

Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Naming & Chemical Formula of Ionic & Molecular Compounds

## ASSIGNMENT

### NAMING IONIC COMPOUNDS

- contain a cation (a metal or polyatomic ammonium) & an anion (a non-metal or a polyatomic)
- when naming, the cation goes first & the anion goes second
  - lithium chloride
- in the written equation, the name of the cation stays the same (i.e. lithium) and the name of the anion changes at the end to *-ide* (i.e. lithium chloride)
- hydrogen is a non-metal that can appear as a cation or an anion
  - as a cation it is written as hydrogen and as an anion it is written as hydride

positively charged ion;  
loses electrons

negatively charged ion;  
gains electrons

#### Practice (K/U - 0.5 marks each)

1.  $\text{Na}_2\text{O}$  \_\_\_\_\_
2.  $\text{CaF}_2$  \_\_\_\_\_
3.  $\text{K}_3\text{N}$  \_\_\_\_\_
4.  $\text{BaSe}$  \_\_\_\_\_
5.  $\text{KH}$  \_\_\_\_\_
6.  $\text{HI}$  \_\_\_\_\_
7.  $\text{RbH}$  \_\_\_\_\_
8.  $\text{Al}_2\text{O}_3$  \_\_\_\_\_

#### Create (Application - 1 mark each)

Create four of your own examples of naming ionic compounds (similar to the ones above) without polyatomics or transition metals. Be sure to include the question (chemical formula) and answer (compound name).

9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

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## NAMING IONIC COMPOUNDS CONTAINING POLYATOMICS

- polyatomics are groups of two or more elements that have an overall charge (i.e. carbonate -  $\text{CO}_3^{-2}$ )
- all polyatomics you will work with will be anions, EXCEPT for AMMONIUM ( $\text{NH}_4^{+1}$ ) which has a charge of +1
- when naming ionic compounds containing polyatomics, the ending stay the same for all polyatomics (several polyatomics have an *-ate* at the end)
  - i.e. lithium carbonate

### Practice (K/U - 0.5 marks each)

13.  $\text{Ca}(\text{HCO}_3)_2$  \_\_\_\_\_ 14.  $\text{NH}_4\text{Cl}$  \_\_\_\_\_

15.  $\text{KClO}_3$  \_\_\_\_\_ 16.  $\text{NaMnO}_4$  \_\_\_\_\_

17.  $\text{HPO}_4$  \_\_\_\_\_ 18.  $(\text{NH}_4)_3\text{AsO}_4$  \_\_\_\_\_

19.  $\text{Be}(\text{ClO}_2)_2$  \_\_\_\_\_ 20.  $\text{Al}(\text{OH})_3$  \_\_\_\_\_

### Create (Application - 1 mark each)

Create four of your own examples of naming ionic compounds containing polyatomics (similar to the ones above) without transition metals. Be sure to include the question (chemical formula) and answer (compound name).

21. \_\_\_\_\_

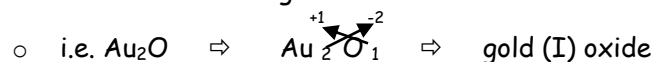
22. \_\_\_\_\_

23. \_\_\_\_\_

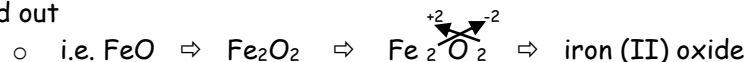
24. \_\_\_\_\_

**NAMING IONIC COMPOUNDS CONTAINING TRANSITION METALS**

- follow all the same naming conventions as "Naming Ionic Compounds" and a few more
- use roman numerals in brackets after the transition metal to indicate the charge of the transition metal (i.e. gold (I) oxide)
- in order to determine the charge of the transition metal use the *cross-up method*



- the *cross-up method* may not always work if the charges of the two elements have cancelled out



\*\*\*Remember that the compound should have NO OVERALL CHARGE!!!

Roman Numerals	
one	I
two	II
three	III
four	IV
five	V
six	VI
seven	VII
eight	VIII
nine	IX
ten	X

Practice (K/U - 0.5 marks each)

25.  $\text{ZnCl}_2$  \_\_\_\_\_ 26.  $\text{AgI}$  \_\_\_\_\_

27.  $\text{PbO}_2$  \_\_\_\_\_ 28.  $\text{FeF}_3$  \_\_\_\_\_

29.  $\text{Co}_3\text{N}_2$  \_\_\_\_\_ 30.  $\text{CrO}_3$  \_\_\_\_\_

31.  $\text{Cu}_2\text{S}$  \_\_\_\_\_ 32.  $\text{Hg}_3\text{P}_2$  \_\_\_\_\_

Create (Application - 1 mark each)

Create four of your own examples of naming ionic compounds containing transition metals (similar to the ones above) and no polyatomics. Be sure to include the question (chemical formula) and answer (compound name).

33. \_\_\_\_\_

34. \_\_\_\_\_

35. \_\_\_\_\_

36. \_\_\_\_\_

**NAMING IONIC COMPOUNDS CONTAINING POLYATOMICS & TRANSITION METALS**

- use all previously learned naming rules

Practice (K/U - 0.5 marks each)

37.  $\text{AuOH}$  \_\_\_\_\_ 38.  $\text{NH}_4\text{I}$  \_\_\_\_\_

39.  $\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2$  \_\_\_\_\_ 40.  $\text{NiBr}_3$  \_\_\_\_\_

41.  $\text{NH}_4\text{ClO}_3$  \_\_\_\_\_ 42.  $\text{MnO}$  \_\_\_\_\_

43.  $\text{Cr}(\text{CO}_3)_3$  \_\_\_\_\_ 44.  $\text{Pb}_3(\text{PO}_4)_4$  \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Create (Application - 1 mark each)

Create four of your own examples of naming ionic compounds containing polyatomic compounds and transition metals (similar to the ones above). Be sure to include the question (chemical formula) and answer (compound name).

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46.

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47.

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48.

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## NAMING MOLECULAR COMPOUNDS

- molecular compounds contain ONLY NON-METALS (this includes hydrogen)
- electrons are shared between the elements in the compound therefore there are
- NO CHARGES on these elements
- to name a molecular compound, always write the name of the element that is less electronegative (farthest to the left on the periodic table) first and the element that is more electronegative (closer to the right on the periodic table) second
- the end of the second element changes to *-ide* (i.e. carbon dioxide)
- if there is more than one atom of an element then you use prefixes to identify the element quantity

\*\*\*Prefixes are NOT used for IONIC COMPOUNDS!!!

Prefix	# of Atoms
mono	1
di	2
tri	3
tetra	4
penta	5
hexa	6
septa	7
octa	8
nona	9
deca	10

Practice (K/U - 0.5 marks each)

49.  $SBr_6$  \_\_\_\_\_ 50.  $N_2O$  \_\_\_\_\_

51.  $PCl_3$  \_\_\_\_\_ 52.  $H_2O_2$  \_\_\_\_\_

53.  $H_2O$  \_\_\_\_\_ 54.  $P_2O_5$  \_\_\_\_\_

55.  $H_4C$  \_\_\_\_\_ 56.  $NF_3$  \_\_\_\_\_

Create (Application - 1 mark each)

Create four of your own examples of naming molecular compounds (similar to the ones above). Be sure to include the question (chemical formula) and answer (compound name).

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58.

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59.

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60.

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## CHEMICAL FORMULA OF IONIC COMPOUNDS

Name: \_\_\_\_\_ Date: \_\_\_\_\_

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- determine the charge of each ion and use the *cross-down method* to determine the quantity of each element you need

Practice (K/U - 0.5 marks each)

61. sodium chloride \_\_\_\_\_ 62. barium oxide \_\_\_\_\_  
63. calcium fluoride \_\_\_\_\_ 64. magnesium hydride \_\_\_\_\_  
65. zinc oxide \_\_\_\_\_ 66. calcium carbide \_\_\_\_\_  
67. cesium sulphide \_\_\_\_\_ 68. aluminium sulphide \_\_\_\_\_

Create (Application - 1 mark each)

Create four of your own examples of ionic chemical formula (similar to the ones above) without polyatomics or transition metals. Be sure to include the question (name of compound) and answer (chemical formula).

69. \_\_\_\_\_

70. \_\_\_\_\_

71. \_\_\_\_\_

72. \_\_\_\_\_

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## **CHEMICAL FORMULA OF IONIC COMPOUNDS CONTAINING POLYATOMICS**

- determine the charge of each element or polyatomic and use the *cross-down method* to determine the quantity of each element necessary
- remember to use brackets when necessary

Practice (K/U - 0.5 marks each)

73. barium bromate \_\_\_\_\_ 74. ammonium chloride \_\_\_\_\_  
75. potassium oxalate \_\_\_\_\_ 76. zinc hydroxide \_\_\_\_\_  
77. aluminium bicarbonate \_\_\_\_\_ 78. barium sulphate \_\_\_\_\_  
79. ammonium hydroxide \_\_\_\_\_ 80. ammonium acetate \_\_\_\_\_

Create (Application - 1 mark each)

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Create four of your own examples of ionic chemical formula containing polyatomics (similar to the ones above) without transition metals. Be sure to include the question (name of compound) and answer (chemical formula).

81.

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82.

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83.

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84.

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### **CHEMICAL FORMULA OF IONIC COMPOUNDS CONTAINING TRANSITION METALS**

- determine the charge of each element and use the *cross-down method* to determine the quantity of each element necessary
- use the roman numerals of the transition metal to determine the charge

Practice (K/U - 0.5 marks each)

85. titanium (IV) iodide \_\_\_\_\_

86. nickel (II) phosphide \_\_\_\_\_

87. gold (I) bromide \_\_\_\_\_

88. copper (III) chloride \_\_\_\_\_

89. iron (II) chloride \_\_\_\_\_

90. iron (III) chloride \_\_\_\_\_

91. tin (IV) oxide \_\_\_\_\_

92. bismuth (V) selenide \_\_\_\_\_

Create (Application - 1 mark each)

Create four of your own examples of ionic chemical formula containing transition metals (similar to the ones above) without polyatomics. Be sure to include the question (name of compound) and answer (chemical formula).

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94.

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95.

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96.

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### **CHEMICAL FORMULA OF IONIC COMPOUNDS CONTAINING POLYATOMICS & TRANSITION METALS**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

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- all chemical formula rules previously used - the *cross-down method* is used for all of them

Practice (K/U - 0.5 marks each)

97. magnesium hydroxide \_\_\_\_\_ 98. sodium sulphate \_\_\_\_\_  
99. manganese (IV) permanganate \_\_\_\_\_ 100. ammonium chromate \_\_\_\_\_  
101. nickel (II) phosphate \_\_\_\_\_ 102. ammonium phosphide \_\_\_\_\_  
103. copper (I) sulphate \_\_\_\_\_ 104. cobalt (III) cyanide \_\_\_\_\_

Create (Application - 1 mark each)

Create four of your own examples of ionic chemical formula containing transition metals and polyatomics (similar to the ones above). Be sure to include the question (name of compound) and answer (chemical formula).

105. \_\_\_\_\_

106. \_\_\_\_\_

107. \_\_\_\_\_

108. \_\_\_\_\_

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## CHEMICAL FORMULA OF MOLECULAR COMPOUNDS

- use the prefix indicated on each element to determine the quantity of each element
- remember "mono-" is not always included because it represents one

Practice (K/U - 0.5 marks each)

109. dihydrogen monoxide \_\_\_\_\_ 110. phosphorus tribromide \_\_\_\_\_  
111. carbon tetrachloride \_\_\_\_\_ 112. dinitrogen tetroxide \_\_\_\_\_  
113. dicarbon monoxide \_\_\_\_\_ 114. carbon monoxide \_\_\_\_\_  
115. dihydrogen dioxide \_\_\_\_\_ 116. tetraphosphorus decaoxide \_\_\_\_\_

Create (Application - 1 mark each)

Create four of your own examples of molecular chemical formula (similar to the ones above). Be sure to include the question (name of compound) and answer (chemical formula).

Name: \_\_\_\_\_ Date: \_\_\_\_\_

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118.

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119.

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120.

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### **NAMING COMPOUNDS & CHEMICAL FORMULA – IONIC & MOLECULAR**

- use a variety of the previously used strategies to solve for the following problems
- if there is a compound name, then write the chemical formula and if there is a chemical formula, then write the compound name (*K/U - 0.5 marks each*)

121. HF -

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122. nickel (III) bromide -

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123. HI -

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124. nitrogen dioxide -

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125.  $\text{Sn}(\text{FO}_3)_2$  -

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126. mercury (I) sulphide -

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127. NiP -

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128. CaO

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129.  $(\text{NH}_4)_2\text{O}$  -

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130. cobalt (II) oxide -

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131. lithium carbonate -

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132.  $\text{Mg}_3(\text{PO}_4)_2$  -

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133. manganese (IV) oxide -

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134. aluminium carbonate -

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135.  $\text{Au}_2(\text{C}_2\text{O}_4)_3$  -

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136.  $\text{Rb}_3\text{N}$  -

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137.  $\text{PCl}_3$  -

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138.  $\text{Al}_2(\text{SO}_4)_3$  -

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139. dicarbon tetrahydride -

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140.  $(\text{NH}_4)_2\text{HPO}_4$  -

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