

Year Group: 12	Subject: Chemistry	Term: Spring 2022
Topic	Key Learning points	Assessment
Chemical Bonding and Structure Continued	<p><i>End Point: Understand the nature of metallic, ionic, covalent, polar covalent, dative covalent bonding and intermolecular interactions. Explain the physical properties of substances based on their bonding and structure.</i></p> <ul style="list-style-type: none"> • Understand what is meant by a polar covalent bond and the difference between polar and non-polar molecules • Understand what is meant by a simple discrete molecule • Understand that the shape of a simple molecule or ion is determined by the repulsion between the electron pairs that surround the central atom and predict the shapes of and bond angles in simple molecules and ions • Understand the nature of the following intermolecular interactions; London Forces, Permanent Dipoles, H bonds • Understand the physical properties of molecules and choice of solvents in terms of intermolecular interactions • Know about the different types of giant lattice (giant metallic, giant ionic, giant covalent) <p>Predict the type of structure and bonding present in a substance and the physical properties of a substance</p>	<p>Students will be formatively assessed during each topic by past paper questions completed in lesson time.</p>
Redox Reactions	<p><i>End Point: Know how to calculate oxidation numbers and write ionic half-equations and full chemical equations to show oxidation and reduction.</i></p> <ul style="list-style-type: none"> • Understand the terms of oxidation and reduction in terms of electron loss and gain • Know what is meant by the term oxidation number and know how to calculate the oxidation number of elements in an ion and a compound • Know how to write chemical formulae of ionic compounds when given the oxidation numbers • Know how to write ionic half-equations to show oxidation and reduction • Know how to construct a full ionic equation from ionic half-equations 	<ul style="list-style-type: none"> • Students will complete homework assignments as ongoing assessment of understanding. • Teachers will provide students with targeted feedback, based on their test performance.
Inorganic Chemistry and the Periodic Table	<p><i>End Point: Explain the trends in physical properties and chemical reactivity for the elements in group 2 and 7 of the periodic table</i></p> <ul style="list-style-type: none"> • Understand the reasons for the trend in ionisation energy down group 2 and how this links to reactivity • Know the reactions of the group 2 elements with water • Know the reactions of group 2 bases with water and with dilute acid • Know the trends in solubility of group 2 hydroxides and sulphates • Understand the trend in thermal stability for group 1 & 2 nitrates and carbonates • Know how to conduct flame tests for group 1 and 2 metal compounds • Explain flame tests in terms of electron transitions • Know how to test for ammonium ions • Understand the trends in physical properties for halogens • Know the trend in electronegativity of halogens and understand the trend in reactivity down the group • Understand the trend in reactivity of group 7 elements in terms of redox reactions • Know the reactions of solid group 1 halides with concentrated sulphuric acid 	

<p>Organic Chemistry Continued</p>	<p><i>End Point: Know what is meant by the terms nucleophile and electrophiles and describe the common reactions of alkenes, alcohols and halogenoalkanes.</i></p> <ul style="list-style-type: none"> • Know that alkenes form polymers through addition polymerisation • Identify the repeat unit of an addition polymer when given the monomer • Know the techniques that chemists can use to dispose of waste polymers • Know how to classify halogenoalkanes as primary, secondary or tertiary • Know how to draw the mechanism for the nucleophilic substitution reactions of halogenoalkanes • Understand in terms of bond enthalpy the reactivity of different halogenoalkanes • Understand how to test for halide ions using nitric acid and silver nitrate • Know that alcohols can be classified as primary, secondary or tertiary • Know the combustion, halogenation and dehydration reactions of alcohols • Describe the conditions for the oxidation of alcohols and the products, to include ketones, aldehydes and carboxylic acids 	
<p>Modern Analytical Techniques</p>	<p><i>End Point: Know how to use analytical techniques to determine the structure of an unknown organic compound.</i></p> <ul style="list-style-type: none"> • Know how to use data from a mass spectrometer to determine the relative molecular mass of an organic compound • Understand how to use fragmentation to determine the possible structure of an organic compound • Know what happens when some molecules absorb infrared radiation • Know how to use data from infrared spectra to deduce functional groups in an organic molecule 	
<p>Chemical Energetics</p>	<p><i>End Point: Know how to measure and calculate the enthalpy change that takes place in a chemical reaction, including using Hess cycles.</i></p> <ul style="list-style-type: none"> • Know that enthalpy change is the heat change measured at constant pressure • Know how to calculate the enthalpy change for a reaction using the mean bond enthalpies • Know how to draw and interpret enthalpy profile diagrams for endothermic and exothermic reactions • Know how to measure and calculate the standard enthalpy of neutralisation • Know what is meant by Hess' Law • Know how to use a Hess cycle to calculate the standard enthalpy change of formation and combustion 	