

# Wave motion

a disturbance that propagates through a medium or space, transferring energy from one location to another without transporting matter

## transverse wave

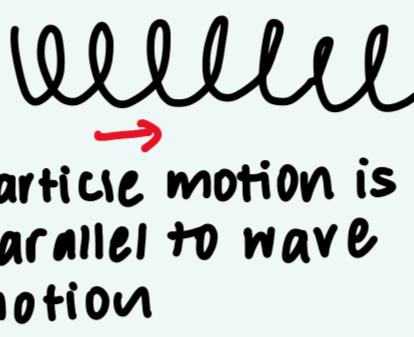


Disturbances on the water's surfaces cause waves that propagate outwards



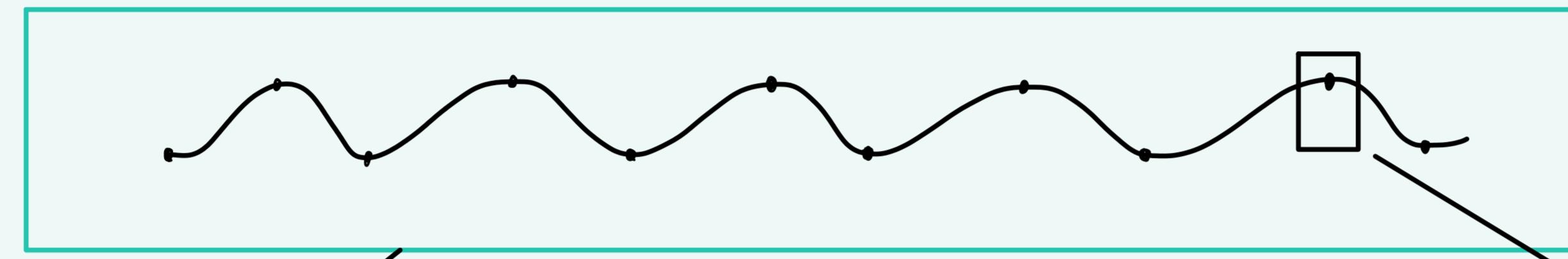
- EM waves
- ocean waves
- light waves

## longitudinal wave



- compression
- refraction
- spring
- sound waves

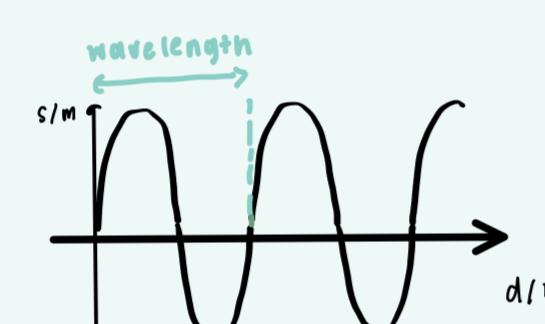
↳ amplitude: loudness ↑  
frequency: pitch ↑



\* depends on direction

## displacement - distance graphs

- Graph of entire wave itself
- ← look behind to determine next position of the wave



period: time to produce 1 wave (s)  
1.5 period = 1.5 wave passed / shifted

wave speed: wave distance/s

$$v = f \lambda = \frac{\lambda}{T}$$

"crests pass ... min - s"

only changes when medium changes

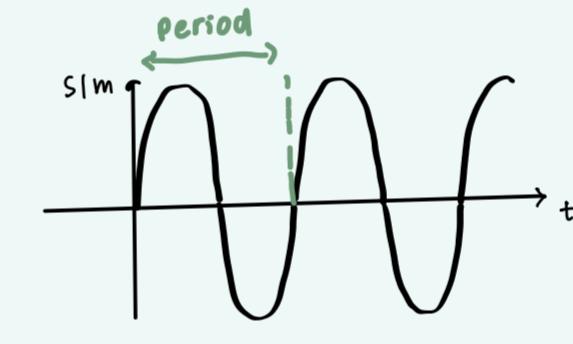
frequency: # of how many complete cycles / waves pass in 1s (Hz)

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

"... crests / s"

## displacement - time graph

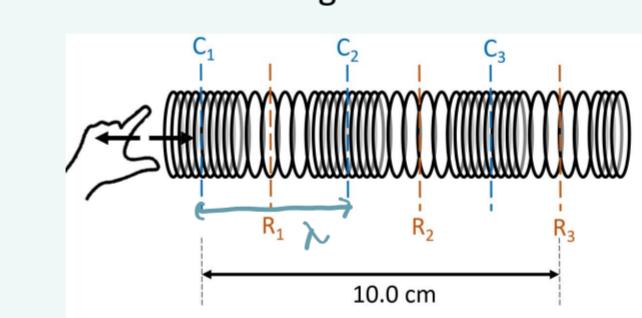
- showing displacement of a specific particle on a wave from equilibrium position
- → look in front for the particle's next position



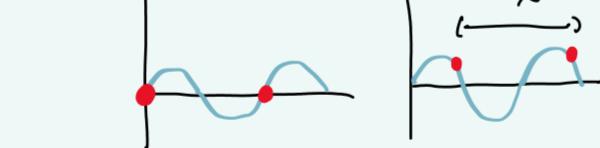
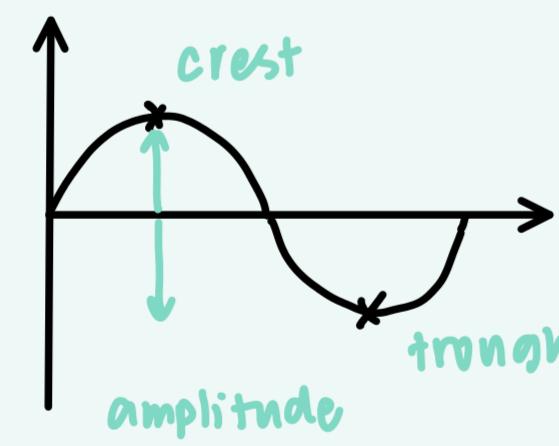
wavelength = speed × time  
over a time interval.

Sound waves:

Echo: 1 heard through medium, other heard through air



## parts

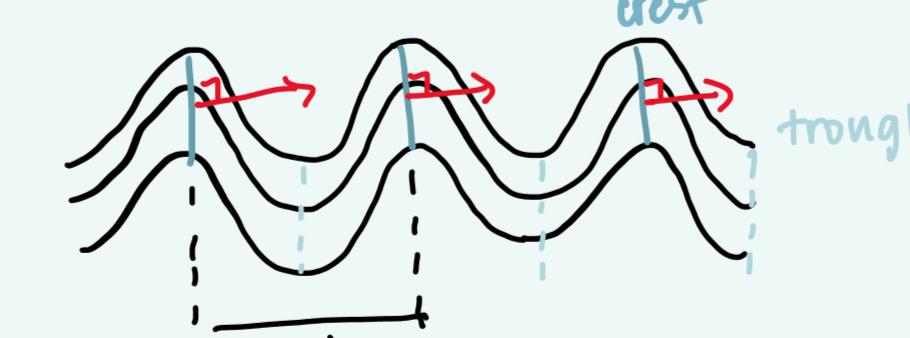


if:  
• same direction  
• same speed  
• same displacement from rest position



## wavefronts

imaginary lines which joins all adjacent points in phase

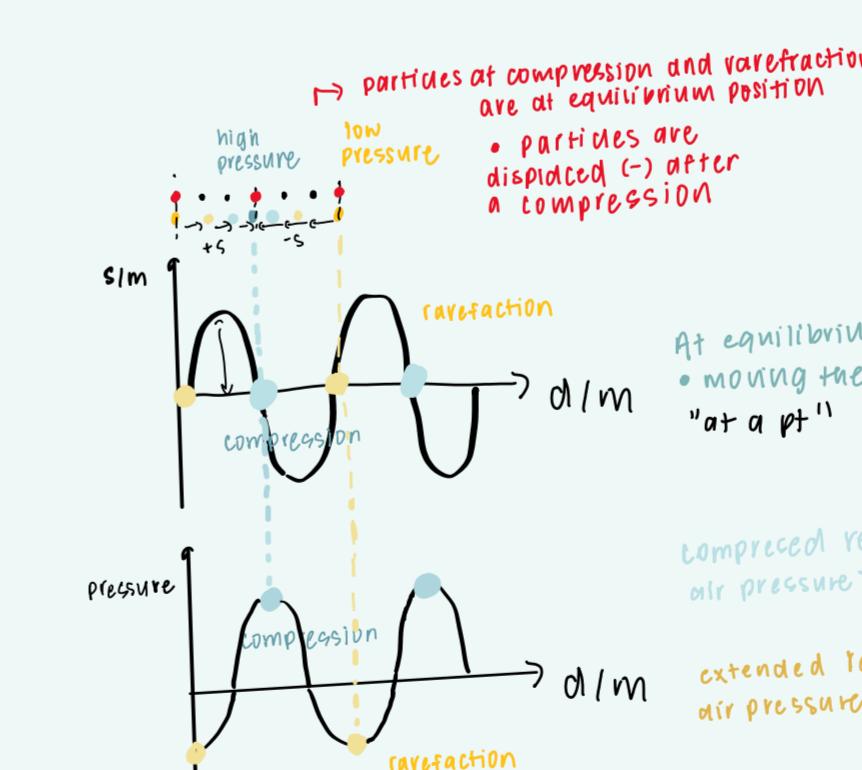


Depth	Frequency	Wavelength	Speed
shallow	same	short	slow
deep	same	long	fast

- Direction of wave is always perpendicular to the wavefront



deep → shallow



At equilibrium  
• moving the fastest  
"at a pt"

Compressed regions  
air pressure > surrounding pressure

extended regions  
air pressure < surrounding pressure

