Belfairs Academy

GCSE Chemistry Fundamentals Map

Italics are for triple-science only

Knowledge	Skills
ESSENTIAL MATHS Standard form Orders of magnitude Decimal form Significant figures Ratios, fractions and percentages	Making estimates Visualise and represent 2D and 3D shapes Change the subject of an equation Measure rate of change using the slope of a tangent Transfer data to graphs
ATOMIC STRUCTURE AND THE PERIODIC TABLE Elements, compounds and mixtures Atoms and formulae Changing ideas about atoms *Modelling the atom: charges, masses and electrons* Electronic structure The periodic table and its development Groups: 0, 1 and 7 *Transition metals*	Use of formulae in equations Understand properties of metals and non-metals Explore and predict trends in reactions
STRUCTURE, BONDING AND THE PROPERTIES OF MATTER Chemical bonds Ionic bonds, compounds and their properties Covalent bonds Metallic bonds States of matter Small molecules and their properties Polymers Diamond, graphite, graphene and fullerenes *Nanoparticles*	Explain the properties of metals and alloys. Model atoms and molecules in 2D and 3D
CHEMICAL QUANTITIES AND CALCULATIONS Relative mass formula Mass changes in gas reactions Moles Concentration of solutions *Percentage yield* *Atom economy and pathway of a reaction* *Amounts of substances in volumes of gases*	Writing balanced equations Chemical measurements and uncertainty Calculate amounts of substances in equations Convert masses to moles *Using concentrations of solutions*
THE ATMOSPHERE Gases in the atmosphere Changes in the Earth's atmosphere Greenhouse gases Climate change and the carbon footprint Fossil fuel pollution	

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Knowledge	Skills
CHEMICAL CHANGES Metal oxides Reactivity series Extraction of metals Oxidation, reduction and electron transfer Reactions of metals and acids pH and neutralisation Neutralisation of acids and salt production Strong and weak acids Electrolysis and its uses	Investigate the preparation of a pure, dry sample of a soluble salt Investigate electrolysis using inert electrodes. *Investigate reacting volumes of acids and alkalis*
ENERGY CHANGES Endothermic and exothermic reactions Reacton profiles Energy change of reactions *Cells, batteries and fuel cells*	Investigate temperature changes in reactions
RATE AND EXTENT OF CHEMICAL CHANGE Limiting reactants and molar masses Increasing rate of reaction and catalysts Collision theory Reversible reactions and energy changes Equilibrium and effects of concentration, temperature and pressure.	Measuring and calculating rates Investigate the effect of concentration on rate of reaction
HYDROCARBONS Crude oil, hydrocarbons and alkanes Fractional distillation Combustion Cracking and alkenes Intermolecular forces *Alcohols* *Carboxylic acids* *Addition and condensation polymerisation* *Amino acids and DNA*	Represent polymers as 3D models *Draw structure of alkenes*
CHEMICAL ANALYSIS Pure substances Formulations Test for gases *Metal hydroxides* *Instrumental methods* *Flame emission spectroscopy*	Investigate use of paper chromatography *Carry out flame tests* *Investigate chemical testing of ions*
SUSTAINABLE DEVELOPMENT Using the Earth's resources Potable water Waste water treatment Metal extraction Life Cycle Assessment, recycling and reduction of resource use *The Haber process*	Investigate purification of water samples *Explore rusting* *Interpret alloy composition from data* *Compare properties of materials* *Production of fertiliser*

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