



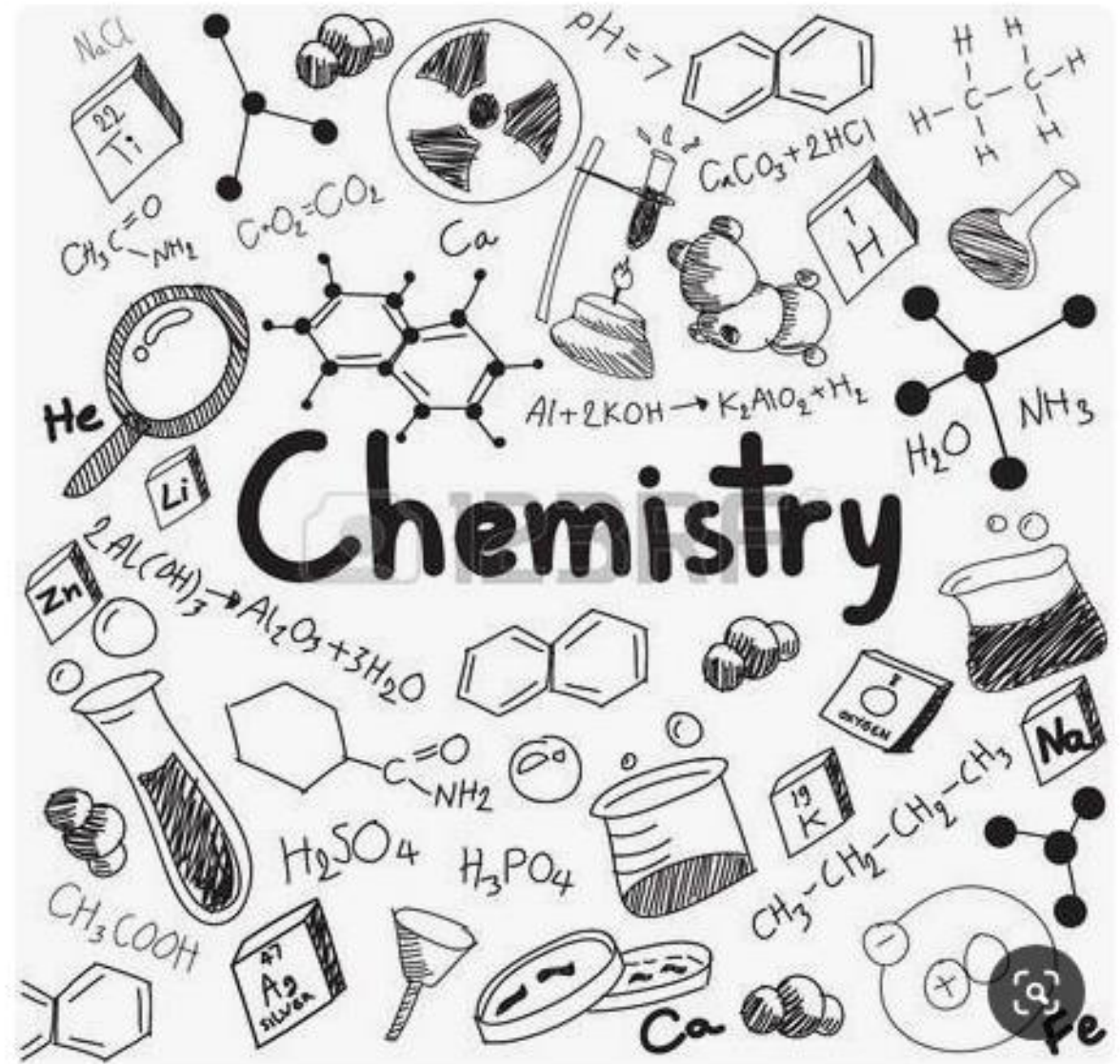
The National
Orthodox School
Shmaisani

Lesson : (Trends in the
periodic table)

Scholastic Year: 2022-2023

Grade: 8CS

Date: October 2022



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Cambridge Assessment
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Objective:

1. To describe trends in the periodic table (Groups 1,2&7).
2. To describe patterns in data.

Resources:

Power point presentation

Videos

Complete Chemistry for Cambridge Secondary 1

Trends in the periodic table

More than 20 properties change in predictable way based on the location of elements on the periodic table.

some properties:

Atomic radius

Density

Melting point/boiling point

Periodic Table of the Elements

1 H 1.01																	18 He 4.00															
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18															
11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95															
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.88	23 V 50.94	24 Cr 51.99	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.63	33 As 74.92	34 Se 78.97	35 Br 79.90	36 Kr 83.80															
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.95	43 Tc 98.91	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.6	53 I 126.90	54 Xe 131.29															
55 Cs 132.91	56 Ba 137.33	57-71 Lanthanide	72 Hf 178.49	73 Ta 180.95	74 W 183.85	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.20	83 Bi 208.98	84 Po [208.98]	85 At 209.98	86 Rn 222.02															
87 Fr 223.02	88 Ra 226.03	89-103 Lanthanide	104 Rf [261]	105 Db [262]	106 Sg [266]	107 Bh [264]	108 Hs [269]	109 Mt [278]	110 Ds [281]	111 Rg [280]	112 Cn [285]	113 Nh [286]	114 Fl [289]	115 Mc [289]	116 Lv [293]	117 Ts [294]	118 Og [294]															
																		57 La 138.91	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm 144.91	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.06	71 Lu 174.97
																		89 Ac 227.03	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np 237.05	94 Pu 244.06	95 Am 243.06	96 Cm 247.07	97 Bk 247.07	98 Cf 251.08	99 Es [254]	100 Fm 257.10	101 Md 258.10	102 No 259.10	103 Lr [262]

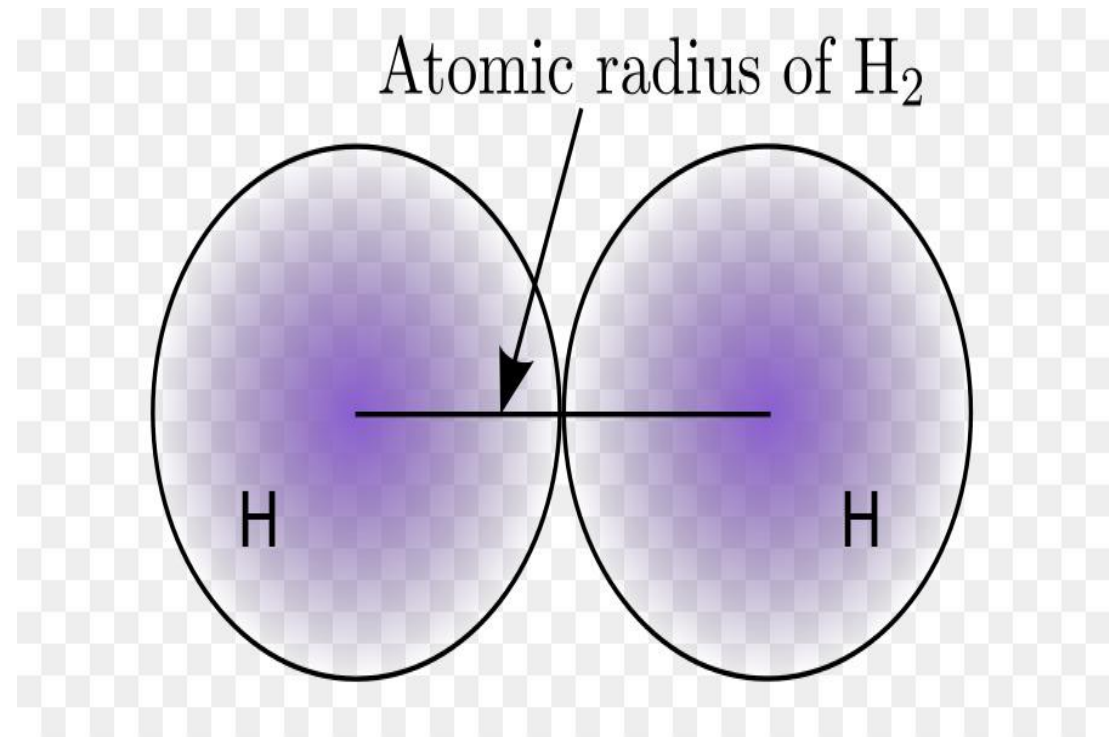
Alkali Metal Alkaline Earth Transition Metal Basic Metal Semimetal Nonmetal Halogen Noble Gas Lanthanide Actinide

Atomic Radius

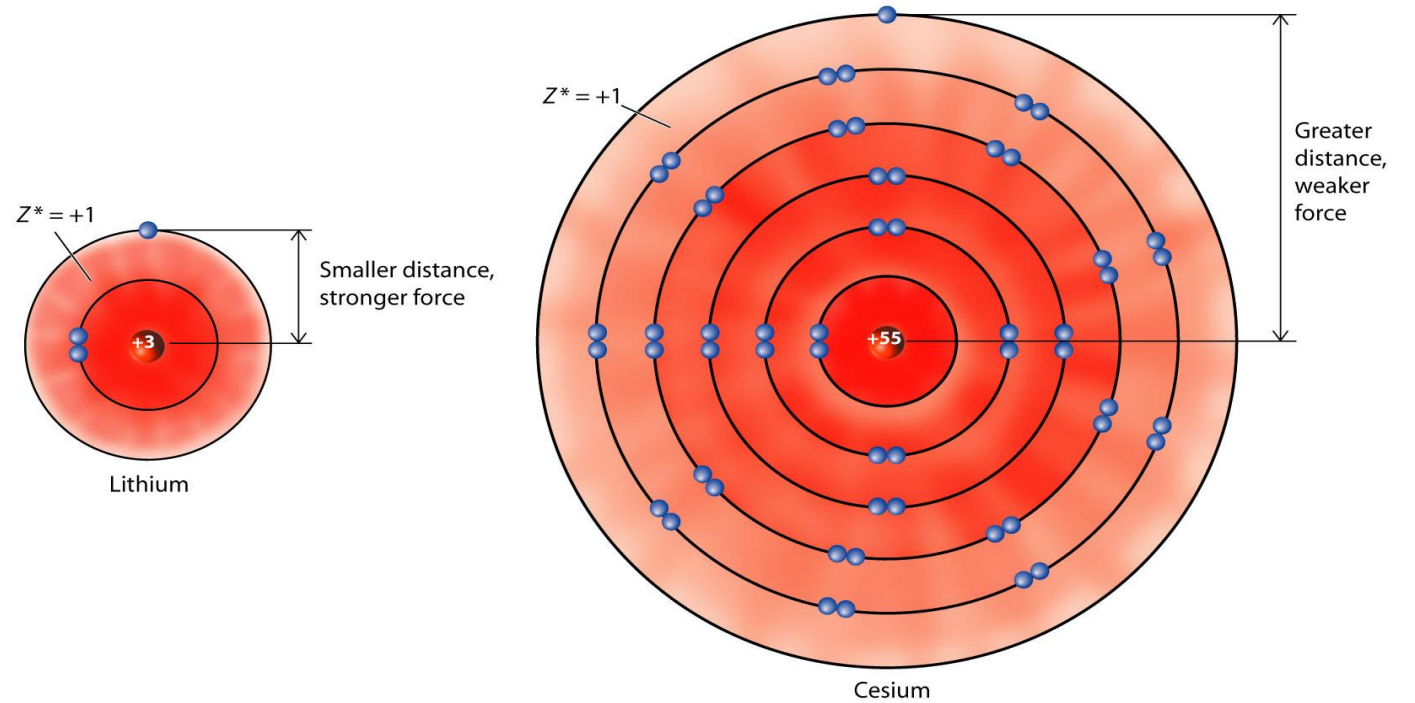
The **atomic radius** of an element is a measure of the size of its atoms, usually it is the distance from the center of the nucleus to the boundary of the surrounding shells of electrons.

The atomic radius is affected by

1. The number of layers of electrons around the nucleus (for elements of the same group)
2. The attraction the outer electrons feel from the nucleus (For elements of the same period)



- An atom gets larger as the number of electronic shells increase; therefore the radius of atoms increases as you go down a certain group in the periodic table of elements.

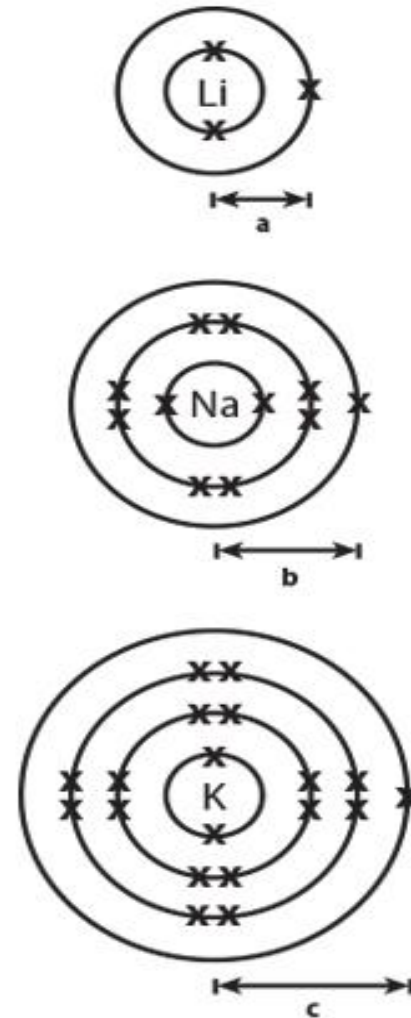


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Reactivity of Group 1 & 2

The reactivity of group 1 & 2 elements increases as you go down the group because:

- The atoms become larger.
- The outer electron becomes further from the **nucleus**.
- The force of attraction between the nucleus and the outer electron decreases.
- The outer electron is lost more easily.

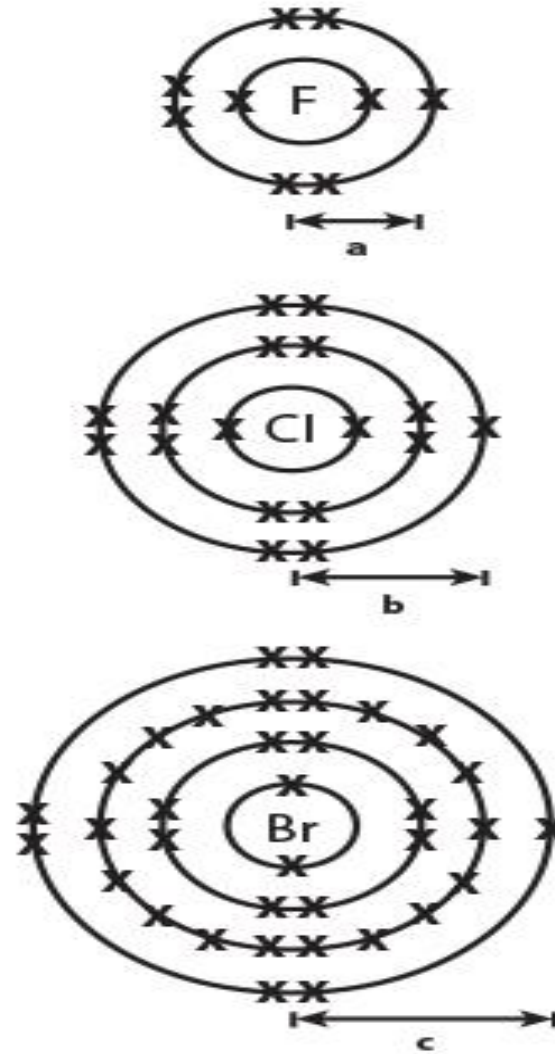


More reactive

More easily transfer an electron away to another atom

Reactivity of Group 7

Halogens from bromine to fluorine get more reactive because the force of attraction between the nucleus and the outer electron get stronger as you go up group 7 elements.



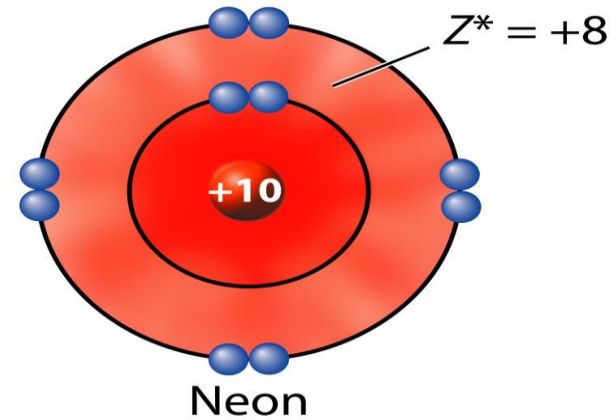
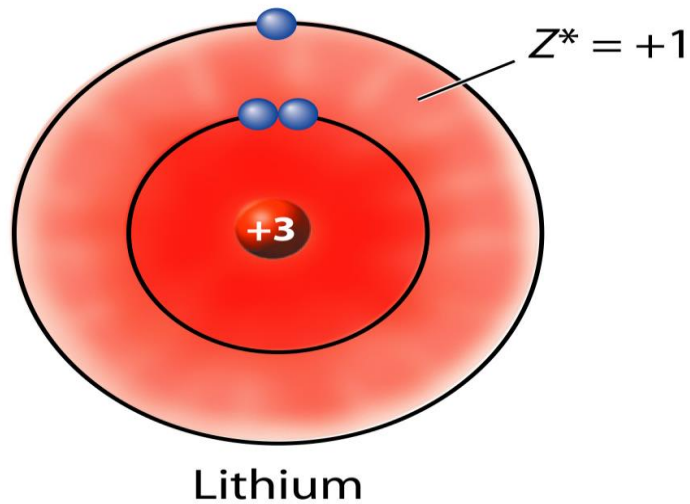
More reactive

More easily transfer an electron to the atom

- The size of an atom will decrease as you move from left to the right of a certain period.

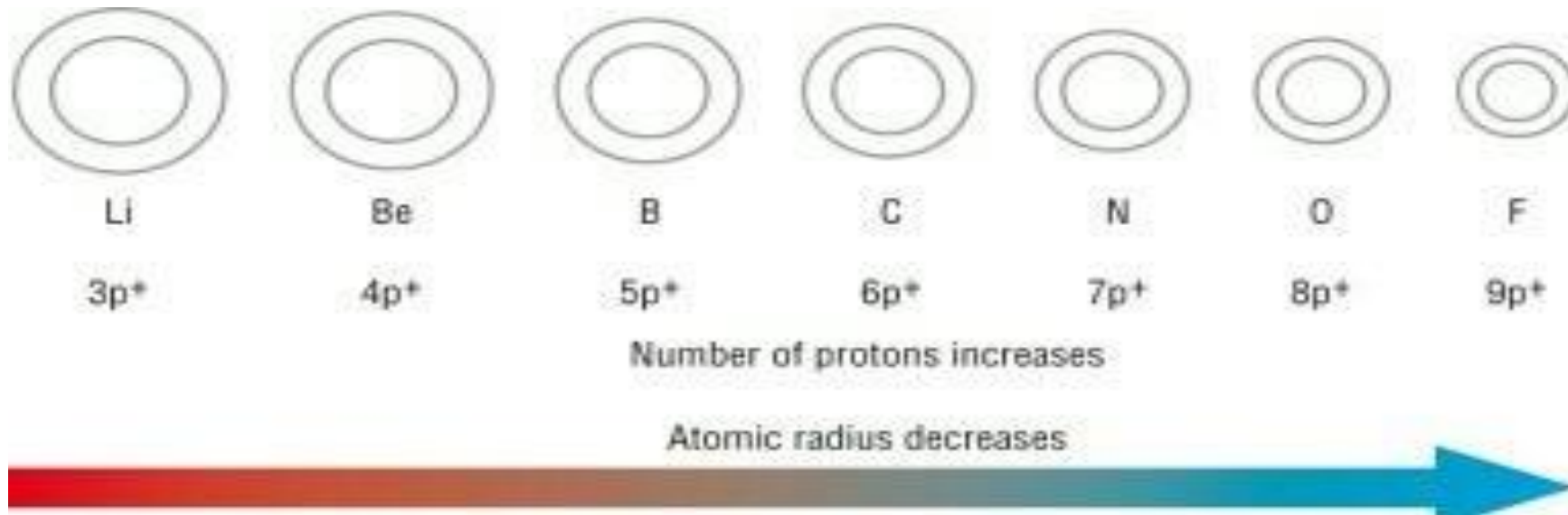
because of greater PPP “proton pulling power”

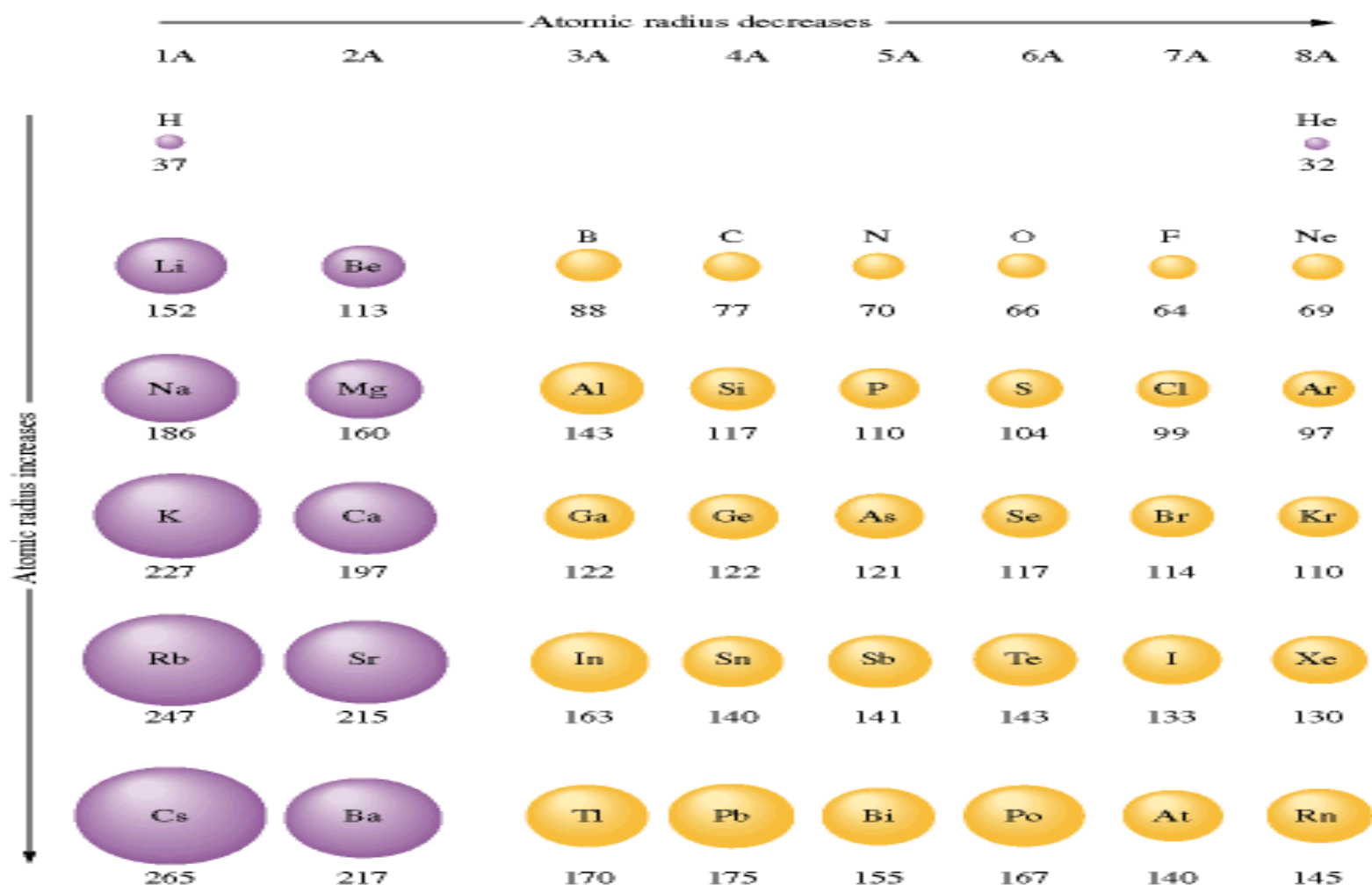
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr



As we move from left to right in a period, the number of electrons in the outer shell of the atom increase. This increases the force of attraction between nucleus and electrons in outer shell.

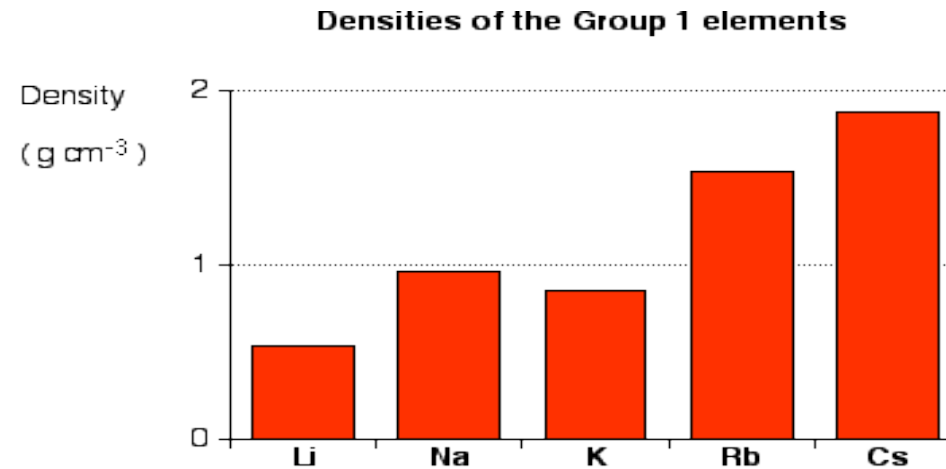
Due to this increased force, the size of the atom shrinks towards the nucleus, and hence the size decrease.



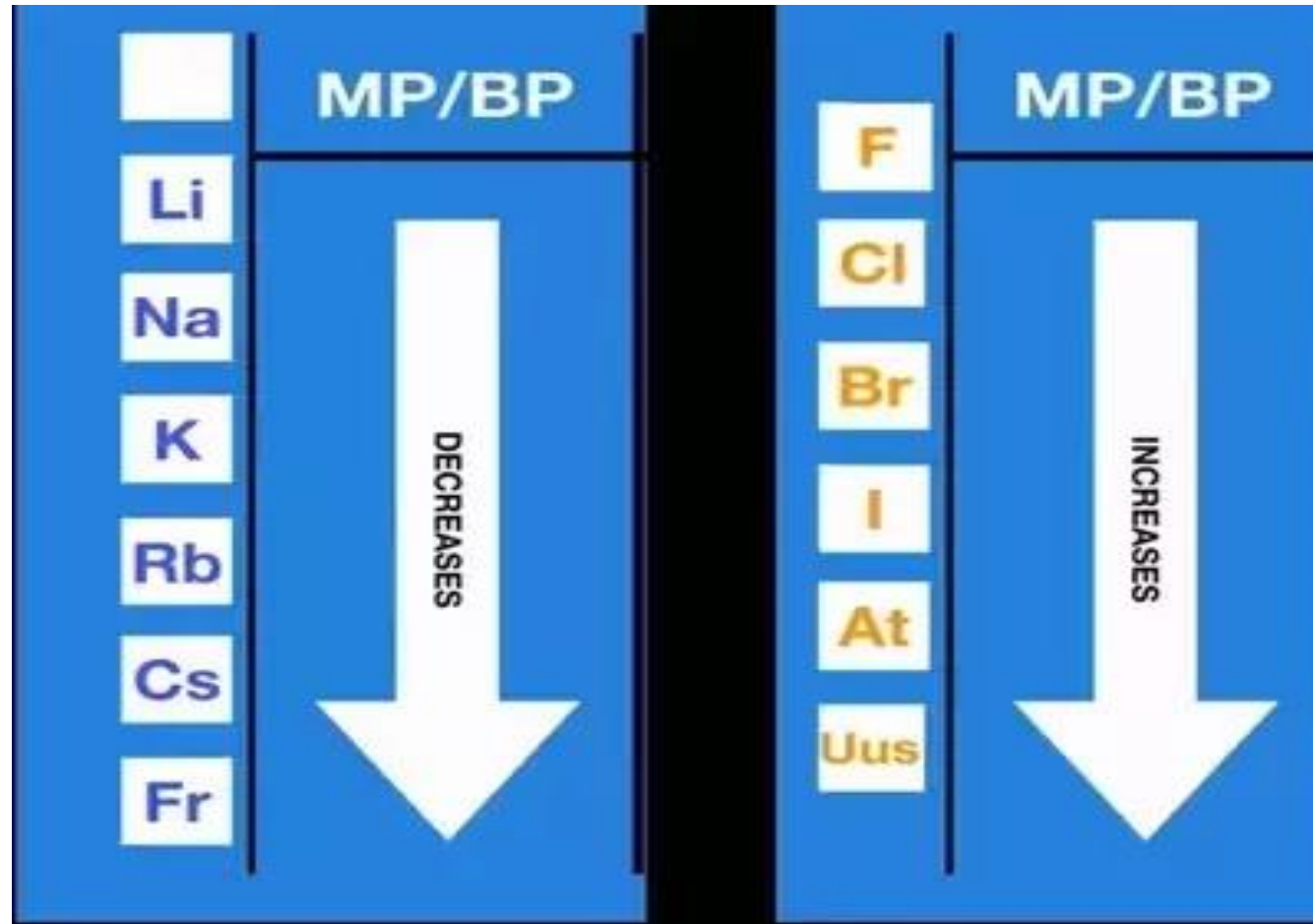


Density

- Density also displays a periodic trend – atomic density increases from top to bottom but varies less as one moves from left to right across a period.
- Density depends different factors, one of them is the size of the atom.



Trends in Melting Point & Boiling Point,





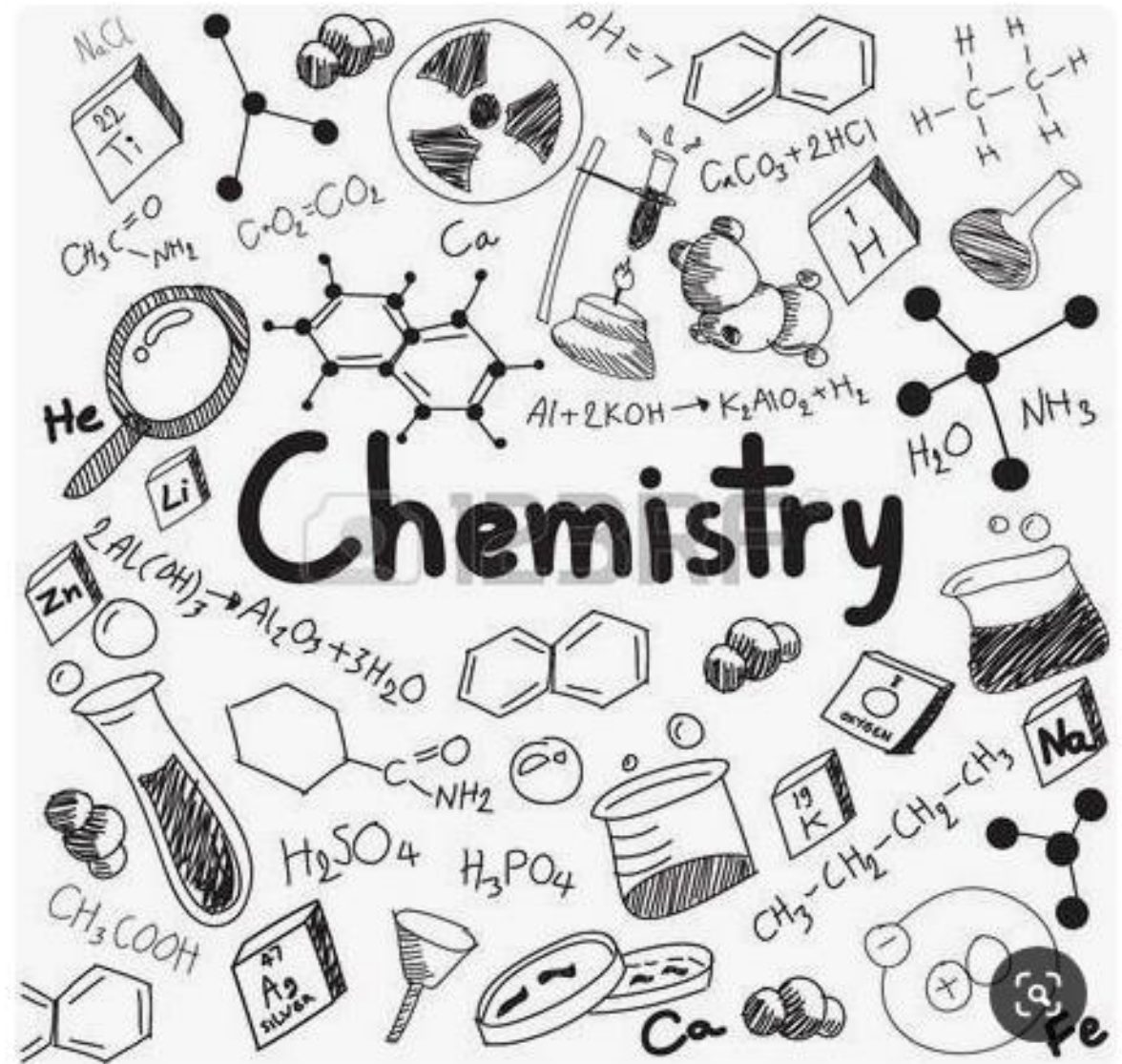
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Objective:

1. To describe trends in reactivity in the periodic table (Groups 1,2).

Resources:

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Videos

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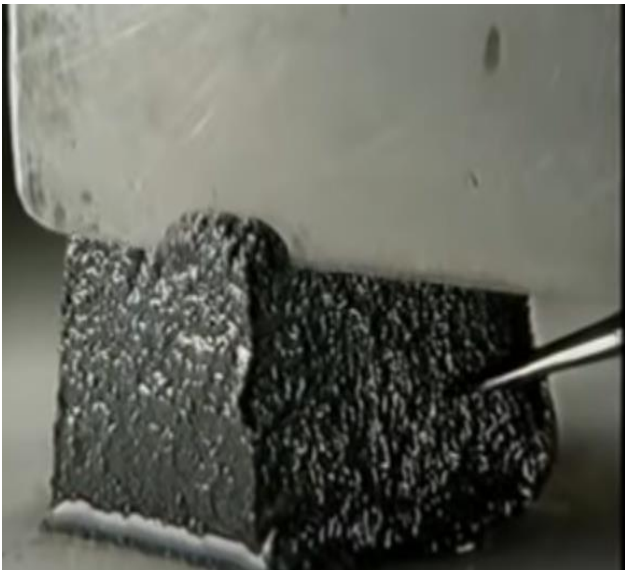
Group 1

Elements of group 1 are stored under oil (Vaseline oil) to prevent any unwanted reaction with oxygen in the air.



- Elements of group 1 are soft. They can be easily cut.
- They get softer as you go down the group.
- Once you cut them, they start to tarnish, forming a layer of metal oxide.

Li



Na



K





3L6507 [RM] © www.visualphotos.com

Li



Na



K

- Elements of group 1 have low density, they float on the surface of water.
- They react with water to form metal hydroxide and hydrogen gas is produced.
- When the product is tested with universal indicator, a blue solution appears, meaning that the product is alkali.

Group 2

Elements of group 2 are solid, they have harder structure comparing to elements of group 1.

They have higher melting point and boiling point comparing to group 1.



Mg



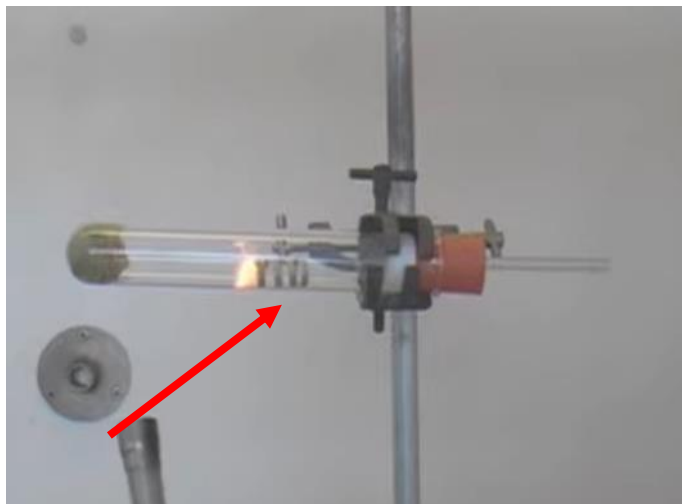
Ca



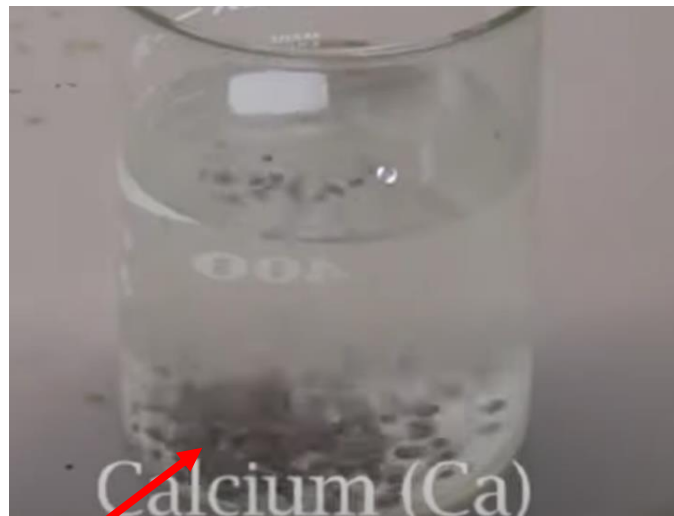
Sr



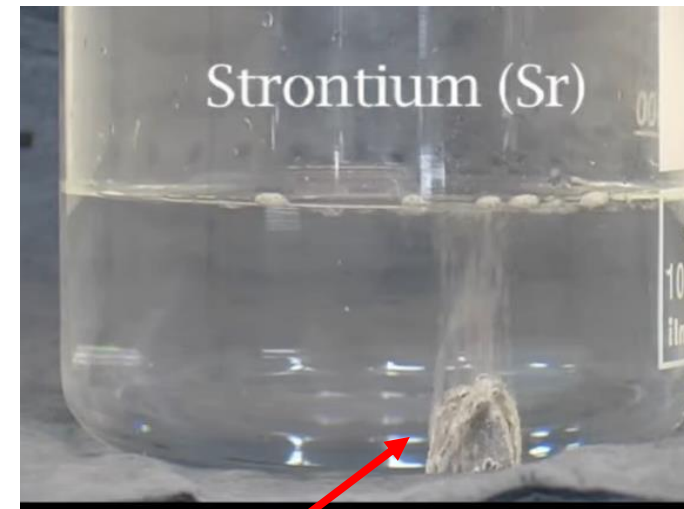
Ba



Mg



Ca



Sr

- Elements of group 2 have high density, comparing to group 1 elements.
- They react with water (except for Be, and Mg reacts with steam) to form metal hydroxide and hydrogen gas is produced. The reactivity increases as you go down the group.
- When the product is tested with universal indicator, a blue solution appears, meaning that the product is alkali.