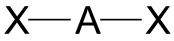
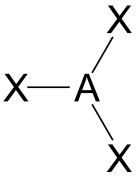
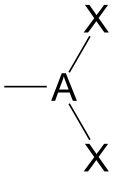
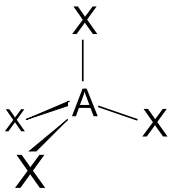
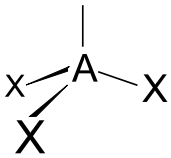
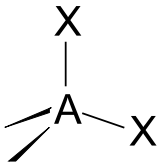
# Valence Shell Electron Pair Repulsion Theory

*Molecular geometry as a function of geometrical distribution of valence-shell electron pairs and number of lone pairs*

SANTA FE COLLEGE Chemistry

| Number of electron pair directions | Geometrical distribution of electron pairs | Number of lone pairs | VSEPR notation | Ideal Molecular geometry | Bond Angles | Hybrid-ization | Examples |
|---|---|---|---|---|---|---|---|
| 2 | linear | 0 | $AX_2$ |  *linear* | 180° | sp | $BeCl_2$, HCN |
| 3 | trigonal planar | 0 | $AX_3$ |  *trigonal planar* | 120° | $sp^2$ | $BF_3$ |
| | trigonal planar | 1 | $AX_2E$ |  *angular* | 120° | $sp^2$ | $SnCl_2$, $O_3$ |
| 4 | tetrahedral | 0 | $AX_4$ |  *tetrahedral* | 109.5° | $sp^3$ | $CH_4$ |
| | tetrahedral | 1 | $AX_3E$ |  *trigonal pyramidal* | 109.5° | $sp^3$ | $NH_3$ |
| | tetrahedral | 2 | $AX_2E_2$ |  *angular* | 109.5° | $sp^3$ | $H_2O$ |