# Review Types of Orbitals and Bonds in Diatomics

We now know of <u>five</u> kinds of molecular orbitals formed by valence electrons.

1. $\sigma$ (bonding) orbitals. Electrons in these bonds lower the energy of the molecule (relative to its atomic orbitals). These are shared between two nuclei and delocalised *along the axis between two nuclei*.

2. $\sigma^*$ (antibonding) orbitals. Electrons in these bonds raise the energy of the molecule (oppose bonding). These orbitals have a node or nodes along the axis between two adjacent nuclei.

3. Non-bonding (nb) orbitals are localised on only one atom and do not affect bonding.

4. $\pi$ (bonding) orbitals. Electrons in these orbitals lower the energy of the molecule, and are delocalised between two nuclei in two lobes on opposite sides of the internuclear axis.

5. $\pi^*$ (antibonding) orbitals. These orbitals have lobes on opposite sides of the internuclear axis, and a node between adjacent atoms.