Chapter 32: Acids and Bases

Acids.

- Are very corrosive. (eat into things)
    - Hydrochloric acid (HCl)
    - Sulfuric acid (H_2SO_4)

- But some are harmless.
    - Carbonic acids in drinks
    - Citric acid in fruit
    - Ethanoic acid in vinegar.

All acids have a sour taste!!

Common household acids include fruit, tea, vinegar, lime scale remover, cream.

Bases.

- Also called alkali.
- Are soluble in water.
- Can be very dangerous also.
    - Sodium Hydroxide NaOH (Caustic Soda)
- A lot are also found in the house and are not as dangerous.
    - Toothpaste, window cleaner, soap, Rennie.

When an **Acid** and a **Alkali** are reacted together, they form a **Salt**.

Indicators.

When an indicator comes in contact with a substance, it's colour change shows the substance is an acid or a base.

An acid is a substance that turns **blue** litmus paper **red.**

A base is a substance that turns **red** litmus paper **blue.**

The pH Scale.

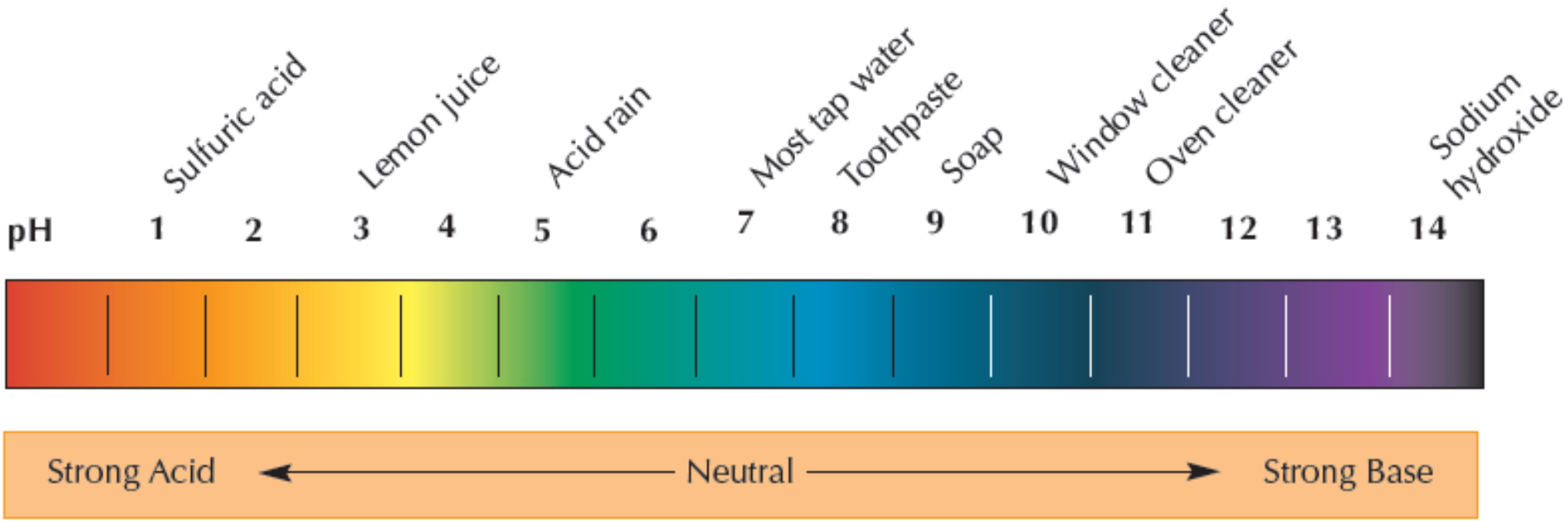
The pH scale shows the strength of an acid or a base.

On the scale, Acids are less than 7

Neutral solutions are 7

Bases are greater than 7

The pH Scale


Sulfuric acid
Lemon juice
Acid rain
Most tap water
Toothpaste
Soap
Window cleaner
Oven cleaner
Sodium hydroxide
pH
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Strong Acid
Neutral
Strong Base

Making a salt from an Acid and an Alkali.

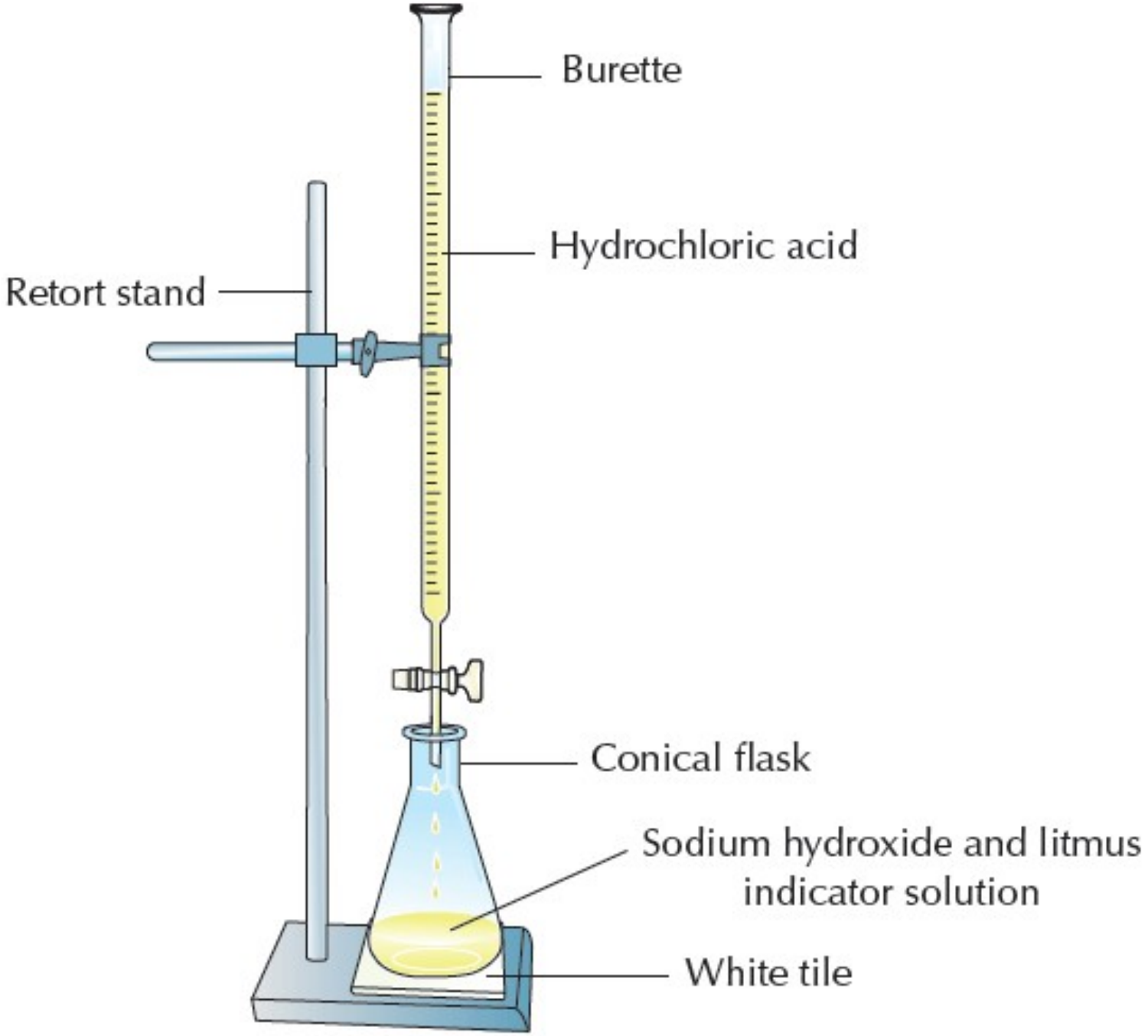
A salt is formed when a metal ion replaces the hydrogen in an acid

Acids and alkalis react together to form a salt and water (pH7)

Example:

$HCl + NaOH \longrightarrow NaCl + H_2O$

The experiment to find out how much HCl is required to neutralise an amount of NaOH is called a **titration**.


Burette
Hydrochloric acid
Retort stand
Conical flask
Sodium hydroxide and litmus indicator solution
White tile

Method:

1. 20cm3 of sodium hydroxide (NaOH) is placed into the conical flask. Add some litmus indicator solution.

2. Place the flask on a white tile. This helps us see the colour change.

3. The burette is filled to the $0cm^3$ mark with hydrochloric acid.

4. Slowly add the HCl to the NaOH, mixing the flask occasionally.

5. When the solution begins to turns from red to clear, neutralisation is complete. At this point, there is no acid or base left in the conical flask.

6. Note how much HCl was used in the experiment.

Reactions of Acids.

When an **Acid** reacts with a **Base**, salt and water are formed.

Example:

Hydrochloric acid + Sodium hydroxide → Sodium Chloride (salt) + Water

$HCl + NaOH \rightarrow NaCl + H_2O$

When an **Acid** reacts with a **Carbonate**, salt and water and carbon dioxide are formed.

Example:

Hydrochloric acid + Calcium carbonate → Calcium chloride + Water + Carbon dioxide

$2HCl + CaCO_3 \rightarrow CaCl_2 + H_2O + CO_2$