

Name: \_\_\_\_\_

Period: \_\_\_\_\_

# Naming Compounds

3.1

**How to use this chart—**  
Determine what the compound is made of and follow the arrows. The chart will tell you how to name the compound.

*Exception—*  
O<sub>2</sub> is “peroxide” and can make polyatomic compounds with only 2 elements! O<sub>2</sub> with a non-metal is *dioxide*. O<sub>2</sub> with a metal OR Hydrogen (acting as a metal) is *peroxide*.

What's it Made of?

Metal and non-metal

2 non-metals

3 or more elements

ionic compound

covalent compound

polyatomic compound

**USE “- IDE” ENDING  
(NO PREFIXES!)**

Name the metal and non-metal and change the ending to “ide”.

Li<sub>2</sub>S

*Metal and non-metal— ionic*

Lithium Sulfide

(not dilithium sulfide—  
no prefixes for ionic compounds)

Why are ionic compounds so easy to name? Because most ionic compounds can only form one way, using the oxidation numbers. In covalent compounds, though, non-metals can sometimes combine in multiple ways (carbon monoxide; carbon dioxide). So, covalent compounds use prefixes.

**USE GREEK PREFIXES**

Put prefixes in front of element names to tell how many atoms are there.

Don't use “mono” for first name, but always for second name.

N<sub>2</sub>O<sub>4</sub>

*2 non-metals—covalent*

(di =2 and tetra =4)

“Dinitrogen tetroxide”

Greek Prefixes

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

Hints to remember prefixes:

Monorail – one rail train  
Monocle – glasses for one eye with only a single lens.

Dilemma – struggle between 2 choices.

Tricycle – 3 wheels

Pentagon – 5 five sided military building in Washington, D.C.

Octopus – 8 legs

Decade – 10 years

**CHECK THE CHART BELOW  
(NO PREFIXES!)**

Use the names on the chart.  
If the polyatomic ion is the cation end the second name with “-ide”.

NaNO<sub>3</sub>

*3 elements — polyatomic*

Check chart (*see below*)

Na - sodium

NO<sub>3</sub> - nitrate (on chart)

Sodium nitrate


**Polyatomic Ions**



| Oxidation # | Name               | Formula   |
|-------------|--------------------|---|
| 1+          | ammonium           | NH <sub>4</sub> <sup>+</sup>                              |
| 1-          | acetate            | C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> <sup>-</sup> |
| 2-          | carbonate          | CO <sub>3</sub> <sup>2-</sup>                             |
| 2-          | chromate           | CrO <sub>4</sub> <sup>2-</sup>                            |
| 1-          | hydrogen carbonate | HCO <sub>3</sub> <sup>1-</sup>                            |
| 1+          | hydronium          | H <sub>3</sub> O <sup>+</sup>                             |
| 1-          | hydroxide          | OH <sup>1-</sup>  |
| 1-          | nitrate            | NO <sub>3</sub> <sup>1-</sup>                             |
| 2-          | peroxide           | O <sub>2</sub> <sup>2-</sup>                              |
| 3-          | phosphate          | PO <sub>4</sub> <sup>3-</sup>                             |
| 2-          | sulfate            | SO <sub>4</sub> <sup>2-</sup>                             |
| 2-          | sulfite            | SO <sub>3</sub> <sup>2-</sup>                             |



**Transition Metals Can Have More Than One Oxidation Number**

Iron (II) has an oxidation number of 2+  
Iron (III) has an oxidation number of 3+.  
When naming them you must specify WHICH ONE.

FeO—Iron (II) oxide  
Fe<sub>2</sub>O<sub>3</sub>— Iron (III) oxide

All sections marked with a  are considered essential concepts and must be completed to receive full credit on WS.

| <u>Metal or Non-metal?</u> | <u>Ionic or Covalent</u>  | <u>Name These Ionic Compounds</u>  | <u>Use the Polyatomic Ion Chart on the front of the worksheet to name these Polyatomic Ions:</u> |
|----------------------------|--|--|--|
| <i>M N</i><br>Iron Oxide   | <u>Ionic</u>   | MgF <sub>2</sub> Magnesium Fluor- <u>ide</u>   | HCO <sub>3</sub> <sup>1-</sup> <u>Hydrogen carbonate</u>   |
| Barium Chloride            | _____  | Li <sub>2</sub> O Lithium Ox- _____  | SO <sub>4</sub> <sup>2-</sup> _____  |
| Carbon Dioxide             | _____  | NaCl Sodium Chlor- _____   | O <sub>2</sub> <sup>2-</sup> _____   |
| Magnesium Oxide            | _____  | K <sub>2</sub> O Potassium Ox- _____   | SO <sub>3</sub> <sup>2-</sup> _____  |
| Aluminum Fluoride          | _____  | CaS _____ Sulf- _____  | NO <sub>3</sub> <sup>1-</sup> _____  |
| Nitrogen Tribromide        | _____  | BeI <sub>2</sub> _____ Iod- _____  | NH <sub>4</sub> <sup>+</sup> _____   |
| Chromium Fluoride          | _____  | AlBr <sub>3</sub> _____ Brom- _____  | CrO <sub>4</sub> <sup>2-</sup> _____   |
| Potassium Oxide            | _____  | CaF <sub>2</sub> _____   | OH <sup>1-</sup> _____   |
|                            |  | MgO _____  | PO <sub>4</sub> <sup>3-</sup> _____  |
|                            |  | LiCl _____   | CO <sub>3</sub> <sup>2-</sup> _____  |

| <u>Define these Greek Prefixes</u>  | <u>Name These Covalent Compounds</u>  |
|--|---|
| Penta = _____  | 1. CO <sub>2</sub> A. Carbon monoxide  |
| Tetra = _____  | 2. C <sub>2</sub> O <sub>4</sub> B. Carbon dioxide  |
| Nona = _____   | 3. C <sub>3</sub> O <sub>5</sub> C. Dicarbon monoxide   |
| Hexa = _____   | 4. CO D. Tricarbon pentoxide  |
| Mono = _____   | 5. C <sub>2</sub> O E. Dicarbon tetroxide   |
| Hepta = _____  | 6. CO <sub>8</sub> F. Carbon octoxide   |
| Octa = _____   | Si <sub>2</sub> O <sub>3</sub> Disilicon _____ oxide  |
| Deca = _____   | N <sub>3</sub> Cl <sub>4</sub> _____ nitrogen tetrachloride   |
| Di = _____   | SO <sub>2</sub> Sulfur _____ oxide  |
|  | PO <sub>5</sub> Phosphorous _____ ox _____  |
|  | S <sub>2</sub> F <sub>4</sub> _____ sulfur _____ fluor _____  |

| <u>Name these Polyatomic Compounds (Remember — no prefixes!)</u> | <u>Classify and Name These Compounds</u> |                        |
|--|--|------------------------|
|  | <u>Ionic, Covalent, or Polyatomic</u>    | <u>Name</u>            |
| CaSO <sub>4</sub> Calcium _____                                  | 1. BaCl <sub>2</sub> <u>Ionic</u>        | <u>Barium chloride</u> |
| K <sub>2</sub> CO <sub>3</sub> _____ carbonate                   | 2. CO _____                              | _____                  |
| CuNO <sub>3</sub> Copper (I) _____                               | 3. Ag <sub>2</sub> O _____               | _____                  |
| NH <sub>4</sub> Cl _____ chloride                                | 4. K <sub>2</sub> SO <sub>4</sub> _____  | _____                  |
| Mg(NO <sub>3</sub> ) <sub>2</sub> Magnesium _____                | 5. MgBr <sub>2</sub> _____               | _____                  |
| K <sub>3</sub> PO <sub>4</sub> Potassium _____                   | 6. SO <sub>3</sub> _____                 | _____                  |
| Li <sub>2</sub> (CrO <sub>4</sub> ) Lithium _____                | 7. P <sub>2</sub> O <sub>4</sub> _____   | _____                  |
| Mg(OH) <sub>2</sub> M _____ H _____                              | 8. Be(CrO <sub>4</sub> ) _____           | _____                  |
| Al(PO <sub>4</sub> ) A _____ P _____                             | 9. LiF _____                             | _____                  |
| K(NO <sub>3</sub> ) _____  | 11. CO <sub>2</sub> _____                | _____                  |
| Ca <sub>2</sub> SO <sub>3</sub> _____                            | 12. OF <sub>2</sub> _____                | _____                  |