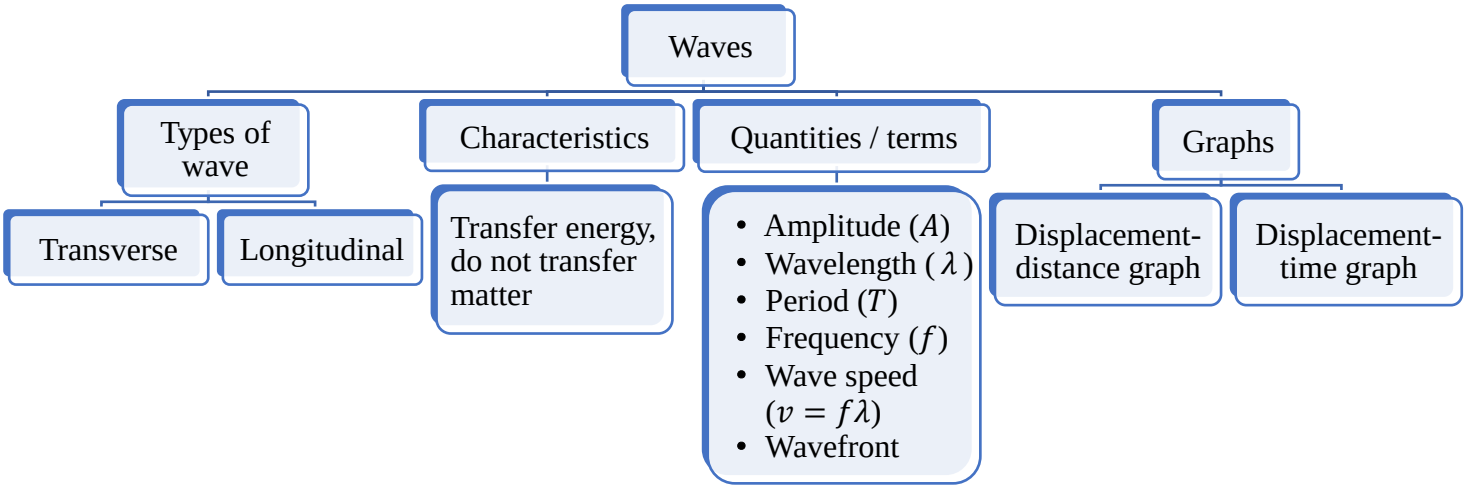
Chapter 13 – Waves

Definitions

Phrase	Definition	SI unit
<u>wave</u>	Periodic disturbance that transfers energy from one place to another through vibrations without the transfer of matter	
crest	Highest point of transverse wave	
trough	Lowest point of transverse wave	
wavelength (λ)	Shortest distance between any two points in phase	m
amplitude (A)	Maximum displacement of a point from its rest position	m
points **in phase**	Points that have same: 1. direction of motion 2. speed 3. displacement from rest position	
period (T)	Time taken to produce one complete wave	s
frequency (f)	Number of complete waves produced per second	Hz
wave speed (v)	Distance travelled by a wave per second	ms^{-1}
<u>wavefront</u>	An imaginary line on a wave that joins all adjacent points in phase	



13.1 Introducing Waves

<u>What a wave is</u>

Wave

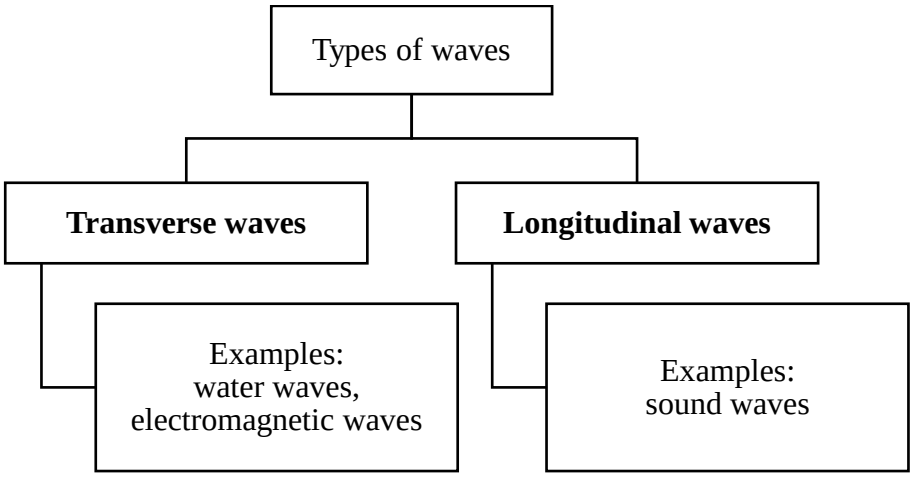
a periodic disturbance that transfers energy from one place to another through vibrations without the transfer of matter

Periodic motion

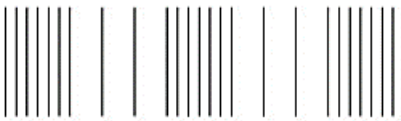
a motion repeated at regular intervals

Characteristics of wave:

- The **source** of wave: **vibration** / oscillation
- Wave **transfers energy** from one point to another
- In waves, energy is transferred **without the medium / matter being transferred**

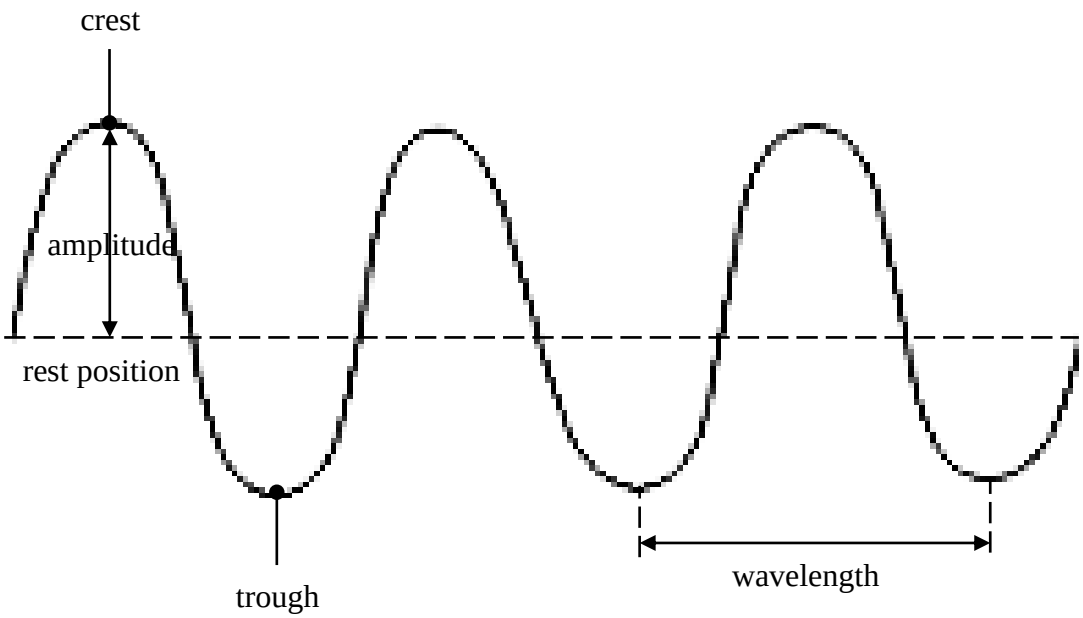


Transverse waves: waves travel in a direction **perpendicular** to direction of vibration of particles
Longitudinal waves: waves travel in a direction **parallel** to direction of vibration of particles

Transverse waves	Longitudinal waves
• Particles move up and down • Kinetic energy transferred from left to right	• Particles move left and right • Kinetic energy transferred from left to right
	

13.2 Properties of Wave Motion

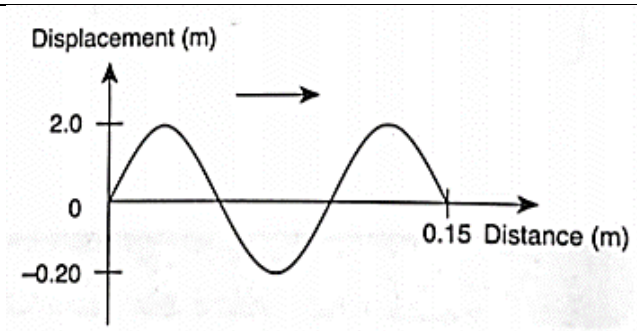
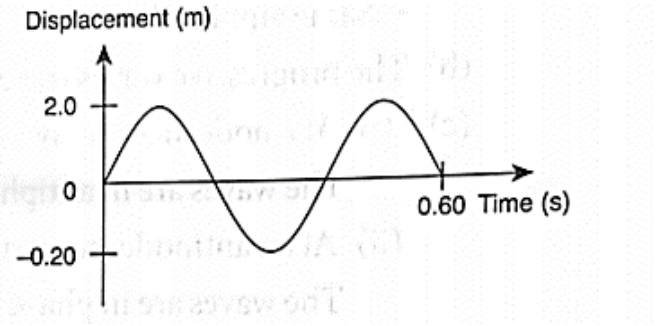
Describing waves



Graphs

Graphs:

1. **Displacement-distance graph**
2. **Displacement-time graph**

Displacement-distance graph	Displacement-time graph
• Describes displacements of all particles at a particular point in time • Can obtain amplitude & wavelength	• Describes displacement of one particle over a time interval • Can obtain amplitude & period
	

Formulas:

Frequency to period	Wave speed
$f = \frac{1}{T}$	$v = f\lambda$

Wavefront

An **imaginary line** on a wave that joins all **adjacent points in phase**