Bonding and structure review

Student activity • desk activity

YEAR 10 / LESSON 25 / CHEMISTRY + SCIENCE (DOUBLE AWARD)

The question

Can you link particles, bonding and properties in one coherent explanation?

Retrieve ionic and covalent bonding ideas, compare structures and improve explanations. These original shared-core questions revisit Lessons 15–24. Metallic bonding is left to Chemistry-only Lesson 27 and is not required in this review.

Equipment

- Student booklet, pencil and a different-colour correction pen
- Periodic table and previous lesson notes for the checking stage
- Blank paper for dot-and-cross diagrams; no practical apparatus

Desk activity only. Use pre-cut blunt modelling pieces and keep small parts out of mouths. Keep the workspace clear; no chemicals, flames or electrical supply are required.

Course coverage: Shared-core review: ion formation, ionic ratios, ionic/covalent bonding, molecular and giant covalent structures, mobile charge carriers and carbon allotropes.

Your starting point

One bonding explanation I can justify; one I need to check:

Method and reasoning

Read the whole sequence before starting

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1. Close your notes. Write one remembered idea for each row in the review table and give confidence 1–3.

2. Complete questions 1–3 independently. Draw complete dot-and-cross diagrams where requested and check particle counts and charges.

3. Complete questions 4–6. For each property, name the structure, identify the relevant attraction or charge carrier, then connect it to the property.

4. Compare reasoning with a partner. Mark any disagreement without erasing your own first attempt.

5. Use the teacher's answer guidance and your earlier notes. Correct errors in a different colour and add one sentence explaining why your original reasoning was incomplete.

6. Select two weak ideas and write a precise practice action for each. Avoid an unspecific instruction such as "revise bonding".

7. Exit task: explain why solid sodium chloride does not conduct but molten sodium chloride does. Identify the moving particles, not just a property name.

Cleanup

• Keep your evidence and corrections. Count and return reusable model pieces; recycle unwanted paper. No chemical waste is produced.

Record your evidence

Blank spaces are for your own work

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Reference and task data

Use Na atomic number 11 and Cl atomic number 17. An oxygen atom has six outer electrons and hydrogen has one. The questions use standard classroom models, not new experimental measurements. “Strong bonds” alone is not enough: state where the bonds or attractions are and what changes.

Topic	Recalled idea / confidence 1–3	Correction / next action
Ions and formula ratios		
Ionic versus covalent bonding		
Molecules and boiling		
Diamond and graphite		
Mobile charge carriers		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. A sodium atom forms Na^+. State its proton and electron counts, and explain the change.

2. Explain why the formula is $MgCl_2$ rather than MgCl. Identify the type of attraction in its solid.

3. Draw a full outer-electron dot-and-cross diagram for H_2O and explain the attraction in one O–H bond.

4. Correct: “Boiling a simple molecular substance breaks its covalent bonds.”

5. Compare diamond and graphite in hardness and electrical conductivity, with structural reasons.

6. Explain why molten sodium chloride conducts but a pure simple molecular liquid usually does not.