## Writing Chemical Names and Formulas of Ionic Compounds

*Use with textbook pages 154–161.*

*You can use the periodic table on page 106 to help you answer these questions.*

**1.** Define the following terms:

**a)** ion

**b)** ionic bond

**c)** binary ionic compound

**2.** Write the formulas for the ionic compounds formed from the following positive and negative ions. Then name the binary ionic compounds.

| | Ions | Chemical Formula | Compound Name |
|---|---|---|---|
| a) | $Li^+$ $F^-$ | | |
| b) | $Be^{2+}$ $Br^-$ | | |
| c) | $Na^+$ $O^{2-}$ | | |
| d) | $Sc^{3+}$ $I^-$ | | |
| e) | $Mg^{2+}$ $S^{2-}$ | | |
| f) | $K^+$ $P^{3-}$ | | |
| g) | $Ca^{2+}$ $N^{3-}$ | | |
| h) | $Al^{3+}$ $Br^-$ | | |
| i) | $Ba^{2+}$ $Se^{2-}$ | | |
| j) | $Zn^{2+}$ $O^{2-}$ | | |

**3.** Write the names of the following ionic compounds.

**a)** RbI _____

**b)** $Cs_2O$ _____

**c)** SrS _____

**d)** $BaCl_2$ _____

**e)** InP _____

**f)** $Li_3N$ _____

**g)** $MgBr_2$ _____

**h)** CaO _____

**i)** KCl _____

**j)** $ZrSe_2$ _____

**4.** Write the chemical formulas for the following ionic compounds.

**a)** cesium fluoride _____

**b)** beryllium phosphide _____

**c)** aluminum oxide _____

**d)** strontium bromide _____

**e)** gallium nitride _____

**f)** zinc sulfide _____

**g)** rubidium iodide _____

**h)** silver chloride _____

**i)** cadmium oxide _____

## Ionic Compounds with Multivalent Metals

*Use with textbook pages 162–163.*

*You can use the periodic table on page 106 and Roman numerals listed on page 162 to help you answer these questions.*

**1.** Write the formulas and names of the ionic compounds with the following combination of ions. The table has been partially completed to help guide you.

| | Positive Ion | Negative Ion | Chemical Formula | Compound Name |
|---|---|---|---|---|
| a) | $Ti^{3+}$ | $Cl^-$ | | |
| b) | | | | iron(II) oxide |
| c) | | | $PdBr_2$ | |
| d) | $Sn^{4+}$ | $F^-$ | | |
| e) | | | | gold(I) chloride |
| f) | $Pt^{4+}$ | $O^{2-}$ | | |
| g) | | | $CoF_2$ | |
| h) | | | | nickel(II) iodide |
| i) | $Nb^{3+}$ | $N^{3-}$ | | |
| j) | | | $MnO_2$ | |

**2.** Write the chemical formulas for the following ionic compounds.

**a)** cobalt(III) fluoride _____

**b)** osmium(IV) chloride _____

**c)** chromium(III) oxide _____

**d)** mercury(II) selenide _____

**e)** copper(II) chloride _____

**f)** lead(II) sulfide _____

**g)** titanium(III) nitride _____

**h)** bismuth(III) sulfide _____

**i)** ruthenium(IV) oxide _____

**j)** nickel(II) fluoride _____

**3.** Write the names of the following ionic compounds.

**a)** $NbCl_5$ _____

**b)** $SnF_4$ _____

**c)** $Mn_2O_3$ _____

**d)** $RhCl_3$ _____

**e)** $NiF_3$ _____

**f)** HgS _____

**g)** TlI _____

**h)** $IrO_2$ _____

**i)** $FeCl_2$ _____

**j)** $V_2O_5$ _____

## Ionic Compounds with Polyatomic Ions

*Use with textbook pages 164–165.*

*You can use the periodic table on page 106 and the list of polyatomic ions on page 164 to help you answer these questions.*

**1.** Complete the following table by providing the correct chemical formula for each compound formed from the ions indicated.

| Formulas for Some Ionic Compounds | | | | |
|---|---|---|---|---|
| | **fluoride** | **hydroxide** | **carbonate** | **phosphate** |
| a) sodium | | | | |
| b) aluminum | | | | |
| c) copper(II) | | | | |
| d) manganese(IV) | | | | |
| e) ammonium | | | | |

**2.** Write the chemical formulas for the following ionic compounds.

**a)** barium chlorite _____

**b)** nickel(II) nitrate _____

**c)** potassium chromate _____

**d)** lead(IV) phosphate _____

**e)** cadmium peroxide _____

**f)** copper(I) carbonate _____

**g)** chromium(III) sulfite _____

**h)** calcium phosphite _____

**i)** iron(III) acetate _____

**j)** strontium permanganate _____

**3.** Write the names of the following ionic compounds.

**a)** $V(ClO_3)_4$ _____

**b)** $Al_2(CO_3)_3$ _____

**c)** $Co(NO_2)_2$ _____

**d)** $(NH_4)_2SO_4$ _____

**e)** $Ti(CrO_4)_2$ _____

**f)** $Li_3PO_4$ _____

**g)** $Cr(MnO_4)_3$ _____

**h)** $Ag_2Cr_2O_7$ _____

**i)** $Mg(HCO_3)_2$ _____

**j)** $Sn(OH)_4$ _____

## Covalent Compounds

*Use with textbook pages 168–172.*

**1.** Write the chemical formula for each of the following binary covalent compounds.

**a)** sulfur dioxide _____

**b)** carbon tetrafluoride _____

**c)** selenium trioxide _____

**d)** nitrogen trichloride _____

**e)** carbon dioxide _____

**f)** boron trifluoride _____

**g)** tetrasulfur tetranitride _____

**h)** diphosphorus pentoxide _____

**i)** carbon disulfide _____

**j)** nitrogen monoxide _____

**k)** diarsenic trioxide _____

**l)** sulfur hexafluoride _____

**2.** Write the name for each of the following binary covalent compounds.

**a)** $Cl_2O_7$ _____

**b)** $N_2O_4$ _____

**c)** $SO_3$ _____

**d)** $PCl_5$ _____

**e)** $NF_3$ _____

**f)** $CS_2$ _____

**g)** $SiF_4$ _____

**h)** $N_2O_3$ _____

**i)** $BI_3$ _____

**j)** $ClF_3$ _____

**k)** $SCl_2$ _____

**l)** $CO$ _____

## Ionic Compounds in Fireworks

*Use with textbook pages 154–165.*

*Use the following reading passage to answer questions 1 to 4.*

The Celebration of Lights is the world's longest-running fireworks competition. Every summer, hundreds of thousands of spectators gather around English Bay and Kitsilano for Vancouver's iconic annual festival. It is a favourite tradition for many Vancouverites. People are entertained for three nights by spectacular displays of world-class pyrotechnics, perfectly choreographed to music. Three countries compete each year to wow the audience.

The firework aerial shells are launched from a barge floating in English Bay. An aerial shell is a small tube that contains the explosive chemicals that make up the fireworks. Each aerial shell has small explosive stars arranged in specific patterns in gunpowder. The gunpowder is made up of mostly potassium nitrate. The stars have explosives that give the fireworks their spectacular colours when they explode in the sky. The fireworks have specific shapes based on the patterns in which the stars are packaged in the aerial shells. Bright red chrysanthemum spinners light up the night sky as a result of the ignition of strontium carbonate. Bursts of blue peonies are due to copper(I) chloride. Green sprays are the result of the explosion of barium chloride.

**1. Asking Questions**

While reading the two paragraphs above, stop to ask who, what, when, where, why, and how questions. Write these six questions down. See if your questions are answered in the text. If they are not, reread the paragraphs to see if you misunderstood a concept. This will allow you to make connections beyond the text.

**a)** Who _____

_____

**b)** What _____

_____

**c)** Where _____

_____

**d)** When _____

_____

**e)** Why _____

_____

## 2. Monitoring Comprehension

**a)** List four ionic compounds used in fireworks and give their chemical formulas.

**b)** What are some chemical properties that all four of these ionic compounds have in common?

**c)** Name three forms of energy that are involved during a firework display.

## 3. Identifying Cause and Effect

**a)** Read the second paragraph and explain why the arrangements of the stars inside the aerial shells are important for the outcome of the visual display of the fireworks show.

**b)** A burst of bright red chrysanthemum illuminates the sky. What chemical is responsible for the colour of this fireworks explosion?

**4.** Research some of the challenges present when attempting to synchronize music to a fireworks display.