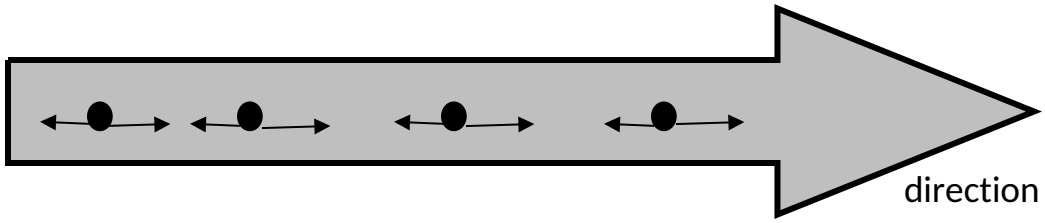
PENANG SANGAM HIGH SCHOOL
YEAR 11 PHYSICS
WEEK 18

Strand	WAVES
Sub Strand	SOLVE PROBLEMS RELATING TO WAVES
Content Learning Outcome	At the end of the lesson students should be able to demonstrate an understanding of the meaning of the terms transverse and longitudinal pulse, differentiating between them.

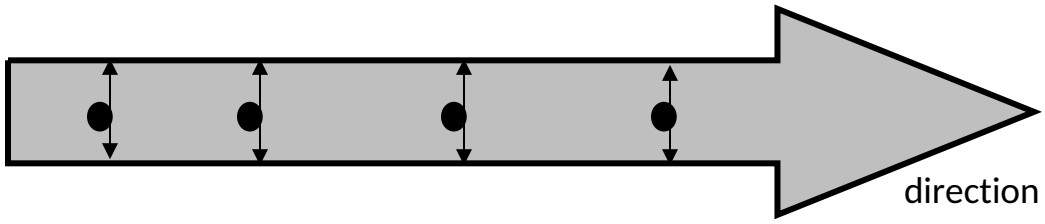
Waves

A wave is a disturbance that transfers energy without the movement of particles.

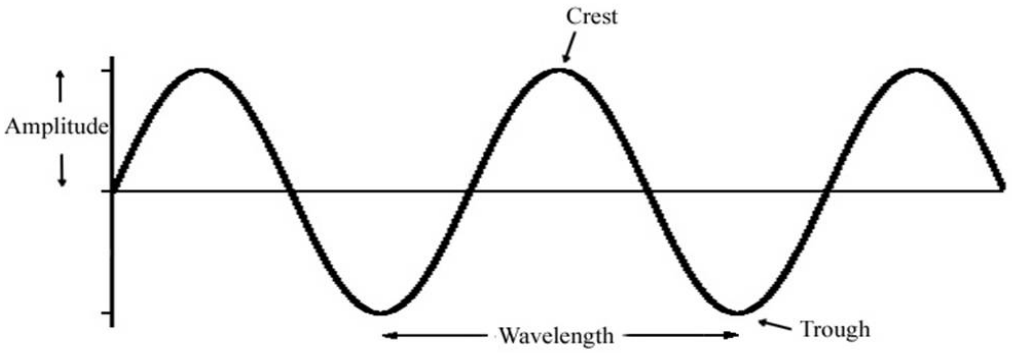
Longitudinal waves – particles vibrate parallel to the direction of movement eg sound waves and pulses on a slinky(spring).



Transverse – particles vibrate perpendicular to the movement eg light waves and waves on a string



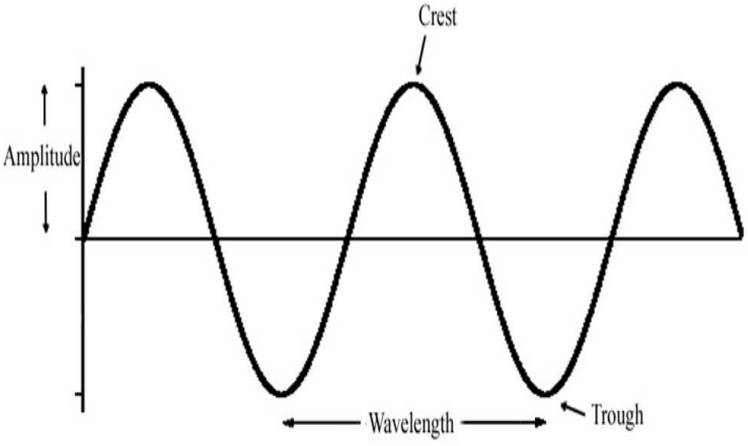
Parts of a wave



Distance if the x axis gives the

distance than one complete turn of the wave gives the wavelength.

If the x axis represents time than, than one complete turn gives the period of the wave



1. **Amplitude** is the maximum distance of the particle on either side

2. **Period,** T, is the time for one complete wave to pass through

3. **frequency** ,f is the number of waves that pass a given ppoint in 1s.

4. **Wavelength** ,λ , is the distance between two crests or two troughs.

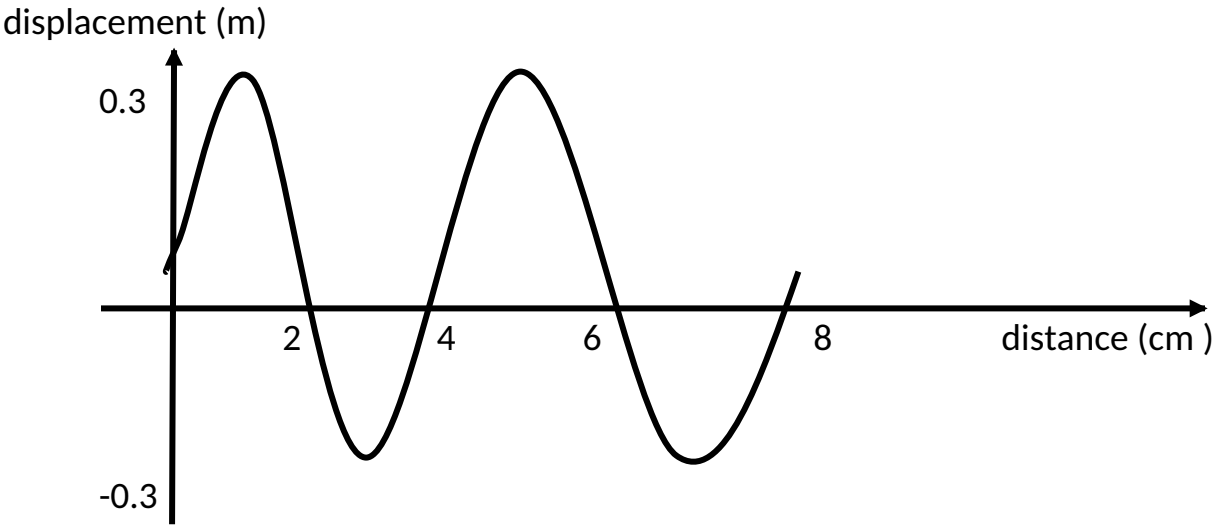
$v = f$ $\quad T = \frac{1}{f}$ **or** $f = \frac{1}{T}$

v- velocity in m/s, f –frequency in hz,

1. Velocity of light is 3×10^{8} m/s. find the frequency of light if the wavelength is 6×10^{-9}m.

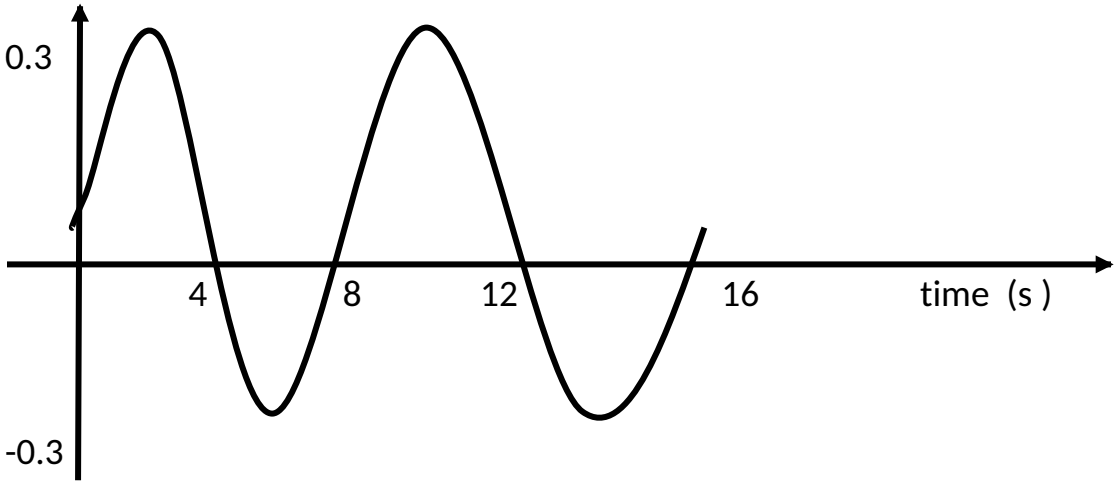
2. Water waves have a velocity of 12cm/s and frequency of 50hz. Find the wavelength.

3. Given below is a wave form



Find a. the amplitude b. the wavelength iii. Speed if frequency is 100hz

4. displacement (m)



Find a. the amplitude b. period iii. frequency

4. A particular TV program is transmitted by waves of frequency 7.5×10^8 hz which travel at the speed of 3×10^8 m/s. find
   a. Period of wave b. wavelength of wave.

Echo

Echo is the sound when we hear the sound when it hits off an object and comes back. We can use the formula

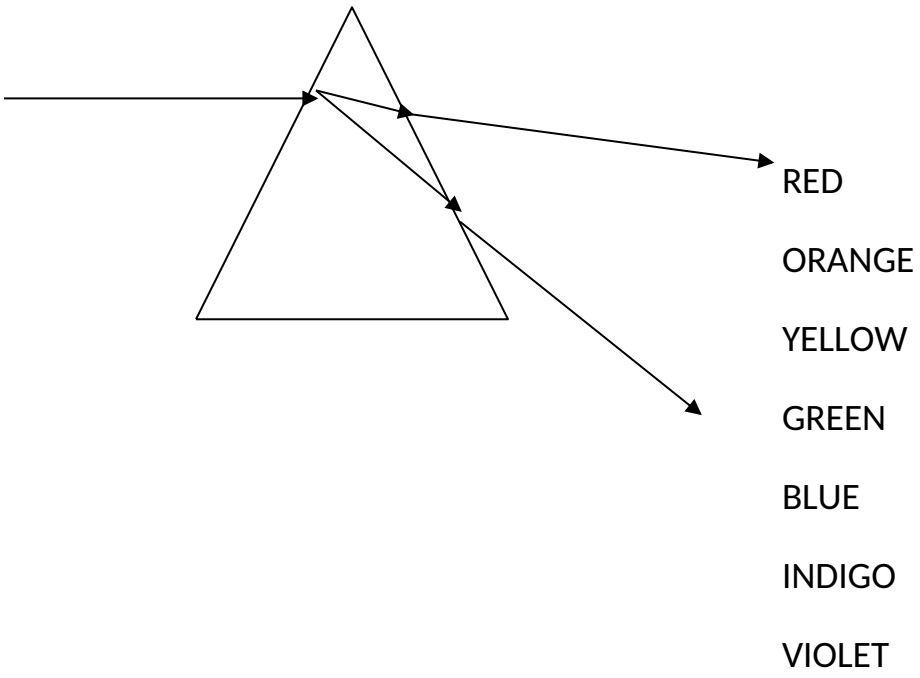
$$S = \frac{D}{t}$$

To calculate either the speed of the wave, distance the wave travelled and **t is the time taken by the wave to travel the same distance.**

1. A ship using an echo sounding device sends and receives an echo form the bottom of the ocean 0.8s after it was emitted. If the velocity of sound in water is 1500m/s what is the depth of the ocean

2. A man stands 200m away from a foot of the hill and shouts. The echo is heard 1.2s later. Calculate the speed of sound in air.

dispersion is the splitting of white light into a spectrum of colours.



MIRAGE is an illusion seen on very hot days as pools of water on roads and desets. This is due to internal reflection.