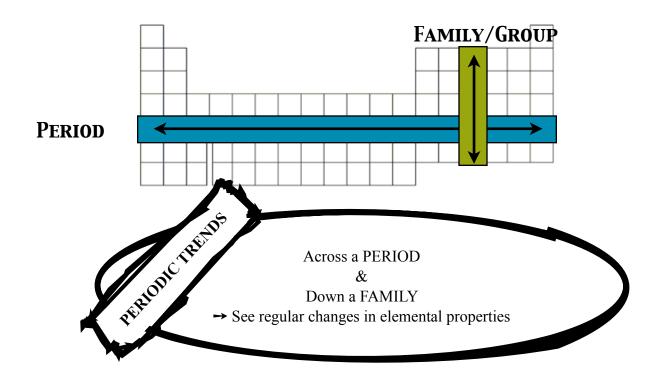
6.2 PERIODIC TRENDS



ATOMIC SIZE

Definite Size	Vs. Estimated Size
Definite Size	Estimated Size
Definite boundaries of an object Eg. Marbles	Possible boundaries with approximations
	Eg. E- clouds where e- spend 90% of their time

ATOMIC SIZE TREND

- 1. As enr levels (n) $\uparrow \rightarrow e^-$ are further from the nucleus \rightarrow atom size \uparrow
- 2. When e^- feel nucleus pull (effective nuclear charge) $\rightarrow e^-$ cloud is closer to nucleus \rightarrow atom size \clubsuit

Example:

$$\begin{array}{l} \text{Li } (1s^22s^1) \\ \text{Na } (1s^22s^22p^63s^1) \\ \text{K } (1s^22s^22p^63s^23p^64s^1) \\ \text{Rb } (1s^22s^22p^63s^23p^64s^23d^{10}4p^65s^1) \\ \text{Cs } (\\ \text{Fr } (\end{array}$$

IONIC SIZE TREND

-Ionic radii of -ve ions > their neutral atomic radii.

→Ionic radii of -ve ions ↑ as the -ve charge ↑.

-Ionic radii of +ve ions < their neutral atomic radii.

→Ionic radii of +ve ions \blacksquare as the +ve charge \blacksquare .

Example:

Same # of e⁻; diff # of p⁺ and n^o

 $N^{3-} > O^{2-} > F^- > Ne > Na^+ > Mg^{2+} > Al^{3+}$

IONIZATION ENERGY TREND

Ionization Energy (IE): the minimum enr required to remove an e⁻ from a (g) atom or ion

Large atom:
Nucleus has a ♣hold on e

↓ IE

Small atom:

Nucleus has a 1 hold on e

↑ IE

Increasing Ionization Energy

Metals: **↓**IE

Lose e

H H Hodogoa 1,00794																	He
3	- 4	1										5	6	7	8	9	10
Li	Be											В	C	N	O	F	Ne
6.94L	9.012182	6										10.811	12,0107	14,00674	15.9994	Plaintin 18,9984032	20,1797
11	12	1										13	14	15	16	17	18
Na	Mg											Al	Si	P	S	Cl	Ar
308/am 12.999778	24.3050											26.981538	28.0855	7hoptors: 30.973761	32.066	35.4527	39.948
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
K	Ca	Se	Ti	v	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
39.0983	40.078	5candum 64.955910	47,867	50.9415	51,9961	54.938049	55,845	58,933200	58,6934	63,546	65.39	69,723	72.61	74.92160	T8.96	79.904	83.80
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Rb	Sr	Y	Zr	Nb	Mo	Te	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	1	Xe
Rabidium 85.4678	Smootum 87.62	Vitrium 88,90585	70000mm 91.224	Notium 92,90638	Mohdoum 95,94	Technosium (98)	Retheniors 101.07	Rhodium 102,90550	Polladum 106.42	58vir 107.8682	112.411	114.818	Tin 118,710	121,760	127.60	126,90447	Xenos 131.29
55	56	57	72	73	74	75	76	77	.78	79	80	81	82	83	84	85	86
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	TI	Pb	Bi	Po	At	Rn
Cessum 132,90545	Barnes 137,327	138 9055	Hafman 178.49	Tamaton 180,9479	Tungsten 183,84	Rhoseum 186,207	Desirate 190.23	192.217	Platinum 195,078	Gell 196,96655	Manage 200.59	Thefices 204 3833	1 red 207.2	Bosoth 208 98038	(209)	1210)	Radon (222)
87	88	89	104	105	106	107	108	109	110	111	112	113	114	500000	2.202	-22.5	2000
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt		05.00	C.50010		1170007-0				
(223)	Radium (226)	Actinium (227)	Rotherfordners (261)	(262)	Suborgium (263)	(262)	(265)	(266)	(209)	(272)	(277)						

Non-metals: ↑IE Gain e⁻

Exceptions to IONIZATION ENERGY TREND

Nitrogen & Oxygen

N: larger atom, but \uparrow IE $\frac{\uparrow \downarrow}{1s} = \frac{\uparrow \downarrow}{2s} = \frac{\uparrow \downarrow}{2p}$

O: smaller atom, but \$\int\$IE

1s 2s 2p

ELECTRONEGATIVITY TREND

Electronegativity: Relative ability of a bonded atom to attract shared e⁻ to itself

INCREASING ELECTRONEGATIVITY

H H Hydrogen 1.00794																	He
3	4											5	6	7	8	9	10
Li tabase 6.941	Be Replan 9.012182											B 10.811	Cietea 12,0107	N Nanagan 14,00674	O 000988 15,9994	F 18,9984032	Ne 20,1797
11	12	ĺ										13	14	15	16	17	18
Na Sodium 2,999770	Mg											Al 26.981538	Si 58cm 28.0855	P 70.973761	S Salte 32,066	CI CMorene 18,4527	Ar Arpm 19.948
19	20	21	22	23	. 24	25	26	27	28	29	30	31	32	33	34	35	36
K Potassium Va mas i	Ca Calcium 40.078	Sc Scandium 44,955910	Ti Titarium 47,867	V Vanadien 50.0415	Cr Chromical 51,9961	Mn Manganose 54.938049	Fe los 55,845	Co 58,933200	Ni Nout 58.4034	Cu Copper 63.546	Zn 65.39	Ga Gatham 69,723	Ge Germanians 72,61	A8 Attente 24,92160	Se Sciences TR 96	Br bosses 79.904	Kr Stypon 83,80
37	38	39	40	41	42	43	- 44	45	46	47	48	49	50	51	52	53	54
Rb Rabidium 85,4678	Strootum 87.62	Y ****** 58.90585	Zr Znovenen 91,224	Nb Notion 92,90638	Mo Mohamm 95,94	Tc Technosium (98)	Ru katheniara 101.07	Rh Rhodium 102,90550	Pd Palladum 106.42	Ag Silver 107,8682	Cd Calmium 112,411	In Intern 114.818	Sn 118,710	Sb Antoning 121,760	Te Telutum 127,60	I fodou 126,90447	Xe Xenca 131.29
55	56	57	72	73	74	75	76	77	.78	79	80	81	82	83	84	85	86
Cs Common 32 90545	Ba Station 137,327	La tantanan 138.9055	Hf Halman 178.49	Ta Tambus 180,9479	W Tangsters 183,84	Re House 186,207	Os 0000000 190.23	Ir 192.217	Pt Plane 195,078	Au 196,96655	Hg Marine 200,59	TI The State 204 3833	Pb 1.red 207.2	Bi (female 208 98038	Po (209)	At (210)	Rn (222)
87	88	89	104	105	106	107	108	109	110	111	112	113	114	0)11/0000		-178.05	
Fr Function (223)	Ra Radium (226)	Ac Actions (227)	Rf Retherfordum (261)	Db Dubnicas (262)	Sg Suborpus (263)	Bh Boleson (202)	Hs Harrison (265)	Mt Mension (266)	(269)	(272)	(277)						