



Science Department – Year 10 Chemistry Curriculum and Assessment Map

	Half Term 1	Half-Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Year 10	C3 Structures and Bonding	C2 The Periodic Table	C7 – Energy Changes	C4 Quantitative Chemistry Pt 1	C5 Chemical Changes	C6 Electrolysis
Fundamental Knowledge	<ol style="list-style-type: none"> Describe what an ion is and how it is formed. Explain how ionic bonding occurs between oppositely charged ions. Explain ionic bonding in terms of electrostatic forces and loss and gain of electrons using dot and cross diagrams. Describe the properties of ionic compounds and explain why they conduct electricity when molten or dissolved. Describe what a covalent bond is and use diagrams to show how covalent bonds form between non-metal elements. Draw diagrams to represent the bonding in the simple molecules of hydrogen, chlorine, hydrogen chloride, 	<ol style="list-style-type: none"> Describe how scientists contributed to the development of the periodic table. Identify what 'Mendeleev did to solve some of the problems of the early periodic table. Define how elements are arranged in the modern periodic table. Explain where metals and non-metals are found in the periodic table. Explain how the electronic structure of metals and non-metals affects their properties and how they react. State the name and properties of the group 1 elements and explain the trend in reactivity down the group. State the name and properties of the group 7 elements and explain 	<ol style="list-style-type: none"> Recall that during a chemical reaction the total amount of energy in the universe stays the same. Describe and explain what is meant by an exothermic and endothermic reactions in terms of temperature change of the surroundings. Give examples of exothermic and endothermic reactions. Required practical 10: investigate how different variables affect the temperature change of a reaction in solution. Key practical skill: measure temperature changes when substances react or dissolve in water. Describe what the 'activation energy' of a 	<ol style="list-style-type: none"> Calculate the relative formula mass (Mr) of a compound, using relative atomic masses (Ar). Make use of relative formula masses (Mr) in chemical calculations. Higher - Recall that amounts of chemical substances are measured in moles and that 1 mole contains 6.02×10^{23} particles. Higher - Describe the relationship between the mass of 1 mole and relative formula mass of a substance. Describe and explain what is meant by the law of conservation of mass and use this principle to balance chemical equations. Higher - Calculate the mass of substances in a reaction when given the 	<ol style="list-style-type: none"> Describe how the pH scale is used to determine how acidic or alkaline a solution is based on a scale from 0 to 14, solutions formed with pH of less than 7 being acidic, more than 7 alkaline and exactly 7 neutral. Describe how to use universal indicator or a pH probe to measure the pH of a solution. Recall that H⁺ ions make solutions acidic and OH⁻ ions alkaline. Explain why water is always a product of a neutralisation reaction. Higher - Explain what makes strong and weak acids in terms of ionisation and dissociation, give examples of these acids and describe the difference between a 	<ol style="list-style-type: none"> State and describe the process of electrolysis in terms of electrolytes, free ions, redox and electrodes. Predict and identify the products of electrolysis of various ionic compounds including NaCl solution, PbBr₂, Al₂O₃, CuSO₄ solution. Describe and explain the products of electrolysis when metals are more or less reactive than hydrogen and if halide ions are present. Higher - Be able to write half equations for the reactions at the electrodes during electrolysis of aqueous solutions. Required practical 9 - Describe how to setup an electrolysis

	<p>methane, water, oxygen & nitrogen.</p> <p>7. Explain in terms of intermolecular forces why simple molecular substance have poor electrical conductivity, low melting and boiling points and are usually gases or liquids at room temperature.</p> <p>8. Recall that silicon dioxide, graphite and diamond are all giant covalent substances and explain why they have high melting and boiling points.</p> <p>9. Describe and explain the structure and properties of diamond, graphite and graphene.</p> <p>10. State what is meant by the term fullerene and give examples of these structures.</p> <p>11. Explain how the properties of nanotubes makes them suitable for their uses.</p> <p>12. Be able to draw diagrams of the bonding in a metal and explain how the structure gives it useful properties.</p> <p>13. State what an alloy is and use understanding of their structure to explain why they are harder than pure metals.</p>	<p>the trend in reactivity down the group.</p> <p>8.State the name and properties of the group 0 elements and explain the trend in properties within the group.</p> <p>9.Describe how positive and negative ions form and explain the charge formed using electronic structure.</p>	<p>reaction is in terms of particles and collisions.</p> <p>7. Interpret reaction profiles (energy level diagrams) to identify the relative energies of reactants and products, the activation energy and the overall energy change.</p> <p>8. Determine if a reaction is exothermic or endothermic using a reaction profile.</p> <p>9. Draw simple reaction profiles for exothermic and endothermic reactions.</p> <p>10. Higher - Calculate using bond energies if a reaction is exothermic or endothermic and explain this using the terms 'bond making' and 'bond breaking'.</p>	<p>mass of 1 of the products or reactants and a symbol equation.</p> <p>7. Higher - State the meaning of the terms limiting reactant and excess.</p> <p>8. Describe the meaning of the term concentration and state the relationship between mass (g), volume (dm³) and concentration (g/dm³).</p> <p>9. Describe the meaning of the term uncertainty and be able to calculate the uncertainty of a measurement from a range.</p>	<p>concentrated acid and a strong acid.</p> <p>6. State that a change in H⁺ ion concentration by a factor of 10 will only result in a change of 1 on the pH scale.</p> <p>7. Describe the reactions of acids with bases such as metal oxides and metal hydroxides.</p> <p>8. Recall that the salts formed depends upon the positive ion in the base and the acid it reacts with.</p> <p>9. Describe the reactions of acids with metal carbonates.</p> <p>10. Required Practical 8 - Describe and explain how to make a pure dry sample of a soluble salt from the reaction of an acid with an insoluble oxide or carbonate.</p> <p>11. Describe how the pH scale is used to determine how acidic or alkaline a solution is based on a scale from 0 to 14, solutions formed with pH of less than 7 being acidic, more than 7 alkaline and exactly 7 neutral.</p> <p>12. Describe how experimental results can be used to work out an order of reactivity and recall that an order of</p>	<p>experiment using inert electrodes and make clear identification of the products.</p>
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	<p>14. Be able to interpret and draw diagrams to represent various polymer molecules.</p> <p>15. Use diagrams and state symbols to represent the 3 states of matter and explain the limitations of each model.</p> <p>16. Recall that the bulk properties of a material aren't possessed by the particles of that material.</p> <p>17. Use the particle model to explain changes of state and describe the relationship between both melting and freezing (melting point) and boiling and condensing (boiling point).</p> <p>18. Explain the relationship between the strength of forces between particles and how much energy it takes for a substance to melt or boil and predict using data the state of a substance at a particular temperature.</p>				<p>reactivity of metals is called the reactivity series.</p> <p>13. State that more reactive metals are able to displace less reactive metals from their compounds.</p> <p>14. Higher - Identify in a given reaction, symbol equation, or half equation which species are oxidised and which are reduced, in terms of electron transfer.</p> <p>15. Describe what is meant by the term 'REDOX reaction' and explain why most metals require extraction.</p> <p>16. Describe how metals lower than carbon in the reactivity series are extracted from their ore.</p> <p>17. Describe how metals higher than carbon in the reactivity series are extracted from their ore.</p> <p>18. Describe REDOX reactions in terms of loss and gain of electrons.</p>	
<p>Learning Checkpoint Tasks</p>	<p>LC1 – Exothermic and Endothermic reactions</p>	<p>LC1 – Oxidation and Reduction reactions</p> <p>LC2 – Acid and Base reactions</p>	<p>LC1 – Relative Formula Mass</p> <p>LC2 - Concentration Calculations</p>	<p>LC1 – Factors affecting rates</p> <p>LC2 – Reversible Reactions</p>	<p>LC1 – Alkanes and Alkenes</p> <p>LC2 – Types of Combustion</p>	<p>LC1 – Electrolysis of melts</p> <p>LC2 – Electrolysis of aqueous solutions</p>

	LC2 – Energy Level Diagrams/ Bond energy calculations (Higher)					
Common Assessment Task	CA1 – C2 Periodic Table, C3 Structures and Bonding, C7 Energy Changes			CA2 – C4 Quantitative Chemistry, C5 Chemical Changes		
Interleaved Knowledge	<p>Previously students will have learnt:</p> <ul style="list-style-type: none"> - About elements, compounds and the periodic table as well as what happens during chemical reactions. - About how to write balanced chemical equations including state symbols. 	<p>Previously students will have learnt:</p> <ul style="list-style-type: none"> - How to represent elements and compound using symbols - How mass is conserved during changes of state and chemical reactions - Solubility, solutes and solutions - How hazard symbols are used - Indicators and the pH of acids, alkalis and neutral solutions - How neutralisations reactions occur. 	<p>Previously students will have learnt:</p> <ul style="list-style-type: none"> - About products and reactants in chemical reactions. - About elements, compounds and the periodic table as well as what happens during chemical reactions. - About how to write balanced chemical equations including state symbols. - How oxidation and displacement reactions occur in relation to the reactivity series. 	<p>Previously students will have learnt:</p> <ul style="list-style-type: none"> - How oxidation and displacement reactions occur in relation to the reactivity series. - How mixtures are separated using fractional distillation to produce fuels and energy resources 	<p>Previously students will have learnt:</p> <ul style="list-style-type: none"> - About products and reactants in chemical reactions. - About elements, compounds and the periodic table as well as what happens during chemical reactions. - About how to write balanced chemical equations including state symbols. - How oxidation and displacement reactions occur in relation to the reactivity series. 	