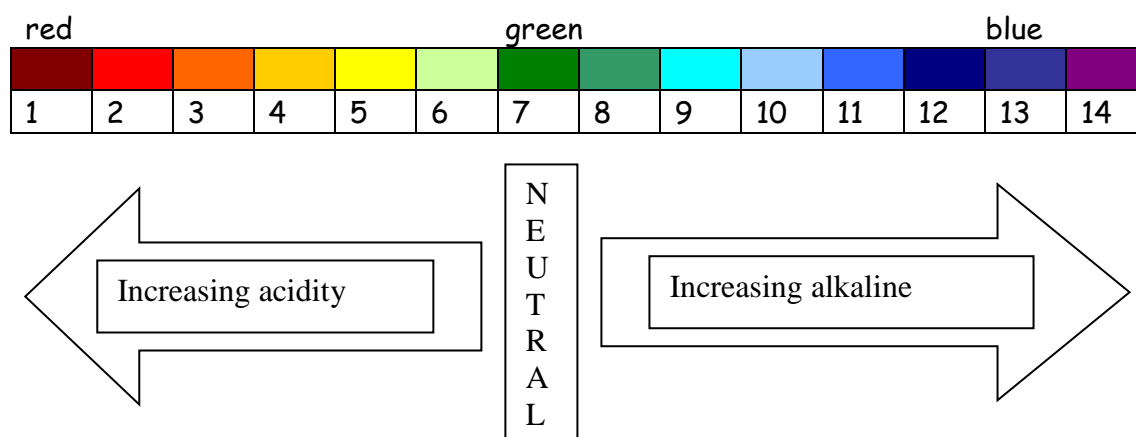


An indicator is a chemical which will change colour in acids and alkalis. Plant material such as red onion and red cabbage and flowers can all be used as indicators; red onions and red cabbage turn red in acid and green in alkali. There are many commercial indicators such as litmus red, litmus blue, pH paper and universal indicator. The colour changes involved are shown in the table below.

<u>Indicator</u>	<u>Colour in acid</u>	<u>Colour in alkali</u>
Litmus paper	red	blue
pH paper	red	purple
Universal indicator	red	purple

The pH scale

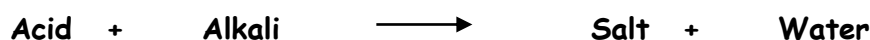


The pH values of some common household substances are shown below.

Substance	Colour in universal indicator	pH number	Acid/Alkali/Neutral
Water	green	7	neutral
Vinegar	orange	3	acid
Washing powder	purple	14	alkaline
toothpaste	turquoise	9	alkaline
Coca cola	orange	4	acid
soap	turquoise	9	alkaline

Neutralisation Reactions

Acids can be neutralised (made neutral) by the addition of an equal volume of alkali to produce a neutral substance and water.



Everyday examples of neutralisation reactions include

- Brushing your teeth with toothpaste (an alkali) to neutralise the acid in your mouth.
- Chewing a Rennie tablet (an alkali) to relieve stomach indigestion (caused by too much acid in the stomach).
- Treating a wasp sting with vinegar.
- Treating a bee sting with bicarbonate of soda.

Fertilisers:

The population of the world is increasing and to feed this increasing population we need more food. To grow more food we need to replace the essential elements (N, P, K) in the soil. Plants need these elements to grow quickly strongly and have more fruit. Leguminous plants (peas, beans and clover) can take the nitrogen directly from the air and use it, all other plants need fertilisers.

There are two types of fertilisers natural (compost and manure) and synthetic (made by chemists). All fertilisers must be soluble and must contain at least one of the essential elements.