

FPS - Naming Binary Compounds

Name Key Period _____

I can...

Construct the name of binary ionic and covalent compounds using nomenclature rules.

Bellwork

The diagram shows a simplified periodic table with the following regions labeled:

- Metals:** Elements in groups 1 through 12.
- Nonmetals:** Elements in groups 13 through 18.
- Metalloids:** Elements in groups 13 through 16, specifically rows 3, 4, and 5.

1. What is the difference between an ionic bond and a covalent bond?

Metals in ionic

2. Give an example of an ionic bond.

NaCl

3. Give an example of a covalent bond.

H₂O

Notes

4. Chemists have a system for naming all types of compounds. Why would this be important?

Universal consistency: chemists everywhere will be able to communicate

5. Some compounds have common names that are used, like H₂O is water.

6. We will learn the steps for naming both ionic and covalent compounds. We will name only binary compounds, meaning they have only *two* parts.

7. These are the steps for naming binary *ionic compounds*:



A. Calcium

B. Chlorine

C. Chlor + ide

Calcium chloride

A. Metal first, then nonmetal

B. Write the metal name.

C. Write the root of the nonmetal and add -ide to the end.

Examples (write the names of the following):

1. NaCl Sodium Chloride

2. CaBr_2 Calcium bromide

3. Na_3P Sodium phosphide

8. These are the steps naming binary *covalent compounds*:

A. The nonmetal farthest on the left of the table is written first.

B. Add prefixes to indicate numbers of atoms.

C. Never write the prefix "mono-" for the first element.

D. Change the ending to -ide for the second element.



A. Nitrogen + oxygen

B. Mononitrogen trioxygen

C. ~~Mono~~Nitrogen trioxygen

D. Nitrogen trioxide

(notice for oxygen, you drop the "y" and change to "i"!)

Prefix	Number
mono	1
di	2
tri	3
tetra	4
penta	5
hexa	6
hepta	7
octa	8
nona	9
deca	10

9. Try these covalent compounds on your own:

$\text{CCl}_4 =$ carbon tetrachloride $\text{N}_2\text{O} =$ dinitrogen monoxide
 $\text{SF}_6 =$ sulfur hexafluoride

Name: _____

Date: _____

Physical Science
Naming and Writing Formulas for Ionic Compounds

Naming Rules:

1. Always write the name of the cation and first. It will usually be a metal.
2. Write the name of the anion second. It will usually be a nonmetal.
3. **DO NOT USE GREEK PREFIXES TO INDICATE SUBSCRIPTS.**
4. The name of the metal will remain the same, however if the anion is a non-metal it will end in -ide, such as chloride for Cl^- .

Formula Rules:

1. Always write the formula of the cation and first. It will usually be a metal.
2. Write the formula of the anion second. It will usually be a nonmetal.
3. Ensure that the overall charge of the formula is equal to zero. To do this you will need to fix the ratio of the elements so that the sum of the positive charge is equal to the sum of the negative charges. If this means you require more than one of each anion or cation write a subscript on the write hand side of the anion or cation to represent the desired number.
4. Ensure that the ratio of cations to anions is written to the simplest / lowest whole number ratio. Therefore 2:2 should be written as 1:1, and 3:9 as 1:3.
5. **ROMAN NUMERALS DO NOT INDICATE THE NUMBER OF THE SUBSCRIPTS; THEY ONLY INDICATE THE CHARGE OF THE CATION.**

NAME: _____

DATE: _____

PHYSICAL SCIENCE
IONIC COMPOUNDS

1. Name the following compounds:

a. Na_2S

sodium sulfide

b. CaCl_2

calcium chloride

c. Al_2O_3

aluminum oxide

d. K_2O

potassium oxide

e. Mg_3N_2

magnesium nitride

2. Write the formulas for the following compounds: (write the ions *first* with their charges, then use the crossing method)

a. Sodium Bromide

NaBr

b. Magnesium Oxide

MgO

c. Barium Chloride

BaCl_2

d. Cesium Oxide

Cs_2O

e. Calcium Iodide

CaI_2

Name: _____

Date: _____

Naming Binary Covalent Compounds

Rules for Naming Covalent Compounds:

1. Identify the compound as covalent. Usually all the elements are nonmetal,
2. Two nonmetal elements can often bind together in more than one way. Greek prefixes are used to describe the number of atoms in each molecule and distinguish one compound from another.
3. The second element always ends in -ide. (chloride, oxide, nitride)
4. *The vowel at the end of the prefix is often dropped if the name of the element begins with a vowel.*
5. If the first element is only supposed to be one element the prefix mono- does not need to be used. However, the prefix mono **must be used** with the second element.
6. The prefix is used to illustrate the subscript in the formula.

1-mono 2-di 3-tri 4-tetra 5-penta 6-hexa 7-hepta 8-octa 9-nona 10-deca

Name the following compounds:

- | | | | | | | |
|----|----|-----------|------------------------|----|-------------|-------------------------|
| 1. | a. | H_2O | water | b. | NO_2 | nitrogen dioxide |
| | c. | CO_2 | carbon dioxide | d. | CCl_4 | carbon tetrachloride |
| | e. | Cl_2O_7 | dichlorine heptoxide | f. | CS_2 | carbon disulfide |
| | g. | P_2O_5 | diphosphorus pentoxide | h. | N_2H_4 | dinitrogen tetrahydride |
| | i. | SO_3 | sulfur trioxide | j. | P_3O_{10} | triphosphorus decoxide |
| | k. | N_2O | dinitrogen monoxide | l. | N_2O_4 | dinitrogen tetroxide |

Write the formula for the following names

- | | | | | | | |
|----|----|--------------------------|-----------|----|--------------------------|--------------|
| 2. | a. | phosphorus pentachloride | PCl_5 | b. | dichlorine heptoxide | Cl_2O_7 |
| | c. | trisilicon tetranitride | Si_3N_4 | d. | tricarbon octahydride | C_3H_8 |
| | e. | boron trichloride | BCl_3 | f. | dihydrogen dioxide | H_2O_2 |
| | g. | carbon monoxide | CO | h. | dichlorine monoxide | Cl_2O |
| | i. | tribromine heptanitride | Br_3N_7 | j. | tetrasilicon decasulfide | Si_4S_{10} |
| | k. | silicon dicarbide | SiC_2 | l. | trichlorine diiodide | Cl_3I_2 |

Name _____

Naming Binary Compounds (Ionic)

Name each ionic compound, using Roman numerals where necessary.



barium chloride



potassium sulfide



Sodium fluoride



Chromium chloride





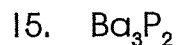


Copper bromide



calcium oxide



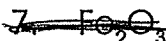


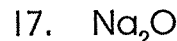
barium phosphide



iron oxide







Sodium oxide



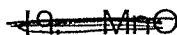
magnesium sulfide

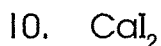


beryllium sulfide



aluminum oxide





calcium iodide

