

## Purpose:

How does the periodic table help predict the ratios of atoms in an *ionic* compound?

## WARMUP :

Molecular compounds are made from molecules contain (~~metals~~ / nonmetals / ~~both metals and nonmetals~~) and when dissolved in water they (~~do~~ don't) conduct electricity.

Ionic compounds are made from molecules contain (~~metals~~ / ~~both metals and nonmetals~~) and when dissolved in water they (do / ~~not~~) conduct electricity.

#1 The charge on an electron is

(-?) **negative**

#2 Definitions

Neutral Atoms

Are usually written as just their letter for that element. **C, S, K**

Ions

Are atoms that became charged when they either gained or lost electrons. **C<sup>4-</sup>, S<sup>2-</sup>, K<sup>+</sup>**

Cations ions that have a positive charge. They form because electrons have been removed from a neutral atom.

Anions ions that have a negative charge. They form because electrons have been added to a neutral atom.

#3 The Periodic Table is organized by Groups and Periods.

Groups – Vertical columns

Periods – Horizontal Rows

Number yesterday's table to show this.

#4 (the Purpose)

ionic compound	the metal is from	the nonmetal is from	in what ratio
$\text{Na}_3\text{N}$	Group 1	Group 15	3:1
$\text{Na}_3\text{P}$	Group 1	Group 15	3:1
$\text{Na}_2\text{O}$	Group 1	Group 16	2:1
$\text{NaF}$			
$\text{NaBr}$			

Name \_\_\_\_\_

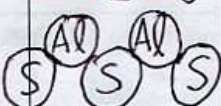
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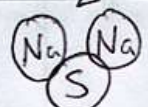
## Chemistry – Unit 6 Worksheet 1

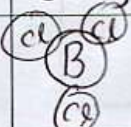
We have observed evidence that when M-NM compounds are dissolved, the metal particles tend to form positively charged ions (cations), while non-metal particles tend to form negatively charged ions (anions). However, when these same metal and non-metal particles are combined to form compounds they do not conduct electricity as solids. We will now examine the patterns that exist for the ratios in which these elements combine in order to determine the charges of the ions they form.

1. Write the formula and draw the particle diagram for each compound.

*The ratio of ions in each compound is given.*

Atoms involved	1 calcium 1 oxygen	2 lithium 1 oxygen	2 aluminum 3 sulfur	1 beryllium 1 sulfur
formula	CaO		Al <sub>2</sub> S <sub>3</sub>	
particle diagram				

Atoms involved	2 boron 3 oxygen	1 magnesium 1 oxygen	2 sodium 1 sulfur
formula	B <sub>2</sub> O <sub>3</sub>		Na <sub>2</sub> S
particle diagram			

Atoms involved	1 magnesium 2 chlorine	1 lithium 1 fluorine	1 beryllium 2 bromine	1 boron 3 chlorine
formula				BCl <sub>3</sub>
particle diagram				

Atoms involved	1 sodium 1 chlorine	1 calcium 2 bromine	1 aluminum 3 chlorine
formula			
particle diagram			

2. Write each formula from Question 1 in the boxes corresponding to its elements. For example, the compound formed from sodium and sulfur have been written in the box for sodium and in the box for sulfur. Now add the rest.

1A

Here is a start. Now finish yourself.  
Notice that many squares will have multiple entries.

Hydrogen 1 H						Helium 2 He	
	2A	3A	4A	5A	6A	7A	
Lithium 3 Li $Li_2O$	Beryllium 4 Be	Boron 5 B $BCl_3$	Carbon 6 C	Nitrogen 7 N	Oxygen 8 O $CaO$ $B_2O_3$ $Li_2O$	Fluorine 9 F	Neon 10 Ne
Sodium 11 $Na_2S$ $Na_2S$	Magnesium 12 Mg	Aluminum 13 Al $Al_2S_3$	Silicon 14 Si	Phosphorus 15 P	Sulfur 16 $Na_2S$ $Al_2S_3$ $Na_2S$	Chlorine 17 Cl $BCl_3$	Argon 18 Ar
Potassium 19 K	Calcium 20 Ca $CaO$	Gallium 31 Ga	Germanium 32 Ge	Arsenic 33 As	Selenium 34 Se	Bromine 35 Br	Krypton 36 Kr

3. What patterns do you find in the formulas of the compounds formed in the table in #2?

BIG HINT FOR HOW TO SOLVE =

You should write a half dozen sentences here, similar to this:

"Elements from Group IIA combine with Group VIIA in a ratio of 1:2"