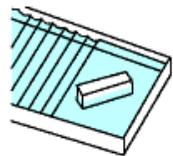
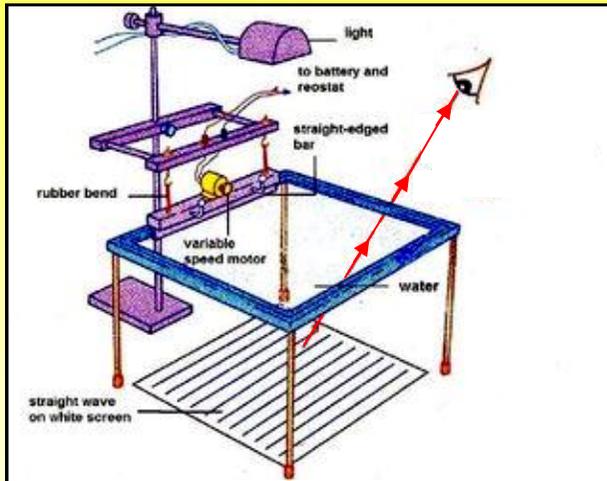
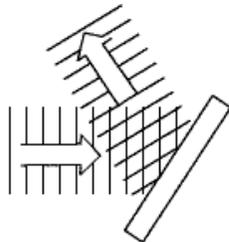


REFLECTION OF LIGHT

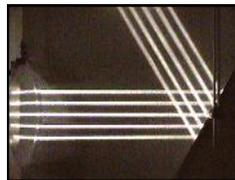
- Light can be considered to travel in waves.
- A ripple tank as shown below may be used to demonstrate reflection of water waves. The waves, produced by a vibrating, straight-edged bar, can be viewed from above or projected onto a screen. The straight lines observed on the screen show the positions of the wave fronts (i.e. the crests of the wave).



The waves are sent at an angle to a straight Reflector.



The angle between the reflected wave fronts and the surface = the angle between the incident wave fronts and the surface. So the direction of the reflected wave is at the same angle to the reflector as the direction of the incident wave.



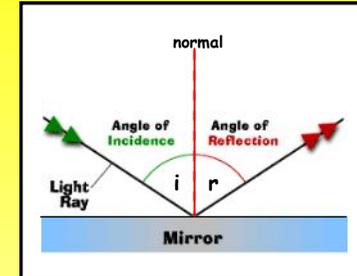
When a ray of light is directed at a plane mirror, the angle between the reflected ray and the mirror = the angle between the incident ray and the mirror.

Sound waves are reflected in the same way.

LAW OF REFLECTION

Consider a ray of light incident on a plane mirror.

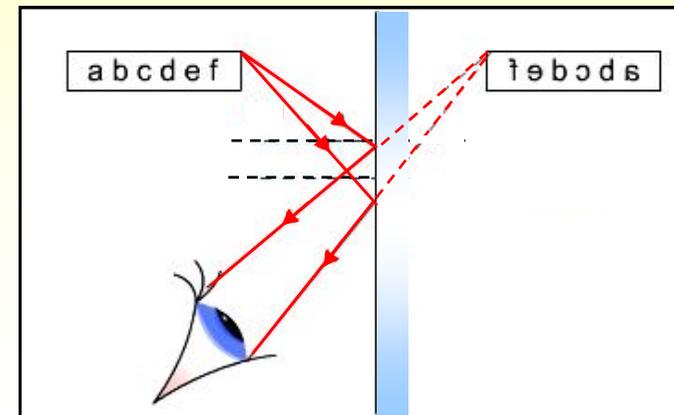
- The perpendicular construction line to the mirror surface is called the **NORMAL**.
- The **ANGLE OF INCIDENCE (i)** is the angle between the incident ray and the normal.
- The **ANGLE OF REFLECTION (r)** is The angle between the reflected ray and the normal.



**ANGLE OF INCIDENCE (i) = ANGLE OF REFLECTION (r)**

IMAGE FORMATION IN A PLANE MIRROR

When an object is viewed in a **plane** mirror, the image obtained is due to the **reflection of light** by the mirror. The diagram below shows the path of two light rays from the object that reflect off the mirror.



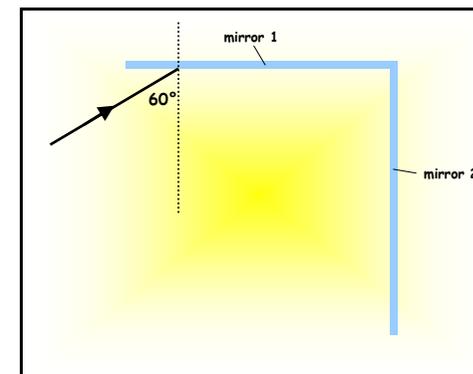
The image in a **plane mirror** is :

- The **same distance** behind the mirror as the object is in front of the mirror.
- The **same way up** as the object (i.e. **upright**).
- The **same size** as the object.
- **Virtual** (i.e. it cannot be projected onto a screen and no real rays pass through it). A **real** image is one which can be projected onto a screen (e.g. the image of this Print produced by the projector on the screen).
- **Laterally inverted** (i.e. it is back to front). Which upper case letters appear laterally inverted when they are seen in a mirror? Ambulances and police cars have a laterally inverted sign at the front so that a driver in a vehicle in front can read the sign properly when looking in the rear-view mirror.



- 1 Draw a **fully labelled** diagram to show how a single ray of light is reflected from a plane mirror and state the **law of reflection**.

- 2 Two plane mirrors are placed at **right angles** to each other as shown opposite. Complete the path of the light ray which strikes the first mirror at an angle of incidence of  $60^\circ$ .



- 3 The figure opposite shows an incomplete diagram of image formation in a plane mirror.

- (a) What can you say about angles **A** and **B** in the diagram?
- (b) Complete the ray diagram to **locate the image**.
- (c) Is the image **real** or **virtual**? **Explain** why.
- (d) What can you say about the distance from the **image to the mirror** compared to the distance from the **object to the mirror**?
- (e) What can you say about the **size of the image** compared to the **size of the object**?

