MATHEMATICS ADVANCED YEAR 11 - MODULE 2 - LESSON 14

Modelling with Trigonometric Functions

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

Tides rise and fall. Temperatures peak in summer and dip in winter. Sound waves travel through air. All of these phenomena can be modelled by sinusoidal functions. In this lesson, you will learn how to extract real-world data, build trigonometric models, and use them to make predictions.

- How to calculate amplitude and midline from maximum and minimum values
- Why periodic phenomena are naturally modelled by trig functions

2. Success Criteria

By the end, you should be able to:

- How to calculate amplitude and midline from maximum and minimum values
- How to determine the period from real-world cycles
- How to write a trigonometric model from given data

3. Key Terms

Trigonometric Ratio
The ratio of sides in a right-angled triangle (sin, cos, tan).

Radian
A unit of angle measure where one radian subtends an arc equal to the radius.

Sine Rule
A formula relating sides and angles in any triangle: $a/\sin A = b/\sin B = c/\sin C$.

Cosine Rule
A formula for finding sides or angles: $c^2 = a^2 + b^2 - 2ab\cos C$.

Period
The length of one complete cycle of a periodic function.

Amplitude
The maximum displacement from the centre line of a periodic function.

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. Explain this lesson goal in your own words: "How to calculate amplitude and midline from maximum and minimum values". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "How to determine the period from real-world cycles". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding Modelling with Trigonometric Functions: "How to write a trigonometric model from given data".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Modelling with Trigonometric Functions 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 Modelling with Trigonometric Functions?

☐ 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 Modelling with Trigonometric Functions?

☐ 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 to calculate amplitude and midline from maximum and minimum values

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: How to determine the period from real-world cycles

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: How to write a trigonometric model from given data

BAND 5 4 MARKS

One thing I still need help with: