



Year group	Topic	Knowledge covered	Skills covered
7	Particles	<ul style="list-style-type: none"> States of matter Particle model Changes of state Properties of different states of matter Diffusion Gas pressure 	<ul style="list-style-type: none"> Using and designing models Practical skills including collecting gases, safely handling equipment and chemicals Using new scientific language correctly Writing extended answers to 6 mark questions
	Atoms, Elements and Compounds	<ul style="list-style-type: none"> The difference between Atoms, elements and compounds Chemical formulae 	<ul style="list-style-type: none"> Practical work including the safe handling of chemicals Writing formulae of compounds Using new scientific language correctly Writing extended answers to 6 mark questions
	Reactions	<ul style="list-style-type: none"> Chemical Vs Physical reactions Combustion reactions Burning fuels Thermal decomposition Conservation of mass Endothermic vs exothermic reactions 	<ul style="list-style-type: none"> Practical skills including the safe handling of chemicals and using Bunsen burners Writing formulae of compounds Word equations Numeracy skills in calculating masses
	Acids and alkalis	<ul style="list-style-type: none"> Hazard symbols Neutralisation reactions Making salts 	<ul style="list-style-type: none"> Practical work including the safe handling of chemicals and using Bunsen burners Writing formulae of compounds Word equations Balanced symbol equations numeracy skills Using new scientific language correctly Writing extended answers to 6 mark questions
8	Periodic Table	<ul style="list-style-type: none"> Metals and non-Metals Groups and periods Group 1, Group 7, Group 0 	<ul style="list-style-type: none"> Graph drawing Writing balanced symbol equations Writing extended answers to 6 mark questions
	Separation Techniques	<ul style="list-style-type: none"> Mixtures Solubility Filtration Distillation Chromatography 	<ul style="list-style-type: none"> Graph drawing Writing plans for methods Analysing data Practical work including the safe handling of chemicals
	Metals and Acids	<ul style="list-style-type: none"> Metals reacting with acids Metals reacting with Oxygen Displacement reactions Extracting metals Ceramics Polymers Composites 	<ul style="list-style-type: none"> Extracting information from text to answer questions Graph drawing Writing plans for methods Analysing data Practical work including the safe handling of chemicals
	Earth	<ul style="list-style-type: none"> Composition of the Earth Sedimentary, igneous and metamorphic rock The rock cycle The carbon cycle Global warming Recycling 	<ul style="list-style-type: none"> Discussion opportunities about global warming and their carbon footprint Designing and evaluating modelling Practical work including the safe handling of chemicals
9	Fundamental Ideas	<ul style="list-style-type: none"> Three states of matter Atoms, elements, compounds, Mixtures Development of scientific models of the atom Relative electrical charges of sub-atomic particles, Size and mass of atoms Electronic structure 	<ul style="list-style-type: none"> Using diagrams to represent states of matter and electron structure Using scientific terminology correctly Measuring temperatures Drawing and interpreting graphs, Applying scientific knowledge to work out how to separate mixtures and the state of substances

		<ul style="list-style-type: none"> • Understanding how scientific theories are developed • Calculating protons, neutrons and electrons in an atom
Bonding and Formulae	<ul style="list-style-type: none"> • Chemical Bonds • Metals and non-metal ions • Ionic Bonding • Covalent Bonding • Balancing equations • State Symbols 	<ul style="list-style-type: none"> • Using dot and cross diagrams to illustrate ionic, covalent and metallic bonding, • Writing ionic formulae • Writing balanced symbol equations.
Reactions of metals	<ul style="list-style-type: none"> • Metal oxides • The reactivity series • Extraction of metals and reduction 	<ul style="list-style-type: none"> • Following written instructions and handling apparatus safely • Collecting and testing gases, recording and interpreting results • Seeing patterns in collected data • Application of practical skills and knowledge to new situations • Writing balanced symbol equations.
Reactions of acids	<ul style="list-style-type: none"> • Reactions of metals with acids • Neutralisation of acids and salt production • Soluble salts • The pH scale and neutralisation • Strong and weak acids 	<ul style="list-style-type: none"> • Following written instructions and handling apparatus (including Bunsen Burners) safely • Collecting and testing gases • Recording and interpreting results • Application of practical skills knowledge to new situations • Extraction of information from text and using it to answer questions • Writing balanced symbol equations.
Basic Organic Chemistry	<ul style="list-style-type: none"> • Crude Oil • Hydrocarbons and alkanes • Fractional distillation and petrochemicals • Properties of hydrocarbons • Cracking and alkenes • Covalent Bonding structure of polymers 	<ul style="list-style-type: none"> • Using displayed formulae to represent molecules • Seeing and explaining patterns in data • Using states of matter, intermolecular forces and energy changes to explain fractional distillation • Using structure to explain properties of molecules • Following instructions safely • Using models to explain processes • Using scientific terminology correctly • Writing balanced symbol equations.
Chemistry of the Atmosphere	<ul style="list-style-type: none"> • Composition and evolution of the Earth's atmosphere • The proportions of different gases in the atmosphere • The Earth's early atmosphere • Processes that led to the changes in the atmosphere • Greenhouse gases and human activities which contribute to their increase • Global climate change • The carbon footprint and its reduction • Common Atmospheric pollutants and their sources • Effects of atmospheric pollutants 	<ul style="list-style-type: none"> • Explaining processes using the correct scientific terminology • Explaining natural processes and the changes caused by human activity • Balancing symbol equations • Calculating percentage composition of the air, • Reading a passage and extracting information • Analysing mathematical data.
The Periodic Table	<ul style="list-style-type: none"> • Development of the Periodic Table • Metals and non-metals • Group 0, Group 1, Group 7 • Comparison of Transition Metals with Group 1 and their properties 	<ul style="list-style-type: none"> • Calculating protons, neutrons and electrons in an atom • Linking electronic structure to properties and to position in the Periodic table • Writing balanced symbol equations • Seeing patterns in observations and data • Understanding the development of scientific theories • Researching and presenting information

10			<ul style="list-style-type: none"> • Graph plotting, good use of the correct scientific terminology to explain trends
	Energy	<ul style="list-style-type: none"> • Energy transfer during exothermic and endothermic reactions • Reaction Profiles • The energy change of reactions 	<ul style="list-style-type: none"> • Following written instructions and handling apparatus safely • Recording and interpreting results, seeing patterns in collected data • Application of practical skills and knowledge to new situations • Writing balanced symbol equations • Using scientific terms correctly • Calculating energy changes from bond energies • Drawing and interpreting energy level/energy profile diagrams.
	Quantitative 1	<ul style="list-style-type: none"> • Relative atomic mass • Conservation of mass and balanced chemical equations • Relative formula and Mass • Chemical measurements • Moles • Amounts of Substance in equations • Using moles to balance equations • Limiting reactants • Percentage yield • Atom economy 	<ul style="list-style-type: none"> • Following written instructions and handling apparatus safely • Recording and interpreting results • Writing formulae and balancing symbol equations • Rearranging mathematical formulae • Converting masses to moles and vice versa • Calculating percentages
	Structure and Properties	<ul style="list-style-type: none"> • Ionic Compounds • Covalent Bonding • Giant Structures • Limitations of using diagrams and deducing a formula from a diagram only • Properties of ionic compounds • Properties of small molecules • Polymers • Giant covalent structures • Properties of metals and alloys • Sizes of Particles and their properties • Uses of nanoparticles 	<ul style="list-style-type: none"> • Following written instructions and handling apparatus safely • measuring volumes and conductivity • Using models of structures to explain physical properties • Finding patterns in data • Working out ionic formulae • Identifying ionic and covalent compounds for their names and using atomic structure to justify the type of bonding • Using ball and stick models, displayed formulae and dot and cross diagrams and molecular formulae to represent molecules • graph plotting • Reading a scientific article and extracting information from it • Using standard form and developing an appreciation of the size of nanoparticles.
	Rates of Reaction	<ul style="list-style-type: none"> • Mass changes when a reactant or product is a gas • Limiting reactants • Calculating rates of reactions • Factors which affect the rates of chemical reactions • Collision Theory and activation energy • Catalysts 	<ul style="list-style-type: none"> • Following written instructions and handling apparatus safely • Recording quantitative results accurately and identifying patterns in them • Drawing graphs • Calculating rates • Calculating the gradient of a tangent to a curve
Electrolysis	<ul style="list-style-type: none"> • Oxidation and reduction in terms of electrons and writing ionic equations • The process of electrolysis • Electrolysis of molten ionic compounds • Using electrolysis to extract metals • Electrolysis of aqueous solutions • Representation of reactions at electrodes as half equations • Alternative ways of extracting metals 	<ul style="list-style-type: none"> • Writing half-equations and identifying oxidation and reduction reactions • Making detailed qualitative observations • Using theory to explain observations and to make predictions • Research using the internet and presenting findings in a suitable format for a given audience • Following written instructions and handling apparatus safely • Describing a process using the correct scientific terms and half-equations. 	

	Earth's Resources	<ul style="list-style-type: none"> • Using the Earth's resources and sustainable development • Potable water • Waste water treatment • Life cycle assessment • Ways of reducing the use of resources 	<ul style="list-style-type: none"> • Extended prose on data interpretation • Research using the internet and presenting historical data on a timeline • Literacy – reading a scientific article and extracting information from it • Using specialist scientific terms correctly, • Preparing and delivering a presentation to peers • Following written instructions and handling apparatus safely, • Thinking about the impact of using materials on the Earth,
	Using Resources	<ul style="list-style-type: none"> • Corrosion and its prevention • Alloys and useful materials • Ceramics • Polymers • Composites. 	<ul style="list-style-type: none"> • Planning a practical investigation • Handling apparatus safely • Calculating percentage by mass • Reading a scientific article and extracting information from it • Linking properties to uses.
	Analysis	<ul style="list-style-type: none"> • Pure Substances • Formulations • Chromatography • Identification of common gasses • Tests for hydrogen, oxygen, carbon dioxide, chlorine, Flame tests • Metal hydroxides (test for metal ions) Carbonates (test for), Halides (test for), Sulphates (test for) • Instrumental tests • Flame emission spectroscopy 	<ul style="list-style-type: none"> • Following written instructions and handling apparatus safely • Making accurate qualitative and quantitative observations • Using observations to identify substances • Calculating Rf values • Identifying gasses using chemical tests, identifying positive ions and negative ions using chemical tests,
11	Quantitative Chemistry 2	<ul style="list-style-type: none"> • Concentration of solutions • Using Concentrations of Solutions in mol/dm³ • Use of amount of substance in relation to volumes of gases • Titrations • Strong and Weak Acids 	<ul style="list-style-type: none"> • Following written instructions and handling apparatus safely • Making accurate qualitative and quantitative observations • Calculating pH from concentration • Writing formulae and balancing equations • Using chemical equations to calculate reacting quantities • Rearranging mathematical formulae • Calculating molar volumes of gases • Calculating concentrations of solutions and titrations • Using precise quantitative measuring equipment • Explaining how to do a titration using the subject specialist language
	Equilibrium	<ul style="list-style-type: none"> • Reversible reactions • Energy changes and reversible reactions • The effect of changing conditions on equilibrium • The effect of changing concentration • The effect of temperature changes on equilibrium • The effect of pressure changes on equilibrium • The Haber process • Production and uses of NPK fertilisers 	<ul style="list-style-type: none"> • Following written instructions and handling apparatus safely • Using scientific theory to explain and interpret observations • Using equilibrium theory to work out how to maximise • An appreciation of safety issues in industry, the need to make a profit and • Reading scientific articles and extracting information from them • Using precise quantitative measuring equipment for titration • Percentage composition calculations, comparisons of different methods of producing fertilisers.
	Electrochemical cells and fuel cells	<ul style="list-style-type: none"> • Cells and Batteries • Fuel Cells • Representation of reactions at electrodes as half equations 	<ul style="list-style-type: none"> • Following written instructions and handling apparatus safely • Interpreting collected quantitative data • Writing half-equations

		<ul style="list-style-type: none"> • Reading scientific articles and extracting information from them.
	Further Organic Chemistry	<ul style="list-style-type: none"> • Structure and formulae of alkenes • Reactions of alkenes • Alcohols • Carboxylic Acids • Addition Polymerisation • Condensation polymerisation • Amino Acid • DNA and other naturally occurring polymers
	Working Scientifically	<ul style="list-style-type: none"> • Writing balanced symbol equations and ionic equations • Using molecular formulae and displayed formulae • Making qualitative observations, extended prose • Planning/describing an experiment • Following written instructions and handling apparatus safely • Reading a scientific passage and extracting information from it
	Calculations and Maths skills	<ul style="list-style-type: none"> • Command words and specialist terminology used in practicals • Required Practical activity 1 preparing a pure dry sample of a salt • Required Practical activity 2 Titration of strong acid with strong alkali • Required Practical activity 3 Investigation electrolysis of ionic solutions with inert electrodes • Required Practical activity 4 investigating the variables that affect the temperature changes in reactions • Required Practical activity 5 investigating how changing concentration affects rate using gas collection and change in colour/turbidity • Required Practical activity 6 Paper chromatography • Required Practical activity 7 flame tests • Required Practical activity 8 Analysis and purification of water samples.
		<ul style="list-style-type: none"> • Writing word and symbol equations • Interpreting a flow chart which illustrates a process • Describing/explaining practical procedures • Calculating percentages • Using precise quantitative measuring equipment for titration • Concentration calculations • Rearranging mathematical formulae • Planning practical procedures • Writing half equations for reactions • Writing ionic equations • Graph plotting • Calculating rates
		<ul style="list-style-type: none"> • Simple mathematical skills • Working out chemical formulae and balancing symbol equations • Converting masses to mole and vice versa • Using chemical equations to calculate reacting quantities • Using reacting masses to work out balanced equations • Calculating concentrations of solutions • Converting from cm³ to dm³ and vice versa • Calculating moles from volumes of gases • Reaction profiles • Calculating energy changes in reactions from bond energies • Graph plotting • Calculating rate of reaction • Calculating surface area • Calculating R_f values • Interpreting graphs,