PHYSICS YEAR 11 - MODULE 3 - LESSON 7

Standing Waves and Resonance

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

A standing wave is not a wave travelling along the medium. It is the stable pattern formed when two identical waves travel in opposite directions. That pattern reveals nodes, antinodes, harmonics, and the idea of resonance — the reason a guitar string can ring out a clear note while other frequencies die away almost instantly.

- How standing waves form
- Why standing waves are formed by opposite-travelling waves

2. Success Criteria

By the end, you should be able to:

- How standing waves form
- What nodes and antinodes are
- What resonance means

3. Key Terms

standing wave
not a wave travelling along the medium

Each loop
half a wavelength, not a full wavelength

Why standing waves
formed by opposite-travelling waves

Work and energy
completely different concepts

Work
the transfer of energy; they share the same unit (joules) and are fundamentally linked

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

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 the difference between a node and an antinode in a standing wave.

BAND 3 3 MARKS

2. 8. A string fixed at both ends has length 1.5 m. Find the wavelength of the third harmonic.

BAND 4 3 MARKS

3. 9. Explain why resonance causes a dramatic increase in amplitude in a mechanical system.

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Standing Waves and Resonance 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 Standing Waves and Resonance?

☐ 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 Standing Waves and Resonance?

☐ 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: How standing waves form

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: What nodes and antinodes are

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: What resonance means

BAND 5 4 MARKS

One thing I still need help with: