PHYSICS YEAR 11 - MODULE 3 - LESSON 8

Progressive vs Standing Waves

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 progressive wave carries energy through a medium. A standing wave does not carry net energy along the medium, even though particles still oscillate. That difference explains why room acoustics can contain loud spots and dead zones, and why the physics of each wave type demands a completely different analysis.

- The difference between progressive and standing waves
- Why progressive waves transfer energy and standing waves do not transfer net energy along the medium

2. Success Criteria

By the end, you should be able to:

- The difference between progressive and standing waves
- Where nodes and antinodes occur
- The phase rule for standing waves

3. Key Terms

not mean every particle
always in phase everywhere

Energy
conserved; machines can only transform energy, never create it (efficiency ≤ 100%)

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

standing wave
still a wave pattern, but it is not a pattern carrying net energy along the medium

the pattern
produced by opposite-travelling waves superposing

but there
no net transfer along the medium as a whole

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. State two differences between a progressive wave and a standing wave.

BAND 3 3 MARKS

2. 8. Explain the phase relationship of particles in a standing wave on the same side of a node and on opposite sides of a node.

BAND 4 3 MARKS

3. 9. A string fixed at both ends has length 0.90 m and vibrates in the third harmonic. Find the wavelength and explain what makes this a standing-wave mode.

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Progressive vs Standing Waves 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 Progressive vs Standing Waves?

☐ 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 Progressive vs Standing Waves?

☐ 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: The difference between progressive and standing waves

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: Where nodes and antinodes occur

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: The phase rule for standing waves

BAND 5 4 MARKS

One thing I still need help with: