

Production and Propagation of Sound

Chapter 11: Sound · Topic 1

Key Concept

Sound waves are longitudinal, meaning particles vibrate parallel to the direction the wave travels, creating alternating regions of compression (particles close together) and rarefaction (particles spread apart). The speed of sound varies by medium: it travels fastest through solids (particles closely packed, transmitting vibrations quickly), slower through liquids, and slowest through gases like air — for example, sound travels roughly four times faster in water than in air.

Quick Revision Notes

- Sound is produced by vibration and travels as a longitudinal wave through a medium.
- Sound cannot travel through a vacuum, since it needs particles to propagate.
- Sound waves create alternating compressions and rarefactions in the medium.
- Sound travels fastest in solids, slower in liquids, slowest in gases.

Practice Questions

- 1 Explain why sound travels faster in solids than in air.
- 2 Describe what happens to air particles during compression and rarefaction in a sound wave.
- 3 Why can astronauts not hear sound directly in the vacuum of space?