

# Scheme of Learning: Chemical Changes

## Topic Sequence:

1	2	3	4	5	6	7	8	9	10	11
Organisation	Electric Circuits	Chemical Changes	Mains Electricity	Quantitative Chemistry	Using Resources	Electro-Magnetism	Homeostasis & Response	Energy Changes	Ecology	Waves

## Topic Overview:

Understanding of chemical changes began when people began experimenting with chemical reactions in a systematic way and organizing their results logically. Knowing about these different chemical changes meant that scientists could begin to predict exactly what new substances would be formed and use this knowledge to develop a wide range of different materials and processes. It also helped biochemists to understand the complex reactions that take place in living organisms. The extraction of important resources from the earth makes use of the way that some elements and compounds react with each other and how easily they can be 'pulled apart'.

## Lesson Sequence:

We begin with a recap of what metals are and how they react with oxygen. Reduction and oxidation are explained only in terms of loss or gain of oxygen. We then place metals into the reactivity series using their reactions with water and acid. This leads onto how metals can be extracted from ores using reduction with carbon and then into displacement reactions. This forms the basis of a series of lessons on salt. Pupils need to know that salts can be made by reacting acid with metal, metal carbonates, metal oxide and metal hydroxides. We leave the metal hydroxides until we have introduced the pH scale and neutralisation. The second half of this topic is on electrolysis. Students must understand electrolysis of molten and aqueous solutions and higher tier students must learn ionic and half equations. The focus skill for this topic is 'explain'.

## Sequence of Lessons:

1	Metals & Oxygen
2	The Reactivity Series
3	Extracting Metals
4	Displacement Reactions
5	Acid + Metal Carbonates ( <i>required practical</i> )
6	Acid + Metal Oxides ( <i>required practical</i> )
7	Making Salts – <i>Mid topic assessment 1</i>
8	Neutralisation & pH Scale
9	Titration ( <i>required practical TRIPLE ONLY</i> )
10	Introduction to Electrolysis
11	Electrolysis of Aqueous Solutions - <i>Mid topic assessment 2</i>
12	The Extraction of Aluminium
13	Revision
14	Test

## Resources:

1	Demo: strip of Mg, Cu, Fe and Zn
2	Demo: alkali metals, UI, trough & lid, scalpel and white tile. Class set: dimple trays, 1M HCl, Fe, Mg, Zn, Cu
3	Class set: crucibles & lids, clay triangles, copper oxide, charcoal.
4	Mg, Zn, Fe, Cu and their sulphate solutions. Dimple trays
5	1M sulphuric acid, magnesium carbonate
6	1M Sulphuric acid, copper oxide
7	n/a
8	HCl, NaOH, universal indicator
9	Burettes, sodium hydroxide, hydrochloric acid, phenolphthalein indicator
10	NaCl solution, powerpacks, leads, electrodes
11	n/a
12	n/a
13	n/a
14	Test in shared area folder

## Supportive Reading:

<b>Literacy task</b>	The mid topic assessments provide an opportunity for feedback on longer written answers.
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## Assessment:

<b>Knowledge:</b>	Multiple choice and short answer questions.
<b>Application of Knowledge:</b>	Exam questions based on the skill of 'explain'.