

Summary of VSEPR Molecular Geometries

Electron Groups	Lone Pairs	Bonds	Geometry	Examples
2	0	2	Linear	BeCl ₂
3	0	3	Trigonal planar	BF ₃
3	1	2	Bent	SO ₂
4	0	4	Tetrahedral	CH ₄
4	1	3	Trigonal pyramidal	NH ₃
4	2	2	Bent	H ₂ O
5	0	5	Trigonal bipyramidal	PCl ₅
5	1	4	See-saw	SF ₄
5	2	3	T-Shaped	ClF ₃
5	3	2	linear	I ₃ ⁻
6	0	6	Octahedral	SF ₆
6	1	5	Square pyramidal	SbCl ₅ ²⁻
6	2	4	Square planar	XeF ₄

Valence Bond Terminology:

- Overlap:** two orbitals existing in the same region of space
- lp:** lone pair of electrons (non-bonding)
- bp:** bonding pair of electrons (result of orbital overlap)
- Central atom:** the atom of concern in a molecule
- hybridization:** the linear combination of atomic orbitals
- hybrid orbital:** bonding orbitals that arise from the mixing of AO's.
- σ -bond:** (sigma bond) overlap of orbitals along the bond axis
- π -bond:** (pi bond) overlap of orbitals above and below the bond axis.
- single bond:** one σ -bond
- double bond:** one σ -bond & one π -bond
- triple bond:** one σ -bond & two π -bonds