

# Covalent Bonding

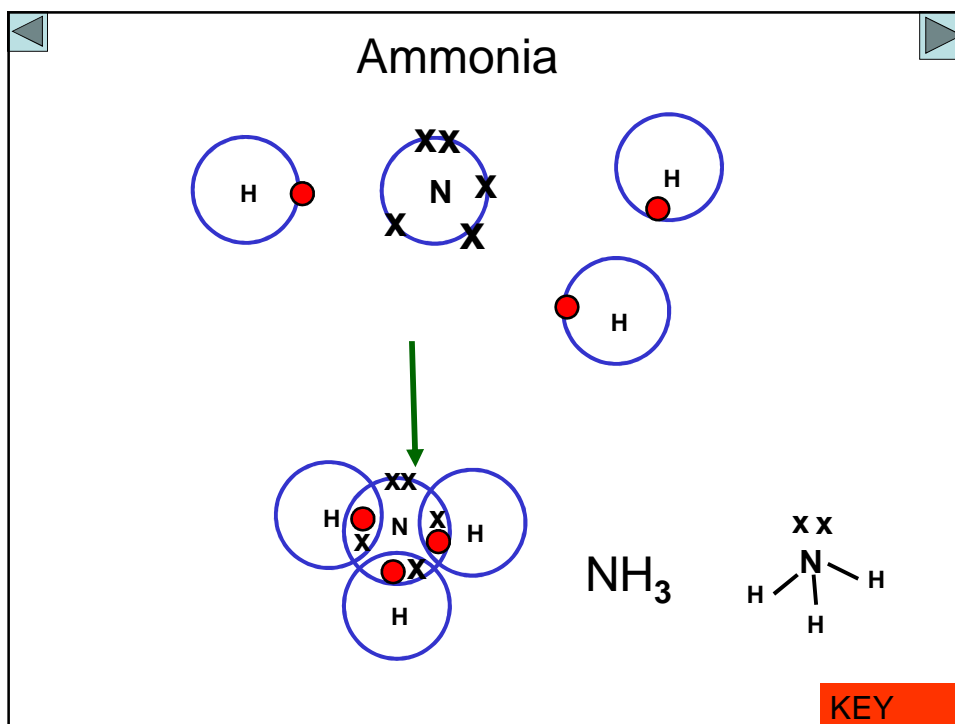
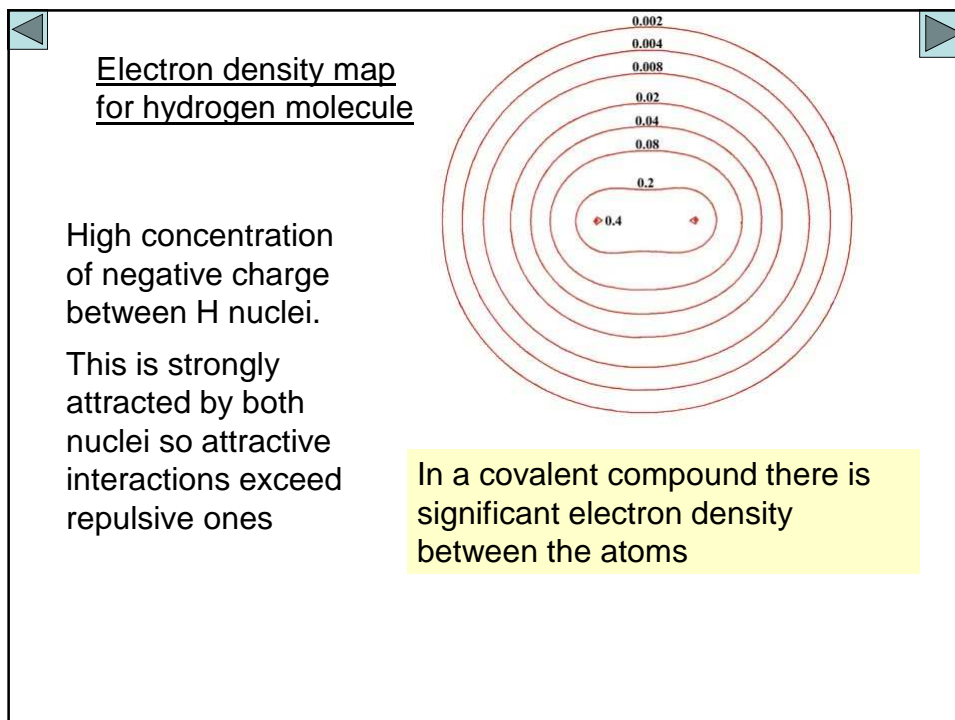
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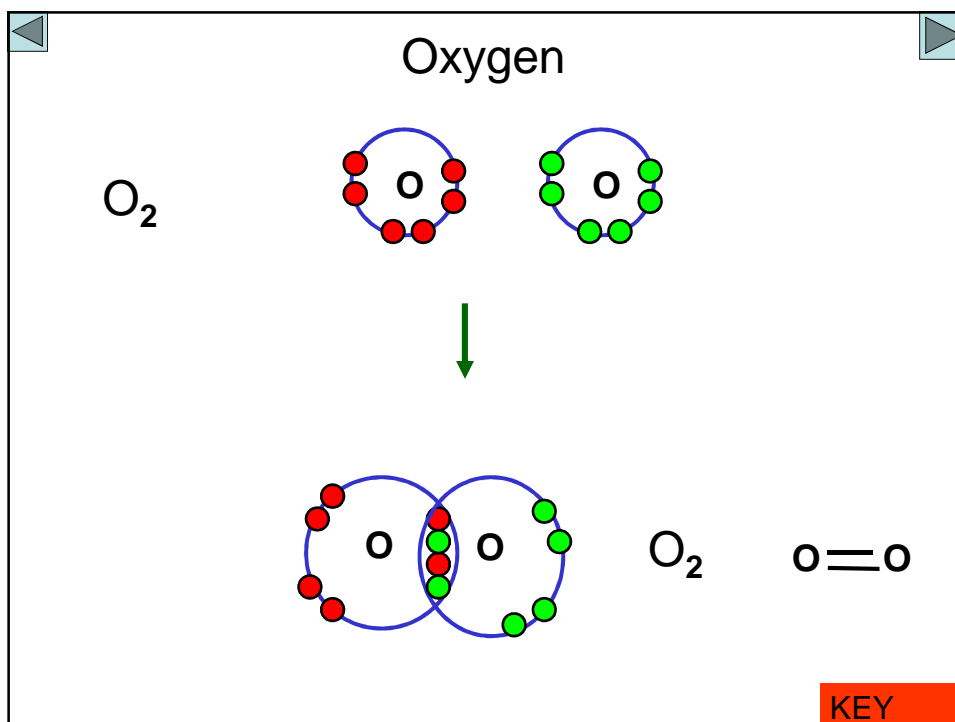
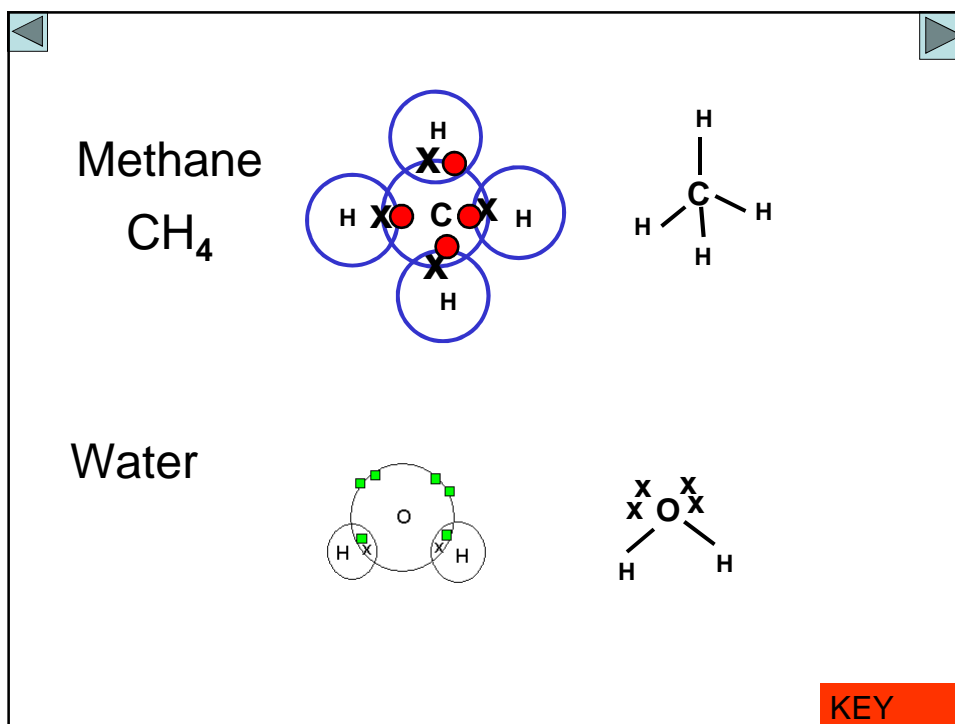
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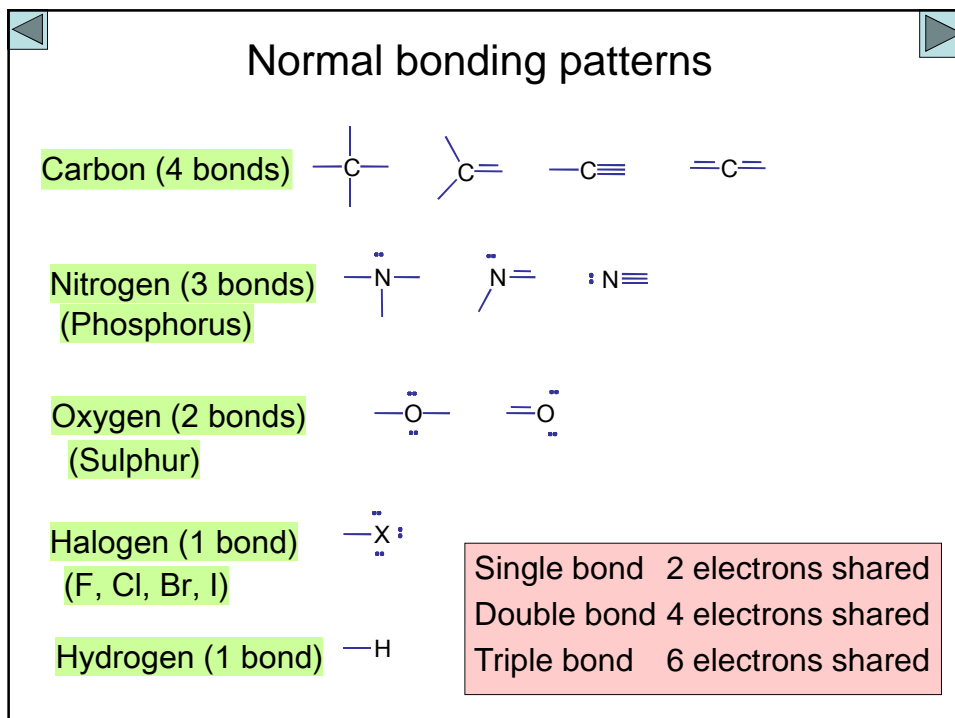
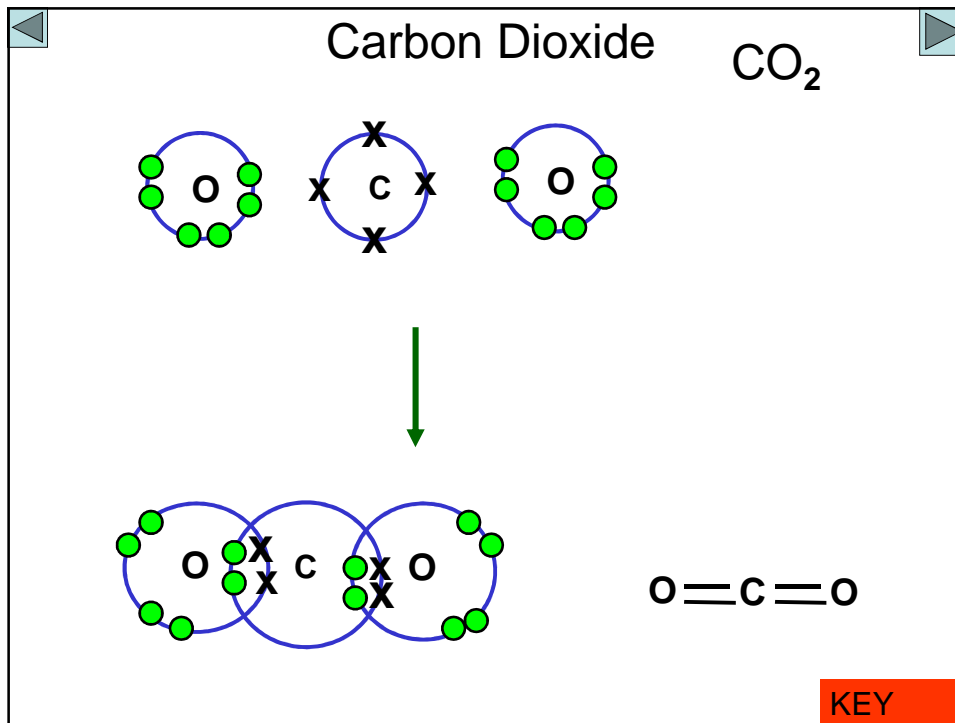
## Covalent Bonding

A covalent bond involves a shared pair of electrons.

- Covalent substances are formed when 2 or more non-metal atoms link up and form a molecule.
- The electron configuration of each atom usually corresponds to that of a noble gas.
- The atoms' nuclei are attracted towards the shared pair of electrons



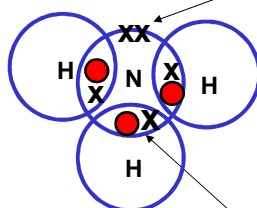




## Comparing Properties of Ionic and Simple Covalent bonding

Property	Simple Covalent	Ionic
boiling and melting points	low- because of weak forces between molecules	high- because of giant lattice of ions with strong forces between ions.
Solubility in water	generally low	generally good
conductivity when solid	poor: no ions to conduct	poor: ions can't move
conductivity when molten	poor: no ions	good: ions can move
general description	mostly gases and liquids	crystalline solids

## Bonding and Non-bonding electrons

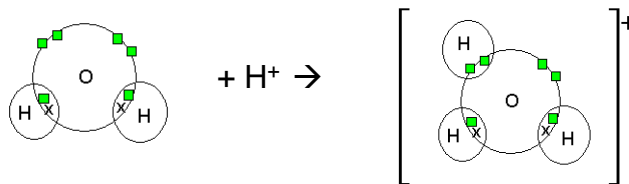


These are called lone pairs of electrons or non-bonding pairs

These are called bonding pairs of electrons

## Dative Covalent Bonding

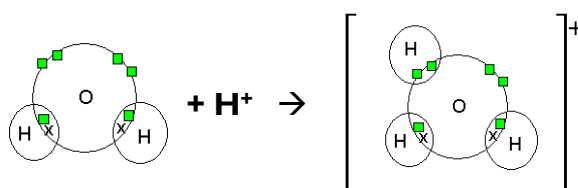
Co-ordinate bonding is dative covalency. A Dative covalent bond forms when both the electrons in the covalent bond come from only one of the bonding atoms.



The donor species must have an available pair of electrons in its outer shell i.e. it will have a **lone pair** of electrons.

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## Oxonium ion $\text{H}_3\text{O}^+$

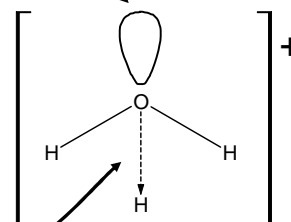


One of the **lone pairs** on the **oxygen** is used to share with the hydrogen ion which needs two electrons to fill its outer shell.

The **positive charge** is now distributed **all over the ion** and **all** the O-H bonds are equivalent.

Lone pair

The dative bond is shown as an arrow rather than a single line. The arrow points away from the atom which donates the pair of electrons.



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