

Chemistry Curriculum Overview

Chemistry is a lively and engaging subject, and our curriculum aims not just to produce strong chemistry students—reflected in our exam results—but to build a genuine enthusiasm for the subject. Investigation lies at the core of chemistry, so we build in regular opportunities for pupils to develop these skills at every stage of their learning. Many of our students go on to study chemistry, in whole or in part, beyond school, so from Year 7 through to Year 13 we teach with an eye to the knowledge and skills they'll carry into their future careers.

In Year 7, pupils cover foundational science topics alongside the scientific skills they'll need going forward. Year 8 builds on this with core chemistry topics, including the particle model, elements, compounds and mixtures, and a deeper look at chemical reactions. Lessons are hands-on and practical, drawing on skills developed in Year 7 while further strengthening independent and collaborative working. We also encourage cross-curricular thinking to help pupils make wider connections. By the end of Key Stage 3, pupils have covered all the substantive and disciplinary content needed for continued success in chemistry, and the year as a whole is designed to build engagement and enthusiasm further still.

Chemistry is compulsory at KS4, but we teach it in a way that keeps interest and enthusiasm high across the three-year GCSE course. We follow the AQA GCSE Chemistry specification, which offers a strong, logical progression of topics, and lessons are taught by subject specialists all with excellent subject knowledge. Our high uptake and retention rates into A-Level Chemistry speak to how well we engage pupils through KS3 and KS4.

At KS5, we continue to follow the AQA specification, building directly on the foundations laid at GCSE and taking topics to a much greater depth including a quantitative look at a lot of theory. Students explore more advanced areas of physical, organic and inorganic chemistry, developing the mathematical and analytical skills needed to succeed at this level, alongside a strong emphasis on independent practical work. Class sizes at A-Level allow for close support from subject specialists, and lessons are geared towards preparing students not just for exams but for the demands of further study, whether that's a chemistry-related degree or another STEM field. Many of our A-Level chemists go on to study chemistry, medicine, engineering and related sciences at university, a real testament to the quality of teaching and the passion for the subject we aim to instil throughout their time here.

Pupils leave Chemistry at Tiffin with a rigorous education but also hopefully with a great passion for good science.

KS3 Chemistry Curriculum

	Year 8	Year 9 (GCSE)
Autumn Term 1	Introduction to chemistry Chemicals and the safe study of them The Particle Model of Matter Using particle theory to explain states of matter. Changes of state Physical and chemical changes Properties of matter	Atomic Structure What is an atom made of? Elements on the Periodic table Word and symbol equations Separation techniques History of atomic structure Electronic structure
Autumn Term 2	The Particle Model of Matter (See above) Elements, Mixtures and Compounds What are elements, mixtures and compounds? Understanding Chemical Formulae Separating Mixtures Making Solutions and using Solubility curves	The periodic table The structure of the periodic table History of the development of the periodic table Group 1 chemistry Group 7 chemistry Transition metals
Spring Term 1	Elements, Mixtures and Compounds (See above)	Bonding Ionic bonding Covalent bonding Metallic bonding
Spring Term 2	Acids Defining acids and alkalis in terms of the pH scale Writing word equations for the reactions of acids The reactivity series and its links with reactions of acids	Structure Properties of ionic compounds Properties of simple molecular compounds Properties of giant covalent compounds Properties of metals Nanoparticles
Summer Term 1	Metals The reactivity series Corrosion and rusting	Chemical changes - Metals Reaction with oxygen and water Word and symbol equations to represent these reactions Oxidation and Reduction
Summer Term 2	Earth and rocks The structure of the Earth Types of Rocks and the Rock Cycle Composition of Air Combustion and Fossil fuels Chemicals from oils History of the Atmosphere and Earth	Chemical change - Acids Reactions with metals, bases, carbonates Word and symbol equations to represent these reactions Making salts required practical Strong/weak acids Concentrated/Dilute acids/pH

KS4 Chemistry Curriculum

	Year 10	Year 11
Autumn Term 1	Quantitative chemistry Conservation of mass Relative formula mass from atomic mass Moles Avogadro's constant Reacting masses Solution calculations and titrations Percentage Yield and Atom economy Gases	Analysis Definitions of pure and formulations Chromatography Identification of gases Identification of positive ions Identification of negative ions Spectroscopy
Autumn Term 2	Electrolysis Electrolysis of molten ionic compounds Electrolysis of ionic solutions Half equations Aluminium extraction	Organic Chemistry Crude oil and fractional distillation Alkanes Alkenes Alcohols Polymers
Spring Term 1	Energy changes Energy conservation Exothermic and Endothermic reactions Reaction profile diagrams Bond breaking and bond making Chemical cells Fuel cells	Earth's resources Potable water Phytomining Bioleaching Life cycle assessments Metal extraction Using materials Corrosion and alloys Glass, ceramics and polymers Haber process NPK fertilisers
Spring Term 2	Rate of Reaction Definition of rate Calculating rate using graphs Factors affecting rate of reaction Collision theory Catalysts	Revision
Summer Term 1	Extent of Reaction Reversible reactions Le Chatelier's principle Effect of changing conditions	Revision
Summer Term 2	Chemistry of the Atmosphere Atmosphere Pollution	

KS5 Chemistry Curriculum

	Year 12		Year 13	
Autumn Term 1	Atomic Structure (& relevant Periodicity) Atomic structure Arrangement of electrons Ionisation energies Time of flight mass spectrometry	Amount of substance Relative mass of atoms and compounds Moles Reacting masses Solution calculations and titrations Percentage Yield and Atom economy Ideal gas equation	Thermodynamics Entropy Gibbs free energy	Carbonyl chemistry and stereochemistry Oxidation of alcohols Reduction of aldehydes and mechanism Reaction with KCN Carboxylic acids Naming carboxylic acids Esterification
Autumn Term 2	Bonding (& relevant Periodicity) Ionic, covalent and metallic bonding Link to properties Shapes of covalent molecule Polarity Intermolecular forces	Intro to Organic Chemistry Empirical, molecular, general, structural, displayed and skeletal structures Isomerism Naming organic molecules	Acids and Bases Proton donors and acceptors pH of a strong acid pH of a weak acid Using Kw pH curves and indicators Buffers	NMR H1 and C13 NMR to find structures Rate Equation Rate equations Order of reaction Arrhenius equation Aromatics
Spring Term 1	Kinetics Collision theory Maxwell Boltzmann distributions Effect of changing the conditions Catalysts Energetics (& Born Haber cycles) Standard enthalpy changes and Calorimetry Hess's Law Bond enthalpies Born Haber and solutions	Alkanes Fractional distillation Cracking Pollution Free radical substitution Haloalkanes Nucleophilic substitution Elimination Ozone depletion	Electrode Potentials Cells Standard Hydrogen Electrode Calculate EMF Measuring EMF Electrochemical Cells	Amines Formation Basic properties Nucleophilic addition with halogenoalkanes, acyl chlorides and acid anhydrides, including mechanisms. Polymers Addition Polymers Condensation Polymers
Spring Term 2	Chemical Equilibria (including Kp) Dynamic equilibria Le Chateliers principe Equilibrium constants Kc and Kp Redox Oxidation and reduction Oxidation states Writing redox half equations and full equations.	Alkenes Electrophilic addition reactions of alkenes with HBr, H ₂ SO ₄ and Br ₂ Addition polymers	Transition Metals Electronic structure Substitution reactions Shapes of complex ions Colours of complex ions Variable oxidation state Catalysts Reactions of Inorganic compounds Reactions with NH ₃ , OH ⁻ , CO ₃ ²⁻	Amino Acids, Proteins and DNA Amino Acids structures and zwitterions Enzymes DNA Anti-cancer drugs
Summer Term 1	Group 2 Trends Reaction with water Solubilities Group 7 Trends Oxidising power and Reducing power	Alcohols, Organic analysis Making alcohols Oxidation Aldehydes and ketones Organic analysis Chemical tests for functional groups IR and Mass spectrometry	Period 3 compounds Reactions of Na and Mg with water. Reactions of Na, Mg, Al, Si, P and S with oxygen. Melting points of period 3 oxides. Reactions of period 3 oxides with water.	Organic synthesis Devise synthetic routes Chromatography How chromatography works TLC, gas and column chromatography
Summer Term 2	Exam feedback and review. Consolidation of identified knowledge gaps. Teacher directed and supported project work and/or progressing to learn new material. 6th Form Progression Programme.	Exam feedback and review. Consolidation of identified knowledge gaps. Teacher directed and supported project work and/or progressing to learn new material. 6th Form Progression		

