

To determine the second word in the compound's name:

3. Give the prefix designating the number of atoms of the second element present.

CO₂: carbon **di**

N₂O₃: dinitrogen **tri**

4. Name the root of the second element. *Note:* The root is the base name that designates the element.

CO₂: carbon diox

N₂O₃: dinitrogen triox

5. Add the suffix *-ide* to the root of the second element.

CO₂: carbon dioxide (official name)

N₂O₃: dinitrogen trioxide (official name)

B. Binary Salts (Metal + Nonmetal) i.e., CaCl₂

Prefixes giving the number of atoms of each element present are *never* used to name an ionic salt. Salts exhibit ionic bonding between a metal and a nonmetal, while molecular substances exhibit covalent bonding between two nonmetals.

Name the following binary salt — CaCl₂

By convention, the metal is written before the nonmetal. To identify the first word in the name:

1. Name the first element (metal).

CaCl₂: **calcium**

To determine the second word in the name of the compound:

2. Name the root of the second element (nonmetal).

CaCl₂: calcium **chlor**

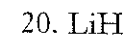
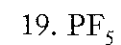
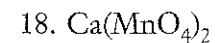
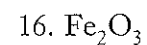
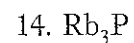
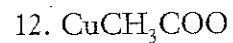
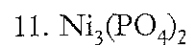
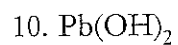
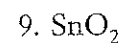
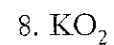
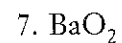
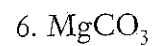
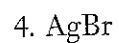
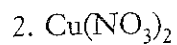
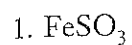
3. Add the suffix *-ide* to the root of the second element.

CaCl₂: calcium **chloride**

Exercise 2-1: In column 1, classify each of the following compounds as binary molecules (M) or binary ionic salts (I). Then in column 2, use the rules to name each binary compound.

| | | | | | |
|------------------------------------|-------|-------|------------------------------------|-------|-------|
| 1. CaF ₂ | _____ | _____ | 10. SrI ₂ | _____ | _____ |
| 2. P ₄ O ₁₀ | _____ | _____ | 11. CO | _____ | _____ |
| 3. K ₂ S | _____ | _____ | 12. Cs ₂ Po | _____ | _____ |
| 4. NaH | _____ | _____ | 13. ZnAt ₂ | _____ | _____ |
| 5. Al ₂ Se ₃ | _____ | _____ | 14. P ₄ S ₃ | _____ | _____ |
| 6. N ₂ O | _____ | _____ | 15. AgCl | _____ | _____ |
| 7. O ₂ F | _____ | _____ | 16. Na ₃ N | _____ | _____ |
| 8. SBr ₆ | _____ | _____ | 17. Mg ₃ P ₂ | _____ | _____ |
| 9. Li ₂ Te | _____ | _____ | 18. XeF ₆ | _____ | _____ |

Exercise 3-2: Name the following substances.



Exercise 3-3: Write formulas for the following substances.

1. vanadium(V) oxide _____
2. dihydrogen monoxide _____
3. ammonium oxalate _____
4. polonium(VI) thiocyanate _____
5. tetraphosphorus decaoxide _____
6. zinc hydroxide _____
7. potassium cyanide _____
8. cesium tartrate _____
9. oxygen molecule _____
10. mercury(II) acetate _____
11. silver chromate _____
12. tin(II) carbonate _____
13. sodium hydrogen carbonate _____
14. manganese(VII) oxide _____
15. copper(II) dihydrogen phosphate _____
16. francium dichromate _____
17. calcium carbide _____
18. mercury(I) nitrate _____
19. cerium(IV) benzoate _____
20. potassium hydrogen phthalate _____

Many common acids contain only oxygen, hydrogen, and a nonmetallic ion or a polyatomic ion. Such acids are called *oxyacids*. The suffixes *-ous* and *-ic* give the oxidation state of the atom bonded to the oxygen and the hydrogen. The *-ous* suffix always indicates the lower oxidation state and *-ic* the higher.

Common Oxyacids

| Formula | Name | Anion |
|---|--------------------------|--|
| HClO_4 | <i>perchloric acid</i> | ClO_4^- <i>perchlorate</i> |
| HClO_3 | <i>chloric acid</i> | ClO_3^- <i>chlorate</i> |
| HClO_2 | <i>chlorous acid</i> | ClO_2^- <i>chlorite</i> |
| HClO | <i>hypochlorous acid</i> | ClO^- <i>hypochlorite</i> |
| HNO_3 | <i>nitric acid</i> | NO_3^- <i>nitrate</i> |
| HNO_2 | <i>nitrous acid</i> | NO_2^- <i>nitrite</i> |
| H_2SO_4 | <i>sulfuric acid</i> | SO_4^{2-} <i>sulfate</i> |
| H_2SO_3 | <i>sulfurous acid</i> | SO_3^{2-} <i>sulfite</i> |
| CH_3COOH or $\text{HC}_2\text{H}_3\text{O}_2$ | <i>acetic acid</i> | CH_3COO^- or $\text{C}_2\text{H}_3\text{O}_2^-$ <i>acetate</i> |
| H_2CO_3 | <i>carbonic acid</i> | CO_3^{2-} <i>carbonate</i> |
| $\text{H}_2\text{C}_2\text{O}_4$ | <i>oxalic acid</i> | $\text{C}_2\text{O}_4^{2-}$ <i>oxalate</i> |
| H_3PO_4 | <i>phosphoric acid</i> | PO_4^{3-} <i>phosphate</i> |

Exercise 4-1: Name the following compounds.

- HIO_3
- NaBrO_2
- $\text{Ca}_3(\text{PO}_4)_2$
- HIO_4
- $\text{Fe}(\text{IO}_2)_3$
- $\text{HAt}(\text{aq})$
- $\text{C}_6\text{H}_5\text{COOH}$
- $\text{Hg}_2(\text{IO})_2$
- H_3PO_3
- NH_4BrO_3

Exercise 4-2: Write formulas for the following compounds.

- tartaric acid
- calcium hypochlorite
- hydrotelluric acid
- copper(II) nitrite
- carbonic acid
- hypoiodous acid
- cyanic acid
- phthalic acid
- tin(IV) chromate
- selenic acid

DO YOU KNOW YOUR ACIDS?

-IC from -ATE

-OUS from -ITE

HYDRO-, -IC, -IDE

Exercise 4-3: Complete the following table.

| Name of Acid | Formula of Acid | Name of Anion |
|--------------------------|---|------------------|
| <i>hydrochloric acid</i> | HCl | <i>chloride</i> |
| <i>sulfuric acid</i> | H ₂ SO ₄ | <i>sulfate</i> |
| | HI | |
| | | <i>sulfite</i> |
| <i>chlorous acid</i> | | |
| | | <i>nitrate</i> |
| | CH ₃ COOH or HC ₂ H ₃ O ₂ | |
| <i>hydrobromic acid</i> | | |
| | | <i>sulfide</i> |
| | HNO ₂ | |
| <i>chromic acid</i> | | |
| | | <i>phosphate</i> |