

Progression Model – Year 13 Chemistry

<p>Module Title:</p> <p>Physical chemistry and carbonyl groups</p>	<p>Module Title:</p> <p>Inorganic and organic chemistry</p>	<p>Module Title:</p> <p>Acids, bases and chemical analysis</p>
<p>Learning Intent for this module:</p> <p>Students will begin year 13 by learning about chemical thermodynamics which builds on their prior knowledge of energetics. Students will go onto study the final physical chemistry topic of electrode potentials. In organic chemistry, students will first learn about optical isomerism in organic molecules. They will then develop and understanding of the structure and reactions of carbonyl containing groups – the aldehydes, ketones and carboxylic acids.</p> <ul style="list-style-type: none"> • Thermodynamics • Electrode potentials • Optical isomerism • Aldehydes and ketones • Carboxylic acids and esters 	<p>Learning Intent for this module:</p> <p>Students will develop their inorganic chemistry by looking in detail at important inorganic groups including Period 3 elements, transition metals and how ions react in aqueous solutions. Student’s organic focus will be on the structure and reactions of aromatic and amine compounds. After being introduced to polymers, students explore the structure and function of amino acids, protein and DNA.</p> <ul style="list-style-type: none"> • Properties of period 3 elements and their oxides • Transition metals • Reactions of ions in aqueous solution • Aromatic chemistry • Amines • Polymers • Amino acids, proteins and DNA 	<p>Learning Intent for this Module:</p> <p>In this module, students will build on their previous physical and quantitative chemistry by completing the acids and bases topic. They will also study analytical techniques such as NMR and chromatography. Finally, they will revise and consolidate their understanding of organic chemistry reactions in the synoptic topic organic synthesis.</p> <ul style="list-style-type: none"> • Acids and bases • NMR • Organic analysis • Chromatography • Organic synthesis
<p>Key Content to be learned:</p> <p>In this module, students will learn about thermodynamics in which concepts such as Born-Haber cycles, entropy and Gibbs Free energy will be studied. Students learn about electrode potentials, the electrochemical series and electrochemical cells. Students will learn about isomerism in organic molecules. They will learn about the structure and reactions of carbonyl compounds including aldehydes, ketones, carboxylic acids and esters.</p>	<p>Key content to be learned:</p> <p>In this module students will develop a deep understanding of inorganic chemistry. They will begin by looking at period 3 elements and oxides. They will then move on to learning about transition elements and the tendency of these elements to form complex ions. They will learn about isomerism and formation of coloured ions. They will also learn about ligand substitution reactions, variable oxidation states, transition metal titrations and catalysts. To complete</p>	<p>Key Content to be learned:</p> <p>The key physical chemistry content of this module surrounds the concept of acids and bases. Students will learn about K_w and will complete pH calculations. They will then learn about the acid dissociation constant. Students will build on their year 12 knowledge of titrations and explore neutralisation reactions and the associated calculations in greater depth. Finally, students will look at the action of buffers and learn how to calculate the pH of buffers.</p>

	<p>inorganic chemistry, the reactions of metal aqua ions will be studied. Students will continue their learning of organic chemistry by looking at the structure and reactions of aromatic compounds, amines and amides. They will learn about condensation polymerisation, monomers and repeating units and some of the issues around the disposal of polymers. In the final topic of the module the structure and bonding in amino acids, protein and DNA molecules and the way they interact is studied. Drug action is also considered.</p>	<p>The organic side of this module will mainly focus on analysis as students will learn about ^{13}C and ^1H NMR, chromatography and organic analysis. They will complete the module by revisiting all of their prior organic chemistry knowledge in the synoptic organic synthesis revision topic.</p>
<p>Prior knowledge:</p> <ul style="list-style-type: none"> • Enthalpy • Bond Enthalpy • Measuring Enthalpy changes • Hess's Law • Reversible reactions • The equilibrium constant • Factors affecting the equilibrium constant • Functional groups • Nomenclature • Mechanisms • Isomers 	<p>Prior knowledge:</p> <ul style="list-style-type: none"> • The Periodic Table • Periodicity • Group 7 elements • Group 2 elements • Oxidation, reduction and redox reactions • Functional groups • Nomenclature • Mechanisms • Isomers 	<p>Prior knowledge:</p> <ul style="list-style-type: none"> • The mole • Titrations • Chemical equations • Equations and calculations • Year 12 and 13 organic chemistry topics
<p>Key tasks for this module:</p> <ul style="list-style-type: none"> • Thermodynamics • Electrode potentials • Aldehydes and ketones • Carboxylic acids and esters • Mock exam 	<p>Key tasks for this module:</p> <ul style="list-style-type: none"> • Transition metals • Practical write up - reactions of ions in aqueous solution • Aromatic chemistry • Amino acids, proteins and DNA • Mock exam 	<p>Key tasks for this module:</p> <ul style="list-style-type: none"> • Acids and bases • Chemical analysis • External examinations