

# Curriculum Map

Subject: Chemistry



Year: 9

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p><b>Content</b></p> <p><b>Knowledge</b></p>	<p><b><u>How Science Works Project</u></b></p> <p>Content:</p> <ul style="list-style-type: none"> <li>- Variables</li> <li>- Practical Techniques</li> <li>- Risk Assessments</li> <li>- Method writing.</li> </ul> <p>Knowledge:</p> <ul style="list-style-type: none"> <li>- Understanding the differences between different variables.</li> <li>- Understanding how to carry out a practical safely.</li> <li>- Understand how to write a risk assessment that would keep scientists safe.</li> <li>- Understanding the importance of writing reproducible methods.</li> </ul> <p><b><u>C1 - Atomic Structure</u></b></p> <p>Content:</p> <ul style="list-style-type: none"> <li>- Structure of the Atom</li> <li>- Chemical Equations</li> <li>- Separating Mixtures</li> <li>- Fractional Distillation and Chromatography</li> <li>- History of the Atom</li> <li>- Ions and Isotopes</li> <li>- Electronic Structure</li> </ul> <p>Knowledge:</p> <ul style="list-style-type: none"> <li>- Why atoms have no overall</li> </ul>	<p><b><u>C2 - The periodic Table</u></b></p> <p>Content:</p> <ul style="list-style-type: none"> <li>- Development of periodic Table</li> <li>- Electronic Structures and the Periodic table.</li> <li>- Group 1</li> <li>- Group 7</li> <li>- Transition Elements</li> </ul> <p>Knowledge:</p> <ul style="list-style-type: none"> <li>- How the periodic table developed over time.</li> <li>- How testing a prediction can support or refute new scientific ideas.</li> <li>- How atomic structure is linked to the periodic table.</li> <li>- How elements behave in different groups and how these properties change as we go down the group</li> <li>- The difference between transition</li> </ul>	<p><b><u>C3 - Structure and Bonding</u></b></p> <p>Content:</p> <ul style="list-style-type: none"> <li>- States of Matter</li> <li>- Atoms into Ions</li> <li>- Ionic Bonding and Structures</li> <li>- Covalent Bonding and Structures</li> <li>- Fullerenes and Graphenes</li> <li>- Metallic Bonding</li> <li>- Nanoparticles</li> </ul> <p>Knowledge:</p> <ul style="list-style-type: none"> <li>- Predicting the states of substances at different temperatures</li> <li>- How atoms can form ions</li> <li>- How the different ionic, covalent and metallic bonds are formed</li> <li>- Why different compounds have different melting and boiling points</li> <li>- How fullerenes and graphene originated</li> <li>- Uses of nanoparticles</li> </ul>	<p><b><u>C4 - Chemical Calculations</u></b></p> <p>Content:</p> <ul style="list-style-type: none"> <li>- Relative and molecular mass</li> <li>- Equation calculations</li> <li>- Percentage yield</li> <li>- Atom economy</li> <li>- Concentration</li> <li>- Titrations</li> <li>- Gas Volumes</li> </ul> <p>Knowledge:</p> <ul style="list-style-type: none"> <li>- Calculate the relative atomic mass and formula mass</li> <li>- Calculating moles</li> <li>- How to use balance equations to calculate masses of reactants and products</li> <li>- Calculating percentage yield and knowing what factors affect it</li> <li>- Why atom economy is important in industrial processes</li> <li>- How to</li> </ul>	<p><b><u>C5 - Chemical Changes</u></b></p> <p>Content:</p> <ul style="list-style-type: none"> <li>- Reactivity Series</li> <li>- Displacement reactions</li> <li>- Extracting Metals</li> <li>- Salts from metals and bases</li> <li>- Neutralisation and pH scale</li> <li>- Strong and Weak Acids</li> </ul> <p>Knowledge:</p> <ul style="list-style-type: none"> <li>- Know how some common metals react with water</li> <li>- How to write ionic displacement reactions</li> <li>- Identify which substances have been oxidised or reduced</li> <li>- Predicting products from their reactants</li> <li>- Deducing the formulae of common salts</li> <li>- Recall the different</li> </ul>	<p><b><u>C6 - Electrolysis</u></b></p> <p>Content:</p> <ul style="list-style-type: none"> <li>- What is electrolysis</li> <li>- Extraction of aluminium</li> <li>- Electrolysis of Solutions</li> </ul> <p>Knowledge:</p> <ul style="list-style-type: none"> <li>- Know how electrolysis works</li> <li>- Understand why electrolysis only works with ionic compounds</li> <li>- What happens to ions during electrolysis</li> <li>- How does water affect the products of electrolysis</li> <li>- How to extract aluminium</li> <li>- Products from the electrolysis of brine</li> </ul> <p><b>Required Practical</b></p> <ul style="list-style-type: none"> <li>- Investigating the electrolysis of different solutions</li> </ul>

	<p>charge</p> <ul style="list-style-type: none"> <li>- Understanding the differences between different atoms.</li> <li>- Knowing how to calculate the number of different sub-atomic particles.</li> <li>- Learning how to balance equations</li> <li>- Appreciate how the model of the atom has evolved over time to lead to the modern atom..</li> <li>- Knowing the differences between atoms and ions.</li> <li>- Understanding how to separate different liquids by different methods.</li> </ul>	<p>metals and alkali mtals.</p>		<p>calculate the concentration of solutions</p> <p><b>Required Practical</b></p> <ul style="list-style-type: none"> <li>- Completing a titration to work out the concentration of an unknown solution</li> </ul>	<p>reactions of acids</p> <ul style="list-style-type: none"> <li>- Why chemicals are either acids or alkali</li> <li>- How to identify acids and alkalis</li> <li>- How pH and acid concentration link</li> </ul> <p><b>Required Practicals</b></p> <ul style="list-style-type: none"> <li>- Making Copper Salts</li> <li>- Making a salt from a metal carbonate</li> </ul>	
<p><b>Skills</b></p>	<ul style="list-style-type: none"> <li>• Identifying different variables</li> <li>• Confidence to carry out practicals</li> <li>• Writing risk assessments.</li> <li>• Recording data in a table.</li> <li>• Evaluate the different models of the atoms and why they are replaced over time.</li> <li>• Using SI Units and Standard form</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate the different models of the periodic table.</li> <li>• Linking the properties of different atoms to their position on the periodic table.</li> <li>• Writing balanced equations</li> </ul>	<ul style="list-style-type: none"> <li>• Appreciate the limitations of the particle theory and structure models</li> <li>• Linking of group number to charge number</li> <li>• Identification of different bonding in different elements</li> <li>• Recognition of different compounds from diagrams</li> <li>• Working in the nano dimension</li> <li>• Evaluate the use of nanoparticles and come to a conclusion.</li> </ul>	<ul style="list-style-type: none"> <li>• Using moles = mass x mr confidently</li> <li>• Know what the balanced symbol equation tells about the chemical equation</li> <li>• Rearrange percentage yield calculation</li> <li>• Calculate atom economy confidently</li> <li>• Accurately measure the amount of acid and alkali that react together.</li> <li>• Be able to determine when a reaction is complete</li> </ul>	<ul style="list-style-type: none"> <li>• Deduce reactivity of metals from experimental data</li> <li>• Predict reactions of unfamiliar metals when given information of their reactivity</li> <li>• Identifying which chemicals have been oxidised or reduced in an ionic equation</li> <li>• Evaluate processes used to extract different metals</li> <li>• Predict products from their reactants</li> <li>• Preparing a salt safely from its reactants</li> </ul>	<ul style="list-style-type: none"> <li>• Representing the reactions occurring at each electrode as a half equation</li> <li>• Predicting the products of the electrolysis of aqueous solutions</li> <li>• Recording information from a practical</li> <li>• Identifying the risks and hazards of a practical</li> </ul>

<b>Key Questions</b>	How do different types of atoms differ from each other?  How do Scientists carry out and document research?	Why was the periodic table such a significant science break through?	How do atoms bond to each other?	How can we use chemical equations to predict reacting quantities?	How can we extract metals from their ores?	How can we decompose ionic compounds to get useful products?
<b>Assessment</b>	How Science Works Test C1 Diagnostics Test C1 End of Chapter Test C1 ReAct Tasks	C2 Diagnostic Test C2 End of Chapter Test C2 ReAct Tasks.	C3 Diagnostics Test C3 End of Chapter Test C3 ReAct Task	C4 Diagnostics Test C4 End of Chapter Test C4 ReAct Tasks	C5 Diagnostics Test C5 End of Chapter Test C5 ReAct Tasks	C6 Diagnostics Test C6 End of Chapter Test C6 ReAct Tasks
<b>Literacy/numeracy/SMSC/Character</b>	<p><b>Numeracy:</b></p> <ul style="list-style-type: none"> <li>- Balancing Equations.</li> <li>- Using standard form.</li> <li>- Calculation of number of subatomic particles.</li> </ul> <p><b>Keywords:</b> element, atom, groups, compounds, nucleus, electrons, reactants, products, equations, balanced, state symbols, solutions, aqueous, filtration, distillation, crystallisation, chromatography, atomic number, mass number, proton, neutron, ion, isotope, shells</p> <p><b>SMSC:</b></p> <ul style="list-style-type: none"> <li>- Appreciating how the model of the atom has changed over time.</li> <li>- Working together to complete practicals safely.</li> </ul>	<p><b>Numeracy:</b></p> <ul style="list-style-type: none"> <li>- Balancing equations</li> </ul> <p><b>Keywords</b> - Alkali, pH, universal indicator, halogens, displacement, transition, properties.</p> <p><b>SMSC:</b></p> <ul style="list-style-type: none"> <li>- Understanding why the periodic table came about.</li> <li>- Understanding why the periodic table was a scientific breakthrough..</li> </ul>	<p><b>Numeracy:</b></p> <ul style="list-style-type: none"> <li>- Writing Ionic formulae</li> <li>- Calculating charges on ions</li> <li>- Surface area to volume ratio</li> <li>- Working in nanometers</li> </ul> <p><b>Keywords:</b> solids, liquids, gases, particle theory, covalent, ionic, metallic, bonding, lattice, polymers, intermolecular, delocalised, fullerenes, alloys, nano</p> <p><b>SMSC:</b></p> <ul style="list-style-type: none"> <li>- Should we be using nanoparticles in cosmetics?</li> <li>- How does the world around us work?</li> </ul>	<p><b>Numeracy:</b></p> <ul style="list-style-type: none"> <li>- Rearranging and solving equations</li> <li>- Fractions in equations</li> <li>- Balancing equations</li> <li>- Reading scales</li> <li>- Conversation between units</li> <li>- Recording data</li> </ul> <p><b>Keywords:</b> relative atomic mass, relative formula mass, limiting reagent, percentage yield, moles, concentration, titration, end point, concordant,</p> <p><b>SMSC:</b></p> <ul style="list-style-type: none"> <li>- Working together to collect data from the practical</li> <li>- Sharing results from practicals to ensure</li> </ul>	<p><b>Numeracy:</b></p> <ul style="list-style-type: none"> <li>- Balancing equations</li> <li>- Measuring and weight salts</li> <li>- Relating pH value to H<sup>+</sup> concentrations</li> </ul> <p><b>Keywords:</b> ores, oxidised, reduced, reactivity series, displacement, ionic, electrolysis, neutralisation, alkalis, bases, neutral, pH scale, strong acids, weak acids</p> <p><b>SMSC:</b></p> <ul style="list-style-type: none"> <li>- Will mining the metal ore impact our environment?</li> <li>- How could we extract metals sustainably?</li> <li>- Working together to complete the</li> </ul>	<p><b>Numeracy:</b></p> <ul style="list-style-type: none"> <li>- Balancing Equations</li> <li>- Recording data in a table.</li> </ul> <p><b>Keywords:</b> electrolyte, anode, cathode, inert, brine</p> <p><b>SMSC:</b></p> <ul style="list-style-type: none"> <li>- Is electrolysis the most environmentally friendly way to extract aluminium?</li> <li>- Working together to collect data</li> </ul>

				reliability - How could we sustainably produce chemicals to sell?	practical safely.	
<b>Enrichment opportunities and futures</b>	STEM Club Visiting Science Museum - There is a specific section for Chemistry on their website Watching the Royal Institute Lectures on Youtube Visiting the Summer Fayre at the Royal Society of Chemistry Research the link between Chemistry and Food. How can we use Chemistry to make different sweets?					