Personalised Learning Checklists Edexcel Single: Chemistry Paper 1

Edexcel Single Chemistry (1CI0) from 2016 Topics C2&3				
Topic	**Student Checklist**	**R**	**A**	**G**
Topic 2 – States of matter and mixtures States of matter	Describe the arrangement, movement and the relative energy of particles in each of the three states of matter			
	Recall the names used for the interconversions between the three states of matter			
	Compare physical changes with chemical reactions			
	Explain the changes in arrangement, movement and energy of particles during these interconversions			
	Predict the physical state of a substance under specified conditions, given suitable data			
	Explain the difference between the use of 'pure' in chemistry compared with its everyday use and the differences between a pure substance and a mixture			
	Interpret melting point data to distinguish between pure substances and mixtures			
	Explain the experimental techniques for separation of mixtures by: simple & fractional distillation, filtration, crystallisation and paper chromatography			
	Describe an appropriate experimental technique to separate a mixture when knowing the properties			
	Describe what paper chromatography is and explain how it can be used to separate a mixture			
	Interpret a paper chromatogram: to distinguish between pure and impure substances			
	Interpret a paper chromatogram: to identify substances by comparison with known substances			
	Interpret a paper chromatogram: to identify substances by calculation and use of Rf values			
	Core Practical: Investigate the composition of inks using simple distillation and paper chromatography			
	Describe how: waste and ground water can be made potable, including the need for sedimentation, filtration and chlorination			
	Describe how: sea water can be made potable by using distillation			
	Describe how: water used in analysis must not contain any dissolved salts			

Topic 3 – Chemical changes	Recall that acids in solution are sources of hydrogen ions and alkalis in solution are sources of hydroxide ions			
	Recall that the pH values of acids, alkalis and neutral			
	Recall the effect of acids and alkalis on indicators, including litmus, methyl orange and phenolphthalein			
	HT ONLY: Recall what the higher the concentration of hydrogen ions and hydroxide ions in a solution does to the pH of a solution			
	HT ONLY: Recall that as hydrogen ion concentration in a solution increases by a factor of 10, the pH of the solution decreases by 1			
	Core Practical: Investigate the change in pH on adding powdered calcium hydroxide or calcium oxide to a dilute hydrochloric acid			
	HT ONLY: Explain the terms dilute and concentrated, with respect to amount of substances in solution			
	HT ONLY: Explain the terms weak and strong acids, with respect to the degree of dissociation into ions			
	Recall what is formed when a base of any substance reacts with an acid			
	Recall what alkalis and bases are			
	Explain the general reactions of aqueous solutions of acids with: metals, metal oxides, metal hydroxides and metal carbonates			
	Describe the chemical test for: hydrogen and carbon dioxide (using limewater)			
	Describe a neutralisation reaction as a reaction between an acid and a base			
	Explain an acid-alkali neutralisation as a reaction in which in terms of the reaction between hydrogen and hydroxide ions			
	Explain why, when soluble salts are prepared from an acid and an insoluble reactant: excess reactant is added and excess insoluble reactant is removed			
	Explain why, if soluble salts are prepared from an acid and a soluble reactant: titration must be used and what is left after the reaction is only salt and water			
	Core Practical: Investigate the preparation of pure, dry hydrated copper sulfate crystals starting from copper oxide including the use of a water bath			
	Describe how to carry out an acid-alkali titration, using burette, pipette and a suitable indicator, to prepare a pure, dry salt			
	Recall the general rules which describe the solubility of all common sodium, potassium and ammonium salts			
	Recall the general rules which describe the solubility of all nitrates			
	Recall the general rules which describe the solubility of common chlorides (except those of silver and lead)			
	Recall the general rules which describe the solubility of common sulfates (except those of lead, barium and calcium)			
	Recall the general rules which describe the solubility of common carbonates and hydroxides (except those of sodium, potassium and ammonium)			
	Predict, using solubility rules, whether or not a precipitate will be formed when named solutions are mixed together, naming the precipitate if any is formed			
	Describe the method used to prepare a pure, dry sample of an insoluble salt			
	Recall that electrolytes are ionic compounds in the molten state or dissolved in water			
	Describe electrolysis as a process in which electrical energy, from a direct current supply, decomposes electrolytes			
	Explain the movement of ions during electrolysis			
	Explain the formation of the products in the electrolysis, using inert electrodes, for copper & sodium chloride solution, sodium sulfate, acidified water & molten lead bromide			
	Predict the products of electrolysis of other binary, ionic compounds in the molten state			
	HT ONLY: Write half equations for reactions occurring at the anode and cathode in electrolysis			
	HT ONLY: Explain oxidation and reduction in terms of loss or gain of electrons			
	HT ONLY: Recall that reduction occurs at the cathode and that oxidation occurs at the anode in electrolysis reactions			
	Explain the formation of the products in the electrolysis of copper sulfate solution, using copper electrodes, and how this can be used to purify copper			
	Core Practical: Investigate the electrolysis of copper sulfate solution with inert electrodes and copper electrodes			

Edexcel Single Chemistry (1CI0) from 2016 Topics C4&5				
Topic	**Student Checklist**	**R**	**A**	**G**
Topic 4 – Extracting metals and equilibria	Deduce the relative reactivity of some metals, by their reactions with water, acids and salt solutions			
	HT ONLY: Explain displacement reactions as redox reactions, in terms of gain or loss of electrons			
	Explain the reactivity series of metals in terms of the reactivity of the metals with water and dilute acids (relative to carbon)			
	Recall what ores and native metals are			
	Describe what oxidation and reduction are			
	Explain why the method used to extract a metal from its ore is related to its position in the reactivity series and the cost of the extraction process (electrolysis and smelting)			
	HT ONLY: Evaluate alternative biological methods of metal extraction (bacterial and phytoextraction)			
	Explain how a metal's relative resistance to oxidation is related to its position in the reactivity series			
	Evaluate the advantages of recycling metals			
	Describe what a life time assessment for a product involves and what it needs to consider			
	Evaluate data from a life cycle assessment of a product			
	Recall that chemical reactions are reversible, the use of the symbol $\rightleftharpoons$ in equations and how the direction of some reversible reactions can be altered			
	Explain what is meant by dynamic equilibrium			
	Describe the formation of ammonia as a reversible reaction in the Haber process			
	Recall the conditions for the Haber process			
	HT ONLY: Predict how the position of a dynamic equilibrium is affected by changes in temperature, pressure and concentration			

Topic 5 – Separate chemistry 1	Chem ONLY: Recall that most metals are transition metals and describe their typical properties			
	Chem ONLY: Recall that the oxidation of metals results in corrosion			
	Chem ONLY: Explain how rusting of iron can be prevented			
	Chem ONLY: Explain how electroplating can be used to improve the appearance and/or the resistance to corrosion of metal objects			
	Chem ONLY: Explain, using models, why converting pure metals into alloys often increases the strength of the product			
	Chem ONLY: Explain why iron is alloyed with other metals to produce alloy steels			
	Chem ONLY: Explain how the uses of metals are related to their properties (and vice versa) for AL, CU, Ag and alloys inc: magnalium and brass			
	HT & Chem ONLY: Calculate the concentration of solutions in mol dm^{-3} and convert concentration in g dm^{-3} into mol dm^{-3} and vice versa			
	Chem ONLY: Core Practical: Carry out an accurate acid-alkali titration, using burette, pipette and a suitable indicator			
	HT & Chem ONLY: Carry out simple calculations using the results of titrations to calculate an unknown concentration/volume of a solution			
	Chem ONLY: Calculate the percentage yield of a reaction from the actual yield and the theoretical yield			
	Chem ONLY: Describe that the actual yield of a reaction is usually less than the theoretical yield and that the causes of this			
	Chem ONLY: Recall the atom economy of a reaction forming a desired product			
	Chem ONLY: Calculate the atom economy of a reaction forming a desired product			
	HT & Chem ONLY: Explain why a particular reaction pathway is chosen to produce a specified product			
	HT & Chem ONLY: Describe what the molar volume, of any gas at room temperature and pressure is			
	HT & Chem ONLY: Use the molar volume and balanced equations in calculations involving the masses of solids and volumes of gases			
	HT & Chem ONLY: Use Avogadro's law to calculate volumes of gases involved in a gaseous reaction, given the relevant equation			
	Chem ONLY: Describe what the Haber process is			
	HT & Chem ONLY: Predict how the rate of attainment of equilibrium is affected by: changes in temperature, pressure, concentration and use of a catalyst			
	HT & Chem ONLY: Explain how, in industrial reactions, including the Haber process, conditions used are related to cost, energy and acceptable yield			
	Chem ONLY: Name the elements (in compound form) fertilisers may contain to promote plant growth			
	Chem ONLY: Describe how ammonia reacts with nitric acid to produce a salt that is used as a fertiliser			
	Chem ONLY: Describe and compare the laboratory and industrial production of ammonium sulfate			
	Chem ONLY: Recall that a chemical cell produces a voltage until what happens			
	Chem ONLY: Recall that in a hydrogen–oxygen fuel cell hydrogen and oxygen are used to produce a voltage and name the only product			
	Chem ONLY: Evaluate the strengths and weaknesses of fuel cells for given uses			