KS3 REVISION
SOUND

Sound is a form of energy made by vibrating objects.

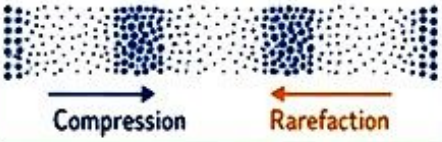
WHAT IS SOUND?

- Sound is produced when objects vibrate.
- The vibrations make the particles in a medium vibrate.
- These vibrations travel to our ears, so we hear sound.

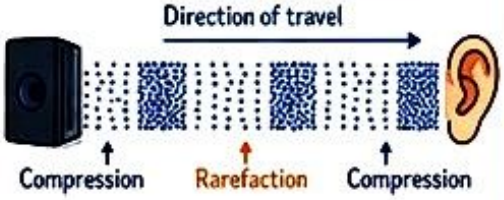


HOW SOUND TRAVELS

- Sound travels as a longitudinal wave.
- Particles vibrate backwards and forwards, transferring energy.
- Sound needs a medium (solid, liquid or gas) to travel.
- Sound cannot travel in a vacuum.



LONGITUDINAL WAVE



In a longitudinal wave, particles vibrate back and forth in the same direction as the wave travels.

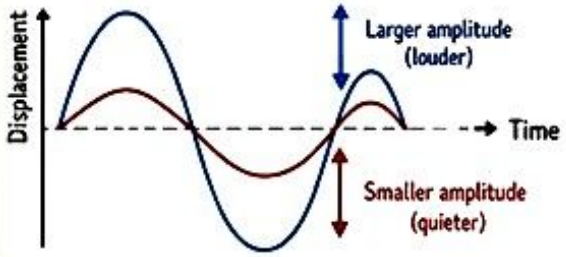
AMPLITUDE AND FREQUENCY

These two properties affect how we hear sound.

Amplitude = Loudness

Amplitude is the size of the vibration.

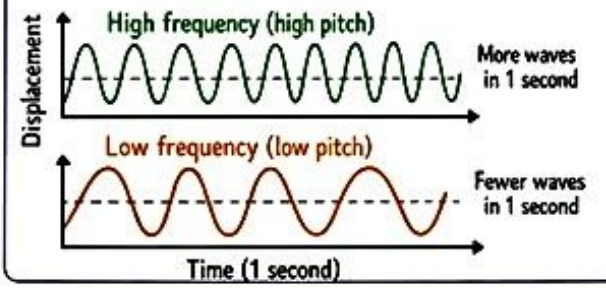
- Bigger amplitude = louder sound
- Smaller amplitude = quieter sound



Frequency = Pitch

Frequency is the number of vibrations per second.

- Higher frequency = higher pitch
- Lower frequency = lower pitch



Frequency is measured in **Hertz (Hz)**
1 Hz = 1 vibration per second



Amplitude is measured in **metres (m)**
(It is often linked to loudness in decibels)

MEASURING SOUND (LOUDNESS)

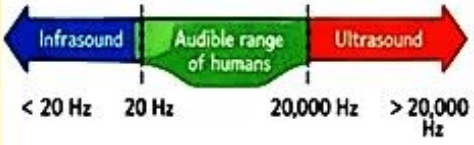
- Loudness is measured in decibels (dB).
- A higher number of decibels means a louder sound.

0 dB	Threshold of hearing (very quiet)
20 dB	Quiet room
60 dB	Normal conversation
80 dB	Busy traffic
100 dB	Loud music / concert
130+ dB	Threshold of pain

Prolonged exposure to loud sounds can damage your hearing.

HEARING RANGE OF HUMANS

- Humans can hear sounds with frequencies from 20 Hz to 20,000 Hz.
- Below 20 Hz = infrasound (too low to hear)
- Above 20,000 Hz = ultrasound (too high to hear)



EXAM TIP

- Learn the units:
  - Frequency → Hertz (Hz)
  - Loudness → Decibels (dB)
- Always label amplitude and wavelength on wave diagrams.
- Use examples in your answers (e.g. drums, echo, traffic noise).
- Read the question carefully – is it asking about pitch, loudness or how sound travels?

KEY POINTS TO REMEMBER

- Sound is produced by vibrations.
- Sound travels as a longitudinal wave.
- Sound needs a medium to travel.
- Higher frequency → higher pitch. Greater amplitude → louder sound.
- Humans hear from 20 Hz to 20,000 Hz. Below: infrasound Above: ultrasound

IMPACT OF NOISE POLLUTION ON HEALTH



Hearing Loss

Damage to inner ear leading to hearing impairment

Sleep Disturbances

Difficulty falling and staying asleep



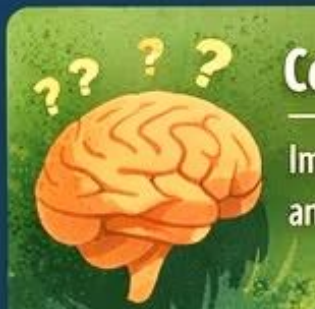
Heart Problems

Increased risk of hypertension, heart disease



Stress & Anxiety

Elevated stress, anxiety and irritability



Cognitive Issues

Impaired focus, memory and concentration

Reduced Quality of Life

Decreased overall well-being and life satisfaction





Reducing noise pollution is essential for protecting our health and well-being.

DAV PUBLIC SCHOOL, PTPS, PATRATU
ASSIGNMENT (PHYSICS)
CHAPTER 10 SOUND

SECTION – A

1. Which of the following statements is correct?
(i) Sound is produced by vibrations.
(ii) Sound requires a medium for propagation.
(iii) Light and sound both require a medium for propagation.
(iv) Sound travels slower than light.
(a) i & ii only (b) i, ii & iii only (c) ii, iii & iv only (d) i, ii & iv only

2. An object is vibrating at 50 hertz. What is its time period?
(a) 0.02 s (b) 2 s (c) 0.2 s (d) 20.0 s

3. The loudness of sound is determined by the
(a) amplitude of vibration (b) the ratio of amplitude and frequency of vibration
(c) frequency of vibration (d) product of amplitude and frequency of vibration

4. Ultrasound has a frequency of vibration
(a) between 20 and 20,000 Hz (b) below 20 Hz
(c) above 20,000 Hz (d) between 500 and 10,000 Hz

5. A list of mediums is given below.
(i) wood (ii) water (iii) air (iv) vacuum
In which of these mediums can sound travel?
(a) i & ii only (b) i, ii & iii only (c) iii & iv only (d) ii, iii & iv only

6. In the below question, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as
Assertion (A): Jal tarang, ektara, veena all are musical instruments.
Reason (R): Sound is produced by vibrations in musical instruments.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A)
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

SECTION – B

7. What are the harmful effects of noise pollution on our health?

8. What do you mean by vacuum? What happens to the loudness of sound in vacuum?

9. What are musical instruments? How do they produce sound?

10. The sound from a mosquito is produced when it vibrates its wings at an average rate of 500 vibrations per second. What is the time period of the vibration?

SECTION – C

11. A pendulum oscillates 40 times in 4 seconds. Find its time period and frequency.

12. Identify the part which vibrates to produce sound in the following instruments.
(a) Dholak (b) Sitar (c) Flute

13. What are the methods to control noise pollution?

14. What is amplitude? How it affects loudness of sound?

OR

Write the applications of the ultrasound.

SECTION – D

15. Draw a diagram of human ear and answer the questions:
(i) What are the three main parts of human ear?
(ii) Name the outer part of ear.
(iii) Name the stretched thin membrane of human ear.

16. (a) Define the term vibration.
(b) What is time period? If strings of a guitar vibrate at 50 oscillations per 5 sec. Calculate its time period.
(c) Calculate the frequency of a bell that has 80 oscillations per 4 s
(d) If the amplitude of a sound wave is 70; what will be its loudness in decibels?

SECTION – E (Case Study Based Question)

17. Sound plays an important role in our lives. It helps us to communicate with one another. We hear a variety of sounds in our surroundings. As you know the to and fro or back and forth motion of an object is called vibration. When a tightly stretched band is plucked, it vibrates and produces sound. When it stops vibrating, it does not produce any sound. In some cases, the vibrations are easily visible to us. But in most cases, their amplitude is so small that we cannot see them. However, we can feel them. In humans, the sound is produced by the voice box or the larynx. Put your fingers on the throat and find a hard bump that seems to move when you swallow. This part of the body is known as the voice box.



(a) Why sound is most important to us?
(b) What is vibration?

OR

Where is sound produced in human body?
(c) How does sound travel from one place to another?