ACIDS	BASES
sour in taste	bitter in taste.
turns blue litmus red	turns red litmus blue.
Phenolphthalein turns colourless in acidic solution	Phenophthalein turns pink in basic solution
Methyl orange shows red colour in acidic medium	Methyl orange shows Yellow in basic solutions.
Onion smell is not destroyed in it.	Onion smell get vanished
Smell of Vanilla extract is not destroyed	Smell get vanished.
Smell of Clove oil remains small	No smell will be detected.
Produces Hydrogen gas with Metal	It also produces H_2 gas.
Non Metal oxides acts as acids	Metal oxides acts as bases.
Mostly acids produces H^+ (actually H_3O^+) ion in aqueous Solution	Mostly bases produces OH^- ion in aq. solution
Ex HCl (Hydrochloric acid) CH_3COOH (acetic acid)	Ex NaOH (Sodium Hydroxide) NH_4OH (ammonium Hydroxide)

- Acid which give more H^+ (H_3O^+, hydroniumion) are strong and which give less are weak.
- Bases which give more OH^- (Hydroxide ion) are strong and which give less are weak.
- Never mix water in acid concentrated acid this can leads to excessive heating and can break glass container.
- When conc. acids are mixed in water they are making the acid dilute (less concentrated)
- Concentration of acid and bases can be determined by pH (potenz of Hydrogen) when P stands for potenz (means power).
- pH ranges from 0-14. From 0-7 as pH increases the acid becomes weak and from 7-14 as pH increases concentration of OH^- increases means bases become strong. At pH = 7 the solution is neutral.
- Bases in aqueous solutions are called alkali and here we always always consider bases as alkali.
- pH of rain is from 7 - 7.8 and pH below 5.6 causes acid rain which harm aquatic life.
- pH of Solid should be from 5.5 - 7.5 of teeth
- pH below 5.5 can cause tooth decay.

- decrease in pH of degestive system due to excessive production of HCl by stomach cause irritation and pain. That's why we use mild bases (or antacides) like Magnesium Hydroxide (Milk of Magnesia) to neutralize.

- Acid + Base ⟶ Salt + H_2O

- Strong acid + Strong base ⟶ neutral salt
- strong acid + weak base ⟶ acidic salt.
- weak acid + strong base ⟶ basic salt.
- weak acid + weak base ⟶ depends on concentration

Common Salt (NaCl)

Found from Sea. Chemically it is the combination of hydrochloric acid and sodium hydroxide. Usually its pH is 7 as it is the combination of strong acid and strong base.

It is the 'raw' material for many chemicals:

1.) Sodium Hydroxide → formed by passing electricity through aqueous solution of ~~salt~~ NaCl (called brine)

3 products form: Cl_2 gas at anode; H_2 gas at cathode

NaOH solution.

Called Chlor-alkali process.

Uses of NaOH: Degreasing metals, soaps and detergents, paper making, artificial fibres.

2.) Bleaching powder ⟶ Cl_2 (Chlorine) gas of chlor-alkali reacts with Calcium hydroxide.

$$Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$$

(Bleaching powder)

Uses: Bleaching cotton and linen in textile industry
Bleaching wood pulp in paper factories.
Oxidising agent in chemical industries.

3.) Baking Soda ⟷ $NaCl + H_2O + CO_2 + NH_3 \rightarrow NH_4Cl$ (Ammonium chloride) + $NaHCO_3$ (Baking Soda)

(Sodium Hydrogencarbonate)

Uses: Making bread or cake soft and spongy, used as antacid due to alkaline nature, used in soda-acid fire extinguishers.

4.) Washing Soda → $NaHCO_3 \xrightarrow{\Delta \text{ Heat}} Na_2CO_3$ (Sodium Carbonate) (Washing Soda)

(Sodium Carbonate)

Crystallisation of Na_2CO_3 gives washing soda.

$$Na_2CO_3 + 10H_2O \longrightarrow Na_2CO_3 \cdot 10H_2O$$

(Sodium Carbonate) (Washing Soda)

Uses: In glass, soap and paper industries, cleaning agent in ~~paper industries~~ & home, removing permanent hardness of water.

Crystals of Salts: Crystals of salts contain some amount of water.

As Copper Sulphate ($CuSO_4$) seems to be blue as it contains 5 molecules of H_2O.

∴ Blue crystal of Copper sulphate = $CuSO_4 \cdot 5H_2O \xrightarrow[\text{Heat}]{\Delta} CuSO_4$ (White crystal)

Plaster of Paris (P.O.P.)

$CaSO_4 \cdot 2H_2O \xrightarrow[373\ K]{\Delta(\text{Heat})} CaSO_4 \cdot \frac{1}{2}H_2O$

(Gypsum) (Calcium sulphate hemihydrate) (Plaster of Paris)

Hemihydrate ka matlab ye h ki 2 Calcium Sulphate 1 water molecule ke sath crystallised h.

POP mix with water the form hard substance gypsum.

Uses: Used for making Toys, decoration materials, making surfaces smooth.