C4 Chemical Changes

Can you…?	☺	😐	☹
4.1.1 Metal oxides			
Recall that metals react with oxygen to produce metal oxides.			
Describe reduction and oxidation in terms of loss or gain of oxygen.			
4.1.2 The reactivity series			
Explain what determines the reactivity of a metal.			
Explain why displacement reactions occur.			
State and describe the reactions, if any, of potassium, sodium, lithium, calcium, magnesium, zinc, iron and copper with water.			
State and describe the reactions, if any, of potassium, sodium, lithium, calcium, magnesium, zinc, iron and copper with dilute acids			
Place these metals in order of reactivity.			
Deduce an order of reactivity of metals based on experimental results.			
4.1.3 Extraction of metals and reduction			
Explain why some metals such as gold are found in the Earth as the metal itself but most metals are found as compounds that require chemical reactions to extract the metal.			
State what determines whether a metal can be extracted from its oxide by reduction carbon.			
Interpret or evaluate specific metal extraction processes when given appropriate information			
Identify the substances which are oxidised or reduced in terms of gain or loss of oxygen.			
4.1.4 Oxidation and reduction in terms of electrons (HT only)			
Describe reduction and oxidation in terms of loss or gain of electrons.			
Write ionic equations for displacement reactions.			
Identify in a given reaction, symbol equation or half equation which species are oxidised and which are reduced.			
4.2.1 Reactions of acids with metals			
Recall that acids react with some metal to produce salts and hydrogen.			
Explain in terms of gain or loss of electrons, that these are redox reactions.			
Identify which species are oxidised and which are reduced in given chemical equations.			
4.2.2 Neutralisation of acids and salt production			

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Recall that acids are neutralised by alkalis (eg soluble metal hydroxides) and bases (eg insoluble metal hydroxides and metal oxides) to produce salts and water. Recall that Acids are neutralised by metal carbonates to produce salts, water and carbon dioxide.			
Name salts produced by these reactions.			
Predict products from given reactants.			
Use the formulae of common ions to deduce the formulae of salts.			
4.2.3 Soluble salts			
State the reactions that can be used to make soluble salts.			
Describe how to make pure, dry samples of named soluble salts from information provided.			
4.2.4 The pH scale and neutralisation			
Recall that acids produce hydrogen ions (H^+) in aqueous solutions.			
Recall that aqueous solutions of alkalis contain hydroxide ions (OH^-).			
Describe what the pH scale is and how it is used.			
Recall that in neutralisation reactions between an acid and an alkali, hydrogen ions react with hydroxide ions to produce water.			
State the ionic equation for a neutralisation reaction.			
Describe the use of universal indicator or a wide range indicator to measure the approximate pH of a solution.			
Use the pH scale to identify acidic or alkaline solutions.			
4.2.6 Strong and weak acids (HT only)			
State what a strong acid is and give examples.			
State what a weak acid is and give examples.			
Recall that for a given concentration of aqueous solutions, the stronger an acid, the lower the pH.			
Recall that as the pH decreases by one unit, the hydrogen ion concentration of the solution increases by a factor of 10.			
Use and explain the terms dilute and concentrated, and weak and strong in relation to acids			
Describe neutrality and relative acidity in terms of the effect on hydrogen ion concentration and the numerical value of pH (whole numbers only).			
4.3.1 The process of electrolysis			

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Can you…?	☺	😐	☹
State what happens to the ions in an ionic compound when it is melted or dissolved in water.			
State what an electrolyte is.			
Describe and explain what happens to ions during electrolysis.			
4.3.2 Electrolysis of molten ionic compounds			
Describe and explain what happens during the electrolysis of molten compounds..			
Predict the products of the electrolysis of ionic compounds in the molten state.			
4.3.3 Using electrolysis to extract metals			
Explain why electrolysis is used to extract some metals.			
Recall that large amounts of energy are used in the extraction process to melt the compounds and to produce the electrical current.			
Describe how aluminium is extracted using electrolysis.			
Explain why a mixture is used as the electrolyte during the extraction of aluminium.			
Explain why the positive electrode must be continually replaced during the extraction of aluminium.			
4.3.4 Electrolysis of aqueous solutions			
Recall that the ions discharged when an aqueous solution is electrolysed using inert electrodes depend on the relative reactivity of the elements involved.			
Explain what will be produced at the negative electrode (cathode) and how this is linked to the break down of water molecules.			
Explain what will be produced at the positive electrode (anode) and how this is linked to the break down of water molecules.			
Predict the products of the electrolysis of aqueous solutions containing a single ionic compound.			
4.3.5 Representation of reactions at electrodes as half equations (HT only)			
Describe and explain what happens are the cathode (negative electrode) and anode (positive electrode) in terms of electrons, oxidation and reduction.			
Write half equations for the reactions occurring at the electrodes.			