Edexcel (combined) Chemistry Topics (1SC0) from 2016 - Paper 1 (Topic 1 parts a&b)				
Topic	**Student Checklist**	**R**	**A**	**G**
Topic 1a – Key concepts in chemistry (part a)	Describe how the Dalton model of an atom has changed over time because of the discovery of subatomic particles			
	Describe the structure of an atom as a nucleus containing protons and neutrons, surrounded by electrons in shells			
	Recall the relative charge and relative mass of: a proton, a neutron and an electron			
	Explain why atoms contain equal numbers of protons and electrons			
	Describe the nucleus of an atom as very small compared to the overall size of the atom			
	Recall that most of the mass of an atom is concentrated in the nucleus			
	Recall the meaning of the term mass number of an atom			
	Describe atoms of a given element as having the same number of protons in the nucleus and that this number is unique			
	Describe what isotopes are			
	Calculate the numbers of protons, neutrons and electrons in atoms given the atomic number and mass number			
	Explain how the existence of isotopes results in relative atomic masses of some elements not being whole numbers			
	HT ONLY: Calculate the relative atomic mass of an element from the relative masses and abundances of its isotopes			
	Describe how Mendeleev arranged the elements known at that time, in a periodic table by using properties of these elements and their compounds			
	Describe how Mendeleev used his table to predict the existence and properties of some elements not discovered by then			
	Explain that Mendeleev thought he had arranged elements in order of increasing relative atomic mass but this was not always true			
	Explain the meaning of atomic number of an element in terms of position in the periodic table and number of protons in the nucleus			
	Describe how elements are arranged in the groups and periods of the periodic table			
	Identify elements as metals or non-metals according to their position in the periodic table, explaining this division in terms of atomic structure			
	Predict the electronic configurations of the first 20 elements in the periodic table as diagrams and in the form 2.8.1 etc			
	Explain how the electronic configuration of an element is related to its position in the periodic table			
	Explain how ionic bonds are formed to produce cations and anions, including the use of dot and cross diagrams			
	Recall that an ion is an atom or group of atoms with a positive or negative charge			
	Calculate the numbers of protons, neutrons and electrons in simple ions given the atomic number and mass number			
	Explain the formation of ions in ionic compounds from their atoms, limited to compounds of elements in groups 1, 2, 6 and 7			
	Explain the use of the endings –ide and –ate in the names of compounds			
	Deduce the formulae of ionic compounds given the formulae of the constituent ions			
	Explain the structure of an ionic compound including a description of the lattice and electrostatic forces			

Topic 1b – Key concepts in chemistry (part b)	Explain how a covalent bond is formed when a pair of electrons is shared between two atoms			
	Recall that covalent bonding results in the formation of molecules			
	Recall the typical size (order of magnitude) of atoms and small molecules			
	Explain the formation of simple molecular, covalent substances, using dot and cross diagrams, including: H, HCl, H_20, CH_4, O_2, CO_2			
	Explain why elements and compounds can be classified as: ionic, simple molecular (covalent), giant covalent and metallic			
	Explain how the structure and bonding of substances results in different physical properties			
	Explain the properties of ionic compounds limited to: melting/boiling points, forces between ions and conductivity			
	Explain the properties of typical covalent, simple molecular compounds limited to: melting/boiling points, forces between ions and conductivity			
	Recall that graphite and diamond are different forms of carbon and that they are examples of giant covalent substances			
	Describe the structures of graphite and diamond			
	Explain, in terms of structure and bonding, why graphite and diamond have different uses			
	Explain the properties of fullerenes including C_{60} and graphene in terms of their structures and bonding			
	Describe, using poly(ethene) as the example, that simple polymers consist of large molecules containing chains of carbon atoms			
	Explain the properties of metals, including malleability and the ability to conduct electricity			
	Describe the limitations of particular representations and models, to include dot & cross, ball & stick models & 2/3D			
	Describe the properties of most metals			
	Calculate relative formula mass given relative atomic masses			
	Calculate the formulae of simple compounds from reacting masses and understand that these are empirical formulae			
	Deduce: empirical formula of a compound from the formula of its molecule			
	Deduce: molecular formula of a compound from its empirical formula and its relative molecular mass			
	Describe an experiment to determine the empirical formula of a simple compound such as magnesium oxide			
	Explain the law of conservation of mass applied to: a closed system and a non-enclosed system			
	Calculate masses of reactants and products from balanced equations, given the mass of one substance			
	Calculate the concentration of solutions in g dm^{-3}			
	HT ONLY: Recall what one mole of particles of a substance is defined as			
	HT ONLY: Calculate the number of: moles of particles of a substance in a given mass of that substance and vice versa			
	HT ONLY: Calculate the number of: particles of a substance in a given number of moles of that substance and vice versa			
	HT ONLY: Calculate the number of: particles of a substance in a given mass of that substance and vice versa			
	HT ONLY: Explain why, in a reaction, the mass of product formed is controlled by the mass of the reactant which is not in excess			
	HT ONLY: Deduce the stoichiometry of a reaction from the masses of the reactants and products			

Edexcel (combined) Chemistry Topics (1SC0) from 2016 - Paper 1 (Topics 2,3&4)				
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			

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 ⇌ 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			