

Progression Model – Year 12 Chemistry

Module Title: Fundamentals of chemistry	Module Title: Chemical systems and homologous series	Module Title: Rate, equilibrium and reactions
Learning Intent for this module: <p>In this module, students will build upon their GCSE knowledge by developing a deeper understanding of atomic structure and bonding. They will then start learn about the mathematical aspects of chemistry in Amount of substance as well as the fundamentals of organic chemistry. These topics will provide an essential foundation to later study in A Level chemistry.</p> <ul style="list-style-type: none">• Atomic structure• Bonding• Amount of substance• Introduction to organic chemistry	Learning Intent for this module: <p>In this module, students will build upon the foundation that they built in module one. Students will progress from the fundamentals learned in the Introduction to organic chemistry topic, to looking at homologous series and reactions of functional groups. They will then look at the periodic table and apply their understanding to group 2 elements. Students will start to develop their understanding of physical chemistry by learning about the theory involved in energetics, kinetics and equilibrium.</p> <ul style="list-style-type: none">• Energetics• Kinetics• Chemical equilibria and Le Chatelier's principle• Alkanes• Halogenoalkanes• Alkenes• Periodicity• Group 2, the alkaline earth metals	Learning Intent for this Module: <p>In this module, students will move onto looking at another group of the periodic table in more detail. This will be preceded by the study of oxidation, reduction and redox, essential to understand how group 7 elements react. To complete their year 12 organic content, students will move on to looking at alcohols and some of their reactions. In physical chemistry, after completing the kinetics and equilibria topic in module 2, students are ready to deepen their knowledge and understanding by learning about rate equations and equilibrium constant.</p> <ul style="list-style-type: none">• Rate equations• Equilibrium constant K_p for homogeneous systems• Oxidation, reduction and redox equations• Group 7 (17), the halogens• Alcohols

<p>Key Content to be learned: Students will start this module by learning about the model of the atoms and how this had change over time. They will then move onto learning about relative mass and interpretation of mass spectra. Students will learn about electronic structure and ionisation energies. In the bonding topic, students will learn about ionic, covalent and metallic bonding and develop an understanding of the shapes of molecules and forces between molecules. In the amount of substance topic, students will learn about concepts including the mole, the ideal gas equation, chemical yield and atom economy. Finally in Introduction to organic chemistry, students will learn the fundamentals of organic chemistry including functional groups, nomenclature, mechanisms and isomers.</p>	<p>Key content to be learned: In this module students will learn about energetics in chemical reactions which includes looking at bond enthalpies, measuring energy changes and Hess's law. In kinetics they will learn about reaction rates and catalysts. In the final physical topic, students will learn about reversible reactions, industrial processes, the equilibrium constant and factors affecting the equilibrium constant. The organic focus of this module is on the uses and reactions of alkanes, alkenes and halogenoalkanes. Finally students will learn about periodicity and group 2 alkaline earth metals.</p>	<p>Key Content to be learned: In this final module, students will learn how to monitor the rate of reactions and to produce and interpret graphs. They will study rate equations and use the idea of initial rates method and clock reactions to calculate rate. Students will also learn about rate-concentration graphs, the rate-determining step and the Arrhenius equation. Students will learn about gas equilibria and the factors that affect it. Students will revisit and develop ideas on redox reactions and redox equations before moving onto learn about group 7 elements and halide ions. In the final organic topic of year 12, students will learn about alcohols and processes including the dehydration and oxidation of alcohols and the production of ethanol</p>
<p>Prior knowledge:</p> <ul style="list-style-type: none"> • Atomic structure and the Periodic Table • Structure, bonding and the properties of matter • Chemical changes • Energy changes in chemistry • Rate and extent of chemical change • Chemical analysis • Working scientifically 	<p>Prior knowledge:</p> <ul style="list-style-type: none"> • Atomic structure and the Periodic Table • Structure, bonding and the properties of matter • Chemical changes • Energy changes in chemistry • Rate and extent of chemical change • Chemical analysis • Working scientifically • Amount of substance • Introduction to organic chemistry 	<p>Prior knowledge:</p> <ul style="list-style-type: none"> • Atomic structure and the Periodic Table • Structure, bonding and the properties of matter • Chemical changes • Energy changes in chemistry • Rate and extent of chemical change • Chemical analysis • Working scientifically • Amount of substance • Introduction to organic chemistry • Kinetics • Chemical equilibria
<p>Key tasks for this module:</p> <ul style="list-style-type: none"> • Atomic structure • Bonding • Amount of substance • Introduction to organic chemistry • Extended Writing 	<p>Key tasks for this module:</p> <ul style="list-style-type: none"> • Energetics • Chemical equilibria • Organic chemistry 1 • Periodicity • Extended Writing 	<p>Key tasks for this module:</p> <ul style="list-style-type: none"> • Rate equations • Kp • Group 7 • Alcohols • Mock exams

