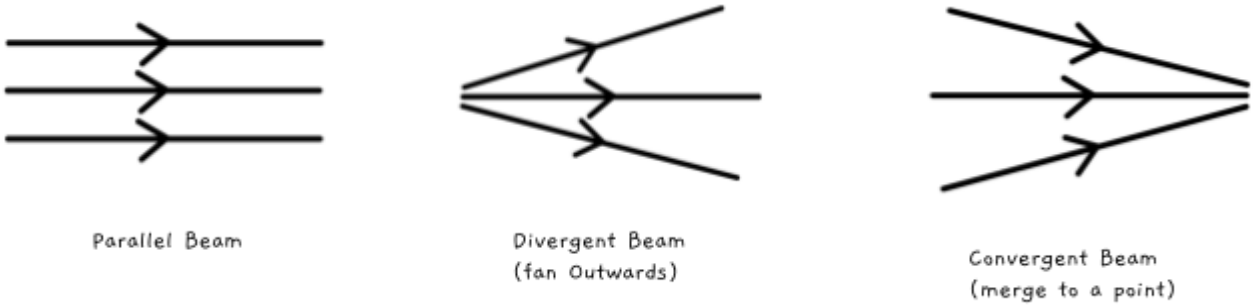
Ray Model Of Light 🛋️

Thomas Edison knew what he was doing 💡

Light And Its Beams

Light is a form of energy.

Types of beams:

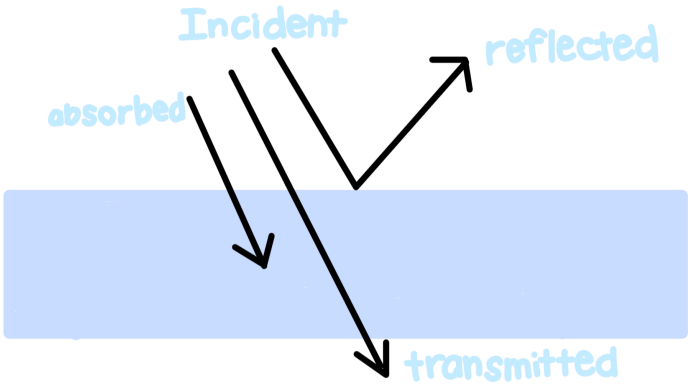


Parallel Beam

Divergent Beam
(fan Outwards)

Convergent Beam
(merge to a point)

When light falls on a surface, it can be reflected, transmitted or absorbed.



Types of Mirrors

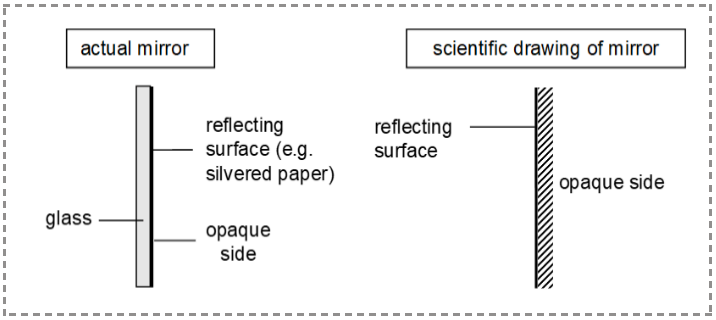
Types of mirrors

1. **Plane mirrors**

   Image is:

   - upright
   - same size as the object
   - virtual (cannot be formed on a screen)
   - laterally inverted (right of image corresponds to left of object and vice versa)

- lies as far behind the mirror as the object is in front of the mirror (image distance = object distance), eg. Dist. from object to mirror = 5cm → dist. from object to image = 10cm
- Representation of a plane mirror



2. Concave mirrors

- Curved surface that bends inwards (like a cave) eg. Front of spoon
- Parallel light rays bounce off the curved surface and converge at a focal point
- Object near the mirror → image upright and magnified
- Object further away from mirror → image inverted

3. Convex mirrors

- Curved surface that bends outwards (eg. Back of spoon)
- Parallel light rays spread apart after reflecting from the mirror
  - As if coming from a focal point behind it
- Cover a wider field of vision
- Images formed are upright and diminished

	Plane	Concave	Convex
Size	Same size	same size/diminished/magnified	diminished
Upright/inverted?	upright	Upright/inverted	upright

Location of image	Same distance as object distance, behind the mirror	Varies, in front/behind the mirror	Varies, behind mirror
Virtual/real?	virtual	Real/virtual	virtual

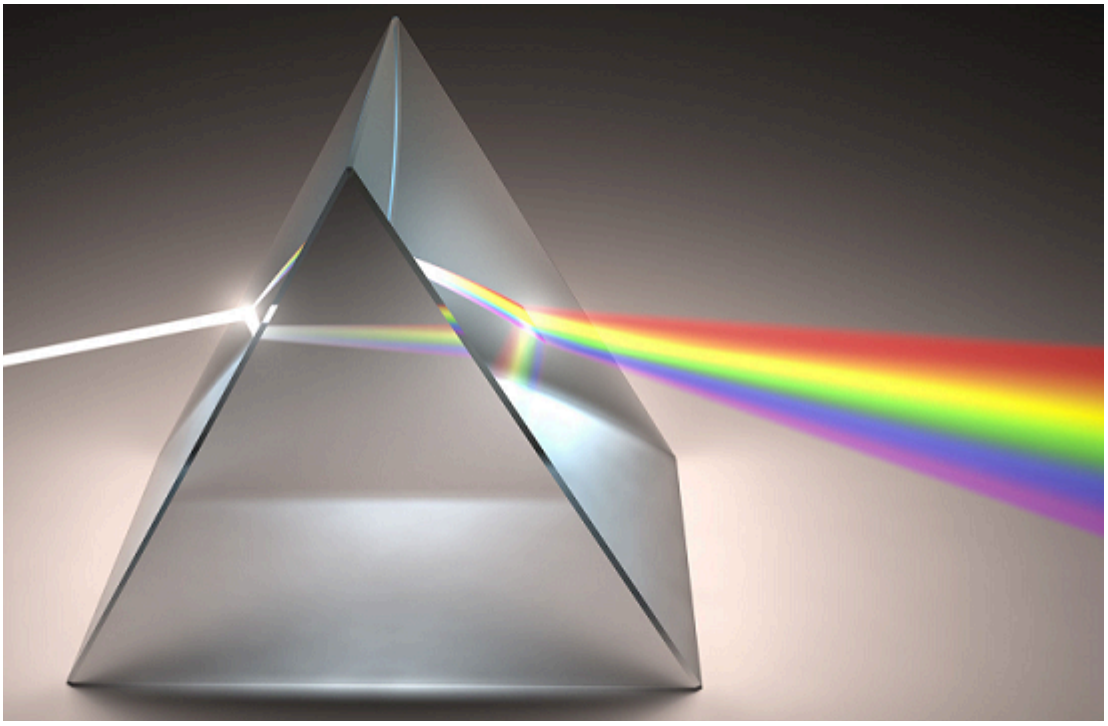
Spectrum Of Light

Dispersion of light

Daylight (or white light) is a mixture of different colours called a spectrum

Spectrum: red, orange, yellow, green, blue, indigo and violet (ROYGBIV, aka ROY Gives Birth In Vietnam)

When a spectrum of white light passes through a glass prism, the light splits up and disperses into a spectrum



Prism bends or refracts each of the colour in white light by a different angle

Red rays travels the fastest through the prism and bends the least

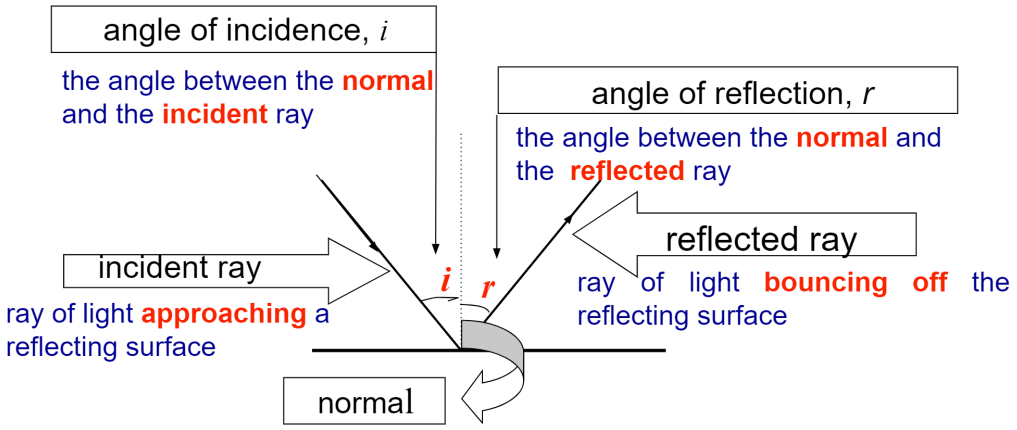
Violet rays travel the slowest through the prism and bend the most

Second prism →can recombine the colours of the spectrum

Reflection

Reflection is formed when light rays bounce off a surface and enter our eyes

Angles & Rays



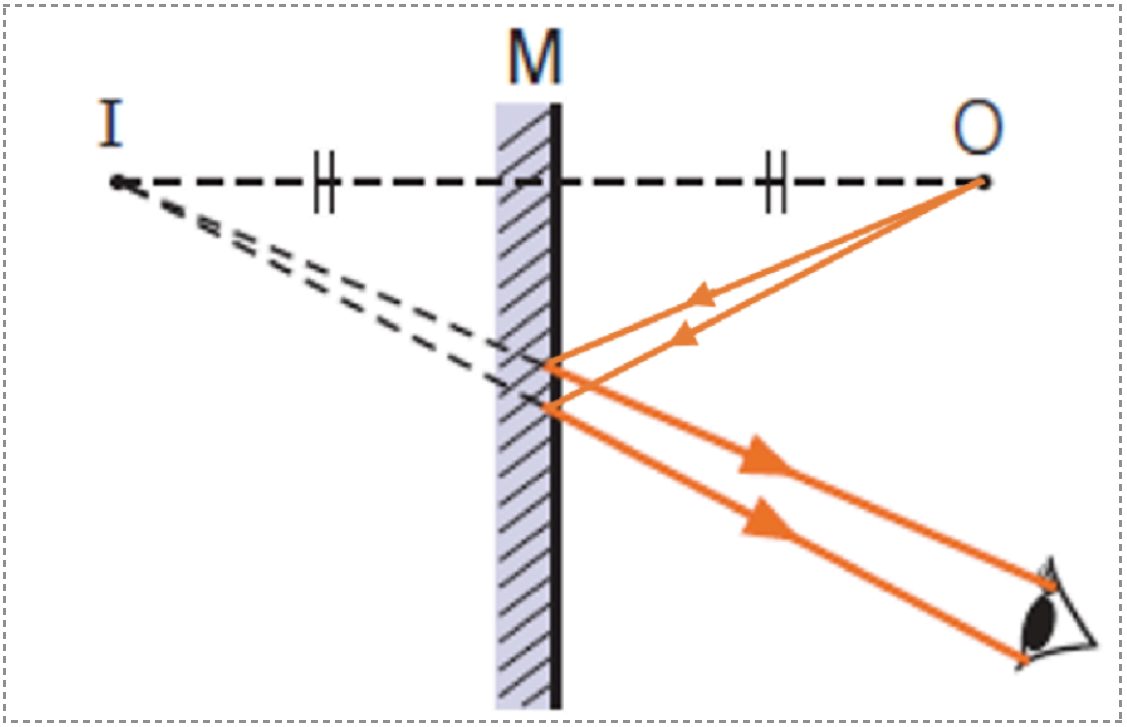
Laws of reflection

Angle of incidence is equal to angle of reflection

Angle i = angle r

The incident ray, reflected ray and the normal at the point of incidence all lie in the same plane (2D analogue that could consist of a line and 3D space)

Ray Diagrams



How to Draw:

1. Locate the image position
    a. Draw a dotted line from object O, perpendicular to the mirror and extend the line into the mirror. IM = OM
2. Draw the reflected rays
    a. Draw lines from the image to the eye. Draw dotted lines behind the mirror and solid lines in front of the mirror (solid rays represent real rays)
3. Draw the incident rays
    a. Draw lines from the object to the reflected rays on the mirror

Refraction

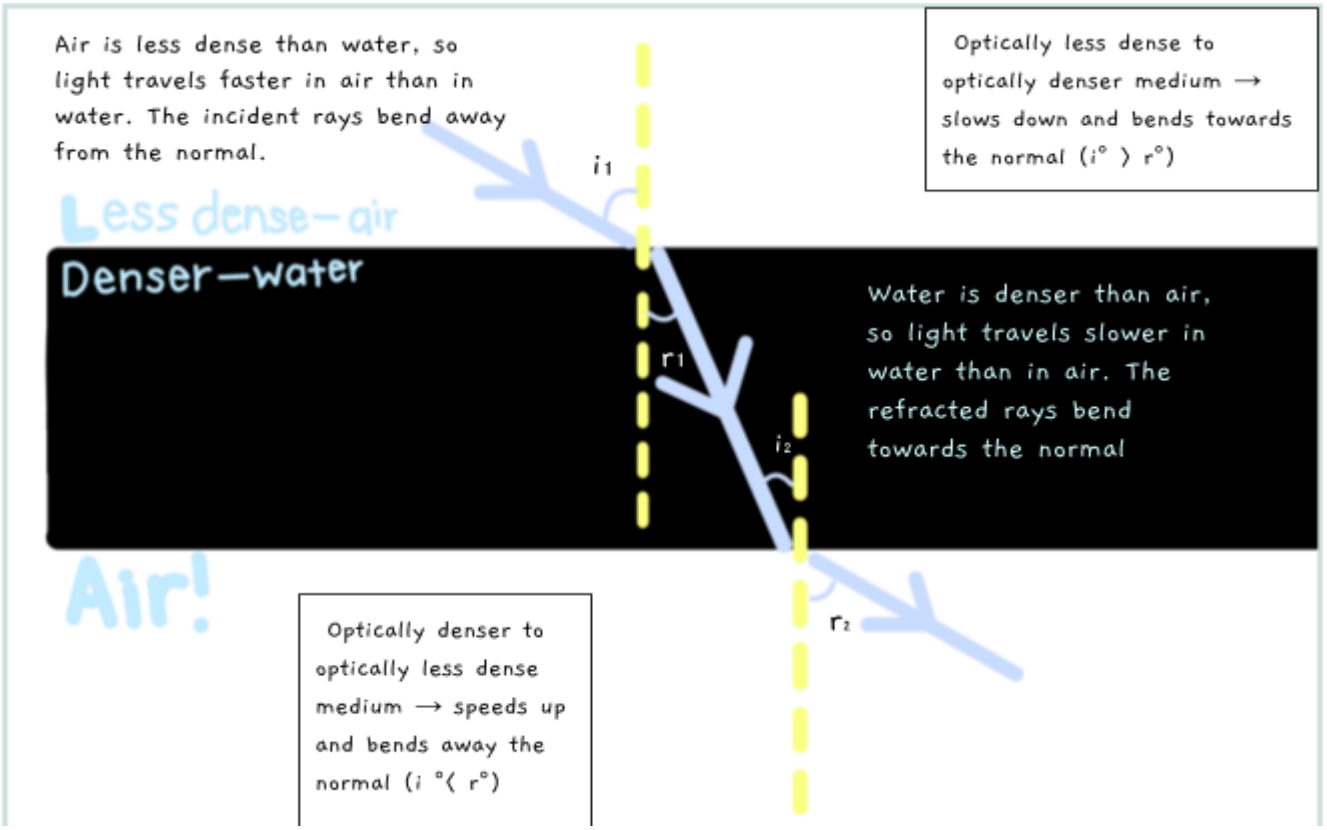
Due to optical density difference, the light travels at different speed in different types of matter

Use FAST to remember!!!

Optically less dense: **Faster** → bend **away** from normal

FAST

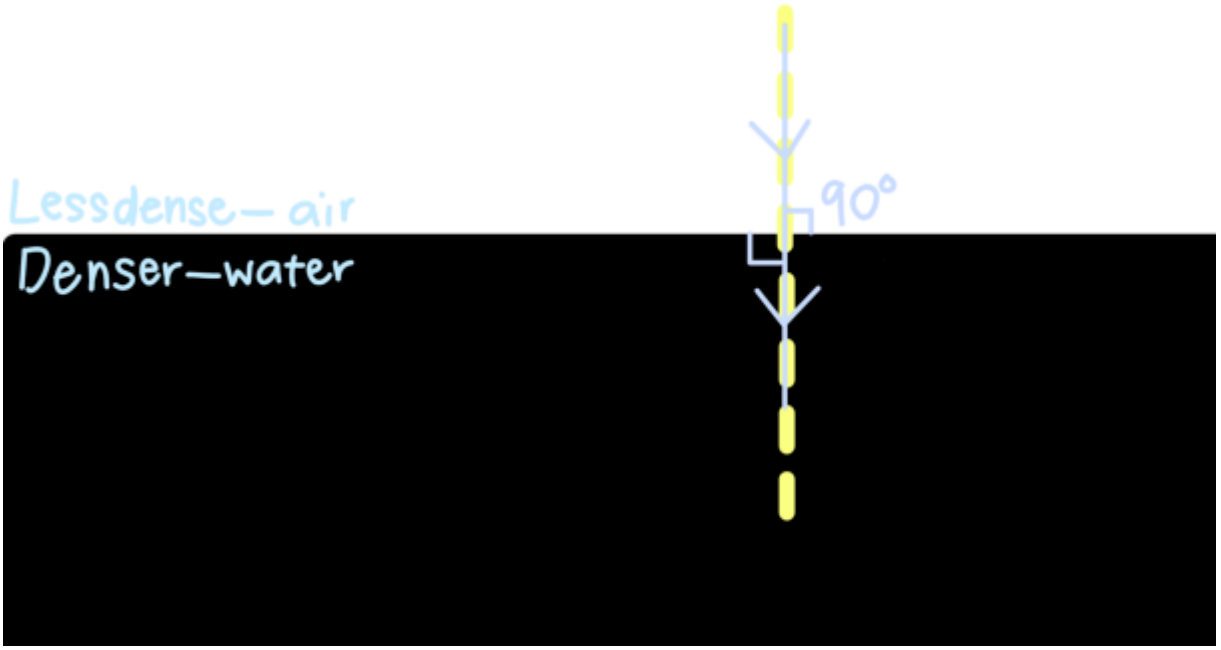
Optically denser : **Slower** → bend **towards** normal



Exception: When looking parallel(90°)

incident ray perpendicular to boundary of 2 media ($i=0^\circ$)

→ light will not bend at all (even if speed of light change**S**



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