

Chemistry – Year 9 – Chemical Changes (FOUNDATION)

A		Reactivity of metals
1	Metal oxides	<ul style="list-style-type: none"> Metals react with oxygen to produce metal oxides. Gain oxygen – oxidation reaction Remove oxygen – reduction reaction
2	The reactivity series	<ul style="list-style-type: none"> Metals are listed in order of their reactivity, A more reactive metal will displace a less reactive metal from its compound.
3	Metal extraction	<ul style="list-style-type: none"> Some very unreactive metals such as gold are found as the pure element. Most metal ores contain metal oxides, which contain enough of it to make it economical to extract the metal. Metals below carbon in the reactivity series are extracted by heating the ore with carbon. It is used because it is cheap and plentiful. Metals that are more reactive than carbon are extracted by electrolysis/displacement, this requires a lot of energy and is expensive.
4	Extraction Methods	<ul style="list-style-type: none"> Reduction – uses carbon e.g. extracting iron Electrolysis – uses electricity e.g. Aluminium Displacement – uses more reactive metals e.g. scrap iron added to copper sulphate solution

B		Reactivity of acids
1	Making Salts	<ul style="list-style-type: none"> Acid + metals/bases make a salt Hydrochloric acid makes metal chloride Sulphuric acid makes metal sulphate Nitric acid makes metal nitrate The pure salt can be obtained by; <ul style="list-style-type: none"> - filtration to remove any unreacted solids - evaporation to remove any water
2	Acids and Bases	<ul style="list-style-type: none"> Neutralisation reaction – acid + alkali ($H^+ + OH^- \rightarrow H_2O$) Alkali – soluble base Indicators change colour when pH changes. pH 1 – strong acid (red), pH 7 – neutral (green), pH 14 – strong alkali (purple)

C		Important Equations
1	Metal + oxygen → metal oxide e.g. sodium + oxygen → sodium oxide	
2	Metal + water → metal hydroxide + hydrogen e.g. sodium + water → sodium hydroxide + hydrogen	
3	Metal + acid → salt + hydrogen e.g. sodium + hydrochloric acid → sodium chloride + hydrogen	
4	Metal carbonate + acid → salt + water + carbon dioxide e.g. sodium carbonate + nitric acid → sodium nitrate + water + carbon dioxide	
5	Displacement reaction e.g. Iron + copper sulphate → iron sulphate + copper	
6	Acid + alkali → salt + water e.g. sodium hydroxide + hydrochloric acid → sodium chloride + water	