

Bonding knowledge organiser


1. Vocabulary

Ionic bond	Bond formed by the transfer of electrons from a metal to a non-metal. Strong attraction between oppositely charged ions.
Covalent bond	Bond between non-metals. A shared pair of electrons
Metallic bond	Positive metal ions in a 'sea' of delocalised electrons
Macromolecular (Giant covalent)	Large covalently bonded molecule. Eg diamond, graphite, silicon dioxide
Molecular covalent molecule	Small covalently bonded molecules that are held together by intermolecular forces. Eg Iodine, water, carbon dioxide.
Co-ordinate bond	A type of covalent bond where both electrons are donated by one atom.
Bonding pair	A pair of electrons in a covalent bond
Lone pair	A pair of un-bonded electrons. Repel more than bonding pairs
Electronegativity	The power of an atom to attract the electrons in a covalent bond
Polar covalent bond	A bond with a unequal distribution of electrons due to a difference in electronegativity of the bonding atoms
Intermolecular forces	The forces between molecules. They are responsible for the trends in melting and boiling points of substances

2. Common anions

Sulfate	SO ₄ ²⁻	Hydroxide	OH ⁻
Carbonate	CO ₃ ²⁻	Ammonium	NH ₄ ⁺
Nitrate	NO ₃ ⁻		

3. Intermolecular forces

	Van der Waals	Temporary dipoles induce complimentary dipoles in neighbours	Happens in all molecules	Eg. Alkanes
	Permanent dipole-dipole	Attraction between slightly positive and negative ends of bond	Happens in any asymmetric bond with different electronegativity	Eg. Hydrogen chloride
	Hydrogen bonding	Attraction between slightly positive and negative ends of bond	Happens when H bonded to O, N, F only	Eg. Water, Ammonia, Alcohol

4. VSEPR molecular shapes

Electron pairs	Geometry	Bonding pairs	Lone pairs	Shape	Angle	Example
2	Linear	2	0	Linear	180	BeCl ₂
3	Trigonal planar	3	0	Trigonal planar	120	SO ₃
4	Tetrahedral	4	0	Tetrahedral	109.5	CH ₄
		3	1	Trigonal pyramidal	107	NH ₃
5	Trigonal bipyramidal	2	2	V-shape	104.5	H ₂ O
		5	0	Trigonal bipyramidal	120, 90	PCl ₅
		4	1	See-saw	120, 90	TeCl ₄
6	Octahedral	3	2	T-shape	87.5	ClF ₃
		6	0	Octahedral	90	SF ₆
		4	2	Square planar	90	ICl ₄ ⁻