Topic	What will I learn?	How will I learn it?	Why is it important that I learn this?	Why am I learning this now?
Year 10 – Term 1				
Bonding and Structure	The three different types of bonding and structures found in elements and compounds. The properties that these different substances have and how their structure is related to their properties. **TRIPLE ONLY** Students will learn about nanoparticles and their applications.	By looking at models of different structures. By comparing different structures and how they relate their properties. By teacher demonstration and discussion. Through the application of knowledge to exam style questions.	To know how the properties of different elements and compounds are the related to their structure and why we use them for certain uses. To appreciate how scientists can use this knowledge to engineer new materials with desirable properties and for use in different technologies.	The build on knowledge of the periodic table and electronic structure studied in Year 9 and explain where the ions used to work out chemical formulae have come from. To gain an understanding of ionic compounds and their properties before learning about electrolysis later in Year 10. To prepare for the study of organic Chemistry and polymers in Year 11. As a basis for further study of bonding and structure at A level
Reactions of metals and acids	Reactions of metals with oxygen, water and acids. How the reactivity series can be determined and the impact this has on methods of extraction. How to prepare a pure sample of a soluble salt. Equations and observations involving acids and bases.	Through planning, risk assessing and conducting practical procedures. Through learning rules for chemical procedures and using these to determine observations and results for given chemicals. Through the application of knowledge to exam style questions involving	To develop practical skills and writing/following a method for a multi-stage practical procedure. To provides you with an understanding of how chemical reactions have been used since the Bronze Age and Iron Age to make useful substances from everyday resources. To know how everyday items can impact the environment and economy.	To build on KS3 knowledge of acids, alkalis, indicators and the pH scale To gain understanding of chemical processes for high grade ores before learning alternate techniques for low grade ores in year 11.

	Properties of acids and the pH scale as a measure of acidity	unfamiliar contexts	To develop skills in safely carrying out procedures including conducting risk assessments.	
Year 10 – Term 2				
<u>Quantitative Chemistry</u>	The physical law of conservation of mass and how this would apply to practical observations The concept of moles and calculations involving moles and molar ratios. Calculations involving concentrations and practice how to convert units/rearrange equations **TRIPLE ONLY** The concepts of efficiency, percentage yield and atom economy Titration calculations.	Through practical observations and data analysis. Through practicing calculations and stretch and challenge applied questions. Through the application of knowledge to exam style questions involving unfamiliar contexts	To develop practical skills and the use of evidence to back up predictions/conclusions. To gain an understanding of physical laws and basic laws of chemistry To make the link between observations and explanations. To gain the skills that will be applicable to many areas of the course (and other sciences)	To consolidate chemistry understanding from year 9 To have a greater understanding of what the chemical equations met later in the course tell us. . To provide knowledge and skills that will help understanding of the rates topic covered in year 11.
Electrolysis	How the process of electrolysis can be used to extract metals.	Through teacher input and modelling. Through learning rules for chemical	To appreciate the processes needed to obtain raw materials from natural resources.	This unit will build on concepts learned in the bonding topic such as forming ions and properties of ionic solutions.

	How to represent the reactions involved in electrolysis using half equations. How the important metal aluminium is extracted using electrolysis.	procedures and using these to predict the products of a reaction. Through context-based tasks.		
Year 10 – Term 3				
<u>Energy Changes</u>	How some chemical reactions release or remove thermal energy. To represent energy changes in a reaction by diagrams. To calculate the energy changes in a reaction. **TRIPLE ONLY** How cells and batteries work. How hydrogen fuel cells work and to evaluate their use.	Through teacher input and demonstration. Through practical observations and data analysis. Through independent learning and research. Through the application of knowledge to exam style questions. Through group and class discussion and debate.	To appreciate that energy changes are an important part of chemical reactions. To recognise that interactions between particles can produce heating or cooling effects that are used in a range of everyday applications. To appreciate that some chemical reactions result in the production of electricity and that cells and batteries use these reactions.	This topic builds on the concept of moles from Quantitative Chemistry and develops the Chemical changes topic to look at the energy changes involved. This topic also links to the Rates of Reaction topic looking at how catalysts lower the energy needed for a reaction and to the Quantitative Chemistry topic The ideas involved are developed even further at A level.

<u>Rates of reaction Part 1</u>	Collision theory and how this can explain experimental data/observations. How changing temperature, concentration, surface area and adding a catalyst can change rate of reaction. The significance of controlling variables in order to provide valid results.	Through modelling of key scientific ideas Through planning and execution of practical work. Through observing teacher demonstrations. .	To appreciate that in addition to reactivity of chemicals changing variables can speed up or slow down a reaction. To develop skills of scientific enquiry (making and testing predictions) To be able to plan and carry out robust scientific investigations using a range of variables.	To extend practical skills learned over the year 10 course. To apply knowledge of how science works when planning and carrying out own practical procedures. This unit provides you with an understanding of collision theory and how rate can be changed so that you can build on this in year 11 when using graphs to measure and describe rate .
Year 11 – Term 1				
<u>Rates of reaction Part 2</u>	The different ways rate can be measured and practice significance of units in equations. How graphs can be used to clearly represent data and aid in making conclusions. Examples of reversible reactions and the state of dynamic equilibrium. **TRIPLE ONLY** Equillibria and Le chateliers principle and how this can be applied to industrial process (Haber process)	Through modelling of key scientific ideas Through interpreting and drawing conclusions from own and given practical data. Through groupwork and class discussion when presented with “how science works” problems By applying new knowledge and techniques to unfamiliar situations in exam style questions	To gain an understanding of how changes to procedures can affect results and how chemists in industry make changes to optimise a process. To apply skills learned in maths and build on ks3 graphs and HSW skills.	This follows the study of collision theory as students are expected to use this knowledge to explain the changes to rate that take place during a reaction. You should have now studied gradients and tangents (higher students) in maths. assessing any given information

Organic Chemistry	How different substances are separated from crude oil and what these substances are used for. The products formed from burning fuels and the consequences to our atmosphere. **TRIPLE ONLY** Reactions of organic molecules and how these can be used. How polymers, proteins and DNA are formed	Through teacher input and demonstration. Through practical observations and data analysis. Through independent learning and research. Through the application of knowledge to exam style questions.	To appreciate that the main sources of organic compounds are fossil fuels which are a major resource for the petrochemical industry To develop an understanding of how chemists can modify organic molecules to make new and useful materials	This topic builds on the Year 8 topic The Atmosphere and extends the concept of covalent bonding and polymers from the GCSE C2 Structure and Bonding topic. This topic also links to the GCSE C9 Chemistry of the Atmosphere topic looking at the products and consequences of burning fossil fuels. The ideas involved are the basis for a large part of the A level course.
Year 11 – Term 2				
Chemical Analysis	The difference between pure substances, mixtures and formulations and how formulations are used in everyday life. More about chromatography and using it to identify unknown substances. Why instrumental analytical methods are particularly useful. **TRIPLE ONLY** A wider range of tests and techniques. Flame emission spectroscopy.	Through teacher input and demonstration. Through practical observations and data analysis. Through independent learning and research. Through the application of knowledge to exam style questions.	Analysis is a key area of Chemistry and there are many tests and techniques that can be used to identify, measure and test the purity of unknown substances. To develop an understanding of how instrumental analysis can be used for many applications and why it is so widely used.	This topic builds on the tests for gases learned in Year 8 and the Separating Mixtures section of the Year 9 topic Basic Chemistry This topic also links to the and GCSE C1 topic Atomic Structure and to electrolysis studied in C4 Chemical Changes. The ideas involved are developed further in the A level Chemistry course

<u>Topic 10: Using Resources</u>	What resources humans use and the need for sustainable development. How to carry out life cycle assessments. How the water we drink is produced and the treatment of waste water. Higher tier students learn about the alternative methods to extract metals. **TRIPLE ONLY** Students will learn about other useful materials, the Haber process and NPK fertilisers.	Through teacher demonstration and analysing data from investigations into water samples. Through independent research. Through carrying out life cycle assessments of products. Through the application of knowledge to exam style questions.	To understand the importance of sustainable development and the Earth's resources and the role Chemistry plays in this. To know how the water you drink is produced, and how waste water is treated. To know how the use of resources can affect the environment and how human activity impact this. The importance the Haber process and fertilisers in agriculture.	This builds on the work done in Year 7 and Year 9 on separating mixtures and Year 8 looking at resources and waste. It also builds on the C4 Chemical Changes GCSE topic looking at alternative methods of extracting metals. For triple students this links to the GCSE C6 topic looking at reversible reactions and the Haber process. Cross-curricular links to Geography.