

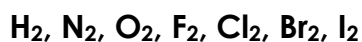
AP CHEMISTRY
SUMMER WORK

NAMING & WRITING THE FORMULAS OF
CHEMICAL COMPOUNDS

Naming Simple Compounds

Molecule or **molecular compound** is an assembly of two or more non-metal atoms tightly bonded together.

A **diatomic molecule** is a molecule made from two atoms of the same element. The following seven elements form diatomic molecules in their natural state:



An **allotrope** is one of two or more distinct forms of an element, such as: graphite and diamond (for carbon) and dioxygen (O_2 - usually referred to simply as oxygen) and ozone (O_3).

Molecular compounds (also known as **covalent compounds**) are composed of nonmetal elements that bond together into larger particles using covalent bonds (bonds created by the sharing of their valence electrons).

Molecular formulas show the exact number of atoms of each element in the molecule.

Empirical formulas are the simplest whole-number ratio of the atoms in a molecular compound or an ionic compound...

Ionic compounds are composed of ions and usually contain both metals and non-metals. The ions in an ionic compound form when the metal atoms give one or more electrons to the nonmetal atoms. Consequently, the metal ion is positively charged (called a cation) and the nonmetal ions are negatively charged (called the anions). Ionic compounds must be electrically neutral, so the sum of the charges of the anions and cations must equal zero. Because the formulas of ionic compounds must be empirical formulas, make sure the subscripts are reduced to their simplest ratio.

Watch the following instructional video:

Ionic vs. Molecular Compounds

<https://www.youtube.com/watch?v=PKA4CZwbZWU>

Naming & Writing Formulas of Molecular Compounds

Watch the following instructional video:

<https://www.youtube.com/watch?v=DejkvR4pvRw>

Identifying a Molecular Compound (aka Covalent Compound)

A molecular compound **contains ALL non-metal elements** (located on the right side of the staircase on the periodic table).

General Naming Rule:

Prefix (except mono) + nonmetal name + prefix + nonmetal name + ide

Prefix Definitions

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

Examples of molecular compounds

Formula	Name
CO	carbon monoxide
CO ₂	carbon dioxide
NO ₂	nitrogen dioxide
N ₂ O ₄	dinitrogen tetroxide

Naming & Writing Formulas for Molecular Compounds

Practice Problems

Instructions: Write the formula from the names of the following molecular compounds and vice versa.

1. **disilicon trioxide** _____
2. nitrogen **dioxide** _____
3. carbon **tetrachloride** _____
4. **trisulfur monoxide** _____
5. phosphorus **trisulfide** _____
6. boron tribromide _____
7. carbon monoxide _____
8. dinitrogen pentoxide _____
9. carbon dioxide _____
10. phosphorus hexafluoride _____
11. _____ SeCl_2
12. _____ NO
13. _____ P_2S
14. _____ Si_3I_8
15. _____ S_2O
16. _____ PBr_5
17. _____ N_2Se_3
18. _____ As_2O_4
19. _____ PH_3
20. _____ OCl_2

Naming & Writing Formulas for Molecular Compounds**ANSWERS****Practice Problems**

Instructions: Check your answers.

1. **disilicon trioxide** Si_2O_3
2. nitrogen **dioxide** NO_2
3. carbon **tetrachloride** CCl_4
4. **trisulfur monoxide** S_3O
5. phosphorus **trisulfide** PS_3
6. boron tribromide BBr_3
7. carbon monoxide CO
8. dinitrogen pentoxide N_2O_5
9. carbon dioxide CO_2
10. phosphorus hexafluoride PF_6
11. **selenium dichloride** SeCl_2
12. **nitrogen monoxide** NO
13. **diphosphorus monosulfide** P_2S
14. **trisilicon octaiodide** Si_3I_8
15. **disulfur monoxide** S_2O
16. **phosphorus pentabromide** PBr_5
17. **dinitrogen triselenide** N_2Se_3
18. **diarsenic tetraoxide** As_2O_4
19. **phosphorus trihydride** PH_3
20. **oxygen dichloride** OCl_2

Naming & Writing Formulas of Ionic Compounds

Identifying an Ionic Compound

An ionic compound will **start with a metal element** or ammonium (NH_4) and end with a non-metal or polyatomic ion (more about that later).

There are **three main types of ionic compound** to be considered:

- Basic (**binary**) ionic compounds (contain 1 metal & 1 nonmetal element)
- Ionic compounds containing a **polyatomic ion**
- Ionic compounds containing a **transition metal**

Examples of ionic compounds

Formula	Name
BaCl_2	barium chloride
$(\text{NH}_4)_2\text{SO}_4$	ammonium sulfate
Cu_2S	copper I sulfide
$\text{Mn}(\text{NO}_3)_4$	manganese IV nitrate

We will learn the rules for naming and writing formulas for each type, one at a time, and then put it all together.

Naming & Writing Formulas of Binary* Ionic Compounds

*a binary ionic compound is the simplest kind of ionic compound. It has only two elements in it (one metal and one nonmetal).

Naming Binary Ionic Compounds

General Rule:

1. Write the name of the metal ion (same as the element's name)
2. Write the name of the nonmetal ion (element's name, but change the ending to -ide)

Example: MgCl_2 Magnesium Chlorine \rightarrow Magnesium Chloride

Writing Formulas for Binary Ionic Compounds

Watch the following instructional videos:

Introduction: <https://www.youtube.com/watch?v=URc75hoKGLY&t=19s>

Practice: https://www.youtube.com/watch?v=X_LVANMpJ0c

Practice Problems

Instructions: Write the formula from the names of the following binary ionic compounds and vice versa.

- | | | |
|-----|-------------------|-------------------------|
| 1. | _____ | Na_2S |
| 2. | _____ | SrO |
| 3. | _____ | Be_3N_2 |
| 4. | _____ | CaF_2 |
| 5. | _____ | KCl |
| 6. | Cesium Phosphide | _____ |
| 7. | Barium Bromide | _____ |
| 8. | Lithium Oxide | _____ |
| 9. | Aluminum Selenide | _____ |
| 10. | Rubidium Iodide | _____ |

Naming & Writing Formulas of Binary Ionic Compounds**Answers****Practice Problems**

Instructions: Check your answers.

1. Sodium sulfide Na_2S
2. Strontium oxide SrO
3. Beryllium nitride Be_3N_2
4. Calcium fluoride CaF_2
5. Potassium chloride KCl
6. Cesium Phosphide Cs_3P
7. Barium Bromide BaBr_2
8. Lithium Oxide Li_2O
9. Aluminum Selenide Al_2Se_3
10. Rubidium Iodide RbI

What is a Polyatomic Ion?

A polyatomic ion is an ion made from a charged group of bonded atoms consisting of more than one element.

Watch the following instructional videos:

Definition: <https://www.youtube.com/watch?v=MJZeZvDxcx8>

IMPORTANT: In AP Chemistry, the names, formulas, and charges of the common polyatomic ions **MUST BE MEMORIZED!** You will be tested on these during the first two days of school.

AP Chemistry Polyatomic Ion Memorization List

(see the next page for tips on how to do it!)

1+ Cations

NH_4^{1+} Ammonium

1- Anions

$\text{C}_2\text{H}_3\text{O}_2^{1-}$ Acetate

CN^{1-} Cyanide

BrO^{1-} Hypobromite

BrO_2^{1-} Bromite

BrO_3^{1-} Bromate

BrO_4^{1-} Perbromate

ClO^{1-} Hypochlorite

ClO_2^{1-} Chlorite

ClO_3^{1-} Chlorate

ClO_4^{1-} Perchlorate

IO^{1-} Hypoiodite

IO_2^{1-} Iodite

IO_3^{1-} Iodate

IO_4^{1-} Periodate

HCO_3^{1-} Hydrogen Carbonate

$\text{H}_2\text{PO}_4^{1-}$ Dihydrogen Phosphate

HSO_4^{1-} Hydrogen Sulfate

NO_2^{1-} Nitrite

NO_3^{1-} Nitrate

OH^{1-} Hydroxide

MnO_4^{1-} Permanganate

SCN^{1-} thiocyanate

2- Anions

CO_3^{2-} Carbonate

$\text{C}_2\text{O}_4^{2-}$ Oxalate

CrO_4^{2-} Chromate

$\text{Cr}_2\text{O}_7^{2-}$ Dichromate

HPO_4^{2-} Hydrogen Phosphate

O_2^{2-} Peroxide

SO_3^{2-} Sulfite

SO_4^{2-} Sulfate

$\text{S}_2\text{O}_3^{2-}$ Thiosulfate

3- Anions

PO_3^{3-} Phosphite

PO_4^{3-} Phosphate

A Strategy for Memorizing the Polyatomic Ions

Watch this video explanation:

<https://www.youtube.com/watch?v=cpaQhgNgF7U&feature=youtu.be>

The Big Five (make flashcards for these!)

- | | |
|------------------------|-----------|
| 1. CO_3^{2-} | carbonate |
| 2. ClO_3^{1-} | chlorate |
| 3. NO_3^{1-} | nitrate |
| 4. SO_4^{2-} | sulfate |
| 5. PO_4^{3-} | phosphate |

Memorization Tip:

Slivka's Square (with corners: Si, S, Te, Sn)

- inside square: -ate has 4 O
- outside square: -ate has 3 O

Ions by Analogy

If you know...

Cl ClO_3^{1-}

you know...

Br and I BrO_3^{1-} and IO_3^{1-}

Ions by Extension

Memorize the -ate ion (example: Chlorate, ClO_3) and you can figure out the rest...

- Hypo- ___ -ite is under -ite (ClO^{1-}) think: hypodermic needle
- ___ -ite is one less (ClO_2^{1-}) - goes under the skin
- ___ -ate memorize this (ClO_3^{1-})
- Per- ___ -ate is over -ate (ClO_4^{1-}) think: hyper - overexcited

Ions by Hydrogenation

SO_4^{2-}	sulfate	CO_3^{2-}	carbonate
HSO_4^{1-}	hydrogen sulfate	HCO_3^{1-}	hydrogen carbonate
PO_4^{3-}	phosphate		
HPO_4^{2-}	hydrogen phosphate		
$\text{H}_2\text{PO}_4^{1-}$	dihydrogen phosphate		

Little Five (make flashcards for these!)

- | | | | |
|---|-----------------------|---------------------------------------|-------------|
| 1. Polyatomic Cations | | 4. Organic Polyatomic Anions | |
| NH_4^{1+} | ammonium | $\text{C}_2\text{H}_3\text{O}_2^{1-}$ | acetate |
| 2. Named like a Monatomic Anion (-ide ending) | | $\text{C}_2\text{O}_4^{2-}$ | oxalate |
| OH^{1-} | hydroxide | 5. Thio- Anions | |
| CN^{1-} | cyanide | SCN^{1-} | thiocyanate |
| O_2^{2-} | peroxide | $\text{S}_2\text{O}_3^{2-}$ | thiosulfate |
| 3. Colored Anions | | | |
| MnO_4^{1-} | permanganate (purple) | | |
| CrO_4^{2-} | chromate (yellow) | | |
| $\text{Cr}_2\text{O}_7^{2-}$ | dichromate (orange) | | |

Naming & Writing Formulas of Ionic Compounds that contain Polyatomic Ions

Naming Ionic Compounds that contain Polyatomic Ions

General Rule:

1. Identify that the ionic compound contains a polyatomic ion. Ionic compounds containing polyatomic ions are easily identified because they will contain more than two elements.
2. Identify the particular polyatomic ion the compound contains. Unless it is ammonia (NH_4^+), the polyatomic ion will be negatively charged, and therefore, will be written AFTER the metal ion (which, by convention, is always written first).
3. Simply write the name of the metal ion (same as the element's name) and then the name of the polyatomic ion (which you've memorized).

Example: MgCO_3 Mg^{2+} and CO_3^{2-} → Magnesium Carbonate

Writing Formulas for Ionic Compounds that contain Polyatomic Ions

Watch the following instructional videos:

Definition: <https://www.youtube.com/watch?v=MJZeZvDxcx8>

Introduction: <https://www.youtube.com/watch?v=p9iQ5Qn42DM>

Practice Problems

Instructions: Write the formula from the names of the following ionic compounds and vice versa.

1. _____ Na_2SO_3
2. _____ $\text{Sr}(\text{NO}_3)_2$
3. _____ $\text{Be}_3(\text{PO}_4)_2$
4. _____ NH_4F
5. Cesium Acetate _____
6. Barium Perchlorate _____
7. Ammonium Cyanide _____
8. Aluminum Hydroxide _____

Naming & Writing Formulas of Ionic Compounds that contain Polyatomic Ions

ANSWERS

Practice Problems

Instructions: Check your answers

1. Sodium Sulfite Na_2SO_3
2. Strontium Nitrate $\text{Sr}(\text{NO}_3)_2$
3. Beryllium Phosphate $\text{Be}_3(\text{PO}_4)_2$
4. Ammonium Fluoride NH_4F
5. Cesium Acetate $\text{CsC}_2\text{H}_3\text{O}_2$
6. Barium Perchlorate $\text{Ba}(\text{ClO}_4)_2$
7. Ammonium Cyanide NH_4CN
8. Aluminum Hydroxide $\text{Al}(\text{OH})_3$

Naming & Writing Formulas of Ionic Compounds that contain Transition Metals

Writing Formulas of Ionic Compounds that contain Transition Metals

Watch the following instructional videos:

Definition: https://www.youtube.com/watch?v=Da_ah6TqAss

Introduction: <https://www.youtube.com/watch?v=H4nfE8gRX7Q>

Naming Ionic Compounds that contain Transition Metals

Watch the following instructional videos:

Introduction: <https://www.youtube.com/watch?v=Rq0A-AHdB74>

Practice: <https://www.youtube.com/watch?v=Rq0A-AHdB74>

Instructions: Write the formula from the names of the following binary ionic compounds and vice versa.

- _____ Mn_2S
- _____ NiO
- _____ Cr_3N_2
- _____ CuF_2
- _____ PbCl
- Tin II Phosphide _____
- Molybdenum III Bromide _____
- Titanium IV Oxide _____
- Vanadium II Selenide _____
- Cadmium I Sulfate _____

**Naming & Writing Formulas of Ionic Compounds
that contain Transition Metals****ANSWERS**

Instructions: Check your answers.

1. Manganese I Sulfide Mn_2S
2. Nickel II Oxide NiO
3. Chromium II Nitride Cr_3N_2
4. Copper II Fluoride CuF_2
5. Lead I Chloride PbCl
6. Tin II Phosphide Sn_3P_2
7. Molybdenum III Bromide MoBr_3
8. Titanium IV Oxide TiO_2
9. Vanadium II Selenide VSe
10. Cadmium I Sulfate Cd_2SO_4

Writing Names & Formulas of Acids

Identifying an Acid

An acid **starts with hydrogen** and ends with a nonmetal or polyatomic ion.

Watch the following instructional videos:

Introduction: <https://www.youtube.com/watch?v=5Jb2u9ihfm4>

Practice: <https://www.youtube.com/watch?v=VyjnMk-Ta10>

General Rules:

Binary acids: acids made from hydrogen plus a single element (like HBr):

Hydro + element name + ic Acid

Example: HBr Hydro + bromine Acid → Hydrobromic Acid

Oxyacids: acids made from hydrogen plus an oxygen-containing polyatomic ion (like HBrO₃):

Polyatomic ion name* Acid

(*but change "ate" endings to "ic" and "ite" endings to "ous")

Example: HBrO₃ BrO₃⁻ = Bromate Bromate Acid → Bromic Acid
 HBrO₂ BrO₂⁻ = Bromite Bromite Acid → Bromous Acid

Practice Problems

Instructions: Write the formulas from the names of the following acids and vice versa.

- _____ HCl
- _____ HI
- _____ H₂SO₃
- _____ HNO₃
- Phosphorous Acid _____
- Hydrofluoric Acid _____
- Perchloric Acid _____
- Acetic Acid _____

Writing Names & Formulas of Acids

ANSWERS

Practice Problems

Instructions: Check your answers.

1. Hydrochloric Acid HCl
2. Hydroiodic Acid HI
3. Sulfurous Acid H₂SO₃
4. Nitric Acid HNO₃
5. Phosphoric Acid H₃PO₄
6. Hydrofluoric Acid HF
7. Hypochlorous Acid HClO
8. Acetic Acid HC₂H₃O₂

Naming Hydrates

Hydrates are ionic compounds that have a specific number of water molecules attached to them. **Anhydrides** are hydrates that have had the water removed (such as through heating). The number of water is indicated with a coefficient in the formula and a prefix in the name.

Examples of common hydrates

Formula	Name
$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	copper II sulfate pentahydrate
$\text{LiCl} \cdot \text{H}_2\text{O}$	lithium chloride monohydrate
$\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$	barium chloride dihydrate
$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	magnesium sulfate heptahydrate
$\text{Sr}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$	strontium nitrate tetrahydrate

Practice Problems

Instructions: Write the formulas from the names of the following hydrates and vice versa.

- _____ $\text{MgBr}_2 \cdot 2\text{H}_2\text{O}$
- _____ $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$
- _____ $\text{NaNO}_3 \cdot 5\text{H}_2\text{O}$
- _____ $\text{NH}_4\text{ClO}_2 \cdot 3\text{H}_2\text{O}$
- potassium sulfide tetrahydrate _____
- lithium hydroxide monohydrate _____
- calcium sulfide octahydrate _____
- barium chloride heptahydrate _____

Naming Hydrates

ANSWERS

Practice Problems

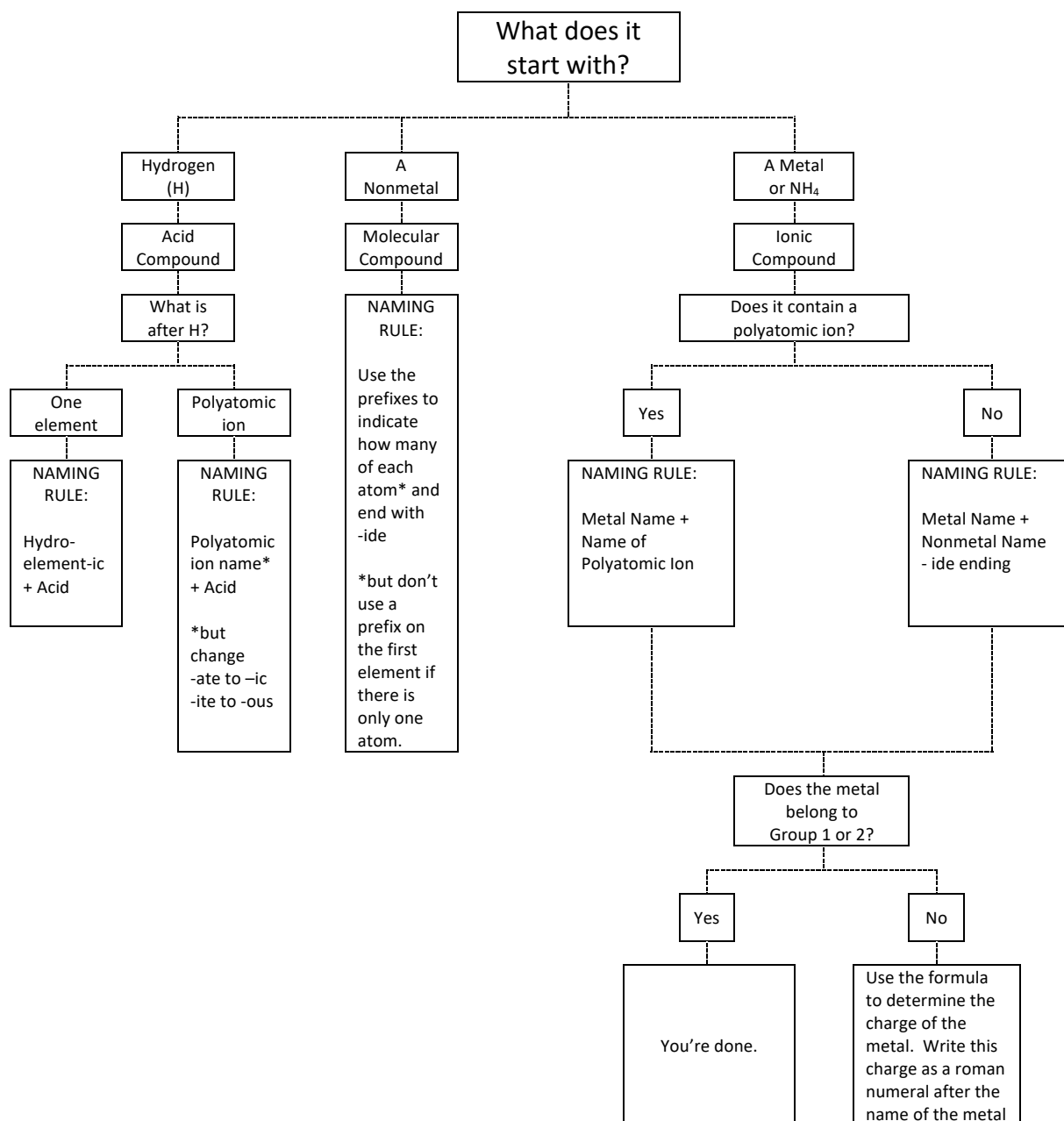
Instructions: Write the formulas from the names of the following hydrates and vice versa.

1. magnesium bromide dihydrate $\text{MgBr}_2 \cdot 2\text{H}_2\text{O}$
2. cobalt II chloride hexahydrate $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$
3. sodium nitrate pentahydrate $\text{NaNO}_3 \cdot 5\text{H}_2\text{O}$
4. ammonium chlorite trihydrate $\text{NH}_4\text{ClO}_2 \cdot 3\text{H}_2\text{O}$
5. potassium sulfide tetrahydrate $\text{K}_2\text{S} \cdot 4\text{H}_2\text{O}$
6. lithium sulfate monohydrate $\text{Li}_2\text{SO}_4 \cdot \text{H}_2\text{O}$
7. calcium carbonate octahydrate $\text{CaCO}_3 \cdot 8\text{H}_2\text{O}$
8. barium chloride heptahydrate $\text{BaCl}_2 \cdot 7\text{H}_2\text{O}$

Putting It All Together

Of course, in chemistry class, you will be asked to name and write the formulas of random compounds. They won't come pre-categorized like the ones on the previous pages. So let's come up with a strategy for how to correctly name or write the formula of a compound when you haven't been told what kind it is.

When you come across a random formula, answer the following questions:



Summary of Naming and Writing Formula Rules

Type of Compound	Naming the Compound	Writing the Formula
Ionic (<i>metal + nonmetal</i>)	<p>Metal Name¹ + Nonmetal² + ide</p> <p>1) Most metals that are not in Group 1 & 2 can have more than one charge. For these, determine the charge of the ion by determining what the charge on each metal would have to be to make the compound neutral, by considering the charge of the negative ion and the entire formula. Indicate the metals charge with a roman numeral (I, II, III, IV).</p> <p>2) If the compound is not binary (has more than two elements), find the polyatomic ion and name it.</p>	<p><i>Using the charge of each ion in the formula, determine the number of each ion (ratio) needed in order to create a neutral compound.</i></p>
Molecular (<i>all nonmetals</i>)	<p>Prefix + Nonmetal + Prefix + Nonmetal + ide</p> <p>Remember: no <i>mono</i> is needed for the first element.</p>	<p><i>Write the formula using the prefixes provided in the name to determine how many atoms of each element there should be.</i></p>
Acid (<i>Begins with H</i>)	<p><i>Binary Acid (Without Oxygen)</i></p> <p>Hydro + nonmetal + ic + Acid</p> <p><i>Oxyacid (With Oxygen)</i></p> <p>Polyatomic Ion Name³ + Acid</p> <p>3) replace an -ite ending with -ous -ate ending with -ic</p>	<p><i>Using the charge of each ion in the formula, determine the number of each ion (ratio) needed in order to create a neutral compound.</i></p>

Practice Writing Formulas**Mix of Molecular, Ionic, and Acid Compounds**

(tip: use the flow chart strategy above to solve these!)

- 1) aluminum arsenide _____
- 2) permanganic acid _____
- 3) tin II sulfite _____
- 4) vanadium (V) fluoride _____
- 5) lithium acetate _____
- 6) hexaboron monosilicide _____
- 7) hydrofluoric acid _____
- 8) ammonium nitrate _____
- 9) silver cyanide _____
- 10) copper (II) chloride _____
- 11) phosphorus triiodide _____
- 12) potassium fluoride _____
- 13) hypobromous acid _____
- 14) nitric acid _____
- 15) acetic acid _____
- 16) phosphoric acid _____
- 17) chlorine dioxide _____
- 18) periodic acid _____
- 19) potassium permanganate _____
- 20) chromium (VI) cyanide _____
- 21) sulfuric acid _____
- 22) perchloric acid _____
- 23) vanadium (III) selenide _____

- 24) manganese (IV) nitride _____
- 25) beryllium oxide _____
- 26) sodium sulfate _____
- 27) iodous acid _____
- 28) sulfurous acid _____
- 29) copper (II) bicarbonate _____
- 30) iodine pentafluoride _____
- 31) dinitrogen trioxide _____
- 32) bromous acid _____
- 33) chlorous acid _____
- 34) ammonium sulfate _____
- 35) magnesium iodide _____
- 36) copper (II) sulfite _____
- 37) aluminum phosphate _____
- 38) lead (II) nitrite _____
- 39) cobalt (II) selenide _____
- 40) iron (II) oxide _____
- 41) lithium cyanide _____
- 42) lead (IV) sulfite _____
- 43) phosphorous acid _____

Practice Naming Compounds**Mix of Molecular, Ionic, and Acid Compounds**

- 1) P_4S_5 _____
- 2) HI _____
- 3) H_2SO_4 _____
- 4) SeF_6 _____
- 5) SrS _____
- 6) Cu_2S _____
- 7) Si_2Br_6 _____
- 8) $HBrO_4$ _____
- 9) $HBrO_3$ _____
- 10) $HC_2H_3O_2$ _____
- 11) SCl_4 _____
- 12) ZnI_2 _____
- 13) NaF _____
- 14) K_2CO_3 _____
- 15) $Ca_3(PO_4)_2$ _____
- 16) NH_4I _____
- 17) H_3PO_3 _____
- 18) H_3P _____
- 19) CH_4 _____
- 20) B_2Si _____
- 21) Cu_2S _____
- 22) H_2CrO_4 _____
- 23) SrS _____

- 24) MgCl_2 _____
- 25) HIO_3 _____
- 26) H_2S _____
- 27) $\text{Be}(\text{OH})_2$ _____
- 28) $\text{Mn}(\text{NO}_3)_3$ _____
- 29) HCN _____
- 30) H_2CO_3 _____
- 31) FePO_4 _____
- 32) CoCO_3 _____
- 33) HCl _____
- 34) HClO_4 _____
- 35) NF_3 _____
- 36) AgNO_3 _____

Practice Writing Formulas ANSWERS**Mix of Molecular, Ionic, and Acid Compounds**

- | | |
|-----------------------------|------------------------------------|
| 1) aluminum arsenide | AlAs |
| 2) permanganic acid | HMnO_4 |
| 3) tin (II) sulfite | SnSO_3 |
| 4) vanadium (V) fluoride | VF_5 |
| 5) lithium acetate | $\text{LiC}_2\text{H}_3\text{O}_2$ |
| 6) hexaboron monosilicide | B_6Si |
| 7) hydrofluoric acid | HF |
| 8) ammonium nitrate | NH_4NO_3 |
| 9) silver (I) cyanide | AgCN |
| 10) copper (II) chloride | CuCl_2 |
| 11) phosphorus triiodide | PI_3 |
| 12) potassium fluoride | KF |
| 13) hypobromous acid | HBrO |
| 14) nitric acid | HNO_3 |
| 15) acetic acid | $\text{HC}_2\text{H}_3\text{O}_2$ |
| 16) phosphoric acid | H_3PO_4 |
| 17) chlorine dioxide | ClO_2 |
| 18) periodic acid | HIO_4 |
| 19) potassium permanganate | KMnO_4 |
| 20) chromium (VI) cyanide | $\text{Cr}(\text{CN})_6$ |
| 21) sulfuric acid | H_2SO_4 |
| 22) perchloric acid | HClO_4 |
| 23) vanadium (III) selenide | V_2Se_3 |

24)	manganese (IV) nitride	Mn_3N_4
25)	beryllium oxide	BeO
26)	sodium sulfate	Na_2SO_4
27)	iodous acid	HIO_2
28)	sulfurous acid	H_2SO_3
29)	copper (II) hydrogen carbonate	$\text{Cu}(\text{HCO}_3)_2$
30)	iodine pentafluoride	IF_5
31)	dinitrogen trioxide	N_2O_3
32)	bromous acid	HBrO_2
33)	chlorous acid	HClO_2
34)	ammonium sulfate	$(\text{NH}_4)_2\text{SO}_4$
35)	magnesium iodide	MgI_2
36)	copper (II) sulfite	CuSO_3
37)	aluminum phosphate	AlPO_4
38)	lead (II) nitrite	$\text{Pb}(\text{NO}_2)_2$
39)	cobalt (II) selenide	CoSe
40)	iron (II) oxide	FeO
41)	lithium cyanide	LiCN
42)	lead (IV) sulfite	$\text{Pb}(\text{SO}_3)_2$
43)	phosphorous acid	H_3PO_3

Practice Naming Compounds ANSWERS**Mix of Molecular, Ionic, and Acid Compounds**

- 1) P_4S_5 tetraphosphorous pentasulfide
- 2) HI hydroiodic acid
- 3) H_2SO_4 sulfuric acid
- 4) SeF_6 selenium hexafluoride
- 5) SrS strontium sulfide
- 6) Cu_2S copper (I) sulfide
- 7) Si_2Br_6 disilicon hexabromide
- 8) $HBrO_4$ perbromic acid
- 9) $HBrO_3$ bromic acid
- 10) $HC_2H_3O_2$ acetic acid
- 11) SCl_4 sulfur tetrachloride
- 12) ZnI_2 zinc (II) iodide
- 13) NaF sodium fluoride
- 14) K_2CO_3 potassium carbonate
- 15) $Ca_3(PO_4)_2$ calcium phosphate
- 16) NH_4I ammonium iodide
- 17) H_3PO_3 phosphorous acid
- 18) H_3P hydrophosphoric acid
- 19) CH_4 carbon tetrahydride (or methane)
- 20) B_2Si diboron monosilicide
- 21) Cu_2S copper (I) sulfide
- 22) H_2CrO_4 chromic acid
- 23) SrS strontium sulfide

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|-----|----------------------------|-------------------------|
| 24) | MgCl_2 | magnesium chloride |
| 25) | HIO_3 | iodic acid |
| 26) | H_2S | hydrosulfuric acid |
| 27) | $\text{Be}(\text{OH})_2$ | beryllium hydroxide |
| 28) | $\text{Mn}(\text{NO}_3)_3$ | manganese (III) nitrate |
| 29) | HCN | cyanic acid |
| 30) | H_2CO_3 | carbonic acid |
| 31) | FePO_4 | iron (III) phosphate |
| 32) | CoCO_3 | cobalt (II) carbonate |
| 33) | HCl | hydrochloric acid |
| 34) | HClO_4 | perchloric acid |
| 35) | NF_3 | nitrogen trifluoride |
| 36) | AgNO_3 | silver (I) nitrite |