STUDY PLUS

A BRIGHTER FUTURE

Year 9 Physics 7

Topics: Waves

Name : ……

Year : ……

- **Waves**

Waves are a way to transfer energy from one place to another place without transporting matter.

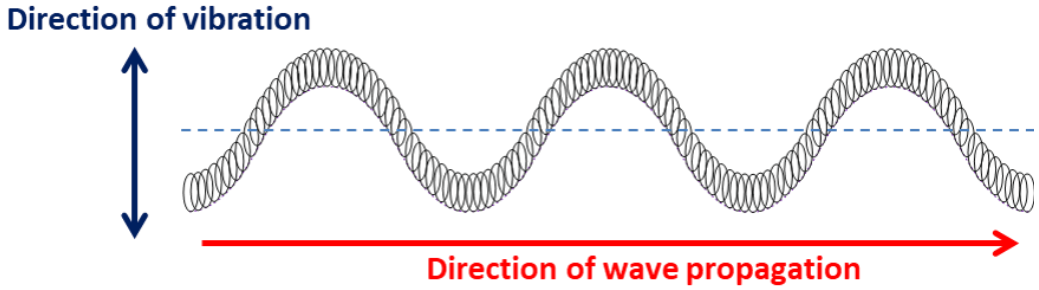
There are two types of waves:

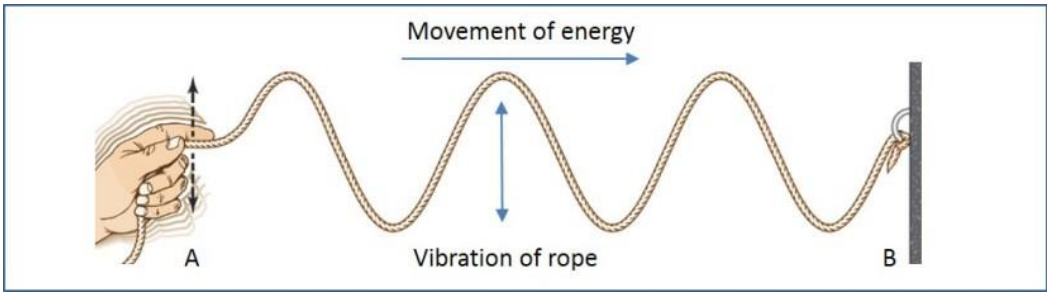
- Transverse waves
- Longitudinal waves

- **Transmission**

Where waves travel through a medium rather than be absorbed or reflected.

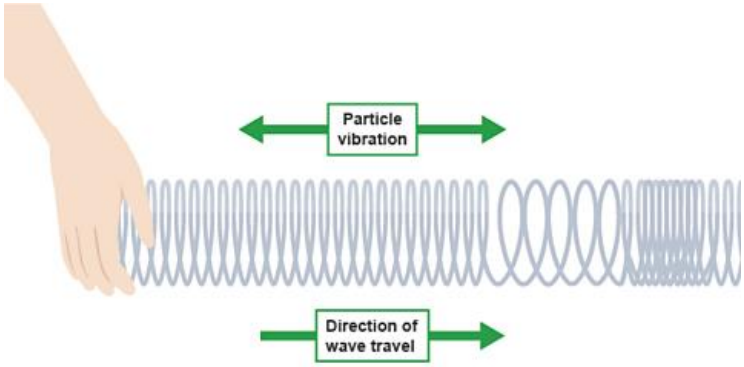
- **Transverse wave**





Where the direction of vibration is **perpendicular** to that of the wave.

- **Longitudinal waves**



A wave that moves in the same direction as the direction in which the particles are vibrating.

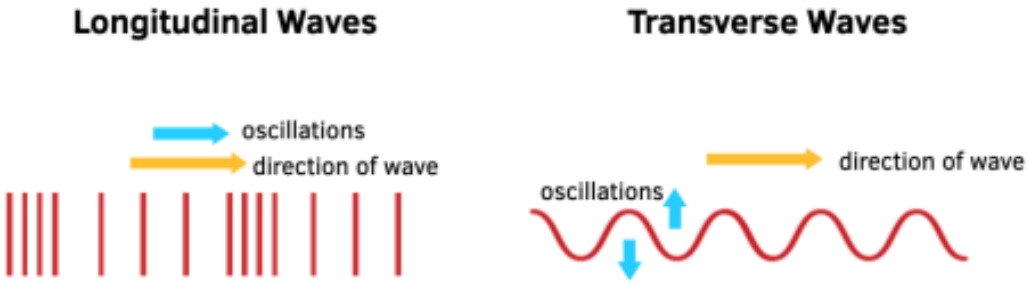
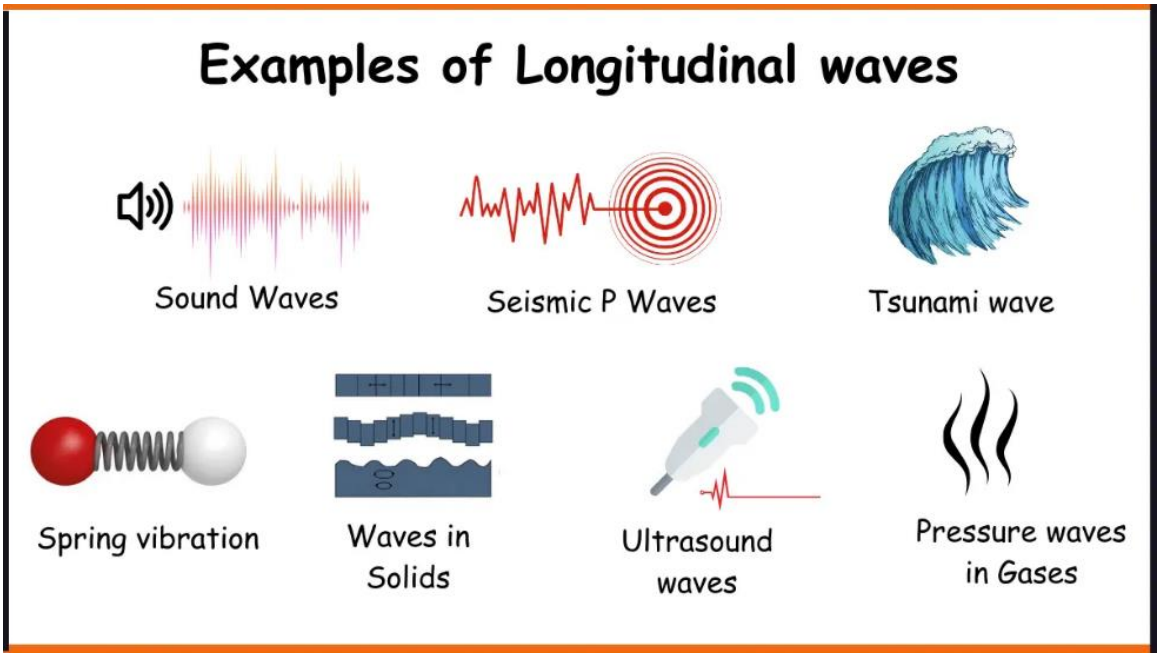
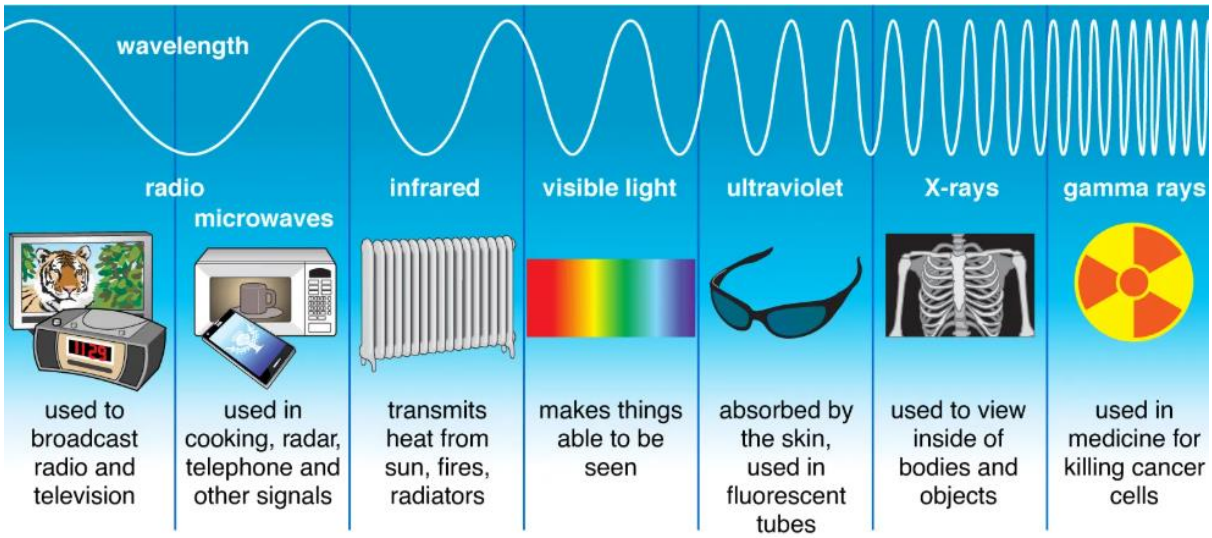


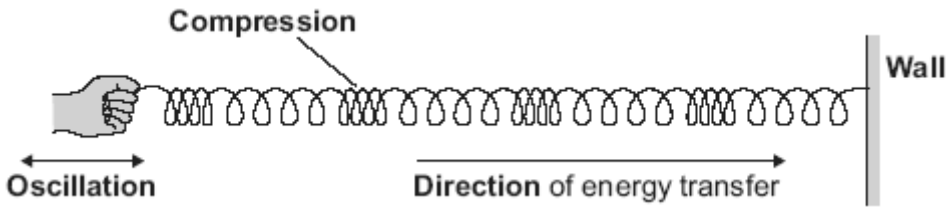
Fig 1. Transverse and Longitudinal Waves.



Examples of Transverse waves



1. The diagram shows a longitudinal wave being produced in a stretched spring.



(i) Use the bold words from the diagram to complete the following sentence. Put only **one** word in each space.

A longitudinal wave is one in which the ..... causing

the wave is parallel to the ..... of energy transfer.

[2 marks]

(ii) Name the type of energy that is transferred by longitudinal waves in the diagram above.

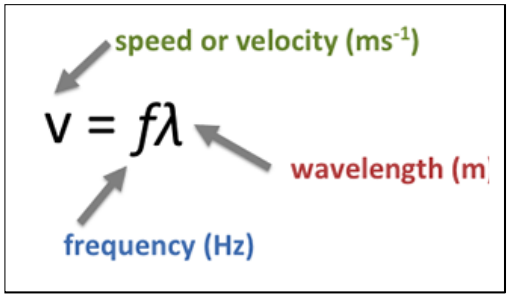
……

[1 mark]

- **Speed of a wave**

Wave speed tells us how fast the wave is moving. Therefore, it also tells us how fast energy is being transferred through a substance.

It is expressed as **V = f λ** , where v is the wave speed, λ is the wavelength, and f is the frequency.



1. A wave of frequency 8 Hz has a wave speed of 24 m/s. What is its wavelength?

……..

……..

[2 marks]

2. Find the velocity of a wave in a ripple tank if its frequency is 12 Hz and its wavelength 3 cm.

……..

……..

[2 marks]

3. The speed of a wave is 1.5 m/s, and its wavelength is 0.25m. What is its frequency?

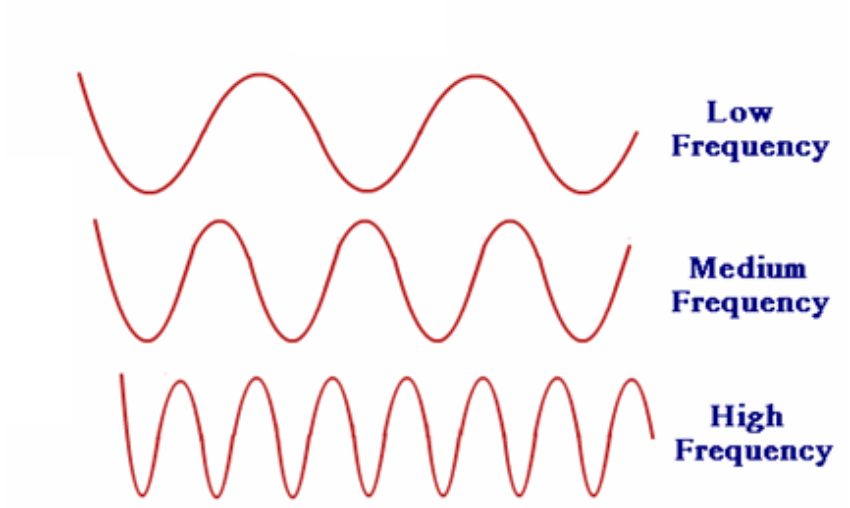
……..

……..

[2 marks]

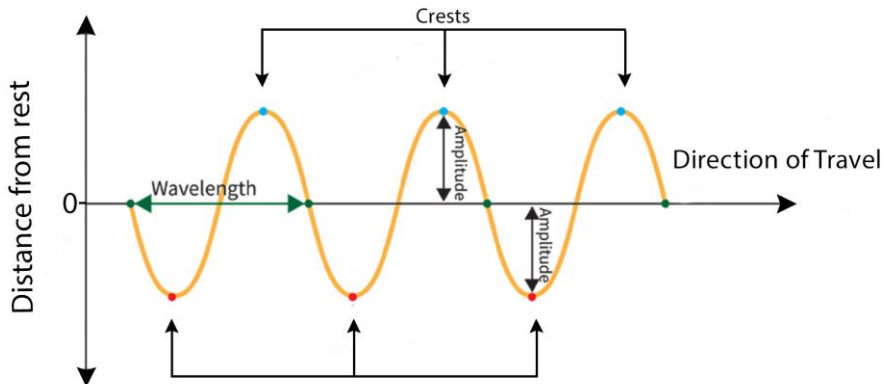
- **Frequency - f**

The number of waves that pass a point in a given amount of time. Frequency is measured in hertz (Hz).



- **Wavelength - λ**

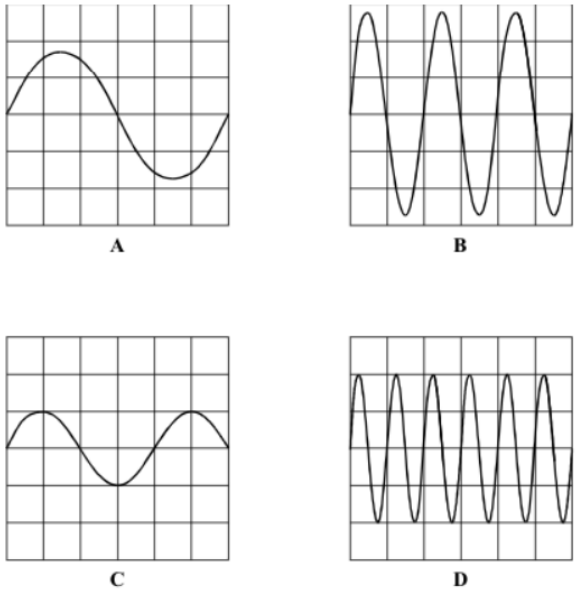
The distance between two corresponding points on adjacent waves. Wavelength is measured in meters. The symbol for wavelength is the Greek letter lambda, λ.



- **Amplitude**

The amplitude of a wave is the distance from the wave's centre line to the top of a crest or the bottom of a trough.

2. (a) The diagram shows four oscilloscope wave traces. The controls of the oscilloscope were the same for each wave trace.



Which one of the waves traces, A, B, C or D, has:

(i) the largest amplitude, …… [1 mark]

(ii) the lowest amplitude? …… [1 mark]