Acids & Alkalis

Key Properties of Acids

- Not all acids are dangerous. E.g. all fizzy drinks are slightly acidic
- Taste sour
- Strong concentrations tend to make them corrosive
- Contain hydrogen

Key Properties of Alkalis

- The opposite of acids
- Usually cleaning products
- Strong concentrations make them corrosive
- Contain the hydroxide group (OH)

Indicators

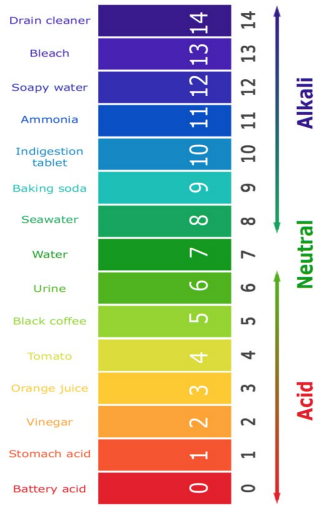
- Most acids and alkalis are clear liquids. So, it is hard to tell which one is which
- They can also be too dangerous to touch or taste.
- Indicators are liquids or paper which change colour depending whether the solution is an acid or alkali.

Common Laboratory Acids & Alkalis

Acid Name	Chemical Formula
Hydrochloric Acid	HCl
Sulphuric Acid	H_2SO_4

Alkali Name	Chemical Formula
Sodium Hydroxide	NaOH
Magnesium Hydroxide	MgOH

The pH Scale



- The strength of an acid and alkali can be determined by a measurement called the pH scale.
- If a liquid has a pH between **0 to 6**, it is an **acid**. With 0 being the strongest acid.
- If a liquid has a pH between **8-14**, it is an **alkali**. With 14 being the strongest alkali.
- An acid with a pH of 0 is just as dangerous as an alkali with a pH of 14.
- A liquid with a **pH of 7 is neutral**. Water is a substance with a pH of 7.

- **Universal indicator** can be used to determine the pH of a liquid as it changes colour depending on the pH
- Red to yellow will indicate an acid
- Green is neutral
- Dark green/blue to purple will indicate an alkali

Neutralisation

- You can react an acid with an alkali, and this will make the two solutions cancel each other out, making a neutral saltwater solution.

Acid + Alkali → Salt + Water

By reacting different combinations of acids and alkalis you can make different types of salt.

Naming Salts

The acid used will allow you to name the salt created.

Acid Name	Salt Created
Hydrochloric Acid	Chloride
Sulphuric Acid	Sulfate
Nitric Acid	Nitrate

Neutralisation Reactions

Reacting an acid and alkali together makes a salt and water. Each acid creates its own salt with the metal from the alkali.

Here are some examples:

Hydrochloric Acid + Sodium Hydroxide → Sodium Chloride + Water

Sulphuric Acid + Sodium Hydroxide → Sodium Sulfide + Water

Nitric Acid + Sodium Hydroxide → Sodium Nitrate + Water

CORE Questions

The following are core questions for this topic. Cover the answer section with a sheet of paper and try and quiz yourself. Only try learning 5 at a time, once you know them move on.

1	True or False. Acids taste sour.	True.
2	True or False. Dilute acidic solutions are corrosive.	False. Concentrated acids tend to be more corrosive.
3	Describe the difference between a dilute and concentrated soultion.	Concentrated solutions have more solute dissolved in them than dilute solutions.
4	Is HCl the formula of an acid or alkali?	HCl is hydrochloric acid (the formula starts with H)
5	What is the purpose of using universal indicator?	It changes colour so you can recognise pH
6	What is the range of the pH scale?	0 - 14
7	What is the range of acids on the pH scale?	0 - 6
8	What is the range of alkalis on the pH scale?	8 to 14
9	A student uses universal indicator on two solutions, one turns red and one turns yellow. Which one is more acidic? Suggest the pH.	Red, 0 - 3
10	A solution turns green with universal indicator, what type of substance is it? Suggest its pH.	Neutral, 7
11	True or False. Salts neutralise alkalis.	False. acids neutralise alkalis.
12	Give two examples of acids	Any from: Hydrochloric acid, sulphuric acid, nitric acid, (other suggestions accepted)
13	Give two examples of alkalis	Any metal hydroxides: Sodium hydroxide, potassium hydroxide
14	State what is formed when an acid reacts with an alkali.	Salt and water
15	Hydrochloric acid reacts with lithium hydroxide. What salt is formed?	Lithium chloride
16	Sulphuric acid reacts with lithium hydroxide. What salt is formed?	Lithium Sulphate
17	Nitric acid reacts with lithium hydroxide. What salt is formed?	Lithium Nitrate
18	Write the word equation for the reaction of hydrochloric acid and magnesium hydroxide.	Hydrochloric Acid + Magnesium Hydroxide -> Magnesium chloride + water
19	A student reacts magnesium hydroxide with sulphuric acid. How can they separate the salt that is formed from the water?	Evaporate the salt
20	Suggest how you can separate the salt formed from its solution in water.	Evaporate the solution.