

## Topic Overview

### Reactions. Acids and alkalis



#### KNOW IT

- I describe how we [know a reaction has happened](#)
- To understand [labels on chemicals](#)
- To use universal indicators to identify [acids and alkalis](#)
- To make an indicator and test its use
- To describe [neutralisation](#) and [plan variables](#)
- To carry out [a valid test and analyse patterns](#)



#### LINK IT

This topic builds on the particle model topic that introduced particles and solutions. This topic goes further and you learn about what happens in reactions.



#### PROVE IT

- DIRT task – writing a method
- End of unit test



#### SAY IT

VOCABULARY	DEFINITION
Chemical reaction	A change in which atoms are rearranged to create new substances.
Solution	A mixture of a solute dissolved in a solvent. All parts of the mixture are the same.
Acid	An acid is a solution with a pH value less than 7.
Corrosive	A substance is corrosive if it can burn your skin or eyes.
Concentrated	A solution is concentrated if it has a large number of solute particles per unit volume (litre or cubic metre).
Dilute	A solution is dilute if it has a small number of solute particles per unit volume (litre or cubic metre).
Litmus	An indicator. Blue litmus paper goes red on adding acid. Red litmus paper goes blue on adding alkali.
Neutral	A solution that is neither alkaline nor acidic. Its pH is 7.
Neutralisation	In a neutralisation reaction, an acid cancels out a base or a base cancels out an acid.
pH scale	The pH scale shows whether a substance is acidic, alkaline, or neutral. An acid has a pH below 7. An alkaline solution has a pH above 7. A solution of pH 7 is neutral.
Universal indicator	An indicator that changes colour to show the pH of a solution. It is a mixture of dyes.

## Chemical reactions

- A **chemical** reaction is a change in which atoms are rearranged to make new substances
- A **reversible** reaction is one where the products can react to get back the substances which you started with, most chemical reactions are not reversible
- You can look for signs that a chemical reaction has taken place such as flames, smells, heat change, a loud bang or gentle fizz

## Acids and alkalis

- Acids** and **alkalis** are the chemical opposites of one another
- Both acids and alkalis can be **corrosive** and **irritants**

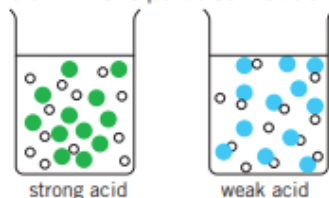
To see whether a substance is an acid or an alkali, we can use an **indicator**. Indicators show how acidic or how alkaline a solution is by showing its position on the **pH scale**, one example of this is **universal indicator**

- If the solution has a pH value of 1–6 it is **acidic**
- If the solution has a pH value of 8–14 it is **alkaline**
- If the solution has a pH value of 7 it is known as **neutral**

Strong acid			Weak acid		Neutral		Weak alkali		Strong alkali				
1	2	3	4	5	6	7	8	9	10	11	12	13	14
sulfuric acid, nitric acid, hydrochloric acid	lemon juice cola drinks	vinegar		saliva tea		water blood (7.4)		toothpaste milk of magnesia				drain cleaner	sodium hydroxide potassium hydroxide

### Acid strength

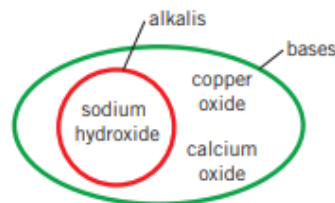
- The strength of an acid depends on how much of the acid has broken apart when it has dissolved in water
- Hydrogen chloride dissolves in water to form hydrochloric acid, this is a **strong acid** as all of the particles split up
- A **weak acid** will have particles that do not all split up



- The **concentration** of the acid is the amount of acid which has dissolved in 1 litre of water
- The more concentrated the acid, the lower the pH

### Neutralisation

- Neutralisation** reactions are any reaction in which acids react with a **base** to cancel out the effect of the acid
- These reactions form a neutral solution with a pH of seven
- A **base** is any substance which neutralises an acid
- An alkali is a base which has been dissolved in water



### Salts

**Salts** are substances which are formed when an acid reacts with a metal or metal compound  
Different acids form different types of salts:

- Hydrochloric acids form chloride
- Sulphuric acids form sulphates
- Nitric acids form nitrates