

GLOSSARY

1. **Diffusion:**
Net movement / spreading out of particles from a region of higher concentration to a region of lower concentration, due to the constant random motion of particles
The gas with a higher relative molecular mass has a slower rate of diffusion
2. **Atomic number / Proton number:**
Number of protons in the nucleus of an atom
3. **Mass number / Nucleon number:**
Number of protons and neutrons in the nucleus of an atom
4. **Isotopes:**
Atoms of the same element with same number of protons and different number of neutrons
5. **Ionisation energy:**
Energy required to remove one electron from a gaseous atom
6. **Element:**
A substance that cannot be broken down into simpler substances by chemical methods
7. **Compound:**
A substance formed when two or more elements are chemically combined by bonding (ionic, covalent)
8. **Atom:**
The smallest particle of any element
9. **Molecule:**
A particle formed when two or more atoms are chemically combined by covalent bonding
10. **Pure substance:**
A single substance that is not mixed with any other substances
A pure solid has a fixed melting point. A pure liquid has a fixed boiling point.
11. **Filtration:**
An experimental method used to separate a mixture of a liquid and an insoluble solid
12. **Crystallisation:**
An experimental method used to obtain pure crystals of a solute from a saturated solution by cooling
13. **Saturated solution:**
A solution that contains the maximum mass of the solute that can dissolve in a given volume of a solvent at a particular temperature
14. **Simple distillation:**
An experimental method used to separate a liquid from a solution

15. **Fractional distillation:**
An experimental method used to separate two miscible liquids
16. **Separating funnel:**
An experimental apparatus used to separate two immiscible liquids
17. **Chromatography:**
An experimental method used to separate components (e.g. dyes, pigments) in a mixture using a suitable solvent (e.g. ethanol, water)
18. **Sublimation:**
An experimental method used to separate two solids, one of which sublimes on heating.
19. **Sublimes:**
Changes from a solid to a gas directly without melting
20. **Allotropes:**
Substances of the same element existing in the same physical state, but with different arrangement of the atoms (e.g. diamond and graphite are allotropes of carbon)
21. **Volatile liquid:**
A liquid that has a low boiling point and vaporises rapidly under room conditions e.g. ethanol
22. **Ionic bond:**
Strong electrostatic force of attraction that exists between oppositely-charged ions (i.e. positive and negative ions)
23. **Covalent bond:**
Strong force of attraction that exists between atoms arising from the sharing of electrons
24. **Intermolecular forces:**
Weak forces of attraction that exist between molecules
25. **Metallic bond:**
Strong electrostatic force of attraction that exists between the lattice of positive metals ions and the sea of 'delocalised electrons'
26. **Malleable:**
Can be bent into sheets
27. **Ductile:**
Can be drawn into wires
28. **Alloy:**
A mixture of a metal with other elements (metal / non-metal)
e.g. brass = copper + zinc
bronze = copper + tin
steel = iron + carbon

29. **Recycling:**
reprocessing of a used manufactured product in order to extract a useful raw material for use again (e.g. recycling of metals)
30. **Rusting:**
An oxidation process where iron (or steel) reacts with oxygen in the presence of water to form hydrated iron(III) oxide ($\text{Fe}_2\text{O}_3 \cdot n\text{H}_2\text{O}$)
31. **Refractory material:**
Usually an ionic compound which is heat-resistant and has a very high melting point (e.g. magnesium oxide)
32. **Acid:**
A compound that ionises in water to form hydrogen ions (H^+)
33. **Alkali:**
A compound that ionises in water to form hydroxide ions (OH^-)
34. **Base:**
A metal oxide / metal hydroxide (soluble bases are called alkalis)
35. **Strong acid:**
An acid that ionises completely in water to form H^+ ions (e.g. HCl , H_2SO_4 , HNO_3)
36. **Weak acid:**
An acid that ionises partially in water to form H^+ ions (e.g. CH_3COOH)
37. **Strong alkali:**
An alkali that ionises completely in water to form OH^- ions (e.g. NaOH)
38. **Weak alkali:**
An alkali that ionises partially in water to form OH^- ions (e.g. $\text{NH}_3(\text{aq})$)
39. **Acidic oxide:**
Oxides of non-metals; react with base to form a salt and water
40. **Basic oxide:**
Oxides of metals; react with acids to form a salt and water
41. **Amphoteric oxide:**
Oxides of metals; react with both acids and bases to form a salt and water
42. **Neutral oxide:**
Oxides of non-metals; do not react with acids or bases
43. **Relative atomic mass:**
Average mass of one atom of an element when compared with $\frac{1}{12}$ of the mass of one carbon-12 atom

44. **Relative molecular / formula mass:**
Average mass of one molecule when compared with $\frac{1}{12}$ of the mass of one carbon-12 atom
45. **Limiting reactant:**
A reactant that is completely used up in a reaction
46. **Excess reactant:**
A reactant that is not completely used up in a reaction
47. **Electrolysis:**
A chemical change that occurs when electricity is passed through a molten / aqueous electrolyte
48. **Electrolyte:**
A compound which in the molten / aqueous state, conducts electricity by the movement of ions, and is decomposed in the process
49. **Precipitation reaction:**
A reaction in which a solid (precipitate) is formed when two solutions are mixed
50. **Redox reaction:**
A reaction that involves oxidation and reduction of the reactants
51. **Displacement reaction:**
A reaction that involves a more reactive element (metal or halogen) displacing a less reactive element from its compound
52. **Exothermic reaction:**
A reaction which releases heat energy to the surroundings, resulting in a temperature rise of the surroundings (enthalpy change, ΔH is negative)
53. **Endothermic reaction:**
A reaction which absorbs heat energy from the surroundings, resulting in a temperature drop of the surroundings (enthalpy change, ΔH is positive)
54. **Activation energy:**
The minimum energy that reactant particles must possess in order for a reaction to take place
55. **Catalyst:**
A substance that speeds up a reaction and remains chemically unchanged at the end of the reaction (a catalyst is not used up in a reaction)
56. **Reversible reaction:**
A reaction which can proceed in two directions (forward and backward) by changing the reaction conditions
57. **Equilibrium mixture:**
A reaction mixture containing a fixed proportion of reactants and products of a reversible reaction under specific reaction conditions

58. **Photosynthesis:**
A process where plants make use of carbon dioxide and water in the presence of sunlight and chlorophyll to make glucose ($6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$)
59. **Respiration:**
A process where food substances (glucose) react with oxygen in inhaled air to produce carbon dioxide, water and energy ($\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$)
60. **Decomposition:**
A reaction in which a compound is broken down into two or more substances (elements/compounds)
61. **Combustion:**
A reaction in which a substance is burnt in oxygen, with the release of heat energy (exothermic)
62. **Incomplete combustion:**
A reaction in which a substance is burnt in a limited supply of oxygen (incomplete combustion of carbon compounds results in the formation of carbon monoxide or soot)
63. **Complete combustion:**
A reaction in which a substance is burnt in excess oxygen (complete combustion of carbon compounds results in the formation of carbon dioxide)
64. **Homologous series:**
A family of organic compounds having the same functional group and general formula, where each member differs from the next by a $-\text{CH}_2-$ group
65. **Functional group:**
An atom / group of atoms that characterises the chemical properties of a compound
66. **Isomers:**
Compounds with the same molecular formula but different structural formula
67. **Saturated compound:**
A compound that contains only carbon-carbon single bonds
68. **Unsaturated compound:**
A compound that contains carbon-carbon double/triple bonds
Unsaturated compounds are generally more reactive than saturated compounds, due to the carbon-carbon double/triple bond
69. **Polyunsaturated:**
Containing many carbon-carbon double/triple bonds
70. **Hydrocarbon:**
A compound that contains hydrogen and carbon only
(alkanes are saturated hydrocarbons; alkenes are unsaturated hydrocarbons)

71. **Cracking:**
A process where big molecules (of alkanes) are broken down into smaller molecules (of alkanes, alkenes) and hydrogen gas
72. **Substitution reaction:**
A reaction in which the hydrogen atoms of an alkane are substituted (replaced) by other atoms (substitution reactions require the presence of light)
73. **Addition reaction:**
A reaction in which a molecule is added to an unsaturated compound, forming a single product
74. **Polymer:**
A large / long-chain molecule made up of many small molecules (monomers) joined together
75. **Polymerisation:**
A reaction where many small molecules (monomers) join together to form a large / long-chain molecule called a polymer
76. **Addition polymerisation:**
A process where many unsaturated monomers are added to one another to form a large / long chain molecule (polymer)
77. **Condensation polymerisation:**
A process where many monomers join together to form a large / long chain molecule (polymer) by the elimination of small molecules e.g. water
78. **Depolymerisation:**
Process in which polymers are broken down into their monomers, exemplified by hydrolysis of polyesters using an acid as a catalyst