Bonding and structure review

Teacher / technician

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

Staff preparation and answer guidance. Keep separate from student sheets. Original formative review. No official examination marks or new practical observations. Metallic bonding is excluded from this shared-core set.

Coverage and delivery

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

Allow about 50 minutes. Follow the student sequence and use the answers to check reasoning.

Requisition • class of 30, working in 15 pairs

Item	Per pair / setup	Class total
Student booklet	1 per student	30
Writing tools / blank paper	1 set per student	30 sets
Periodic table	1 per pair	15
Correction pen	1 per student	30

Immediate safety

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.

Preparation and delivery

Read alongside the student method

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

1. Use a closed-notes first attempt followed by an explicit correction stage. Do not distribute the staff answer sheet at the start.

2. Suggested 50 minutes: 5 retrieval, 20 independent responses, 15 compare/correct, 5 targeted actions and 5 exit question. The confidence scores are formative, not marks.

3. Keep this a shared-core review. Do not introduce the Chemistry-only metallic-bonding explanation before Lesson 27 or make it part of Double Award checking.

4. Watch for “electrons flow through molten salts”, “all covalent bonds are weak” and “graphite layers are joined by weak covalent bonds”. Require the correct particles or location of attractions.

Close of lesson

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

Check before teaching

Check the cards, reference data and quantities against this requisition. Keep the staff answer guide separate until the checking stage. Supplied numerical practice datasets are labelled examples; they are not class measurements.

Answers and teaching notes

Expected explanations • do not give as experimental observations

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• Na^+ has 11 protons and 10 electrons: one electron has been lost; the nucleus is unchanged.

• Mg^{2+} balances two Cl^- ions, giving a 1:2 ratio and overall neutrality. Ionic bonding is attraction between oppositely charged ions in the extended structure.

• H_2O has two shared pairs and two lone pairs on O. Each H reaches two outer electrons; O reaches eight. Positive nuclei attract the shared electron pair.

• Boiling overcomes attractions between intact molecules; the internal covalent bonds are not broken in this change of state.

• Diamond: four bonds per carbon in a rigid 3D network; hard and ordinarily non-conducting. Graphite: three bonds per carbon in sheets; weaker interlayer attractions allow sliding and delocalised electrons permit conduction along sheets.

• Molten sodium chloride has mobile ions that carry charge; its solid ions are fixed. Pure simple molecular liquids usually have neither mobile ions nor delocalised electrons. Exit answer uses mobile ions, not moving electrons through the salt.

References and provenance

Pearson Chemistry specification

Prepared 22 November 2026. Original wording, tables and questions. Sources inform the concepts and technique; the lesson scope and classroom quantities are explicitly described here. No laboratory trial or final school risk approval is claimed.