

Personal Guided Inquiry:

Naming Chemical Compounds and Writing Formulas

As you work through the [online videos](#), make notes of important ideas and practice what you are learning. These skills are some of the most important you will learn this semester.

You will use these naming and formula writing skills everyday in Chemistry.

These videos will be available all semester. You are always welcome to come back and review later, as you need it. The best part about these videos is that you can pause them, rewind, and listen again if you aren't sure about something you hear. If you want more practice, go back and try the videos again. Or use the practice examples here in this worksheet.

Always use your naming guide that we have colored together in class.

This will serve as a helpful tool all semester long!

Video 1: Introduction to Chemical Nomenclature

After watching this video, complete part 1 of CHECKPOINT 1.

Video 2: Naming Category 1 compounds

After watching this video, complete part 2 of CHECKPOINT 1, for all of the Category 1 compounds in the first section.

Video 3: Writing formulas for Category 1 compounds

After watching this video, complete part 2 of CHECKPOINT 1, for all of the Category 1 compounds in the second section.

Video 4: Naming Category 2 compounds

After watching this video, complete part 2 of CHECKPOINT 1, for all of the Category 2 compounds in the first section.

Video 5: Writing formulas for Category 2 compounds

After watching this video, complete part 2 of CHECKPOINT 1, for all of the Category 2 compounds in the second section.

Video 6: Naming Category 3 compounds

After watching this video, complete part 2 of CHECKPOINT 1, for all of the Category 3 compounds in the first section.

Video 7: Writing formulas for Category 3 compounds

After watching this video, complete part 2 of CHECKPOINT 1, for all of the Category 3 compounds in the second section. This should complete all of CHECKPOINT 1.

Video 8: Working with polyatomic ions

After watching this video, complete CHECKPOINT 2.

Video 9: Naming and writing formulas for acids

After watching this video, complete CHECKPOINT 3.

After watching all 9 videos, and working through CHECKPOINTS 1-3, complete CHECKPOINTS 4 and 5 to pull all of these new skills together. Feel free to work with other students and ask questions when you need help. Keys will be posted on Blackboard so that you can check your work.

CHECKPOINT 1: Naming and Formula Writing, part 1

Complete this CHECKPOINT in parts. **Part 1:** Name the category for each compound (formula or name) given in this CHECKPOINT. Write a 1, 2, 3 under the "Category" column. **Part 2:** As you learn how to write names and formulas for different categories, fill in the missing information under the "Name" or "Formula" column. **By the end of video 7**, you should have all of your answers for this CHECKPOINT.

	Compound formula	Category	Name
1.	KCl		
2.	Cs ₂ S		
3.	MgBr ₂		
4.	CrN		
5.	NiCl ₂		
6.	Au ₂ O		
7.	Mn ₃ P ₂		
8.	ZrS ₂		
9.	NO		
10.	C ₂ H ₈		
11.	SCl ₄		
12.	ZnO		
13.	CaF ₂		
14.	FeBr ₂		
15.	MnI ₄		
16.	SiF ₃		
17.	Cu ₂ S		
18.	Ag ₃ P		

	Compound name	Category	Formula
19.	Barium oxide		
20.	Potassium iodide		
21.	Sodium nitride		
22.	Strontium phosphide		
23.	Cadmium chloride		
24.	Vanadium (V) fluoride		
25.	Cobalt (III) nitride		
26.	Copper (I) sulfide		
27.	Manganese (II) oxide		
28.	Phosphorus dibromide		
29.	Trinitrogen pentasulfide		
30.	Monoiodine dichloride		
31.	Dihydrogen pentacarbide		
32.	Mercury (II) sulfide		
33.	Magnesium phosphide		
34.	Iron (III) iodide		
35.	Cuprous chloride		
36.	Triselenium tetroxide		
37.	Chromium (III) sulfide		
38.	Rubidium fluoride		
39.	Nickel (II) chloride		

Working with chemical formulas and names that include Polyatomic Ions (PAIs)

Polyatomic Ions	
NH_4^+	Ammonium
BrO_3^-	Bromate
CN^-	Cyanide
$\text{C}_2\text{H}_3\text{O}_2^-$ (CH_3COO^-)	Acetate
ClO_4^-	Perchlorate
ClO_3^-	Chlorate
ClO_2^-	Chlorite
ClO^-	Hypochlorite
IO_3^-	Iodate
MnO_4^-	Permanganate
NO_3^-	Nitrate
NO_2^-	Nitrite
OH^-	Hydroxide
HCO_3^-	Hydrogen carbonate
HSO_4^-	Hydrogen sulfate
SCN^-	Thiocyanate
CO_3^{2-}	Carbonate
$\text{Cr}_2\text{O}_7^{2-}$	Dichromate
CrO_4^{2-}	Chromate
SO_4^{2-}	Sulfate
SO_3^{2-}	Sulfite
PO_4^{3-}	Phosphate

Polyatomic ions (PAIs)			
Acetate	$\text{C}_2\text{H}_3\text{O}_2^-$	Thiocyanate	SCN^-
Bromate	BrO_3^-	Cyanide	CN^-
Carbonate	CO_3^{2-}	Peroxide	O_2^{2-}
Chlorate	ClO_3^-	Azide	N_3^-
Chromate	CrO_4^{2-}	Hydroxide	OH^-
Iodate	IO_3^-	Ammonium	NH_4^+
Manganate	MnO_3^-	Hydronium	H_3O^+
Nitrate	NO_3^-		
Phosphate*	PO_4^{3-}		
Sulfate*	SO_4^{2-}		

* The root for phosphate is phosphor- and the root for sulfate is sulfur-

More with polyatomic ions (PAIs)

Prefix or suffix	Number of oxygens	Example PAI	Example compound		
<u>ate</u>	original, from list	<u>chlorate</u>	ClO_3^-	HClO_3	chloric acid
per <u>ate</u>	original +1	per <u>chlorate</u>	ClO_4^-	NaClO_4	sodium perchlorate
<u>ite</u>	original -1	<u>chlorite</u>	ClO_2^-	$\text{Ca}(\text{ClO}_2)_2$	calcium chlorite
hypo <u>ite</u>	original -2	hypo <u>chlorite</u>	ClO^-	HClO	hypochlorous acid

CHECKPOINT 2: Using Polyatomic Ions (PAIs)

Part 1: In the following chart, circle all the polyatomic ions. Then, write the name of each polyatomic ion you circled. If a box contains no PAIs, write a note to the side explaining why it is not a polyatomic ion.

CO_2	OH^{-1}	Cl_2	ClO_3^{-1}	CO_3^{-2}
CN^{-1}	SO_4	H_2SO_4	HSO_4^{-1}	$\text{Fe}(\text{OH})_3$
$\text{C}_2\text{H}_3\text{O}_2^{-1}$	NH_4^{+1}	NO_3^{-1}	PO_4^{-3}	NH_4Cl

Part 2: Name the category for each compound given in this CHECKPOINT. Write a 1, 2, 3 under the "Category" column. Then, fill in the missing piece of information in the "Name or Formula" column.

Compound	Category	Name or Formula
1. KOH		
2. Iron (III) phosphate		
3. Zinc chlorate		
4. MgCO_3		
5. $\text{Cu}(\text{NO}_3)_2$		
6. CO_3		
7. Aluminum acetate		
8. Chromium (III) sulfate		
9. Calcium hydroxide		
10. Na_2SO_4		
11. $(\text{NH}_4)_2\text{CO}_3$		
12. Ammonium hydroxide		

(Add Acids Help Guide Here)

CHECKPOINT 3: Naming and Writing Formulas for Acids

Complete this CHECKPOINT in parts. **Part 1:** Read through the given list of compounds in this CHECKPOINT and circle anything that is NOT an acid. Write "Not an acid" in the "Name or Formula" column. **Part 2:** Fill in the missing information under the "Name or Formula" column.

Compound	Name or Formula
1. HClO_3	
2. H_2CO_3	
3. HNO_3	
4. HBr	
5. $\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$	
6. Sulfuric acid	
7. Phosphoric acid	
8. Sulfur hexafluoride	
9. Acetic acid	
10. Hydrochloric acid	
11. HBrO_3	
12. Hydrocyanic acid	
13. H_3P	
14. HMnO_4	
15. Hydroiodic acid	

CHECKPOINT 4: Naming and Formula Writing, part 2

This CHECKPOINT mixes up all 3 categories of compounds, as well as Complete this CHECKPOINT in parts.

Part 1: Read through the given list of compounds in this CHECKPOINT and circle all of the polyatomic ions (names or formulas) you recognize. Use your polyatomic ion list for help. **Part 2:** Read through the compounds and draw a box around all of the acids. Write "acid" for each of these in the "Category" column. **Part 3:** For each compound, write which category (1, 2, or 3) it fits into, and fill in the missing information under the "Name or Formula" column. **By the end of video 9,** you should have all of your answers for this CHECKPOINT.

Compound	Category	Name or Formula
1. Ammonium chloride		
2. SiO_2		
3. Cadmium sulfate		
4. Cobalt (III) phosphide		
5. ZnNO_3		
6. HBrO_4		
7. SeF_6		
8. Cr_2O_3		
9. Barium hydroxide		
10. Chloric acid		
11. Copper (II) bromide		
12. SrF_2		
13. Silver carbonate		
14. Carbonic acid		
15. H_2CO_3		
16. Nickel (II) nitrate		
17. $\text{HC}_2\text{H}_3\text{O}_2$		
18. F_3Br_5		
19. Ammonium phosphate		

CHECKPOINT 5: Putting it all together!

When atoms and ions form compounds, they form bonds made of energy that hold them together. Depending on the type of atoms, special types of bonds will form. Two of these types of bonds are ionic bonds and covalent bonds.

Ionic bonds form between metals and nonmetals. These bonds form when atoms or ions exchange electrons from one to another. Polyatomic ions also form ionic bonds.

(Category ___ and ___ compounds)

Covalent bonds form between nonmetals and other nonmetals. These bonds form when atoms share electrons without actually giving them away.

(Category ___ compounds)

Acids form ionic bonds, but behave in a very special way. So, we will say that **acids form “acidic” bonds.**

Categorize each of the compounds below according to the type of bonds they contain. For each, write ionic, covalent, or acidic.

1. Sulfur dioxide
2. Manganese (IV) fluoride
3. Li_3PO_4
4. Zinc chlorate
5. HNO_3
6. PF_3
7. $\text{Ca}(\text{OH})_2$
8. Aluminum nitrate
9. Ba_3N_2
10. H_2SO_4
11. Carbon tetrahydride