PHYSICS YEAR 11 - MODULE 3 - LESSON 12

The Doppler Effect

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

When a siren rushes past, the pitch seems higher on approach and lower as it moves away. That apparent frequency shift is the Doppler effect, and it underpins police radar, weather Doppler systems, astronomy, and medical ultrasound.

- What the Doppler effect is
- Why wavefronts bunch up in front of a moving source

2. Success Criteria

By the end, you should be able to:

- What the Doppler effect is
- That approaching motion raises observed frequency
- That receding motion lowers observed frequency

3. Key Terms

That apparent frequency shift
the Doppler effect, and it underpins police radar, weather Doppler systems, astronomy, and medical ultrasound

the source
moving and the observer is stationary

approaching source
higher observed frequency, so the denominator must get smaller

the observer
moving and the source is stationary

Zero acceleration
an object is stationary

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 why an approaching source produces a higher observed frequency.

BAND 3 3 MARKS

2. 8. A 600 Hz siren moves towards a stationary observer at 30 m/s. Take the speed of sound as 340 m/s. Find the observed frequency.

BAND 4 3 MARKS

3. 9. Distinguish the moving-source and moving-observer Doppler equations, and explain one technological use of the effect.

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about The Doppler Effect 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 The Doppler Effect?

- [ ] 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 The Doppler Effect?

- [ ] 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: What the Doppler effect is

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: That approaching motion raises observed frequency

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: That receding motion lowers observed frequency

BAND 5 4 MARKS

One thing I still need help with: