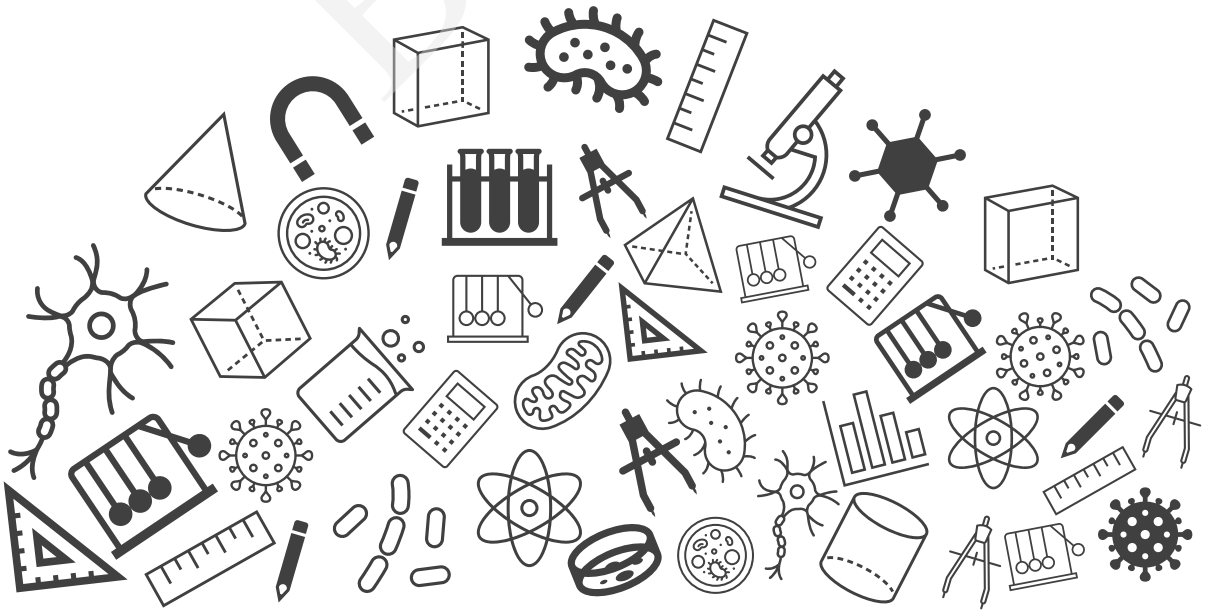
Grade 08
Chapter Notes



BYJU'S Classes

Class Notes

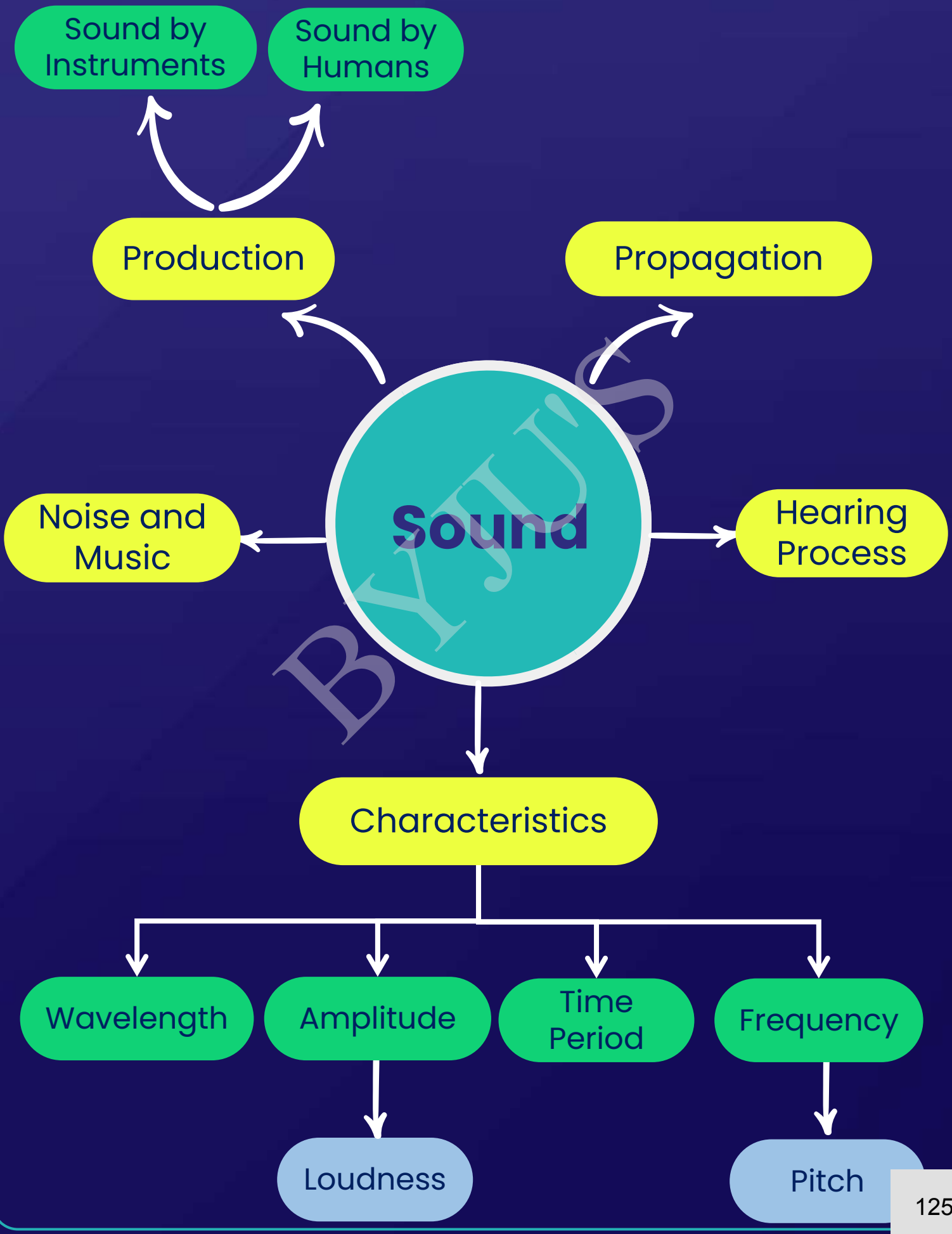
Sound

Grade 08

Topics to be Covered

1. **Production of Sound**
   - 1.1 Sound Production in Different Instruments
   - 1.2 Sound Production in Humans
2. **Propagation of Sound**
3. **Hearing Process**
4. **Characteristics of Sound**
   - 4.1 Wavelength
   - 4.2 Amplitude
   - 4.3 Time Period
   - 4.4 Frequency
5. **Audible and Inaudible Sounds**
6. **Noise and Music**
   - 6.1 Noise Pollution

Mind Map



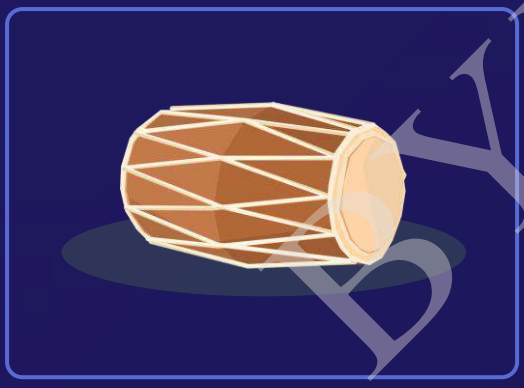
1. Production of Sound

Sound is a form of energy which is produced by vibrating objects.

1.1 Sound Production in Different Instruments

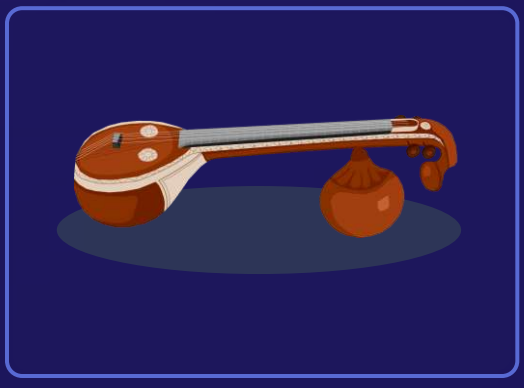
Guitar:

Due to vibration of strings



Dholak:

Due to vibration of membranes



Sitar:

Due to vibration of strings

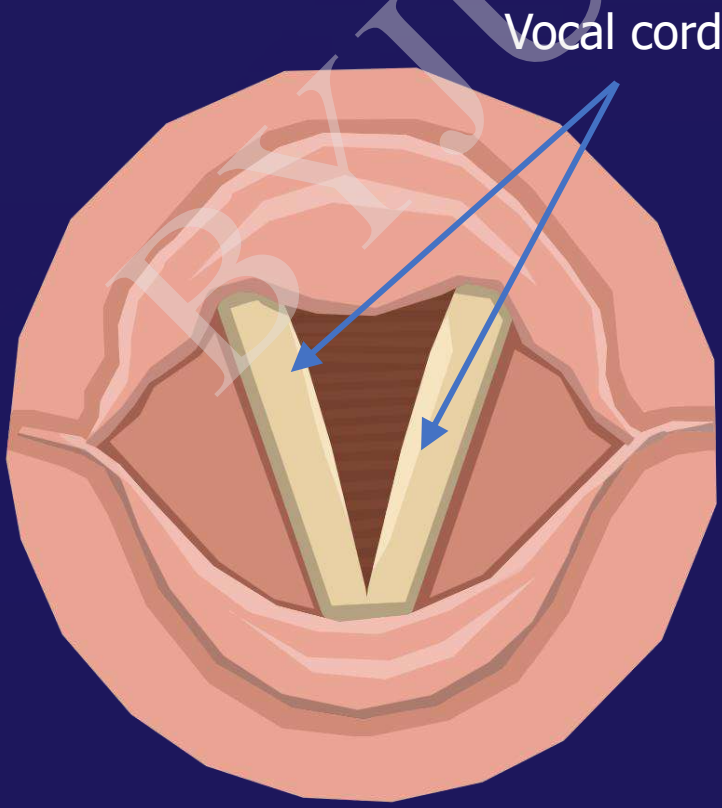
Flute:

Due to vibration of air column

1. Production of Sound

1.2 Sound Production in Humans

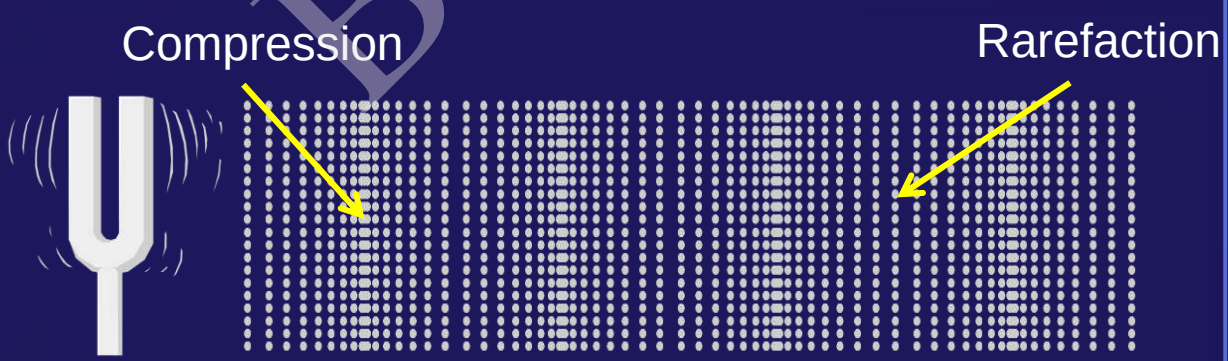
- In humans, sound is produced by the voice box or the larynx.
- It is at the upper end of the windpipe. Two vocal cords are stretched across the voice box or larynx in such a way that it leaves a narrow slit between them for the passage of air.
- When the lungs force air through the slit, the vocal cords vibrate, thus producing sound.



2. Propagation of Sound

Sound propagates in air as a series of compressions and rarefactions.

- Let's take the example of a vibrating tuning fork. When it moves forward, it pushes and compresses the air in front of it, creating a region of high pressure. This region is called compression.
- When the vibrating body moves backward, it creates a region of low pressure called rarefaction.
- As the object moves back and forth rapidly, a series of compressions and rarefactions are created in air. This is how sound propagates.



2. Propagation of Sound

- Sound requires a medium for propagation. It cannot travel through a vacuum because the vacuum has no medium which can carry the sound energy.
- Sound can travel through solids, liquids and gases. Its speed is maximum in solids, followed by liquids and then gases.

In Solids:

Speed is maximum.

In Liquids:

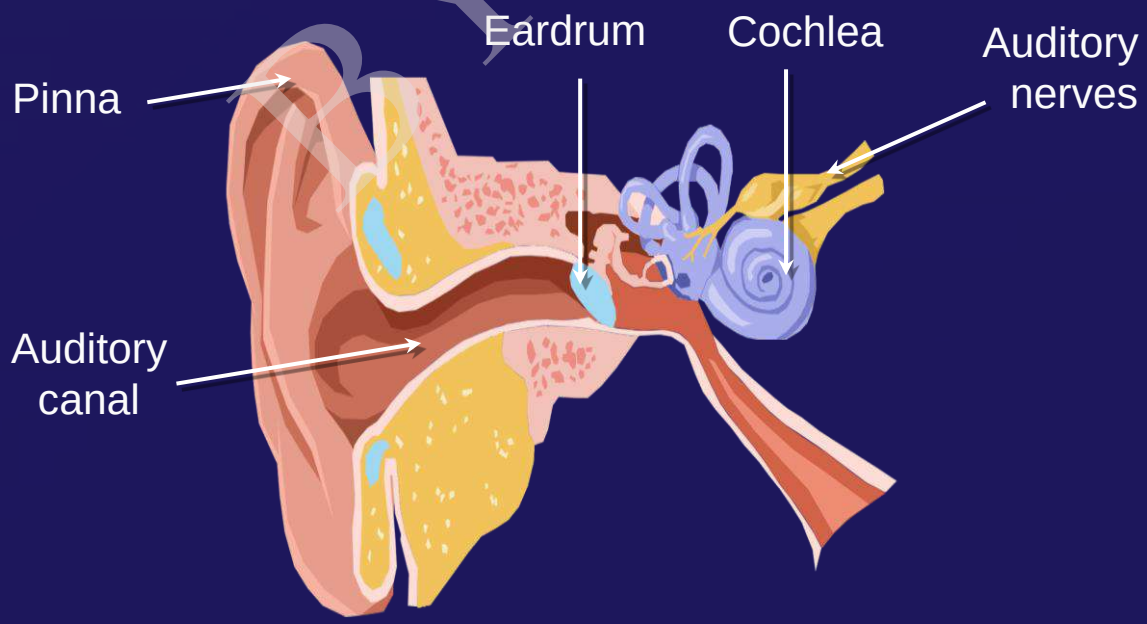
Speed is more than gases but less than solids.

In Gases:

Speed is minimum.

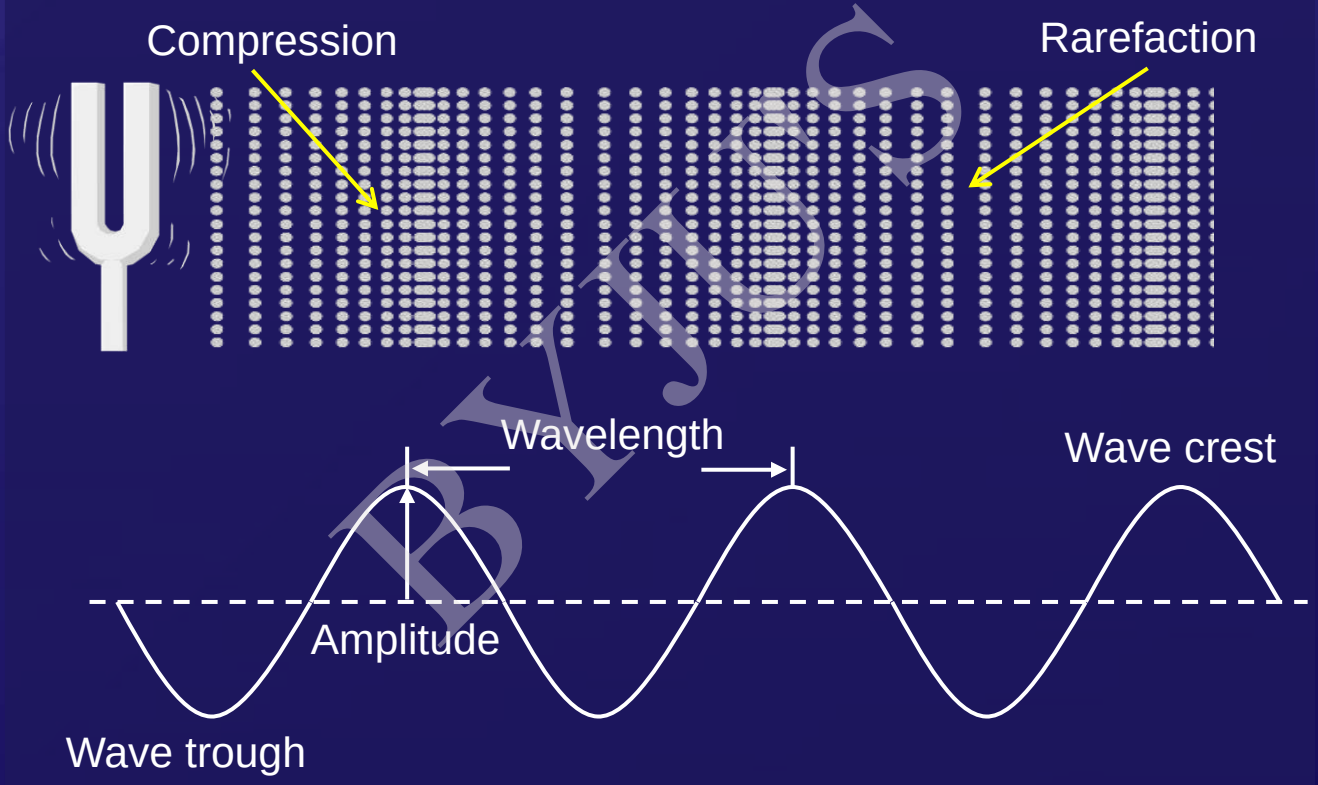
3. Hearing Process

- The outer part of the ear called pinna helps in collecting the sound and funnels it into the eardrum through the ear canal.
- Eardrum starts vibrating in a response to the incoming sound.
- Three little bones present in the middle ear increase the strength of the sound and pass the vibrations to the cochlea, where these vibrations are converted into electrical impulses. These impulses are then sent to the brain by the auditory nerves.
- Finally, the brain senses these impulses as sound.



4. Characteristics of Sound

- The propagation of sound can be represented in the form of a wave.
- The region of higher pressure or compression is represented as crest and the region of lower pressure or rarefaction is represented as trough.



4.1 Wavelength

- Wavelength is the distance between any two consecutive crests or troughs.
- The S.I. unit of wavelength is metre (m).

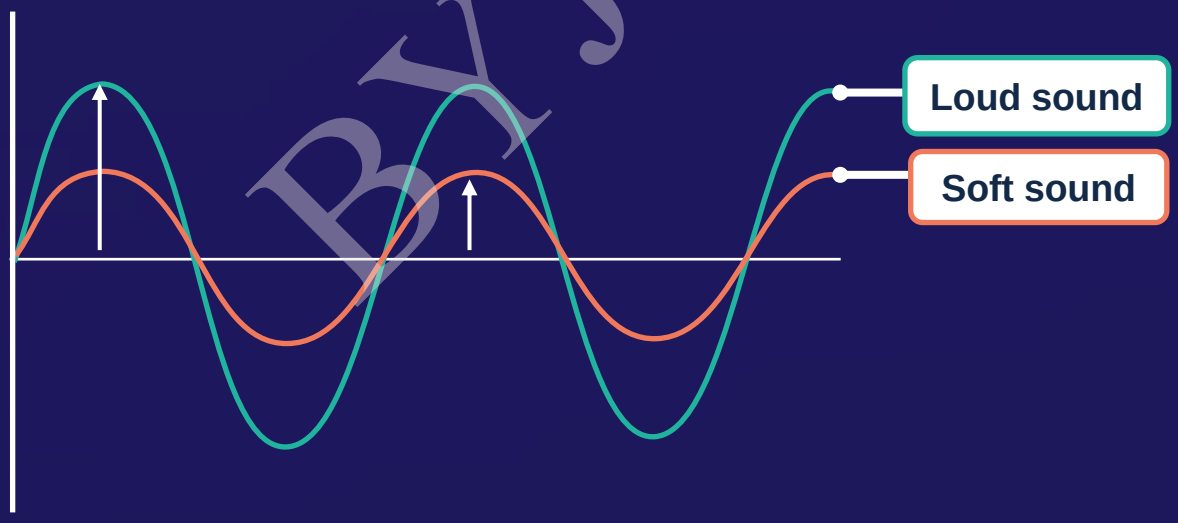
4. Characteristics of Sound

4.2 Amplitude

- The maximum displacement (or distance) of a crest or a trough from the mean position is called amplitude.
- Its SI unit is metre (m).

Loudness:

- Loudness is the characteristic by which a loud sound can be distinguished from a feeble sound.
- It depends on the amplitude of the sound wave. More the amplitude, louder is the sound.
- It is measured in decibel (dB).



4.3 Time Period

- Time period is the time required to produce one complete wave or oscillation.
- Its SI unit is second (s).

4. Characteristics of Sound

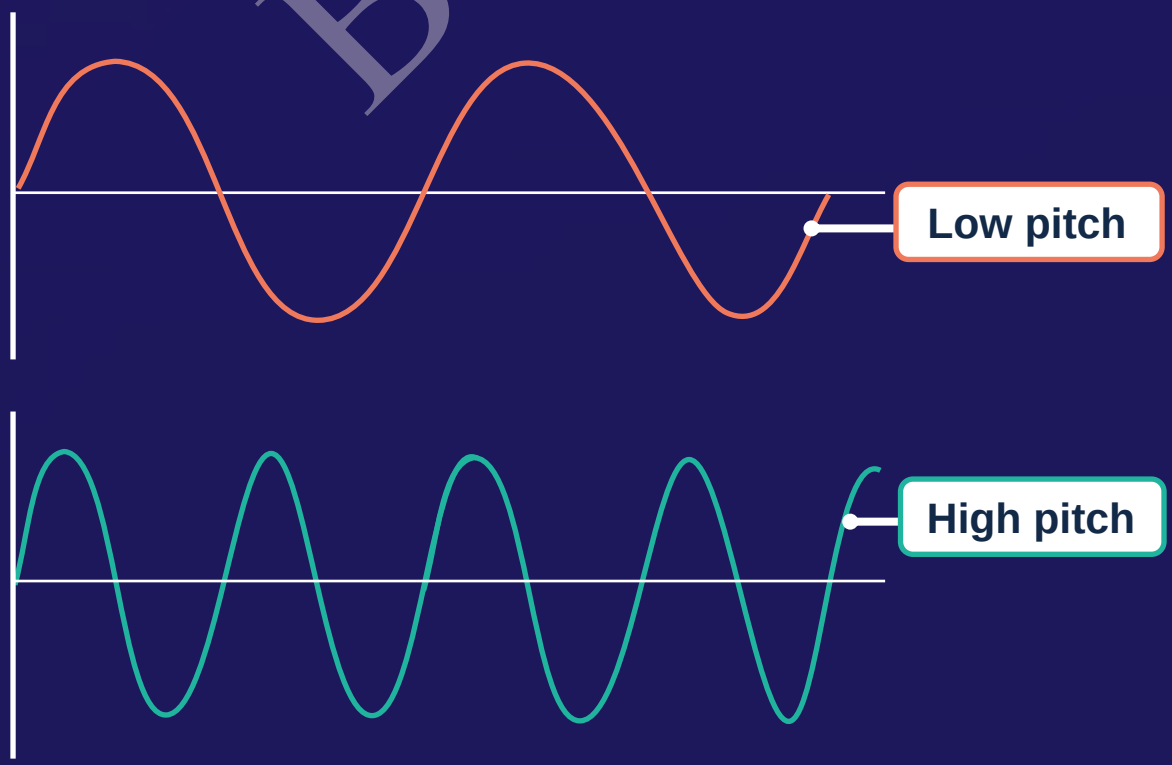
4.4 Frequency

- Frequency is the number of waves or oscillations produced in one second.
- The SI unit of frequency is hertz (Hz).

$$\text{Frequency} = \frac{1}{\text{Time period}}$$

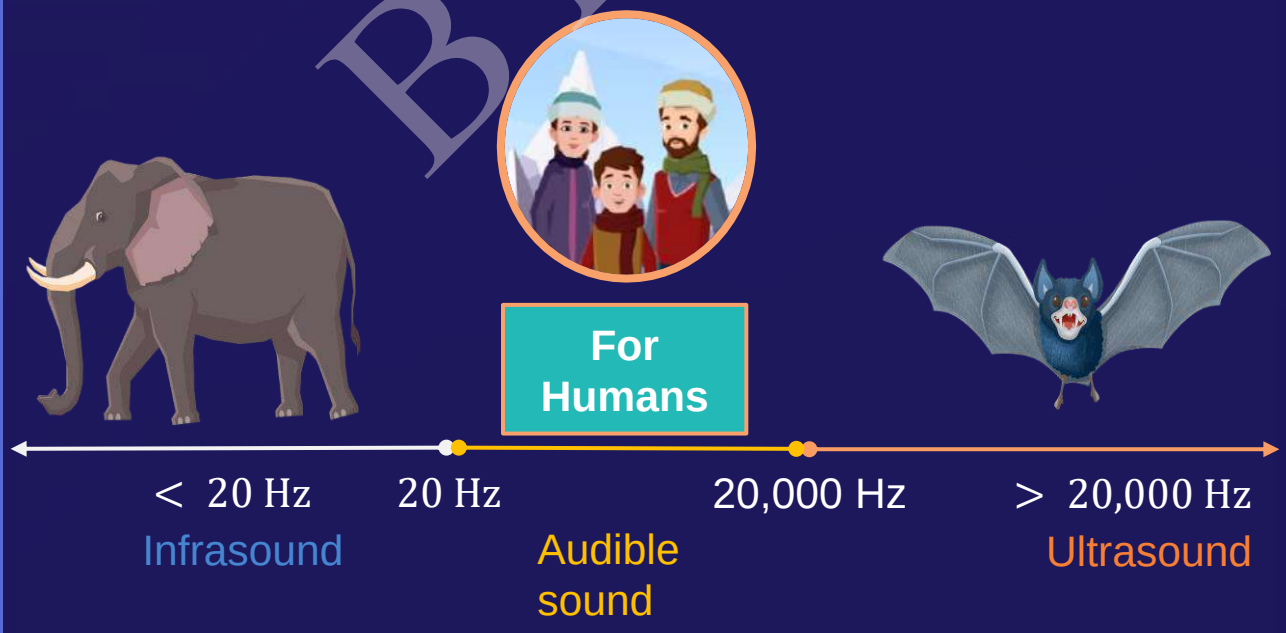
Pitch:

- Pitch is the characteristic by which a shrill sound can be distinguished from a flat sound.
- It depends on the frequency of the sound wave.
- Low frequency implies low pitched sound and high frequency implies high pitched sound.



5. Audible and Inaudible Sounds

- Our ears can hear sound in a particular range only.
- Sound having frequency roughly ranging from 20 Hz to 20,000 Hz lies in the audible range. In this range we can hear the sound.
- Sound having a frequency of less than 20 Hz is called **infrasound** and sound having a frequency of more than 20,000 Hz is called **ultrasound**. These frequencies are inaudible to us.
- Unlike humans, animals have different audible range of hearing. For example: elephants can hear sound of frequency less than 20 Hz and bats can hear sound of frequency even more than 20 kHz.



6. Noise and Music

- Noise is any unwanted or unpleasant sound while music is a sound that produces a pleasing sensation.

6.1 Noise Pollution

- The presence of excessive or unwanted sounds in the environment is called noise pollution.
- In cities, unnecessary honking and noise coming from vehicles are the major sources of noise pollution.

Honking of vehicles

- Apart from that, music speakers operating at high volumes, noisy machinery, etc. also contribute to noise pollution.

Speaker on high volume

6. Noise and Music

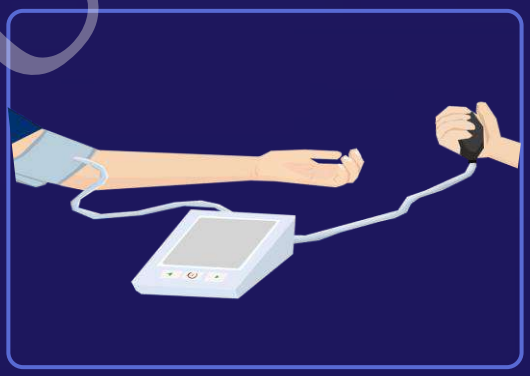
6.1 Noise Pollution

Hazards of Noise Pollution:

Headache

Sleeplessness

Hearing loss



Hypertension

Methods to reduce Noise Pollution:

Planting trees

Lubricating machines