400 YEARS OF EXCELLENCE

SUBJECT: Curriculum Overview

Year 9

From September 2025, there will be a change in the sequencing of topics in KS4. Please find below the topics covered and how this fits into the overall curriculum throughout KS4.

Term	Topic studied	What will I learn?	How will I be assessed?
Year 9 Autumn	*Atomic structure and the periodic table*	*A simple model of the atom, symbols, relative atomic mass, electronic charge and isotopes* *Development of the periodic table* *Metals and non-metals, groups 0, 1 and 7.* *Properties of transition metals*	*End of topic test.*
	Chemical Analysis	*What a pure substance is, how you can tell if a substance is pure using melting and boiling points.* *Know what a formulation is.* *How chromatography can be used to separate mixtures and help to identify substances.* *Know the tests for hydrogen, oxygen, carbon dioxide and chlorine.*	*End of topic test.*
Year 9 Spring	*Chemistry of the atmosphere*	*The composition and evolution of the Earth's atmosphere. Greenhouse gasses, what they are, and how human activity has led to an increase in them. Global climate change. The carbon footprint* *Common atmospheric pollutants, their sources and their effects on the atmosphere.*	*End of topic test.*
	Chemical Change	*Acids and bases, including what ions makes solutions acidic or alkaline and explain what happens in neutralisation reactions. Why some acids are string acids and be able to explain the strength of an acid on the basis of concentration of hydrogen ions.* *Making soluble salts including explaining these reactions in terms of gain or loss of electrons and that these are redox reactions.* *How to make pure, dry, crystalline, samples of named soluble salts from metals, metal oxides, metal hydroxides or metal carbonates.*	*End of topic test*

Year 9 Summer	*Chemical Changes (cont)*	*Define and explain reduction and oxidation in terms of loss or gain of oxygen.* *The reactivity of a metal is related to its tendency to form positive ions. Reactivity of metals and the reactivity series.* *Includes being able to write ionic equations for displacement reactions and identify which species in a given reaction is oxidised and which is reduced.* *Unreactive metals are found in the Earth as the metal itself, but most metals are found as compounds. Extraction of metals less reactive than carbon from their ores can be obtained by reduction with carbon.*	*End of topic test (end of year exam)*
Year 10 Autumn	*Bonding structure and the properties of matter*	*Ionic covalent and metallic bonding* *Structure and bonding of carbon* *Bulk and surface properties of matter including nanoparticles.*	*End of topic test*
	Chemical Changes (cont)	*The process of electrolysis and the conditions under which it occurs and what happens at the electrodes. The electrolysis of molten compounds and how to work out which ion would be discharged at the electrodes. Be able to represent reactions at the electrodes as half-equations.*	*End of topic test*
Year 10 Spring	*Energy Changes*	*Exothermic and endothermic reactions* *Reaction profiles and the activation energy.* *Be able to calculate the energy changes in reactions.* *What an electrochemical cell and a battery is. The differences between non-rechargeable and rechargeable cells.* *What a fuel cell is*	*End of topic test*
	The rate and extent of chemical change	*How to measure the rate of a chemical reaction* *How concentration of reactants in solution, the pressure of reacting gases, the surface area of solid reactants, the temperature and catalysts can affect the rates of chemical reactions. Collison theory and activation energy. That catalysts are not used up in chemical reactions and provide an alternative reaction pathway with a lower activation energy.* *What a reaction profile is and how to interpret them.* *Reversible reactions and dynamic equilibrium.* *Energy changes and reversible reactions.* *Equilibrium. The effect of changing conditions, concentration, temperature and pressure on equilibrium and the use of Le Chatelier's principle.*	*End of topic test*

Year 10 Summer	*Organic chemistry*	*Crude oil, alkanes. Cracking and the production of alkenes.* *Alcohols.* *Carboxylic acids, esters.* *Synthetic and naturally occurring polymers.* *Addition polymerisation of alkenes* *Condensation polymers.* *Amino acids, polypeptides and proteins.* *DNA* *Other naturally occurring polymers important for life include proteins, starch and cellulose.*	*End of topic test (end of year exam)*
Year 11 Autumn	*Quantitative*	*Conservation of mass and how to balance equations. Relative formula mass. Concentration of solutions.* *(Combined Higher and Separate only) Moles and Avogadro's number. Mole calculations. What limiting reactants are and how to identify them. The pH scale, neutralisation,* *(Separate only) How to do a titration and titration calculations. Percentage yield, atom economy. gas volumes.*	*End of topic test*
	Using Resources	*Using the Earth's finite and natural resources. How chemistry plays a vital part in improving agriculture and industrial processes and provide new products* *Definition of sustainable development. What potable water is and the processes of how it is produced.How waste water is treated. What a life cycle assessment is, how they are produced and the limitations of using selective or abbreviated ones.* *Ways of reducing the use of resources by reduced use, reuse and recycling.* *(Combined Higher and Separate only) What an ore is, the use of phytomining and bioleaching. Use of displacement, and electrolysis to extract copper.* *(Separate only) Corrosion and its prevention. Alloys as useful materials, including the use of carats to express the proportion of gold in an alloy.* *Properties, structure linked to uses of ceramic, polymers and composites.* *The Haber process including where the reactants come from, the catalyst and the conditions used. How the ammonia is removed. Be able to apply the principles of dynamic equilibria to this important process.* *The production and use of NPK (nitrogen, phosphorous, potassium) fertilisers.*	*End of topic test*

Year 11 Spring	*Chemical Analysis*	*(Separate only) Flame tests* *Reaction with sodium hydroxide can be used to identify some metal ions* *Test for metal carbonates, halides and sulfates. Instrumental methods are accurate, sensitive and rapid. How flame emission spectroscopy (an instrument method which is used to analyse metal ions in solution), is done and how it tells you the ions present in solution and their concentration.*	*End of topic test*
Year 11 Summer	*Revision*	Revision of topics from the last 3 years	Past paper 2 Past paper questions