SCIENCE YEAR 9 - UNIT 2 - LESSON 10

Metallic Bonding and Comparing Material Types

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

This lesson completes the bonding sequence by introducing the Stage 5 metallic bonding model and then comparing metallic, ionic and covalent substances. The goal is not to memorise three separate lists, but to use bonding as evidence for real material decisions.

- metallic bonding uses a model of positive ions in a sea of delocalised electrons
- mobile electrons help explain electrical conductivity in metals

2. Success Criteria

By the end, you should be able to:

- metallic bonding uses a model of positive ions in a sea of delocalised electrons
- metals are often conductive, malleable and ductile
- ionic, covalent and metallic substances can be compared using bonding and property evidence

3. Key Terms

Metallic bonding
The attraction between positive metal ions and delocalised electrons in a metal.

Delocalised electrons
Electrons that are not fixed to one atom and can move through the metal structure.

Malleable
Able to be hammered or shaped without shattering.

Ductile
Able to be drawn into wires.

Conductivity
The ability of a material to allow electricity or heat to move through it.

Material type
A broad structural category such as ionic, covalent or metallic.

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: "metallic bonding uses a model of positive ions in a sea of delocalised electrons". Use one specific example from the lesson.

CORE

2. Apply this idea to a new example: "metals are often conductive, malleable and ductile". Show your reasoning clearly.

CORE

3. Analyse why this idea matters for understanding Metallic Bonding and Comparing Material Types: "ionic, covalent and metallic substances can be compared using bonding and property evidence".

REASONING

6. Extend: Apply the Idea

A student says, "I understand Metallic Bonding and Comparing Material Types because I memorised the definition."

Explain why memorising a definition is not enough. Use an example from the lesson to show deeper understanding.

7. Multiple Choice

1. What is the best first step when answering a question about Metallic Bonding and Comparing Material Types?

☐ 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 Metallic Bonding and Comparing Material Types?

☐ 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: metallic bonding uses a model of positive ions in a sea of delocalised electrons

SUCCESS CRITERION 2

Prove that you can: metals are often conductive, malleable and ductile

SUCCESS CRITERION 3

Prove that you can: ionic, covalent and metallic substances can be compared using bonding and property evidence

One thing I still need help with: