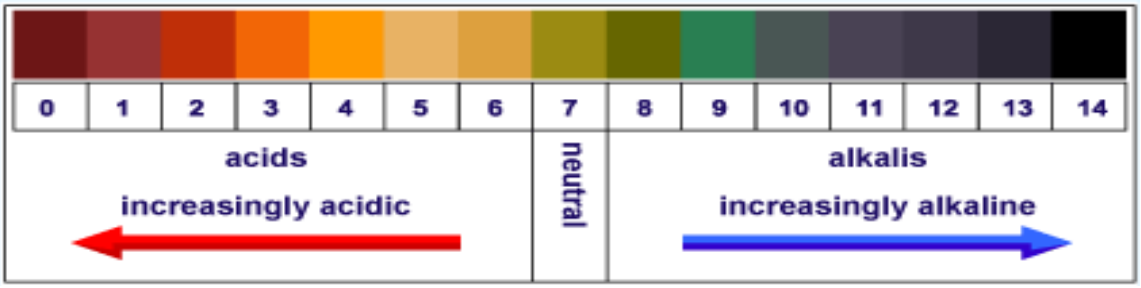
Acids and Alkalis



Pure water is neutral on the pH scale

When we dissolve a substance we make an **aqueous substance**

The **(aq)** symbol shows that the ions are in an **aqueous solution.**

This solution could be acidic, alkaline or neutral – depending on what chemical has been dissolved.

Bases can neutralise **acids.**

Alkalis are bases which dissolve in water. (i.e. they are soluble bases)

All acids form H^+ ions when we add them to water – it is the **hydrogen which makes solutions acidic.**

Bases are the opposite of acids, in the way they react.

All bases form hydroxide ions (OH^-) when we add them to water. It is the hydroxide ions which make a solution alkaline

<u>Indicators</u> change colour when we add them to a solution, we then use the pH scale to measure the acidity or alkaline (see above)
A H^+ ion is hydrogen which has lost an electron (proton) so we can call an acid **a proton donor.**

Acids and Alkalis

Some examples of acids, alkalis and neutral substances

Acid	Neutral	Alkali
Sulphuric Acid	Water	Sodium Hydroxide
Citric Acid	Alcohol	Potassium Hydroxide
Hydrochloric Acid		Ammonia
Nitric Acid		
Carbonic Acid		

Making Salts

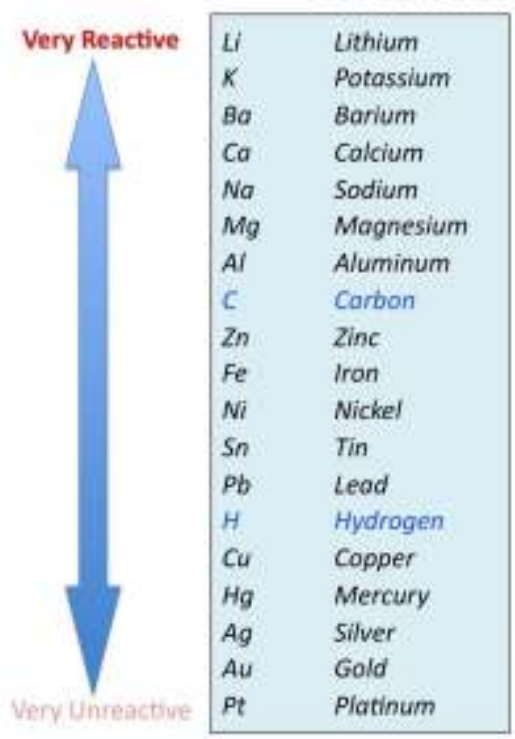
From metal and acid

We can make salts by reacting acids with metals

- This only works if the metal is above hydrogen in the reactivity series

- When the acid reacts with a more reactive metal, hydrogen gas is produced along with a salt.

Metal + Acid → Salt + Hydrogen



From acid and bases

When we react an acid with a base we produce a solution which consists of a salt and water. This type of salt is soluble.

Acid + Alkali → Salt + Water

When an acid reacts with an alkali **neutralisation** takes place
During neutralisation H^+ ions react with OH^- ions to form water
When we react acids and alkalis we need to know they've completely reacted – **indicator paper, pH probe**

Making Salts

From solutions – precipitate reaction

We can sometimes make salts by combining **two solutions.**

This makes an **insoluble salt**, which is called a **precipitation reaction** because the insoluble solid is called a **precipitate.**

Silver nitrate and sodium chloride are both soluble. When you mix their solutions together, you make soluble sodium nitrate and insoluble silver chloride:

silver nitrate + sodium chloride → sodium nitrate + silver chloride

$AgNO_3(aq) + NaCl(aq) \rightarrow NaNO_3(aq) + AgCl(s)$

The silver chloride appears as tiny particles suspended in the reaction mixture - it forms a precipitate. The precipitate can be filtered, washed with water on the filter paper, and then dried in an oven.

Method for acid + alkali

1. The alkali is measured out using a pipette, indicator is added, and enough acid is added from a burette to just change the colour of the indicator (Titration)
2. The volumes of acid and alkali used are noted, and the experiment is repeated using the same volumes, but no indicator.
3. The solution is evaporated to leave the salt

Method for acid + insoluble base

1. Some acid is measured into a beaker and warmed.
2. The base (or carbonate or metal) is added a little at a time until no more will dissolve.
3. The solution is filtered to remove any unreacted material, and the filtrate is left to evaporate, leaving the pure salt.

Method for acid + insoluble base

1. We find solutions which contain the two halves of the salt.
2. These solutions are mixed and form a precipitate, which can then be filtered off.
3. The precipitate is washed and dried

e.g. to make silver chloride, we mix solutions of silver nitrate and sodium chloride.