

# Chemistry GCSE Revision Checklist

Blue = Required Practical

Red = Higher tier only

Green = Triple Chemistry only

Title	Topic	Sub-topic			
4.1 Atomic structure and the periodic table	4.1.1 A simple model of the atom, symbols, relative atomic mass, electronic charge and isotopes	4.1.1.1 Atoms, elements and compounds			
		4.1.1.2 Mixtures			
		4.1.1.3 The development of the model of the atom (common content with physics)			
		4.1.1.4 Relative electrical charges of subatomic particles			
		4.1.1.5 Size and mass of atoms			
		4.1.1.6 Relative atomic mass			
		4.1.1.7 Electronic structure			
	4.1.2 The periodic table	4.1.2.1 The periodic table			
		4.1.2.2 Development of the periodic table			
		4.1.2.3 Metals and non-metals			
		4.1.2.4 Group 0			
		4.1.2.5 Group 1			
		4.1.2.6 Group 7			
	4.1.3 Properties of transition metals (chemistry only)	4.1.3.1 Comparison with Group 1 elements			
		4.1.3.2 Typical properties			
4.2 Bonding, structure, and the properties of matter	4.2.1 Chemical bonds, ionic, covalent and metallic	4.2.1.1 Chemical bonds			
		4.2.1.2 Ionic bonding			
		4.2.1.3 Ionic compounds			
		4.2.1.4 Covalent bonding			
		4.2.1.5 Metallic bonding			
	4.2.2 How bonding and structure are related to the properties of substances	4.2.2.1 The three states of matter			
		4.2.2.2 State symbols			
		4.2.2.3 Properties of ionic compounds			
		4.2.2.4 Properties of small molecules			
		4.2.2.5 Polymers			
		4.2.2.6 Giant covalent structures			
		4.2.2.7 Properties of metals and 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			
		4.2.3.3 Graphene and fullerenes			
	4.2.4 Bulk and surface properties of matter including nanoparticles (chemistry only)	4.2.4.1 Sizes of particles and their properties			
		4.2.4.2 Uses of nanoparticles			
4.3 Quantitative chemistry	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			
	4.3.2 Use of amount of substance in relation to	4.3.2.1 Moles (HT only)			
		4.3.2.2 Amounts of substances in equations (HT only)			
		4.3.2.3 Using moles to balance equations (HT only)			

	masses of pure substances	4.3.2.4 Limiting reactants (HT only) 4.3.2.5 Concentration of solutions		
	4.3.3 Yield and atom economy of chemical reactions (chemistry only)	4.3.3.1 Percentage yield 4.3.3.2 Atom economy		
	4.3.4. Using concentrations of solutions in mol/dm <sup>3</sup> (chemistry only) (HT only)			
	4.3.5 Use of amount of substance in relation to volumes of gases (chemistry only) (HT only)			
4.4 Chemical changes	4.4.1 Reactivity of metals	4.4.1.1 Metal oxides 4.4.1.2 The reactivity series 4.4.1.3 Extraction of metals and reduction 4.4.1.4 Oxidation and reduction in terms of electrons (HT only)		
		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		
		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.		
		4.4.2.4 The pH scale and neutralisation 4.4.2.5 Titrations (chemistry only)		
	4.4.2 Reactions of acids	Required practical 2: (chemistry only) determination of the reacting volumes of solutions of a strong acid and a strong alkali by titration. (HT only) determination of the concentration of one of the solutions in mol/dm <sup>3</sup> and g/dm <sup>3</sup> from the reacting volumes and the known concentration of the other solution.		
		4.4.2.6 Strong and weak acids (HT only)		
		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		
		Required practical 3: investigate what happens when aqueous solutions are electrolysed using inert electrodes. This should be an investigation involving developing a hypothesis.		
		4.4.3.5 Representation of reactions at electrodes as half equations (HT only)		
4.5 Energy changes	4.5.1 Exothermic and endothermic reactions	4.5.1.1 Energy transfer during exothermic and endothermic reactions		
		Required practical 4: investigate the variables that affect temperature changes in reacting solutions such as, eg acid plus metals, acid plus carbonates, neutralisations, displacement of metals		

		4.5.1.2 Reaction profiles		
		4.5.1.3 The energy change of reactions (HT only)		
	4.5.2 Chemical cells and fuel cells (chemistry only)	4.5.2.1 Cells and batteries		
		4.5.2.2 Fuel cells		
		4.6.1.1 Calculating rates of reactions		
		4.6.1.2 Factors which affect the rates of chemical reactions		
	4.6.1 Rate of reaction	Required practical 5: investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produced and a method involving a change in colour or turbidity.		
		4.6.1.3 Collision theory and activation energy		
		4.6.1.4 Catalysts		
4.6 The rate and extent of chemical change	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 (HT only)		
		4.6.2.5 The effect of changing concentration (HT only)		
		4.6.2.6 The effect of temperature changes on equilibrium (HT only)		
		4.6.2.7 The effect of pressure changes on equilibrium (HT only)		
	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 Organic chemistry	4.7.2 Reactions of alkenes and alcohols (chemistry only)	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		
	4.7.3 Synthetic and naturally occurring polymers (chemistry only)	4.7.3.1 Addition polymerisation		
		4.7.3.2 Condensation polymerisation (HT only)		
		4.7.3.3 Amino acids (HT only)		
		4.7.3.4 DNA (deoxyribonucleic acid) and other naturally occurring polymers		
	4.8.1 Purity, formulations and chromatography	4.8.1.1 Pure substances		
		4.8.1.2 Formulations		
		4.8.1.3 Chromatography		
		Required practical 6: investigate how paper chromatography can be used to separate and tell the difference between coloured substances. Students should calculate Rf values.		
	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 (chemistry only)	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		
		Required practical 7: use of chemical tests to identify the ions in unknown single ionic compounds covering the ions from sections Flame tests to Sulfates.		
		4.8.3.6 Instrumental methods		

		4.8.3.7 Flame emission spectroscopy		
4.9 Chemistry of the atmosphere	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 in the atmosphere		
		4.9.2.3 Global climate change		
		4.9.2.4 The carbon footprint and its reduction		
	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 Using resources	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		
		Required practical 8: analysis and purification of water samples from different sources, including pH, dissolved solids and distillation.		
		4.10.1.3 Waste water treatment		
		4.10.1.4 Alternative methods of extracting metals (HT only)		
	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 (chemistry only)	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 (chemistry only)	4.10.4.1 The Haber process		
		4.10.4.2 Production and uses of NPK fertilisers		