

# 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)



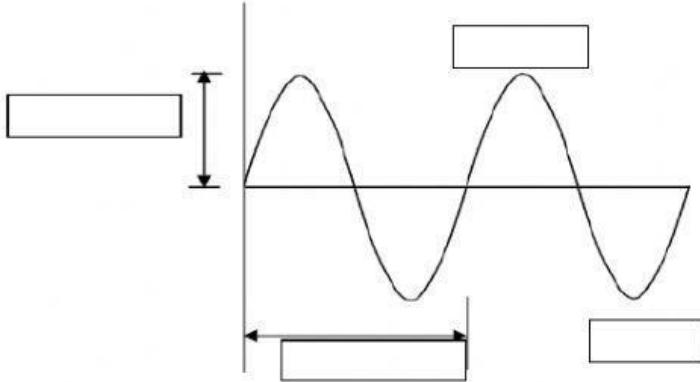
- **progressive** waves – travelling disturbances that transfer .....;
- **stationary** (or ..... ) waves – non-travelling waves that ..... transfer energy from one end to the other.

## Key terms

term	symbol	definition	unit
amplitude		The ..... displacement of the medium from its ..... ( <b>equilibrium</b> ) 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  $\lambda$

$$V =$$

## WAVES - Worksheet 2

Use these words to complete the paragraph below

peaks	energy	frequency	pitch	two
wavelength	hertz	crest	amplitude	colour

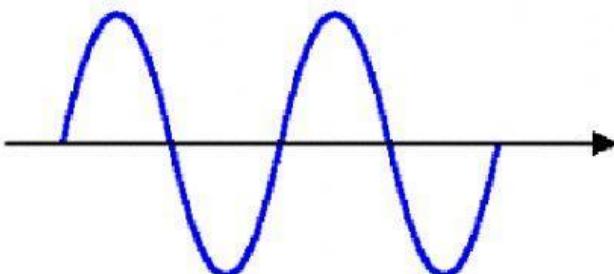
The distance between two consecutive \_\_\_\_\_ of a wave is called the \_\_\_\_\_ of the wave.

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 \_\_\_\_\_.

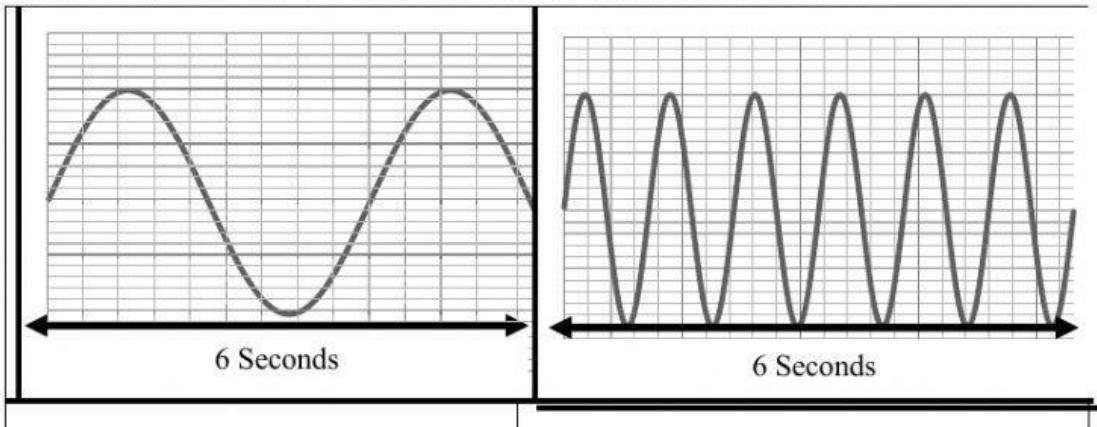
All waves carry \_\_\_\_\_ from one place to another. The wavelength, frequency and amplitude affect the **properties** of the wave. For example, the wavelength and frequency of a sound wave affect the sound's \_\_\_\_\_.

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  $3 \times 10^5$  Hz. Calculate the wave speed.

## WAVES - Worksheet 4

### 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.

$$\frac{V}{f \times \lambda}$$

3. A sound wave travelling in water at  $1440 \text{ ms}^{-1}$  has a wavelength of 0.5 m.

Determine the frequency of the wave.

4. An electromagnetic wave moving through free space at  $3 \text{ ms}^{-1}$  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.