



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 (Autumn - spring term)	Topic 6 Year 10 (Spring term)	Topic 7 Year 10 (Spring - summer Term)	Topic 8 Year 10 (Summer Term)	Topic 9 Year 11 (Autumn - Spring Term)	Topic 10 Year 11 (Autumn - spring Term)	Topic 11 Year 11 (Spring Term)
Content <i>Declarative Knowledge</i> – <i>‘Know What’</i>	<u>Chemistry 1 - Atomic Structure</u> -Subatomic particles -Atoms and elements -Compounds -Relative atomic mass and electron configuration - A model of the atom -The periodic table; Group 1, 7 and 0 -Mixtures compared to compounds -A chemical formula shows the relative proportions of each type	<u>Chemistry 2 - Bonding, Structure and Properties of Matter</u> -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	<u>Chemistry 5 - Energy Changes</u> -Energy changes in reactions -Investigating energy changes -Energy profiles -Bond energies -Calculating energy changes -Cells and batteries -Fuel cells	<u>Chemistry 6 - The Rate and Extent of Chemical Change</u> -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	<u>Chemistry 10b - Using Resources</u> -Corrosion and its prevention -Alloys and useful materials -Ceramics, composites and polymers - The Haber process -Production and used of NPK fertilisers	<u>Chemistry 7 - Organic Chemistry</u> -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	<u>Chemistry 4 - Chemical Changes</u> -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	<u>Chemistry 3 - Quantitative Chemistry</u> -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	<u>Chemistry 8b - Analysis</u> -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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	of atom present in a substance, e.g. H ₂ O.	-Properties of Metals and Alloys -Polymers -Bulk and surface properties of matter including nanoparticles -Sizes of particles and their properties -Uses of nanoparticles		-The effect of changing conditions on equilibrium: concentration, temperature and pressure		-Condensation Polymerisation -Amino Acids -DNA and other naturally occurring polymers	- 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	-Percentage yield -Atom economy -Using concentrations of solutions in mol/dm ³ -Use of amount of substance in relation to volumes of gases	
Skills <i>Procedural Knowledge</i> — <i>'Know How'</i>	Evaluation How to identify metals and non-metals in the periodic table -Draw the electron configuration of the first 20 elements -Calculate relative abundance of isotopes	-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	-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, time, temperature, and volume of liquids and gases.	- 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	-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	-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.	-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	-Balance formula equations - A variety of maths skills (detailed in numeracy)	-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



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		<p>metals in Groups 1 and 2, and non-metals in Groups 6 and 7.</p> <p>-Identify the types of bonding and/or molecule from their formulas</p> <p>-Recognise substances as small molecules, polymers or giant structures from diagrams showing their bonding.</p>	<p>temperature, and volume of liquids.</p> <p>-Use of appropriate apparatus and techniques for conducting and monitoring chemical reactions.</p> <p>-Making and recording of appropriate observations during chemical reactions including changes in temperature.</p> <p>-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.</p> <p>-Use scientific theories and explanations to develop hypotheses.</p>	<p>techniques for conducting and monitoring chemical reactions.</p> <p>-Safe use and careful handling of gases, liquids and solids, including careful mixing of reagents under controlled conditions.</p> <p>-Use scientific theories and explanations to develop hypotheses.</p> <p>-Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena.</p> <p>-Apply a knowledge of a range of techniques, instruments, apparatus,</p>	<p>purify and/or separate chemical mixtures including evaporation, distillation.</p> <p>-Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment.</p> <p>-Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations.</p> <p>-Recognise when to apply a knowledge of sampling techniques to ensure any samples collected are representative.</p> <p>-Make and record observations and measurements using a range of apparatus and methods.</p> <p>-Evaluate methods and suggest</p>	<p>-Recognise organic molecules from given formulae.</p>	<p>appropriate reagents.</p> <p>-Safe use of a range of equipment to purify and/or separate chemical mixtures including evaporation, filtration, crystallisation.</p> <p>-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.</p> <p>-Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and</p>	<p>having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations.</p> <p>-Make and record observations and measurements using a range of apparatus and methods.</p> <p>-Safe use of a Bunsen burner</p> <p>-Use of appropriate qualitative reagents and techniques to analyse and identify unknown samples.</p>
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			<ul style="list-style-type: none"> -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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> possible improvements and further investigations. 		<ul style="list-style-type: none"> 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. 		
Key Questions	<ul style="list-style-type: none"> 1.How does the periodic table explain the arrangement of chemical elements 	<ul style="list-style-type: none"> -How is the bonding in metals and non-metals different? -How does the type of bonding 	<ul style="list-style-type: none"> -What are endothermic and exothermic reactions? -How can we calculate energy 	<ul style="list-style-type: none"> -How can the rate of a chemical reaction be measured? -What factors affect the rates of 	<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? 	<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? 	<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 	<ul style="list-style-type: none"> -How can we use the mole to help us with calculations? -How can we write ionic formulae? 	<ul style="list-style-type: none"> -What is a formulation? - How does chromatography work? -How can gases be identified?



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	<p>2.What is an atom, and ion and an isotope?</p> <p>3.What are the properties of group 1, 7 and 0?</p> <p>4. What is a mixture?</p> <p>5.What is a compound?</p>	<p>affect properties?</p> <p>-Why do non-metals tend to be gases at room temperature?</p> <p>-Why is diamond so strong?</p>	<p>changes in endothermic and exothermic reactions?</p> <p>-What are the uses of endothermic and exothermic reactions?</p>	<p>chemical reactions?</p> <p>-What is equilibrium?</p> <p>-What factors can affect equilibrium?</p>	<p>-Why is it important for industry to evaluate the environmental impact of their processes?</p> <p>-Why is it important that we reduce, reuse, recycle?</p>	<p>-How do we make more useful hydrocarbons from less useful ones?</p> <p>-How can we make alcohols, carboxylic acids and polymers from other hydrocarbons?</p>	<p>on their reactivity?</p> <p>-What determines an acid and what makes a base?</p> <p>-What makes an acid stronger than another irrespective of concentration.</p> <p>-How can salts be made?</p> <p>-How can pH be measured?</p> <p>-How can titrations help to find the concentration of a solution?</p>	<p>-How can we balance equations correctly?</p> <p>-How can we find the efficiency of a chemical process?</p> <p>-How can we do a titration using the correct techniques and the associated calculations?</p>	<p>- How can ions be identified?</p> <p>- How does flame emission spectroscopy work?</p>
<p>Assessment</p>	<p>1.Required practical assessed questions</p> <p>2.Mid unit test</p> <p>3.End of topic test</p>	<p>-Assessed Exam Question</p> <p>-End of Unit Assessment</p>	<p>-Required Practical Assessed Exam Questions</p> <p>-End of unit test</p>	<p>-Required Practical Assessed Exam Questions</p> <p>-Assessed Exam Question</p> <p>-End of Topic Test</p>	<p>-Required Practical - Assessed Exam Questions</p> <p>-Mid-unit assessment</p> <p>-End of unit test</p>	<p>-Assessed Exam Question</p> <p>-End of Unit Assessment</p>	<p>-Required Practical Assessed Exam Questions (Making salts & Neutralisation)</p> <p>-Mid unit test</p> <p>-End of unit test</p>	<p>-Assessed Exam Question</p> <p>-End of topic test</p>	<p>-Required Practical Assessed Exam Questions</p> <p>-End of unit test</p>
<p>Literacy/Numeracy/SMSC/Character</p>	<p><u>Literacy</u>;</p> <p>plan experiments or devise procedures to make observations.</p> <p><u>Numeracy</u>;</p> <p>Calculating relative abundance of an</p>	<p>Literacy</p> <p>-Appropriate use of tier three vocabulary.</p> <p>-Develop extended answers through practice of 6 mark questions.</p> <p>-Development of comprehension skills through research using a</p>	<p>Literacy</p> <p>-Appropriate use of tier three vocabulary.</p> <p>-Develop extended answers through practice of 6 mark questions.</p> <p>-Development of</p>	<p>Literacy</p> <p>-Appropriate use of tier three vocabulary.</p> <p>-Develop extended answers through practice of 6 mark questions.</p> <p>-Development of comprehension skills through research using a variety of sources.</p>	<p>Literacy</p> <p>-Appropriate use of tier three vocabulary.</p> <p>-Develop extended answers through practice of 6 mark questions.</p> <p>-Development of comprehension skills through research using a</p>	<p>Literacy</p> <p>-Appropriate use of tier three vocabulary.</p> <p>-Develop extended answers through practice of 6 mark questions.</p> <p>-Development of comprehension skills through</p>	<p>Literacy</p> <p>-Appropriate use of tier three vocabulary.</p> <p>-Develop extended answers through practice of 6 mark questions.</p> <p>-Development of comprehension skills through research using a</p>	<p>Literacy</p> <p>-Appropriate use of tier three vocabulary.</p> <p>-Develop extended answers through practice of 6 mark questions.</p> <p>-Development of comprehension skills through research using a variety of sources.</p>	



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<p>isotope, number of neutrons from relative atomic mass, charges and using it to write compound formula</p> <p>SMSC; collaborative working on challenging aspects of the topic</p> <p>Character; Resilience - understanding isotopes and percentage abundance can be challenging</p>	<p>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>comprehension skills through research using a variety of sources. -Plan experiments or devise procedures to make observations</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>of comprehension skills through research using a variety of sources. -Plan experiments or devise procedures to make observations</p> <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.</p>	<p>Numeracy: -Translate information between graphical and numeric form. -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>variety of sources.</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</p>	<p>research using a variety of sources. -Plan experiments or devise procedures to make observations</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</p>	<p>variety of sources.</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>-Plan experiments or devise procedures to make observations</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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				<p>-Plot two variables from experimental or other data.</p> <p>-Determine the slope and intercept of a linear graph.</p> <p>-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.</p> <p>-Resilience & Initiative - Resolving difficulties in practical techniques</p>		<p>practical techniques</p>	<p>and socio-economic impacts</p> <p>Character</p> <p>-Tolerance - of others views during discussions</p> <p>-Confidence - Building confidence in practical skills with the completion of a required practical.</p> <p>-Resilience & Initiative - Resolving difficulties in practical techniques</p>		
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