

Electronic Geometry, Molecular Shape, and Hybridization

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The Valence Shell Electron Pair Repulsion Model (VSEPR Model)

The guiding principle: Bonded atoms and unshared pairs of electrons about a central atom are as far from one another as possible.

Bonded atoms	Nonbonded Pairs	Total	Electronic Geometry	Molecular Shape	Bond Angle	Hybridization
2	0	2	linear Examples: CO ₂ , HCN	linear	180°	sp
3	0	3	trigonal Examples: SO ₃ , CH ₂ O	trigonal planar	120°	sp²
2	1	3	trigonal Examples: SO ₂ , O ₃	bent	120°	sp²
4	0	4	tetrahedral Examples: CH ₄ , CH ₃ Cl, CH ₂ Cl ₂ , CHCl ₃ , CCl ₄ , NH ₄ ⁺	tetrahedral	109.5°	sp³
3	1	4	tetrahedral Examples: NH ₃ , H ₃ O ⁺	pyramidal	109.5°	sp³
2	2	4	tetrahedral Examples: H ₂ O, SCl ₂	bent	109.5°	sp³