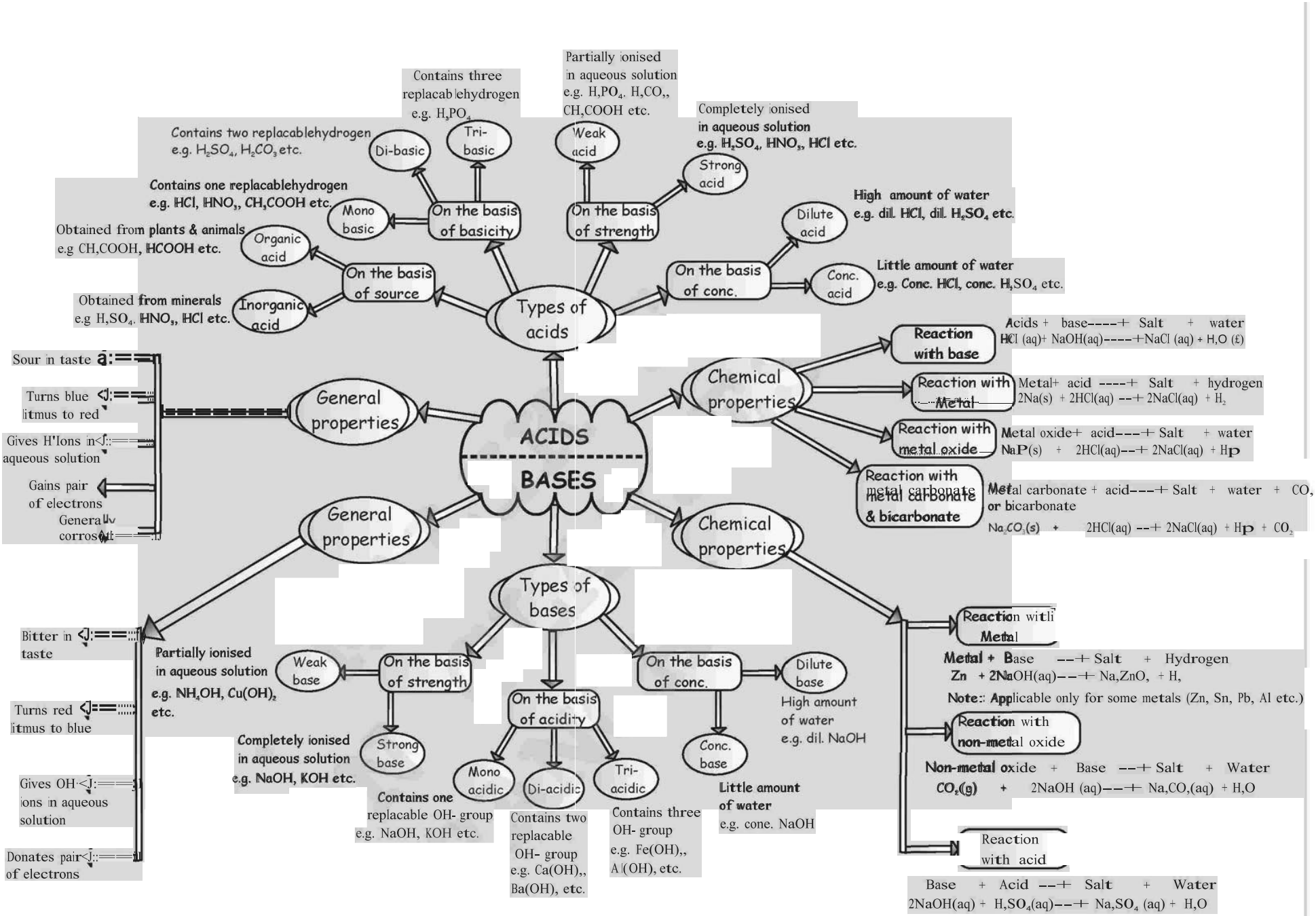
ACIDS
BASES
General properties
Chemical properties
Types of acids
On the basis of basicity
Di-basic
Tri-basic
Mono basic
Contains two replacablehydrogen e.g. H_2SO_4, H_2CO_3 etc.
Contains three replacablehydrogen e.g. H_3PO_4
Contains one replacablehydrogen e.g. HCl, HNO_3, CH_3COOH etc.
On the basis of strength
Weak acid
Strong acid
Partially ionised in aqueous solution e.g. H_3PO_4, H_2CO_3, CH_3COOH etc.
Completely ionised in aqueous solution e.g. H_2SO_4, HNO_3, HCl etc.
On the basis of source
Organic acid
Obtained from plants & animals e.g CH,COOH, HCOOH etc.
Inorganic acid
Obtained from minerals e.g H_2SO_4, HNO_3, HCl etc.
On the basis of conc.
Dilute acid
High amount of water e.g. dil. HCl, dil. H_2SO_4 etc.
Conc. acid
Little amount of water e.g. Conc. HCl, conc. H_2SO_4 etc.
Sour in taste
Turns blue litmus to red
Gives H^+ Ions in aqueous solution
Gains pair of electrons
General corrosive
Reaction with base
Acids + base ----+ Salt + water
HCl (aq)+ NaOH(aq) ----+NaCl (aq) + H,O (ℓ)
Reaction with Metal
Metal+ acid ----+ Salt + hydrogen
2Na(s) + 2HCl(aq) --+ 2NaCl(aq) + H_2
Reaction with metal oxide
Metal oxide+ acid---+ Salt + water
NaP(s) + 2HCl(aq)--+ 2NaCl(aq) + Hp
Reaction with metal carbonate & bicarbonate
Metal carbonate + acid---+ Salt + water + CO_2 or bicarbonate
Na_2CO_3(s) + 2HCl(aq) --+ 2NaCl(aq) + Hp + CO_2
Types of bases
Bitter in taste
Turns red litmus to blue
Gives OH^- ions in aqueous solution
Donates pair of electrons
On the basis of strength
Weak base
Partially ionised in aqueous solution e.g. NH_4OH, $Cu(OH)_2$ etc.
Strong base
Completely ionised in aqueous solution e.g. NaOH, KOH etc.
On the basis of acidity
Mono acidic
Contains one replacable OH- group e.g. NaOH, KOH etc.
Di-acidic
Contains two replacable OH- group e.g. $Ca(OH)_2$, Ba(OH), etc.
Tri-acidic
Contains three OH- group e.g. $Fe(OH)_3$, $Al(OH)_3$ etc.
On the basis of conc.
Dilute base
High amount of water e.g. dil. NaOH
Conc. base
Little amount of water e.g. cone. NaOH
Reaction with Metal
Metal + Base --+ Salt + Hydrogen
Zn + 2NaOH(aq)--+ Na_2ZnO_2 + H_2
Note:: Applicable only for some metals (Zn, Sn, Pb, Al etc.)
Reaction with non-metal oxide
Non-metal oxide + Base --+ Salt + Water
CO_2(g) + 2NaOH (aq)--+ Na_2CO_3(aq) + H_2O
Reaction with acid
Base + Acid --+ Salt + Water
2NaOH(aq) + H_2SO_4(aq)--+ Na_2SO_4 (aq) + H_2O

Solution	PH	Solution	PH
1. 1 M Hydrochloric acid	0	14. Urine	5.5 - 7.5
2. Battery acid	0.5	15. Saliva	6.5 - 7.5
3. Dilute hydrochloric acid	1.0	16. Blood	7.3 - 7.5
4. Gastric juices (Digestive juices in stomach)	1.0–3.0	17. Eggs	7.8
5. Lemon juice	2.2 - 2.4	18. Baking soda solution	8.4
6. Vinegar	2.4 - 3.4	19. Sea-water	8.5
7. Soft drinks	3.0	20. Washing soda solution	9.0
8. Wine	2.8 - 3.8	21. Lime-water	10.5
9. Oranges	3.6	22. Milk of magnesia [Mg (OH) 2 solution]	10.5
10. Tomato juice	4.0 - 4.4	23. 1 M Ammonium hydroxide (Household ammonia)	11.6
11. Beer	4.0 - 5.0	24. Dilute sodium hydroxide	13
12. Coffee	4.5 - 5.5	25. 1 M Sodium hydroxide	14
13. Milk	6.5		

pH values of some common substances

pH = $-\log_{10}[H^+]$ or $[H^+] = 10^{-pH}$ (Formula)

Negative logarithm of H^+ ion concentration (Definition)

pH of solution

Salts which contain two or more acidic or basic radicals e.g. $Ca(OCl)Cl$, $NaKCO_3$

Mixed Salts

Salt

Obtained by crystallisation of two simple salts from mixture of this saturated solution e.g. $K_2SO_4.Al_2(SO_4)_3.24H_2O$

Double salts

Contains replacable OH e.g $Pb(OH)Cl$, $Cu(OH)NO_3$

Basic salts

Contains replaceable H e.g. $NaHCO_3$, $KHSO_4$

Acidic salts

Normal salt

Contains no replacable H^+ & OH^- NaCl, K_2SO_4 etc.

Poisoning effect of stings of wasp (alkaline) is neutralised by vinegar (acidic)

Poisoning effect of stings of ant & bees (acidic) is neutralised by soap (basic)

Application

Acidity (gastric problem) is neutralised by antacid such as $NaHCO_3$, $Mg(OH)_2$ etc.

Effect of acidity in soil is neutralised by $Ca(OH)_2$

Neutralization Reaction

Acid + Base ----+ Salt + Water

$HCl(aq) + NaOH(aq) \rightarrow NaCl(aq) + H_2O$ (Salt)

SALTS

INDICATORS

Indicators

Olfactory) Change its colour in different medium. e.g. Clove Oil, Vanila extract, Raw onion

Visual

Indicator	Original colour	Colour in acidic medium	Colour in basic medium
Blue litmus	Blue	Red	Blue
Red litmus	Red	Red	Blue
Turmeric	Yellow	Yellow	Reddish-brown
China rose	Pink	Dark pink (magenta)	Green
Methyl orange	Orange	Red	Orange
Phenolphthalein	Colourless	Colourless	Pink
Purple Cabbage juice	Purple	Red	Green