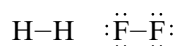


The pair of dots represents the shared electron pair of the hydrogen-hydrogen covalent bond. For a molecule of fluorine, F_2 , the electron-dot notations of two fluorine atoms are combined.



Here also the pair of dots between the two symbols represents the shared pair of a covalent bond. In addition, each fluorine atom is surrounded by three pairs of electrons that are not shared in bonds. An *unshared pair*, also called a *lone pair*, is a pair of electrons that is not involved in bonding and that belongs exclusively to one atom.

The pair of dots representing a shared pair of electrons in a covalent bond is often replaced by a long dash. According to this convention, hydrogen and fluorine molecules are represented as follows.



These representations are all **Lewis structures**, *formulas in which atomic symbols represent nuclei and inner-shell electrons, dot-pairs or dashes between two atomic symbols represent electron pairs in covalent bonds, and dots adjacent to only one atomic symbol represent unshared electrons*. It is common to write Lewis structures that show only the electrons that are shared, using dashes to represent the bonds. A **structural formula** indicates the kind, number, arrangement, and bonds but not the unshared pairs of the atoms in a molecule. For example, $F-F$ and $H-Cl$ are structural formulas.

The Lewis structures (and therefore the structural formulas) for many molecules can be drawn if one knows the composition of the molecule and which atoms are bonded to each other. The following sample problem illustrates the basic steps for writing Lewis structures. The molecule described in this problem contains bonds with single shared electron pairs. A single covalent bond, or a **single bond**, is a covalent bond in which one pair of electrons is shared between two atoms.

SAMPLE PROBLEM C

For more help, go to the *Math Tutor* at the end of this chapter.

Draw the Lewis structure of iodomethane, CH_3I .

SOLUTION

1. Determine the type and number of atoms in the molecule.

The formula shows one carbon atom, one iodine atom, and three hydrogen atoms.

2. Write the electron-dot notation for each type of atom in the molecule.

Carbon is from Group 14 and has four valence electrons. Iodine is from Group 17 and has seven valence electrons. Hydrogen has one valence electron.

