Physics 11
Waves
7.1 Wave Properties

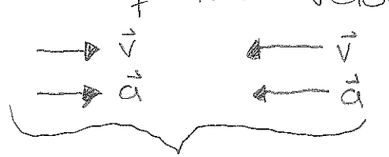
Review

Acceleration: when an object experiences a change in velocity

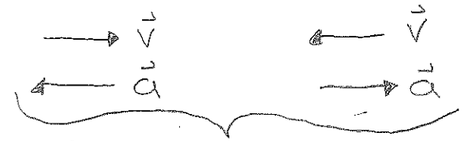
$$\text{Acceleration} : \frac{\Delta \text{ Velocity}}{\Delta \text{ time}} = \frac{\Delta \vec{v}}{\Delta t} = \vec{a}$$

→ Can be read from a velocity vs. time graph

* remember that ⊖ acceleration does not always mean ≠ object is slowing down → it is also a function of ≠ direction of the velocity



* Speeding up



* Slowing down

New

WAVES

Wave: a motion that spreads a disturbance, usually thru a material [exception: electromagnetic radiation which moves thru electric & magnetic fields].

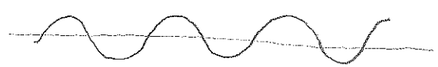
Waves R one of ≠ major ways nrg is transmitted

∴ waves ≙ nrg

Two Types

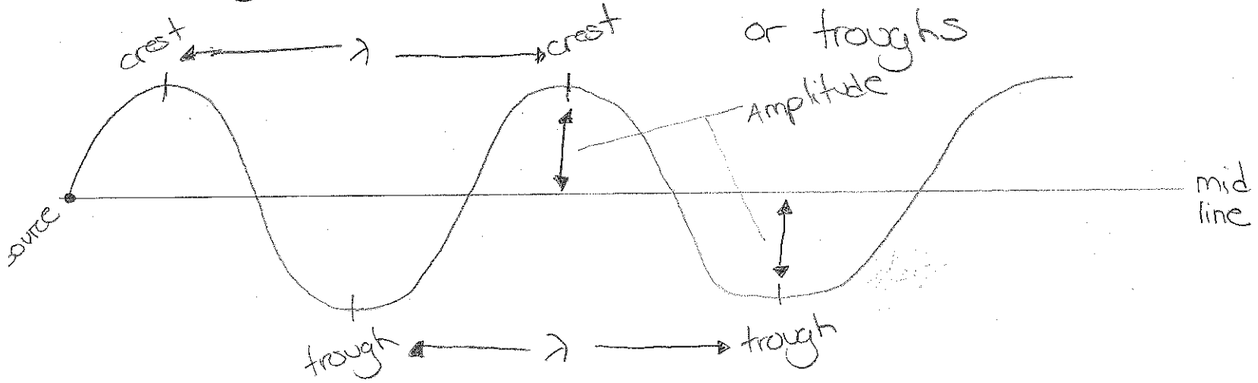
1) Pulse - non repeating, single event

2) Periodic - repeat @ regular intervals



Wave Terminology

Wavelength (λ) units (m) → the distance between 2 consecutive crests or troughs



Amplitude units (m) → the distance from the midline to the top/bottom of a crest/trough.

Frequency (f) units (Hz) → the number of waves in a fixed period of time

$f = \frac{1}{\text{period}}$

low (f) ~~~ high (f)

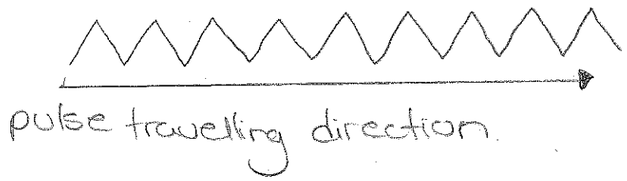
Period (T) units (s) → time interval between vibrations (disturbances)

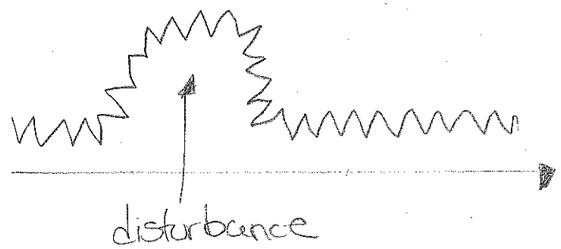
$P = \frac{1}{f}$

Wave Speed ($\hat{v}$) → the rate at which one point on the wave moves

$\hat{v} = \lambda f$

Transverse & Longitudinal Waves





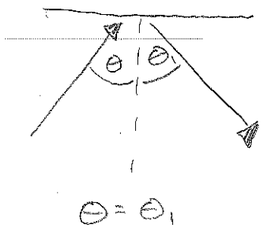
Transverse Wave: disturbance is @ right angle to ↕ direction of ↕ pulse

Longitudinal Wave: disturbance is in the same direction as ↕ pulse

Wave Properties (2)

When waves encounter a boundary many things can happen including **Reflection** or **Refraction** of the wave...

Reflection: wave ∆ directions after hitting a boundary



Refraction: wave is transmitted thru a medium but changes direction (bent)