CHEMISTRY YEAR 12 - MODULE 8 - LESSON 17

Nanomaterials & Their Properties

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

Modern sunscreen can contain titanium dioxide nanoparticles that block ultraviolet radiation while remaining less visibly white on the skin. That usefulness comes from nanoscale behaviour, but it also raises a serious question: when a material becomes extremely small, do its benefits and risks both change?

- The definition of a nanomaterial
- Why nanomaterials differ from bulk materials through surface area and quantum effects

2. Success Criteria

By the end, you should be able to:

- The definition of a nanomaterial
- The named nanomaterials and applications in the course
- The meanings of top-down and bottom-up synthesis

3. Key Terms

Titanium dioxide
titanium dioxide

the composition
the same, nanoparticles should behave exactly like the bulk material and carry no new issues

Why
that statement chemically incomplete?

The statement
incomplete because

Nanomaterials
just very small versions of bulk materials with identical properties

nanomaterial
not just “a very small material”

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: "The definition of a nanomaterial". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "The named nanomaterials and applications in the course". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding Nanomaterials & Their Properties: "The meanings of top-down and bottom-up synthesis".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Nanomaterials & Their Properties 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 Nanomaterials & Their Properties?

☐ 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 Nanomaterials & Their Properties?

☐ 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 definition of a nanomaterial

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: The named nanomaterials and applications in the course

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: The meanings of top-down and bottom-up synthesis

BAND 5 4 MARKS

One thing I still need help with: