Compound Naming Packet Name_____ Period_____

Naming compounds (AKA, nomenclature) is a very important part of chemistry. To properly name a compound, you must know how the compound is bonded because the type of bond that forms the compound determines the naming rules you must follow. This sheet will address naming **binary ionic compounds**.

Naming Rule: *To name binary ionic compounds, you name the cation (+) first, then you name the anion (-) with an* ***–ide*** *ending. If the formula contains a transition metal, you must* ***use Roman Numerals*** *to indicate the charge of the transition metal.*

Example 1: NaCl = sodium chloride **Example 2:** $FeBr_2$ = Iron (II) Bromide

Name the following ionic compounds using IUPAC nomenclature rules.

1. _____ $BaCl_2$
2. _____ NaF
3. _____ MgS
4. _____ Al_2O_3
5. _____ CaI_2
6. _____ K_2S
7. _____ CaO
8. _____ Ba_3P_2
9. _____ Na_2O
10. _____ BeS
11. _____ Ag_2O
12. _____ CuBr
13. _____ $CuBr_2$
14. _____ FeO
15. _____ Fe_2O_3
16. _____ $CrCl_2$
17. _____ $CrCl_3$
18. _____ $HgBr_2$
19. _____ MnO
20. _____ Mn_2O_3
21. _____ KCl
22. _____ LiBr
23. _____ $FeCl_3$
24. _____ $MgCl_2$
25. _____ $NiBr_3$
26. _____ $AuCl_3$
27. _____ MnS
28. _____ K_2O
29. _____ $CuBr_2$
30. _____ CuBr
31. _____ CaS
32. _____ $MgBr_2$
33. _____ MgI_2
34. _____ Al_2S_3
35. _____ NaBr
36. _____ $SrCl_2$
37. _____ Mg_3N_2
38. _____ BaI_2
39. _____ Al_2O_3
40. _____ $CdBr_2$

41. _____ Ag_3N

42. _____ MgF_2

43. _____ ZnO

44. _____ Ag_2S

45. _____ Ba_3N_2

46. _____ MgF_2

47. _____ LiF

48. _____ AlP

49. _____ BaS

50. _____ Ag_2O

51. _____ $CdCl_2$

52. _____ Li_3N

53. _____ ZnF_2

54. _____ CsCl

55. _____ KF

56. _____ CsF

57. _____ Li_3P

58. _____ NaF

59. _____ K_2S

60. _____ CdI_2

61. _____ CsBr

62. _____ Na_2O

63. _____ LiCl

64. _____ Al_2S_3

65. _____ MgF_2

66. _____ NaI

67. _____ K_2O

68. _____ AgF

69. _____ Sr_3N_2

70. _____ CdS

71. _____ $ZnBr_2$

72. _____ AlF_3

73. _____ Cu_3P_2

74. _____ MgS

75. _____ HgO

76. _____ $CoBr_2$

77. _____ Rb_3P

78. _____ K_2Se

79. _____ Fe_2Se

80. _____ Ag_2S

Naming Ternary Formulas *(AKA Ionic Formulas with a Polyatomic Ion)*

To name a ternary formula containing a polyatomic ion, you name the cation (+) first and the anion (-) second. If you have a polyatomic ion, you DO NOT change it to an –ide ending. If the polyatomic is the cation (+) and the anion (-) is a monatomic ion, you can still add the –ide ending. *If the formula contains a transition metal, you must* ***use Roman Numerals*** *to indicate the charge of the transition metal.*

Example 1: $Li_2Cr_2O_7$ = Lithium dichromate Example 2: $(NH_4)_2O$ = Ammonium oxide

Name the following ionic compounds using IUPAC nomenclature rules.

1. _____ $NaNO_3$
2. _____ $Ca(OH)_2$
3. _____ K_2CO_3
4. _____ NH_4Cl
5. _____ $MgSO_4$
6. _____ $AlPO_4$
7. _____ $(NH_4)_2SO_4$
8. _____ Na_3PO_4
9. _____ $CuSO_4$
10. _____ NH_4OH
11. _____ Li_2SO_3
12. _____ $Mg(NO_3)_2$
13. _____ $Al(OH)_3$
14. _____ $(NH_4)_3PO_4$
15. _____ KOH
16. _____ $Ca(NO_3)_2$
17. _____ K_2SO_4
18. _____ $Pb(OH)_2$
19. _____ Na_2CrO_4
20. _____ $CuCO_3$
21. _____ $PbSO_4$
22. _____ Li_2CO_3
23. _____ Na_2CO_3
24. _____ $NaOH$
25. _____ $Ca(C_2H_3O_2)_2$
26. _____ NH_4Cl
27. _____ $AlPO_4$
28. _____ K_3PO_4
29. _____ Be_2SO_4
30. _____ $Zn(OH)_2$
31. _____ Li_3PO_4
32. _____ $Ga(NO_2)_3$
33. _____ NH_4OH
34. _____ $Be(C_2H_3OO)_2$
35. _____ $NaC_2H_3O_2$
36. _____ $Pb_3(PO_4)_4$
37. _____ $Pb_3(PO_4)_2$
38. _____ $Pb(SO_4)_2$
39. _____ $Al(CN)_3$
40. _____ $Mg(ClO_4)_2$

41. _____ $Al(ClO_3)_3$

42. _____ $Ga(NO_2)_3$

43. _____ Cs_2SO_3

44. _____ $(NH_4)_2CO_3$

45. _____ $Pb(HCO_3)_2$

46. _____ $Ga(NO_3)_3$

47. _____ $CaSO_4$

48. _____ $Ag_3(PO_4)_2$

49. _____ Ag_3PO_4

50. _____ $Fe(C_2H_3O_2)_3$

51. _____ $Ba(HCO_3)_2$

52. _____ $Cr(HCO_3)_2$

53. _____ $CuCr_2O_7$

54. _____ $Zn(CN)_2$

55. _____ $Hg_3(PO_4)_2$

56. _____ $Fe(C_2H_3O_2)_2$

57. _____ Cu_2CO_3

58. _____ $Sn(OH)_2$

59. _____ $Sr(NO_3)_2$

60. _____ $Fe(HCO_3)_2$

61. _____ $Cu(ClO_4)_2$

62. _____ $HgCrO_4$

63. _____ $Ba(OH)_2$

64. _____ $Al(ClO_3)_3$

65. _____ $Mg_3(PO_4)_2$

66. _____ $Pb(SO_4)_2$

67. _____ $(NH_4)_2CrO_4$

68. _____ $Zn(HCO_3)_2$

69. _____ $K_2Cr_2O_7$

70. _____ $Pb(Cr_2O_7)_2$

71. _____ $(NH_4)_2CO_3$

72. _____ $Al(OH)_3$

73. _____ $Ca(MnO_4)_2$

74. _____ $(NH_4)_2Cr_2O_7$

75. _____ $KHCO_3$

76. _____ $Sr(NO_2)_2$

77. _____ $Ag(OH)_2$

78. _____ $(NH_4)_2SO_3$

79. _____ $Mn(ClO_4)_2$

80. _____ $CsClO_3$

Naming Covalent Compounds

Remember that covalent compounds contain nonmetals bonded with other nonmetals. A covalent compound can also be called a molecule. When naming molecules, you use a Greek prefix to indicate the number of each type of atom present in the compound. You also add an –ide to the end of the second element in the compound. You DO NOT need the mono-prefix before the first element. Also, you can alter the spelling to avoid putting two vowels together.
An example of this rule: CO = carbon monoxide, not carbon monooxide.

Greek Prefixes	
Mono - 1	Hexa – 6
Di – 2	Hepta – 7
Tri – 3	Octa – 8
Tetra – 4	Nona – 9
Penta – 5	Deca – 10

Example 1: CO = carbon monoxide **Example 2:** N_2O dinitrogen monoxide

Name the following covalent compounds using IUPAC nomenclature rules.

81. _____ CO
82. _____ CO_2
83. _____ SO_2
84. _____ NO_2
85. _____ N_2O
86. _____ SO_3
87. _____ CCl_4
88. _____ NO
89. _____ N_2O_5
90. _____ P_2O_5
91. _____ N_2O_4
92. _____ CS_2
93. _____ OF_2
94. _____ PCl_3
95. _____ PCl_5
96. _____ SCl_6
97. _____ SiO_2
98. _____ PBr_5
99. _____ NH_3
100. _____ N_2O_3
101. _____ PBr_3
102. _____ Cl_2O_7
103. _____ CBr_4
104. _____ OF_2
105. _____ $SiCl_4$
106. _____ BF_3
107. _____ SiS_2
108. _____ SiF_6
109. _____ AsF_5
110. _____ SeF_6
111. _____ P_4S_3
112. _____ P_4S_3

113. _____ $SeCl_6$

114. _____ P_4S_5

115. _____ Si_2Br_6

116. _____ H_2O

117. _____ B_2Si

118. _____ NF_3

119. _____ IF_7

120. _____ $AsBr_5$

121. _____ S_2F_{10}

122. _____ B_2Cl_4

123. _____ C_4S_3

124. _____ N_4O_{10}

125. _____ ClO_2

126. _____ XeF_2

127. _____ $AsCl_5$

128. _____ $SbCl_3$

129. _____ XeO_3

130. _____ SeF_4

Write the formula for the named compound.

131. _____Antimony tribromide

132. _____Chlorine dioxide

133. _____Silicon tertrachloride

134. _____Phosphorus pentafluoride

135. _____Dinitrigen tribromide

Naming Acids

Acids are a special chemical that chemically behave a certain way. They typically begin with a hydrogen (H). The rules for naming the acid depend on if there is an oxygen in the acid.

Nonoxyacids *do not contain an oxygen* and you name them with a **hydro- prefix and change the –ide suffix with –ic**.

Example: HCl = ***hydro***chlor***ic*** acid

Oxyacids are names based on the polyatomic ion which it was formed from.

Ions that end in –ate, replace –ate with –ic acid

Example: H^+, NO_3^- = HNO_3 = Hydrogen nitr**ate** = Nitr**ic** acid

Ions that end in –ite, replace –ite with –ous acid

Example: H^+, NO_2^- = HNO_2 = Hydrogen nitr**ite** = Nitr**ous** acid

Ions that are per_____-ate, replace –ate with per_____-ic acid.

Example: H^+, ClO_4^- = $HClO_4$ = Hydrogen Perchlor**ate** = Perchloric**ic** acid

Ions that are hypo_____-ite, replace-ite with hypo_____-ous acid.

Example: H^+, ClO^- = HClO = Hydrogen hypochlor**ite** = Hypochlor**ous** acid

Name the following acids using IUPAC nomenclature rules.

136. _____HNO_3
137. _____HCl
138. _____HF
139. _____H_2SO_4
140. _____H_2SO_3
141. _____$HC_2H_3O_2$
142. _____HBr
143. _____HI
144. _____HNO_2
145. _____H_3PO_4
146. _____H_2S
147. _____H_2CO_3

Write the formulas of the following acids

148. _____Sulfuric acid
149. _____Nitric acid
150. _____Hydrochloric acid
151. _____Acetic acid
152. _____Hydrofluoric acid
153. _____Phosphorus acid
154. _____Carbonic acid
155. _____Nitrous acid
156. _____Phosphoric acid
157. _____Hydrosulfuric acid

Mixed Practice

The following compounds are a mixture of binary ionic compounds, ternary ionic compounds w/ polyatomic ions, covalent compounds, and acids. Name the following compounds using IUPAC nomenclature rules.

It is helpful to determine what type of compound it is first, so you can name it following the correct nomenclature rules.

1) Identify the compound type: "**I-2**" for binary ionic, "**I-3**" tor ternary ionic, "**C**" for covalent, and "**A**" for acids.

2) Then name the compound using IUPAC nomenclature rules.

	Type	*Name*	
1.	_____	_____	N_2O_2
2.	_____	_____	$Ba_3(PO_4)_2$
3.	_____	_____	$SrBr_2$
4.	_____	_____	BrF_3
5.	_____	_____	$HClO_3$
6.	_____	_____	$Ag(NO_3)_2$
7.	_____	_____	$AgNO_3$
8.	_____	_____	$SiBr_4$
9.	_____	_____	HNO_3
10.	_____	_____	NH_4CN
11.	_____	_____	CaF_2
12.	_____	_____	$Mn_3(PO_4)_2$
13.	_____	_____	H_2SO_4
14.	_____	_____	Cs_3PO_4
15.	_____	_____	$HC_2H_3O_2$
16.	_____	_____	H_2SO_3
17.	_____	_____	CO_2
18.	_____	_____	SH_8
19.	_____	_____	CBr_4
20.	_____	_____	ZnO