



Chemistry Scheme of Learning

Year 9 – Term 3 – C4: Chemical Changes

Intent – Rationale

A largely experimental unit, this topic allows students carry out a wide variety of practical experiments to determine properties of different chemicals, e.g. reactivity, and then challenges students to use this information to predict behaviour in other chemical reactions. Students are introduced to general equations that describe a type of reaction and learn to form more specific equations based on these. Through use of equations students develop their ability to use common chemical notation, e.g. state symbols, charges on ionic compounds, as well as naming conventions for chemicals such as salts and acids.

Students learn to recognise different types of equations based on the chemicals taking part and the methods they can use to check, e.g. testing for specific gases. Students practice determining which species has been oxidised and which reduced in redox reactions, and can challenge themselves to write ionic equations to show electron transfer between species.

<p><b>Sequencing – what prior learning does this topic build upon?</b></p> <ul style="list-style-type: none"> <li>Year 7 Topic 2 Atoms and Elements.</li> <li>Year 7 Topic 5 Simple chemical reactions</li> <li>Year 7 Topic 6 Compounds</li> <li>Year 8 Topic 7 Periodic Table</li> <li>Year 8 Topic 9 Reactions of Acids</li> <li>Topic 1 Atomic structure and the Periodic Table</li> </ul>	<p><b>Sequencing – what subsequent learning does this topic feed into?</b></p> <ul style="list-style-type: none"> <li>Topic 2 Structure and bonding</li> <li>Topic 4 Electrolysis</li> <li>Topic 6 Rates and extents of reactions</li> <li>Topic 7 Crude oil</li> <li>Topic 8 Chemical analysis</li> <li>Topic 10 Using resources</li> </ul>
<p><b>What are the links with other subjects in the curriculum?</b></p> <ul style="list-style-type: none"> <li>Base the content here on what you already know but there will be time in future to liaise further as part of our collaborative work</li> </ul>	<p><b>What are the links to SMSC, British Values and Careers?</b></p> <ul style="list-style-type: none"> <li>Use the help guides to complete this section</li> </ul>
<p><b>What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?</b></p>	<p><b>What are the opportunities for developing mathematical skills?</b></p>
<p>FROM THE LIBRARY  <i>The Elements</i>; Dan green-546  <i>Periodic Table</i>; Brian Knapp-546  <i>Chemistry in a Social and Historical Context</i>; D. Warren-540  <i>Elephants on Acid and Other Bizarre Experiments</i>; Alex Boese-500  <i>Chemicals in Action-Acids and Bases</i>; Chris Oxlade-546  <i>Chemicals in Action-ATOMS</i>; Chris Oxlade-541.24  <i>Chemicals in Action-Materials Changes and Reactions</i>- 541.39</p>	<ul style="list-style-type: none"> <li>Balancing chemical equations</li> </ul>



## Chemistry Scheme of Learning

### Year 9 – Term 3

#### Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?		
<b><u>Know</u></b>		
<ul style="list-style-type: none"> <li>• Know that acids react with some metals to produce salts and hydrogen.</li> <li>• Know that acids are neutralised by alkalis and bases to produce salts and water.</li> <li>• Know that the particular salt produced in any reaction between an acid and a base or alkali depends on the acid.</li> <li>• Know that the particular salt produced in any reaction between an acid and a base or alkali depends on the positive ions in the base, alkali or carbonate.</li> <li>• Know that acids are neutralised by metal carbonates to produce salts, water and carbon dioxide.</li> <li>• Know that soluble salts can be made from reacting them with solid insoluble substances, such as metals, metal oxides, hydroxides, and carbonates.</li> <li>• Know that a solid must be added to acid until no more reacts and the excess solid filtered off to produce a solution of the salt.</li> <li>• Know that salt solutions can be crystallised to produce a solid salt.</li> </ul>		
<b><u>Apply</u></b>		
<ul style="list-style-type: none"> <li>• Explain, in terms of loss or gain of electrons, that metal-acid reactions are redox reactions.</li> <li>• Deduce the formulae of salts using the formulae of common ions.</li> <li>• Understand and use the terms alkali, base, and acid correctly.</li> <li>• Describe how to make pure, dry samples of named soluble salts from information provided.</li> </ul>		
<b><u>Extend</u></b>		
<ul style="list-style-type: none"> <li>• Identify which species has been oxidised and which has been reduced in given chemical equations.</li> </ul>		
What subject specific language will be used and developed in this topic?		What opportunities are available for assessing the progress of students?
<b>Oxidation</b>	Loss of electrons/ gain of oxygen	<ul style="list-style-type: none"> <li>• Be as specific as possible here. What will be assessed.?</li> </ul>
<b>Reduction</b>	Gain of electrons/ loss of oxygen	
<b>Reactivity series</b>	List of elements in order of their reactivity	
<b>Ion</b>	An atom that has gained or lost an electron to form a charged particle	
<b>Cation</b>	A positively charged ion	
<b>Anion</b>	A negatively charged ion	



<b>Half equation</b>	An equation that describes oxidation or reduction by showing the movement of electrons.
<b>Salt</b>	A compound formed when the hydrogen in an acid is replaced by a metal
<b>Neutralisation</b>	The chemical reaction of an acid with a base in which salt and water are formed. If the base is a carbonate CO <sub>2</sub> is also produced
<b>Soluble</b>	Can dissolve
<b>Filtration</b>	A method of separating mixtures which separates solids from liquids/solutions
<b>Filtrate</b>	The liquid/solution collected after removing the solid
<b>Crystallisation</b>	Forming solid crystals from a salt solution.
<b>Acids</b>	When dissolved in water the solution has a pH below 7. They are H <sup>+</sup> donors
<b>Alkalis</b>	A solution that has a pH above 7
<b>Ph</b>	A number that tells you how acidic or alkaline a solution is. It tells you the concentration of H <sup>+</sup> in a solution
<b>Titration</b>	A method for measuring the volumes of two solutions reacting together
<b>Ionised</b>	When an ionic compound separates into separate ions in solution
<b>Strong Acid</b>	An acid which fully ionises in a solution, producing many H <sup>+</sup>
<b>Weak Acid</b>	An acid which partially ionises in a solution, not producing many H <sup>+</sup>
<b>Concentration</b>	The amount of particles in a solution compared to the volume of water



## Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
Revision (Term 2)			
Summative test			
Topic 4 Lesson 5a – Acids and metals (practical)	Can I recall that acids react with some metals for produce salts and hydrogen?	Can I identify which species has been oxidised and which has been reduced in given chemical equations?	
Topic 4 Lesson 5b – Acids and metals	Can I explain, in terms of loss or gain or electrons, that these are redox reactions?		
Topic 4 Lesson 6a – Acids and metal compounds (practical)	Can I recall that acids are neutralised by alkalis and bases to produce salts and water?	Can I use the formulae of common ions to deduce the formulae of salts?	
Topic 4 Lesson 6b – Acids and metal compounds	Can I recall that the particular salt produced in any reaction between an acid and a base or alkali depends on the acid?  Can I recall that the particular salt produced in any reaction between an acid and a base or alkali depends on the positive ions in the base, alkali or carbonate?		
Topic 4 Lesson 7a – Acids and metal carbonates (practical)	Can I recall that acids are neutralised by metal carbonates to produce salts, water and carbon dioxide	Can I use the formulae of common ions to deduce the formulae of salts?	
Topic 4 Lesson 7b – Acids and metal carbonates	Can I recall that the particular salt produces in any reaction between an acid and a base or alkali depends on the positive ions in the base, alkali or carbonate?		
Topic 4 Lesson 8 Preparing a soluble salt	Can I recall that soluble salts can be made from acids by reacting them with solid insoluble substances, such as metals, metal oxides, hydroxides, or carbonates?  Can I recall that a solid must be added to the acid until no more reacts and the excess solid is filtered off to produce a solution of the salt?	Can I recall that salt solutions can be crystallised to produce a solid salt?  Can I describe how to make pure, dry samples of named soluble salts from information provided?	