

## HOW TO NAME COVALENT COMPOUNDS?

Covalent compounds are produced by **non metallic** elements bonding with one another. Eg. Water, H<sub>2</sub>O

**Valencies** can be used to determine the formula of some covalent compounds. Determine the chemical formula of compounds formed between the following pairs of non-metallic elements using valencies.

Elements	H & O	N & H	N & O	C & O	P & F
Compound					

The chemical formulas of many molecules however, cannot be determined by using valencies.

eg. H<sub>2</sub>O<sub>2</sub>, N<sub>2</sub>H<sub>4</sub>, NO, NO<sub>2</sub>, CO and PF<sub>5</sub>

Romans numerals can be used but often fail to distinguish between some molecular compounds.

eg. NO<sub>2</sub> is nitrogen(IV) oxide and N<sub>2</sub>O<sub>4</sub> is nitrogen(IV) oxide.

Another system of naming is needed.

### RULES FOR NAMING COVALENT COMPOUNDS

1. Prefixes are added according to the molecular formula. Fill in the table with the correct number.

mono	di	tri	tetra	penta	hexa	hepta	octa	nona	deca

2. The **most non-metallic** element has the "ide" suffix. Determine which element has the suffix?

\* Across a period the elements become (more/ less) non-metallic.

eg. Sulfur and chlorine \_\_\_\_\_

eg. Boron and fluorine \_\_\_\_\_

\* Down a group the element become (more/ less) metallic.

eg. Chlorine and fluorine \_\_\_\_\_

eg. Carbon and silicon \_\_\_\_\_

3. There is no mono for the first name, ONLY for the second.

eg. Carbon monoxide and is not monocarbon monoxide

\* Sometimes the mono is also left out in the second name.

eg. NO, nitrogen monoxide is sometimes called nitrogen oxide.

4. Where the suffix ends in an "a" or an "o" and the element begins with an "a" or an "o", the final vowel of the prefix is often dropped for ease of pronunciation.

eg. Carbon monoxide and **not** carbon monoxide

eg. dinitrogen tetroxide and **not** dinitrogen tetraoxide

**Note:** Phosphorous triiodide remains unchanged.

Sulfur tetraiodide remains unchanged.

5. Some substances still retain their common names

eg. H<sub>2</sub>O is water and not *dihydrogen monoxide*

eg. H<sub>2</sub>O<sub>2</sub> is hydrogen peroxide and not \_\_\_\_\_

eg. NH<sub>3</sub> is ammonia and not \_\_\_\_\_

## NAME THE FOLLOWING COVALENT COMPOUNDS

	Name	Chemical Formula	
1.	Sulfur dioxide		
2.		SiO <sub>2</sub>	
3.		SO <sub>3</sub>	
4.		SCl <sub>2</sub>	
5.	Nitrogen trifluoride		
6.		N <sub>2</sub> O <sub>3</sub>	
7.	Dinitrogen pentoxide		
8.		Cl <sub>2</sub> O <sub>7</sub>	
9.			Carbon(IV) oxide*
10.	Disulfur dichloride		
11.		CO	
12.		N <sub>2</sub> O <sub>4</sub>	
13.		NO <sub>2</sub>	
14.			Nitrogen(I) oxide*
15.	Nitrogen monoxide		
16.		PF <sub>3</sub>	
17.			Phosphorus(III) chloride*
18.		SF <sub>6</sub>	
19.		BI <sub>3</sub>	
20.	Tricarbon disulfide		

\***Hint:** Romans numerals are used to tell us the combining power of an element.

Use the arm and link method to determine the chemical formula for these compounds first.

Which element is given the **ide** suffix? *The most electronegative (or non-metallic) element.*

## HOW TO NAME COVALENT COMPOUNDS? ANSWERS

Covalent compounds are produced by **non metallic** elements bonding with one another. Eg. Water, H<sub>2</sub>O  
**Valencies** can be used to determine the formula of some covalent compounds. Determine the chemical formula of compounds formed between the following pairs of non-metallic elements using valencies.

Elements	H & O	N & H	N & O	C & O	P & F
Compound	H <sub>2</sub> O	NH <sub>3</sub>	N <sub>2</sub> O <sub>3</sub>	CO <sub>2</sub>	PF <sub>3</sub>

The chemical formulas of many molecules however, cannot be determined by using valencies.

eg. H<sub>2</sub>O<sub>2</sub>, N<sub>2</sub>H<sub>4</sub>, NO, NO<sub>2</sub>, CO and PF<sub>5</sub>

Romans numerals can be used but often fail to distinguish between some molecular compounds.

eg. NO<sub>2</sub> is nitrogen(IV) oxide and N<sub>2</sub>O<sub>4</sub> is nitrogen(IV) oxide.

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### RULES FOR NAMING COVALENT COMPOUNDS

1. Prefixes are added according to the molecular formula. Fill in the table with the correct number.

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

2. The **most non-metallic** element has the "ide" suffix. Determine which element has the suffix?

\* Across a period the elements become **(more/ less)** non-metallic.

eg. Sulfur and chlorine. **chloride suffix**

eg. Boron and fluorine. **fluoride suffix**

\* Down a group the element become **(more/ less)** metallic.

eg. Chlorine and fluorine. **fluoride suffix**

eg. Carbon and silicon. **carbide suffix**

3. There is no mono for the first name, ONLY for the second.

eg. Carbon monoxide and is not monocarbon monoxide

\* Sometimes the mono is also left out in the second name.

eg. NO, nitrogen monoxide is sometimes called nitrogen oxide.

4. Where the suffix ends in an "a" or an "o" and the element begins with an "a" or an "o", the final vowel of the prefix is often dropped for ease of pronunciation.

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eg. dinitrogen tetroxide and **not** dinitrogen tetraoxide

**Note:** Phosphorous triiodide remains unchanged.

Sulfur tetraiodide remains unchanged.

5. Some substances still retain their common names

eg. H<sub>2</sub>O is water and not *dihydrogen monoxide*

eg. H<sub>2</sub>O<sub>2</sub> is hydrogen peroxide and not **dihydrogen dioxide**

eg. NH<sub>3</sub> is ammonia and not **nitrogen trihydride**

## NAME THE FOLLOWING COVALENT COMPOUNDS - ANSWERS

	Name	Chemical Formula	
1.	Sulfur dioxide	SO <sub>2</sub>	
2.	Silicon dioxide	SiO <sub>2</sub>	
3.	Sulfur trioxide	SO <sub>3</sub>	
4.	Sulfur dichloride	SCl <sub>2</sub>	
5.	Nitrogen trifluoride	NF <sub>3</sub>	
6.	Dinitrogen trioxide	N <sub>2</sub> O <sub>3</sub>	
7.	Dinitrogen pentoxide	N <sub>2</sub> O <sub>5</sub>	
8.	Dichlorine heptoxide	Cl <sub>2</sub> O <sub>7</sub>	
9.	Carbon dioxide	CO <sub>2</sub>	Carbon(IV) oxide*
10.	Disulfur dichloride	S <sub>2</sub> Cl <sub>2</sub>	
11.	Carbon monoxide	CO	
12.	Dinitrogen tetroxide	N <sub>2</sub> O <sub>4</sub>	
13.	Nitrogen dioxide	NO <sub>2</sub>	
14.	Dinitrogen monoxide	N <sub>2</sub> O	Nitrogen(I) oxide*
15.	Nitrogen monoxide	NO	
16.	Phosphorus trifluoride	PF <sub>3</sub>	
17.	Phosphorus trichloride	PCl <sub>3</sub>	Phosphorus(III) chloride*
18.	Sulfur hexafluoride	SF <sub>6</sub>	
19.	Boron triiodide	BI <sub>3</sub>	
20.	Tricarbon disulfide	C <sub>3</sub> S <sub>2</sub>	

\*Hint: Romans numerals are used to tell us the combining power of an element.

Use the arm and link method to determine the chemical formula for these compounds first.

Which element is given the **ide** suffix? *The most electronegative (or non-metallic) element.*