

Sound



Sound

Sound is a form of energy produced by **vibrations**.

It travels through **solids, liquids, or gases** but **not through vacuum**.

Examples: *Music, voices, rustling leaves, drumbeats.*

Production of Sound: Sound is produced when an object **vibrates**. Vibrations disturb the air, creating sound waves.

Vibration - A **vibration** is a rapid back-and-forth or to-and-fro motion of an object about its mean position.

Examples: *Guitar strings vibrating, Drum surfaces vibrating when struck.*

Vocal Cords in the voice box (**larynx**) produce sound.

Sound cannot travel in a **vacuum**. It needs a **medium** (solid, liquid, or gas).

Hearing Sound: Our ears detect sound through three main parts:

- ➔ **Outer Ear:** Collects sound waves.
- ➔ **Middle Ear:** Amplifies sound using tiny bones.
- ➔ **Inner Ear:** Converts sound waves to signals for the brain.

Properties of Sound

- ➔ **Amplitude:** Maximum displacement of vibrating particles. Determines loudness. Measured in meters (m).
- ➔ **Time Period:** Time taken for one complete vibration. Measured in seconds (s).
- ➔ **Frequency:** Number of vibrations per second. Determines the pitch of sound. Measured in Hertz (Hz).
- ➔ **Pitch:**
 - Higher frequency → Higher pitch (e.g., bird's chirping).
 - Lower frequency → Lower pitch (e.g., lion's roar).
- ➔ **Loudness:**
 - Greater amplitude → Louder sound.
 - Measured in decibels (dB).
 - Sounds above 80 dB can be harmful.

Types of Sound

- ➔ **Audible Sound:** Frequencies between 20 Hz to 20,000 Hz. Humans can hear these sounds.
- ➔ **Inaudible Sound:**
 - Infrasonic: Below 20 Hz (e.g., earthquake waves).
 - Ultrasonic: Above 20,000 Hz (e.g., bats using echolocation).

Noise and Music

- ➔ **Noise:** Unpleasant and chaotic sounds. Examples: Traffic, construction, loud shouting.
- ➔ **Music:** Pleasant and rhythmic sounds. Examples: Songs, instrumental tunes, bird chirping.

Noise Pollution

Excessive or unwanted sound that causes discomfort.

Sources: Vehicles, machines, loudspeakers, construction work.

Effects: Stress, hearing loss, sleep disturbances, anxiety.

Prevention: Use silencers, plant trees, reduce loud sounds, maintain quiet zones.

Hearing Impairment

- ➔ **Partial Impairment:** Due to age, injury, or disease.
- ➔ **Total Impairment:** Rare, often present from birth.
- ➔ **Solutions:**
 - Hearing aids and cochlear implants.
 - Sign language and special education for communication.