

Atomic Mass
X
Atomic Number
Element Name

GENESIS OF CLASSIFICATION

DOBEREINER'S TRIAD (1852)

Middle element of each triads had an atomic weight about half way between the atomic weight of other two and also properties between the other two.
Eg. (Li, Na, K), (Ca, Sr, Ba).

LAW OF OCTAVES (1865)

J. Alexander Newlands arranged the elements in increasing order of their atomic weight. Every 8th element had similar properties to 1st element.
Eg. Li resembles with Na.

LOTHAR MEYER

Lothar Meyer found a periodic pattern by plotting physical properties like atomic volume, B.P and M.P against atomic weight.

MENDELEEV PERIODIC LAW

Properties of elements are a periodic function of their atomic weights.
Mendeleev Periodic elements Eka-Aluminium as Gallium.

35.5
17
Cl
CHLORINE

NEED FOR CLASSIFICATION

To make it easier to understand the chemistry of all the elements and their compounds separately.

TRENDS IN PHYSICAL PROPERTIES

	Properties	Group	Period
(a)	Atomic Radius Distance between the Atomic Nucleus and the outermost shell containing electron.	Increases	Decreases
(b)	Electron Gain Enthalpy Energy released when an electron is added to the valence shell of an isolated Gaseous Atom.	Decreases	Increases
(c)	Ionisation Energy Amount of energy required to remove an electron from an isolated gaseous atom.	Decreases	Increases
(d)	Electronegativity Tendency of an element to attract shared electrons towards itself.	Decreases	Increases
(e)	Metallic Character	Increases	Decreases
(f)	None-Metallic Character	Decreases	Decreases

TRENDS IN CHEMICAL PROPERTIES

- The valence of representative elements is generally equal to valence electron or (8-valence electrons).
- Anomalous behaviour of 2nd period elements is due to their small size, large charge/radius ratio, high electronegativity and only 4 valence orbitals.
- Diagonal relationship: Li and Be is more similar to Mg as Al respectively.
- The normal oxides formed by the element on extreme left is most basic (E.g. Na₂O) and formed by elements on extreme right is most acidic (E.g. Cl₂O₇).
- Oxides of centre elements are amphoteric (Eg. Al₂O₃) or neutral (Eg. N₂O).
Amphoteric oxides are basic in acidic medium and vice versa.



CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES

MODERN PERIODIC TABLE

- Modern Periodic Law:** Physical and chemical properties of elements are periodic functions of their atomic number.
- Father of modern Periodic table: Dimitri Mendeleev
- 7 Horizontal rows: Periods; 18 Vertical columns: Groups

Periods	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	H	He																
2	Li	Be	B	C	N	O	F	Ne										
3	Na	Mg	Al	Si	P	S	Cl	Ar										
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Kr	
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
6	Cs	Ba	La-Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
7	Fr	Ra	Ac-Lr	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Uut	Fl	Uup	Lv	Uus	Uuo

Lanthanides	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Actinide	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

NOMENCLATURE OF ELEMENTS (ATOMIC NO. > 100)

Derived from Atomic Number of Element using numerical roots for 0 and number 1-9 and 'ium' is added at the end of name

Digit	Name	Abbreviation
0	Nil	N
1	Un	U
2	bi	b
3	tri	t
4	quad	a
5	Pent	p
6	hex	n
7	Sept	s
8	Oct	o
9	enn	e

STUDY OF PERIODIC TABLE

S-Block Elements

- Electronic configuration: ns¹⁻²
- Consist of Group 1 (alkali metals)
- and also group 2 (alkali earth metals)

D-Block Elements

- Electronic configuration: (n-2)d¹⁻¹⁰(n-1)ns²
- Consist of Group 3 to 12
- also known as transition elements

P-Block Elements

- Electronic configuration: ns²np¹⁻⁶
- Consist of Group 1 to 18
- also known as Representative or main group elements.

F-Block Elements

- Electronic configuration: (n-2)f¹⁻¹⁴(n-1)d⁰⁻¹ns²
(2 = 58-71) (2 = 90-103)
- Consist of Lanthanoids and Actinoids
- also known as inner transition elements