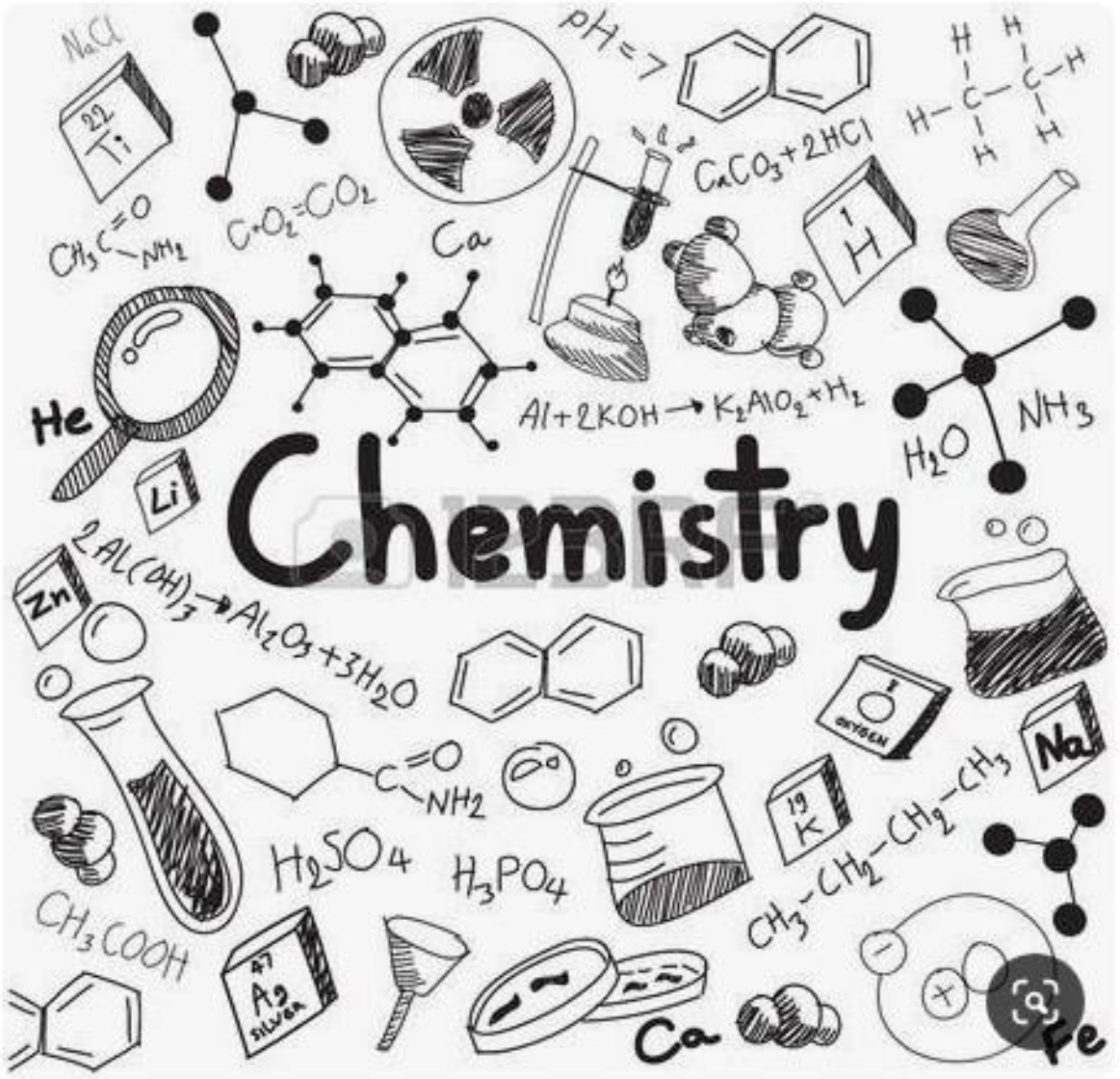
The National Orthodox School Shmaisani

Lesson : (Trends in the periodic table)

Scholastic Year: 2022-2023

Grade: 8CS

Date: October 2022



Objective:

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

Resources:

Power point presentation

Videos

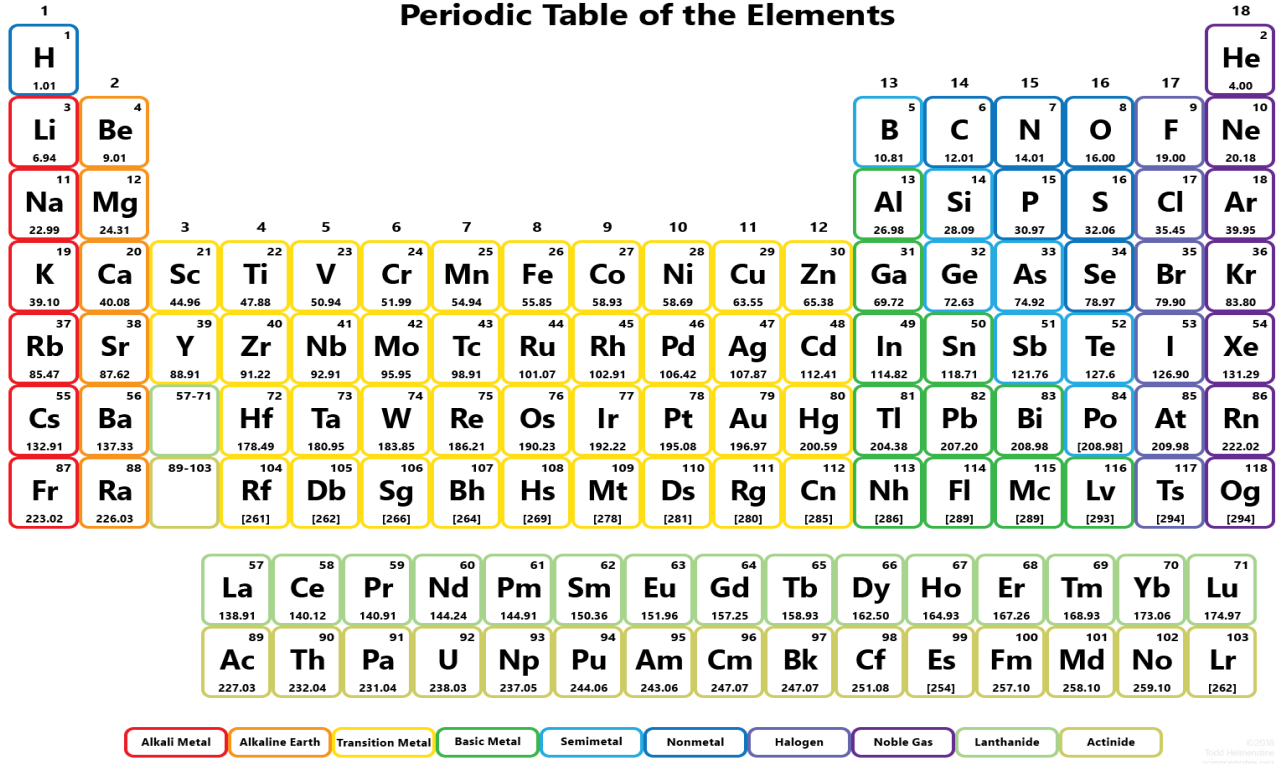
Complete Chemistry for Cambridge Secondary 1

Trends in the periodic table

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

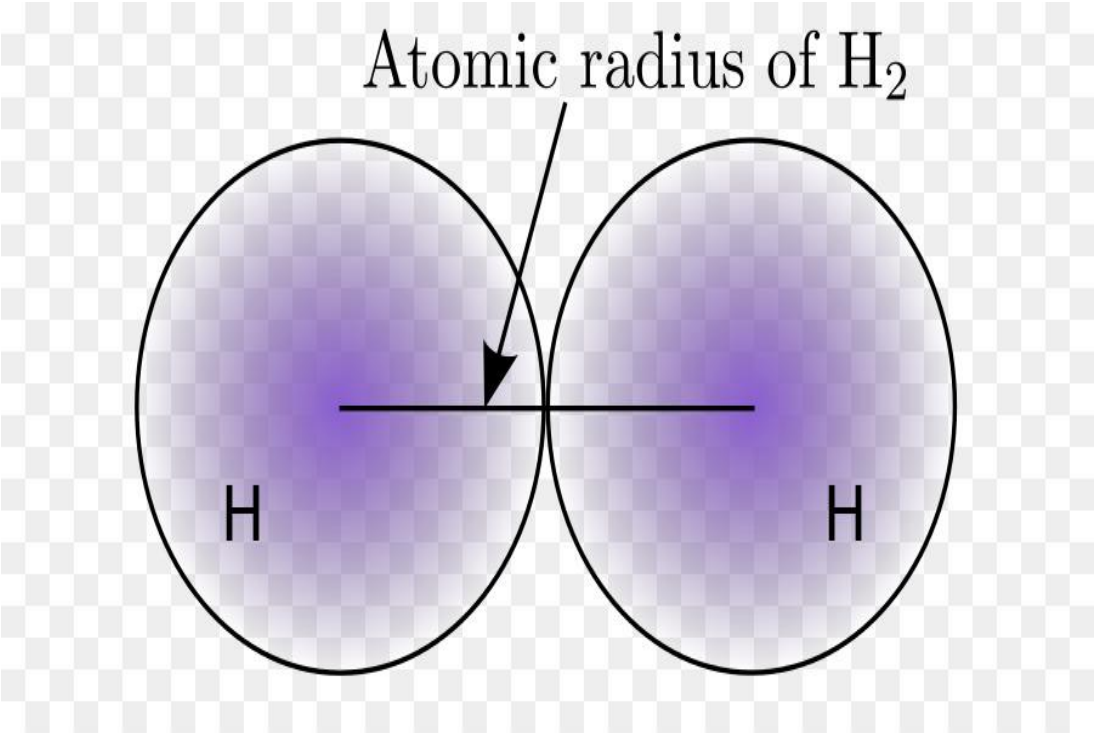
some properties:

- **Atomic radius**
- **Density**
- **Melting point/boiling point**



Atomic Radius

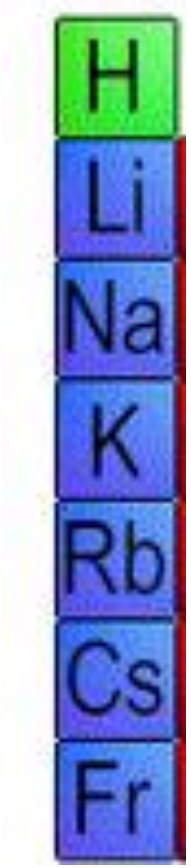
The **atomic radius** of an element is a measure of the size of its **atoms**, usually it is the distance from the center of the nucleus to the boundary of the surrounding shells of electrons.

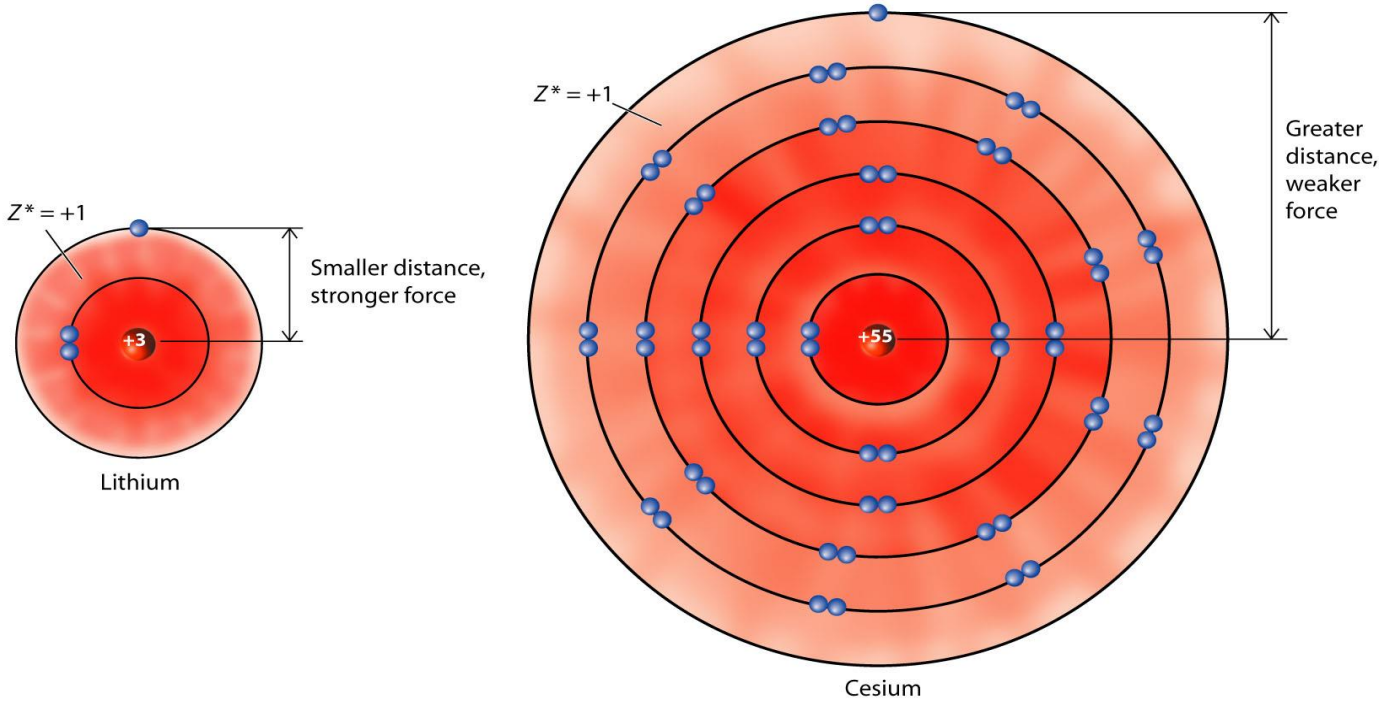


The atomic radius is affected by

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.**

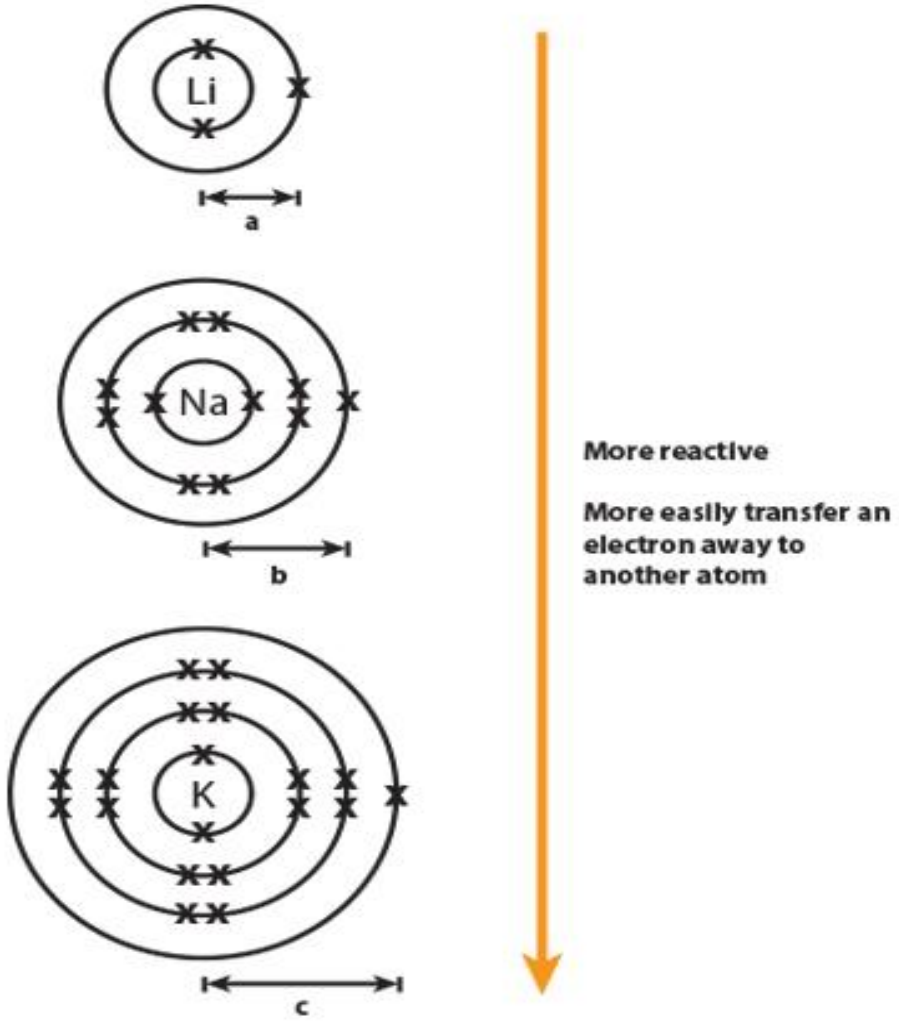




Reactivity of Group 1 &2

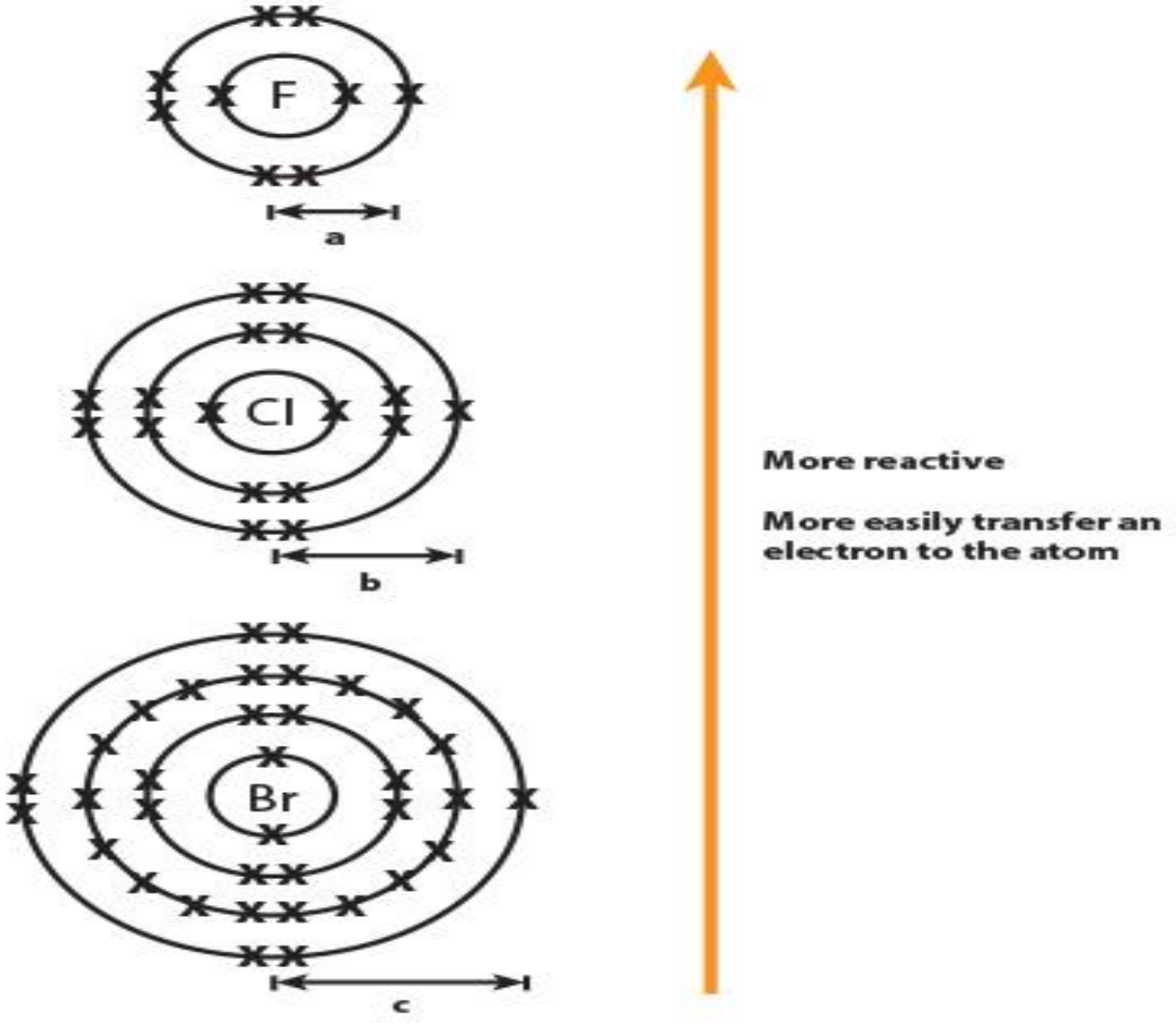
The reactivity of group 1& 2 elements increases as you go down the group because:

- 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.



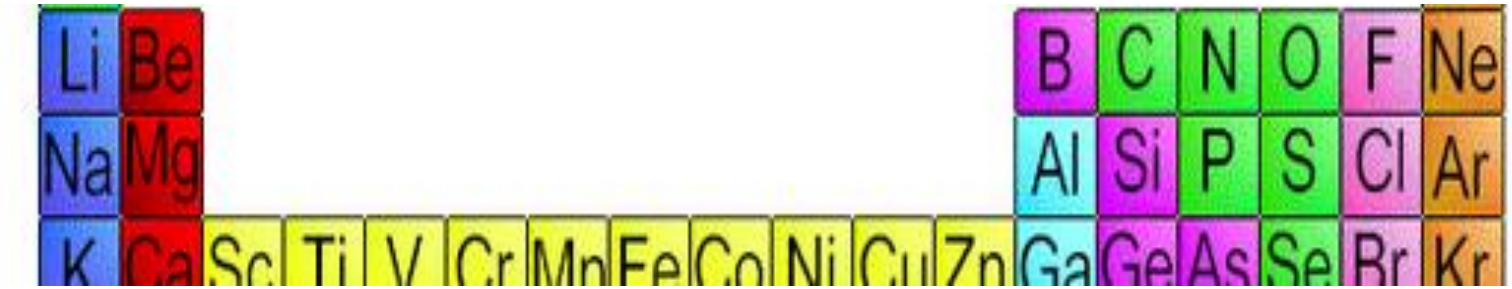
Reactivity of Group 7

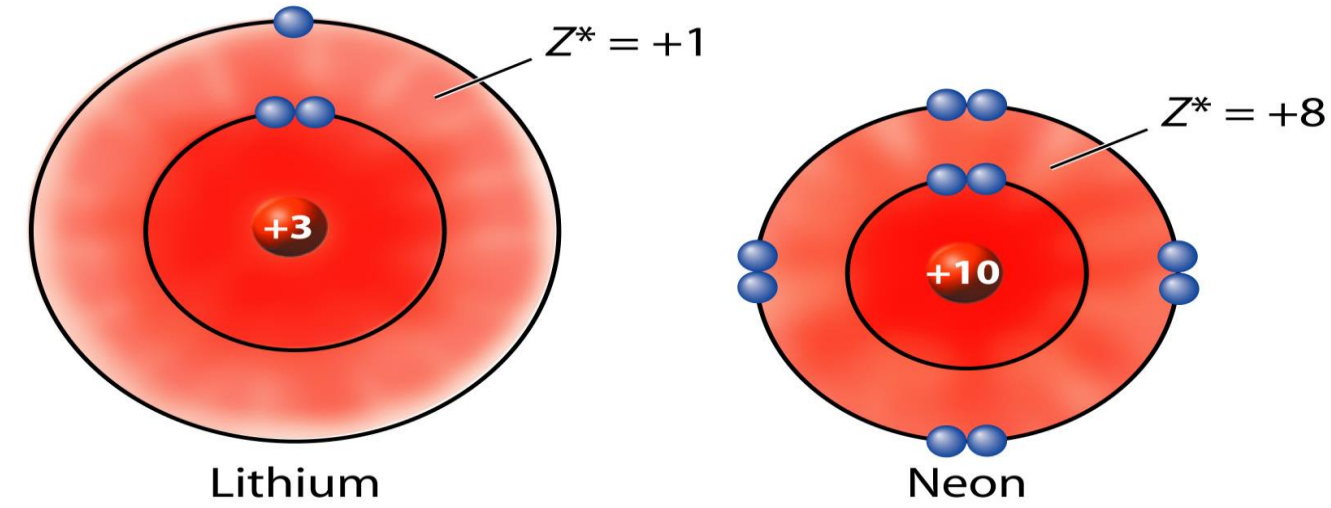
Halogens from bromine to fluorine get more reactive because the force of attraction between the nucleus and the outer electron get stronger as you go up group 7 elements.



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

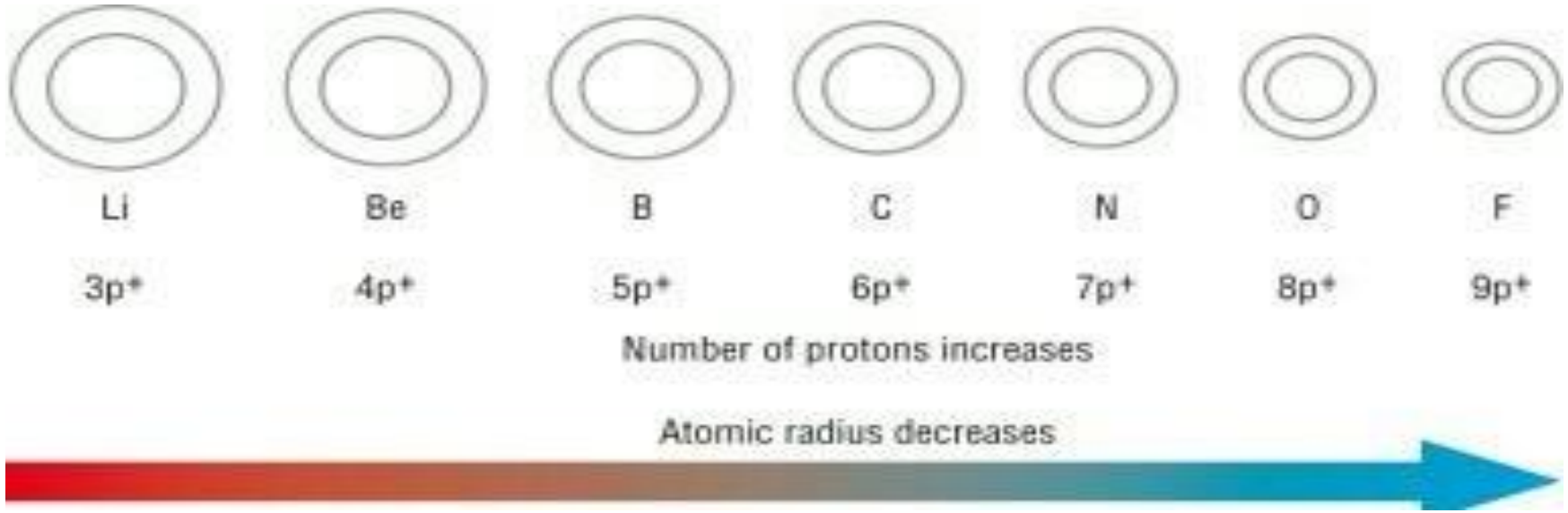
because of greater PPP "proton pulling power"

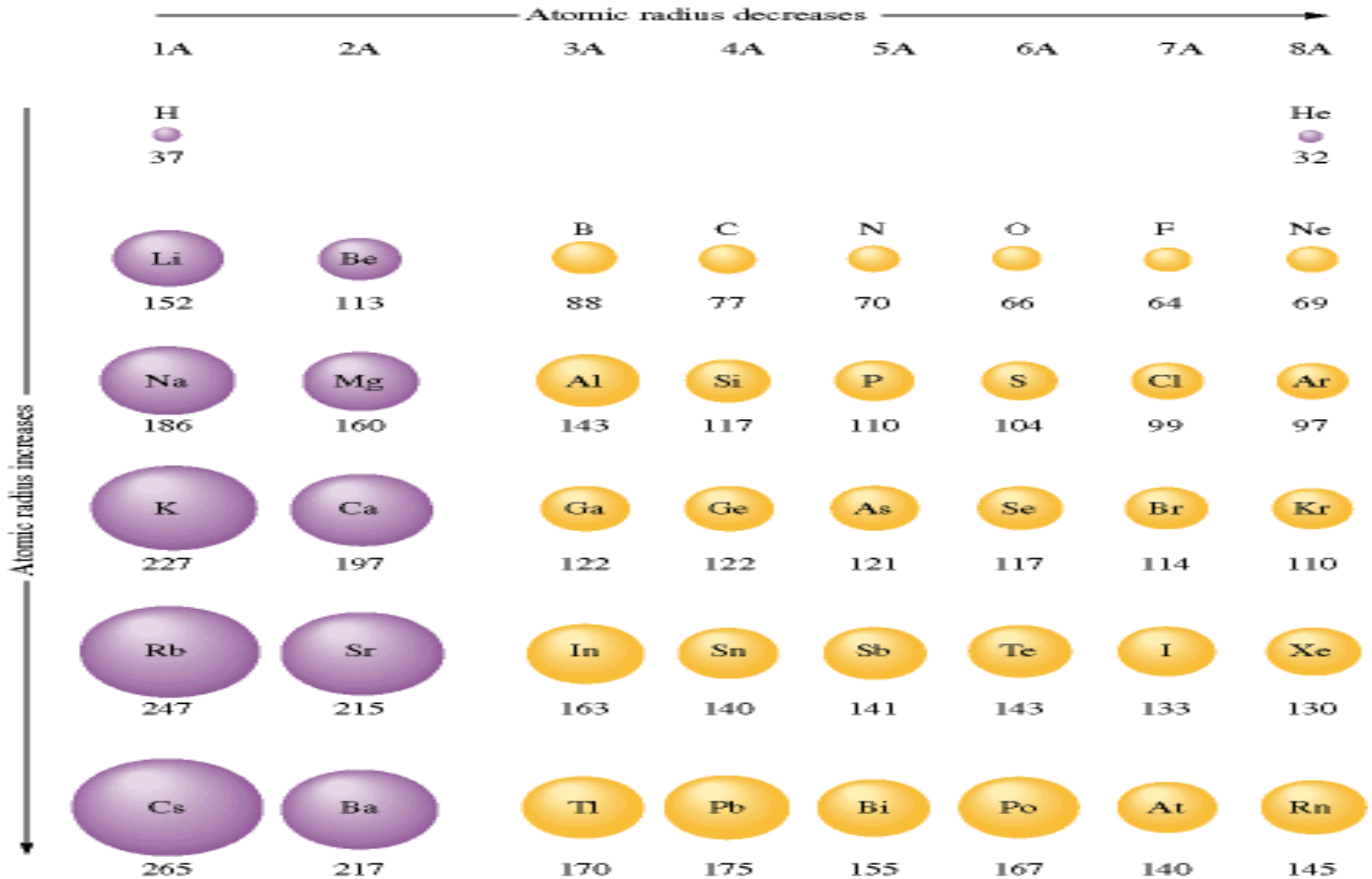




As we move from left to right in a period, the number of electrons in the outer shell of the atom increase. This increases the force of attraction between nucleus and electrons in outer shell.

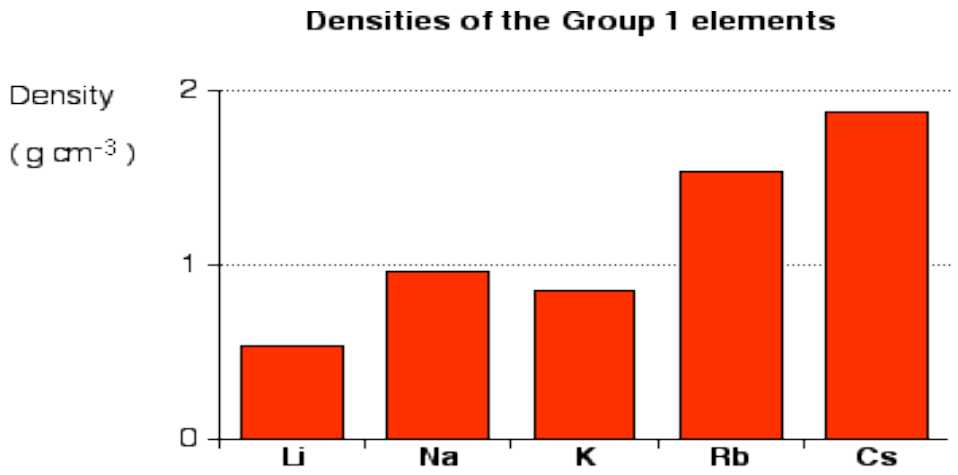
Due to this increased force ,the size of the atom shrinks towards the nucleus, and hence the size decrease.



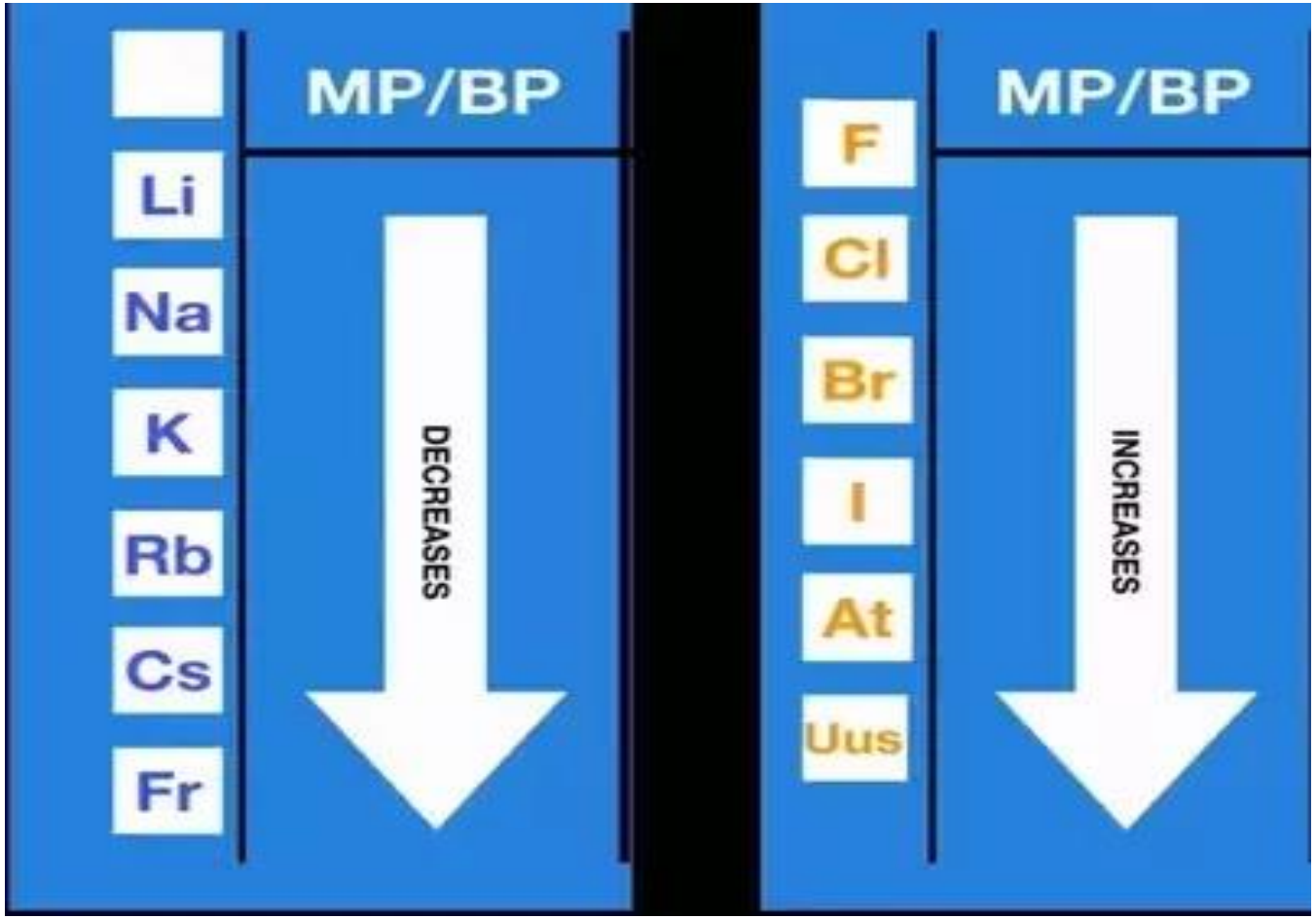

Atomic radius decreases
1A
2A
3A
4A
5A
6A
7A
8A
H
37
He
32
B
C
N
O
F
Ne
Li
Be
152
113
88
77
70
66
64
69
Na
Mg
Al
Si
P
S
Cl
Ar
186
160
143
117
110
104
99
97
K
Ca
Ga
Ge
As
Se
Br
Kr
227
197
122
122
121
117
114
110
Rb
Sr
In
Sn
Sb
Te
I
Xe
247
215
163
140
141
143
133
130
Cs
Ba
Tl
Pb
Bi
Po
At
Rn
265
217
170
175
155
167
140
145
Atomic radius increases

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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Lesson : (Reactivity of group 1,2 elements)

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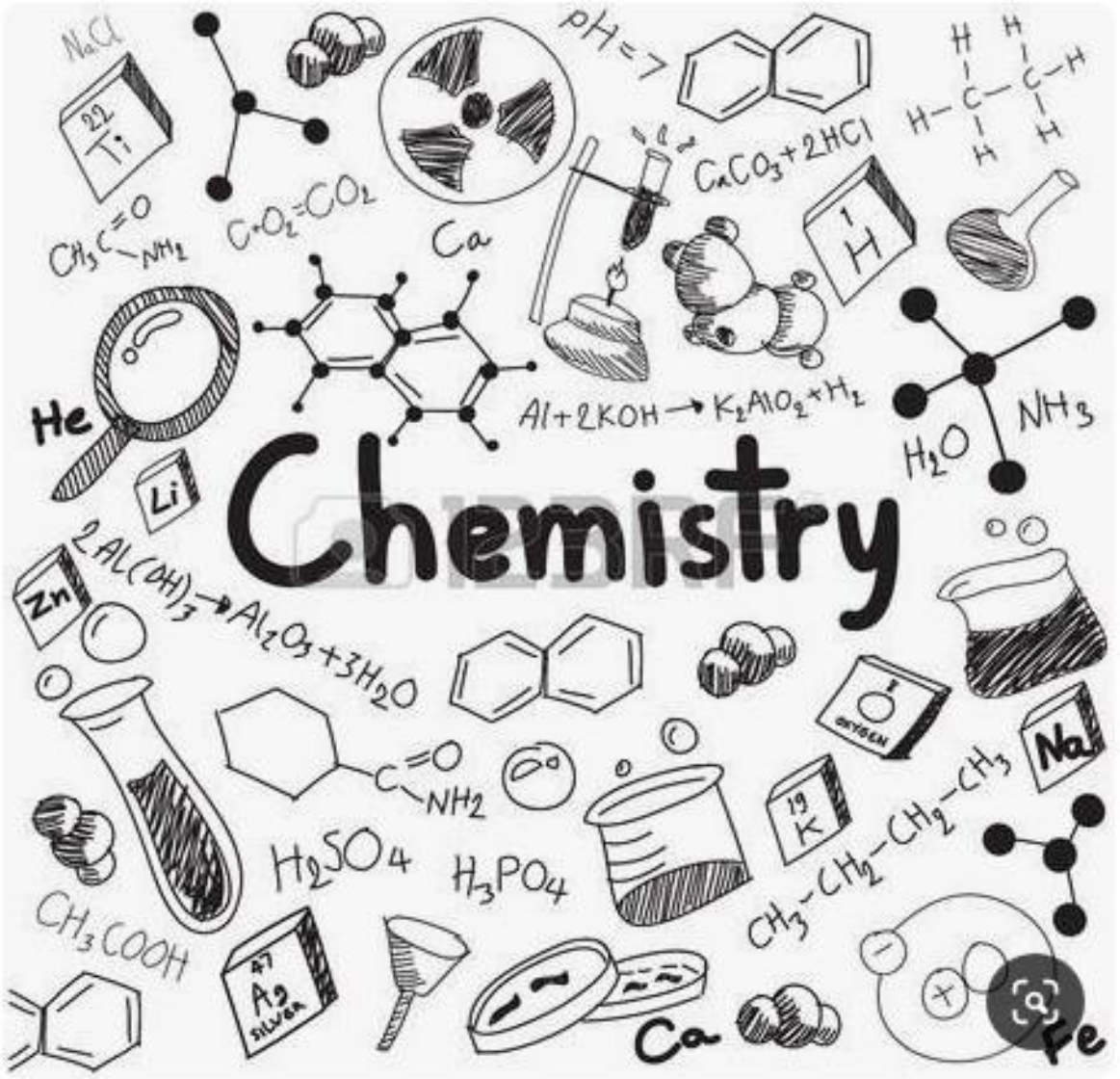


Objective:

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

Resources:

Power point presentation

Videos

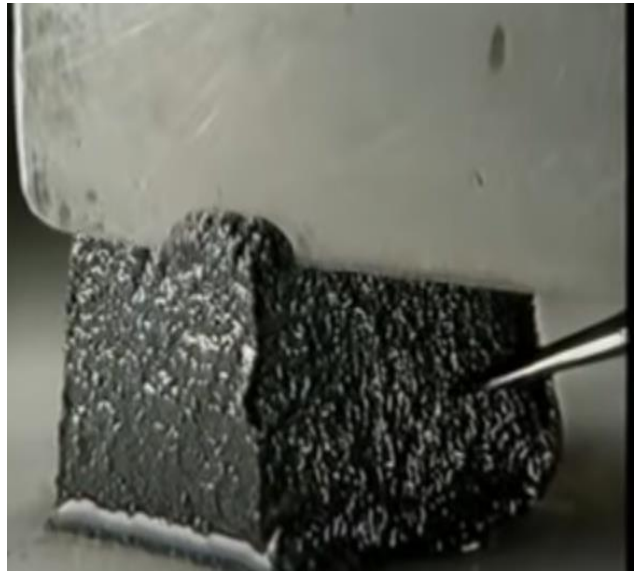
Complete Chemistry for Cambridge Secondary 1

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.

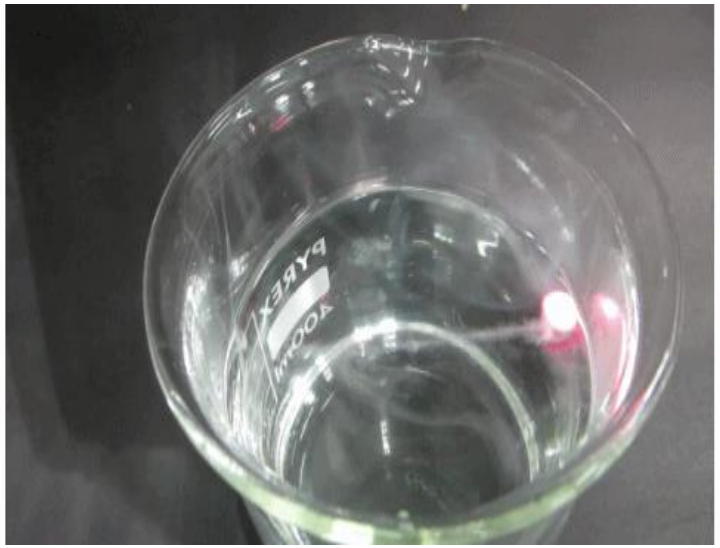
Li



Na

K

Li



Na

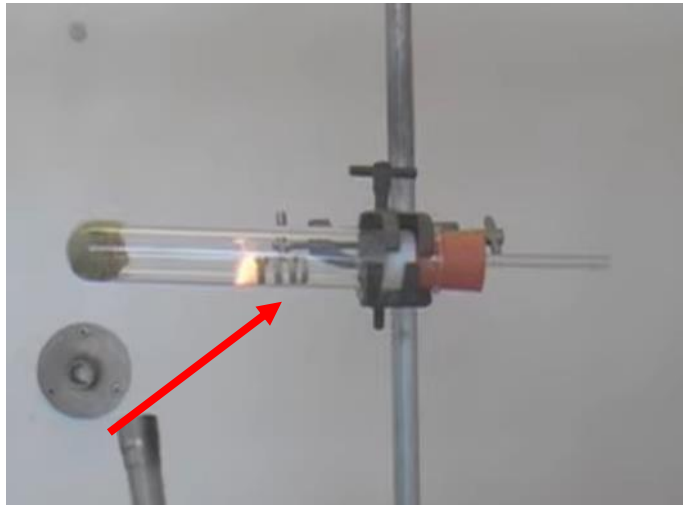
K

- 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

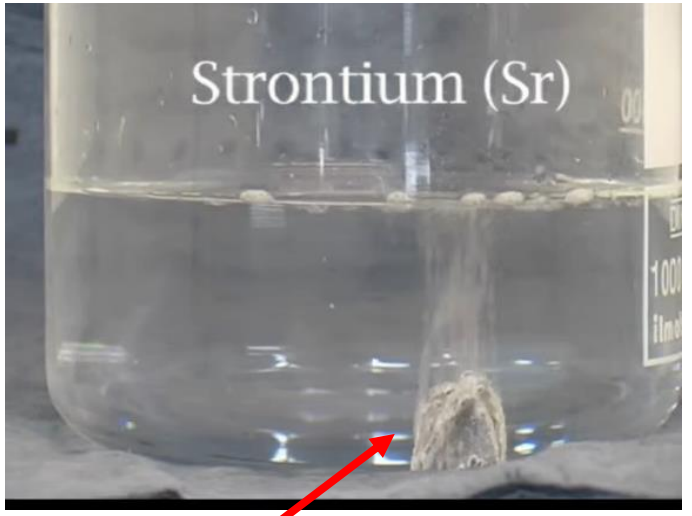
Elements of group 2 are solid, they have harder structure comparing to elements of group 1.

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



Mg

Ca



Sr

- 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.