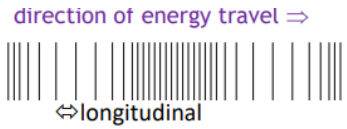
Waves& reflection

The particles vibrate at right angles to the direction of travel of the wave.

All EM waves are transverse.

The particles vibrate parallel to the direction of travel of the wave.



Sound waves are longitudinal.

Frequency: The number of waves produced per second, Hertz

Or The number of waves passing a point per second,

Period: The time taken for one wave to pass a point, second

Wavelength: The distance between the same point on waves right next to each other. The distance between successive crests on a wave.

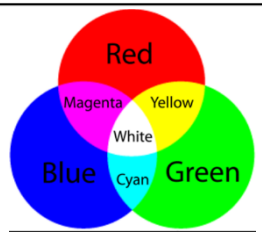
Describe a transverse wave. Give an example.

Describe a longitudinal wave. Give an example.

All waves transfer.. ENERGY.

Give the definition of...

Primary and secondary light colours?



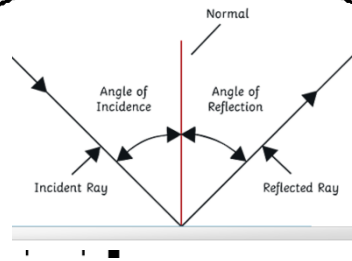
1: RED, BLUE & GREEN

2 Magenta, Cyan, Yellow

What are the units of frequency, period, amplitude and wavelength?

Units
Frequency ⇒Hertz
Period ⇒ second
Amplitude⇒ metre
wavelength⇒metre

Draw a labelled diagram of a ray reflecting off a plane mirror



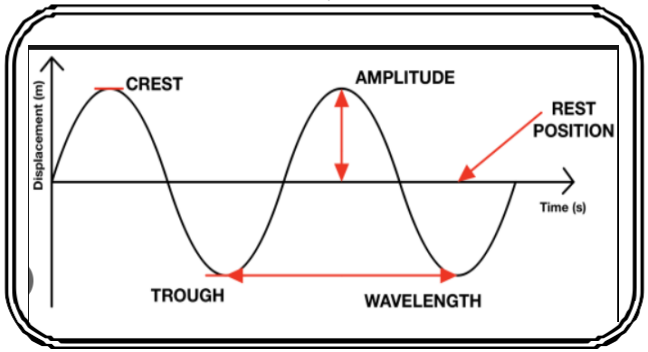
Normal: a line at right angles to a surface at the point where the incident ray strikes the mirror.

Angle of incidence: the angle measured from the normal to the incident ray

Reflected ray: the angle measured from the normal to the reflected ray.

Show light through a prism.

Draw a diagram of a wave and label the; crest, trough, amplitude and wavelength



Give uses of curved mirrors

Inspection mirrors
Rear view mirrors
Dental viewing mouths, solar oven
Beauty (magnifying)
Security (shops, buses)

Relationships to calculate frequency and period

$f = \frac{Number\ of\ waves}{time}$

$Period, T = \frac{t}{N}$

$f = \frac{1}{T}$

Electromagnetic Spectrum

What do all EM waves have in common? What speed do they travel at?

All EM waves, transfer energy, are transverse waves and travel at 300 million metres per second (3.0×10^8 m/s) in air
They have no mass.

Put the EM spectrum in order of increasing frequency

- RADIO
- MICROWAVES
- INFRA RED (IR)
- VISIBLE
- ULTRA VIOLET (UV)
- X-RAYS
- GAMMA

List detectors for eac type of radiation

Radio & TV	aerial
Microwaves	aerial
IR	photodiode, thermocouple, thermistor
Visible	black bulb thermometer
UV	photodiode, photographic film, retina CCD
X-Ray	photodiode / melanocyte skin cells, fluorescent materials
Gamma	photodiode / photographic film / electrical current detectors

List typical sources for each type of radiation

Radio & TV	Micro-waves	Infra Red	Visible	Ultra violet	X-Ray	Gamma Rays
transmitter, outer space	magnetron, transmitters, outer space	warm objects, sun convector heate	stars including t sun, LEDs, cinem screens	Fluorescent tub very hot objects sun	X-ray tubes, star	Radioactive nucl outer space (sta

List applications for each type of radiation

Radio & TV	communication (under the sea, in space) Watching TV programmes, films, listening to the news
Microwaves	heating water molecules to warm food, communications
Infra Red	remote controls, security systems, automatic external lights searching for people in dark
Visible	humans viewing the world, photography,
Ultra violet	detecting forged bank notes, causing white shirts to look cleaner kills bacteria and viruses
X-Ray	detecting broken bones, checking suitcases at the airport,
Gamma Rays	medical tracers to detect cancer, killing bacteria, sterilising intruments, detecting broken pipes underground

Refraction of Light

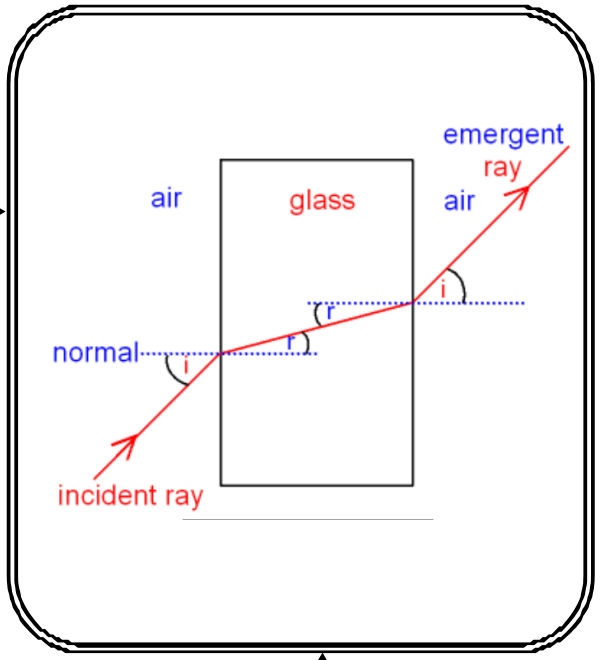
Define refraction in terms of wave speed and wavelength

Refraction is a change in the speed and wavelength of a wave as it moves into a material of different optical densities and it can lead to a change in direction of the wave.

When does refraction occur?

Refraction occurs when a wave moves between material of different optical densities (like thickness)

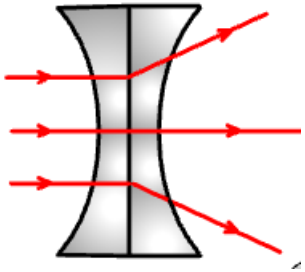
Complete the diagram showing the path of the ray of light



Label the angles of incidence and refraction; and the normal

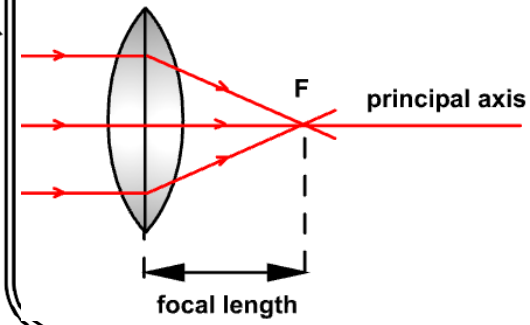
Name this lens. Complete the diagram

Diverging lens **concave**



Name this lens. Complete the diagram

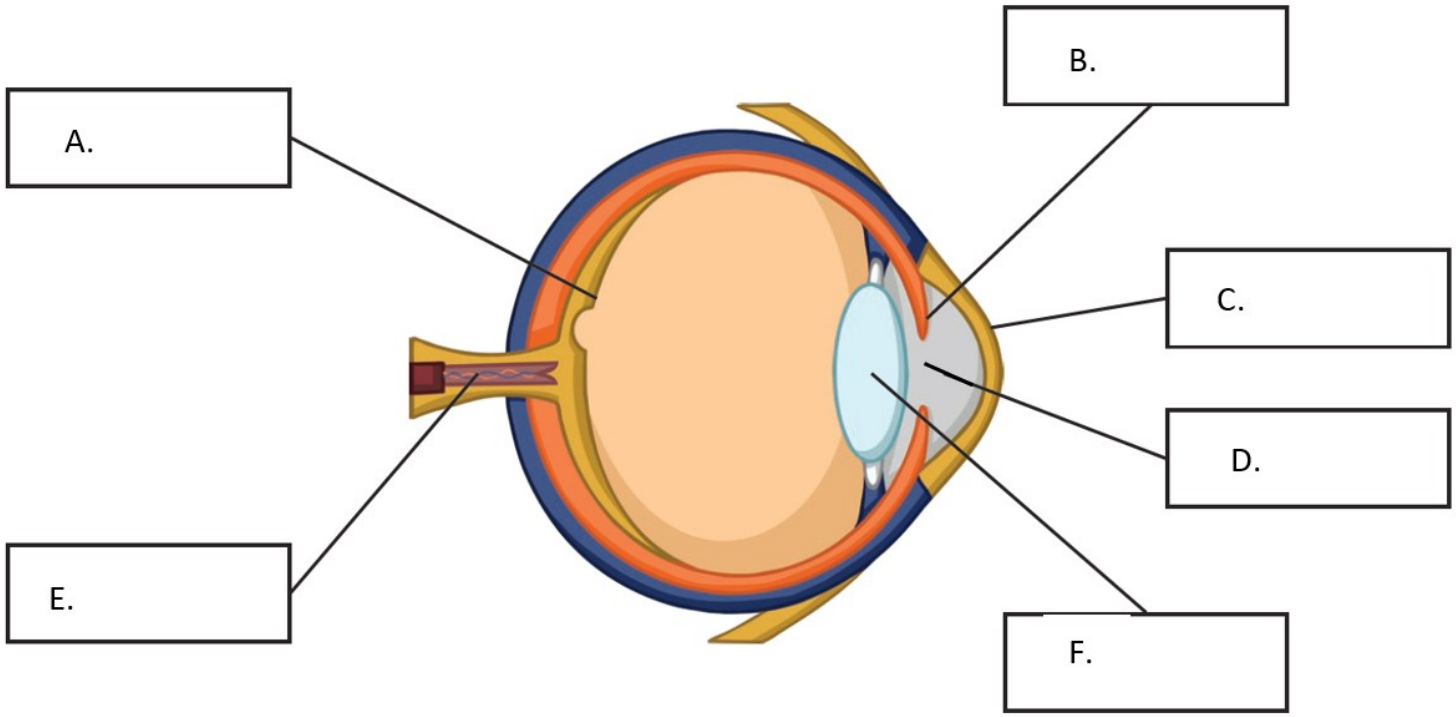
Converging lens **convex**



Define

Angle of incidence: the angle measured from the normal to the incident ray

Angle of refraction: the angle measured from the normal to the refracted ray:



Letter	Part Name	Function (What is does)
A	RETINA	Detects the light
B	IRIS	Controls the size of the pupil
C	CORNEA	Protects the eye and refracts the light as it enters the eye
D	PUPIL	Controls the quantity of light that enters the eye
E	OPTIC NERVE	Carries the electrical signals from the retina to the brain
F	LENS	Fine-tunes the focussing of light on the retina