Name_____ Date_____ Block_____

Worksheet 2: Practice on Naming and Forming Polyatomic Compounds

Name Ionic Compounds that have: Polyatomic ions

A. Polyatomic ions. "poly" means many. Ions are particles with a positive or negative charge. So polyatomic ions are groups of (many) two or more atoms that have a charge. The *group as a whole shares the charge*. The polyatomic ion is treated just like the negative nonmetals we have been using already. Most polyatomic ion's names end in "**-ate**" some end in "**-ite**". Only a few end in "**-ide**". Most polyatomic ions are negative.

1. Look up the following polyatomic ions Write down the formula (***including the charge***):

ammonium _____	acet**ate** _____	carbon**ate** _____
dichrom**ate** _____	hydroxide _____	nitr**ate** _____
oxal**ate** _____	sulf**ate** _____	phosph**ate** _____
permangan**ate** _____	nitri**te** _____	cyanide _____
sulfite _____	hydrogen carbon**ate** _____	

2. What is common about most of the names of the polyatomic ions?

3. What element do most of the polyatomic ions have in the formula?

4. What type of elements are found in the polyatomic ions? (metal/nonmetal)

Naming ionics with polyatomic ions. Identify the compound as an ionic compound first [begins with a metal and ends with nonmetal(s)]. **You have to recognize the polyatomic ions within the formula**. At first you may incorrectly attempt to name every element in the formula. If the formula *begins with a metal and ends with two or three nonmetals* then it must be a polyatomic ion in the formula.

Steps for naming:
1. Name the metal with its full name.
2. Identify the polyatomic ion at the end of the formula, use its name.

naming examples:

$Ca(NO_3)_2$	*Ca* (**NO_3**) 2	*calcium* **nitrate**
KNO_3	*K* **NO_3**	*potassium* **nitrate**
$Ba(OH)_2$	*Ba* (**OH**) 2	*barium* **hydroxide**
Li_2CO_3	*Li* 2 **CO_3**	*lithium* **carbonate**
$Al_2(SO_4)_3$	*Al* 2 (**SO_4**) 3	*aluminum* **sulfate**
NH_4ClO_3	***NH_4*** **ClO_3**	***ammonium*** **chlorate**

Practice:

5. Name the following:

Name_____ Date_____ Block_____

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$NaOH$ _____ $NaClO_3$ _____

$NaC_2H_3O_2$ _____ $Ca(OH)_2$ _____

$BaSO_4$ _____ $ZnCO_3$ _____

$AlPO_4$ _____ $AgNO_3$ _____

When writing the **formulas for compounds with polyatomic ions from the names,** you need to **balance the charges** just like you did before with binary (only two elements) ionic compounds. last worksheet When a polyatomic ion must be multiplied to make the compound neutral, parentheses must be used so that any subscripts added will apply to the entire polyatomic ion.

examples:

sodium carbonate

- sodium in compounds = Na^{1+} carbonate = CO_3^{2-}
- drop the sign and switch the charge number to be a subscript for the opposite ion:
- $Na_{\mathbf{2}}\ (CO_3)_{\mathbf{1}}$ parentheses around CO_3 not needed since there is just one, do not write the subscript "1".
- Na_2CO_3 = final answer

calcium phosphate

- calcium = Ca^{2+} phosphate = PO_4^{3-}
- $Ca_{\mathbf{3}}\ (PO_4)_{\mathbf{2}}$ distinguish between subscripts used for balancing charge and those that are part of the formula of the polyatomic ion by using parenthesis
- $Ca_3(PO_4)_2$ final answer

6. Write the formulas for the following compounds:

sodium nitrate _____ lithium chlorate _____

potassium acetate _____ magnesium nitrate _____

aluminum sulfate _____ ammonium acetate _____

potassium dichromate _____ sodium sulfate _____

ammonium sulfate _____ potassium nitrate _____