3.5: Naming binary covalent compounds

What is a binary covalent compound?

Binary covalent compounds are atoms of two different elements held together by covalent bonds. Usually, they are composed of nonmetals elements, e.g., laughing gas NO, acid rain causing gas SO_2, etc.

Writing formulae of binary covalent compounds.

The molecular formula of a binary covalent compound shows the symbols of constituent elements, followed by a subscript showing how many atoms of the element are in the molecule. Usually, the symbol of an element closer to metals in a period or a group is written first, followed by the symbol of the other element. For example, CO_2, NO, P_2O_5, where carbon, nitrogen, and phosphorous are nearer to the metals in the periodic table than the other element. An exception occurs when the compound contains oxygen combined with chlorine, bromine, or iodine, where oxygen is closer to metals but is second in the formula, e.g., ClO_2.

Writing the names of binary covalent compounds

The name of binary covalent compounds contains prefixes, listed in Table 1, to indicate the number of atoms followed by the name of the elements according to the following rules:

1. name of the first element in the formula with a prefix showing the number of atoms, followed by,
2. the name of the second element with a prefix showing the number of atoms and its last syllable replaced with –ide.
3. Do not write mono- if it applies to the first element in the formula, but write mono- if it applies to the second element. Write all other prefixes.
4. If the prefix ends with a vowel and the element name begins with a vowel, drop the ending vowel of the prefix.

Table 3.5.1 lists the prefixes used to represent the number of atoms from 1 to 10. Examples of the names are: NO is nitrogen monoxide, CO_2 is carbon dioxide, PCl_3 is phosphorous trichloride, P_2O_5 is diphosphorus pentoxide, SiO_2 is silicon dioxide. Trivial names are well known for some molecular compounds and they are often used in the place of systematic names, e.g., water for H_2O and ammonia for NH_3.

Table 1: Prefixes used in naming binary covalent compounds

Prefix	Means
Mono-	1
di-	2
Tri-	3
tetra-	4
penta-	5
hexa-	6
hepta-	7
octa-	8
nona-	9
deca-	10