CHEMISTRY KS4 CURRICULUM MAP

Specifications Taught

GCSE Chemistry – AQA Specification (8462)
GCSE Combined Science: Trilogy – AQA Specification (8464)

GCSE Chemistry – Separate Science

YEAR	TERM	Topic	
10	Autumn	**4.3.1 Chemical measurements, conservation of mass and the quantitative interpretation of chemical equations** 4.3.1.1 Conservation of mass and balanced chemical equations 4.3.1.2 Relative formula mass 4.3.1.3 Mass changes when a reactant or product is a gas 4.3.1.4 Chemical measurements **4.2.2 How Bonding & Structure are Related to Properties of Substances** 4.2.2.1 The three states of matter 4.2.2.2 State symbols 4.2.2.3 Ionic bonding & Compounds 4.2.2.4 Covalent bonding & properties of small molecules 4.2.2.5 Polymers 4.2.2.6 Giant covalent structures 4.2.2.7 Metallic bonding & properties of metals & alloys 4.2.2.8 Metals as conductors **4.2.3 Structure and Bonding of Carbon** 4.2.3.1 Diamond 4.2.3.2 Graphite 4.2.2.3 Graphene & Fullerenes **4.2.4 Bulk & Surface Properties** 4.2.3.1 Sizes of particles & their properties 4.2.3.2 Uses of nanoparticles **4.5.1 Exothermic and endothermic reactions** 4.5.1.1 Energy transfer during exothermic and endothermic reactions 4.5.1.2 Reaction profiles 4.5.1.3 The energy change of reactions **4.5.2 Chemical cells and fuel cells** 4.5.2.1 Cells and batteries 4.5.2.2 Fuel cells **4.3.2 Use of amount of substance in relation to masses of pure substances** 4.3.2.1 Moles 4.3.2.2 Amounts of substances in equations 4.3.2.3 Using moles to balance equations 4.3.2.4 Limiting reactants 4.3.2.5 Concentration of solutions	**Required practical 4:** investigate the variables that affect temperature changes in reacting solutions such as, e.g. acid plus metals, acid plus carbonates, neutralisations, displacement of metals
	Spring	**4.3.3 Yield and atom economy of chemical reactions** 4.3.3.1 Percentage yield 4.3.3.2 Atom economy **4.3.4 Using concentrations of solutions in mol/dm^3** 4.4.2.5 Titrations	**Required practical 2:** determination of the reacting volumes of solutions of a strong acid and

		4.3.5 Use of amount of substance in relation to volumes of gases **4.4.2 Reactions of acids** 4.4.2.1 Reactions of acids with metals 4.4.2.2 Neutralisation of acids and salt production 4.4.2.3 Soluble salts 4.4.2.4 The pH scale and neutralisation 4.4.2.6 Strong and weak acids (HT only) **4.4.3 Electrolysis** 4.4.3.1 The process of electrolysis 4.4.3.2 Electrolysis of molten ionic compounds 4.4.3.3 Using electrolysis to extract metals 4.4.3.4 Electrolysis of aqueous solutions 4.4.3.5 Representation of reactions at electrodes as half equations **4.6.1 Rate of reaction** 4.6.1.1 Calculating rates of reactions 4.6.1.2 Factors which affect the rates of chemical reactions 4.6.1.3 Collision theory and activation energy 4.6.1.4 Catalysts	a strong alkali by titration. **Required practical 3:** investigate what happens when aqueous solutions are electrolysed using inert electrodes. **Required practical 1:** preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate using a Bunsen burner to heat dilute acid and a water bath or electric heater to evaporate the solution. .
	Summer	**4.6.2 Reversible reactions and dynamic equilibrium** 4.6.2.1 Reversible reactions 4.6.2.2 Energy changes and reversible reactions 4.6.2.3 Equilibrium 4.6.2.4 The effect of changing conditions on equilibrium 4.6.2.5 The effect of changing concentration 4.6.2.6 The effect of temperature changes 4.6.2.7 The effect of pressure changes **4.10.4 The Haber process and the use of NPK fertilisers** 4.10.4.1 The Haber process **4.7.1 Carbon compounds as fuels and feedstock** 4.7.1.1 Crude oil, hydrocarbons and alkanes 4.7.1.2 Fractional distillation and petrochemicals 4.7.1.3 Properties of hydrocarbons 4.7.1.4 Cracking and alkenes **4.7.2 Reactions of alkenes and alcohols** 4.7.2.1 Structure and formulae of alkenes 4.7.2.2 Reactions of alkenes 4.7.2.3 Alcohols 4.7.2.4 Carboxylic acids	**Required practical 5**: investigate how changes in concentration affect the rates of reactions
11	**Autumn**	**4.7.3 Synthetic and naturally occurring polymers** 4.7.3.1 Addition polymerisation 4.7.3.2 Condensation polymerisation 4.7.3.3 Amino acids 4.7.3.4 DNA (deoxyribonucleic acid) and other naturally occurring polymers **4.8.1 Purity, formulations and chromatography**	**Required practical 6:** investigate how paper chromatography can be used to separate and

		4.8.1.1 Pure substances 4.8.1.2 Formulations 4.8.1.3 Chromatography **4.8.2 Identification of common gases** 4.8.2.1 Test for hydrogen 4.8.2.2 Test for oxygen 4.8.2.3 Test for carbon dioxide 4.8.2.4 Test for chlorine **4.8.3 Identification of ions by chemical and spectroscopic means** 4.8.3.1 Flame tests 4.8.3.2 Metal hydroxides 4.8.3.3 Carbonates 4.8.3.4 Halides 4.8.3.5 Sulfates 4.8.3.6 Instrumental methods 4.8.3.7 Flame emission spectroscopy **4.9.1 The composition and evolution of the Earth's atmosphere** 4.9.1.1 The proportions of different gases in the atmosphere 4.9.1.2 The Earth's early atmosphere 4.9.1.3 How oxygen increased 4.9.1.4 How carbon dioxide decreased **4.9.2 Carbon dioxide and methane as greenhouse gases** 4.9.2.1 Greenhouse gases 4.9.2.2 Human activities which contribute to an increase in greenhouse gases 4.9.2.3 Global climate change 4.9.2.4 The carbon footprint and its reduction	tell the difference between coloured substances. **Required practical 7:** use of chemical tests to identify the ions in unknown single ionic compounds
	Spring	**4.9.3 Common atmospheric pollutants and their sources** 4.9.3.1 Atmospheric pollutants from fuels 4.9.3.2 Properties and effects of atmospheric pollutants **4.10.1 Using the Earth's resources and obtaining potable water** 4.10.1.1 Using the Earth's resources and sustainable development 4.10.1.2 Potable water 4.10.1.3 Waste water treatment 4.10.1.4 Alternative methods of extracting metals **4.10.2 Life cycle assessment and recycling** 4.10.2.1 Life cycle assessment 4.10.2.2 Ways of reducing the use of resources **4.10.3 Using materials** 4.10.3.1 Corrosion and its prevention 4.10.3.2 Alloys as useful materials 4.10.3.3 Ceramics, polymers and composites **4.10.4 The Haber process and the use of NPK fertilisers** 4.10.4.2 Production and uses of NPK fertilisers	**Required practical 8:** analysis and purification of water samples from different sources, including pH, dissolved solids and distillation
	Summer	**Preparation for final exam** Consolidation of required practicals Approaches to extended response questions. **Final Examination**	

GCSE Chemistry – Trilogy

YEAR	TERM	Topic	
10	Autumn	**5.3.1 Chemical measurements, conservation of mass and the quantitative interpretation of chemical equations** 5.3.1.1 Conservation of mass and balanced chemical equations 5.3.1.2 Relative formula mass 5.3.1.3 Mass changes when a reactant or product is a gas 5.3.1.4 Chemical measurements **5.2.2 How Bonding & Structure are Related to Properties of Substances** 5.2.2.1 The three states of matter 5.2.2.2 State symbols 5.2.2.3 Ionic bonding & Compounds 5.2.2.4 Covalent bonding & properties of small molecules 5.2.2.5 Polymers 5.2.2.6 Giant covalent structures 5.2.2.7 Metallic bonding & properties of metals & alloys 5.2.2.8 Metals as conductors **5.2.3 Structure and Bonding of Carbon** 5.2.3.1 Diamond 5.2.3.2 Graphite 5.2.2.3 Graphene & Fullerenes **5.5.1 Exothermic and endothermic reactions** 5.5.1.1 Energy transfer during exothermic and endothermic reactions 5.5.1.2 Reaction profiles 5.5.1.3 The energy change of reactions	**Required practical 10:** investigate the variables that affect temperature changes in reacting solutions such as, e.g. acid plus metals, acid plus carbonates, neutralisations, displacement of metals
	Spring	**5.3.2 Use of amount of substance in relation to masses of pure substances** 5.3.2.1 Moles 5.3.2.2 Amounts of substances in equations 5.3.2.3 Using moles to balance equations 5.3.2.4 Limiting reactants 5.3.2.5 Concentration of solutions **5.4.2 Reactions of acids** 5.4.2.1 Reactions of acids with metals 5.4.2.2 Neutralisation of acids and salt production 5.4.2.3 Soluble salts 5.4.2.4 The pH scale and neutralisation 5.4.2.6 Strong and weak acids (HT only) **5.4.3 Electrolysis** 5.4.3.1 The process of electrolysis 5.4.3.2 Electrolysis of molten ionic compounds 5.4.3.3 Using electrolysis to extract metals 5.4.3.4 Electrolysis of aqueous solutions 5.4.3.5 Representation of reactions at electrodes as half equations	**Required practical 8:** preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate using a Bunsen burner to heat dilute acid and a water bath or electric heater to evaporate the solution.
	Summer	**5.6.1 Rate of reaction** 5.6.1.1 Calculating rates of reactions 5.6.1.2 Factors which affect the rates of chemical reactions 5.6.1.3 Collision theory and activation energy 5.6.1.4 Catalysts	**Required practical 9:** investigate what happens when aqueous solutions are

		5.6.2 Reversible reactions and dynamic equilibrium 5.6.2.1 Reversible reactions 5.6.2.2 Energy changes and reversible reactions 5.6.2.3 Equilibrium 5.6.2.4 The effect of changing conditions on equilibrium 5.6.2.5 The effect of changing concentration 5.6.2.6 The effect of temperature changes 5.6.2.7 The effect of pressure changes **5.7.1 Carbon compounds as fuels and feedstock** 5.7.1.1 Crude oil, hydrocarbons and alkanes 5.7.1.2 Fractional distillation and petrochemicals 5.7.1.3 Properties of hydrocarbons 5.7.1.4 Cracking and alkenes	electrolysed using inert electrodes. **Required practical 11**: investigate how changes in concentration affect the rates of reactions.
11	**Autumn**	**5.8.1 Purity, formulations and chromatography** 5.8.1.1 Pure substances 5.8.1.2 Formulations 5.8.1.3 Chromatography **5.8.2 Identification of common gases** 5.8.2.1 Test for hydrogen 5.8.2.2 Test for oxygen 5.8.2.3 Test for carbon dioxide 5.8.2.4 Test for chlorine **5.9.1 The composition and evolution of the Earth's atmosphere** 5.9.1.1 The proportions of different gases in the atmosphere 5.9.1.2 The Earth's early atmosphere 5.9.1.3 How oxygen increased 5.9.1.4 How carbon dioxide decreased **5.9.2 Carbon dioxide and methane as greenhouse gases** 5.9.2.1 Greenhouse gases 5.9.2.2 Human activities which contribute to an increase in greenhouse gases 5.9.2.3 Global climate change 5.9.2.4 The carbon footprint and its reduction	**Required practical 12:** investigate how paper chromatography can be used to separate and tell the difference between coloured substances. .
	Spring	**5.9.3 Common atmospheric pollutants and their sources** 5.9.3.1 Atmospheric pollutants from fuels 5.9.3.2 Properties and effects of atmospheric pollutants **5.10.1 Using the Earth's resources and obtaining potable water** 5.10.1.1 Using the Earth's resources and sustainable development 5.10.1.2 Potable water 5.10.1.3 Waste water treatment 5.10.1.4 Alternative methods of extracting metals 4.10.2.2 Ways of reducing the use of resources **5.10.2 Life cycle assessment and recycling** 5.10.2.1 Life cycle assessment 5.10.2.2 Ways of reducing the use of resources	**Required practical 13:** analysis and purification of water samples from different sources, including pH, dissolved solids and distillation
	Summer	**Preparation for final exam** Consolidation of required practicals Approaches to extended response questions. **Final Examination**	