



WORKSHEET 9

SCHOOL: BA SANGAM COLLEGE

YEAR 12

SUBJECT: PHYSICS

NAME OF STUDENT: _____

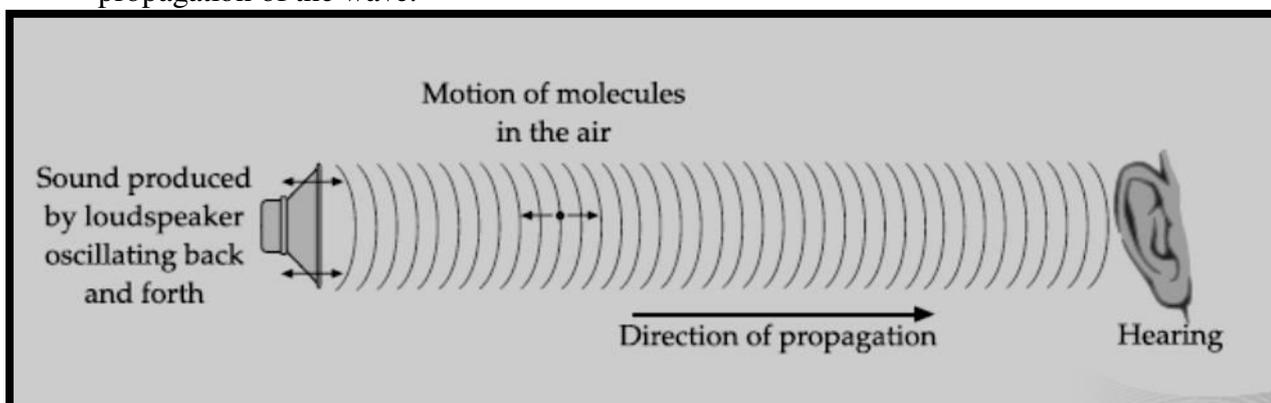
STRAND	GEOMETRICAL OPTICS AND WAVE MOTION
SUB-STRAND	<i>Waves</i>
Content Learning Outcome	➤ <i>Investigate the behavior of light and other waves under various conditions, with reference to the properties of waves</i>

Waves

A **wave** is a disturbance which can transfer energy without the particles of wave having to move from one place to another.

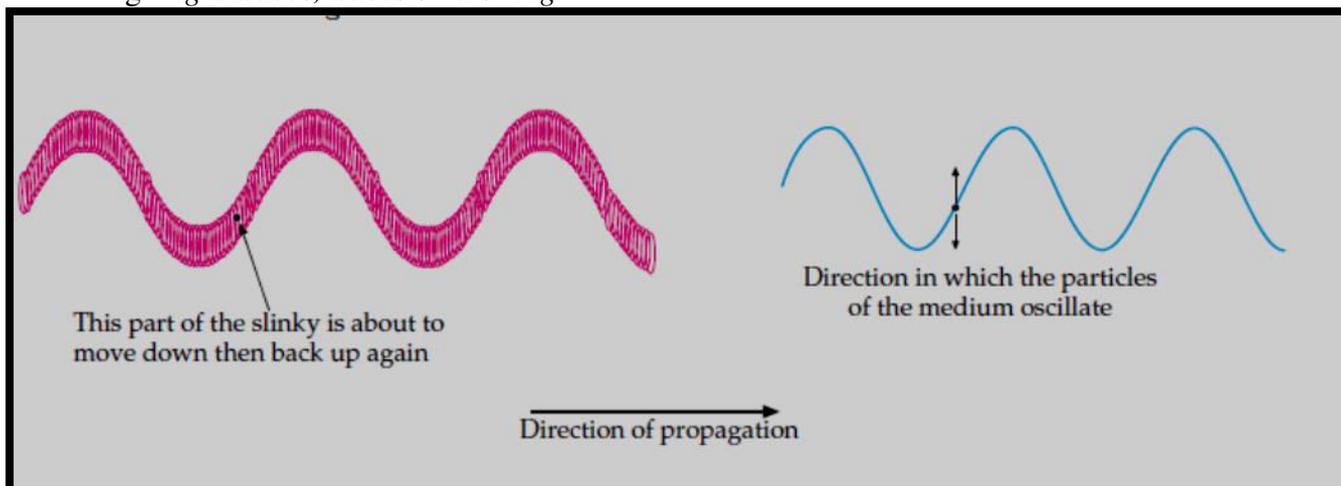
Types of waves

1. **Longitudinal waves:** are waves where the particles of the wave vibrate parallel to the direction of propagation of the wave.

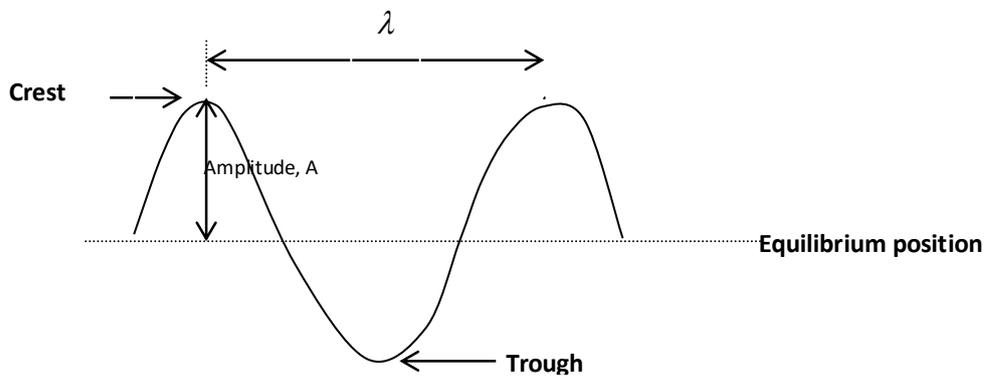


2. **Transverse waves :** where the particles vibrate perpendicular to the direction of propagation of the wave.

Eg: *Light waves, waves on a string.*



Transverse Wave



Definitions

1. **Amplitude:** is the maximum displacement of the particle from its equilibrium(rest) position.
2. **Frequency, f :** number of waves passing a point in one second.
Units: Hertz (Hz)
3. **Period, T :** is the time taken for one wave to pass any point.

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

4. **Wavelength, λ :** is the distance between two successive corresponding positions in a wave.
Eg: distance between crest – crest.

The wave velocity, frequency and wavelength are related by the wave equation:

$$v = f \lambda$$

Where: v = wave velocity (m/s)

f = frequency (Hz)

λ = wavelength (m)

Exercise

1. A ripple tank generates straight waves of frequency, $f = 5$ Hz. Calculate:
 - a) the wavelength.
 - b) the velocity of the wave.

(4 Marks)

2. Orange light has a wavelength of 600nm. Calculate the frequency if the speed of light in vacuum $c = 3 \times 10^8$ m/s.

(2 Marks)

3. A particular TV program is transmitted by electromagnetic wave of frequency 7.5×10^8 Hz, which travel at the speed of 3×10^8 m/s. Calculate the wavelength and period of the wave?

(2 Marks)