PHYSICS YEAR 11 - MODULE 3 - LESSON 9

Sound as a Mechanical Wave

Use this worksheet after reading the lesson to practise the key ideas and prove you can meet the success criteria.

Name _____

Date _____

Class _____

1. Key Ideas

Sound is not a transverse ripple moving through empty space. It is a longitudinal mechanical wave produced by a vibrating source, moving through a medium by compressions and rarefactions. No medium means no sound — which is why the universe is silent even when stars explode.

- Sound is a longitudinal mechanical wave
- How a vibrating source launches a sound wave

2. Success Criteria

By the end, you should be able to:

- Sound is a longitudinal mechanical wave
- Sound requires a medium and cannot travel through a vacuum
- Compressions and rarefactions describe sound-wave structure

3. Key Terms

Work
The product of force and displacement in the direction of the force; W = Fd.

Energy
The capacity to do work, measured in joules (J).

Kinetic Energy
The energy of motion; KE = ½mv^2.

Potential Energy
Stored energy due to position or configuration.

Power
The rate at which work is done or energy is transferred; P = W/t.

Conservation of Energy
The principle that energy cannot be created or destroyed, only transformed.

4. Activity: Build the Lesson Map

Use the lesson to complete the table. Keep answers brief but specific.

Prompt	Your answer
Main concept	
Important example	
Common mistake to avoid	
How this links to the next lesson	

5. Short Answer Questions

1. 7. Explain why sound is described as both longitudinal and mechanical.

BAND 3 3 MARKS

2. 8. Describe what the bell-jar experiment shows about sound transmission.

BAND 4 3 MARKS

3. 9. Compare loudness and pitch, linking each to the correct wave property.

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Sound as a Mechanical Wave but does not use evidence or reasoning.

Improve the answer by writing a stronger response that uses accurate terminology, a relevant example and a clear explanation.

7. Multiple Choice

1. What is the best first step when answering a question about Sound as a Mechanical Wave?

☐ A. Identify the key concept being tested

☐ B. Write every fact from memory

☐ C. Ignore the command word

☐ D. Skip examples and evidence

2. Which answer would show stronger understanding of Sound as a Mechanical Wave?

☐ A. An answer with accurate terms and reasoning

☐ B. A copied definition only

☐ C. A single-word response

☐ D. An answer with no example

3. What should you do if a question asks you to explain?

☐ A. Link the idea to a reason or cause

☐ B. List unrelated facts

☐ C. Only draw a diagram

☐ D. Write the shortest possible answer

8. Success Criteria Proof

Finish with evidence that you can do each success criterion.

SUCCESS CRITERION 1

Prove that you can: Sound is a longitudinal mechanical wave

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: Sound requires a medium and cannot travel through a vacuum

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: Compressions and rarefactions describe sound-wave structure

BAND 5 4 MARKS

One thing I still need help with: