key words

amplitude	is half of the distance between a waves high point **crest** and low point **trough**. Amplitude measures how much a wave is displaced from its resting point.
wavelength	is measured from a point on one wave to the same point on the next wave and is written as **λ** (Greek letter for lamba). The difference in colours is caused by different wavelengths of light. *Red has the longest wavelength in the rainbow while purple has the shortest*
oscillation	an up-and-down or back-and-forth motion
vacuum	space that has no matter in it
frequency	the number of waves that pass a fixed point in a given unit of time is written as **f**
node	the node of a wave is where the wave doesn't move
antinode	the part of the wave where it moves the most away from the centre
wave speed	is the speed at which the energy is transferred through the medium
transverse Wave	are when the oscillations are perpendicular to the direction of the waves advance
longitudinal wave	are when the displacement is parallel to the direction of the wave
overtone	generally applied to any higher-frequency standing wave
fundamental	the frequency at which the entire wave vibrates
stationary waves	when two waves are moving at the same time in opposite directions, both having the same amplitude and frequency
Displacement	how far the quantity that is in oscillation has moved from its mean
Period	time taken for a wave to pass
electromagnetic	is a continuous range of wavelengths **electro** contains electric energy **magnetic** contains magnetic disturbance**
phase difference	The difference in phase angle of two different waves with the same frequency

equations

frequency = 1/time or time = frequency/1	f=1/t or T=f/1
speed= frequency x wavelength	v=f x λ
wavespeed = frequency x wavelength	v=f x λ

electromagnetic spectrum

	uses	dangers
radio waves ($3x10^{9}$)	Telecommunication, TV, radio	None
microwaves ($3x10^{12}$)	Cooking, telecommunication, RADAR	None
infra red radiation ($4x10^{14}$)	Heating, cooking, TV remotes, night vision	Can burn
visible light (10^{-6})	photography, illumination	erythema, pigmentation, thermal damage, free radical, production
ultra violet (10^{-9})	killing bacteria, creating fluorescent effects, curing inks and resins, phototherapy, sun tanning, security	skin cancer, premature ageing
X-rays (10^{-6})	looks at bones	causes cancer
gamma rays (10^{-4})	radio therapy, sterilisation and disinfection, nuclear industry	Causes cancer

the laws of refraction

Light waves (or electromagnetic radiation of other frequencies) travel best in a vacuum (a space without any matter in it)

When the waves have to travel through solid, opaque materials, their movement **IS STOPPED** by *the electronic charges of the atoms and molecules around them* e.g Metals that are full of freely moving electrons stop the oscillations completely and so the light wave energy is reflected back – metals therefore look shiny and make good mirrors. Some waves are absorbed in solids, with certain waves being reflected back so that we are able to see colours

In transparent materials *(water, glass and many plastics)* the waves are **NOT STOPPED** or **ABSORBED** but they are slowed down

Diagrams

transverse wave https://i.ytimg.com/vi/-HW8JcL8wms/maxresdefault.jpg

longitudinal wave https://cdn1.byjus.com/wp-content/uploads/2020/07/Longitudinal-Waves-1.png

stationary wave https://www.a-levelphysicstutor.com/images/waves/statw-formation.jpg

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