

## Notes – Element Symbols and Chemical & Structural Formulas

**Symbol** – a one or two letter abbreviation of an element name. If there is only one letter in the symbol, it must be capitalized. If there are two letters in the symbol, the first letter must be capitalized and the second letter must be in lower case. Most symbols are abbreviations of the English name for the element, such as H for hydrogen and He for helium. Some symbols are abbreviations of the Latin name for the element, such as Na for sodium, K for potassium, Fe for iron, Cu for copper, Au for gold, Ag for silver, Hg for mercury, Pb for lead, and Sn for tin.

**Chemical Formula** – a description of the type and number of atoms in a molecule of a compound or an element. Symbols are used to represent each element, and a small number to the right and below the symbol, called the subscript, is used to indicate how many atoms of that element are in the molecule. If there is only one atom of an element, no subscript is used; the symbol alone represents that atom. For example, in the chemical formula  $H_2O$ , there are two hydrogen atoms and one oxygen atom.

**Structural Formula** – a drawing of a molecule, using symbols to represent each atom, and lines between the symbols representing the bonds between atoms. When two lines are shown between the symbols, this represents a double bond. A structural formula shows the actual arrangement of the atoms in a molecule.

<u>Common Name</u>	<u>Chemical Formula</u>	<u>Structural Formula</u>
Water	$H_2O$	$\begin{array}{c} \text{H} \quad \text{O} \quad \text{H} \\ \diagdown \quad \diagup \\ \text{O} \end{array}$
Carbon Dioxide	$CO_2$	$O = C = O$
Hydrogen (diatomic)	$H_2$	$H - H$
Sugar (Glucose)	$C_6H_{12}O_6$	$\begin{array}{ccccccc} & & \text{H} & & \text{H} & & \text{H} \\ & &   & &   & &   \\ & \text{H} & \text{O} & \text{H} & \text{O} & \text{O} & \text{H} \\ &   &   &   &   &   &   \\ \text{O} = & \text{C} - & \text{C} - & \text{C} - & \text{C} - & \text{C} - & \text{H} \\ &   &   &   &   &   & \\ & \text{H} & \text{O} & \text{H} & \text{H} & \text{O} & \\ & &   & & &   & \\ & & \text{H} & & & \text{H} & \end{array}$
Methane	$CH_4$	$\begin{array}{c} \text{H} \\   \\ \text{H} - \text{C} - \text{H} \\   \\ \text{H} \end{array}$