Curriculum Map for Year 12 Chemistry The board of Examination is OCR A

Term	INTENT	IMPLEMENTATION	IMPACT
	Substantive Knowledge This is the specific, factual content for the topic, which should be connected into a careful sequence of learning.	**Disciplinary Knowledge (Skills)** This is the action taken within a particular topic in order to gain substantive knowledge.	**Assessment opportunities** What assessments will be used to measure student progress? Evidence of how well students have learned the intended content.
Autumn Term-1 Year 12	**All chemical reactions and properties of matter, starts from our knowledge of the elements and the atoms. It is therefore rational to start the course to discuss the topics as listed below, and much of which is the extension of what has already been covered at GCSE** • The atom • Atomic structure • Shell and orbitals • Chemical bonding	• The structure of the atom. Electrons, protons and neutrons. Idea of isotopes and calculation of relative atomic mases based on isotopes and their abundance. • Further development of bonding in chemicals. Ionic, covalent and metallic, as well as simple and giant structures. Understanding the concept of intermolecular forces, with inclusion of London's forces and Hydrogen bonds.	• **Test on atomic structure, masses, period table and idea of the Mole** • Past papers, or tests. • Tests are marked by teacher and answers are reflected on. • Dr Salem's own written questions from a bank of 600+ Questions and answers are used to provide further help in implementation of objectives relating to topics
Autumn Term-2 Year 12	• PAG/Practical	• All Safety issues reiterated **BEFORE** practical starts.	• **Test on, shells, sub-shells, ionic bonding and chemical structures**
Spring Term-1 Year 12	• PAG/Practical **Chemical reactions are indeed calculations, always start with a balanced equation. Calculations of ether concentrations or gas volumes all stem from reflecting on balanced equations.** • Types of formula • Moles and gas volumes	• All Safety issues reiterated **BEFORE** practical starts. • Presentation of formulas, as 'chemical', 'structural', 'displayed', 'empirical', '3-D', and 'skeletal'. Further discussion of moles and molar/ concentration calculations, for instance in 'titrations. Extending the idea into 'gas volume calculations', considering the mole of any ideal gas under standard conditions to occupy $24dm^3$.	A mini test on this section will be carried out. Qs from the Q folder, or sheets will be provided

Beths Grammar Curriculum Map for Year 12 Chemistry

	• Covalent and dative bonding **Shapes and structures of chemicals are always a deciding factor about their reactivity. After studying electronic configuration, the idea can be used to explain why molecules have certain shapes, and bond angles. In fact this idea can be extended to why for instance enzymes become ineffective, when they get denatured. This is solely due to changes in their shapes.**	• Expanding the idea of bonding to 'dative', where one element shares electrons by donating both electrons in covalent bonding.	
Spring Term-2 Year 12	• Moles calculation/ concentration • Structures and Shapes • Equations week 1 • Reactions • Shapes and bondings • PAG/Practical	• All Safety issues reiterated **BEFORE** practical starts. • Structure and 'shapes 'of simple molecules will be discussed, where the idea of 'electronic configuration' and availability of 'lone pair(s)' and 'repulsion forces between lone pairs and bonding pairs decide the ultimate shapes of molecules. • Reflecting on equations and approaches in balancing different types of equations, and indeed constructing 'formulas' for compounds, will be addressed.	Past papers, or tests. Tests are marked by teacher and answers are reflected on. Dr Salem's own written questions from a bank of 600+ Questions and answers are used to provide further help in implementation of objectives relating to topics
Summer Term-1 Year 12	3.2 and module 4 week 11 **Introduction to Organic chemistry, related to the chemistry of the element Carbon. We need to rationalise as to why of the 118 elements in the periodic table, the element Carbon stands up. This is the only element that forms single, double, triple and cyclic bonds with itself. There are more carbon-based compounds than all the remaining 117 compounds of other elements put together. We start with compounds that students were acquainted with at GCSE, such as the alcohols, hydrocarbons, carboxylic acids and esters,**	• Module 4- 'core organic chemistry', will begin and should be completed a few weeks before the end of academic year. • Importance of the element 'Carbon' in compounds and the extent and variety of compounds in which C is present is discussed. • Presence of C in biological compounds such as fats, starches/sugars, proteins (Amino acids), as well as industrial chemical compounds such as alkanes, alkenes, cyclic and aromatic compounds as well as carboxylic acids, alcohols, aldehydes and ketones will be discussed. • Classification of compounds and their naming and rules associated with naming compounds will be discussed.	End of Module 4 test End of Module 3.2 test Past papers, or tests. Tests are marked by teacher and answers are reflected on. Dr Salem's own written questions from a bank of 600+ Questions and answers are used to provide further help in implementation of objectives relating to topics

	and slowly make ways into more challenging areas and finally 'organic reactions and synthesis'.		
Summer Term-2 Year 12	Chemical reactions in Organic Chemistry	• Chemical reactions, starting with 'Free radical substitution' and then Nucleophilic substitution and oxidation as well as simple 'reaction mechanisms' will be discussed. • Use of 'oxidizing agents' and oxidation under 'reflux', or 'distillation' will be discussed. • Idea of 'structural' as well as 'geometric' isomerism will be covered Parallel to Module 4, the physical chemistry module encompassing rates, enthalpy, Hess's law. K_c, etc., will be covered	Past papers, or tests. Tests are marked by teacher and answers are reflected on. Dr Salem's own written questions from a bank of 600+ Questions and answers are used to provide further help in implementation of objectives relating to topics

Beths Grammar Curriculum Map for Year 12 Chemistry

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The idea of reactions including Reduction-Oxidation (Redox), is reflected on, a topic that has been learnt at GCSE, however with the intent to expand it to organic compounds too. Here the intention is to introduce oxidizing agents that cause oxidation and how for instance primary alcohols under distillation as compared to reflux condition can turn to alcohols.		
• Oxidation and Redox week 12	• Oxidation numbers will be discussed and how in a compound based on the oxidation numbers of the 'other elements', the ON of the unknown can be calculated. • 'Redox' reactions will be revisited, and examples of redox equations will be given and discussed.	
• Evidence for shell week 12-13 **At GCSE we study basic electronic configuration. Here we intend to expand the idea into orbitals and shells, enabling us to write the electronic configuration in which 'different orbitals' are also considered. A clear extension to the knowledge already gained at GCSE.**	• In module 3, evidence for existence of 'Shells' and 'orbitals', will be discussed, based on the 'ionization pattern' in energy requirement.	
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• Energy profile week 13-14 **In all chemical reactions energy is either lost or gained. Diagram such as energy diagram profile will show how such changes in energy in various stages of a chemical reaction take place, that eventually decide if the reaction overall releases energy, or consumes energy.**	• Energy diagram profiles will be discussed to reflect on differences of 'exo and endo-thermic' reactions. Labelling the Activation energy and reiterating the importance of 'bond breakage' being endothermic and bond formation as exothermic.	Appropriate assessment Including end of module 2.1, 2.2, 3.1 and 3.2 will be done. All tests will be marked by the teachers and reflected on to address any difficulties.
• Group 2 chemistry week 14-15 **The elements in the periodic Table are not put there in random. The logic and the rationality and hence the trends in properties and reactivities can be explained, by reflecting on where the elements are. In groups, or in Periods. Our requirement at this stage is to reflect on Group 2 and 7.**	• Elements with two electrons in their outer shell and hence the typical metallic character of losing 2 electrons forming a 2^+ ions. The order of reactivity will be discussed, and the reason will be given. • The most important feature of studying Grp II elements is reflection on the 'solubility of their hydroxides' and 'the Thermal stability of their Carbonates'.	
• Group 7 – The Halogens week 15-16 **Studying the Halogens, as the most reactive non-metallic elements, also enables us to discuss anther type of reactions students will be introduced to for the first time. 'Disproportionation Reactions'. This is an extension of the REDOX reactions already introduced earlier**	• The concluding part of module 2 would be the chemical properties of the Halogens. • Trend in reactivity is discussed as well as analysis and identification of the 'halide ions'. • Introduction to 'disproportionation' reactions will be discussed here as well	With the conclusion of this part, end of module test will be carried out