



Curriculum Plan *Separate Chemistry*



Year 10	Golden Treads: State the big ideas that will be taught across the year (Threshold concepts) Substances and properties, particles and structure, chemical reactions				Enrichment: What is offered through the year to support learning in the classroom?		Review and evaluation: Give date for review of the curriculum
	Topics	Assessment	Substantive Knowledge	Disciplinary Knowledge	Misconceptions	Key Vocabulary	Knowledge tracking
Term 1	Atomic structure and the periodic table		Atoms, elements and compounds. Mixtures. The development of the model of the atom. Relative electrical charges of subatomic particles. Size and mass of atoms. Relative atomic mass. Electronic structure. The periodic table. Development of the periodic table. Metals and non-metals. Group 0. Group 1. Group 7. Transition metals comparison with group 1 and properties		Confusion between the difference between neutron and nucleus. Student also confuse the term nucleus in chemistry and biology. Attraction between the nucleus and electrons. How shielding affects electrons in different energy levels. Students identify all molecules as compounds eg. H ₂ is an element but students identify this as a compound as it contains 2 hydrogen atoms.	Atom Element Compound Formulae Filtration Proton Neutron Electron Abundance Reactivity Properties Halogen Transition	Year 7: Properties and materials. Year 7: Substances and Mixtures. Year 8: Elements and compounds. Year 8: Particle model.
Term 2	Bonding, structure and properties of matter	Assessment 1 – Atomic structure and Periodic Table	Chemical bonds Ionic bonding Ionic compounds Covalent bonding Metallic bonding The three states of matter State symbols Properties of ionic compounds Properties of small molecules Polymers Giant covalent structures Properties of metals and alloys Metals as conductors Diamond Graphite Graphene and fullerenes Bulk and surface properties of matter including nanoparticles Use of Nanoparticles		Students see chemical bonding and forces within chemical structures as largely unrelated. Students limit their category of chemical bond to types of interactions that can be readily conceptualised in terms of the full shells explanatory principle.	Ion Delocalised electron Malleable Lattice Conductivity Nano	Year 7: Properties and materials. Year 10: Atomic structure and the periodic table



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Term 3	Introductory quantitative chemistry	Assessment Week 1 Atomic structure and the periodic table and Bonding	Conservation of mass and balanced symbol equations. Relative formula Mass. Amounts of substances in equations. Moles. Using moles to balance equations. Limiting reactants. Concentrations of solutions. Atom economy Percentage yield		Most students can understand the principle behind conservation of mass, students however struggle to apply this when a reaction involves a gas leading to losses or gains from the surroundings. Students struggle to balance equations. A more common problem at this level is the way that chemists tend to use the term substance (or pure substance). Like many other words used in science, students will have heard the word 'substance' used with a more general everyday meaning akin to 'essence' or 'flavour'. Misconception surrounding the difference between mass and weight. Students struggle to visualise the size of a mole of a substance. Can relate this to concepts students can visualise to give an impression of scale.	Conservation Concentration Excess Limiting Yield	Year 8: Elements and compounds.
Term 4 & 5	Chemical changes	Mock Assessment 2 - ATOMIC STRUCTURE & PT, BONDING, QUANTITATIVE AND CHEMICAL CHANGES	Metal oxides The reactivity series Extraction of metals and reduction Oxidation and reduction in terms of electrons (HT only) Reactions of acids with metals Neutralisation of acids and salt production Soluble salts	Soluble salts required practical (AT 2, 3, 4, 6) Neutralisation (Titration) required practical (AT 1,8) Electrolysis of aqueous solutions required practical (AT 3,7, 8)	Students struggle when using more abstract formulae equations, word equations should be introduced first to boost understanding. Students struggle to visualise what is changing when species react, using schema to help link equations together can help with this.	Displacement Extraction Electrolysis Crystallisation Neutralisation Cathode Anode Miniscus Burette Volume	Year 8: Chemical Changes Year 8+9: Understanding chemical reactions Year 9: Acids and Alkalis



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			The pH scale neutralisation Titrations Strong and weak acids (HT only) The process of electrolysis Electrolysis of molten ionic compounds Using electrolysis to extract metals Electrolysis of aqueous solutions Representation of reactions at electrodes as half equations (HT only)		Students struggle to give valid reasons for why reactions occur.		
Term 6	Energy changes		Energy transfer during exothermic and endothermic reactions Reaction profiles The energy change of reactions (HT only) Cells and Batteries Fuel Cells	Energy transfer during exothermic and endothermic reactions Required practical (AT 1, 3, 5, 6)	Students struggle when using more abstract formulae equations, word equations should be introduced first to boost understanding. Students struggle to visualise what is changing when species react, using schema to help link equations together can help with this. Students struggle to give valid reasons for why reactions occur. Students struggle to link substantive knowledge of exothermic and endothermic processes when asked to explain a set of data.	Exothermic Endothermic Thermal decomposition Activation (energy) Combustion Cell Oxidation	Year 9: Understanding chemical reactions