



Box 1: Keywords

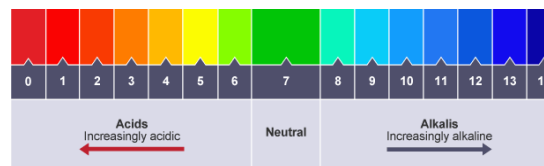
Word	Definition
Acids	Substances which dissolve in water to form solutions with a pH of less than 7.
Alkalis	Substances which dissolve in water to form solutions with a pH of more than 7.
pH scale	A measure of the acidity or alkalinity of a solution.
Neutralisation	Acid-alkali neutralisation is the reaction between hydrogen ions and hydroxide ions to produce water
Ionise	When a molecule splits up into ions
Weak acid	An acid where only a small proportion of molecules ionise when dissolved in water.
Strong acid	An acid where all the molecules ionise when dissolved in water
Concentrated	Contains a relatively large amount of dissolved solute
Dilute	Contains a small amount of dissolved solute

Box 2: Key skills

- Use appropriate apparatus and techniques to measure pH
- Use and explain terms dilute/concentrated and weak/strong in relation to acids (HT only)

Box 3: The pH Scale

The pH scale from 0-14 is a measure of acidity or alkalinity of a solution



It can be measured with universal indicator or a pH probe

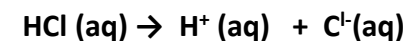
Box 4: Acids, Alkalis and neutralisation

Acids are substances which dissolve in water to form solutions with a pH of less than 7.

Common laboratory acids

Hydrochloric acid	HCl (aq)
Sulphuric acid	H ₂ SO ₄ (aq)
Nitric acid	HNO ₃ (aq)

Acids release hydrogen ions (H⁺) when they form aqueous solutions.



Alkalis are substances which dissolve in water to form solutions with a pH of more than 7.

Common laboratory alkalis

Sodium hydroxide	NaOH(aq)
Potassium hydroxide	KOH(aq)
Calcium hydroxide	Ca(OH) ₂ (aq)

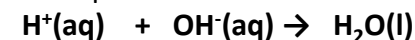
Alkalis release hydroxide ions (OH⁻) when they form aqueous solutions.



Neutralisation reactions between acids and alkalis produce a salt and water



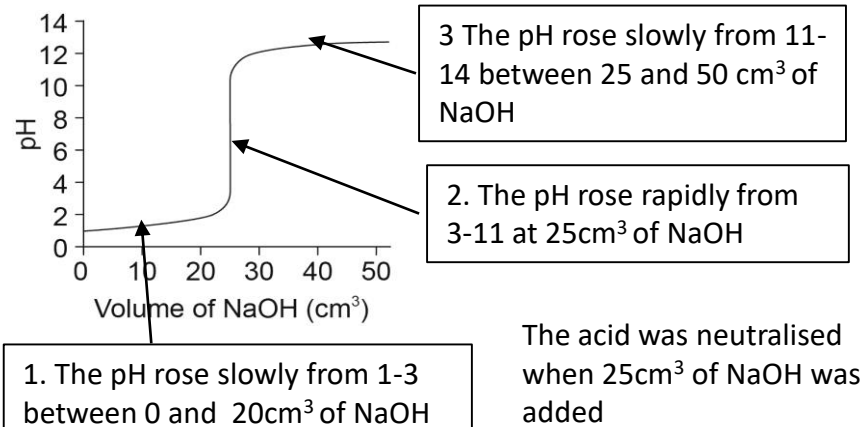
In all neutralisation reactions between an acid and an alkali, hydrogen ions react with hydroxide ions to produce water



Box 4: pH Curves

A graph which shows how the pH changes during a neutralisation reaction between an acid and an alkali

pH Curve for adding 50cm³ NaOH to 25cm³ HCl



Box 6: Pathway

Previous knowledge: KS3 Acids, Alkalis and Neutralisation, KS4 Acids, bases and salts and structure and bonding

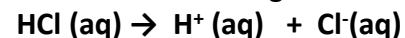
Future links: A Level Chemistry; Acids, bases and Buffers, Environmental science

Careers: Environmental scientist, pharmacist, agricultural scientist, quality control officer

Box 7: Cross curricular links

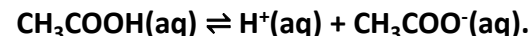
Box 5: Strong and weak acids (HT only)

A strong acid is completely ionised in aqueous solution. For example, Hydrochloric acid is a strong acid.



Nitric acid and sulfuric acid are also strong acids.

A weak acid is only partially ionised in aqueous solution. Ethanoic acid (the acid in vinegar) is a weak acid.



The $\rightleftharpoons$ symbol is used in the equation to show that the reaction is a **reversible reaction** and does not go to completion.

pH and hydrogen ion concentration

The **pH** of a solution is a measure of its concentration of hydrogen ions:

- the higher the concentration of H⁺ ions in an acidic solution, the lower the pH and the stronger the acid
- the lower the concentration of H⁺ ions in an acidic solution, the higher the pH and the weaker the acid

As the pH decreases by one unit, the hydrogen ion concentration of the solution increases by a factor of 10.

Acid concentration is a measure of how many acid particles there are in a certain volume (whether ionised or not).

