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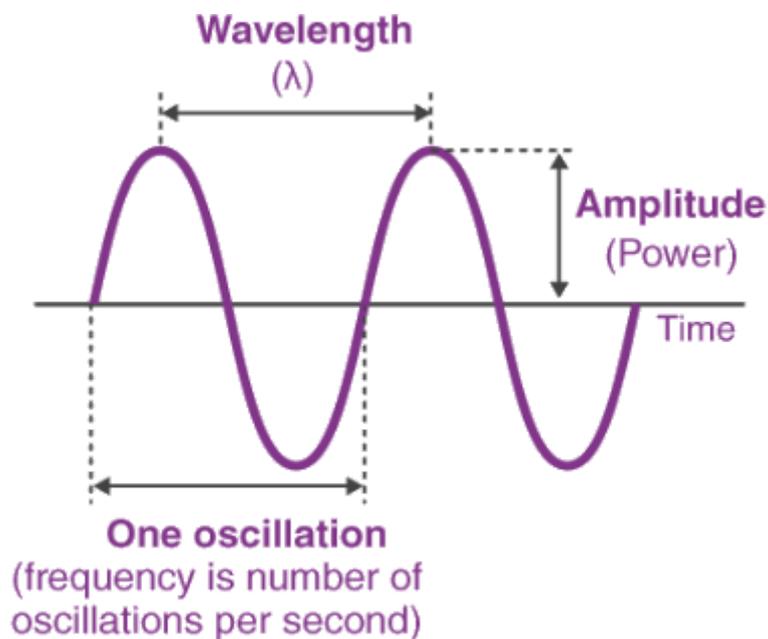
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Waves: Types of Waves, Wavelength of a Wave, Time Period of Oscillation (For CBSE, ICSE, IAS, NET, NRA 2022)

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Wave, propagation of disturbances from place to place in a regular and organized way.

Wave



- Most familiar are surface waves that travel on water, but sound, light, and the motion of subatomic particles all exhibit wavelike properties.
- In the simplest waves, the disturbance oscillates periodically with a fixed frequency and wavelength.

Types of Waves

There are four types of waves as given below:

Mechanical Waves

- Which can exist in material media and follows Newton's laws.
- A wave which needs a medium in order to propagate itself. Sound waves, waves in a Slinky, and water waves are all examples of this.

Transverse Waves

Transverse waves are referred to those whose particles oscillate in a perpendicular motion of the direction of propagation of the wave

Examples of Transverse Waves

- Water waves (ripples of gravity waves, not sound through water)
- Light waves
- S-wave earthquake waves
- Stringed instruments
- Torsion wave

Longitudinal Waves

Longitudinal waves are referred to those whose particles oscillate along the way of the propagation of the wave

Examples of Longitudinal Waves

- Sound waves
- P-type earthquake waves
- Compression wave

When the waves move from one point of the medium to another is called **progressive wave**.

Wavelength of a Wave

- In the case of a progressive wave, the distance between two points in the same phase at that time period is known as the wavelength of a wave.
- Distance is twice the number of two consecutive nodes and antinodes.

Time Period of Oscillation

When an element of a medium takes time to move through one complete oscillation then it is called time period.

Principle of Superposition of Waves

- In a medium when multiple waves transverse simultaneously, the displacement is the algebraic sum of the displacements due to each wave.
- This phenomenon is referred to as the principle of superposition.

Standing Waves

- When two identical waves moving in opposite directions interfere, it results in a standing wave.
- These waves are characterized by the zero displacement locations which are fixed and are called as nodes and locations of maximum displacements called as antinodes.

Doppler Effect

- Change in the frequency of a wave when the source or the observer or both are moving relative to the medium.
- So, this phenomenon is used in different scientific aspects such as planetary science wherein astronomers depend on this effect to identify planets exterior to the solar system.
- This Effect is an increase (or decrease) in the frequency of sound, light, or other waves as the source and observer move towards (or away from) each other.

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