

Knowledge Organiser: Year 8: - Acid and Alkali

Section 1: Key Words

Acid	Chemicals that have a pH of less than 7. The stronger the acid, the lower the pH number. They turn universal indicator red
Alkali	When a bases is dissolved in water it a called an alkali. They are chemicals that have a pH of more than 7. The stronger the alkali, the higher the pH number. They turn universal indicator blue
Neutral	Chemicals that have a pH of 7. They turn universal indicator green
pH	A number expressing the acidity or alkalinity of a solution
Indicators	a compound that changes colour in solution over a narrow range of pH values
Universal indicator	a mixture of dyes that changes colour gradually over a range of pH and is used (especially as indicator paper) in testing for acids and alkalis
Bases	Substances that can react with acids and neutralise them to make a salt and water are called bases
Concentration	The number of particles in a given volume of a substance

Section 4: Mixing acids and alkalis

Mixing an acid and an alkali is called a neutralisation reaction

The end product is neutral (pH of 7)

Acid	Type of salt produced
Hydrochloric acid	Chloride
Sulphuric acid	Sulphate
Nitric acid	Nitrate
Phosphoric acid	phosphate

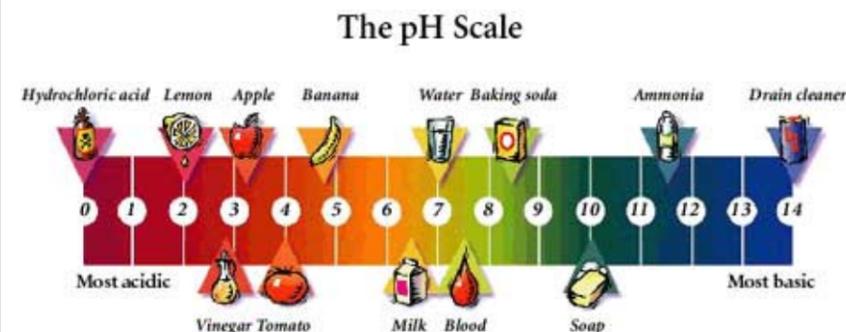
General Equation



Examples for different acids

Hydrochloric acid	+	Sodium hydroxide	→	Sodium chloride	+	Water
Sulphuric acid	+	Potassium hydroxide	→	Potassium sulphate	+	Water
Nitric acid	+	Calcium oxide	→	Calcium nitrate	+	Water
Phosphoric acid	+	Iron oxide	→	Iron phosphate	+	water

Section 2: The pH scale



	pH
Strong Acid	1-3
Weak Acid	4-6
Neutral	7
Weak alkali	8-10
Strong alkali	11-14

Section 5: Neutralisation reactions - method

1	Use a measuring cylinder to measure out 20cm ³ of acid and pour into the burette.
2	Measure 20cm ³ of sodium hydroxide into a flask/beaker
3	Add 2-3 drops of indicator with a pipette.
4	Slowly open tap on burette and let the acid drop out.
5	Stop when solution turns green.
6	Pour solution into a petri dish and leave overnight.
7	Note the amount of acid used to neutralise the alkali.
8	Repeat the experiment

Section 7: Types of Indicator

Indicator	Description	Colour Change	Use
Universal Indicator	Mixture of lots of different indicators	Red – acid Green – neutral Purple - alkaline	Everyday testing of solutions
Litmus	Vegetable based dye	Acid – red Alkali - blue	It is usually used in the form of paper impregnated with the litmus dye. This comes in two varieties, the red paper that is used to test for bases and the blue litmus paper that is used to test for acids.
Phenolphthalein		Pink – acid Colourless - alkali	Titration
Red cabbage	Made from red cabbage (the vegetable)	Red –acid Yellow – alkali Purple - neutral	Homemade indicator as safe to use – no hazards

Section 3: Hazard of Acids and Alkalis

Hazard	Definition	Symbol
Danger	Irritant can cause illness	
Corrosive	Can burn skin or material	
Oxidising	Provides oxygen to make other substances burn faster	
Toxic	Poisonous if ingested	

Section 6: Neutralisation reactions - application

Application	description
Antacids	Medicines that contain a base like sodium bicarbonate or magnesium hydroxide are used to neutralise excess stomach acid
Treat wasp stings	Wasp stings are alkali. Vinegar (acid) can be used to treat wasp stings as it neutralises the sting
Treat bee stings	Bee stings are acidic. Baking powder (alkali) can be used to treat bee stings as it neutralises the sting
Prevent tooth decay	Chocolate and decaying food produce acid in our mouth with reacts with the tooth enamel. Using toothpaste helps to neutralise the acid as toothpaste is alkali
Make fertilisers	Ammonia is often reacted with an acid to produce a salt high in nitrogen (good for growing plants).
To treat acidic/alkaline soil	Plants don't grow well in acidic soil. Bases like calcium oxide and calcium carbonate are added to the soil to neutralize its acidity. A compost of rotting vegetables and/or leaves. The plant matter releases carbon dioxide which is acidic and neutralises the alkaline soil
Shampoo	Shampoo is slightly alkaline, so you use conditioner, which is slightly acidic, to neutralise this.

Section 8: Strong and Weak Acids and alkalis

Strength of acid	pH	Colour of UI	Reaction with Metal
Strong acid	0-3	Pink – red	Lots of bubbling
Weak acid	4-6	Yellow – orange	Some bubbles
Neutral	7	Green	nothing
Weak alkali	8-9	Turquoise – blue	Nothing
Strong alkali	10-12	Lilac - purple	nothing