

# Periodic Table

- Periods - increasing atomic # Left → Right
- Groups - elements with similar properties
- Metal & non-metal boundary
- Metalloids reside along it
- BCNO Family

Period 1 →	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
← Group 1	H	Alkali Metals												BCNO Family				Noble Gases	
← Group 2		Alkali Metals																	
← Group 3																			
← Group 4																			
← Group 5																			
← Group 6																			
← Group 7																			
← Group 8																			
← Group 9																			
← Group 10																			
← Group 11																			
← Group 12																			
← Group 13																			
← Group 14																			
← Group 15																			
← Group 16																			
← Group 17																			
← Group 18																			

← Period 1  
← Period 2  
(valence e<sup>-</sup> shell empty)

• Halogens - highly reactive  
• Noble Gases - inert  
• Noble Gases (nonreactive) - full valence e<sup>-</sup> shell  
• Helium (inert)

Lanthanide Series																			
Actinide Series																			

Actinides - radioactive  
Synthetic (manmade)






• Alkali & Alkaline highly reactive  
valence e<sup>-</sup> shell empty  
ex: "Na Sodium"

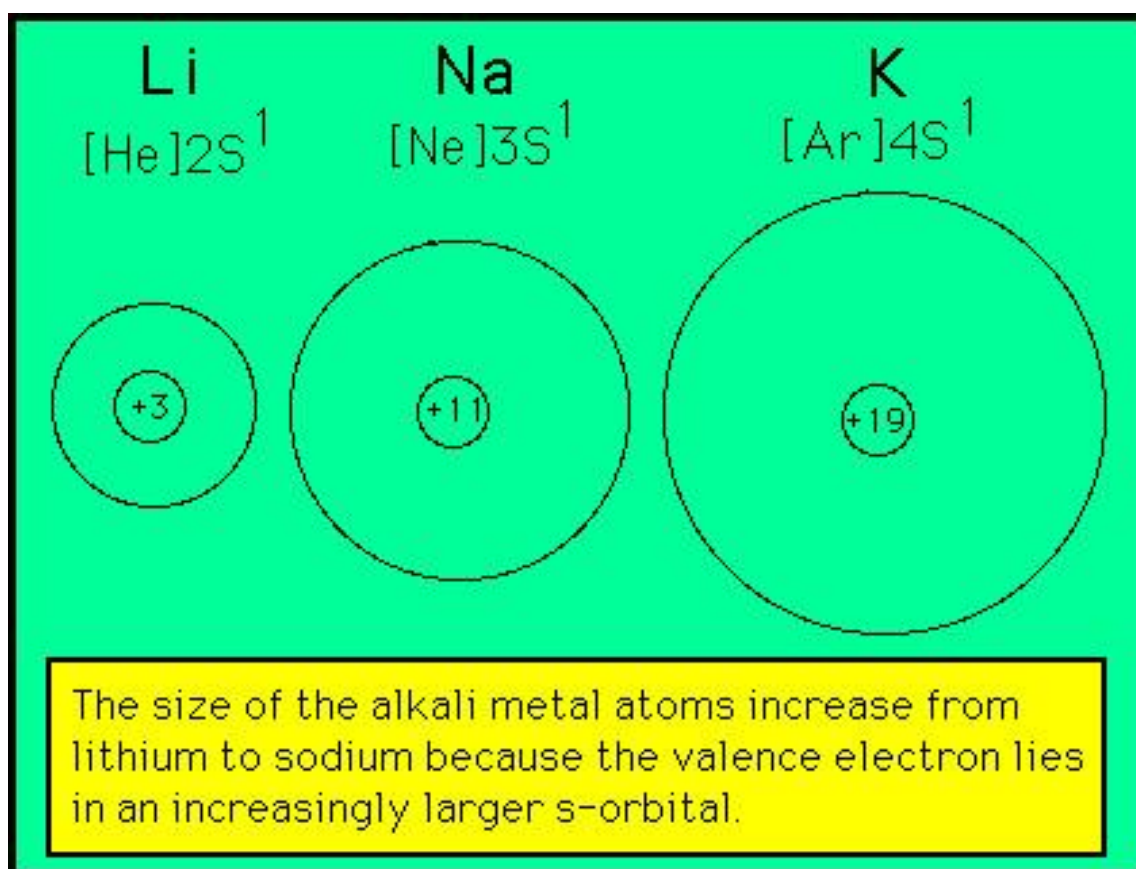




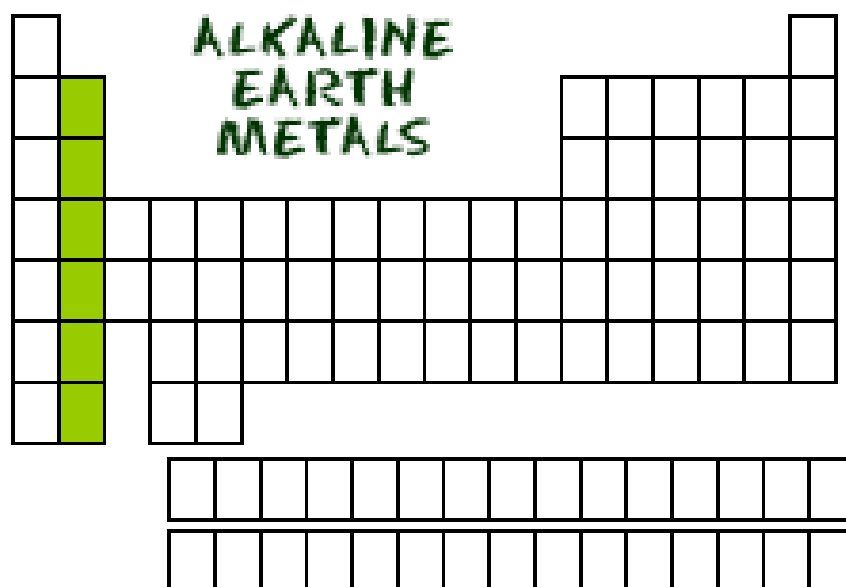
## STATION 4

### Group I The Alkali Metals

			Electronic configuration	
LEAST REACTIVE  ↓  MOST REACTIVE	Li	Lithium	<b>2,1</b>	
	Na	Sodium	<b>2,8,1</b>	
	K	Potassium	<b>2,8,8,1</b>	
	Rb	Rubidium	2,8,8,18,1	
	Cs	Cesium	2,8,8,18,18,1	
	Fr	Francium	2,8,8,18,18,32,1	



## STATION 4



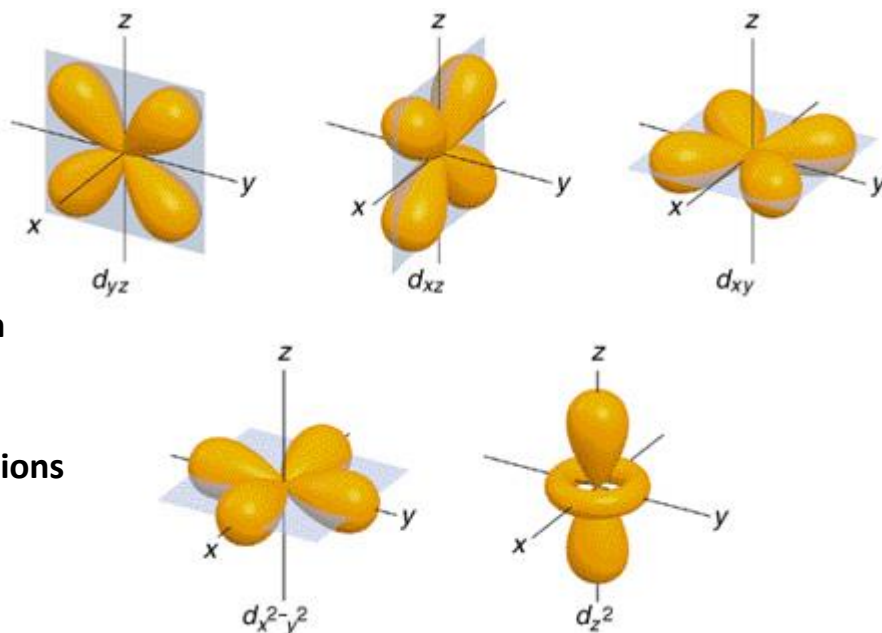
- All alkaline earth metals have 2 valence electrons
- Alkaline earth metals are less reactive than alkali metals
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- The word “alkaline” means “basic” – common bases include salts of the metals  
 $\text{Ca(OH)}_2$   $\text{Ca(OH)}_2$   $\text{Mg(OH)}_2$   $\text{Mg(OH)}_2$

Below- see relative sizes of the alkaline metals

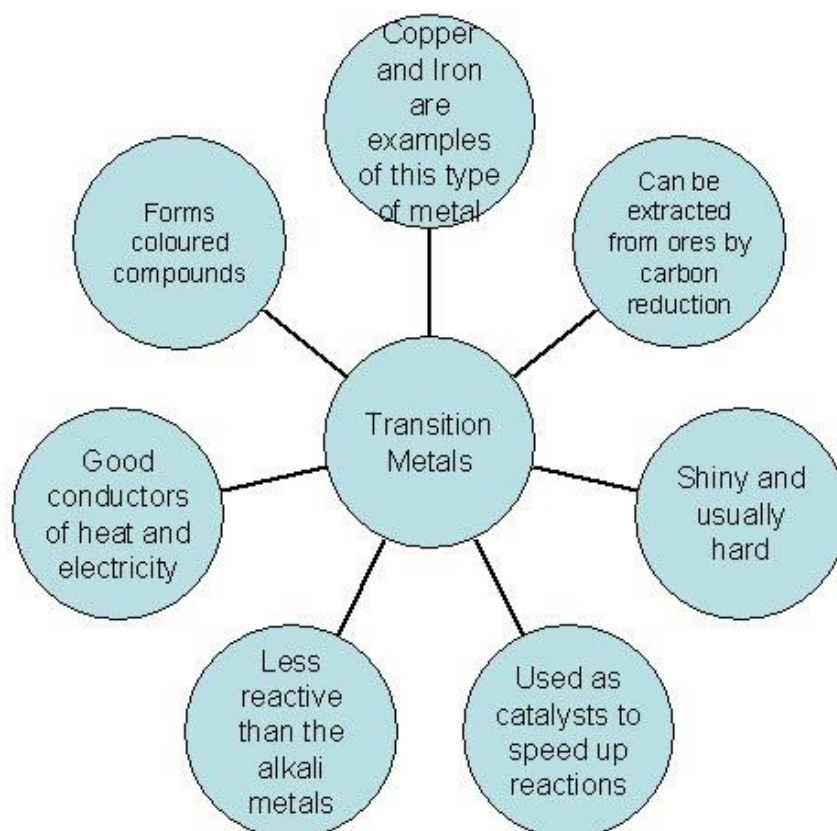


## Transition Metals

- Mercury (Hg) is the only transition metal that is not a solid.
- The transition metals all have valence electrons in a  $d$  subshell.
- Like other metals, transition metals form cations not anions.



Various transition  
Metal electron d-  
Subshell configurations



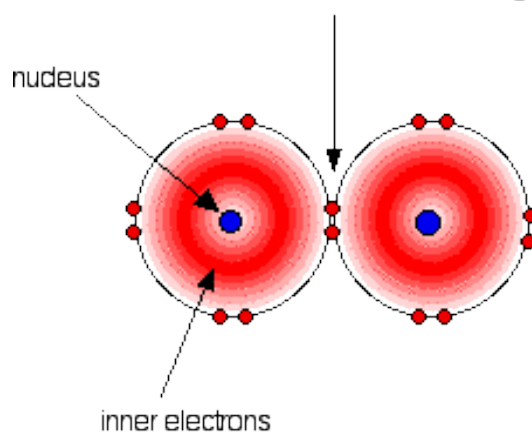
STATION 6

# Halogens

17

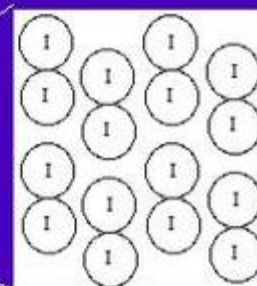
9	19.0
<b>F</b>	Fluorine
17	35.5
<b>Cl</b>	Chlorine
35	79.9
<b>Br</b>	Bromine
53	126.9
<b>I</b>	Iodine
85	210
<b>At</b>	Astetine

The bonding pair is quite close to both nuclei, and so the bond is strong.



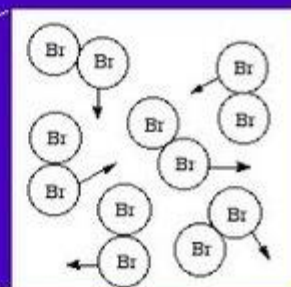
iodine  
 $I_2$

**solid**



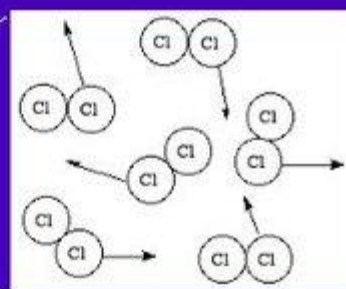
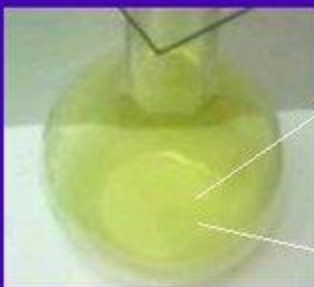
bromine  
 $Br_2$

**liquid**



chlorine  
 $Cl_2$

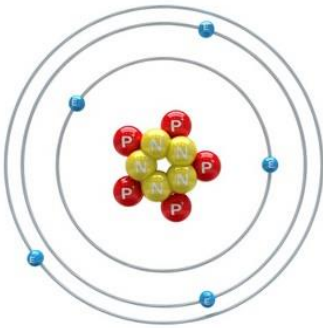
**gas**



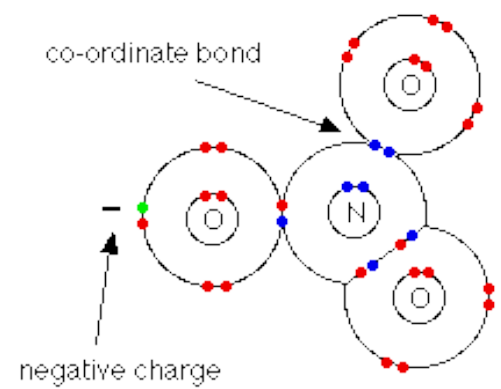
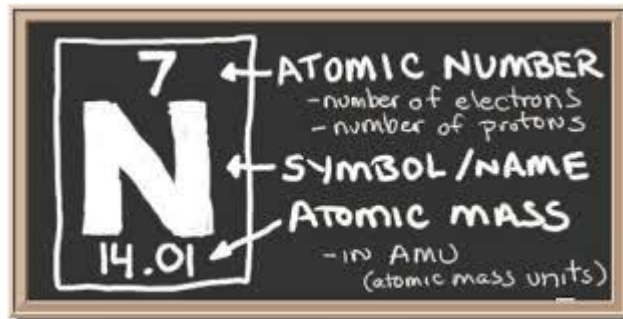
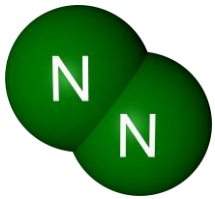
STATION 5 –

Other nonmetal -- The BNCO Family

Boron



Nitrogen



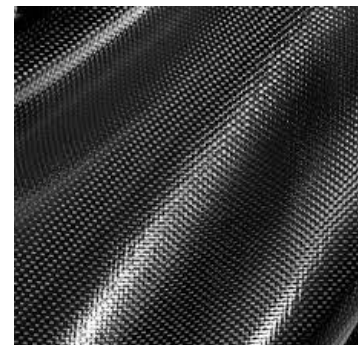
Carbon



Charcoal

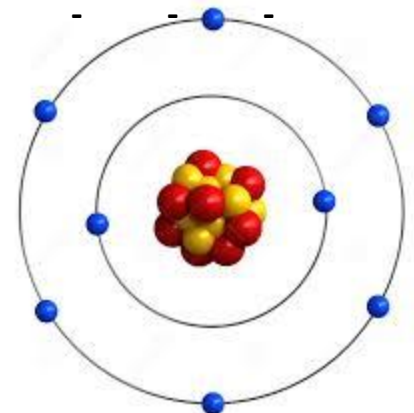
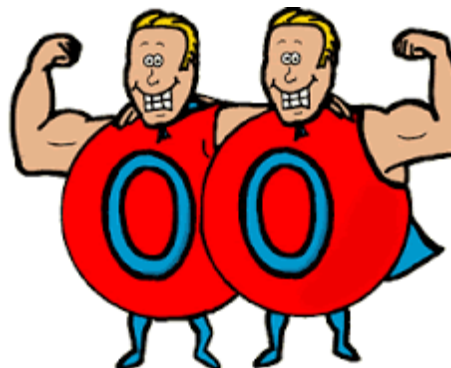


diamond



carbon – fiber

Oxygen



## Station 7