



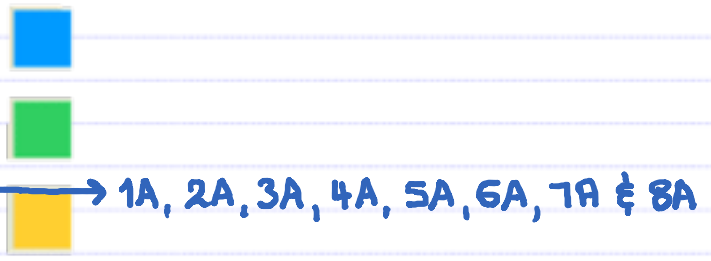
2.5

# What Is the Periodic Table

*Groups – Periods – Main Group – Transition Metal – Lanthanide – Actinide*

## Periodic Table Structure

- Groups ▶
- Main Group Elements ▶
- Transition Group Elements ▶
- Periods ▶
- Lanthanides and Actinides ▶
- Metals ▶
- Nonmetals ▶
- Metalloids ▶
- Alkali Metals ▶
- Alkaline Earth Metals ▶
- Halogens ▶
- Noble Gases ▶



1A	2A																			8A	
H																				He	
Li	Be																				Ne
Na	Mg	3B	4B	5B	6B	7B	8B	1B	2B	Al	Si	P	S	Cl	Ar						
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr				
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe				
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn				
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	110	111											
		GROUPS → 1										Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu									
		GROUPS → 2										Th Pa U Np Pu Am Cm Bk Cf Es Fm Md No Lr									

1. LANTHANIDES.
2. ACTINIDES.



## 2.5 What Is the Periodic Table – *The Seven Diatomics*

# Periodic Table Structure

Groups

Main Group Elements

Transition Group Elements

Periods

Lanthanides and Actinides

Metals

Nonmetals

Metalloids

Alkali Metals

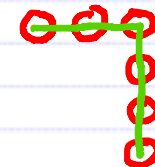
Alkaline Earth Metals

Halogens

Noble Gases



# Element 7



1A	2A											3A	4A	5A	6A	7A	8A	
<b>H</b>		$H_2, N_2, O_2, F_2, Cl_2, Br_2, I_2$																He
Li	Be											B	C	<b>N</b>	<b>O</b>	<b>F</b>	Ne	
Na	Mg	3B	4B	5B	6B	7B	8B	1B	2B	Al	Si	P	S	<b>Cl</b>	Ar			
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	<b>Br</b>	Kr	
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	<b>I</b>	Xe	
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn	
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	110	111								
		Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu			
		Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr			



### 3.5 What Is an Ionic Bond and What Holds It Together – *Coulomb's Law*

#### Coulomb's Law

stationary  
ion



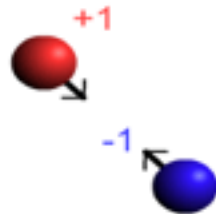
+1

mobile  
ion



-1

See Class Web Site.



FA: FORCE OF ATTRACTION

a) Magnitude of the charges

b) Distance between them

↳ plays a significant role when the distance gets very small.

Force of Attraction =  $3.7 \times 10^{-9}$  N

Distance = 2.50 Å

### 3.5 What Is an Ionic Bond and What Holds It Together

Which of the following three salts have the greatest force of attraction?  
(*Assume that the distance is constant*)



a) AlP ✓

b) NaI

c) CaO

AlP

Al ... Group 3A ... +3  
P ... Group 5A ... -3

NaI

Na ... Group 1A ... +1  
I ... Group 7A ... -1

CaO

Ca ... Group 2A ... +2  
O ... Group 6A ... -2

### 3.5 What Is an Ionic Bond and What Holds It Together

Which of the following salts would you expect to be soluble in water?  
(Assume that the distance is constant)



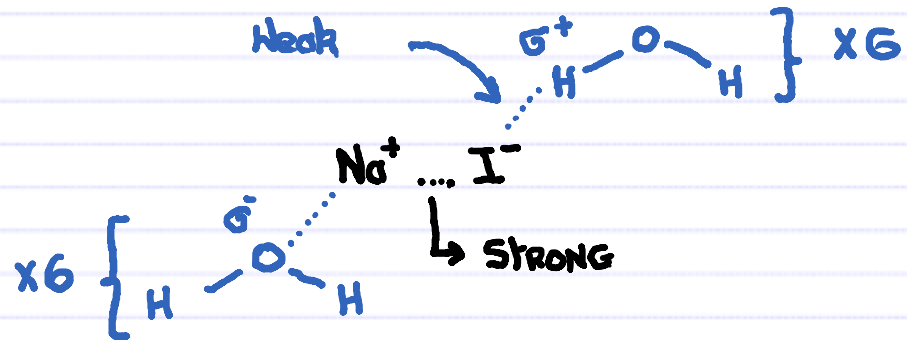
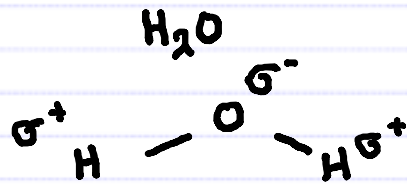
a) AlP

b) NaI ✓

c) CaO

The one with the smallest FA

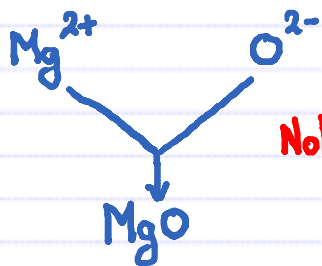
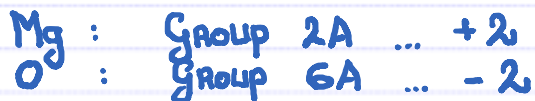
EXPLANATION ... a prelude to a future topic!



## 3.6 How Do We Predict Formulas and Name Ionic Compounds.

### A Binary Compounds

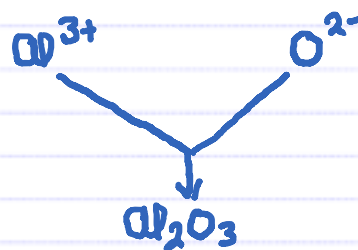
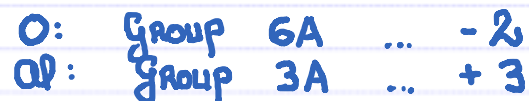
What is the **formula** and **name** of the ionic compound produced by **Magnesium** and **Oxygen**?



**Note:** Cation placed first and named first.

Magnesium oxide

Formula and **name** for the ionic compound produced by **Oxygen** and **Aluminum**?



Aluminum oxide