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Mrs. Meer
Chemistry

Name _____ # _____
Date _____ Period _____

Chemical
All Worksheets
Formulas

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1

Types of Chemical Compounds

Classify the following compounds as ionic or molecular (covalent).

- | | |
|-------------------------------------------------|----------------------------------------------------|
| 1. CaCl_2 _____ ionic _____ | 11. MgO _____ ionic _____ |
| 2. CO_2 _____ molecular _____ | 12. NH_4Cl _____ ionic _____ |
| 3. H_2O _____ molecular _____ | 13. $\text{Sr}(\text{NO}_3)_2$ _____ ionic _____ |
| 4. Na_2SO_4 _____ ionic _____ | 14. KI _____ ionic _____ |
| 5. K_2O _____ ionic _____ | 15. $\text{Ba}(\text{OH})_2$ _____ ionic _____ |
| 6. NaF _____ ionic _____ | 16. NO_2 _____ molecular _____ |
| 7. Na_2CO_3 _____ ionic _____ | 17. $\text{Ca}_3(\text{PO}_4)_2$ _____ ionic _____ |
| 8. CH_4 _____ molecular _____ | 18. FeCl_3 _____ ionic _____ |
| 9. $\text{Mg}(\text{NO}_3)_2$ _____ ionic _____ | 19. P_2O_5 _____ molecular _____ |
| 10. LiBr _____ ionic _____ | 20. N_2O_3 _____ molecular _____ |

Binary Ionic Compounds – Compounds with monatomic ions in it, a metallic ion and a nonmetallic ion. This allows only two types of atoms in the formula. Ex: Rb_2O

Ternary Ionic Compounds – Compounds with at least one polyatomic ion in it. This allows three or more types of atoms in the formula. Ex: RbNO_3

Classify the following compounds as binary ionic or ternary ionic.

- | | |
|----------------------------------------------------------|------------------------------------------------------------------|
| 21. KOH _____ ternary ionic _____ | 26. $\text{Na}_2\text{Cr}_2\text{O}_7$ _____ ternary ionic _____ |
| 22. CoO _____ binary ionic _____ | 27. MgSO_4 _____ ternary ionic _____ |
| 23. $\text{Fe}(\text{NO}_3)_2$ _____ ternary ionic _____ | 28. Cu_2S _____ binary ionic _____ |
| 24. MgH_2 _____ binary ionic _____ | 29. SnO_2 _____ binary ionic _____ |
| 25. Cs_2S _____ binary ionic _____ | 30. NH_4NO_3 _____ ternary ionic _____ |

Naming Ions

Polyatomic Ions

Rule: Look up the name or symbol from your polyatomic ion sheet.

Example 1: ammonium ion NH_4^+ _____

Example 2: NO_3^- _____ nitrate ion _____

Example 3: NO_2^- _____ nitrite ion _____

Monatomic Ions

• CATIONS

Rule A: If the atom always forms the same charge when forming an ion, (all group 1, group 2, and Zn^{+2} , Ag^{+1} , Cd^{+2} , & Al^{+3}), take the name of the atom that the ion is formed from, and add “ion”.

Example 4: Na^+ _____ sodium ion _____

Example 5: Mg^{2+} _____ magnesium ion _____

Example 6: aluminum ion Al^{3+} _____

Rule B: If the atom can form more than one charge when forming an ion, (any of the transition metals and any metals underneath the staircase), take the name of the atom that the ion is formed from, place the charge as a Roman numeral in parentheses, and then add “ion”.

Example 7: Pb^{2+} _____ lead(II) ion _____

Example 9: copper(I) ion Cu^+ _____

Example 8: Fe^{2+} _____ iron(II) ion _____

Example 10: copper(II) ion Cu^{2+} _____

Try These:

11. Rb^+ _____ rubidium ion _____

15. Fe^{3+} _____ iron(III) ion _____

12. Ca^{2+} _____ calcium ion _____

16. cobalt(II) ion Co^{2+} _____

13. Ni^+ _____ nickel(I) ion _____

17. lithium ion Li^+ _____

14. Ag^+ _____ silver ion _____

18. zinc ion Zn^{2+} _____

- ANIONS

Rule: Take the nonmetal atom name, remove the ending and add “-ide ion” to it.

Example 21: S^{2-} ___sulfide ion_____

Example 22: N^{3-} ___nitride ion___

Example 23: bromide ion ___ Br^- _____

Example 24: telluride ion ___ Te^{2-} _____

YOU TRY IT!

25. iodide ion ___ I^- _____

26. selenide ion ___ Se^{2-} _____

27. F^- ___fluoride ion_____

28. O^{2-} ___oxide ion_____

Let's Compare some ions:

N^{3-} ___nitride ion_____

NO_2^- ___nitrite ion_____

NO_3^- ___nitrate ion_____

sulfide ion ___ S^{2-} _____

sulfite ion ___ SO_3^{2-} _____

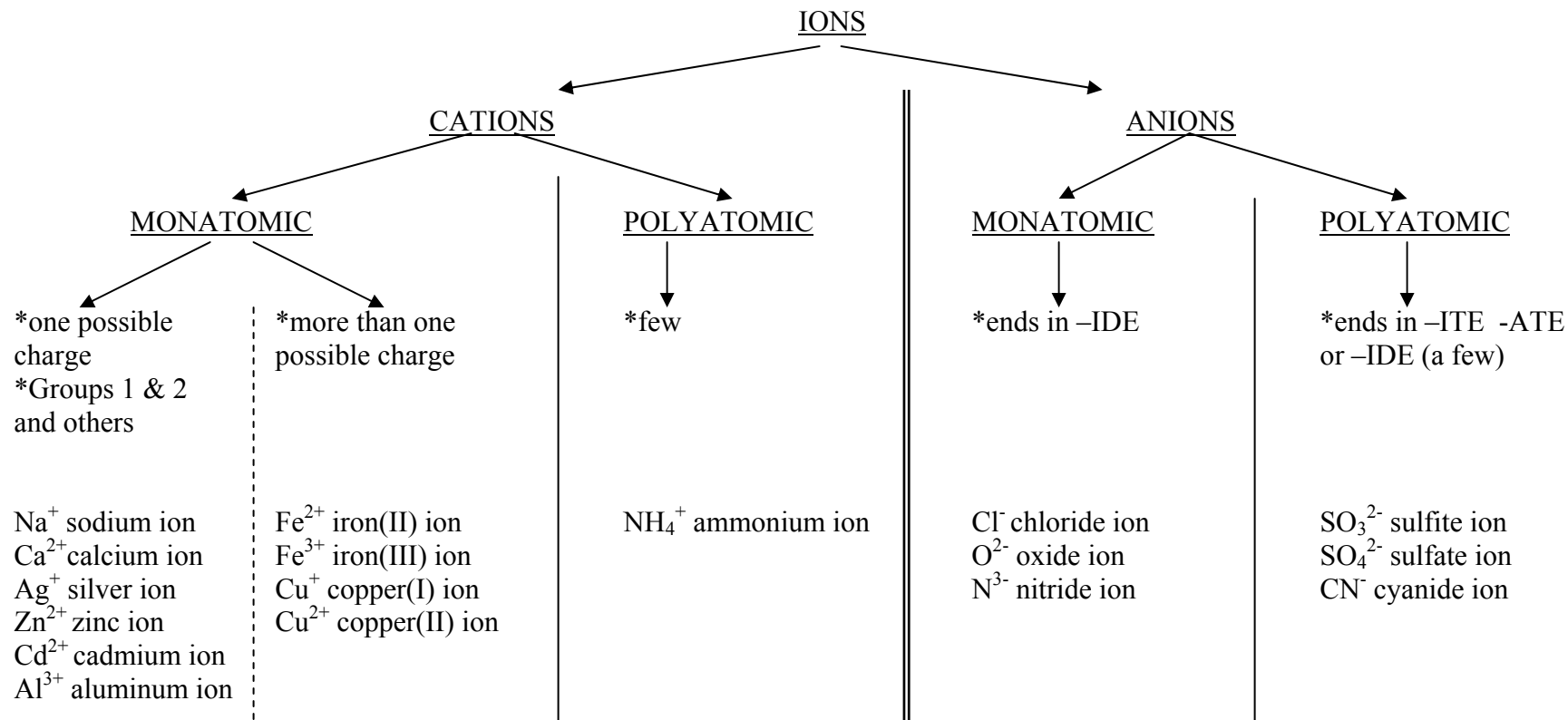
sulfate ion ___ SO_4^{2-} _____

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Understanding Ion Nomenclature



Monatomic cation with one possible charge – Name of atom and add “ion”

Monatomic cation with more than one possible charge – Name of atom, with charge as Roman numeral in parentheses, and add “ion”

Monatomic anion – Name of atom, remove ending, and add “-ide ion”

Polyatomic ions – no naming rules...just know them.

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Ions - Worksheet

Name the following ions.

1. Ca^{2+} ___ calcium ion _____
2. O^{2-} ___ oxide ion _____
3. H^+ ___ hydrogen ion _____
4. H^- ___ hydride ion _____
5. Cu^+ ___ copper(I) ion _____
6. Fe^{3+} ___ iron(III) ion _____
7. CO_3^{2-} ___ carbonate ion _____
8. NH_4^+ ___ ammonium ion _____
9. Zn^{2+} ___ zinc ion _____
10. N^{3-} ___ nitride ion _____

Write the formulas for the following ions.

11. acetate ion ___ $\text{C}_2\text{H}_3\text{O}_2^-$ _____
12. phosphide ion ___ P^{3-} _____
13. phosphate ion ___ PO_4^{3-} _____
14. iron(II) ion ___ Fe^{2+} _____
15. strontium ion ___ Sr^{2+} _____
16. nickel(II) ion ___ Ni^{2+} _____
17. tin(II) ion ___ Sn^{2+} _____
18. sulfate ion ___ SO_4^{2-} _____
19. sulfite ion ___ SO_3^{2-} _____
20. sulfide ion ___ S^{2-} _____

Ionic Compound Nomenclature

ALL COMPOUNDS ARE NEUTRAL!

When ions combine, they will form neutral compounds. These formulas are written in the lowest, whole-number ratio. These lowest, whole-number ratios are called “formula units”.

An ionic compound is often referred to as a “salt”. One of the most common ionic compounds is NaCl. This is why we usually refer to it as salt or table salt.

When determining the formula for an ionic compound, determine the charges of each ion and be sure to combine them so that the number of positive charges is equal in magnitude to the number of negative charges.

Example: Al_2O_3 - aluminum oxide

It is made of two Al^{3+} ions (aluminum ions) and three O^{2-} ions (oxide ions).

2 Al^{3+} ions would make a total positive charge of +6.

3 O^{2-} ions would make a total negative charge of -6.

This makes a neutral compound.

Ionic Compounds are named after the ions they contain.

Example: **CaI_2**

This contains 1 Ca^{+2} ion and 2 I^- ions. They are written in a 1:2 ratio in the compound so it is neutral. However, when naming the compound, just write the names of the two types of ions. So the name is **calcium iodide**.

Example: **MnO_2**

This contains 1 Mn^{4+} ion and 2 O^{2-} ions. I had to determine the charge on the Mn. It is a transition metal and needs a roman numeral in its name. I first looked at the O and knew it was a 2-. I then thought that if there were two 2- ions, then that would be a total negative charge of 4-. In order to make a neutral compound, the positives would have to add up to 4+. If there is only one Mn in the compound, then its entire charge would be 4+. So, the compound is made of manganese(IV) ions and oxide ions. The name is **manganese(IV) oxide**.

Example: copper(I) sulfide

This contains Cu^+ ions and S^{2-} ions. Two Cu^+ ions are needed for each S^{2-} ion, making **Cu_2S** .

Binary Ionic Compounds – Worksheet #1

A. Write the formulas for the compounds formed from these elements. Remember, the cation is always written first.

1. rubidium and iodine RbI
2. barium and chlorine BaCl_2
3. lithium and selenium Li_2Se
4. nitrogen and magnesium Mg_3N_2
5. sulfur and sodium Na_2S
6. aluminum and oxygen Al_2O_3
7. silver and phosphorus Ag_3P
8. fluorine and zinc ZnF_2

B. Write the names for these binary ionic compounds.

9. Cs_2S cesium sulfide
10. BaO barium oxide
11. AlI_3 aluminum iodide
12. MnO_2 manganese(IV) oxide
13. Tc_3P_4 technetium(IV) phosphide
14. CdBr_2 cadmium bromide
15. NaCl sodium chloride
16. FeF_3 iron(III) fluoride
17. Mg_3N_2 magnesium nitride
18. Ni_3P_2 nickel(II) phosphide
19. UO_2 uranium(IV) oxide
20. HF hydrogen fluoride
21. CoN cobalt(III) nitride
22. K_2S potassium sulfide

C. Write the formulas for these binary ionic compounds.

23. rubidium sulfide Rb_2S
24. mercury(II) oxide HgO
25. calcium nitride Ca_3N_2
26. zinc bromide ZnBr_2
27. uranium(VI) fluoride UF_6
28. silver phosphide Ag_3P
29. platinum(II) selenide PtSe
30. europium(II) nitride Eu_3N_2
31. cesium phosphide Cs_3P
32. lead(II) chloride PbCl_2
33. cadmium oxide CdO
34. tin(IV) fluoride SnF_4
35. iron(II) oxide FeO
36. iron(III) oxide Fe_2O_3

Binary Ionic Compounds – Worksheet #2

If the name of the compound is given, write the formula. If the formula of the compound is given, write the name.

1. KBr ____potassium bromide_____
2. V_2O_5 ____vanadium(V) oxide_____
3. cobalt(III) oxide __ Co_2O_3 _____
4. barium phosphide ____ Ba_3P_2 _____
5. cadmium nitride __ Cd_3N_2 _____
6. Cu_3P ____copper(I) phosphide_____
7. Ag_2S ____silver sulfide_____
8. Sn_3N_4 ____tin(IV) nitride_____
9. radium iodide ____ RaI_2 _____
10. beryllium selenide __ $BeSe$ _____
11. Fe_2S_3 ____iron(III) sulfide_____
12. SrO ____strontium oxide_____
13. $CrCl_2$ ____chromium(II) chloride_____
14. mercury(II) fluoride __ HgF_2 _____
15. lead(IV) bromide __ $PbBr_4$ _____
16. CuSe ____copper(II) selenide_____
17. FeP ____iron(III) phosphide_____
18. lithium oxide __ Li_2O _____
19. cobalt(III) fluoride __ CoF_3 _____
20. CdI_2 ____cadmium iodide_____

Ternary Ionic Compounds - Worksheet

If the name of the compound is given, write the formula. If the formula of the compound is given, write the name.

1. calcium nitrite $\text{Ca(NO}_2)_2$
2. BaSO_4 barium sulfate
3. silver acetate $\text{AgC}_2\text{H}_3\text{O}_2$
4. SrSO_3 strontium sulfite
5. nickel(II) phosphate $\text{Ni}_3(\text{PO}_4)_2$
6. Na_2CO_3 sodium carbonate
7. LiHCO_3 lithium hydrogen carbonate (lithium bicarbonate)
8. ammonium phosphate $(\text{NH}_4)_3\text{PO}_4$
9. $\text{Be}(\text{ClO})_2$ beryllium hypochlorite
10. aluminum oxalate $\text{Al}_2(\text{C}_2\text{O}_4)_3$
11. rubidium dichromate $\text{Rb}_2\text{Cr}_2\text{O}_7$
12. KHSO_3 potassium hydrogen sulfite
13. calcium hydroxide $\text{Ca}(\text{OH})_2$
14. manganese(II) silicate MnSiO_3
15. HCN hydrogen cyanide
16. cesium hydrogen sulfate CsHSO_4
17. $\text{Ti}(\text{OH})_4$ titanium(IV) hydroxide
18. ammonium chloride NH_4Cl
19. $\text{Ca}(\text{ClO}_3)_2$ calcium chlorate
20. rubidium cyanate RbOCN
21. copper(II) sulfate CuSO_4
22. CuCl copper(I) chloride
23. iron(II) arsenate $\text{Fe}_3(\text{AsO}_4)_2$
24. NH_4OH ammonium hydroxide

Latin Nomenclature

Some ions have Latin names for them that are commonly used. When there are two possible charges for similar ions, the lower of the two is the “-ous” ion and the higher of the two is the “-ic” ion.

For your information, the Latin roots for the name of the metals are: Cu “cupr”, Fe “ferr”, Cr “chrom”, Sn “stann”, Co “cobalt”, and Pb “plumb”.

Cu^+ - copper(I) ion – cuprous ion

Cu^{2+} - copper(II) ion – cupric ion

Fe^{2+} - iron(II) ion – ferrous ion

Fe^{3+} - iron(III) ion - ferric ion

Cr^{2+} - chromium(II) ion – chromous ion

Cr^{3+} - chromium(III) ion – chromic ion

Sn^{2+} - tin(II) ion – stannous ion

Sn^{4+} - tin(IV) ion – stannic ion

Pb^{2+} - lead(II) ion – plumbous ion

Pb^{4+} - lead(IV) ion – plumbic ion

You must learn all of these Latin names. Remember the lower of the two is “ous” and the higher of the two is “ic”.

Name the following compounds with both methods:

- | | | |
|----------------------------|------------------------|-----------------------|
| 1. Fe_2O_3 | <u>iron(III) oxide</u> | <u>ferric oxide</u> |
| 2. Cu_2O | <u>copper(I) oxide</u> | <u>cuprous oxide</u> |
| 3. SnO_2 | <u>tin(IV) oxide</u> | <u>stannic oxide</u> |
| 4. PbO | <u>lead(II) oxide</u> | <u>plumbous oxide</u> |

Hydrate Nomenclature

hydrate – a compound that releases water when heated

Example: $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

Cu	SO_4	▪	5	H_2O
copper(II)	sulfate	part of the compound	penta	hydrate

Example: $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ magnesium sulfate heptahydrate

Example: aluminum chloride hexahydrate $\text{AlCl}_3 \cdot 6\text{H}_2\text{O}$

Name the following hydrates:

1. $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ magnesium chloride hexahydrate

2. $\text{Cd}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$ cadmium nitrate tetrahydrate

3. $\text{ZnCl}_2 \cdot 6\text{H}_2\text{O}$ zinc chloride hexahydrate

4. $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ sodium thiosulfate pentahydrate

5. $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$ calcium chloride dihydrate

mono-	one
di-	two
tri-	three
tetra-	four
penta-	five
hexa-	six
hepta-	seven
octa-	eight
nona-	nine
deca-	ten

Write the formulas for the following hydrates:

6. barium hydroxide octahydrate $\text{Ba}(\text{OH})_2 \cdot 8\text{H}_2\text{O}$

7. sodium sulfate decahydrate $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$

8. lithium chloride tetrahydrate $\text{LiCl} \cdot 4\text{H}_2\text{O}$

9. cobalt(II) chloride hexahydrate $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$

10. sodium carbonate decahydrate $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$

All Ionic Compounds - Worksheet

If the name of the compound is given, write the formula. If the formula of the compound is given, write the name.

- lead(II) nitrate $\text{Pb}(\text{NO}_3)_2$
- sodium carbonate Na_2CO_3
- potassium iodide KI
- AgNO_3 silver nitrate
- barium nitrate $\text{Ba}(\text{NO}_3)_2$
- Na_2SO_3 sodium sulfite
- potassium carbonate K_2CO_3
- sodium nitrate NaNO_3
- barium acetate $\text{Ba}(\text{C}_2\text{H}_3\text{O}_2)_2$
- hydrogen peroxide H_2O_2
- potassium biphosphate K_2HPO_4
- $\text{Ba}(\text{OH})_2$ barium hydroxide
- FeCl_3 (use the Latin nomenclature) ferric chloride
- $\text{Fe}_3(\text{PO}_4)_2$ iron(II) phosphate
- aluminum sulfate $\text{Al}_2(\text{SO}_4)_3$
- calcium hydroxide $\text{Ca}(\text{OH})_2$
- tin(II) oxide SnO
- aluminum hydrogen carbonate $\text{Al}(\text{HCO}_3)_3$
- sodium perchlorate NaClO_4
- copper(I) dichromate $\text{Cu}_2\text{Cr}_2\text{O}_7$
- potassium selenide K_2Se
- ZnS zinc sulfide
- stannic dichromate $\text{Sn}(\text{Cr}_2\text{O}_7)_2$
- sodium hydrogen phosphate Na_2HPO_4
- $\text{Fe}(\text{ClO})_2$ iron(II) hypochlorite
- $\text{NH}_4\text{CH}_3\text{COO}$ ammonium acetate
- copper(II) nitrate $\text{Cu}(\text{NO}_3)_2$
- potassium hypochlorite KClO
- iron(III) chromate $\text{Fe}_2(\text{CrO}_4)_3$
- Ag_2SO_4 silver sulfate

****THIS MAY BE GRADED FOR CORRECTNESS****

Molecular Compound Nomenclature

Molecular compounds are composed of individually covalently bonded atoms. The simplest unit of a molecular compound is called a “molecule”. These compounds are composed of all nonmetals. They are sometimes called *covalent* compounds.

One system for naming these compounds is based on the use of prefixes.

mono-	one
di-	two
tri-	three
tetra-	four
penta-	five
hexa-	six
hepta-	seven
octa-	eight
nona-	nine
deca-	ten

When naming the molecular compound, the prefix that indicates the number of each atom is placed before the atom in the name. All molecular compounds end in “-ide”.

Example: N_2O IS dinitrogen monoxide

NOT dinitride monoxide (the first element does not end in “-ide”)

NOT dinitrogen monoxygen (the second element should end in “-ide”)

NOT dinitrogen monoxide (often the “o” is dropped before a vowel)

Also, mono is not used to indicate one atom if it applies to the first atom.

Example: CO IS carbon monoxide

NOT monocarbon monoxide (no mono necessary to indicate the first)

NOT carbon oxide (the mono is necessary to indicate the number of O)

NOT carbon monoxide (often the “o” is dropped before a vowel)

Molecular Compounds - Worksheet

If the name of the compound is given, write the formula. If the formula is given, write the name.

1. CF_4 ___ carbon tetrafluoride _____
2. N_2O_5 ___ dinitrogen pentoxide _____
3. CS_2 ___ carbon disulfide _____
4. SO_3 ___ sulfur trioxide _____
5. P_4O_8 ___ tetraphosphorus octoxide _____
6. iodine tribromide ___ IBr_3 _____
7. chlorine dioxide ___ ClO_2 _____
8. sulfur hexafluoride ___ SF_6 _____
9. difluorine octachloride ___ F_2Cl_8 _____
10. tribromine nonatelluride ___ Br_3Te_9 _____
11. H_2O ___ dihydrogen monoxide _____
12. P_2S_4 ___ diphosphorus tetrasulfide _____
13. N_2O_4 ___ dinitrogen tetraoxide _____
14. XeF_4 ___ xenon tetrafluoride _____
15. SI_4 ___ sulfur tetraiodide _____
16. carbon dioxide ___ CO_2 _____
17. trinitrogen hexabromide ___ N_3Br_6 _____
18. diiodine heptaselenide ___ I_2Se_7 _____
19. CO ___ carbon monoxide _____
20. dicarbon octafluoride ___ C_2F_8 _____
21. P_4O_{10} ___ tetraphosphorus decoxide _____
22. Si_3N_4 ___ trisilicon tetranitride _____
23. Cl_2S_7 ___ dichlorine heptasulfide _____
24. NBr_5 ___ nitrogen pentabromide _____
25. phosphorus trichloride ___ PCl_3 _____
26. PI_3 ___ phosphorus triiodide _____
27. disulfur trioxide ___ S_2O_3 _____
28. PCl_5 ___ phosphorus pentachloride _____
29. diiodine dichloride ___ I_2Cl_2 _____
30. dinitrogen monoxide ___ N_2O _____
31. I_4O_9 ___ tetraiodine nonoxide _____
32. dihydrogen monoxide ___ H_2O _____

Acid Nomenclature

If a hydrogen atom, H, ($1p^+$, $1e^-$, $0n^0$) loses an electron to become a hydrogen ion, H^+ , what is left? Only a proton is left. So, sometimes, a proton is written as H^+ .

Often, an acid is referred to as a “proton donor”. If something is a proton donor, it has an H^+ in the formula to donate to another substance during a chemical reaction.

There are many definitions of acids. For naming purposes, we will only be naming acids that begin with “H” in the formula.

Often, these acids are said to be “aqueous”. Aqueous means something is dissolved in water. It is written as (aq), although acids are not always written with the (aq).

binary acid – an acid that contains only two different elements: hydrogen and one of the more electronegative elements

Example: $HCl(aq)$ – hydrochloric acid

oxyacid – an acid that contains hydrogen, oxygen and a third element, usually a nonmetal.

Example: $HNO_3(aq)$ – nitric acid

NAMING RULES: Since all the acids we are naming begin with a hydrogen ion, they are differentiated by the anion in the formula. If the anion is identified, then the acid can be named.

-ide ions hydro stem ic acid Ex: $HCl(aq)$ Cl^- chloride ion hydrochloric acid

-ite ions stem ous acid Ex: $HClO_2(aq)$ ClO_2^- chlorite ion chlorous acid

-ate ions stem ic acid Ex: $HClO_3(aq)$ ClO_3^- chlorate ion chloric acid

Sulfur and phosphorus are exceptions. For sulfur you place sulfur in the blank. For phosphorus, you place phosphor in the blank.

When taking the name and writing the formula, be sure to combine the appropriate amount of H^+ with the anion to make a neutral compound.

Example: phosphoric acid phosphor-ic acid is from the phosph-ate ion, PO_4^{3-}
Therefore the formula is $H_3PO_4(aq)$.

So, if the citrate ion is $C_6H_5O_7^{3-}$, what is the formula for citric acid?

Acids - Worksheet

If the name of the acid is given, write the formula. If the formula of the acid is given, write the name.

1. hydrocyanic acid **HCN** _____
2. dichromic acid _____ **H₂Cr₂O₇** _____
3. hydrobromic acid _____ **HBr** _____
4. nitrous acid _____ **HNO₂** _____
5. sulfuric acid _____ **H₂SO₄** _____
6. H₂SiO₃(aq) _____ **silicic acid** _____
7. HF(aq) _____ **hydrofluoric acid** _____
8. H₃PO₃(aq) _____ **phosphorous acid** _____
9. H₂CO₃(aq) _____ **carbonic acid** _____
10. H₂S(aq) _____ **hydrosulfuric acid** _____
11. acetic acid _____ **HC₂H₃O₂** _____
12. sulfurous acid _____ **H₂SO₃** _____
13. perchloric acid _____ **HClO₄** _____
14. hydroselenic acid _____ **H₂Se** _____
15. carbonic acid _____ **H₂CO₃** _____
16. HClO(aq) _____ **hypochlorous acid** _____
17. HClO₂(aq) _____ **chlorous acid** _____
18. H₂C₂O₄(aq) _____ **oxalic acid** _____
19. H₃P(aq) _____ **hydrophosphoric acid** _____
20. HMnO₄(aq) _____ **permanganic acid** _____
21. hydrochloric acid _____ **HCl** _____
22. chromic acid _____ **H₂CrO₄** _____
23. phosphoric acid _____ **H₃PO₄** _____
24. HCl(g) _____ **hydrogen chloride (It is not named as an acid because it is not aqueous.)** _____

Chapter Review of All Naming

If the name of the substance is given, write the formula. If the formula is given, write the name.

1. cadmium nitrate **Cd(NO₃)₂** _____
2. chromate ion **CrO₄⁻²** _____
3. dinitrogen monoxide **N₂O** _____
4. potassium bromide **KBr** _____
5. nitrous acid **HNO₂** _____
6. HPO₄⁻² **hydrogen phosphate ion** _____
7. PCl₃ **phosphorus trichloride** _____
8. V₂O₅ **vanadium(V) oxide** _____
9. HClO₄ **perchloric acid** _____
10. BaSO₄ **barium sulfate** _____
11. sulfur hexafluoride **SF₆** _____
12. cuprous oxide **Cu₂O** _____
13. sulfuric acid **H₂SO₄** _____
14. hydrogen peroxide **H₂O₂** _____
15. carbonate ion **CO₃⁻²** _____
16. BaO **barium oxide** _____
17. HClO₂ **chlorous acid** _____
18. SrSO₃ **strontium sulfite** _____
19. Fe **iron** _____
20. acetic acid **HC₂H₃O₂** _____
21. CBr₄ **carbon tetrabromide** _____
22. hypochlorite ion **ClO⁻** _____
23. (NH₄)₂SO₄•6H₂O **ammonium sulfate hexahydrate** _____
24. calcium hydroxide **Ca(OH)₂** _____
25. Na₂CO₃ **sodium carbonate** _____
26. Cu₃P **copper(I) phosphide** _____
27. HI **hydroiodic acid** _____
28. lead(II) acetate **Pb(C₂H₃O₂)₂** _____

Polyatomic Ion Practice

NO_2^-	___ nitrite ion _____	hydroxide ion ___ OH^- _____
CO_3^{2-}	___ carbonate ion _____	hydrogen sulfate ion ___ HSO_4^- _____
$\text{B}_4\text{O}_7^{2-}$	___ tetraborate ion _____	hydrogen phosphate ion ___ HPO_4^{2-} _____
HSO_3^-	___ hydrogen sulfite ion (bisulfite ion) _____	hydrogen carbonate ion ___ HCO_3^- _____
SCN^-	___ thiocyanate ion _____	chlorate ion ___ ClO_3^- _____
H_2PO_4^-	___ dihydrogen phosphate ion _____	ammonium ion ___ NH_4^+ _____
$\text{C}_2\text{O}_4^{2-}$	___ oxalate ion _____	perchlorate ion ___ ClO_4^- _____
PO_3^{3-}	___ phosphite ion _____	hypochlorite ion ___ ClO^- _____
H_3O^+	___ hydronium ion _____	nitrate ion ___ NO_3^- _____
AsO_4^{3-}	___ arsenate ion _____	cyanide ion ___ CN^- _____
NH_4^+	___ ammonium ion _____	sulfate ion ___ SO_4^{2-} _____
MnO_4^-	___ permanganate ion _____	sulfite ion ___ SO_3^{2-} _____
BO_3^{3-}	___ borate ion _____	chromate ion ___ CrO_4^{2-} _____
PO_4^{3-}	___ phosphate ion _____	chlorite ion ___ ClO_2^- _____
$\text{Cr}_2\text{O}_7^{2-}$	___ dichromate ion _____	acetate ion ___ $\text{C}_2\text{H}_3\text{O}_2^-$ _____
O_2^{2-}	___ peroxide ion _____	thiosulfate ion ___ $\text{S}_2\text{O}_3^{2-}$ _____
I_3^-	___ triiodide ion _____	cyanate ion ___ OCN^- _____