Senior's Tuition And Mentorship Program 3.0 Year 2s 2S.2 (Chemistry) Periodic Table



The Periodic Table

Group		Ш											III	IV	V	VI	VII	0
Perioc 1	1 H]		Г		on Met	als		● N	oble G	ases	1						2 He
2	3 Li	4 Be			 Alkali Metals Alkaline Metals Transition Metals 				•н •н	etalloid alogen ther Me	is s etals	5 B	5 B	6 C	7 N	8 0	9 F	10 Ne
3	11 Na	12 Mg	Rare Earth Elements								13 Al	14 Si	15 P	16 S	17 CI	18 Ar		
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 	54 Xe
6	55 Cs	56 Ba	57 * La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 r	78 Pt	79 Au	80 Hg	81 TI	82 Pb	83 Bi	84 Po	85 At	86 Rn
7	87 Fr	88 Ra	89** Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Uut	114 Uuq	115 Uup	116 Uuh	117 Uus	118 Uuo

*Lanthanides	58	59	60	61	62	63	64	65	66	67	68	69	70	71
	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Actinides	90	91	92	93	94	95	96	97	98	99	100	101	102	103
	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

- O The elements in the periodic table are arranged in atomic (proton) number
- O The vertical columns are called groups and the horizontal rows are called periods
- O Properties of different groups:
- O Group I: Alkali metals
- Group VII: Halogens
- Group 0 (or group VIII) : Noble gases
- O Transition Metals are those in between group II and group III
- When naming groups, use ROMAN NUMERALS (I, II, III, etc.) and not ARABIC NUMERALS (1, 2, 3, etc)
- O The metallic properties of elements decrease as the group number increases
- O Elements in the same period have the same number of electron shells $(1^{st} \text{ period} 1 \text{ shell}, 2^{nd} \text{ period} 2 \text{ shells and so on and so forth})$
- O Elements in the same group have the same number of valence electrons
- O Alkali Metals:
- O Reactive Metals (seen from reactions with water)
- Have low melting and boiling points
- O Silvery and soft metals. Low density
- O Easily cut with knife
- Melting and boiling points decrease down the group (Lithium highest, Caesium lowest)

- O Densities increase down the group
- O React easily in air (tarnish) and therefore kept in oil
- **O** They react with water to give alkaline solutions
- O Reactivity increases down the group (Caesium has the most vigorous reaction while Lithium has the least vigorous reaction). This is because the valence electrons are found further away from the nucleus when the number of electron shells increases and thus held less strongly by the nucleus' electrostatic forces of attraction, thus it is lost more easily.
- O Halogens:
- O Reactive non-metals
- $\, \odot \,$ Low melting and boiling points
- O Diatomic molecules
- Melting and boiling points increase down the group (Fluorine lowest, Astatine highest)
- O Reactivity decreases down the group (Flourine is the most reactive while Astatine is the least reactive). This is because the force from the nucleus that attracts electrons is weaker as the number of electron shells increases, thus, it is harder to gain an electron when the number of electron shell increases
- O A more reactive halogen will **displace** (take the place of) a less reactive halogen from an aqueous solution of the less reactive halogen's ions
- For example, Chlorine + Potassium Iodide ----> Potassium Chloride + Iodine
- Colour darkens down the group:
- F (Fluorine): Pale Yellow
- O Cl (Chloride): Yellowish Green
- O Br (Bromine): Reddish Brown
- I (Iodine): Purple
- O At (Astatine): Black
- O Noble Gases:
- O Unreactive non-metals due to its noble gas configuration (duplet/ octet configuration)
- O Have low melting and boiling points (gases at r.t.p)
- O Colourless, **monoatomic**
- O The size of atoms increases down the group as the number of electron shells increases
- O The size of atoms decreases down the period. Across the period, the number of electron shells remains the same. However, the distance between the valence electrons and the nucleus is shorter down the period as the proton number of the atom increases down the period. This means that there are more protons in the nucleus and the electrostatic forces of attraction acting on the valence electrons are greater and therefore, the valence electrons are pulled more closely towards the nucleus.