



Curriculum Map

Subject: Chemistry

Year group: 10 & 11

Timings are broad as classes they vary depending on how many teachers the class has.

The colours denote: Higher tier only content

Separate science only content

Time period	Topic 3 Year 10 (Autumn Term)	Topic 4 Year 10 (Autumn Term)	Topic 5 Year 10 (Spring Term)	Topic 6 Year 10 (Spring Term)	Topic 7 Year 10 (Summer Term)	Topic 8 Year 11 (Autumn Term)	Topic 9 Year 11 (Autumn-Spri ng Term)	Topic 10 Year 11 (Spring Term)
<p>Content</p> <p><i>Declarative Knowledge – 'Know What'</i></p>	<p><u>Chemistry 6 - The Rate and Extent of Chemical Change</u></p> <ul style="list-style-type: none"> -Calculating rates of reactions - Factors which affect the rates of chemical reactions - Collision theory and activation energy -Catalysts -Reversible reactions -Energy changes and reversible reactions -Equilibrium -The effect of changing conditions on equilibrium: concentration, temperature and pressure 	<p><u>Chemistry 2 - Bonding, Structure and Properties of Matter</u></p> <ul style="list-style-type: none"> -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 	<p><u>Chemistry 7 - Organic Chemistry</u></p> <ul style="list-style-type: none"> -Crude Oil, hydrocarbons and alkanes -Fractional distillation and petrochemicals -Properties of hydrocarbons -Cracking and alkenes -Structure and formulae of alkenes -Reactions of Alkenes -Structure and reactions of alcohols -Structure and reactions of carboxylic acids -Addition Polymerisation -Condensation Polymerisation -Amino Acids 	<p><u>Chemistry 10 - Using Resources</u></p> <ul style="list-style-type: none"> -Using the Earth's resources and sustainable development - Potable water -Waste water treatment -Alternative methods of extracting metals - Life cycle assessments -Ways of reducing the use of resources -Corrosion and its prevention -Alloys and useful materials -Ceramics, composites and polymers - The Haber process -Production and used of NPK fertilisers 	<p><u>Chemistry 5 - Energy Changes</u></p> <ul style="list-style-type: none"> -Energy changes in reactions -Investigating energy changes -Energy profiles -Bond energies -Calculating energy changes -Cells and batteries -Fuel cells 	<p><u>Chemistry 3 - Quantitative Chemistry</u></p> <ul style="list-style-type: none"> -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 -Percentage yield -Atom economy -Using concentrations of solutions in mol/dm³ 	<p><u>Chemistry 4 - Chemical Changes</u></p> <ul style="list-style-type: none"> -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 -Titrations -Strong and weak acids - The process of electrolysis -Electrolysis of molten ionic compounds -Using electrolysis to extract metals -Electrolysis of aqueous solutions 	<p><u>Chemistry 8 - Analysis</u></p> <ul style="list-style-type: none"> -Pure substances -Formulations -Chromatography -Identification of common gases: hydrogen, oxygen, carbon dioxide, chlorine -Flame tests to identify ions -Use of metal hydroxides to identify ions -Identification of carbonates -Identification of halides -Identification of sulfates -Instrumental methods -Flame emission spectroscopy



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		<ul style="list-style-type: none"> -Properties of Metals and Alloys -Polymers -Bulk and surface properties of matter including nanoparticles -Sizes of particles and their properties -Uses of nanoparticles 	<ul style="list-style-type: none"> -DNA and other naturally occurring polymers 			<ul style="list-style-type: none"> -Use of amount of substance in relation to volumes of gases 	<ul style="list-style-type: none"> -Representation of reactions at electrodes as half equations 	
<p>Skills</p> <p><i>Procedural Knowledge – 'Know How'</i></p>	<ul style="list-style-type: none"> - Use of appropriate apparatus to make and record a range of measurements accurately, including mass, time, temperature, and volume of liquids and gases. -Use of appropriate apparatus and techniques for conducting and monitoring chemical reactions. -Safe use and careful handling of gases, liquids and solids, including careful mixing of reagents under controlled conditions. -Use scientific theories and explanations to 	<ul style="list-style-type: none"> -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 	<ul style="list-style-type: none"> -Write balanced formula equations -Draw fully displayed structural formulae of the first four members of the alkenes and the products of their addition reactions with hydrogen, water, chlorine, bromine and iodine. -Recognise organic molecules from given formulae. 	<ul style="list-style-type: none"> -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 the measurement of pH in different situations. -Safe use of a range of equipment to purify and/or separate chemical mixtures including evaporation, distillation. -Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. 	<ul style="list-style-type: none"> -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, 	<ul style="list-style-type: none"> -Balance formula equations - A variety of maths skills (detailed in numeracy) 	<ul style="list-style-type: none"> -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. 	<ul style="list-style-type: none"> -Use of appropriate apparatus to make and record a range of measurements accurately. -Safe use of a range of equipment to purify and/or separate chemical mixtures including chromatography. -Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. -Make and record observations and measurements using a range of apparatus and methods. -Safe use of a Bunsen burner



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	<p>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. -Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. -Evaluate methods and suggest possible improvements and further investigations.</p>	<p>and/or molecule from their formulas -Recognise substances as small molecules, polymers or giant structures from diagrams showing their bonding.</p>		<p>-Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. -Recognise when to apply a knowledge of sampling techniques to ensure any samples collected are representative. -Make and record observations and measurements using a range of apparatus and methods. -Evaluate methods and suggest possible improvements and further investigations.</p>	<p>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>-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. -The determination of concentrations of strong acids and strong alkalis. -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. -Make and record observations and measurements using a range of apparatus and methods.</p>	<p>-Use of appropriate qualitative reagents and techniques to analyse and identify unknown samples.</p>
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<p>Key Questions</p>	<ul style="list-style-type: none"> -How can the rate of a chemical reaction be measured? -What factors affect the rates of chemical reactions? -What is equilibrium? -What factors can affect equilibrium? 	<ul style="list-style-type: none"> -How is the bonding in metals and non-metals different? -How does the type of bonding affect properties? -Why do non-metals tend to be gases at room temperature? -Why is diamond so strong? 	<ul style="list-style-type: none"> -How does crude oil form and what is it made of? -How do we split crude oil into its useful components? -How do we make more useful hydrocarbons from less useful ones? -How can we make alcohols, carboxylic acids and polymers from other hydrocarbons? 	<ul style="list-style-type: none"> -How is waste water made into potable water? -How can we be more sustainable to preserve the world's resources? -Why is it important for industry to evaluate the environmental impact of their processes? -How can we make alcohols, carboxylic acids and polymers from other hydrocarbons? -Why is it important that we reduce, reuse, recycle? 	<ul style="list-style-type: none"> -What are endothermic and exothermic reactions? -How can we calculate energy changes in endothermic and exothermic reactions? -What are the uses of endothermic and exothermic reactions? 	<ul style="list-style-type: none"> -How can we use the mole to help us with calculations? -How can we write ionic formulae? -How can we balance equations correctly? -How can we find the efficiency of a chemical process? -How can we do a titration using the correct techniques and the associated calculations? 	<ul style="list-style-type: none"> -How and why do different chemicals react and what will be their products? -How can metals be extracted based on their reactivity? -What determines an acid and what makes a base? -What makes an acid stronger than another irrespective of concentration. -How can salts be made? -How can pH be measured? -How can titrations help to find the concentration of a solution? 	<ul style="list-style-type: none"> -What is a formulation? -How does chromatography work? -How can gases be identified? -How can ions be identified? -How does flame emission spectroscopy work?
<p>Assessment</p>	<ul style="list-style-type: none"> -Required Practical -Assessed Exam Questions -Assessed Exam Question -End of Topic Test 	<ul style="list-style-type: none"> -Assessed Exam Question -End of Unit Assessment 	<ul style="list-style-type: none"> -Assessed Exam Question -End of Unit Assessment 	<ul style="list-style-type: none"> -Required Practical -Assessed Exam Questions -Mid-unit assessment -End of unit test 	<ul style="list-style-type: none"> -Required Practical -Assessed Exam Questions -End of unit test 	<ul style="list-style-type: none"> -Assessed Exam Question -End of topic test 	<ul style="list-style-type: none"> -Required Practical -Assessed Exam Questions (Making salts & Neutralisation) -Mid unit test -End of unit test 	<ul style="list-style-type: none"> -Required Practical -Assessed Exam Questions -End of unit test
<p>Literacy/Numeracy/SMSC/Character</p>	<ul style="list-style-type: none"> Literacy -Appropriate use of tier three vocabulary. -Develop extended answers through practice of 6 mark questions. -Development of comprehension skills through research using a variety of sources. -Plan experiments or devise procedures to make observations 	<ul style="list-style-type: none"> Literacy -Appropriate use of tier three vocabulary. -Develop extended answers through practice of 6 mark questions. -Development of comprehension skills through research using 	<ul style="list-style-type: none"> Literacy -Appropriate use of tier three vocabulary. -Develop extended answers through practice of 6 mark questions. -Development of comprehension skills through research using a variety of sources. 	<ul style="list-style-type: none"> Literacy -Appropriate use of tier three vocabulary. -Develop extended answers through practice of 6 mark questions. -Development of comprehension skills through research using a variety of sources. Numeracy: -Translate information between graphical and numeric form. 	<ul style="list-style-type: none"> Literacy -Appropriate use of tier three vocabulary. -Develop extended answers through practice of 6 mark questions. -Development of comprehension skills through research using a variety of sources. -Plan experiments or devise procedures to make observations 	<ul style="list-style-type: none"> Literacy -Appropriate use of tier three vocabulary. -Develop extended answers through practice of 6 mark questions. -Development of comprehension skills through research using a variety of sources. 	<ul style="list-style-type: none"> Literacy -Appropriate use of tier three vocabulary. -Develop extended answers through practice of 6 mark questions. -Development of comprehension skills through research using a variety of sources. -Plan experiments or devise procedures to make observations 	<ul style="list-style-type: none"> Literacy -Appropriate use of tier three vocabulary. -Develop extended answers through practice of 6 mark questions. -Development of comprehension skills through research using a variety of sources. -Plan experiments or devise procedures to make observations



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	<p>Numeracy -Use decimals, fractions, percentages and ratios. -Make estimates of the results of simple calculations. -Use an appropriate number of significant figures. -Find arithmetic means. -Translate information between graphical and numeric form. -Understand that $y = mx + c$ represents a linear relationship. -Plot two variables from experimental or other data. -Determine the slope and intercept of a linear graph. -Draw and use the slope of a tangent to a curve as a measure of rate of change.</p> <p>Character Confidence - Building confidence in practical skills with the completion of a required practical. -Resilience & Initiative -Resolving difficulties in practical techniques</p>	<p>a variety of sources.</p> <p>Numeracy -Calculating Surface Area to Volume Ratio for nanoparticle. -Use of standard form and decimals -Conversion of units</p> <p>SMSC -Discussion of the uses of nanoparticles and how it affects human biology and the environment</p>	<p>Numeracy -Use of general formulae to classify different functional groups.</p> <p>SMSC -Discussion on the continued use of fossil fuels and how this affects the environment? -Discussion of uses of crude oil including plastics and their effect on the environment</p> <p>Character -Tolerance - of others views during discussions -Confidence - Building confidence in practical skills with the completion of a required practical. -Resilience & Initiative -Resolving difficulties in practical techniques</p>	<p>-Use decimals, ratios, fractions and percentages.</p> <p>SMSC - -Discussion of use of fluorine in drinking water. -Discussion around should we reduce, reuse, recycle. - Evaluations of use of synthetic fertilisers.</p> <p>Character -Tolerance of others' views during discussions</p>	<p>Numeracy -Use decimals, fractions, percentages and ratios. -Use an appropriate number of significant figures. -Find arithmetic means. -Translate information between graphical and numeric form. -Plot two variables from experimental or other data.</p>	<p>Numeracy -Use of decimals, fractions, ratios and percentages -Change the subject of an equation -Substitute numerical values into algebraic equations -Use an appropriate number of significant figures -Recognise and express figures in standard form</p>	<p>Numeracy -Calculate the chemical quantities in titrations -Use decimals, ratios, fractions and percentages. -Use an appropriate number of significant figures. involving concentrations in mol/dm³ and in g/dm³ -Make order of magnitude calculations. -Use an appropriate number of significant figures.</p> <p>SMSC -Evaluation of methods used to extract metals including environmental and socio-economic impacts</p> <p>Character -Tolerance - of others views during discussions -Confidence - Building confidence in practical skills with the completion of a required practical. -Resilience & Initiative -Resolving difficulties in practical techniques</p>	<p>Numeracy -Use of decimals, fractions, ratios and percentages -Use an appropriate number of significant figures -Recognise and express figures in standard form</p> <p>Character -Confidence - Building confidence in practical skills with the completion of a required practical. -Resilience & Initiative -Resolving difficulties in practical techniques</p>
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Curriculum Map



Sandringham School
'Everybody can be Somebody'

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