

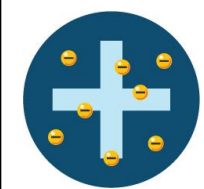
Chemistry 1: Atomic Structure and the Periodic Table

Section 1: Key Terms

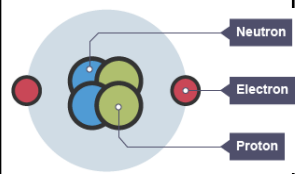
1 Atom	The smallest part of an element that can exist. All substances are made of atoms. No overall electrical charge. Very small , radius of 0.1nm.
2 Element	An element contains only one type of atom . Found on the Periodic Table. There are about 100 elements.
3 Compound	Two or more elements chemically bonded with each other. Can only be separated into the elements through chemical reactions.
4 Mixture	Contains two or more elements or compounds not chemically bonded . Can be separated using physical methods e.g. by filtration, crystallisation, distillation and chromatography.
5 Filtration	A process that separates mixtures of insoluble solids and liquids .
6 Crystallisation	A process that separates dissolved solids from liquids by evaporating the liquid to leave crystals.
7 Distillation	A process that separates a mixture of liquids based on their boiling points .
8 Chromatography	A process that separates mixtures by how quickly they move through a stationary phase (e.g. paper)
9 Isotope	An atom of the same element with different numbers of neutrons .
10 Relative atomic mass	An average value of mass that takes account of the abundance of the isotopes of the element.

Section 2: Development of Atomic Model

11 Plum Pudding	The plum pudding model shows that the atom is a ball of positive charge with negative electrons embedded in it. Was incorrect .
-----------------	--



12 Nuclear Model	Rutherford's scattering experiment found a central area of positive charge. The nuclear model has a positive nucleus and electrons in shells . Chadwick later discovered neutrons . Bohr discovered the arrangement of electrons in shells .
------------------	---



Section 3: Properties of Sub-Atomic Particles

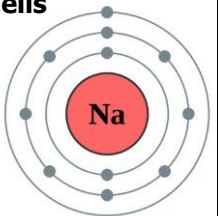
Sub-atomic particle	Mass	Charge	Position in Atom
13 Proton	1	+1	Nucleus
14 Neutron	1	0	Nucleus
15 Electron	Very small	-1	Orbiting in shells

16 **Mass number** – the total number of **protons** and **neutrons**

17 **Atomic number** – the **number of protons** (the number of electrons is the same in an atom)

18 **Electron configuration**– Electrons fill the first energy level (shell) first. Maximum electrons: **2 in first shell** **8 electrons in other shells**

23 Na



Section 4: Periodic Table

16 Group	Elements in the same vertical column are in the same group. Elements in the same group have the same number of electrons in their outer shell , and therefore similar properties .
17 Period	Elements in the same horizontal row . The atomic number increases by one moving across the period.
18 Metal	Elements that react to form positive ions (except Hydrogen). Left and centre of periodic table
19 Non-Metal	Elements that react to form negative ions. Right of periodic table.
20 Mendeleev	Was able to make a relatively accurate periodic table by leaving gaps for undiscovered elements and re-arranging some elements (Mendeleev could only measure relative atomic mass, not atomic number).

21 Group

22 Period

23 Elements in the modern periodic table are **arranged by atomic (proton) number**.

Section 3: Groups of the Periodic Table

Sub-atomic particle	Properties	Trends	Reactions
24 Group 0 (Noble Gases)	Unreactive and do not form molecules .	Boiling point increases going down the group .	Very unreactive as they have full outer shells .
25 Group 1 (Alkali Metals)	Reactive because they can easily lose one electron.	Reactivity increases going down the group .	With water: Metal + water → Metal hydroxide and hydrogen With oxygen: Metal + oxygen → Metal oxide With chlorine: Metal + chlorine → Metal chloride
26 Group 7 (Halogens)	Non-metals Form molecules	Reactivity decreases going down the group . Boiling point and melting point increase going down the group .	A more reactive halogen can displace a less reactive halogen from a solution of its salt.