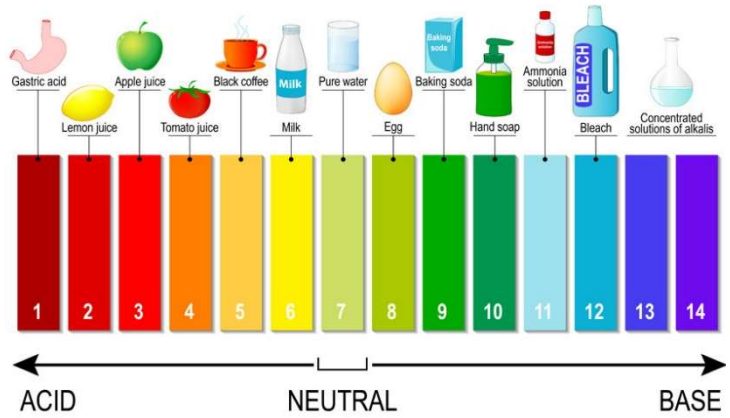
KNOWLEDGE ORGANISER

Keyword	Definition
Acid	Corrosive substance which has a pH lower than 7. Acidity is caused by a high concentration of hydrogen ions.
Acidic	Having a pH lower than 7.
Alkali	A base which is soluble in water.
Alkaline	Having a pH greater than 7.
Base	A substance that reacts with an acid to neutralize it and produce a salt.
Neutralise	To be make neutral by removing any acidic or alkaline nature.
Neutral	When a substance is neither acidic nor alkaline, and has a pH of 7.
Litmus Paper	An indicator that can be red or blue. Red litmus paper turns blue in alkalis, while blue litmus turns red in acids.
pH	A scale of acidity or alkalinity. A pH value below 7 is acidic, a pH value above 7 is alkaline.
Universal Indicator Paper	Paper stained with universal indicator, a chemical solution that produces many different colour changes corresponding to different pH levels.



NEUTRALISATION

A chemical reaction happens if you mix together an acid and an alkali. The reaction is called neutralisation. A **neutral solution** is made if you add just the right amount of acid and base together. The products formed are **salt and water**.

acid + alkali → salt + water

Hydrochloric acid + sodium hydroxide → sodium chloride + water

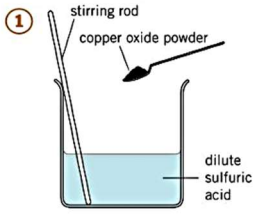
Indicators

Blue litmus paper turns red when it is put into an acid.
If the substance was an alkali or neutral, the blue litmus paper would stay blue.

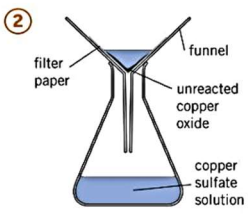
Red litmus paper turns blue when it is put into an alkali.
If the substance was an acid or neutral the red litmus paper would stay red.

How can you make crystals of salts?

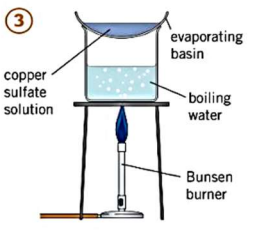
The reactions of acids with metals or bases make salt solutions. Removing water makes salt crystals. The diagrams show how to make copper sulfate crystals.



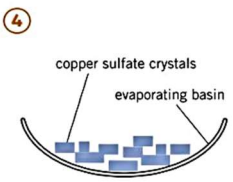
▲ Add copper oxide powder (a base) to dilute sulfuric acid. Keep adding until some copper oxide is left over. All the acid has now reacted.



▲ Filter to remove the copper oxide that has not reacted.



▲ Heat the copper sulfate solution in an evaporating basin until most of the water evaporates.



▲ Leave the evaporating basin in a warm place. The rest of the water evaporates. Copper sulfate crystals remain.

Acids

If you look around your kitchen, you may find some acids to eat or drink.


Vitamin C – Ascorbic Acid


Lemons – Citric Acid


Vinegar – Ethanoic Acid


Fizzy Drink – Carbonic Acid

Some acids are more dangerous. Hydrochloric Acid (HCl), Sulfuric Acid (H_2SO_4) and Nitric Acid (HNO_3) are acids which we use in the Science Lab. These acids can come as dilute or more concentrated.


Dilute solution


Concentrated solution

Dilute acids are not as dangerous as concentrated acids. This is because there are fewer acid particles in the same volume.


Irritant hazard sign, used for substances that are not corrosive but are irritants. Usually found on more dilute acids and alkali.


Corrosive hazard sign. Usually found on more concentrated acids and alkali.

Bases

A base is a substance that can react with acids and neutralise them.
Metal oxides, metal hydroxides and metal carbonates are examples of bases.
Many bases are insoluble – they don't dissolve in water. However, if a base does dissolve in water, we also call it an alkali.

Some alkalis are harmful. However, many are harmless and useful. Many cleaning products such as bleach, washing powder and oven cleaner contain alkalis.
The most dangerous alkalis in our homes are oven cleaners and caustic soda (used to unblock drains).

Soap and washing up liquid are safe alkalis.

Oven cleaner is a very strong alkali which is very corrosive.