

# Year 1 GCSE Curriculum Map for Chemistry (dept.)

| What are the intended aims for this year's curriculum? For students to be able to write word and symbol equations using common formulae and symbols. To be able to identify different types of chemical reaction. For students to be able to predict the outcome of a chemical reaction based on their knowledge of periodic table and reactivity. |  |  |   |  |  |  |   |   |  |   |  |   |
|--|--|--|---|--|--|--|---|---|--|---|--|---|
| Term 1   |  | Term 2   |   | Term 3   |  | Term 4   |   | Term 5  |  | Term 6  |  |   |
|  | Topic(s): States of Matter and separation. Atomic structure and periodic table   | Aim of A&R                                       | Topic(s): Bonding   | Aim of A&R   | Topic(s): Acids and Alkalis<br>Calculations involving masses   | Aim of A&R   | Topic(s): Obtaining and using metals<br>Transition metals, alloys and corrosion.  | Aim of A&R  | Topic(s): Quantitative analysis, Dynamic Equilibria, Chemical cells and Fuel Cells<br>Groups in the periodic table, Rates of reaction, Heat Changes.   | Aim of A&R  | Topic(s): Fuels, Earth and Atmospheric Science<br>Alcohols, Carboxylic acids   | Aim of EoY exam   |
| 'Big idea(s)' / fundamental concepts   | What practical techniques to be used to separate different mixtures?<br>What is the structure of the atom, how was it developed and how is the periodic table arranged?  | To check understanding of separation techniques. | <i>How are compounds and other chemicals held together?</i>   | To test if students can describe the structure of the atom and periodic table. | <i>How can acids and alkalis neutralise each other?<br/>How do we know the formula of chemical compounds?</i>  | To test if students can describe how elements form molecules and compounds and how type of bonding affects properties. | How are metals extracted using the reactivity series?<br>What are the uses of transition metals?  | To test if students can describe and predict the reactions between acids and alkalis. | How can chemical reactions be adapted to produce the biggest yield?<br><br><i>How does position in the periodic table tell us about the use and reactivity of an element?</i>  | To test if students can calculate formula mass, empirical formula and concentration | <i>How is crude oil separated to produce fossil fuels and what are the products and dangers of burning fossil fuels.</i>   | To assess the key points of the year, including products of reactions, chemical calculations, and the periodic table. |
| Knowledge to be learnt   | <i>Recap of states of matter and mixtures. Methods for filtration, crystallisation, distillation and chromatography.</i><br>How the structure of the atom was discovered and how the periodic table is arranged based on atomic structure. |  | What are the three types of bonding and how does bonding affect physical and chemical properties.     |  | What is the chemical composition of acids and alkalis? How does neutralisation occur?<br><br>How to calculate formula mass, empirical formula and moles. |  | Recap the reactivity series of metals and the methods used to extract the different types of metal.<br><i>Where are transition metals on the periodic table and how do we use them?</i> |   | How to calculate yield and concentration? What is a titration and what is the Haber process?<br><br>How do elements in groups 1,7 and 0 react? What factors affect the rate of reaction?                                     |   | What is the chemical composition of crude oil and how is it separated? How does the burning of fossil fuels cause environmental and physical damage?<br><br>What are the structures of alcohols and carboxylic acids and how they are produced from crude oil? |   |
| Key vocabulary   | Mixtures, filtration, crystallisation, distillation, chromatography, Model, Proton, electron, neutron, Isotope, Periods, shells, groups,   |  | Ionic, Covalent, Metallic, Lattice, Ion, Solubility, Conductivity, Allotrope                          |  | Acid, Alkali, Base, Salt, Neutralisation, Carbonates, Solubility<br><br>Mass number, empirical formula, moles, Avogadro's constant, Conservation         |  | Electrolysis, anode, cathode, anion, cation, smelting, native, reactivity<br><br>Transition, Equilibrium, corrosion, electroplating, alloys   |   | Yield, Atom economy, titration, burette, Haber process, Fuel cell, Equilibria<br><br>Alkali metals, Halogens, Noble gases, electron shielding, catalysts, collisions, exothermic, endothermic                                |   | Crude oil, fractional distillation, Alkane, combustion, carbon monoxide, carbon dioxide, greenhouse effect, climate change, homologous series, cracking<br><br>Alcohol, Ethanol, carboxylic acid, finite, biodegradable  |   |
| The role of reading and comprehension  | <i>Reading practical instructions and being able to follow them</i><br><i>Reading the different scientific models of the atom.</i>   |  | How can carbon exist in so many forms and how does bonding effect the properties of carbon molecules. |  | Reading practical instructions and being able to follow them<br><br>To understand what Avogadro's constant is.   |  | <i>Reading practical instructions and being able to follow them</i><br><br><i>Reading practical instructions and being able to follow them</i>  |   | <i>Reading practical instructions and being able to follow them</i><br><br>To understand what causes a chemical reactions and what factors affect it.<br><i>Reading practical instructions and being able to follow them</i> |   | To summarise how the atmosphere has changed over the past 4 billion years.<br>To describe how long useless alkanes can be turned into short more useful alkanes and alkenes  |   |
| The role of independent extended writing   | <i>To be able to describe the methods for different separation techniques.</i><br>Comparing how the model of the atom has changed over time.   |  | Compare how different molecules of carbon have such different physical and chemical properties.       |  | To be able to predict the products of neutralisation reactions.<br><br>To calculate Empirical formula from practical results.                            |  | To be able to identify and describe the correct extraction method for certain metals.<br><i>To be able to describe the advantages and disadvantages of alloys</i>                       |   | To be able to describing the practical method to carry out a titration.<br><br>To be able to compare how different factors will affect rate of reaction.   |   | To be able to describe how human activity may change the climate in the future.  |   |
| The role of maths/ numeracy  | <i>Interpreting heating and cooling curves and identifying state form melting and boiling point values.</i><br>Using mass and atomic number to work out proton, electron and neutron number. Isotope calculations.                         |  | Use the periodic table to calculate the charge on an ion  |  | Balancing chemical equations<br><br>Calculation of empirical formula, moles and formula mass.  |  | Use the periodic table to calculate the charge on an ion  |   | Percentage yield calculations. Concentration calculations, titration calculations.<br><br>Using energy values to explain if a reaction is endothermic or exothermic. Balancing equations.                                    |   | Balancing chemical equations   |   |

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| Links to careers/ aspirations | <i>engineers, environmental scientists.</i><br>Research chemists.   |  | Chemical engineer, Engineers, Research scientist's, Designers                              |  | Pharmacology   |  | Engineers, Miners, <i>environmental scientists.</i>   |  | Chemical engineer, pharmaceutical manufacturer, Materials Scientists<br><br>Chemical engineer, Research scientist's, Drug manufacturer.   |  | Environmental scientists, sustainability scientists, Engineers<br>Brewers,  |
| Core skills                   | To be able to: describe how different separation techniques are used and select the correct method.<br>To be able to: describe how the model of the atom changed and what the current model is. To describe how the periodic table structure is based on the structure of the atom. |  | To be able to: describe the 3 forms of bonding and their chemical and physical properties. |  | To be able to: predict and write equations for neutralisation reactions.<br><br>To be able to: calculate formula mass, empirical formula and moles |  | To be able to: explain the practical method of electrolysis and explain what method you would use to extract certain metals.<br><br>To be able to: describe dynamic equilibrium, the uses of transition metals and alloys |  | To be able to: describe how to carry out a titration practical and calculation. To be able to calculate yield and what factors affect it. To explain why a battery goes flat.<br><br>To be able to: describe the use and reactivity of elements in groups 1,7 and 0. To describe what causes chemical reactions and what factors affect them. To be able to show if a chemical reaction is endothermic or exothermic. |  | To be able to: describe the structure and separation of crude oil. To explain how combustion of fuels from crude oil can produce both physical and environmental harm. To describe how the atmosphere has changed and will continue to change in the future.<br><br>To be able to: explain how alcohols and carboxylic acids are produced |
| Dept. enrichment activities   |   |  |  |  |  |  |   |  |   |  |   |
| Home learning opportunities   | <a href="https://www.youtube.com/watch?v=eOxZrCAPHok">https://www.youtube.com/watch?v=eOxZrCAPHok</a><br>Purifying water  |  |  |  | <a href="https://www.youtube.com/watch?v=vVOZe3fnoX0">https://www.youtube.com/watch?v=vVOZe3fnoX0</a><br>Neutralisation                            |  |   |  |   |  | <a href="https://www.youtube.com/watch?v=LQWXFcaOGs">https://www.youtube.com/watch?v=LQWXFcaOGs</a><br>What one person can do for climate change.   |

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|  | Term 1  | Term 2  | Term 3           | Term 4           | Term 5           | Term 6   |
|--|---|---|------------------|------------------|------------------|--|
|  | <p>Topic(s):<br/>Heat Changes.<br/>Fuels, Earth and Atmospheric Science</p> <p>Alcohols, Carboxylic acids</p>   | <p>Polymers<br/>Qualitative analysis<br/>Nanoparticles<br/>Revision Paper 1</p>   | Revision paper 2 | Revision paper 1 | Revision paper 2 |  |
| 'Big idea(s)' / fundamental concepts     | <p><i>How is crude oil separated to produce fossil fuels and what are the products and dangers of burning fossil fuels.</i></p> <p>How are alcohols and carboxylic acids produced from crude oil?</p>   | <p><i>How can we identify unknown chemicals? How do we choose the correct material for a specific job?</i></p> <p>How are polymers produced from crude oil?</p>   |                  |                  |                  |  |
| Knowledge to be learnt                   | <p>What is the chemical composition of crude oil and how is it separated? How does the burning of fossil fuels cause environmental and physical damage?</p> <p>What are the structures of alcohols and carboxylic acids and how they are produced from crude oil?</p> | <p>What are the chemical tests for common cation and anions.? How has the development of composites and nanoparticles changed material science?</p>   |                  |                  |                  |  |
| Key vocabulary                           | <p>Crude oil, fractional distillation, Alkane, combustion, carbon monoxide, carbon dioxide, greenhouse effect, climate change, homologous series, cracking</p> <p>Alcohol, Ethanol, carboxylic acid, finite, biodegradable</p>  | <p>Cation, anion, flame test, photometry, composite, nanoparticle. polymers, addition polymerisation, condensation polymerisation</p>   |                  |                  |                  |  |
| The role of reading and comprehension    | <p>To summarise how the atmosphere has changed over the past 4 billion years.<br/>To describe how long useless alkanes can be turned into short more useful alkanes and alkenes</p>   | <p><i>Reading practical instructions and being able to follow them. Comparing properties of different material and identifying uses</i></p> <p>To be able to describe the difference between condensation polymerisation and addition polymerisation.</p> |                  |                  |                  |  |
| The role of independent extended writing | <p>To be able to describe how human activity may change the climate in the future.</p>  | <p>To be able to explain why a specific material has been chosen for a specific job.</p>  |                  |                  |                  |  |
| The role of maths/ numeracy              | <p>Balancing chemical equations</p>   | <p>To be able to state the size of nanoparticles in standard form</p>   |                  |                  |                  |  |
| Links to careers/ aspirations            | <p>Environmental scientists, sustainability scientists, Engineers<br/>Brewers,</p>  | <p>Chemists, Nano scientists, composite chemists. Designers, engineers.</p>   |                  |                  |                  |  |
|  |   |   |                  |                  |                  | Aim of EoY exam  |
|  |   |   |                  |                  |                  | To test to see if students can describe and predict the reactions between acids and alkalis. |

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| Core skills                 | <p>To be able to: describe the structure and separation of crude oil. To explain how combustion of fuels from crude oil can produce both physical and environmental harm. To describe how the atmosphere has changed and will continue to change in the future.</p> <p>To be able to: explain how alcohols and carboxylic acids are produced</p> |  | <p>To be able to identify the composition of an unknown sample through chemical tests.</p> <p>To describe the properties of materials and select the correct material for a specific job.</p> <p>To be able to describe how polymers are produced. To be able to discuss the issues surrounding the disposal of</p> |  |  |  |  |  |  |  |
| Dept. enrichment activities |  |  |   |  |  |  |  |  |  |  |
| Home learning opportunities | <p><a href="https://www.youtube.com/watch?v=LRQWXFCaOGs">https://www.youtube.com/watch?v=LRQWXFCaOGs</a><br/>What one person can do for climate change.</p>  |  | <p><a href="https://www.youtube.com/watch?v=lkYimZBzguw">https://www.youtube.com/watch?v=lkYimZBzguw</a></p>  |  |  |  |  |  |  |  |