

PART IV. MOLECULES

Atoms stick together in fixed numbers to form *molecules*. Chemical *formulas* use element symbols, parentheses and subscripts to represent element composition, (e.g. H_2O for water). The elements in a chemical formula may be ordered and grouped to reflect the way atoms are bound together. Graphical pictures called *structural formulas* show the relative positions of atoms and the chemical bonds holding the atoms together (e.g. $H-O-H$). It is literally true for complex substances that a picture can be worth a thousand words.

In this unit we will see how molecular formulas are derived from experiment and theory, investigate the forces that hold atoms together in molecules, and discuss how molecular substances are named. When you have finished this unit you should know how to deduce and name chemical formulas and explain properties of the molecules which they represent.

The foundation concepts for this unit are that *molecules are collections of atoms held together by chemical bonds described by the Schrodinger wave mechanical equation*. These principles will be used to determine the number and nature of the bonds in molecules.