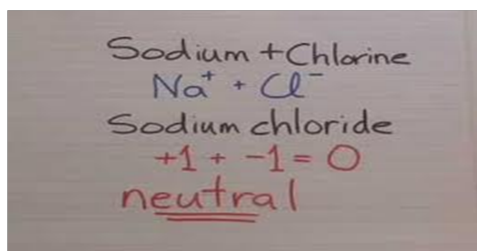


### 5.3 Naming Ionic Compounds



Oct 14-10:35 AM

### Some Formula Definitions

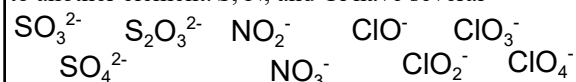
An essential skill in chemistry is writing formulas from chemical names.

Formula Unit: Simplest ratio of the ions in a compound, with an overall charge of **zero**.

Oxidation number: the charge of an ion.

Some metals have multiple oxidation numbers.

Oxyanions: **Negative** ion with **oxygen** atoms connected to another element. S, N, and Cl have several.



Nov 1-9:18 PM

### Monkeys vs. Wizards

Two ways to determine formulas for ionic compounds, BOTH start by writing down what ions are involved.

The Wizard Method: Add ions until charges balance:



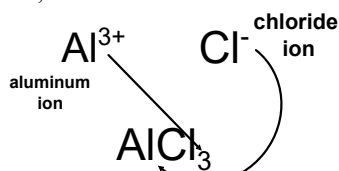
Example: Aluminum Chloride:  
 If you have three negative chloride ions, they cancel the 3+ charge of the aluminum ion.



Nov 1-9:18 PM

### Monkeys vs. Wizards

The Monkey Method: swap charge values between ions, and write the formula:



(Implied subscripted 1 behind Al)

Caution: The formula must be reduced if possible:

Ex:  $\text{Pb}_2\text{O}_4$  becomes  $\text{PbO}_2$ .

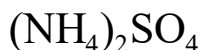
Nov 1-9:18 PM

### Polyatomic Ion Formulas

If multiple polyatomic ions (a group of atoms with a charge) are needed to balance a formula, write the ion in parenthesis, with the number as a subscript.

Example: ammonium sulfate.

Ammonium has 1+ charge, sulfate has 2- charge: it takes two ammonium ions to counter one sulfate ion.



Nov 1-9:18 PM

### Naming Ionic Compounds Process

1. Write cation's name first
2. Name anion.

Note: If cation has multiple oxidation numbers, determine which one is in the formula, and parenthesize the number using Roman Numerals.

Ex:  $\text{PbCl}_2$  - Lead can be 2+ or 4+, but chloride has only a 1- charge. There are two chloride ions, for a total charge of 2-. Lead must be 2+ for balance.

$\text{PbCl}_2$  is **lead (II) chloride**.

Note: chemical names NEVER have super/subscripts.

Nov 1-9:18 PM

## Chem 5.3 Notes - Naming Ionic Compounds.notebook

### 1. Formula Examples:

Write these formulas:

calcium nitrite:  $\text{Ca}(\text{NO}_2)_2$

lead (IV) chloride:  $\text{PbCl}_4$

chromium (II) borate:  $\text{Cr}_3(\text{BO}_3)_2$

silver sulfate:  $\text{Ag}_2\text{SO}_4$

beryllium cyanide:  $\text{Be}(\text{CN})_2$

Nov 1-9:18 PM

### 2. Naming Examples

$\text{Na}_3\text{N}_2$ : sodium nitride

$\text{FeO}$ : iron (II) oxide

$\text{Fe}_2\text{O}_3$ : iron (III) oxide

$\text{KOH}$ : potassium hydroxide

Note: Group 1 and 2 elements only have one oxidation number: don't write "potassium (I) hydroxide"

Nov 1-9:18 PM

### 3. Naming Examples:

Name these:

$\text{LiNO}_3$  = lithium nitrate

$\text{Cr}_3(\text{PO}_4)_2$  = chromium (II) phosphate

$\text{Sn}(\text{SO}_3)_2$  = tin (IV) sulfite

Nov 1-9:18 PM

### Homework

Preview 5.4

5.3 Problems in your Booklet

Due: Next Class

Nov 1-9:24 PM