Yr12 Chemistry – Unit 3.1

MAGHULL HIGH SCHOOL – CURRICULUM MAP

	Sequence		
TOPIC (S) **BONDING**	1. Ionic Bonding 2. Covalent and dative covalent bonds	3. Metallic bonding 4. Bonding and physical properties	5. Shapes of simple molecules and ions 6. Bond polarity 7. Forces between molecules
Knowledge & Skills development	• Know that ionic bonding involves electrostatic attraction between oppositely charged ions in a lattice. • Recall the formulas of compound ions eg sulfate, hydroxide, nitrate, carbonate and ammonium. • Predict the charge on a simple ion using the position of the element in the Periodic Table • construct formulas for ionic compounds. • Know that a single covalent bond contains a shared pair of electrons. Multiple bonds contain multiple pairs of electrons. • Define a co-ordinate (dative covalent) bond: contains a shared pair of electrons with both electrons supplied by one atom. • Represent a covalent bond using a line and a co-ordinate bond using an arrow. • Know that metallic bonding involves attraction between delocalised electrons and positive ions arranged in a lattice. • Know the four types of crystal structure: ionic , metallic, macromolecular (giant covalent), molecular. • Know the structures of the following crystals as examples of these four types of crystal structure: diamond, graphite , ice, iodine, magnesium, sodium chloride. • 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.		• Know bonding pairs and lone (non-bonding) pairs of electrons as charge clouds that repel each other. • Know pairs of electrons in the outer shell of atoms arrange themselves as far apart as possible to minimise repulsion. • Know lone pair–lone pair repulsion is greater than lone pair–bond pair repulsion, which is greater than bond pair–bond pair repulsion. • Know the effect of electron pair repulsion on bond angles. • 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. • Know electronegativity as the power of an atom to attract the pair of electrons in a covalent bond. • Know 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. • Use partial charges to show that a bond is polar • Explain why some molecules with polar bonds do not have a permanent dipole. • Explain the different forces between unfamiliar molecules: permanent dipole–dipole forces, induced dipole–dipole (van der Waals, dispersion, London) forces, hydrogen bonding. • Explain how the melting and boiling points of molecular substances are influenced by the strength of these intermolecular forces. • Describe the importance of hydrogen bonding in the low density of ice and the anomalous boiling points of compounds.

Assessment / Feedback Opportunities	Exam questions – teacher assessed	Exam questions – self assessed	Extended writing task – teacher assessed	Topic assessment
Cultural Capital	• Using molymods to observe molecule shapes and structures			
SMSC / Promoting British Values **(Democracy, Liberty, Rule of Law, Tolerance & Respect)**	• •			
Reading opportunities	• Recommended Read: The Chemical Bond: Structure and Dynamics, Elsevier Science			
Key Vocabulary	Electrostatic attraction, Lattice, Coordinate bond, ionic, covalent, metallic, electronegativity, polarity, dipole, Van der Waals, Independent Variable, Dependent Variable, Control Variables, Method, Conclusion, Precaution, Evaluation, Reliable, Precision, Valid, Anomaly, Describe, Explain, Compare, Analyse, Calculate, Suggest, Absolute, Uncertainty, Error			
Digital Literacy	Research MSOffice35 apps including SharePoint			
Cross-Curricular Links	Numeracy/Maths – averages (means), reading scales, graph plotting, lines of best fit, using and rearranging equations, using scientific calculators			
Careers	Applied Research and Product Development, Cheminformatics, Chemical Information Management Specialist			