Meden School Curriculum Planning							
Subject	Chemistry	**Year Group**	12	**Sequence No.**		**Topic**	3.1.3 Bonding

Retrieval	Core Knowledge	Student Thinking
What do teachers need to **retrieve** from students before they start teaching **new content**?	What **specific ambitious knowledge** do teachers need to teach students in this sequence of learning?	What real life examples can be applied to this sequence of learning to **development of our students thinking, encouraging them to see the inequalities around them** and 'do something about them!'
GCSE C2 Structure and Bonding	**3.1.3.1 Ionic Bonding** Ionic bonding involves electrostatic attraction between oppositely charged ions in a lattice. The formulas of compound ions eg sulfate, hydroxide, nitrate, carbonate and ammonium. Students should be able to: • predict the charge on a simple ion using the position of the element in the Periodic Table • construct formulas for ionic compounds. **3.1.3.2 Nature of Covalent and Dative Covalent Bonds** A single covalent bond contains a shared pair of electrons. Multiple bonds contain multiple pairs of electrons. A co-ordinate (dative covalent) bond contains a shared pair of electrons with both electrons supplied by one atom. Students should be able to represent: • a covalent bond using a line • a co-ordinate bond using an arrow. **3.1.3.3 Metallic Bonding** Metallic bonding involves attraction between delocalised electrons and positive ions arranged in a lattice.	Materials scientists use knowledge of structure and bonding to engineer new materials with desirable properties. These new materials may offer new applications in a range of different modern technologies.

	3.1.3.4 Bonding and Physical Properties The four types of crystal structure: • ionic • metallic • macromolecular (giant covalent) • molecular. The structures of the following crystals as examples of these four types of crystal structure: • diamond • graphite • ice • iodine • magnesium • sodium chloride. Students should be able to: • relate the melting point and conductivity of materials to the type of structure and the bonding present • explain the energy changes associated with changes of state • draw diagrams to represent these structures involving specified numbers of particles. Students could be asked to find the type of structure of unknowns by experiment (eg to test solubility, conductivity and ease of melting). **3.1.3.5 Shapes of Simple Molecules and Ions** Bonding pairs and lone (non-bonding) pairs of electrons as charge clouds that repel each other. Pairs of electrons in the outer shell of atoms arrange themselves as far apart as possible to minimise repulsion. Lone pair–lone pair repulsion is greater than lone pair–bond pair repulsion, which is greater than bond pair–bond pair repulsion. The effect of electron pair repulsion on bond angles. Students should be able to explain the shapes of, and bond angles in, simple molecules and ions with up to six electron pairs (including lone pairs of electrons) surrounding the central atom. Students should be able to identify linear, non-linear, trigonal planar, trigonal pyramidal, tetrahedral and octahedral shapes and the variations in between	

	Students could be given familiar and unfamiliar examples of species and asked to deduce the shape according to valence shell electron pair repulsion (VSEPR) principles. **3.1.3.6 Bond Polarity** Electronegativity as the power of an atom to attract the pair of electrons in a covalent bond. The electron distribution in a covalent bond between elements with different electronegativities will be unsymmetrical. This produces a polar covalent bond, and may cause a molecule to have a permanent dipole. Students should be able to: • use partial charges to show that a bond is polar • explain why some molecules with polar bonds do not have a permanent dipole. **3.1.3.7 Forces between Molecules** Electronegativity as the power of an atom to attract the pair of electrons in a covalent bond. The electron distribution in a covalent bond between elements with different electronegativities will be unsymmetrical. This produces a polar covalent bond, and may cause a molecule to have a permanent dipole. Students should be able to: • use partial charges to show that a bond is polar • explain why some molecules with polar bonds do not have a permanent dipole. Students could try to deflect jets of various liquids from burettes to investigate the presence of different types and relative size of intermolecular forces.	