



Curriculum Map

Subject: Triple Science Chemistry (Triple Science topics only in RED)

Year Group: 10

	Autumn 1/Autumn 2	Autumn 2	Autumn 2/Spring 1	Spring 2	Summer 1 and Summer 2
Content	<p>1 Review Year 9 Topics</p> <p>2 Structure and Bonding</p> <p>-Ionic Bonding -Ionic Compounds and their properties - Covalent bonding - Properties of simple covalent molecules - Properties of giant covalent molecules - Structure and properties of isomers of carbon: Diamond, graphite, graphene and fullerenes - Metallic Bonding Properties of Metals and Alloys –Polymers</p> <p>Review of Chapters 1 and 2</p> <p>Transition Metals – Properties Reactions Uses</p> <p>Ch3 Structure and Bonding Nanoparticles What they are Uses Risks</p>	<p>Chemical Calculations</p> <p>Conservation of mass and balanced chemical equations - Relative formula mass -Mass changes when a reactant or product is a gas - Chemical measurements - Moles -Amounts of substances in equations -Using moles to balance equations - Limiting reactants -Concentration of solutions</p> <p>Ch4 Chemical Calculations Higher tier maths skills Yield of a chemical reaction Atom economy Titrations and associated calculations Volumes of gases</p>	<p>Chemical Changes</p> <p>Formation of metal oxides -The reactivity series - Extraction of metals and reduction - Oxidation and reduction in terms of electrons - Reactions of acids with metals - Neutralisation of acids and salt production - Soluble salts -The pH scale and neutralisation Strong and weak acids</p> <p>Ch5 Chemical Changes Apply chemical calculations to the reactions in this chapter.</p>	<p>Electrolysis</p> <p>- The process of electrolysis - Electrolysis of molten ionic compounds -Using electrolysis to extract metals - Electrolysis of aqueous solutions Representation of reactions at electrodes as half equations</p>	<p>Energy Changes</p> <p>Energy changes in reactions - Investigating energy changes -Energy profiles -Bond energies -Calculating energy changes</p> <p>Rates of Reaction</p> <p>Calculating rates of reactions - Factors which affect the rates of chemical reactions - Collision theory and activation energy –Catalysts</p> <p>Ch7 Chemical Cells and Batteries What happens at electrodes How to interpret data on chemical cells in terms of the relative reactivity of different metals</p> <p>The use of hydrogen fuel cells as alternative fuels. Half equations in hydrogen fuel cells.</p>

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Skills	<p>-Know how to identify and differentiate between the bonding in substances. -Draw a dot-and-cross diagram for simple molecules -Work out the charge on the ions of metals and non-metals from the group number of the element, limited to the metals in Groups 1 and 2, and non-metals in Groups 6 and 7. -Identify the types of bonding and molecule from their formulae -Recognise substances as small molecules, polymers or giant structures from diagrams showing their bonding.</p> <p>Ch 1 and 2 Transition Metals – compare their physical and chemical properties with other elements Investigate the different colours of transition metal ions eg Vanadium</p>	<p>Balance formula equations - A variety of maths skills (detailed in numeracy)</p> <p>Ch4 Chemical Calculations Using data and experimental results to calculate yield and atom economy, Balance symbol equations Carry out accurate titrations, getting concordant results that can be used in calculations Carry out titration calculations to work out concentration and moles of reactants and products of titrations.</p> <p>Ch4 Solving problems by balancing chemical equations and using calculations</p>	<p>Safe use of appropriate heating devices and techniques including use of a Bunsen burner and a water bath or electric heater. -Use of appropriate apparatus and techniques for conducting chemical reactions, including appropriate reagents. -Safe use of a range of equipment to purify and/or separate chemical mixtures including evaporation, filtration, crystallisation. - Safe use and careful handling of liquids and solids, including careful mixing of reagents under controlled conditions.</p>	<p>-Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. -Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations.</p>	<p>-Calculate bond energies -Draw energy profiles for an endothermic and exothermic reaction -Use of appropriate apparatus to make and record a range of measurements accurately, including mass, temperature, and volume of liquids. - Use of appropriate apparatus and techniques for conducting and monitoring chemical reactions. - Making and recording of appropriate observations during chemical reactions including changes in temperature. -Safe use and careful handling of gases, liquids and solids, including careful mixing of reagents under controlled conditions, using appropriate apparatus to explore chemical changes. -Use scientific theories and explanations to develop hypotheses. -Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena. -Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. -Evaluate methods and suggest possible improvements and further investigations.</p> <p>Ch7 Energy Changes Evaluate the use of chemical cells using given data and information Practical investigation on chemical cells – plan and carry out an</p>

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	<p>Ch3 Compare normal dimensions and sizes to nano dimension and sizes Appreciate some of the uses and applications of nanoparticles. Appreciate some of the risks that they might pose.</p>	<p>to determine the yield and atom economy of a variety of reactions. Carrying out titrations accurately and safely and then using your results to calculate concentrations and moles of reactants and products. Considering practical processes and considering how yield can be improved.</p>	<p>Ch5 Chemical Changes Apply chemical calculations to the reactions in this chapter.</p>		<p>investigation on voltage produced by simple cells using different metals</p> <p>Evaluate the use of hydrogen fuel cells. Write half equations for the electrode reactions in hydrogen fuel cells.</p>	
Key questions	<p>How can we use the particle model to explain the properties of solids, liquids and gases, including changes of state? What are chemical compounds? How are ions formed, and how are ionic compounds held together? How are covalent bonds formed and what type of</p>	<p>What is Relative Atomic Mass and how is it calculated? What is Relative Formula Mass and how is it calculated? How do we calculate moles? How do we balance equations? What is concentration</p>	<p>How can we extract metals from their ores? How can we make and prepare pure dry samples of salts? How can we use the reactivity series to predict displacement reactions? How can we use ideas about electron transfer to identify</p>	<p>What is electrolysis and why is it useful? How can we decompose ionic compounds to get useful products? What happens at each electrode during electrolysis and how can we represent the reactions at each electrode using half equations?</p>	<p>Why do chemical reactions always involve transfers of energy? What are exothermic reactions? What are endothermic reactions? How can we distinguish between exothermic and endothermic reactions?</p>	<p>What factors affect the rate of a reaction? How can we use collision theory to explain how temperature, concentration, pressure, surface area and using a catalyst all affect the rate of a reaction. How can we measure the rate of a reaction?</p>

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	<p>substances contain covalent bonds? What is metallic bonding? How can we use an understanding of the different types of chemical bond to explain the properties of different compounds and materials?</p> <p>Ch1 and 2 What are transition metals? How do their properties compare to other metallic elements? What uses do they have? Why do they produce such a variety of coloured solutions and compounds?</p> <p>Ch3 What are nanoparticles? How small are they? What uses do they have? What problems might they cause?</p>	<p>and how can we calculate it?</p> <p>Ch4 What is yield? What factors affect yield? What is atom economy? Why is it important in the chemical industry? What are titrations useful for? How can we calculate the volume of gases in chemical reactions?</p>	<p>oxidised and reduced species? How can we investigate pH changes with different neutralisation reactions?</p> <p>Ch5 Chemical Changes How can we apply chemical calculations to the reactions in this chapter? What transition metal uses do we find here? What connections can we make to other chapters and ideas?</p>		<p>How can we represent exothermic and endothermic reactions with reaction profiles?</p> <p>Ch7 Energy Changes How to the relative reactivity of different metals affect the voltage produced by chemical cells?</p> <p>How do you write half equations for the electrode reactions in hydrogen fuel cells?</p>	

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Assessment	<p>Formative 'low stakes' assessments to take place more frequently throughout the term. This could be in the form of a range of methods:</p> <ul style="list-style-type: none"> • Quiz • Homework task • Microsoft Forms short tests • In class short tests • Questions and answer sessions • Spelling tests • Group work tasks • Peer assessments <p>Literacy and numeracy activities End of term summative assessments</p>	<p>Formative 'low stakes' assessments to take place more frequently throughout the term. This could be in the form of a range of methods:</p> <ul style="list-style-type: none"> • Quiz • Homework task • Microsoft Forms short tests • In class short tests • Questions and answer sessions • Spelling tests • Group work tasks • Peer assessments <p>Literacy and numeracy activities End of term summative assessments</p>	<p>Formative 'low stakes' assessments to take place more frequently throughout the term. This could be in the form of a range of methods:</p> <ul style="list-style-type: none"> • Quiz • Homework task • Microsoft Forms short tests • In class short tests • Questions and answer sessions • Spelling tests • Group work tasks • Peer assessments <p>Literacy and numeracy activities End of term summative assessments</p>	<p>Formative 'low stakes' assessments to take place more frequently throughout the term. This could be in the form of a range of methods:</p> <ul style="list-style-type: none"> • Quiz • Homework task • Microsoft Forms short tests • In class short tests • Questions and answer sessions • Spelling tests • Group work tasks • Peer assessments <p>Literacy and numeracy activities End of term summative assessments</p>	
Literacy/ Numeracy/ SMSC/ Character	<p>Literacy and numeracy activities in class including practical write-ups. Using models eg Particle Model to explain physical and chemical phenomena and properties. Numeracy: Calculations including relative atomic mass, moles, balancing equations, interpreting data, plotting graphs. Also above. SMSC/Character – appreciating the environmental impact of industrial chemical processes</p>	<p>Literacy: Writing up class practicals including required practicals. Using models to explain chemical processes. Numeracy: Balancing equations. Interpreting data. SMSC/Character – appreciating the environmental impact of industrial chemical processes</p>	<p>Literacy – writing up class practicals, using models to explain chemical processes, analysing data to draw conclusions. Numeracy – calculating bond enthalpies, drawing reaction profiles, calculating rates of reaction, interpreting data, using experimental data to draw conclusions. SMSC/Character – appreciating the environmental impact of industrial chemical processes</p>		