C1 Chapter 4: Acids and alkalis

Knowledge organiser

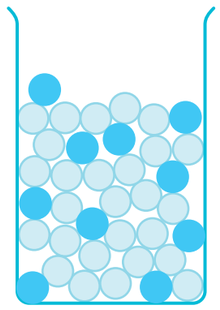
Acids and alkalis

Acids and **alkalis** are special solutions which are chemical opposites to each other.

If a solution is exactly between acid and alkaline it is **neutral**.

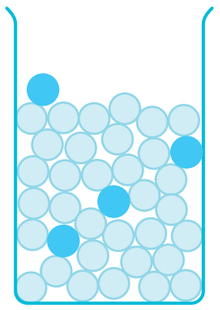
Acids and alkalis can be:

concentrated



Lots of acid/alkali particles in a small amount of water

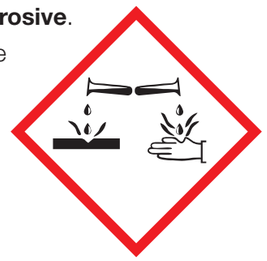
dilute



A small number of acid/alkali particles in a lot of water.

Some acids and alkalis are **corrosive**.

This means that they can cause burns if they get on your skin.



Acids and alkalis can be extremely dangerous, depending on the type of acid/alkali and its concentration.

As a general rule the more concentrated the solution, the more dangerous it can be.

Indicators

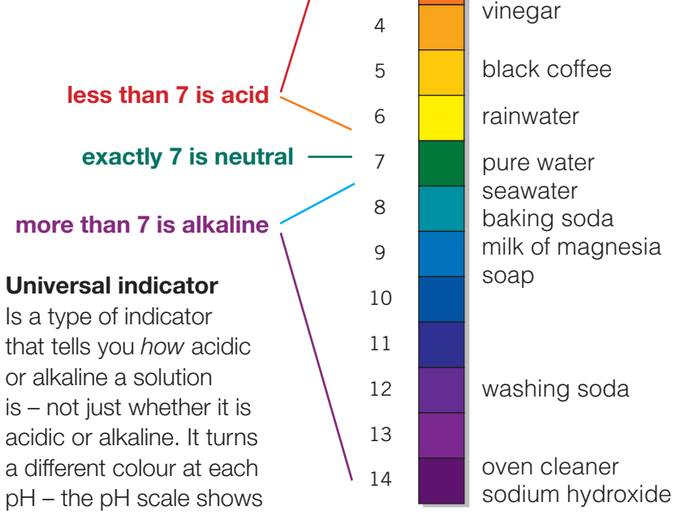
If you want to know if something is an acid or alkali, you need to use an **indicator.** Indicators contain a dye that turns different colours in acidic and alkaline solutions.

Litmus paper is a type of indicator. It can be either **red** paper or **blue** paper.

In acid – **blue** paper turns **red**

In alkali – **red** paper turns **blue**.

The **pH scale** measures how acidic or alkaline something is.



Universal indicator
Is a type of indicator that tells you *how* acidic or alkaline a solution is – not just whether it is acidic or alkaline. It turns a different colour at each pH – the pH scale shows the colours of universal indicator in solutions of different pH.

Reactions with acids

When an acid reacts with a metal element or compound a **salt** is formed.
The hydrogen atoms of the acid are replaced with atoms of the metal element.

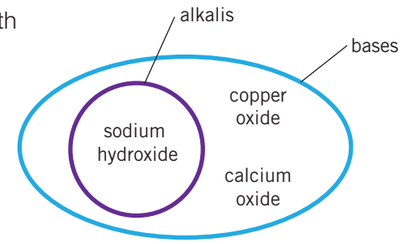
$$Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$$

zinc + sulfuric acid → zinc sulfate + hydrogen

A **base** is a compound that can react with an acid to make a **neutral** solution.

This is called **neutralisation**.

Bases that are soluble in water are alkalis.



Neutralisation reactions produce water and a salt.

base + acid → salt + water

for example,

sodium hydroxide + hydrochloric acid → sodium chloride + water

copper oxide + sulfuric acid → copper sulfate + water

Metals can also react with acids, but they produce a salt and hydrogen gas.

for example,

magnesium + hydrochloric acid → magnesium chloride + hydrogen

Naming salts

The name of the metal comes first, e.g., **magnesium** chloride.

Different acids produce different types of salt:

- hydrochloric acid produces metal **chlorides**
- sulfuric acid produces metal **sulfates**
- nitric acid produces metal **nitrates**

Key Words

Make sure you can write a definition for these key terms.

acid *alkali* *base* *concentrated* *corrosive* *dilute* *indicator* *litmus* *neutral* *neutralisation* *pH scale* *salt* *universal indicator*