



Combined Science Chemistry Academic Overview 2018-2019

Science						
	Term 1.1	Term 1.2	Term 2.1	Term 2.2	Term 3.1	Term 3.2
Year 9	States of Matter Methods of Separating and Purifying Substances	Atomic Structure	The Periodic Table Ionic Bonding	Covalent Bonding Types of Substance	Acids	Acids End of Year Assessment Preparation and Feedback
Year 10	Calculations Involving Masses	Groups In The Periodic Table	Electrolytic Processes Obtaining and Using Metals Reversible Reactions and Equilibria	Rates of Reactions and Energy Changes	Fuels and Earth Science	End of Year Assessment Preparation and Feedback
Year 11	Revision of Topic 3	Catch-up and Examination Preparation	PPE 1 Feedback and Revision	PPE 2 Preparation and Feedback	Revision For GCSE Examinations	



Year 11 Combined Science Chemistry Curriculum Content Overview 2018-2019

Knowledge and Skills Students will be taught to....	Reading, Oracy, Literacy and Numeracy	Assessment
<ul style="list-style-type: none"> • Recall and be able to write word, balanced symbol, ionic and half equations • Recall the formulae of elements, simple compounds and ions • Use and identify state symbols in chemical equations and describe the use of hazard symbols on containers • Analyse and interpret information presented in a variety of forms including graphs, tables and written text • Carry out practical activities in order to obtain results and explain their findings using correct scientific principles • For each core practical explain; what equipment is used, how to carry out the practical, what is being changed (independent variable), what is being measured (dependent variable), what is being controlled and why • Draw labelled diagrams of relevant practical equipment • Explain why some substances are acidic, whereas others are basic • Construct neutralisation equations for the reactions of acids and bases and identify the solubility of the products • Construct a diagram for simple electrolysis, explaining why each piece of equipment is used • Explain how and why a substance will break down using electrolysis and state the products formed • Investigate the electrolysis of copper sulfate solution • Describe and explain the reactivity series, describing how metals can be extracted from their ores and why this process is done • Recall and explain that some chemical reactions are reversible 	<p style="text-align: center;">Reading</p> <ul style="list-style-type: none"> • Edexcel combined science text book • Recommended reading texts • CGP revision guide • PLC checklists 	<p style="text-align: center;">Formative</p> <ul style="list-style-type: none"> • Questioning in lessons • Live student performance in lessons followed by questions • Whole class feedback during lessons • Regular peer and self assessment • Book checks for general presentation, work completion and spellings • Low stakes quizzing • Learning checkpoints in between main assessments <p style="text-align: center;">Summative</p> <ul style="list-style-type: none"> • 3 cumulative assessments throughout the year
	<p style="text-align: center;">Numeracy</p> <ul style="list-style-type: none"> • Recall of key values and quantities • Recall, use and application of equations • Conversion between units • Working with numbers in standard form • Drawing appropriate graphs and tables with suitable scales/ headings and plotting/ recording data • Describing mathematical patterns in experimental data and explaining them using scientific concepts • Perform calculations based on extracting data from both tables and graphs 	
	<p style="text-align: center;">Oracy and Literacy</p> <ul style="list-style-type: none"> • Key words • Writing a method for core practicals • Six mark questions 	



Assessment Skills, Knowledge and Concepts Map

Key learning questions	Edexcel Combined Science Chemistry Year 11 Assessment Phase 1
	Acids
<ul style="list-style-type: none"><input type="checkbox"/> What is pH a measure of?<input type="checkbox"/> If a solution is neutral, what pH will it have?<input type="checkbox"/> What type of ions are released when an acid dissolves in water?<input type="checkbox"/> HT – Describe the relationship between the concentration of these ions and the pH of a solution<input type="checkbox"/> What range of pHs show that a substance is a base<input type="checkbox"/> What is an alkali?<input type="checkbox"/> What ions are present in an alkali?<input type="checkbox"/> State the products that are formed during a neutralisation reaction<input type="checkbox"/> Write an equation to show the reaction of a hydrogen ion with a hydroxide ion, include state symbols<input type="checkbox"/> HT – Give the definition of a strong acid<input type="checkbox"/> HT – Give the definition of a weak acid<input type="checkbox"/> HT – Describe the difference between the strength and the concentration of an acid<input type="checkbox"/> Describe the chemical test for hydrogen gas<input type="checkbox"/> Describe the chemical test for carbon dioxide gas<input type="checkbox"/> State whether the following salts will be soluble or insoluble in water – sodium hydroxide, silver nitrate, barium chloride, potassium iodide<input type="checkbox"/> What type of reaction is used to make insoluble salts?<input type="checkbox"/> What is the name of the process used to make a soluble salt?<input type="checkbox"/> Give the name of three indicators<input type="checkbox"/> Explain why universal indicator is not used during a titration<input type="checkbox"/> State which chemical goes into the burette during a titration<input type="checkbox"/> Describe how to put a chemical into the conical flask during a titration	<ul style="list-style-type: none"><input type="checkbox"/> Recall that acids in solution are sources of hydrogen ions and alkalis in solution are sources of hydroxide ions<input type="checkbox"/> Recall that the pH values of acids, alkalis and neutral<input type="checkbox"/> Recall the effect of acids and alkalis on indicators, including litmus, methyl orange and phenolphthalein<input type="checkbox"/> HT ONLY: Recall what the higher the concentration of hydrogen ions and hydroxide ions in a solution does to the pH of a solution<input type="checkbox"/> 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<input type="checkbox"/> Core Practical: Investigate the change in pH on adding powdered calcium hydroxide or calcium oxide to a dilute hydrochloric acid<input type="checkbox"/> HT ONLY: Explain the terms dilute and concentrated, with respect to amount of substances in solution<input type="checkbox"/> HT ONLY: Explain the terms weak and strong acids, with respect to the degree of dissociation into ions<input type="checkbox"/> Recall what is formed when a base of any substance reacts with an acid<input type="checkbox"/> Recall what alkalis and bases are<input type="checkbox"/> Explain the general reactions of aqueous solutions of acids with: metals, metal oxides, metal hydroxides and metal carbonates<input type="checkbox"/> Describe the chemical test for: hydrogen and carbon dioxide (using limewater)<input type="checkbox"/> Describe a neutralisation reaction as a reaction between an acid and a base<input type="checkbox"/> Explain an acid-alkali neutralisation as a reaction in which hydrogen ions react with hydroxide ions<input type="checkbox"/> Explain why, when soluble salts are prepared from an acid and an insoluble reactant: excess reactant is added and excess insoluble reactant is removed<input type="checkbox"/> 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<input type="checkbox"/> Core Practical: Investigate the preparation of pure, dry hydrated copper sulfate crystals starting from copper oxide including the use of a water bath<input type="checkbox"/> Describe how to carry out an acid-alkali titration, using burette, pipette and a suitable indicator, to prepare a pure, dry salt<input type="checkbox"/> Recall the general rules which describe the solubility of all common types of substance in water<input type="checkbox"/> 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<input type="checkbox"/> Describe the method used to prepare a pure, dry sample of an insoluble salt



Key learning questions	Electrolytic Processes, Obtaining and Using Metals, Reversible Reactions and Equilibria
<ul style="list-style-type: none"><input type="checkbox"/> Why are dissolved ionic substances able to conduct electricity?<input type="checkbox"/> What type of ions are attracted to the negative electrode?<input type="checkbox"/> What two states can the electrolyte be in?<input type="checkbox"/> What determines the products of electrolysis of an aqueous solution using inert electrodes?<input type="checkbox"/> If a metal is more reactive than hydrogen what will be produced at the cathode when carrying out electrolysis on an aqueous solution?<input type="checkbox"/> What is produced at the anode during electrolysis of an aqueous solution if there are no halogen ions present?<input type="checkbox"/> Describe the electrodes used for the purification of copper sulfate<input type="checkbox"/> Define oxidation in terms of the loss or gain of oxygen<input type="checkbox"/> Define reduction in terms of the loss or gain of oxygen<input type="checkbox"/> HT - Define oxidation and reduction in terms of the loss or gain of electrons<input type="checkbox"/> What does a reactivity series show?<input type="checkbox"/> Why does iron displace copper in a solution of copper sulfate?<input type="checkbox"/> Write the general word equation for the reaction of a metal with acid<input type="checkbox"/> What is a metal ore?<input type="checkbox"/> Name a metal which is found in the Earth as the metal itself (native)<input type="checkbox"/> True or false? Sodium can be extracted from its ore by reduction with carbon<input type="checkbox"/> Give two benefits of recycling materials<input type="checkbox"/> State the four stages that are assessed in a life cycle assessment<input type="checkbox"/> What is a reversible reaction?<input type="checkbox"/> Define the term dynamic equilibrium<input type="checkbox"/> State the conditions of the Haber process	<ul style="list-style-type: none"><input type="checkbox"/> Recall that electrolytes are ionic compounds in the molten state or dissolved in water<input type="checkbox"/> Describe electrolysis as a process in which electrical energy, from a direct current supply, decomposes electrolytes<input type="checkbox"/> Explain the movement of ions during electrolysis<input type="checkbox"/> Explain the formation of the products in the electrolysis, using inert electrodes, for copper & sodium chloride solution, sodium sulfate, acidified water & molten lead bromide<input type="checkbox"/> Predict the products of electrolysis of other binary, ionic compounds in the molten state<input type="checkbox"/> HT ONLY: Write half equations for reactions occurring at the anode and cathode in electrolysis<input type="checkbox"/> HT ONLY: Explain oxidation and reduction in terms of loss or gain of electrons<input type="checkbox"/> HT ONLY: Recall that reduction occurs at the cathode and that oxidation occurs at the anode in electrolysis reactions<input type="checkbox"/> 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<input type="checkbox"/> Core Practical: Investigate the electrolysis of copper sulfate solution with inert electrodes and copper electrodes<input type="checkbox"/> Deduce the relative reactivity of some metals, by their reactions with water, acids and salt solutions<input type="checkbox"/> HT ONLY: Explain displacement reactions as redox reactions, in terms of gain or loss of electrons<input type="checkbox"/> Explain the reactivity series of metals in terms of the reactivity of the metals with water and dilute acids (relative to carbon)<input type="checkbox"/> Recall what ores and native metals are<input type="checkbox"/> Describe what oxidation and reduction are<input type="checkbox"/> 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)<input type="checkbox"/> HT ONLY: Evaluate alternative biological methods of metal extraction (bacterial and phytoextraction)<input type="checkbox"/> Explain how a metal's relative resistance to oxidation is related to its position in the reactivity series<input type="checkbox"/> Evaluate the advantages of recycling metals<input type="checkbox"/> Describe what a life time assessment for a product involves and what it needs to consider<input type="checkbox"/> Evaluate data from a life cycle assessment of a product<input type="checkbox"/> 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<input type="checkbox"/> Explain what is meant by dynamic equilibrium<input type="checkbox"/> Describe the formation of ammonia as a reversible reaction in the Haber process<input type="checkbox"/> Recall the conditions for the Haber process<input type="checkbox"/> HT ONLY: Predict how the position of a dynamic equilibrium is affected by changes in temperature, pressure and concentration



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