KNOWLEDGE AND SKILLS OVERVIEW	HT1	HT2	HT3	HT4	HT5	HT6
Year 7			Chemical Substances • Separating Mixtures • Solubility • Acids and Alkalis • Neutralisation	The Earth • Structure of the Earth • Plate tectonics • Rock types and the rock cycle • Earth's atmosphere and climate change		
Year 8	Chemical Patterns • Development of the periodic table • Metals and non-metals • Elements, compounds and formulae • Types of chemical reactions including energy changes • Group I, VII and 0			Particles • Particle diagrams • Changes of state including sublimation • Diffusion • Simple atomic model • Reversible and irreversible changes • Formulae and compounds • Pure substances/checks for purity		
Year 9	Metals • Periodic table • Atomic structure • Properties of metals and non-metals • Reactions of metals with water, oxygen and acid • Reactivity series, displacement reactions	• Metal extraction • Metal and non-metal oxides • Making copper sulphate Chemical reactions • Conservation of mass • Thermal decomposition • Formulae and compounds • Combustion	• Combustion and the greenhouse effect • Energy in reactions • Types of materials (polymers)	• .Types of materials (ceramics and composites) Working Scientifically Working Scientifically skills and practical investigations	Working Scientifically Working Scientifically skills and practical investigations. KS3 assessment and feedback	• Atoms (History and structure) • Balancing equations • Separating mixtures • Ions and isotopes • Electronic structure
Year 10 **Bold indicates Set 1 only**	GCSE • Development of the periodic table • Electronic structure and the periodic table	GCSE • Covalent bonding • Simple molecules • Giant covalent structures	GCSE • Relative masses and moles • Equations and calculations	GCSE • Reactivity of metals • Displacement reactions • Extraction of metals	GCSE • Introduction to electrolysis • Changes at the electrodes	GCSE ctd • Bond energy calculations • **Cells and batteries** • **Fuel cells**

	• Group I and VII (including explaining reactivity) • **The transition metals** • Forming ions • Ionic bonding and giant ionic structures	• Fullerenes and graphene • Metallic bonding • Giant Metallic structures • **Nano particles and their applications**	• Masses and balanced equations • **Calculating yield** • **Calculating atom economy** • Expressing concentrations • **Titrations and their calculations** • **Volumes of gases**	• Making salts from metals, metal oxides, alkalis and carbonates • Neutralisation and the pH scale • Strong and weak acids	• Extraction of aluminium • Electrolysis of solutions • Exothermic and endothermic reactions and their applications	• Measuring rates of reaction • Rates and surface area • Rates and temperature
Year 11 **Bold indicates Set 1 only**	GCSE ctd • Rate and concentration or pressure • Rate and catalysts • Reversible reactions • Energy and reversible reactions • Dynamic equilibria • Altering conditions	GCSE ctd • Hydrocarbons • Fractional distillation • Burning hydrocarbons • Cracking • **Reactions of alkenes** • **Alcohols, carboxylic acids and esters** • **Addition polymerisation** • **Condensation polymerisation** • **Natural polymers** • **DNA**	GCSE ctd • Pure substances • Analysing chromatograms • Testing for gases • **Testing for positive and negative ions** • **Industrial methods** • The history of the atmosphere • The evolving atmosphere • Greenhouse gases • Climate change • Atmospheric pollutants	GCSE ctd • Finite and renewable resources • Making water safe to drink • Treating sewage • Extracting metals from ores • Lifecycle assessments • Reduce reuse recycle • **Rusting** • **Useful alloys** • **Polymers** • **Glass, ceramics and composites** • **Haber Process**	GCSE ctd • **Fertilisers** • **Making fertilisers in industry**	
Year 12	Fundamental particles Mass number and isotopes Electron configuration Ionic bonding Nature of covalent and dative covalent bonds Metallic bonding Bonding and physical properties Relative atomic mass and relative molecular mass The mole and Avogadro constant The ideal gas equation Empirical and molecular formula	Bonding and physical properties Shapes of simple molecules and ions Bond Polarity Forces between molecules Forces between molecules Enthalpy change Calorimetry Applications of Hess's law Nomenclature Reaction mechanisms Isomerism Fractional distillation of crude oil	Applications of Hess's law Bond enthalpies Collision theory Maxwell–Boltzmann distribution Effect of temperature on reaction rate Effect of concentration and pressure Effect of catalysts Elimination Ozone depletion Structure, bonding and reactivity of alkenes Addition reactions of alkenes	Chemical equilibria and Le Chatelier's principle Equilibrium constant K_c for homogeneous systems Redox Classification Physical properties of the Period 3 elements Oxidation of alcohols Elimination Identification of functional groups by test-tube reactions Mass Spectrometry Infra-red spectroscopy	Physical properties of the Period 3 elements Group 2, the alkaline earth metals Born-Haber Cycles Trends in properties Uses of chlorine and chlorate(I) Optical isomerism Aldehydes and ketones	Gibbs free-energy change ΔG and entropy change ΔS Carboxylic acids and esters Acylation

	Balanced equations and associated calculations	Modification of alkanes by cracking Combustion of alkanes Chlorination of alkanes Nucleophilic substitution	Addition polymers Oxidation of alcohols			
Year 13	Bonding in arenes Electrophilic substitution Preparation of amines Base Properties Condensation polymers Biodegradability and disposal of polymers Amino acids Proteins Enzymes DNA Action of anti-cancer drugs Organic synthesis Gibbs free-energy change ΔG and entropy change ΔS Rate Equations	Organic synthesis Nuclear magnetic resonance spectroscopy Chromatography Equilibrium constant K_p for homogeneous systems Determination of rate equation General Properties of the Transition Metals	Electrode potentials and cells Commercial applications of electrochemical cells Brønsted-Lowry acid-base equilibria in aqueous solutions Definition and determination of pH The ionic product of water K_w Weak acids and bases; K_a for weak acids pH curves, titrations and indicators Substitution reactions Shapes of complex ions Formation of coloured ions	Buffer action Properties of Period 3 elements and their oxides Variable oxidation states Catalysts Formation of coloured ions Reactions of ions in aqueous solution Formation of coloured ions Reactions of ions in aqueous solution	Catalysts Reactions of ions in aqueous solution	
ORACY/LIT/NUM	Oracy: Presentations Group work Class discussions Student led activities Practical work	Literacy: Reading Extended writing tasks Scientific terminology Spelling tests	Numeracy: Balancing equations Rearranging equations Calculations Manipulation of data Tables Graphs			
CULTURAL CAPITAL	Climate and the atmosphere Sustainability Lifecycle assessments Metal extraction Biofuel and fuel cells Fertilisers Polymers and plastics Clean water and sewage Reaction rates and energy					

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