at 60 degrees.
  - It is used in solar heaters and cookers to heat substances by reflecting the sunlight towards the substances.

  - **Regular reflection** **Irregular and diffused reflection**





Regular reflection Diffused reflection

- The laws of reflection are valid in regular as well as irregular or diffused reflections.
- Smooth or polished surfaces gives regular reflection.
- Uneven of unpolished surfaces gives irregular reflection.
- Objects that give their own light are known as **luminous objects**

- Objects that are visible because of reflected light are known as **illuminated objects**.

1. Newton's colour disc is a disc that consists of sections of seven colours of the rainbow. These are arranged sequentially and in a circular order. Each colour occupies a small section or pie of the disc equally.

2. When we rotate the disc with at a high speed, it appears white because of the persistence of vision.

3. Persistence of vision is the phenomenon of eye by which an image formed is considered to remain for approximately 1/16th of a second on the retina.

4. Primary colours are the three colours that combine to give white colour. They are not formed by combining colours. Red, blue and green are primary colours.

5. Colours that form by combining of two primary colours are called secondary colours.

6. Secondary colours are known as complementary colours if their combination with primary colours gives a white light.
7. A transparent object acquires the colour of light which is allowed to pass through it.
8. An opaque object acquires the colour of light which is reflected by it.