Year 12 Chemistry Curriculum Overview

Rationale: The Year 12 Chemistry curriculum is designed to further explore and investigate Chemistry by building a mind-set that allows skills to be continuously developed. Students will study and experience modules such as simple organic compounds, trends in the periodic table and gain a deeper understanding of reactions. In doing so students will develop their practical and investigative skills.

Term/Length of Time	Outline	Assessment/Teacher Feedback Opportunities	Homework and Literacy resources
Physical Chemistry 60 lessons (including assessment and responding to feedback lessons)	<u>Section 1 Physical Chemistry 1</u> Students should be familiar with atomic structure and in particular the arrangement of electrons around the nucleus. They will learn how chemists can measure the mass of atoms and molecules to a high degree of accuracy in a mass spectrometer. Students will continue to develop their knowledge from GCSE of amount of substance using the quantity of a mole. Students will deepen their understanding of how the physical and chemical properties of compounds depend on the ways in which the compounds are held together by chemical bonds and by intermolecular forces. Students should be familiar with enthalpy changes and how to measure these changes in a reaction. Students will study kinetics and equilibria, enabling them to determine how a change in conditions affects the speed of a chemical reaction and how far reactions will go.	Atomic Structure, Amount of Substance, Bonding, Energetics, Kinetics, Equilibria and Redox end of topic assessments in the style of exam questions Written and verbal feedback given throughout module through in-class activities and homework.	Homework is set weekly and contains a mixture of recall exam-style questions as well as more detailed application based exam style questions. All homework is reviewed with at least one detailed FAR (Feedback, Action, Response) marked by the teacher approximately once every 2 weeks **Optional homework tasks and Literacy resources:** SoL on science shared area, including PowerPoints, details of practical investigations, worksheets, revision resources, a range of AFL (assessment for learning) activities, research based tasks, model answers, short answer questions, exam questions, mark schemes, examiner's reports as well as homeworks. <u>**Chemistry**</u> offers many opportunities to develop and extend students' literacy skills. There is a large amount of new, subject-specific vocabulary, and so each unit includes a PLC (Personnel Learning checklist) which students will engage with throughout the unit. Students will use texts to find out information for themselves, using the functional layout of such texts, including index, contents and glossary sections of text books used in class, and also at home in an online format. Students will also review and connect information within topics.

	Students should be familiar with redox reactions and how the change in the oxidation state of an element in a compound or ion is used to identify the element that has been oxidised or reduced in a given reaction. Students should be familiar with writing half-equations and combining those to give an overall equation for any redox reaction. <u>Skills</u> • Use an appropriate number of significant figures • Use angles and shapes in regular 2D and 3D structures • Make up a volumetric solution and carry out a simple acid–base titration • Safely and carefully handle solids and liquids, including corrosive, irritant, flammable and toxic substances • Investigation of how the rate of a reaction changes with temperature • Use laboratory apparatus for a variety of experimental techniques including titration, using burette and pipette • Use acid–base indicators in titrations of weak/strong acids with weak/strong alkalis • Consider margins of error, accuracy and precision of data • Identify variables including those that must be controlled • Plot and interpret graphs		**Useful websites:** https://chemrevise.org/ http://chemguide.co.uk/ http://www.physicsandmathstutor.com/ http://www.docbrown.info/ https://www.youtube.com/results?search_query=machemguy https://www.khanacademy.org/ https://chemrevise.org/revision-guides/ https://www.youtube.com/@MrERintoul **Reading list:** **CHEMISTRY – SIXTH FORM READING LIST** *50 chemistry ideas you really need to know* Hayley Birch Quercus 2015 *Chemistry at Home* J.Emsley RSC 2015 *The Chemistry of Explosives* * Jacqueline Akhavan RSC Publishing, 2011. *Elements of Physical Chemistry (5th edition)** 1992 edition in stock P. Atkins and J. de Paula OUP, 2009. *Foundations of Organic Chemistry* M. Hornby and J. Peach OUP, 1993. *Inorganic Chemistry (5th edition)* D.F. Shriver and P.W. Atkins OUP, 2009. *Napoleon's Buttons: How 17 Molecules Changed History* * Penny Le Couteur and Jay Burreson Penguin, 2004. *Oxygen: The molecule that made the world* * Nick Lane OUP, 2003. *The Periodic Kingdom* * P.W. Atkins

Inorganic Chemistry 17 lessons (including assessment and responding to feedback lessons)	<u>Section 2 Inorganic Chemistry 1</u> Students will use the Periodic Table to help provide a structured organisation of the known chemical elements from which students can make sense of the physical and chemical properties of these elements and the compounds they make. Students will further their knowledge of the periodic table, in particular group 2 and 7. Students will study the trends in the solubilities of the hydroxides and the sulfates of these elements and how this is linked to their uses, their reactivity and reactions and will study the trends in their physical and chemical properties. <u>Skills</u> • Safely and carefully handle solids and liquids, including corrosive, irritant, flammable and toxic substances • Investigate chemical reactions, analysing observations made to deduce trends in properties and linking knowledge to explain trends • Present data in appropriate ways • Carry out simple test-tube reactions to identify: cations and anions	Periodicity, Group 2 and Group 7 end of topic assessments in the style of exam questions Written and verbal feedback given throughout module through in-class activities and homework.	
Organic Chemistry 45 lessons (including	<u>Section 3 Organic Chemistry 1</u> Students should be familiar with naming organic compounds using the International Union of Pure and	Introduction to organic, alkanes, halogenoalkanes, alkenes, alcohols and organic analysis end	

assessment and responding to feedback lessons)	Applied Chemistry (IUPAC) system and the structure or formula of these molecules. Students will study four main organic compound groups; Alkanes, Halogenoalkanes, Alkenes and Alcohols. Students should be familiar with their structure, reactions, physical and chemical properties, uses, and mechanisms of reactions. Students should be familiar with the analytical techniques used by chemists, including test-tube reactions and spectroscopic techniques to analyse and identify organic structures. <u>Skills</u> • Visualise and represent 2D and 3D forms including two-dimensional representations of 3D objects • Understand the symmetry of and use angles and shapes in regular 2D and 3D structures • Use laboratory apparatus for a variety of experimental techniques including qualitative tests for ions and organic functional groups and distillation and heating under reflux, including setting up glassware using retort stand and clamps. • Safely and carefully handle solids and liquids, including corrosive, irritant, flammable and toxic substances • Use water bath or electric heater or sand bath for heating	of topic assessments in the style of exam questions Written and verbal feedback given throughout module through in-class activities and homework.	