

Naming Binary Covalent Compounds

Binary covalent compounds come from the combination of two nonmetals (or a nonmetal and a metalloid). These compounds do not involve ions; as a result, they have a slightly different naming system. Chemists use *prefixes* to indicate the number of atoms in each compound. The prefixes are listed in the table below:

# of Atoms	Prefix
1	Mono
2	Di
3	Tri
4	Tetra
5	Penta
6	Hexa
7	Hepta
8	Octa
9	Nona
10	Deca

When naming binary covalent compounds, the first element name is given followed by the second element with an “ide” ending. The first element gets a prefix when there is more than one atom in the compound.* The second element ALWAYS gets a prefix. Here are some examples:

Compound	Name
NO*	Nitrogen Monoxide
N ₂ O	Dinitrogen Monoxide
NO ₂ *	Nitrogen Dioxide
N ₂ O ₃	Dinitrogen Trioxide
N ₂ O ₄	Dinitrogen Tetraoxide
N ₂ O ₅	Dinitrogen Pentaoxide

* Notice that the prefix “mono” is omitted in these cases

Prefixes are necessary when naming covalent compounds because the atoms can combine in any whole number ratio. N₂O, for example, cannot simply be called “nitrogen oxide,” because there are several other compounds that contain nitrogen and oxygen. We must specify that there are two nitrogen atoms bonded to a single oxygen atom.

When dealing with ionic compounds, there is only one way for a cation and anion to combine to form a neutral compound. As a result, there is no need to use prefixes. This is why CaCl₂ is called “calcium chloride,” rather than “calcium dichloride.”

Nomenclature Worksheet 6: Binary Covalent Compounds

Please complete the following table:

Name of <i>Covalent</i> Compound	Formula of <i>Covalent</i> Compound
1. carbon dioxide	
2. phosphorus triiodide	
3. sulfur dichloride	
4. nitrogen trifluoride	
5. dioxygen difluoride	
	6. N ₂ F ₄
	7. SCl ₄
	8. ClF ₃
	9. SiO ₂
	10. P ₄ O ₁₀

Determine whether the following compounds are **covalent** or **ionic** and give them their proper names.

1. Ba(NO₃)₂
2. CO
3. PCl₃
4. KI
5. CF₄
6. MgO
7. Cu₂S
8. SO₂
9. NCl₃
10. XeF₆