

Mechanical Waves Key Terms

On-level Physics

The following are the terms you should be familiar with in order to properly complete this unit. You are expected to be able to define each as well as apply these terms in any situation during this and subsequent units of study.

oscillation - A repeating “to-and-fro” motion about an equilibrium position.

wave - A rhythmic disturbance that carries energy through matter or space.

medium - The material (solid, liquid, gas, or a combination of these) through which a wave travels.

propagation – the direction of travel of a wave and its energy.

crest/trough - The highest or lowest point of a transverse wave. Where the amplitude is measured.

rarefaction - Part of a longitudinal wave in which the particles are spread apart.

compression - Part of a longitudinal wave in which the particles are close together.

amplitude - For a wave, the maximum displacement from the rest position of the medium. Proportional to the energy of a wave.

hertz - The unit of measure for frequency. Equivalent to 1/s.

doppler effect - The observed increase or decrease in wave frequency, caused by motion of the sound source or receiver relative to each other. If moving towards each other a higher frequency is observed.

reflection - Occurs when a wave strikes an object and bounces off.

refraction - The bending of a wave caused by a change in speed as it travels from one medium into other.

diffraction - The bending of a wave around a barrier or through a narrow slit.

interference - The ability of two or more waves to combine and form a new wave. Constructive interference results in an increased amplitude, while destructive interference results in a decreased amplitude.

rest position - the natural orientation of the medium without the effects of a wave disturbance. For example, a pond may be perfectly flat and still. This is its rest position and it will return to this position after a wave completes its disturbance.

transverse wave - a wave in which the medium is displaced perpendicular to the direction of travel of the wave itself. A surface water wave would be an example. This type of wave is described in appearance by its crests (high points) and troughs (low points). High and low are simply relative to the rest position.

longitudinal (compressional) wave - a wave in which the medium is displaced parallel to the direction of travel of the wave itself. An accordion being played would be an example. This type of wave is described in appearance by its compressions (high density of medium) and rarefactions (low density of medium).

wavelength (λ) - the distance between two consecutive crests or troughs, or any other similar points on a wave.

frequency (f) - the number of waves passing a fixed point in a given time. Usually written as waves per second or Hertz (Hz). The inverse of the period.

period (T) - the time required for one complete wave (crest to crest) to pass a fixed point. The inverse of the frequency.

wave speed (v) - (a) Distance traveled by a wave in a given time. (b) Wavelength divided by the period. (c) Wavelength multiplied by the frequency.

standing wave - wave pattern which seems to have no motion and occurs due to the reflection of waves in a medium with distinct and "fixed" ends. Composed of nodes and anti-nodes.

node - a point on a standing wave where there is no displacement of the medium from the rest position

anti-node - a point on a standing wave where there is maximum displacement of the medium from the rest position.

vibration - an oscillation of a material due to a force applied.

pendulum - usually a mass at the end of a string or thin metal rod, which swings back and forth at a regular rate due to gravity only.

natural frequency - a frequency at which an object, once energized, will vibrate.