
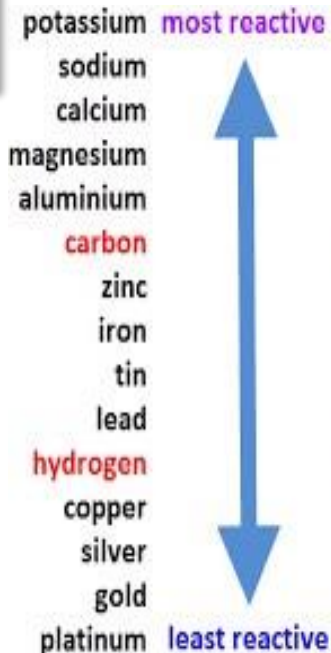


**AQA C4a Chemical Changes: Metal & Acid Reactions**  
**COMBINED FOUNDATION**  
**RP – Making salts**

**Reactivity Series**

<b>metals form positive ions when they react</b>	The reactivity of a metal is related to how easily it forms positive ions	The reactivity series arranges metals in order of their reactivity
<b>carbon and hydrogen</b>	Carbon and hydrogen are non-metals but included in the reactivity series	These 2 non-metals are included as they can be used to extract some metals from their ores, depending on their reactivity
<b>displacement</b>	A more reactive metal can displace a less reactive metal from a compound	silver nitrate + sodium  sodium nitrate + silver



	Reaction with water	Reaction with dilute acid	Extraction Method
potassium	bubbles, gives off hydrogen and leaves an alkaline solution	explode	electrolysis
sodium			
lithium			
calcium			
magnesium	very slow reaction	bubbles, gives off hydrogen and forms a salt	reduction (removal of oxygen) with carbon
aluminium			
zinc			
iron	slight reaction with steam	slow reaction with warm acid	found as native metal
tin			
lead	no reaction	no reaction	
copper			
silver			
gold			

**Neutralisation of Acids**

<b>neutralisation</b>	Acids can be neutralised by bases	A <b>base</b> is a substance that neutralises an acid e.g. a metal carbonate, metal oxide. or soluble metal hydroxide, An <b>alkali</b> is a soluble base e.g. a metal hydroxide.
<b>acid + base → metal salt + water</b>		

Acids react with some metals to produce salts and hydrogen.

**Reactions of Acids**

<b>acid + metal → metal salt + hydrogen</b> sulfuric acid + iron → iron sulfate + hydrogen
<b>acid + metal oxide → metal salt + water</b> sulfuric acid + iron oxide → iron sulfate + water
<b>acid + metal hydroxide → metal salt + water</b> sulfuric acid + iron hydroxide → iron sulfate + water
<b>acid + metal carbonate → metal salt + water + carbon dioxide</b> sulfuric acid + iron carbonate → iron sulfate + water + carbon dioxide

**Oxidation, Reduction and Metal Oxides**

<b>metals and oxygen</b>	Metals react with oxygen to form metal oxides	<b>magnesium + oxygen → magnesium oxide</b> <b>2Mg + O<sub>2</sub> → 2MgO</b>
<b>reduction</b>	When oxygen is removed during a reaction	e.g. metal oxides reacting with hydrogen, extracting low reactivity metals
<b>oxidation</b>	When oxygen is gained during a reaction	e.g. metals reacting with oxygen, carbon during extraction of some metals from their ores

**Metal Salt Production**

acid name	salt name
hydrochloric acid	chloride
sulfuric acid	sulfate
nitric acid	nitrate