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| Paper 2 Content | | | |
| **C8 Rates and Equilibria** | **Analysis** | **Revised** | **☺** |
| Can calculate the mean rate of a reaction using this remembering time always goes on the bottom of the division. |  |  |  |
| Can draw and interpret graphs showing product formed or reactant used against time. |  |  |  |
| Can draw tangents to curves and use the slope to measure the rate of reaction. |  |  |  |
| **Can calculate the gradient of a tangent to a curve to measure rate of reaction.** |  |  |  |
| Can name 5 factors that would affect the rate of a reaction. |  |  |  |
| *Can give detail on RP 5: Investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produced and a method involving a change in colour.* |  |  |  |
| Can describe collision theory in terms of particles and energy. |  |  |  |
| Can predict and explain the effect of changing conditions on the rate of a reaction. |  |  |  |
| Explain how each factor would affect the rate of reaction using collision theory |  |  |  |
| State what a catalyst is and its role in a chemical reaction. |  |  |  |
| Can explain catalysts by referring to reaction profiles and reaction pathways. |  |  |  |
| Can identify catalysts from an equation. |  |  |  |
| Can recognise and define reversible reactions. |  |  |  |
| Can link reversible reactions to endothermic and exothermic in terms of energy transfer. |  |  |  |
| Can describe equilibria in a reversible reaction. |  |  |  |
| **Can state Le Chatelier’s Principle.** |  |  |  |
| **Can predict the effect of changes on systems at equilibrium from information given** |  |  |  |
| **Can describe and explain the effect of changing concentration of a reactant or product on the position of equilibrium.** |  |  |  |
| **Can describe and explain the effect of changing the temperature of a system on the position of equilibrium.** |  |  |  |
| **Can describe and explain the effect of changing the pressure of a system on the position of equilibrium.** |  |  |  |
| **C9 Crude Oils and Fuels** | **Analysis** | **Revised** | **☺** |
| Can describe how crude oil was formed. |  |  |  |
| Can describe crude oil as a mixture of hydrocarbons. |  |  |  |
| Can define an endothermic reaction in terms of energy and give examples. |  |  |  |
| Can give the general formula for an alkane and name and draw the first 4. |  |  |  |
| Can describe the process of fractional distillation including evaporation and condensation. |  |  |  |
| Can give uses for the fractions obtained from fractional distillation. |  |  |  |
| Can link size of hydrocarbon molecule to the properties of boiling point, viscosity and flammability. |  |  |  |
| Can describe the combustion of fuels to produced energy. |  |  |  |
| Can write balanced equations for the complete combustion of hydrocarbons. |  |  |  |
| Can describe and interpret trends in properties of hydrocarbons. |  |  |  |
| Can describe steam and catalytic cracking including the conditions. |  |  |  |
| Can state the products of cracking. |  |  |  |
| Can balance equations showing cracking. |  |  |  |
| Can recall the test for alkenes and explain why it happens. |  |  |  |
| Can explain the reason cracking is used and some uses of alkenes. |  |  |  |
| **C10 Organic Reactions** | **Analysis** | **Revised** | **☺** |
| Can describe the structure of alkenes. |  |  |  |
| Can give the general formula for alkenes. |  |  |  |
| Can state the names of the first four alkenes. |  |  |  |
| Can recognise and draw the molecular and displayed formula of the first four alkenes. |  |  |  |
| Give the functional group in the alkene molecule that determined the reactions. |  |  |  |
| Can describe combustion reactions of alkenes and link to incomplete combustion. |  |  |  |
| Can describe the reactions and conditions for the addition of hydrogen, water and halogens to alkenes. |  |  |  |
| Draw displayed formula for the first four alkenes and the products of their addition reaction with hydrogen, water, Cl, Br and I |  |  |  |
| Can state the functional group of alcohols. |  |  |  |
| Can name the first four alcohols, write their formula and draw their displayed formula. |  |  |  |
| Can give uses for alcohols. |  |  |  |
| Can describe the reactions of the first four alcohols with sodium, being burned in air, added to water and reacted with an oxidising agent. |  |  |  |
| Can state the functional groups of carboxylic acids. |  |  |  |
| Can draw the displayed formula of the first four carboxylic acids and give the molecular formula for each. |  |  |  |
| Can describe what happens when the first four carboxylic acids react with carbonates, dissolve in water and react with alcohols. |  |  |  |
| **Can explain why carboxylic acids are weak acids in terms of ionisation and pH.** |  |  |  |
| Can name and draw ethyl ethanoate and name the group of molecules to which this belongs. |  |  |  |
| **C11 Polymers** | **Analysis** | **Revised** | **☺** |
| Can describe addition polymerisation. |  |  |  |
| Can recognise addition polymers and monomers from diagrams of displayed formula. |  |  |  |
| Can use the double bond functional group in a monomer to recognise when addition polymerisation will occur. |  |  |  |
| Can draw diagrams to represent the formation of a polymer from an alkene monomer and the monomer from the polymer repeating unit. |  |  |  |
| **Can describe condensation polymerisation in terms of loss of a molecule from the functional group of the molecules.** |  |  |  |
| **Can recognise a diol and a dicarboxylic acid in terms of the functional groups.** |  |  |  |
| **Can use diagrams to show how a diol and a dicarboxylic acid react to form a polyester.** |  |  |  |
| **Can describe the structure of amino acids in terms of their functional groups.** |  |  |  |
| **Can describe how amino acids react together to form polypeptides.** |  |  |  |
| Can describe the role of DNA. |  |  |  |
| Can describe the structure of DNA. |  |  |  |
| Can name monomers of the natural polymers DNA, proteins, starch and cellulose. |  |  |  |
| **C12 Chemical Analysis** | **Analysis** | **Revised** | **☺** |
| Can state what is meant by pure substance. |  |  |  |
| Can use melting and boiling point data to distinguish pure from impure substances. |  |  |  |
| Can state what a formulation is. |  |  |  |
| Can identify formulations from information. |  |  |  |
| Can define the stationary and mobile phase of chromatography. |  |  |  |
| Can explain how paper chromatography separated mixtures. |  |  |  |
| Can say how chromatography can distinguish a pure substance from an impure substance. |  |  |  |
| Can interpret chromatograms and calculate Rf values from chromatograms. |  |  |  |
| *Can give details on RP6: Investigate how paper chromatography can be used to separate and tell the difference between coloured substances and calculate Rf values.* |  |  |  |
| Can describe the test for hydrogen gas. |  |  |  |
| Can describe the test for oxygen. |  |  |  |
| Can describe the test for carbon dioxide. |  |  |  |
| Can describe the test for chlorine gas. |  |  |  |
| Can recall the colours of flame tests for Li, Na, K, Ca, Cu. |  |  |  |
| Can explain why K can sometimes be difficult to detect in a mixture. |  |  |  |
| Describe how sodium hydroxide can be used to identify some metal ions. |  |  |  |
| Can give the results when sodium hydroxide is added to solutions of aluminium, calcium and magnesium. |  |  |  |
| Can give the results when sodium hydroxide is added to solutions of Cu (II), Fe (II) and Fe (III) |  |  |  |
| Can write balanced symbol equations for the reaction which produce insoluble hydroxides. |  |  |  |
| Can describe how carbonates react with dilute acids. |  |  |  |
| Can give the results of tests to identify halide ions Cl-, Br-, I- with silver nitrate solution in nitric acid. |  |  |  |
| Can describe the test for sulfate ions in solution with barium chloride in dilute hydrochloric acid. |  |  |  |
| *Give details on RP7: Use of chemical tests to identify the ions in unknown single ionic compounds.* |  |  |  |
| Give advantages of instrumental methods compared with chemical tests. |  |  |  |
| Can describe how flame emission spectroscopy is carried out to analyse metal ions in solution. |  |  |  |
| Can interpret an instrumental result from chart or tables from flame emission spectroscopy. |  |  |  |
| **C13 The Atmosphere** | **Analysis** | **Revised** | **☺** |
| Can give the composition of the atmosphere. |  |  |  |
| Can describe how the atmosphere changed over time. |  |  |  |
| Can explain where the carbon dioxide went and how oxygen increased. |  |  |  |
| Can evaluate different theories about the Earth’s early atmosphere. |  |  |  |
| Can describe the greenhouse effect in terms of how greenhouse molecules interact with short and long wave radiation. |  |  |  |
| Can recall two human activities that increase the amounts of greenhouse gases carbon dioxide and methane. |  |  |  |
| Can evaluate the quality of evidence in a report about global climate change when given information. |  |  |  |
| Can describe why data is uncertain. |  |  |  |
| Can explain why peer review is important. |  |  |  |
| Can describe four possible effects of climate change. |  |  |  |
| Can discuss the environmental implications of global climate change. |  |  |  |
| Can explain what a carbon footprint is. |  |  |  |
| Can describe what actions are taken to reduce carbon dioxide and methane emissions. |  |  |  |
| Can describe how carbon monoxide, carbon particles (also called soot and particulates), sulfur dioxide and oxides of nitrogen are produced by burning fuels. |  |  |  |
| Can predict the products of combustion of a fuel based on its composition. |  |  |  |
| Can describe and explain the problems cause by the pollutants carbon monoxide, carbon particles, sulfur dioxide and oxides of nitrogen. |  |  |  |
| **C14 Using Resources** | **Analysis** | **Revised** | **☺** |
| Can give the difference between finite and renewable resources. |  |  |  |
| Can define sustainable development. |  |  |  |
| Can state examples of natural products that have been replaced by synthetic products. |  |  |  |
| Can interpret information about resources from charts, graphs and tables. |  |  |  |
| Can distinguish between potable and pure water. |  |  |  |
| Can describe the differences between salty water and ground water. |  |  |  |
| Can give the steps taken to produce potable water in the UK. |  |  |  |
| Can describe how water is sterilised. |  |  |  |
| Can describe ways that salty water can be made potable and say what the problems with this are. |  |  |  |
| *Give details on RP8: Analysis and purification of water samples from different sources, including pH, dissolved solids and distillation.* |  |  |  |
| Can describe how waste water is treated to make it potable. |  |  |  |
| **Can describe the processes of extracting copper by bioleaching and phytomining.** |  |  |  |
| **Can explain how scrap iron can extract copper from solutions.** |  |  |  |
| **Can explain how copper can be extracted from solutions by electrolysis.** |  |  |  |
| Can give the stages in a life cycle assessment. |  |  |  |
| Can give a life cycle assessment for shopping bags made from plastic and paper and compare the two. |  |  |  |
| Can explain why recycling and reusing materials is important. |  |  |  |
| Can briefly describe how glass bottles and metals can be recycled. |  |  |  |
| Can evaluate was of reducing the use of limited resources from information. |  |  |  |
| **C15 Using Materials** | **Analysis** | **Revised** | **☺** |
| Can explain what corrosion is and how it occurs. |  |  |  |
| Can describe ways of preventing corrosion. |  |  |  |
| Can describe experiments and interpret results to show that both air and water are necessary for rusting. |  |  |  |
| Can explain sacrificial protection in terms of relative reactivity. |  |  |  |
| Can give the metals in the alloys bronze, brass and steels. |  |  |  |
| Can describe how alloys of gold link to carats. |  |  |  |
| Can give the differences between high carbon steel, low carbon steel and stainless steel. |  |  |  |
| Can recall a use for the alloys bronze, brass, gold, high carbon steel, low carbon steel, stainless steel and aluminium. |  |  |  |
| Can give examples of ceramics, composites and polymers. |  |  |  |
| Can give the difference in properties of HD and LD polyethene and explain how they are produced. |  |  |  |
| Can explain the difference between thermosetting and thermosoftening polymers in terms of their structures. |  |  |  |
| Can compare the physical properties of glass and clay ceramics, polymers, composites and metals. |  |  |  |
| Can state what the Haber process is used for. |  |  |  |
| Can state the raw materials for the Haber process and give sources from them. |  |  |  |
| Can give the conditions at which the Haber process is carried out. |  |  |  |
| Can write the word and balanced symbol equation for the reaction. |  |  |  |
| Can explain how ammonia is removed and the nitrogen and hydrogen are recycled. |  |  |  |
| **Can interpret graphs of reaction conditions versus rate.** |  |  |  |
| **Can apply the principles of dynamic equilibrium to the Haber process.** |  |  |  |
| Can explain why the conditions for the Haber process are a compromise. |  |  |  |
| Can give the elements used in NPK fertilisers. |  |  |  |
| Can recall the names of the salts produced when phosphate rock is treated with nitric acid, sulfuric acid and phosphoric acid. |  |  |  |
| Can compare the industrial production of fertilisers with lab preparations. |  |  |  |