

# AQA Chemistry

## GCSE Student checklist

C3

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Structure and bonding

| Lesson                | Aiming for 4   |                          | Aiming for 6   |                          | Aiming for 8  |                          |
|-----------------------|--|--------------------------|--|--------------------------|---|--------------------------|
| C3.1 States of matter | I can identify the three states of matter and their state symbols.   | <input type="checkbox"/> | I can use data to determine the state of a substance at a given temperature.   | <input type="checkbox"/> | I can use the particle model to describe how energy, movement, and attraction between particles changes as a substance is heated or cooled. | <input type="checkbox"/> |
|                       | I can describe the process of melting, freezing, boiling, and condensing.  | <input type="checkbox"/> | I can explain, in terms of particles, energy and temperature of a substance when it is at the melting point or boiling point.                  | <input type="checkbox"/> | I can suggest why substances have different melting and boiling points from each other.   | <input type="checkbox"/> |
|                       | I can use the particle model to draw a representation of how particles are arranged in the three states of matter. | <input type="checkbox"/> | I can describe the factors that affect rate of evaporation.  | <input type="checkbox"/> | I can evaluate a model, explaining its limitations. <b>H</b>  | <input type="checkbox"/> |
| C3.2 Atoms in ions    | I can state the particles involved in ionic and covalent bonding.  | <input type="checkbox"/> | I can draw dot and cross diagrams of compounds formed between Group 1 and Group 7 elements.  | <input type="checkbox"/> | I can draw dot and cross diagrams of unfamiliar ionic compounds.  | <input type="checkbox"/> |
|                       | I can describe, with an example, how a Group 1 metal atom becomes a positive ion.                                  | <input type="checkbox"/> | I can explain how electron transfer allows ionic bonding to occur in the compound formed when a Group 1 metal reacts with a Group 7 non-metal. | <input type="checkbox"/> | I can suggest and explain the charge of a monatomic ion based on its position in the periodic table.  | <input type="checkbox"/> |
|                       | I can describe, with an example, how a Group 7 non-metal atom becomes a negative ion.                              | <input type="checkbox"/> |  |                          |   |                          |
| C3.3 Ionic bonding    | I can state that opposite charges attract.   | <input type="checkbox"/> | I can explain how the position of an element on the periodic table relates to the charge on its most stable monatomic ion.                     | <input type="checkbox"/> | I can suggest the charge on unfamiliar ions using the position of the element in the periodic table.  | <input type="checkbox"/> |
|                       | I can write the charges of ions of Group 1, Group 2, Group 6, and Group 7 elements.                                | <input type="checkbox"/> | I can explain, in terms of electronic structure, how unfamiliar elements become ions.  | <input type="checkbox"/> | I can explain the ratio of metal and non-metal ions in compounds.   | <input type="checkbox"/> |

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|                             | I can describe an ionic lattice.  | <input type="checkbox"/> | I can interpret formula of familiar ionic compounds to determine the number and type of each ion present.   | <input type="checkbox"/> | I can generate formula of a wide range of ionic compounds when the charges of the ions are given.  | <input type="checkbox"/> |
| C3.4 Giant ionic structures | I can state that ionic compounds have high melting points and can dissolve in water.        | <input type="checkbox"/> | I can explain why ionic compounds have a high melting point.  | <input type="checkbox"/> | I can explain in detail why ionic compounds cannot conduct electricity when they are solid but can when molten or in solution.                   | <input type="checkbox"/> |
|                             | I can state that ionic compounds can conduct electricity when molten or dissolved in water. | <input type="checkbox"/> | I can describe, in terms of ions, how an ionic compound can conduct electricity.  | <input type="checkbox"/> | I can justify in terms of properties that a compound has ionic bonding.  | <input type="checkbox"/> |
|                             | I can describe an ionic lattice.  | <input type="checkbox"/> | I can explain the movement of ions in solutions or when molten.   | <input type="checkbox"/> | I can apply the ionic model to make predictions of the physical properties of ionic compounds.   | <input type="checkbox"/> |
| C3.5 Covalent bonding       | I can describe a covalent bond.   | <input type="checkbox"/> | I can explain how a covalent bond forms in terms of electronic structure.   | <input type="checkbox"/> | I can draw dot and cross diagrams and ball and stick diagrams for unfamiliar small molecules.  | <input type="checkbox"/> |
|                             | I can recognise a covalent compound from its formula, name, or diagram showing bonds.       | <input type="checkbox"/> | I can draw dot and cross diagrams and ball and stick diagrams for H <sub>2</sub> , Cl <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> , HCl, H <sub>2</sub> O, NH <sub>3</sub> , and CH <sub>4</sub> . | <input type="checkbox"/> | I can suggest how double and triple covalent bonds can be formed.  | <input type="checkbox"/> |
|                             | I can name familiar examples of small molecules which contain covalent bonds.               | <input type="checkbox"/> | I can describe a double bond in a diatomic molecule.  | <input type="checkbox"/> | I can suggest how the properties of a double bond could be different to the properties of a single covalent bond.                                | <input type="checkbox"/> |
| C3.6 Simple molecules       | I can state that small molecules have low melting and boiling points.                       | <input type="checkbox"/> | I can explain how the size of molecules affects melting and boiling points  | <input type="checkbox"/> | I can predict the physical properties of unfamiliar covalently bonded substances.  | <input type="checkbox"/> |
|                             | I can state that small molecules do not conduct electricity.                                | <input type="checkbox"/> | I can explain why small molecules and polymers do not conduct electricity.  | <input type="checkbox"/> | I can compare and contrast the properties of substances with different bonding.  | <input type="checkbox"/> |
|                             | I can describe an intermolecular force.   | <input type="checkbox"/> | I can identify substances that would have weak intermolecular forces.   | <input type="checkbox"/> | I can justify the use of a model to explain the physical properties of a small molecule and discuss the limitations of various molecular models. | <input type="checkbox"/> |

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| C3.7 Giant covalent structures | I can list the main physical properties of diamond and graphite.             | <input type="checkbox"/> | I can recognise the structure of diamond and graphite from information provided in written or diagrammatic form. | <input type="checkbox"/> | I can use a molecular model of an unfamiliar giant covalent structure to predict and explain its physical properties.                        | <input type="checkbox"/> |
|                                | I can state that giant covalent structures have high melting points.         | <input type="checkbox"/> | I can explain the properties of diamond in terms of its bonding.   | <input type="checkbox"/> | I can justify in detail a use for graphite based on its properties.  | <input type="checkbox"/> |
|                                | I can describe the structure of graphite in terms of layers of carbon atoms. | <input type="checkbox"/> | I can explain the properties of graphite in terms of its bonding.  | <input type="checkbox"/> | I can justify in detail a use for diamond based on its properties.   | <input type="checkbox"/> |
| C3.8 Fullerenes and graphene   | I can describe the relationship between graphite and graphene.               | <input type="checkbox"/> | I can recognise the structure of a fullerene or nanotube in diagrams and prose.                                  | <input type="checkbox"/> | I can describe and explain the applications of fullerenes.   | <input type="checkbox"/> |
|                                | I can list the main physical properties of fullerenes.                       | <input type="checkbox"/> | I can explain the structure of fullerenes.   | <input type="checkbox"/> | I can use molecular models of graphene, nanotubes, and fullerenes to explain their properties.   | <input type="checkbox"/> |
|                                | I can state the molecular formula of buckminsterfullerene.                   | <input type="checkbox"/> | I can list the properties and consequent uses of fullerenes and carbon nanotubes.                                | <input type="checkbox"/> | I can justify in detail a use for graphene, nanotubes and fullerenes, based on their properties.   | <input type="checkbox"/> |
| C3.9 Bonding in metals         | I can state that metals form a giant structure.                              | <input type="checkbox"/> | I can describe metallic bonding.   | <input type="checkbox"/> | I can explain how metal atoms form giant structures.   | <input type="checkbox"/> |
|                                | I can recognise metallic bonding in diagrams.                                | <input type="checkbox"/> | I can recognise and represent metallic bonding diagrammatically.   | <input type="checkbox"/> | I can evaluate different models of metallic bonding.   | <input type="checkbox"/> |
| C3.10 Bonding in metals        | I can list the physical properties of metals.                                | <input type="checkbox"/> | I can explain key physical properties of metals using the model of metallic bonding.                             | <input type="checkbox"/> | I can explain in detail, including labelled diagrams, how alloying affects the structure and bonding in metals and its effect on properties. | <input type="checkbox"/> |
|                                | I can describe the structure of a pure metal.                                | <input type="checkbox"/> | I can describe why metals are alloyed.   | <input type="checkbox"/> | I can justify in detail why alloys are more often used than pure metals.   | <input type="checkbox"/> |

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| C3.11 Nanoparticles               | I can state a definition of nanoscience.   | <input type="checkbox"/> | I can describe the size of nanoparticles.   | <input type="checkbox"/> | I can classify a particle as coarse, fine, or nanoparticles based on their size.   | <input type="checkbox"/> |
|                                   | I can describe how surface area to volume increases as particle size reduces.                          | <input type="checkbox"/> | I can explain why surface area to volume ratio increases as particle size decrease. | <input type="checkbox"/> | I can quantitatively explain the relationship between surface area to volume ratio and particle size and its effect on properties. | <input type="checkbox"/> |
|                                   | I can recognise that the negative indices in standard form used in nanoscience are very small numbers. | <input type="checkbox"/> | I can convert lengths into standard form.   | <input type="checkbox"/> | I can convert standard form into a variety of length units.  | <input type="checkbox"/> |
| C3.12 Applications of nanoscience | I can state that nanoparticles can be used in sun cream.   | <input type="checkbox"/> | I can list the advantages and disadvantages of using nanoparticles.                 | <input type="checkbox"/> | I can evaluate the use of nanoparticles in their applications, including sun cream.  | <input type="checkbox"/> |
|                                   | I can list a variety of uses of nanoparticles.   | <input type="checkbox"/> | I can explain why nanoparticles can have new applications.                          | <input type="checkbox"/> | I can decide and justify in detail why nanotechnology research should continue.  | <input type="checkbox"/> |