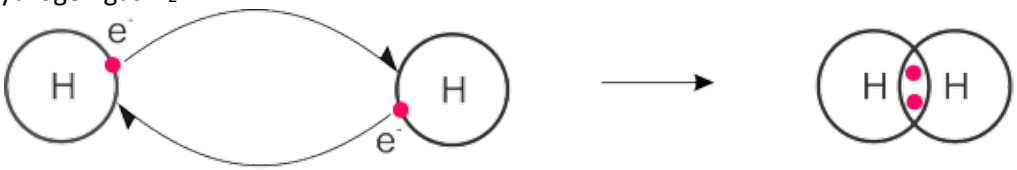
Lewis diagram of a molecule or an ion

Covalent bond

To increase its stability and verify the duet or octet rule, an atom of either block s or p can form molecules by bonding to other atoms via a "covalent bond".

When a covalent bond is formed, each atom in the bond contributes an electron from its outer (valence) layer. The two electrons are pooled between the two atoms. This shared **electron pair** forms the covalent bond

Ex : Hydrogen gas H_2



⇨ H-H

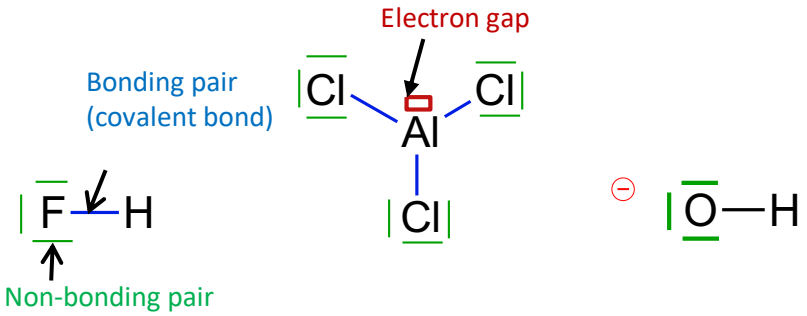
A **multiple covalent bond** is made of 2 or 3 shared electron pairs between the 2 atoms.

- **Double** bond**:** 2 atoms linked by 2 shared electron pairs: O = CH_2
- **Triple bond:** 2 atoms linked by 3 shared electron pairs: N ≡ N

Already there – to be – absent

- A **bonding pair** is a pair of electrons made up of an electron from the outer layer of each of the two atoms bonded together. The two electrons are shared in the single covalent bond between the two atoms.
- An atom's **non-bonding pair** is a pair formed by 2 electrons in the atom's outer layer that are not involved in a single covalent bond. The electrons of a non-bonding doublet are tightly bound to their atom.
- An electron gap in an atom represents a missing electron doublet.

Ex:



Note: The above representations of HF, $AlCl_3$ and HO^- are the structural formulas of these molecules (and ions), with the addition of non-bonding doublets and electron vacancies.
These representations are known as Lewis representations (or diagrams). They show the distribution of valence electrons in molecules or ions.