

Secondary Curriculum Information Pro-Forma

| YEAR 10 Chemistry | Theme Title | Key Areas of Knowledge Acquisition | Key Skills and Processes Learned |
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| <p>Examination Board and Specification Title & Number: Edexcel Chemistry 2CH01</p> <p>Recommended reading/preparation: EDEXCEL GCSE Core Science EDEXCEL GCSE Additional Science EDEXCEL GCSE Extension Science CGP GCSE Chemistry Revision Guide CGP GCSE Chemistry Workbook</p> | | | |
| <p>Term 1 (September – October)</p> | <p>C1. The Earth's sea and atmosphere Materials from the Earth</p> | <p>Recall that the gases produced by volcanic activity formed the Earth's early atmosphere and that the early atmosphere contained: little or no oxygen, a large amount of carbon dioxide, water vapour and small amounts of other gases</p> <p>Explain why there are different sources of information about the development of the atmosphere which makes it difficult to be precise about the evolution of the atmosphere</p> <p>Describe how condensation of water vapour formed oceans and how the amount of carbon dioxide in the atmosphere was reduced.</p> <p>Describe the current composition of the atmosphere and interpret data sources showing this information used carbon dioxide and released oxygen by photosynthesis and consequently the amount of oxygen in the atmosphere gradually increased</p> <p>Demonstrate an understanding of how small changes in the atmosphere occur.</p> <p>Describe that igneous rocks, such as granite, are: a formed by the solidification of magma or lava b made of crystals whose size depends on the rate of cooling</p> <p>Describe chalk and limestone as examples of sedimentary rocks and how sedimentary rocks are formed by the compaction of layers of sediment over a very long time period. Recall that sedimentary rocks: a may contain fossils b are susceptible to</p> | <p>Investigate the proportion of oxygen in the atmosphere</p> <p>Investigate the ease of thermal decomposition of carbonates, including calcium carbonate, zinc carbonate and copper carbonate</p> |

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| | | <p>erosion. Describe the formation of metamorphic rocks by the action of heat and/or pressure, including the formation of marble from chalk or limestone.</p> <p>Demonstrate an understanding of the balance between the demand for limestone and the economic, environmental and social effects of quarrying it including the commercial need for quarrying calcium carbonate on a large scale, as a raw material, for the formation of glass, cement and concrete</p> <p>Describe the thermal decomposition of calcium carbonate into calcium oxide and carbon dioxide</p> <p>Demonstrate an understanding that: a atoms are the smallest particles of an element that can take part in chemical reactions b during chemical reactions, atoms are neither created nor destroyed c during chemical reactions, atoms are rearranged to make new products with different properties from the reactants</p> <p>Describe the effect of water on calcium oxide and how calcium hydroxide dissolves in water to form a solution, known as limewater.</p> <p>Explain how calcium carbonate can be used to remove acidic gases from coal-fired power station chimneys, reducing harmful emissions and helping to reduce acid rain</p> | |
| <p>Term 2 (November – December)</p> | <p>C1. Acids Obtaining and using metals</p> | <p>Recall that hydrochloric acid is produced in the stomach to: a help digestion b kill bacteria and that indigestion remedies as containing substances that neutralise excess stomach acid</p> <p>Recall that acids are neutralised by: a metal oxides b metal hydroxides c metal carbonates to produce salts.</p> <p>Recall that: a hydrochloric acid produces chloride salts b nitric acid produces nitrate salts c sulfuric acid produces sulfate salts</p> <p>Describe electrolysis as a process in which electrical energy, from a d.c. supply, decomposes compounds, by considering the electrolysis of dilute hydrochloric acid to produce hydrogen and</p> <p>Recall that chlorine can be obtained from sea water by electrolysis</p> <p>Describe chlorine as a toxic gas and that this leads to potential hazards associated with its large-scale manufacture and the use of chlorine in the manufacture of bleach and of the polymer poly(chloroethene) (PVC)</p> <p>Recall that: a most metals are extracted from ores found in the</p> | <p>Investigate the electrolysis of dilute hydrochloric acid</p> <p>Investigate the effectiveness of different indigestion remedies</p> |

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| | | <p>Earth's crust b unreactive metals are found in the Earth as the uncombined elements and describe how most metals are extracted from their ores by: heating with carbon, illustrated by iron electrolysis and illustrated by aluminium.</p> <p>Explain why the method used to extract a metal is related to its position in the reactivity series and cost of the extraction process.</p> <p>Describe oxidation as the gain of oxygen and reduction as the loss of oxygen and recall that the extraction of metals involves reduction of ores and that the oxidation of metals results in corrosion.</p> <p>Demonstrate an understanding that a metal's resistance to oxidation is related to its position in the reactivity series</p> <p>Discuss the advantages of recycling metals, including economic implications, and how recycling preserves both the environment and the supply of valuable raw materials</p> <p>Use models to explain why converting pure metals into alloys often increases the strength of the product</p> <p>Demonstrate an understanding that iron is alloyed with other metals to produce alloy steels with a higher strength and a greater resistance to corrosion</p> | |
| <p>Term 3 (January – February)</p> | <p>C1. Fuels</p> | <p>Describe hydrocarbons as compounds that contain carbon and hydrogen only and that crude oil as a complex mixture of hydrocarbons.</p> <p>Describe the separation of crude oil into simpler, more useful mixtures by the process of fractional distillation</p> <p>Describe that hydrocarbons in different fractions differ from each other</p> <p>Describe how the complete combustion of hydrocarbons: a. involves the oxidation of the hydrocarbons b. produces carbon dioxide and water c. gives out energy and describe the chemical test for carbon dioxide (using limewater)</p> <p>Explain why the incomplete combustion of hydrocarbons can produce carbon and carbon monoxide and how carbon monoxide behaves as a toxic gas</p> <p>Explain why impurities in some hydrocarbon fuels result in the production of sulfur dioxide and demonstrate an understanding of some problems associated with acid rain caused when sulfur dioxide dissolves in rain water</p> <p>Describe how various gases in the atmosphere, including carbon dioxide, methane and water vapour, trap heat from the Sun and</p> | <p>Compare the temperature rise produced when the same volume of water is heated by different fuels</p> |

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| | | <p>that this keeps the Earth warm and demonstrate an understanding that the Earth's temperature varies and that human activity may influence this</p> <p>Demonstrate an understanding that the proportion of carbon dioxide in the atmosphere varies, due to human activity, and that chemists are investigating methods to control the amount of the gas in the atmosphere</p> <p>Evaluate how far the correlation between global temperature and the proportion of carbon dioxide in the atmosphere provides evidence for climate change</p> <p>Describe biofuels as being possible alternatives to fossil fuels</p> <p>Demonstrate an understanding of the factors that make a good fuel, including: a. how easily it burns b. the amount of ash or smoke it produces c. the comparative amount of heat energy it produces d. how easy it is to store and transport</p> <p>Recall that a simple fuel cell combines hydrogen and oxygen to form water and that this reaction releases energy</p> <p>Evaluate the advantages and disadvantages of using hydrogen, rather than petrol, as a fuel in cars</p> <p>Describe petrol, kerosene and diesel oil as non-renewable fossil fuels obtained from crude oil and methane as a non-renewable fossil fuel found in natural gas</p> | |
| <p>Term 4 (March – April)</p> | <p>C2. Atomic structure & periodic table Groups in the periodic table</p> <p>Ionic compounds and analysis</p> | <p>Explain how Mendeleev: a arranged the elements, known at that time, in a periodic table by using properties of these elements and their compounds b used his table to predict the existence and properties of some elements not then discovered</p> <p>Classify elements as metals or non-metals according to their position in the periodic table</p> <p>Describe the structure of an atom as a nucleus containing protons and neutrons, surrounded by electrons in shells (energy levels)</p> <p>Describe atoms of a given element as having the same number of protons in the nucleus and that this number is unique to that element</p> <p>Demonstrate an understanding that the existence of isotopes results in some relative atomic masses not being whole numbers</p> <p>Calculate the relative atomic mass of an element from the relative masses and abundances of its isotopes</p> <p>Describe the connection between the number of outer electrons</p> | <p>Investigate displacement reactions of halogens reacting with halide ions in solution</p> |

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| | | <p>and the position of an element in the periodic table</p> <p>Describe an ion as an atom or group of atoms with a positive or negative charge</p> <p>Recall the general rules which describe the solubility of common types of substances in water</p> <p>Demonstrate an understanding that insoluble salts can be formed as precipitates by the reaction of suitable reagents in solution</p> <p>Demonstrate an understanding of the method needed to prepare a pure, dry sample of an insoluble salt</p> <p>Recall that the insoluble salt, barium sulfate, is given as a 'barium meal' to X-ray patients because a it is opaque to X-rays b it is safe to use as, although barium salts are toxic, its insolubility prevents it entering the blood</p> <p>Describe the properties of metals</p> <p>Describe the reaction of halogens with metals to form metal halides</p> <p>Describe the relative reactivity of the halogens as shown by their displacement reactions with halide ions in aqueous solution</p> | |
| Term 5 (April – May) | <p>C2. Covalent compounds and separation techniques Chemical reactions</p> | <p>Explain the formation of simple molecular, covalent substances using dot and cross diagrams.</p> <p>Classify different types of elements and compounds by investigating their melting points and boiling points, solubility in water and electrical conductivity (as solids and in solution) including sodium chloride, magnesium sulphate, hexane, liquid paraffin, silicon(IV) oxide, copper sulfate, and sucrose (sugar)</p> <p>Explain why, although they are both forms of carbon and giant molecular substances, graphite is used to make electrodes and as a lubricant, whereas diamond is used in cutting tools</p> <p>Describe how paper chromatography can be used to separate and identify components of mixtures, including colouring agents in foodstuffs</p> <p>Evaluate the information provided by paper chromatograms, including the calculation of R_f values, in a variety of contexts, such as the food industry and forensic science</p> | |
| Term 6 (June – July) | <p>C2. Quantitative chemistry C4. Preparation for</p> | <p>Define an exothermic change or reaction as one in which heat energy is given out, including combustion reactions or explosions</p> <p>Define an endothermic change or reaction as one in which heat energy is taken in, including photosynthesis or dissolving ammonium nitrate in water.</p> <p>Use balanced equations to calculate masses of reactants and</p> | <ul style="list-style-type: none"> • Measure temperature changes accompanying some of the • following types of change: • a salts dissolving in |

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| | controlled assessment | products, recall that the yield of a reaction is the mass of product obtained in the reaction. Demonstrate an understanding that the actual yield of a reaction is usually less than the yield calculated using the chemical equation Calculate the percentage yield of a reaction from the actual yield and the theoretical yield | water <ul style="list-style-type: none">• b neutralisation reactions• c displacement reactions• d precipitation reactions |
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