

**PHYSICS**  
**FORM 5**  
**SOUND**

Sound waves are longitudinal waves. A longitudinal wave is one in which the movement of the particles is parallel to the direction of the wave. Sound waves are also progressive waves, that is, they transmit energy away from a source. NB. Sound waves require a medium to travel in.

**Mechanism of Propagation**

If a disturbance is created in a medium, the particles adjacent to the disturbance gain energy and begin to vibrate. The particles next to this vibrating particle also gain energy and begin to vibrate. As the energy transferred from one particle to the next, more and more particles begin to vibrate. In this way a sound wave travels within a medium.

When energy is transferred from one particle to another there is a loss of energy. The energy is also transferred from particle to all neighbouring particles, that is, the energy dissipates (spreads out). The end result is that as the sound wave travels, more and more energy is lost until eventually there is no sound wave.

Since sound waves rely on the vibration of one particle being passed on to a neighbouring particle, it means therefore that the closer the particles are to reach other the better the transmission of the sound wave. This means an increase in the density of the medium, the better the transmission.

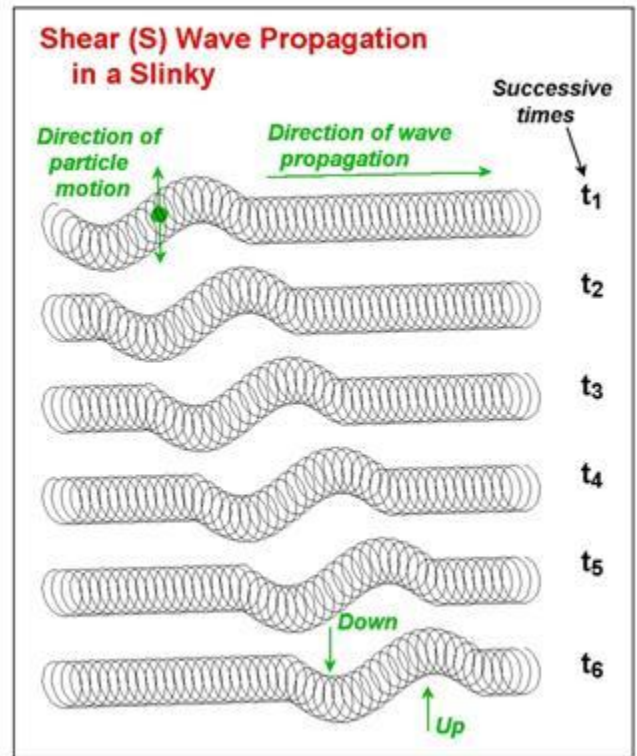
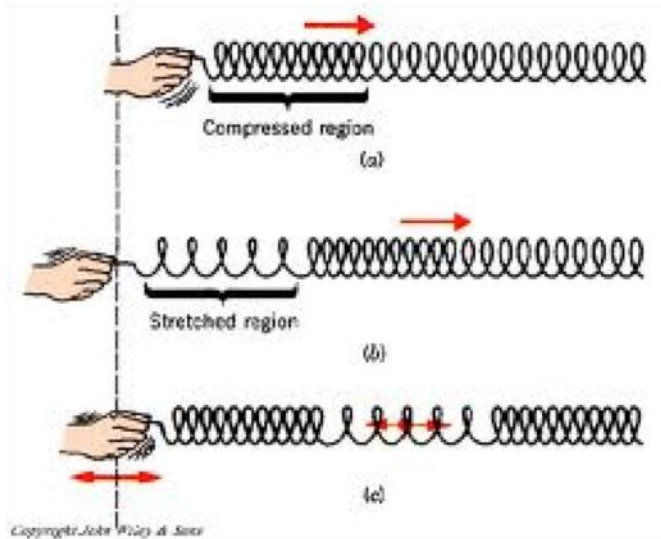
Sound waves therefore travel faster in solids than liquids and slower in air.

Speed of sound in air – 333m/s

Speed of sound in water – 1500m/s

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Slinky Toy (Example of a Longitudinal Waves)



Pitch – the pitch of a sound wave refers to the frequency. A high pitch sound has a high frequency.

Loudness – the loudness of sound refers to the amplitude. The greater the amplitude the louder is the sound.

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