

Start by opening to Figure 5.16 (“Nomenclature flowchart”) on page 147 of your textbook. This worksheet shows you how to use this flowchart to name the three classes of compounds we need to know.

PART A: Types of compounds

Looking at the “Nomenclature flowchart” on page 147, we see there are three main headings (**Ionic**, **Molecular**, and **Acids**) one for each class of compounds we have to name. Also, two of the classes (**Ionic** and **Acids**) have subclasses. The following table summarizes how we assign a compound to a given class/subclass.

Class	Subclass	What to look for in the formula.
Ionic	Type I	A metal (specifically from group 1, group 2, Ag^+, Zn^{+2}, or Al^{+3}) and one or more nonmetals. Remember NH_4^+ can occur in place of the metal.
	Type II	Any metal (other than those in Type I) + one or more nonmetals.
Molecular (covalent)		2 nonmetals (no H in front)
Acids	Binary	H + one nonmetal + (aq)
	Oxyacids	H + two or more nonmetals, one of which is oxygen + (aq)

1. Put a check (\checkmark) in the box for the appropriate class/subclass for each of the following compounds:

Compound Formula	Ionic, Type I	Ionic, Type II	Molecular (covalent)	Acid, Binary	Acid, Oxyacid
CCl_4					
SnCl_2					
HCl(aq)					
SrCl_2					
NH_4Cl					
$\text{H}_2\text{CO}_3\text{(aq)}$					
MgCO_3					
MnCO_3					
CO_2					

PART B: Formula \Rightarrow Name

After identifying the class/subclass for a compound we can use the flowchart in Figure 5.16 to name the compound. Each subclass has its own rules for naming. The following table summarizes the rules for naming each class/subclass of compounds.

Class	Subclass	Rules for naming this class/subclass of compounds
Ionic	Type I	If the anion is polyatomic: [name of metal] + [name of polyatomic ion] If the anion is monatomic: [name of metal] + [base name of nonmetal + -ide]
	Type II	If the anion is polyatomic: [name of metal] + (charge of metal in roman numerals) + [name of polyatomic ion] If the anion is monatomic: [name of metal] + (charge of metal in roman numerals) + [base name of nonmetal + -ide]
Molecular (covalent)		[prefix + name of 1st element] + [prefix + base name of 2nd element + -ide]
Acids	Binary	[hydro] + [base name of nonmetal + -ic] + [acid]
	Oxyacids	If the anion ends in –ate: [base name of ion + -ic] + [acid] If the anion ends in –ite: [base name of ion + -ous] + [acid]

2. Name each of the following compounds:

Compound formula	Compound name
CCl ₄	
SnCl ₂	
HCl(aq)	
SrCl ₂	
NH ₄ Cl	
H ₂ CO ₃ (aq)	
MgCO ₃	
MnCO ₃	
CO ₂	

PART C: Name \Rightarrow Formula

We can also use the flowchart in Figure 5.16 to go from name \Rightarrow formula. The following table summarizes the rules for identifying and writing the formula for each class/subclass of compounds.

Class	Subclass	<ul style="list-style-type: none"> • What to look for in the name • Rules for writing the formula
Ionic	Type I	<ul style="list-style-type: none"> • <i>Name of a metal (or "ammonium") + anion name</i> • Write the ions that correspond to each half of the name. Combine ions in the ratio that cancels their charges.
	Type II	<ul style="list-style-type: none"> • <i>Name of a metal (Roman numerals) + anion name</i> • Write down the ions that correspond to each half of the name. The roman numerals indicate the charge on the metal. Combine ions in the ratio that cancels their charges.
Molecular (covalent)		<ul style="list-style-type: none"> • <i>Two different non-metal elements with prefixes</i> • Write the symbols corresponding to each of the two elements. Use the prefixes to determine the subscript after each element.
Acids	Binary	<ul style="list-style-type: none"> • <i>"hydro-" "acid"</i> • Start by writing down "H⁺" followed by the monatomic ion that corresponds to the name. Combine ions in the ratio that cancels their charges.
	Oxyacids	<ul style="list-style-type: none"> • <i>"acid" (but no "hydro-")</i> • Start by writing down "H⁺" followed by the polyatomic ion that corresponds to the name. If the acid ends in "-ic", the polyatomic ion ended in "-ate". If the acid ends in "-ous", the polyatomic ion ended in "-ite". Combine ions in the ratio that cancels their charges.

3. Provide the class/subclass and formula for each of the following compounds:

Compound name	Class/subclass	Formula
hydrosulfuric acid		
sulfuric acid		
sulfurous acid		
sulfur dioxide		
tin(IV) sulfite		
cesium sulfate		
silver sulfide		