

Acids, Bases and Alkalis.

Indicators

Indicators are used to tell us if something is an acid or an alkali. Indicators have different colours in acids and alkalis. There are 2 indicators commonly used:

Litmus indicator:

(1) Litmus solution

This is a purple coloured solution. It can only be used to tell if something is an acid, neutral or alkali. Its colours are:

RED in ACIDS PURPLE in NEUTRAL solutions BLUE in ALKALIS
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(2) Litmus paper

There are 2 kinds of LITMUS PAPER – RED and BLUE litmus paper. These can be used to tell if something is an acid, neutral or alkali:

RED litmus STAYS RED in ACIDS and TURNS BLUE in ALKALIS BLUE litmus STAYS BLUE in ALKALIS and TURN RED in ACIDS
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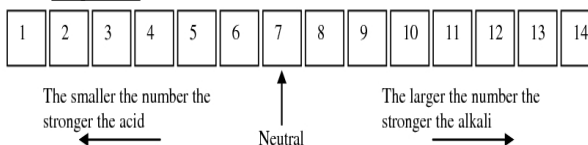
If BOTH coloured litmus papers stay THE SAME colour in a solution, it is a NEUTRAL solution.
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Universal indicator.

This is a much more useful indicator as it can be used to give the strength of an acid or alkali. The strength of an acid or alkali is shown using a scale of numbers called the pH scale, which runs from 0 to 14,

By adding Universal indicator to a solution, and matching the colour with the colours on the pH scale, the strength of the acid or alkali can be shown. Neutral solutions have a pH of 7 (the middle of the scale) and give a green colour.

The pH scale.



Acids.

Properties of Acids

- pH less than 7
- turn litmus indicator red
- have a sour taste (e.g. vinegar)
- neutralise bases (alkalis)
- react with metals to form salts + hydrogen
- react with bases to form salts + water
- react with carbonates to form salts + water + carbon dioxide

What causes acidity?

All acids have one thing in common that makes them act the same. They all contain a replaceable hydrogen ion

Acids contain hydrogen ions H^+

All acids are made of hydrogen ions and some other negative ion bonded together in a compound. The other negative ion is what determines what type of acid it is, e.g.

Acid name	Acid formula	Ions present in the acid
Hydrochloric acid	HCl	Hydrogen ion H^+ Chloride ion Cl^-
Nitric acid	HNO_3	Hydrogen ion H^+ Nitrate ion NO_3^-
Sulphuric acid	H_2SO_4	Hydrogen ion H^+ Sulphate ion SO_4^{2-}

The hydrogen ion is replaceable – when acids react with other substances the hydrogen ion is replaced by another substance, often a metal (see section on salts)