

Waves

'A wave is a disturbance that propagates in space and time.'

- A wave is caused by a **vibrating source**.
- Waves transfer **energy** but do not transfer the medium.

There are two basic types of wave motion (choose the right option)



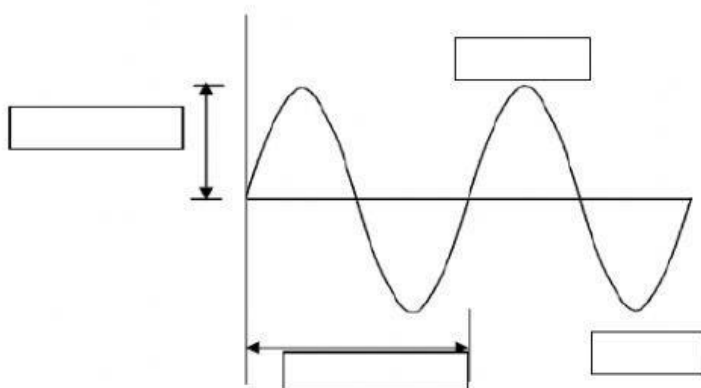
- **progressive waves** – travelling disturbances that transfer
- **stationary** (or) waves – non-travelling waves that transfer energy from one end to the other.

Key terms

term	symbol	definition	unit
amplitude		The displacement of the medium from its (<i>equilibrium</i>) position	
wavelength		The spatial period of the wave in the direction of motion: the distance Between any two successive points with the phase (e.g. to)	
crest		the point on a wave	
trough		the point on a wave	
frequency		the of waves passing a point per	
period		the taken for complete wave to pass	

Use key terms from the table to label:

Wavelength **amplitude** **crest** **trough**



The connection between f and T

$$f =$$

$$T =$$

Connection between v , f and λ

$$v =$$

WAVES - Worksheet 2

Use these words to complete the paragraph below

peaks	energy	frequency	pitch	two
wavelength	hertz	crest	amplitude	colour

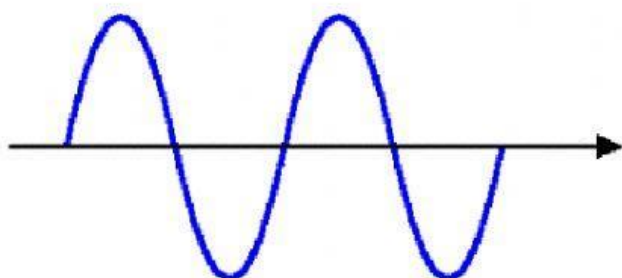
The distance between two consecutive _____ of a wave is called the _____ of the wave.

The furthest point of wave above the undisturbed position is called the peak or _____ of the wave. The furthest point of a wave below the undisturbed position is called the trough of the wave.

The height of a peak measured from the undisturbed position is called the _____ of the wave. There are _____ complete waves in the diagram below. The number of complete waves passing a point per second is called the _____ of the wave and is measured in _____.

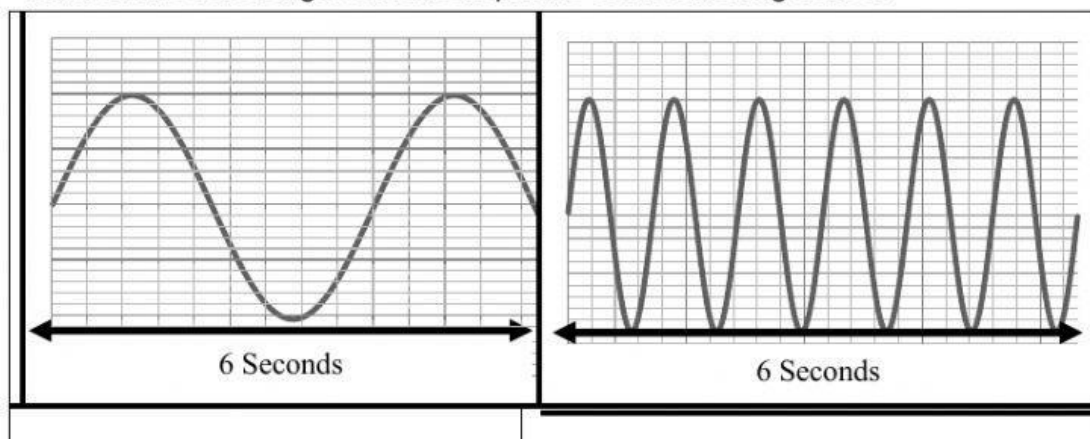
All waves carry _____ from one place to another. The wavelength, frequency and amplitude affect the **properties** of the wave. For example, the wavelength and frequency of a sound wave affect the sound's _____.

The wavelength and frequency of a light wave affect the light's _____. The amplitude of the wave affects the **intensity** of the wave, eg the brightness of a light wave or loudness of a sound.



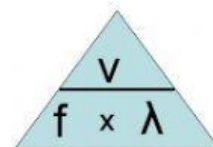
WAVES - Worksheet 3

1. Draw on the wavelength and the amplitude of the following waves.



Calculate the time period and the frequency of each wave.

2. A wave travelling at 3000 m/s has a wavelength of 1 m.
- Calculate the frequency of the wave.
 - Calculate the time period of the wave.
 - How many complete wave cycles will occur in:
 - 1 second?
 - 10 seconds?
 - 1 minute?
3. A radio wave has a wavelength of 1000 m and a frequency of 3×10^5 Hz. Calculate the wave speed.

Individual Wave Calculations

2. A wave travelling on a string has a wavelength of 0.10 m and a frequency of 7 Hz. Calculate the speed of the wave.
3. A sound wave travelling in water at 1440 ms^{-1} has a wavelength of 0.5 m. Determine the frequency of the wave.
4. An electromagnetic wave moving through free space at 3 ms^{-1} has a frequency of 4.62 Hz. Find the wavelength of this wave.
5. A water wave is moving across the surface of a lake. The wave has a wavelength of 2 m and a frequency of 2.5 Hz. Calculate the speed of the wave.
6. A sound wave is moving through air. The wave has a wavelength of 0.65 m and a frequency of 512 Hz. Calculate the speed of the wave.
7. A light wave moving due east through the air at $3 \times 10^8 \text{ m/s}$ has a frequency of $5.55 \times 10^{14} \text{ Hz}$. Calculate the wavelength.