

KEY

STUDY GUIDE: Naming & Formulas of Ionic Compounds

Are you **B**eginning, **D**eveloping, or **A**ccomplished at each of the following learning goals? Go through the check list and mark each row as “B”, “D”, or “A” based on your level of understanding. Focus on the “B”s when you’re studying!

KNOW

B	D	A	LEARNING GOAL
			I can identify a Bohr diagram
			I can identify the valence electrons of an atom or ion
			I can describe the differences between ionic & covalent compounds
			I can describe how to write formulas for ionic compounds (<i>including multivalent metals & polyatomic ions</i>)
			I can describe how to write names for ionic compounds (<i>including multivalent metals & polyatomic ions</i>)

DO

B	D	A	LEARNING GOAL
			I can draw Bohr diagrams for the first 18 elements on the periodic table (as atoms or ions)
			I can draw a Bohr diagram that shows what happens in an ionic bond between two elements
			I can count the number of atoms in an ionic compound using its chemical formula
			I can write the formula for an ionic compound, given the elements involved or the name of the compound
			I can write the name of an ionic compound, given the elements involved or the formula of the compound

In the following pages you will find worksheets to practice your skills and understanding. Make sure you check your work using the keys posted on

www.mrrudolf.weebly.com !!!

The test will be an MYP-style test. Make sure to review lots and ask questions!

Chemical Formula Writing Worksheet

Write chemical formulas for the compounds in each box. The names are found by finding the intersection between the cations and anions. Example: The first box is the intersection between the "zinc" cation and the "chloride" anion, so you should write "ZnCl₂", as shown.

		(+ ions)					
		Zn ²⁺	Fe ²⁺	Cations Fe ³⁺	Ga ³⁺	Ag ⁺	Pb ⁴⁺
(- ions) Cl ⁻ C ₂ H ₃ O ₂ ⁻ or CH ₃ COO ⁻ NO ₃ ⁻ O ²⁻ N ³⁻ SO ₄ ²⁻	Anions	zinc	iron (II)	iron (III)	gallium	silver	lead (IV)
	chloride	ZnCl ₂	FeCl ₂	FeCl ₃	GaCl ₃	AgCl	PbCl ₄
	acetate	Zn(CH ₃ COO) ₂	Fe(CH ₃ COO) ₂	Fe(CH ₃ COO) ₃	Ga(CH ₃ COO) ₃	AgCH ₃ COO	Pb(CH ₃ COO) ₄
	nitrate	Zn(NO ₃) ₂	Fe(NO ₃) ₂	Fe(NO ₃) ₃	Ga(NO ₃) ₃	AgNO ₃	Pb(NO ₃) ₄
	oxide	ZnO	FeO	Fe ₂ O ₃	Ga ₂ O ₃	Ag ₂ O	PbO ₂
	nitride	Zn ₃ N ₂	Fe ₃ N ₂	FeN	GaN	Ag ₃ N	Pb ₃ N ₄
	sulfate	ZnSO ₄	FeSO ₄	Fe ₂ (SO ₄) ₃	Ga ₂ (SO ₄) ₃	Ag ₂ SO ₄	Pb(SO ₄) ₂

Write the formulas for the following compounds:

- 1) copper (II) chloride CuCl₂
- 2) lithium acetate Li: CH₃COO
- 3) vanadium (III) selenide V₂Se₃
- 4) manganese (IV) nitride Mn₃N₄
- 5) beryllium oxide BeO
- 6) sodium sulfate Na₂SO₄
- 7) aluminum arsenide AlAs
- 8) potassium permanganate KMnO₄
- 9) chromium (VI) cyanide Cr(CN)₆
- 10) tin (II) sulfite SnSO₃
- 11) vanadium (V) fluoride VF₅
- 12) ammonium nitrate NH₄NO₃

Words to know about compounds

Vocabulary

atom	ionic lattice
chemical bonds	lose
compound	molecule
covalent compounds	negatively
electrons	neutrons
element	polyatomic ion
gain	positively
ion	protons
ionic compounds	

Use the terms in the vocabulary box to fill in the blanks. Each term may be used more than once. You will not need to use every term.

1. A pure substance that is made up of one type of atom is called a(n) element.
2. A pure substance that is made up of two or more types of atoms that are joined together due to a chemical change is called a(n) compound.
3. Atoms in a molecule and ions in an ionic lattice are held together by chemical bonds.
4. Chemical bonds are formed when atoms gain or lose electrons or when they share electrons.
5. When an atom loses electrons it becomes positively charged. When an atom gains electrons it becomes negatively charged.
6. Metals and non-metals may form ionic compounds.
7. The atoms in non-metals tend to gain electrons.
8. A(n) ionic lattice is a repeating pattern of positive and negative ions.
9. covalent compounds form when non-metal atoms bond together by sharing their electrons.
10. A neutral particle that is made up of atoms that are joined together by covalent bonds is called a(n) covalent compound.
11. A(n) polyatomic ion is an ion that is made up of two or more atoms that are held together with covalent bonds.

Comparing ionic and covalent compounds

Use the chart to help you compare ionic compounds and covalent compounds. On the left side, place the letters of the statements that are only true of ionic compounds. On the right side, place the letters of the statements that are only true of covalent compounds. In the middle, place the letters of the statements that are true of both compounds.

- A. atoms gain or lose electrons to form ions
- B. pure substance made up of two or more kinds of elements
- C. compound is made of a positive ion and a negative ion
- D. atoms join by sharing electrons
- E. atoms are joined to each other by chemical bonds
- F. exist as a solid in the form of an ionic lattice
- G. oppositely charged ions attract each other
- H. molecule made of uncharged atoms
- I. bond between atoms is due to electron transfer
- J. compound is made of a non-metal and a non-metal
- K. sodium chloride (NaCl) is an example
- L. water (H₂O) is an example

Ionic compound	Both	Covalent compound
A C F G I K	B E	D H J L

Naming Ionic Compounds

Write the name of the compound.

1.	KCl	potassium chloride	21.	Li ₂ O	lithium oxide
2.	Na ₂ S	sodium sulfide	22.	NaCN	sodium cyanide
3.	AlCl ₃	aluminum chloride	23.	Ag ₂ CrO ₄	silver chromate
4.	BaO	barium oxide	24.	Ca(ClO ₃) ₂	calcium chlorate
5.	Ag ₂ S	silver sulfide	25.	NH ₄ HCO ₃	ammonium hydrogen carbonate
6.	Al ₂ O ₃	aluminum oxide	26.	ZnI ₂	zinc iodide
7.	LiF	lithium fluoride	27.	KMnO ₄	potassium permanganate
8.	ZnF ₂	zinc fluoride	28.	BaBr ₂	barium bromide
9.	MgBr ₂	magnesium bromide	29.	Ca ₃ (PO ₄) ₂	calcium phosphate
10.	CaS	calcium sulfide	30.	Na ₂ Cr ₂ O ₇	sodium dichromate
11.	KNO ₃	potassium nitrate	31.	LiNO ₃	lithium nitrate
12.	MgSO ₄	magnesium sulfate	32.	MgS	magnesium sulfide
13.	Zn(OH) ₂	zinc hydroxide	33.	NaClO	sodium hypochlorite
14.	NH ₄ I	ammonium iodide	34.	K ₂ HPO ₄	potassium monohydrogen phosphate
15.	Na ₂ CO ₃	sodium carbonate	35.	Ca(OH) ₂	calcium hydroxide
16.	Mg(HSO ₄) ₂	magnesium hydrogen sulfate	36.	(NH ₄) ₃ PO ₄	ammonium phosphate
17.	AgOH	silver hydroxide	37.	Al(H ₂ PO ₄) ₃	aluminum dihydrogen phosphate
18.	Zn ₃ (PO ₄) ₂	zinc phosphate	38.	AgCl	silver chloride
19.	(NH ₄) ₂ SO ₄	ammonium sulfate	39.	K ₂ SO ₃	potassium sulfite
20.	Al(HS) ₃	aluminum hydrogen sulfide	40.	NaClO ₄	sodium perchlorate

Writing Formulas for Ionic Compounds

Write the formula for the compound.

1.	zinc bromide $ZnBr_2$	21.	copper(II) chloride $CuCl_2$
2.	sodium oxide Na_2O	22.	iron(III) oxide Fe_2O_3
3.	lithium hydroxide $LiOH$	23.	manganese(II) nitrate $Mn(NO_3)_2$
4.	calcium fluoride CaF_2	24.	lead(IV) bromide $PbBr_4$
5.	silver sulfide Ag_2S	25.	chromium(III) carbonate $Cr_2(CO_3)_3$
6.	ammonium sulfide $(NH_4)_2S$	26.	tin(IV) chromate $SnCrO_4$
7.	magnesium oxalate MgC_2O_4	27.	lead(II) sulfate $PbSO_4$
8.	barium sulfate $BaSO_4$	28.	ammonium permanganate NH_4MnO_4
9.	potassium chlorite $KClO_2$	29.	silver oxalate $Ag_2C_2O_4$
10.	aluminum nitrate $Al(NO_3)_3$	30.	iron(III) hydroxide $Fe(OH)_3$
11.	ammonium dichromate $(NH_4)_2Cr_2O_7$	31.	manganese(IV) phosphate $Mn_3(PO_4)_4$
12.	silver acetate $AgCH_3COO$	32.	iron(II) nitrate $Fe(NO_3)_2$
13.	sodium chromate Na_2CrO_4	33.	copper(II) carbonate $CuCO_3$
14.	lithium sulfide Li_2S	34.	zinc chlorate $Zn(ClO_3)_2$
15.	aluminum chlorate $AlClO_3$	35.	iron(II) oxide FeO
16.	calcium nitrate $Ca(NO_3)_2$	36.	mercury(II) sulfate $HgSO_4$
17.	ammonium oxide $(NH_4)_2O$	37.	lead(IV) sulfide PbS_2
18.	potassium sulfide K_2S	38.	iron(III) carbonate $Fe_2(CO_3)_3$
19.	silver carbonate Ag_2CO_3	39.	potassium oxalate $K_2C_2O_4$
20.	magnesium phosphate $Mg_3(PO_4)_2$	40.	manganese(II) sulfide MnS