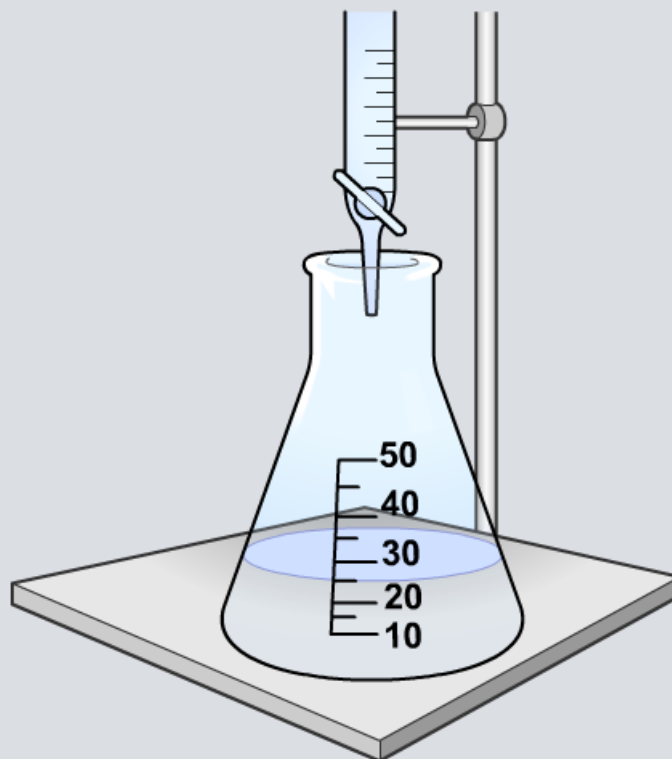


Neutralization



What are acids?

Acids are substances that:

- have a pH below 7 and turn universal indicator yellow, orange or red
- turn litmus red
- form solutions containing hydrogen ions (H^+).

Hydrochloric acid is a strong acid.

Ethanoic acid (vinegar) is a weak acid.



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What are alkalis?

Alkalis are substances that:

- have a pH above 7 and turn universal indicator blue or purple
- turn litmus blue
- can neutralize acids
- form solutions containing hydroxide ions (**OH⁻**).

Sodium hydroxide is a strong alkali.

Ammonia is a weak alkali.

When ammonia is dissolved in water, it forms ammonium hydroxide (NH_4OH), a fertilizer.

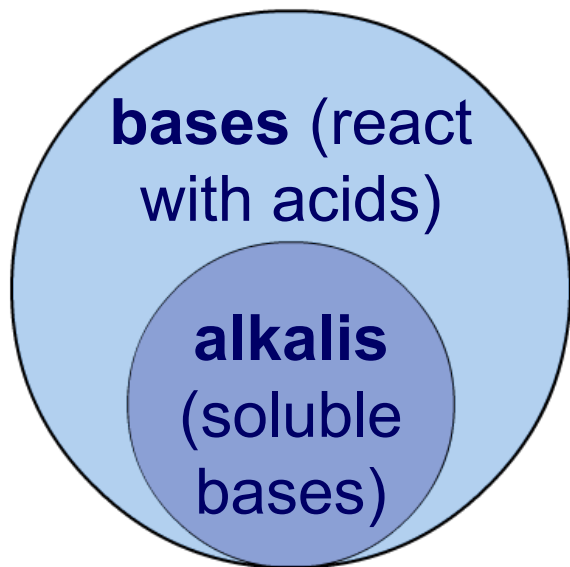


What are bases?

All alkalis are **bases**. Bases are substances that react with acids by absorbing hydrogen ions (H^+).

The oxides, hydroxides and carbonates of metals, such as sodium hydroxide, are bases.

Ammonia is a base that does not contain a metal.



Some bases are soluble in water – these are called **alkalis**.

All alkalis contain hydroxide ions (OH^-). The more OH^- ions in the solution, the stronger the alkali.

Acids and bases – true or false?



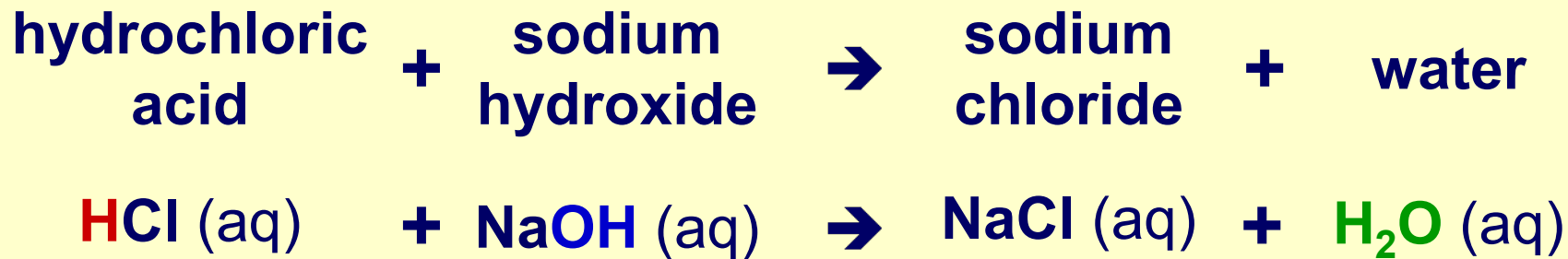
Making salts: acid + alkali

When an acid reacts with an alkali, the products are a **salt** and **water**.



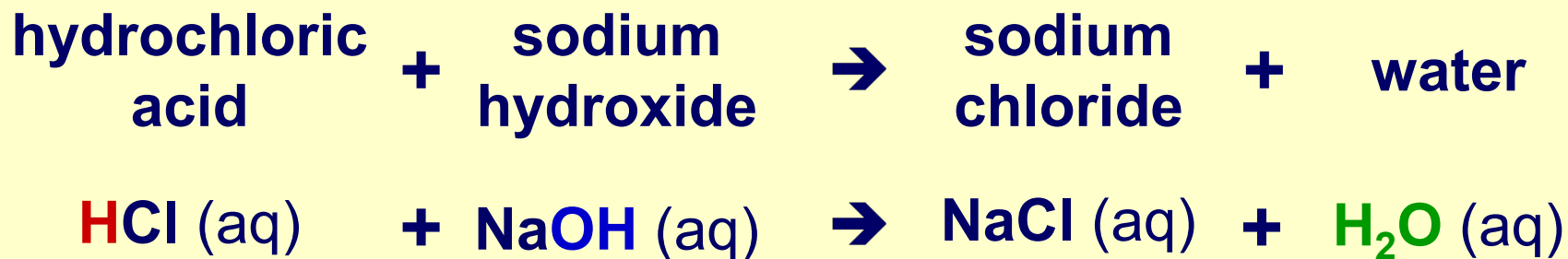
Water is formed because **OH⁻** ions from the alkali react with **H⁺** ions from the acid to produce molecules of water (**H₂O**).

For example:



When is the reaction complete?

The reaction between sodium hydroxide and hydrochloric acid produces sodium chloride, which is soluble in water.



There is no obvious sign when this reaction is complete, so an indicator is used to show when the solution is **neutral**.

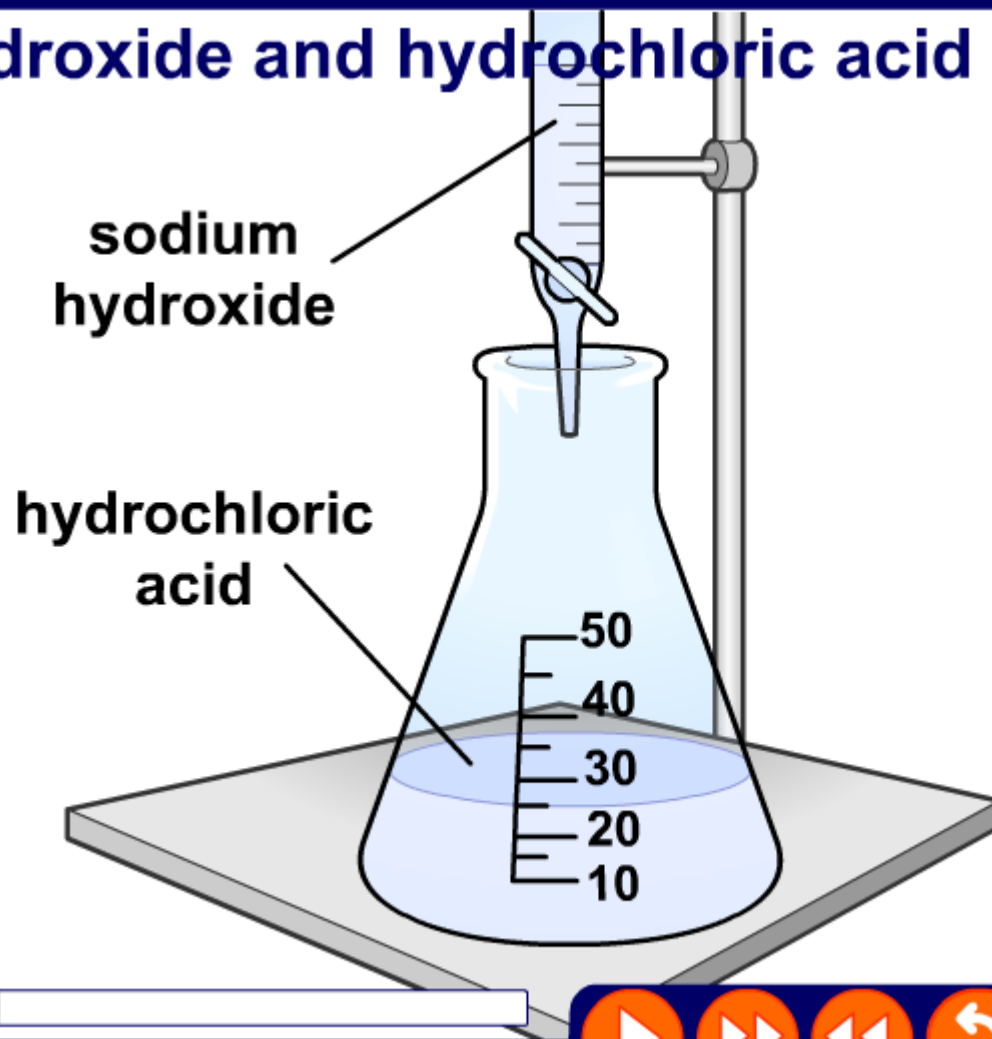
This process is called **titration**.



Titrating sodium hydroxide and hydrochloric acid

Titration is used to find the concentration of a solute in a solution. Titrations can also indicate when an otherwise undetectable reaction is complete.

Click "**play**" to find out more.



Complete the neutralization reaction



What is missing from each neutralization equation?

Reaction 1/5



NaCl

sodium peroxide

sodium hydroxide

NaHCl



solve

