

SCIENCE • CLASS 9

CHAPTER 10

Sound Waves

Characteristics and Applications

NCERT SOLUTIONS



PRODUCING SOUND

Pause and Ponder — Questions 1 and 2

Q1. Explore different ways of producing sound.

Answer: Make an object vibrate.

- Pluck a stretched string or rubber band.
- Strike a drum membrane or a tuning fork.
- Blow across a flute opening to vibrate its air column.
- Speak or sing by vibrating the vocal cords.

Q2. List musical instruments and identify their main vibrating parts.

Instrument	Vibrating part
Guitar / sitar	Stretched strings
Tabla / dholak	Stretched membrane
Flute / bansuri	Air column
Taal / cymbals	Metal plates

The instrument body may also vibrate and make the sound stronger.

SOUND NEEDS A MEDIUM

Pause and Ponder — Question 3

Choose the correct assertion–reason option.

A: We cannot hear a bell ringing in a closed jar after most of the air is pumped out.

R: Sound requires a medium to travel.

Options:

- (i) Both true; R does not explain A.
- (ii) Both true; R correctly explains A.
- (iii) A true; R false.
- (iv) A false; R true.

Solution:

Sound is a mechanical wave. Removing air removes most particles that carry the disturbance. The bell still vibrates, but its sound becomes very faint.

Therefore, both A and R are true, and R correctly explains A.

Expected answer: (ii).

Precision:

In a near vacuum, almost no sound is heard; complete silence is an idealisation. Sound cannot travel through a perfect vacuum.

WHAT TRAVELS WITH SOUND?

Pause and Ponder — Questions 4 and 5

Q4. Choose the correct assertion–reason option.

A: Compressions and rarefactions move through the medium.

R: Individual particles continuously move forward with the wave.

- (i) Both true; R does not explain A.
- (ii) Both true; R explains A.
- (iii) A true; R false.
- (iv) A false; R true.

Answer: (iii).

Particles oscillate about their mean positions. The density disturbance moves forward; the particles do not travel with it.

Q5. What reaches your ear when sound travels from a tuning fork?

- (i) Air particles near the fork
- (ii) Energy carried by sound waves
- (iii) Tuning-fork material
- (iv) A continuous stream of compressed air

Answer: (ii).

Neighbouring particles pass on the disturbance and energy.

COMPRESSIONS AND RAREFACTIONS

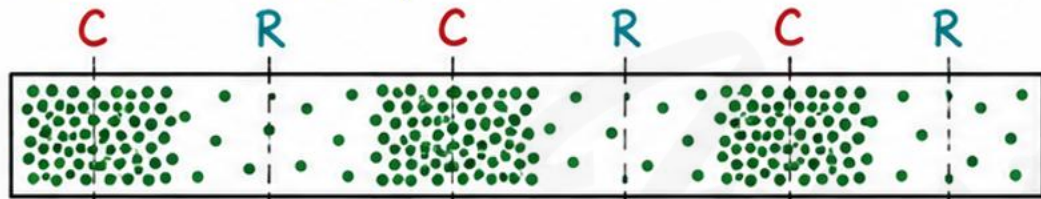
Pause and Ponder — Question 6

Question: Mark compressions C and rarefactions R in the two density patterns. Label the axes and draw the matching density-distance graphs.

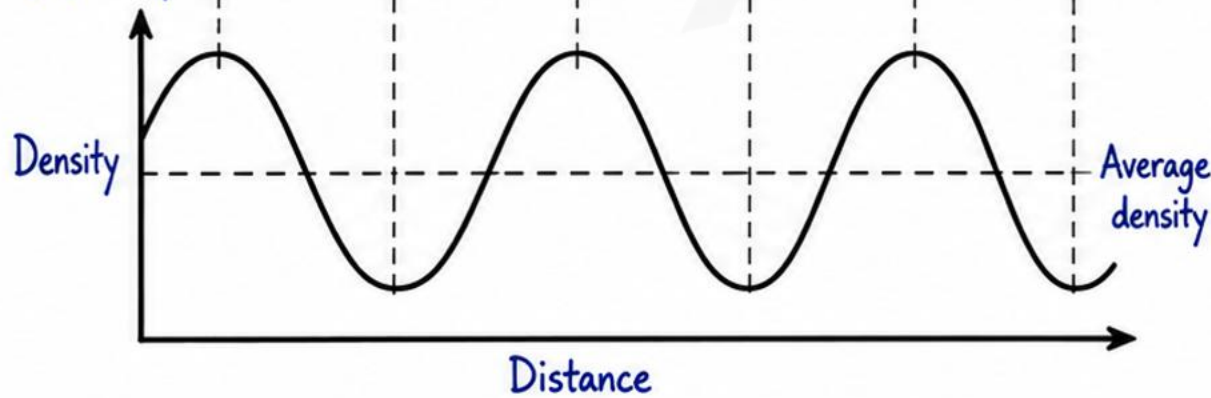
Answer key:

C = closely packed particles;
R = widely spaced particles.

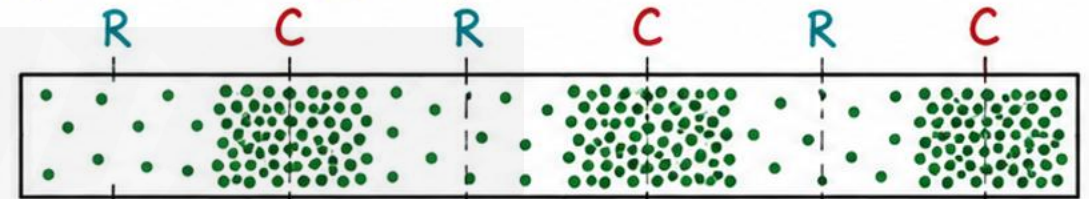
(a) Pattern → (c) Graph



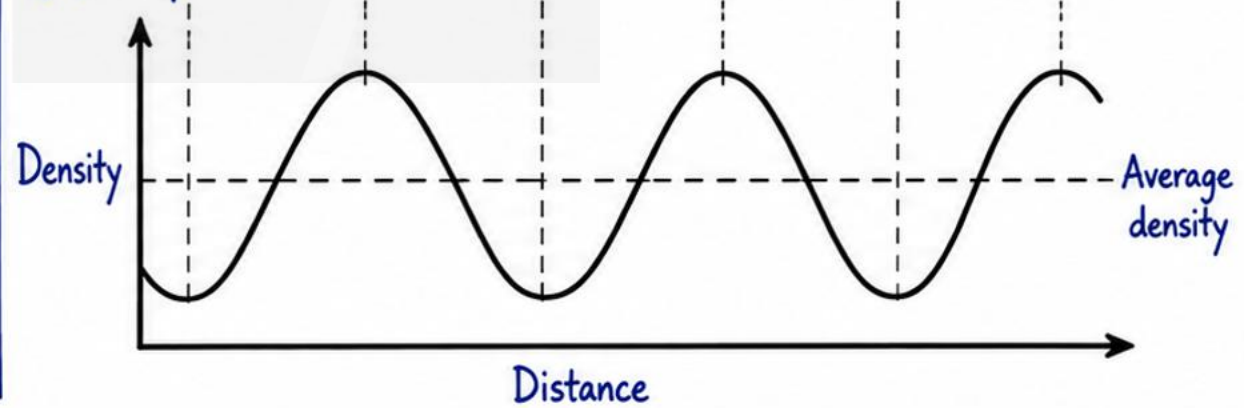
(c) Graph



(b) Pattern → (d) Graph



(d) Graph



Compression gives density above the average; rarefaction gives density below the average.

The curve represents density, not the path followed by a particle.



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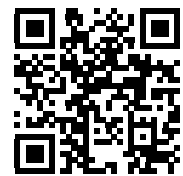


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