C1: Acids and alkalis

Knowledge organiser

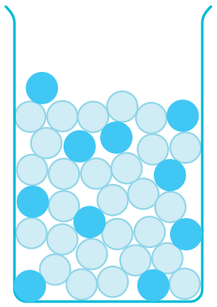
Acids and alkalis

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

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

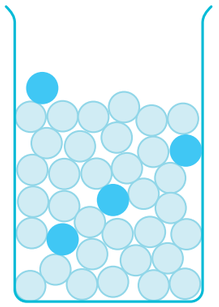
Acids and alkalis can be:

concentrated



Lots of acid/alkali particles for the amount of water.

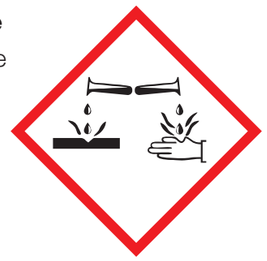
dilute



A small number of acid/alkali particles in the same amount of water.

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.

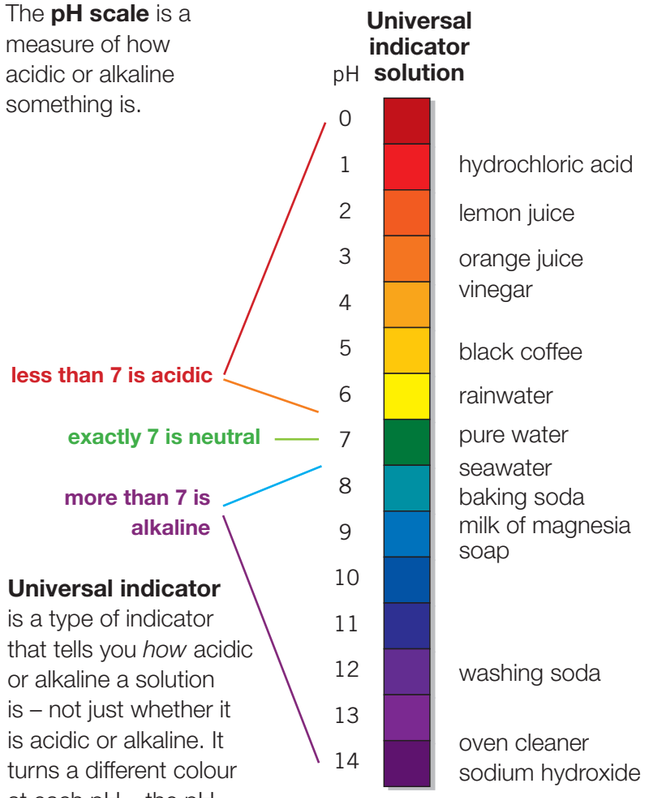
Indicators

If you want to know if something is acidic or alkaline, 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 **pink** paper or **blue** paper.

- in acid – **blue** paper turns **pink**
- in alkali – **pink** paper turns **blue**

The **pH scale** is a measure of 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.

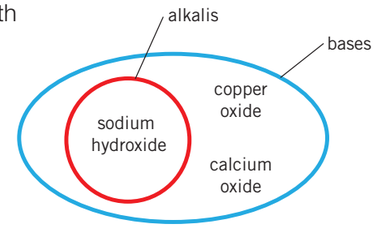
$$Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$$

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.

acid + base → 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, for example, **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 terms

Make sure you can write definitions for these key terms.

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