2. Periodic Classification of Elements

- The classification of elements was necessary to make their study more convenient.
- The earliest classification was based on grouping the known elements as metals and non-metals.
- Dobereiner was the first person to illustrate the relationship between the atomic masses of elements and their properties. He also formulated the Law of Triads.

Li	Ca	Cl
Na	Sr	Br
K	Ba	I

- Newlands arranged the known elements in the increasing order of their atomic masses. He also formulated the Law of Octaves. However, the Newlands' Law of Octaves is applicable only to the elements having low atomic masses.

Notes of music	**sa**	**re**	**ga**	**ma**	**pa**	**dha**	Ni
Arrangement of elements	H	Li	Be	B	C	N	O
	F	Na	Mg	Al	Si	P	S
	Cl	K	Ca	Cr	Ti	Mn	Fe
	Co and Ni	Cu	Zn	Y	In	As	Se
	Br	Rb	Sr	Ce and La	Zr	–	–

- Mendeleev gave a periodic law which states that the properties of elements are a periodic function of their atomic masses.
- Achievements of Mendeleev's periodic table:
    - Mendeleev left some gaps in his periodic table so that the undiscovered elements could get a place in it without disturbing the positions of the other elements.
    - Noble metals were not discovered at that time. When they were discovered later, they got a place in Mendeleev's table without disturbing the positions of the other elements.
    - Mendeleev predicted the existence of gallium and named it as *eka*-aluminium.

- **Limitations of Mendeleev's periodic table**
    - It failed to explain the position of hydrogen.
    - It was not able to explain the position of isotopes.
    - In the table some elements having higher mass were kept before the elements having lesser atomic mass.

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Modern periodic law states that the properties of elements are a periodic function of their atomic numbers, not their atomic masses.

The modern periodic table consists of 7 periods and 18 groups. Elements having the same valence shell are present in the same period. Elements having the same number of valence electrons are present in the same group.

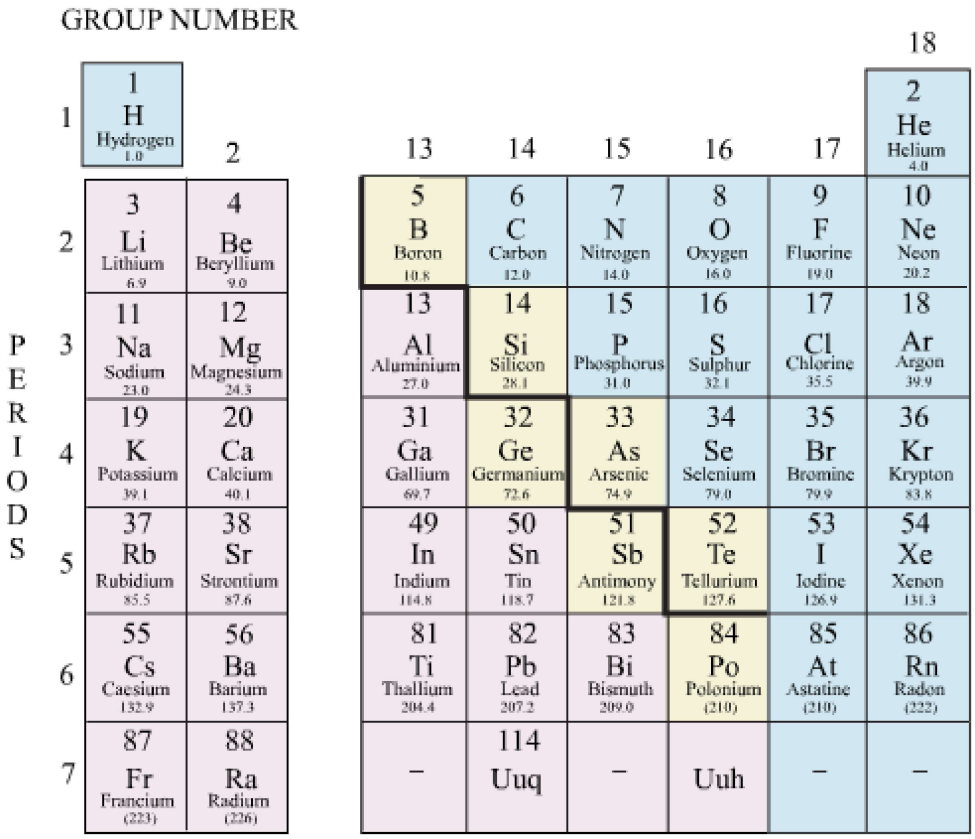
Metals are present on the left-hand side of the periodic table, whereas non-metals are present on the right hand side of the periodic table.

Group 1, 2 and 13-18: Representative elements

Group 3-12: Transition elements

Period 6: Elements with atomic numbers 58-71: Lanthanoids

Period 7: Elements with atomic numbers 90-103: Actinoids



- The valencies of the elements remain same down the group. However while moving across the period, the valency first increases and then decreases.
- The atomic size of elements increases on moving down the group and decreases on moving from left to right in a period.
- Elements show periodicity because of their valence shell configuration. All elements showing periodicity in properties have the same number of electrons in the last or valence shell.
- Metallic character of elements increases on moving down the group and decreases on moving from left to right in a period.
- Ionisation energy as well as electron gain of enthalpy of elements increases on moving left to right in a period. However while moving across the group, they decreases.