

# CIE Physics GCSE

## Topic 3.1 - General Wave Properties

### Flashcards



# What is a wave?



# What is a wave?

A regular disturbance transferring energy in the direction of the wave's propagation **without transferring matter.**



# What is a transverse wave?



# What is a transverse wave?

A wave in which oscillations are at right angles (perpendicular) to the direction of motion.



Give examples of transverse waves



Give examples of transverse waves

Waves on a string, all electromagnetic waves (eg. visible light), ripples on water, vibrations on guitar strings



# What is a longitudinal wave?





# What is a longitudinal wave?

A wave where the oscillations are parallel to (in the same direction as) the direction of motion.



Give examples of longitudinal waves



Give examples of longitudinal waves

Pulses along a spring, sound waves,  
ultrasound



# Transverse waveforms have...



Transverse waveforms have...

Peaks and troughs



Longitudinal waveforms have...



Longitudinal waveforms have...

Compressions and rarefactions



# Wavelength is...





Wavelength is...

The shortest distance between the same point on two consecutive waves (e.g. the distance between two consecutive peaks)



# Displacement is...



## Displacement is...

- The distance from equilibrium position
- At maximum distance (peaks or troughs), this is the **amplitude** (the maximum displacement of the wave)



# Frequency is...



Frequency is...

The number of complete waves passing a given point per second, or the number of waves per second produced by the source.



State the wave equation (supplement)



State the wave equation (supplement)

$$v = \lambda \times f$$

- $v$  = velocity (m/s)
- $\lambda$  = wavelength (m)
- $f$  = frequency (Hz)



# What is refraction?





# What is refraction?

Refraction is the change in **speed** of a wave when crossing a boundary between two media, resulting in a change in direction.



What property of a wave is **not** changed by refraction?



Which property of a wave is **not** changed by refraction?

The frequency.



What happens when waves are incident  
on a flat surface?



What happens when waves are incident on a flat surface?

Reflection.



A stronger reflected wave is produced  
when...



A stronger reflected wave is produced when...

The surface is smoother.



Why do rough surfaces appear matt  
when illuminated?





Why do rough surfaces appear matt when illuminated?

The reflected rays light are scattered in all directions.



When entering a denser material, light  
waves...



When entering a denser material, light waves...

...slow down and bend towards the  
**normal.**



When entering a less dense material,  
light waves...



When entering a less dense material, light waves...

...speed up and bend away from the  
**normal.**



# What is diffraction?



# What is diffraction?

The spreading out of waves passing through a narrow gap or across an edge.



What size of gap produces the largest diffraction?





What size of gap produces the largest diffraction?

A gap of the same width as the wavelength of the wave passing through it.



# What is a ripple tank?



## What is a ripple tank?

A shallow glass tank with an oscillating paddle/needle to create waves. It is illuminated from above so waves can be seen on the surface below the tank.



Describe how to demonstrate reflection using a ripple tank.



Describe how to demonstrate reflection using a ripple tank.

Waves will reflect off the glass sides of the tank.



Describe how to demonstrate refraction using a ripple tank.



Describe how to demonstrate refraction using a ripple tank.

Place a glass box across half of the floor of the ripple tank. The waves will change speed when travelling through the less dense area.



Describe how to demonstrate diffraction using a ripple tank.





Describe how to demonstrate diffraction using a ripple tank.

Place two glass blocks in the middle of the tank, leaving a small gap, and observe the wave patterns.

