

Naming Compounds Flowchart

Formula:

AX

If **A** is a **metal OR ammonium**

(Ionic compound)

Cation with **one**
Oxidation #

Cation with **multiple**
Oxidation #s

Group 1	+1
Group 2	+2
Group 13 metals	+3
Silver	+1
Zinc	+2
Cadmium	+2
Ammonium (NH ₄ ⁺)	+1

Transition Metals and "Other" Metals

Use:

- Stock System (roman numerals)

Examples:

Na₂SO₄ – Sodium sulfate
 (NH₄)₂CO₃ – Ammonium Carbonate
 K₃P – Potassium Phosphide
 Al(OH)₃ – Aluminum hydroxide
 CdSO₃ – Cadmium Sulfite

Examples:

CuBr₂ – Copper (II) bromide
 MnO₂ – Manganese (IV) oxide
 Cr₂N₃ – Chromium (III) nitride
 FeCr₂O₇ – Iron (II) dichromate
 Pb(NO₂)₄ – Lead (IV) nitrite

If **A** is **hydrogen**

(Acid)

Name based on the
ANION

BINARY – H + nonmetal (or CN⁻)

"STEM" IS THE ROOT OF THE NONMETAL

- change to **hydro-STEM-ic** acid.

TERNARY – H + polyatomic oxyanion

"STEM" IS THE ROOT OF THE POLYATOMIC ION

- STEM–ate, change to STEM-ic acid
- STEM–ite, change to STEM-ous acid

Examples:

HNO₂ – Nitrous acid
 H₃PO₄ – Phosphoric Acid
 HCl – Hydrochloric Acid
 H₂SO₃ – Sulfurous Acid
 H₂CrO₄ – Chromic Acid

If **A** is a **non-metal or metalloid**

(Covalent compound)

Greek Prefix System

1st element – NO MONO
 2nd element – ALL prefixes

#	Prefix	#	Prefix
1	Mono	6	Hexa
2	Di	7	Hepta
3	Tri	8	Octa
4	Tetra	9	Nona
5	Penta	10	Deca

Examples:

CO – Carbon monoxide
 SO₃ – Sulfur trioxide
 CCl₄ – Carbon tetrachloride
 N₂O₅ – Dinitrogen pentoxide
 XeO₄ – Xenon tetroxide

Writing Formulas Flowchart

First element is H, a metal, or ammonium

1. Determine identify of cation and anion
2. Determine charges
3. Find ratio and express as subscripts OR "Criss cross" and reduce
 - *preserve PI's inside parentheses
 - *never change a PI
 - *multivalent cation charge is roman numeral

Examples:

Sodium sulfate - Na_2SO_4
 Ammonium carbonate - $(\text{NH}_4)_2\text{CO}_3$
 Potassium Phosphide - K_3P
 Aluminum hydroxide - $\text{Al}(\text{OH})_3$
 Cadmium sulfite - CdSO_3

Examples:

Nitrous acid - HNO_2
 Phosphoric acid - H_3PO_4
 Hydrochloric acid - HCl
 Sulfurous acid - H_2SO_3
 Chromic acid - H_2CrO_4

Roman Numerals for Transition Metals 1-6

1 = I 2 = II 3 = III 4 = IV 5 = V 6 = VI

First element is a nonmetal (not H) or metalloid

1. Use prefixes in name to find number of atoms of each element
2. Express number of atoms of each element as subscripts
 - *remember, no mono on first term

Examples:

Carbon monoxide - CO
 Sulfur trioxide - SO_3
 Carbon tetrachloride - CCl_4
 Dinitrogen pentoxide - N_2O_5
 Xenon tetroxide - XeO_4

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