AQA GCSE Chemistry
Y9 Knowledge Grid

Christleton High School
C2 Structure and bonding

Name ..... Class ..... Date .....

Structure and bonding

Lesson	Aiming for 4 (Foundation / Intermediate)		Aiming for 6 (Intermediate / Higher)		Aiming for 8 (Higher / Exceptional)	
C2.1 States of matter	I can identify the three states of matter and their state symbols.	☐	I can use data to determine the state of a substance at a given temperature.	☐	I can use the particle model to describe how energy, movement, and attraction between particles changes as a substance is heated or cooled.	☐
	I can describe the process of melting, freezing, boiling, and condensing.	☐	I can explain, in terms of particles, energy and temperature of a substance when it is at the melting point or boiling point.	☐	I can suggest why substances have different melting and boiling points from each other.	☐
	I can use the particle model to draw a representation of how particles are arranged in the three states of matter.	☐	I can describe the factors that affect rate of evaporation.	☐	I can evaluate a model, explaining its limitations. (H)	☐
C2.2 Atoms in ions	I can state the particles involved in ionic and covalent bonding.	☐	I can draw dot and cross diagrams of compounds formed between Group 1 and Group 7 elements.	☐	I can draw dot and cross diagrams of unfamiliar ionic compounds.	☐
	I can describe, with an example, how a Group 1 metal atom becomes a positive ion.	☐	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.	☐	I can suggest and explain the charge of a monatomic ion based on its position in the periodic table.	☐
	I can describe, with an example, how a Group 7 non-metal atom becomes a negative ion.	☐				
C2.3 Ionic bonding	I can state that opposite charges attract.	☐	I can explain how the position of an element on the periodic table relates to the charge on its most stable monatomic ion.	☐	I can suggest the charge on unfamiliar ions using the position of the element in the periodic table.	☐
	I can write the charges of ions of Group 1, Group 2, Group 6, and Group 7 elements.	☐	I can explain, in terms of electronic structure, how unfamiliar elements become ions.	☐	I can explain the ratio of metal and non-metal ions in compounds.	☐

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	I can describe an ionic lattice.	☐	I can interpret formula of familiar ionic compounds to determine the number and type of each ion present.	☐	I can generate formula of a wide range of ionic compounds when the charges of the ions are given.	☐
C2.4 Giant ionic structures	I can state that ionic compounds have high melting points and can dissolve in water.	☐	I can explain why ionic compounds have a high melting point.	☐	I can explain in detail why ionic compounds cannot conduct electricity when they are solid but can when molten or in solution.	☐
	I can state that ionic compounds can conduct electricity when molten or dissolved in water.	☐	I can describe, in terms of ions, how an ionic compound can conduct electricity.	☐	I can justify in terms of properties that a compound has ionic bonding.	☐
	I can describe an ionic lattice.	☐	I can explain the movement of ions in solutions or when molten.	☐	I can apply the ionic model to make predictions of the physical properties of ionic compounds.	☐
C2.5 Covalent bonding	I can describe a covalent bond.	☐	I can explain how a covalent bond forms in terms of electronic structure.	☐	I can draw dot and cross diagrams and ball and stick diagrams for unfamiliar small molecules.	☐
	I can recognise a covalent compound from its formula, name, or diagram showing bonds.	☐	I can draw dot and cross diagrams and ball and stick diagrams for H_2, Cl_2, O_2, N_2, HCl, H_2O, NH_3, and CH_4.	☐	I can suggest how double and triple covalent bonds can be formed.	☐
	I can name familiar examples of small molecules which contain covalent bonds.	☐	I can describe a double bond in a diatomic molecule.	☐	I can suggest how the properties of a double bond could be different to the properties of a single covalent bond.	☐
C2.6 Simple molecules	I can state that small molecules have low melting and boiling points.	☐	I can explain how the size of molecules affects melting and boiling points	☐	I can predict the physical properties of unfamiliar covalently bonded substances.	☐
	I can state that small molecules do not conduct electricity.	☐	I can explain why small molecules and polymers do not conduct electricity.	☐	I can compare and contrast the properties of substances with different bonding.	☐
	I can describe an intermolecular force.	☐	I can identify substances that would have weak intermolecular forces.	☐	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.	☐

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C2.7 Giant covalent structures	I can list the main physical properties of diamond and graphite.	☐	I can recognise the structure of diamond and graphite from information provided in written or diagrammatic form.	☐	I can use a molecular model of an unfamiliar giant covalent structure to predict and explain is physical properties.	☐
	I can state that giant covalent structures have high melting points.	☐	I can explain the properties of diamond in terms of its bonding.	☐	I can justify in detail a use for graphite based on its properties.	☐
	I can describe the structure of graphite in terms of layers of carbon atoms.	☐	I can explain the properties of graphite in terms of its bonding.	☐	I can justify in detail a use for diamond based on its properties.	☐
C2.8 Fullerenes and graphene	I can describe the relationship between graphite and graphene.	☐	I can recognise the structure of a fullerene or nanotube in diagrams and prose.	☐	I can describe and explain the applications of fullerenes.	☐
	I can list the main physical properties of fullerenes.	☐	I can explain the structure of fullerenes.	☐	I can use molecular models of graphene, nanotubes, and fullerenes to explain their properties.	☐
	I can state the molecular formula of buckminsterfullerene.	☐	I can list the properties and consequent uses of fullerenes and carbon nanotubes.	☐	I can justify in detail a use for graphene, nanotubes and fullerenes, based on their properties.	☐
C2.9 Bonding in metals	I can state that metals form a giant structure.	☐	I can describe metallic bonding.	☐	I can explain how metal atoms form giant structures.	☐
	I can recognise metallic bonding in diagrams.	☐	I can recognise and represent metallic bonding diagrammatically.	☐	I can evaluate different models of metallic bonding.	☐
C2.10 Bonding in metals	I can list the physical properties of metals.	☐	I can explain key physical properties of metals using the model of metallic bonding.	☐	I can explain in detail, including labelled diagrams, how alloying affects the structure and bonding in metals and its effect on properties.	☐
	I can describe the structure of a pure metal.	☐	I can describe why metals are alloyed.	☐	I can justify in detail why alloys are more often used than pure metals.	☐

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C2.11 Nanoparticles	I can state a definition of nanoscience.	☐	I can describe the size of nanoparticles.	☐	I can classify a particle as coarse, fine, or nanoparticles based on their size.	☐
	I can describe how surface area to volume increases as particle size reduces.	☐	I can explain why surface area to volume ratio increases as particle size decrease.	☐	I can quantitatively explain the relationship between surface area to volume ratio and particle size and its effect on properties.	☐
	I can recognise that the negative indices in standard form used in nanoscience are very small numbers.	☐	I can convert lengths into standard form.	☐	I can convert standard form into a variety of length units.	☐
C2.12 Applications of nanoscience	I can state that nanoparticles can be used in sun cream.	☐	I can list the advantages and disadvantages of using nanoparticles.	☐	I can evaluate the use of nanoparticles in their applications, including sun cream.	☐
	I can list a variety of uses of nanoparticles.	☐	I can explain why nanoparticles can have new applications.	☐	I can decide and justify in detail why nanotechnology research should continue.	☐