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_2O	Dinitrogen Monoxide
NO_{2*}	Nitrogen Dioxide
N_2O_3	Dinitrogen Trioxide
N_2O_4	Dinitrogen Tetraoxide
N_2O_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. N_2O, 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 a nion to combine to form a neutral compound. As a result, there is no need to use prefixes. This is why $CaCl_2$ is called "calcium chloride," rather than "calcium dichloride."

Nomenclature Worksheet

Binary Covalent Compounds

Please complete the following table:

Name of *Covalent* Compound	**Formula of *Covalent* Compound**
1. carbon dioxide	
2. phosphorus triiodide	
3. sulfur dichloride	
4. nitrogen trifluoride	
5. dioxygen difluoride	
	6. N_2F_4
	7. SCl_4
	8. ClF_3
	9. SiO_2
	10. P_4O_{10}

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

1. $Ba(NO_3)_2$
2. CO
3. PCl_3
4. KI
5. CF_4
6. MgO
7. Cu_2S
8. SO_2
9. NCl_3
10. XeF_6