**Names and Formulas** **Name**_____

# Ionic Compounds Containing Polyatomic Ions

Read from **Lesson 1: Ionic Compounds** in the **Chemistry Tutorial Section, Chapter 4** of **The Physics Classroom**:
**Part b:** Combining Ions to form Ionic Compounds **Part d:** Ionic Compounds Containing Polyatomic Ions

Some ions consist of groups of atoms bonded together that have an overall electric charge. These are called "polyatomic ions" because the ions contain more than one atom. Your teacher may provide a list of polyatomic ions for you to use or memorize. Each polyatomic ion has a specific name, formula, and charge.

**Writing Formulas and Naming Ionic Compounds with Polyatomic Ions:**

1. Name each ion and determine their charges.
2. Crisscross the charges and reduce, if necessary (just like for binary ionic compounds).
   a. Subscripts do not change in polyatomic ions!
   Example: $Na_2SO_4$ Sodium sulfate – the subscripts **2** and **4** do not change nor get reduced.
   b. Use parentheses if more than one polyatomic unit is present.
   Example: $Ca(OH)_2$ Calcium hydroxide - **2** units of hydroxide are indicated outside parentheses.
3. Name the cation first and the anion second.
   The polyatomic ion keeps its name – there is no ending change to **–ide**.

**Complete the following table of ionic compounds with polyatomic ions.**

| Cation | Anion | Compound Name | Compound Formula |
|---|---|---|---|
| $Al^{3+}$ | $OH^-$ | Aluminum hydroxide | $Al(OH)_3$ |
| $NH_4^+$ | $PO_4^{3--}$ | Ammonium phosphate | $(NH_4)_3PO_4$ |
| $Na^+$ | $SO_4^{2-}$ | | |
| $Mg^{2+}$ | $CO_3^{2-}$ | | |
| $Cu^{2+}$ | $NO_3^-$ | | |
| $K^+$ | $PO_3^{3-}$ | | |
| $NH_4^+$ | $Cr_2O_7^{2-}$ | | |
| $Al^{3+}$ | $C_2H_3O_2^-$ | | |
| $Pb^{4+}$ | $PO_4^{3-}$ | | |
| $Sn^{2+}$ | $ClO_2^-$ | | |
| $Ba^{2+}$ | $SO_3^{2-}$ | | |
| $Fe^{3++}$ | $ClO_4^-$ | | |
| $Cr^{6+}$ | $NO_2^-$ | | |

**Names and Formulas**

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| $Al^{3+}$ | $C_2H_3O_2^-$ | | |
| $Pb^{4+}$ | $PO_4^{3-}$ | | |
| $Sn^{2+}$ | $ClO_2^-$ | | |
| $Ba^{2+}$ | $SO_3^{2-}$ | | |
| $Fe^{3+}$ | $ClO_4^-$ | | |
| $Cr^{6+}$ | $NO_2^-$ | | |