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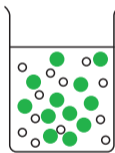
# Acids and Alkalis

1	I can state that different acids and alkalis may have different strengths
2	I can state the purpose of an indicator and describe how Universal indicator is used to find the strength of an acid or alkali using the pH scale

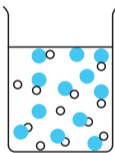
	Keyword	Definition
1	acid	An acid is a solution with a pH value less than 7.
2	alkali	An alkali is a soluble base.
3	concentration	A measure of the number of particles in a given volume.
4	indicator	Substances used to identify whether unknown solutions are acidic or alkaline. The colour of an indicator is different in acidic and alkaline solutions.
5	neutralisation	In a neutralisation reaction, an acid cancels out a base or a base cancels out an acid.
6	pH scale	The pH scale shows whether a substance is acidic, alkaline, or neutral. An acid has a pH between 0 and 7. An alkaline has a pH between 7 and 14. A solution of pH 7 is neutral.
7	strong acid	An acid in which all of the acid particles split up when it dissolves in water.
8	weak acid	An acid in which only some of the acid particles split up when it dissolves in water.

## 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



strong acid

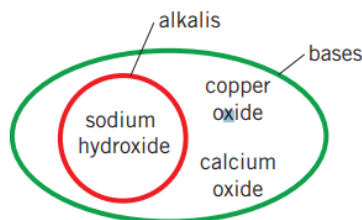


weak acid

- 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



# Acids and alkalis

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



Strong acid



Weak acid

Neutral



Weak alkali



Strong alkali

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**

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

Prior Knowledge From KS2:  
*Chemical reactions occur in all forms of life such as toothpaste and beestings. It is important to learn how metals are extracted leading to sustainability of materials.*

Why?  
*Chemical reactions occur in all forms of life such as toothpaste and beestings. It is important to learn how metals are extracted leading to sustainability of materials.*

Careers:  
Chemist  
Chemical engineer  
Product tester  
Health and safety inspector

Future Learning:  
*At GCSE you learn in more detail about the reactivity series and various extraction methods of metals from their ores. You will also learn about acids and their strengths along with neutralisation reactions.*

## Homework Menu Grid

Topic	1 Point	2 Points	4 Points	6 Points	10 Points
<b>Acids</b> 	Make a list of different substances in your house that are acids	Use the pH scale to explain why hydrochloric acid is a strong acid and why vinegar is a weak acid	Write a short paragraph explaining what you would expect to see when universal indicator is added to an acid. Explain why (pH scale)	Make a lab leaflet stating what an acid is, the pH of strong and weak acids, different acids, what the risks are of working with acids and what to do to work with them safely.	Design an experiment too determine what pH different acidic substances are. Make sure you include the independent, dependent and control variables
<b>Alkalis</b> 	Make a list of different substances in your house that are alkalis	Use the pH scale to explain why sodium hydroxide is a strong alkali and why sodium carbonate is a weak alkali	Write a short paragraph explaining what you would expect to see when universal indicator is added to an alkali. Explain why (pH scale)	Make a lab leaflet stating what an alkali is, the pH of strong and weak alkalis, different alkalis, what the risks are of working with alkalis and what to do to work with them safely.	Design an experiment too determine what pH different alkaline substances are. Make sure you include the independent, dependent and control variables
<b>Neutralisation</b> 	Use a pH scale to state what pH neutral is and why it is neutral.	Write down examples of uses of neutralisation reactions in everyday life	Use your knowledge of neutralisation to explain how lemon juice can be used to treat a wasp sting (think about pH)	"If 50 ml an acid with a pH of 1 is added to 50 ml of an alkali with a pH of 8, the solution at the end will be neutral." Is this right or wrong? Defend your answer.	Design an experiment too determine what how to make a neutral solution from hydrochloric acid and sodium hydroxide. Make sure to talk about independent, dependent and control variables.
<b>Acids and metals</b> 	Write a poem or create an acronym to remember the word equation for the reaction between an acid and a metal	Create a poster that state the similarities and differences of the reactions between acids and alkalis, and acids and metals. Include the word equations and drawings!	Create the word equations for the following reactions: Hydrochloric acid with magnesium Sulphuric acid with sodium Nitric acid with zinc	Explain why hydrogen forms in the reactions between acids and metals, but water is formed in the reaction between an acid and an alkali	Find out why copper doesn't appear to react with hydrochloric acid, but magnesium does

