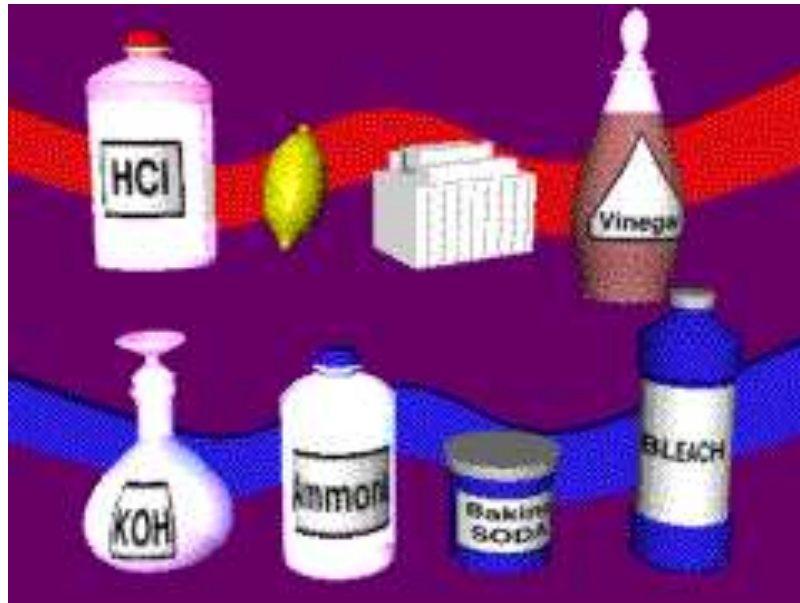


# Acids and Alkalis

# Acids and alkalis

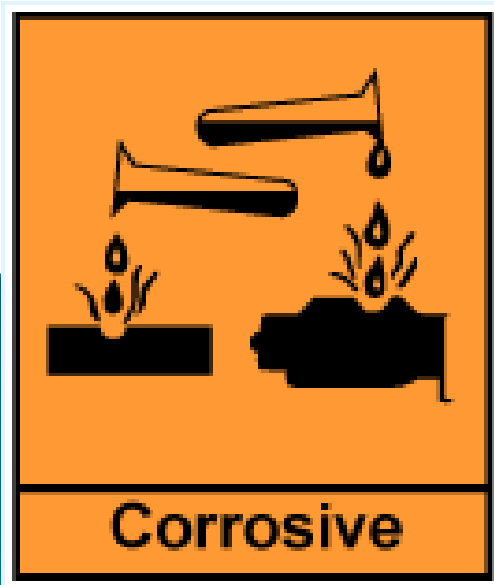
When a substance dissolves in water it makes a solution.



Solutions can be sorted by whether they are: **acid**, **alkali** or **neutral**.

When the **oxide**  
of some **non-metals**  
dissolve in **water**  
they make an **acid**.

Non-Metal  
↓  
+ Oxygen  
↓  
Oxide  
↓  
+Water  
↓  
Acid



Acids have a **sour taste**.  
They are **corrosive**.

# Acids react with metals and carbonates.



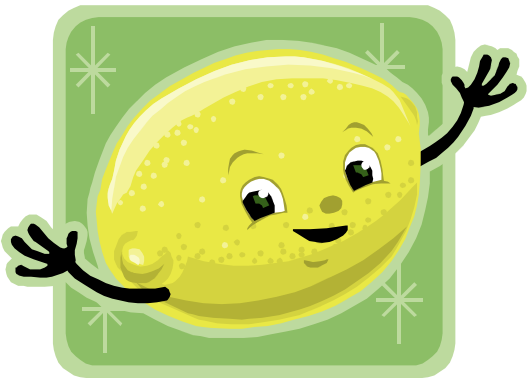
Metal + Acid  $\longrightarrow$  Salt + Hydrogen

magnesium + hydrochloric acid  $\longrightarrow$  magnesium chloride + hydrogen

Acid + Carbonate  $\longrightarrow$  Salt + Water + Carbon dioxide

sulphuric acid + copper carbonate  $\longrightarrow$  copper sulphate + water + carbon dioxide

# Acids



There are many acids present in our everyday lives.



**Lemon juice** contains **citric acid**, and **vinegar** contains **ethanoic acid**.

Some strong acids are hydrochloric acid, sulphuric acid and nitric acid.

Some weak acids are ethanoic acid, citric acid and carbonic acid.

# Neutralisation

- ▶ Acids and alkalis **react** with each other. The alkali **cancels out** the acid in the reaction. This is called **neutralisation**.

Acid + Alkali  $\rightarrow$  Salt + Water

$\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$

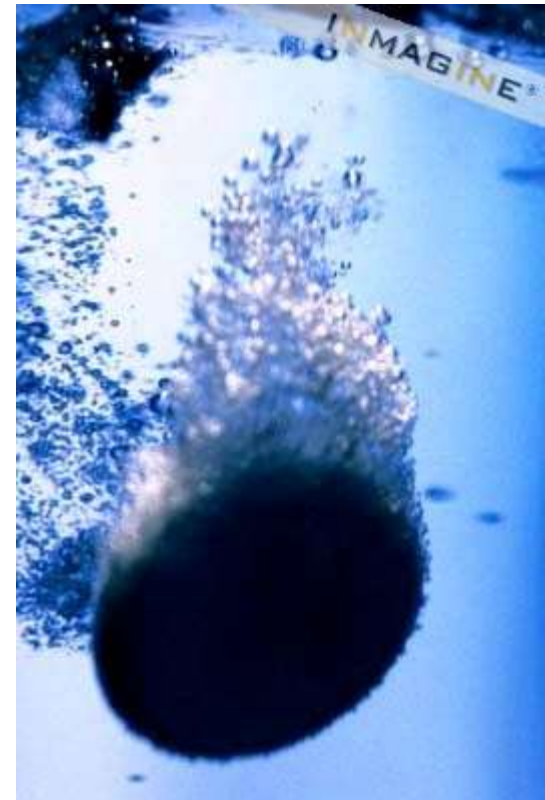
A salt is made.

# Neutralisation

- ▶ During neutralisation, the particles are rearranged to form new products
- ▶ If you know the chemical formulae of the reactant and product, you can write the balanced equations

# Neutralisation

- ▶ Antacids are very helpful in neutralisation of the stomach.





# Neutralisation

- ▶ Calcium carbonate helps raise the pH of acidic soils



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# Applications of Neutralisation

- Insect Stings
  - ▶
  - ▶ **Bee stings** are **acidic** and can be **neutralised** with **baking soda** (bicarbonate of soda).
  - ▶ **Wasp stings** are **alkaline** and can be **neutralised** with **vinegar**.



European Honey Bee



Yellow Jacket

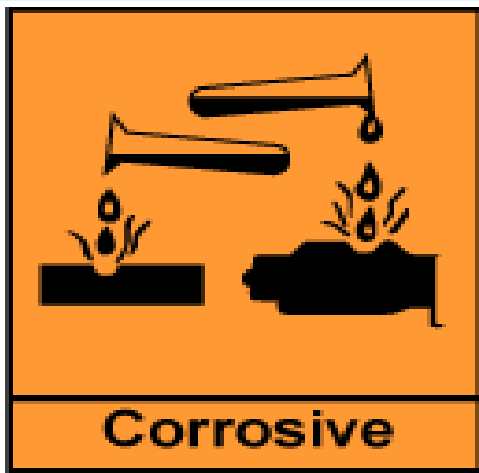
# Salts

- ▶ The salt made depends on the acid and alkali used.
- ▶ The salt contains the metal atom from the alkali, and part of the acid molecule.

The salts of sulphuric acid are known as **sulphates**.

The salts of hydrochloric acid are known as **chlorides**.

The salts of nitric acid are known as **nitrates**.



Many everyday substances are alkalis.

They feel **soapy**.

They are **corrosive**.

When the **oxides** of some **metals** dissolve in **water** they make an **alkali solution**.

**Alkalis** react with **acids** and **neutralise** them.

Metal  
↓  
+ Oxygen  
↓  
Oxide  
↓  
+ Water  
↓  
Alkali

# Alkalis



**Alkalis** are present in many cleaning substances in use in our homes.

Kitchen cleaners are alkaline because they contain **ammonia** or **sodium hydroxide**, which **attack grease**.

**Calcium hydroxide** and **sodium hydroxide** are strong alkalis.

The most recognisable and common **weak alkali** is **ammonia**.

# Indicators



**Indicators help you find out whether a solution is acidic or not.**

**They change colour in acid or alkaline solutions.**

**Different indicators change to different colours.**

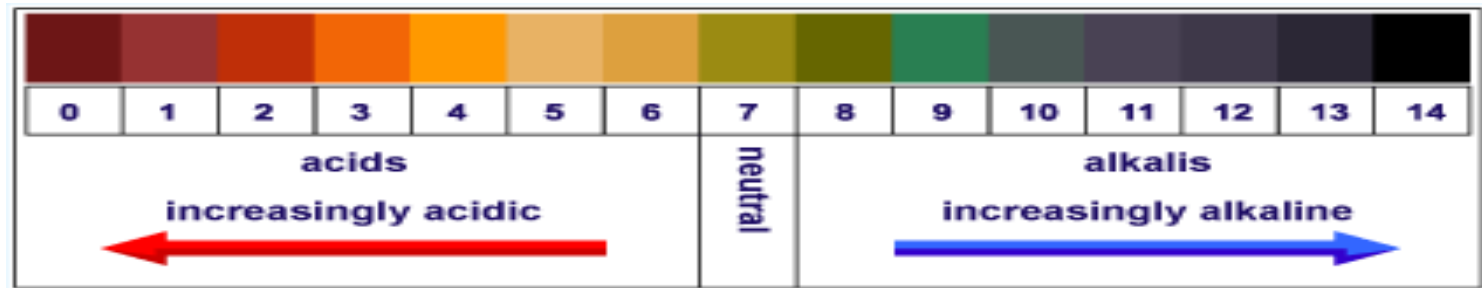


# Litmus Test

- ▶ Litmus is an indicator. It changes colour in acid and alkaline solutions.
- ▶ Litmus is **red** in an **acid**.
- ▶ Litmus is **blue** in an **alkali**.

# Universal Indicator

- ▶ Universal indicator **changes colour** in acids and alkalis.



**ACIDS**

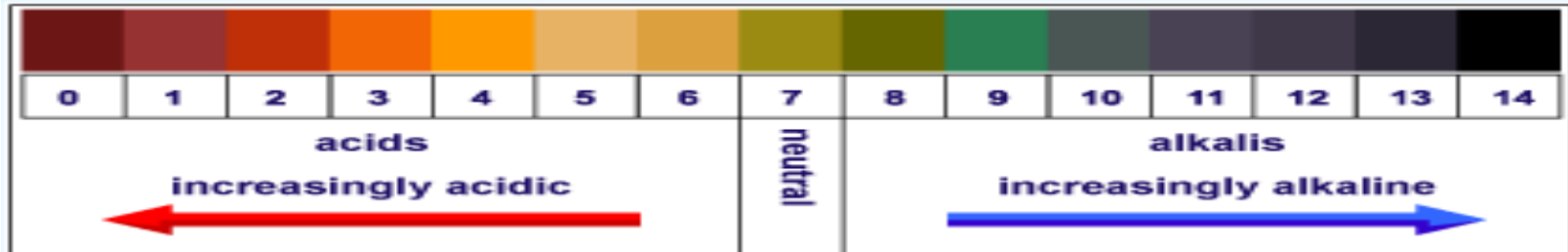
**Neutral**

**ALKALIS**

**Its colour shows the strength of an acid or alkali.**



# The pH scale



**1 – 6**  
**Acids**

**7 Neutral**

**8 - 14**  
**Alkalis**