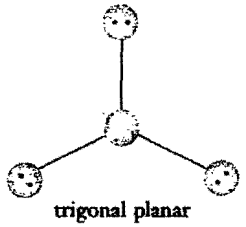
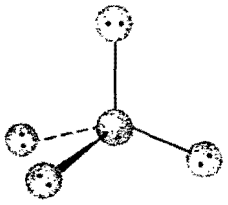
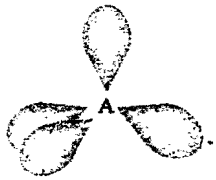
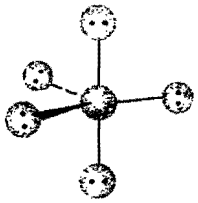
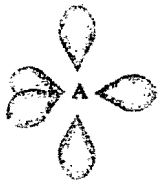
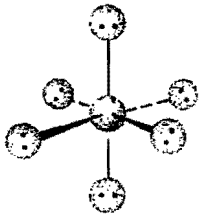
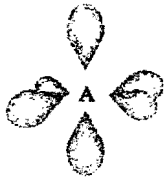
TABLE 8.4 *A Summary of Electronic and Molecular Geometries of Polyatomic Molecules and Ions*

Regions of High Electron Density[a]	Electronic Geometry	Hybridization at Central Atom (Angles)	Hybridized Orbital Orientation	Examples	Molecular Geometry
2	 linear	*sp* (180°)		$BeCl_2$ $HgBr_2$ CdI_2 CO_2[b] C_2H_2[c]	linear linear linear linear linear
3	 trigonal planar	sp^2 (120°)		BF_3 BCl_3 NO_3^-[e] SO_2[d,e] NO_2^-[d,e] C_2H_4[f]	trigonal planar trigonal planar trigonal planar angular (AB_2U) angular (AB_2U) planar (trig. planar at each C)
4	 tetrahedral	sp^3 (109.5°)		CH_4 CCl_4 NH_4^+ SO_4^{2-} $CHCl_3$ NH_3[d] SO_3^{2-}[d] H_3O^+[d] H_2O[d]	tetrahedral tetrahedral tetrahedral tetrahedral distorted tet. pyramidal (AB_3U) pyramidal (AB_3U) pyramidal (AB_3U) angular (AB_2U_2)
5	 trigonal bipyramidal	sp^3d (90°, 120°, 180°)		PF_5 $SbCl_5$ SF_4[d] ClF_3[d] XeF_2[d] I_3^-[d]	trigonal bipyramidal trigonal bipyramidal seesaw (AB_4U) T-shaped (AB_3U_2) linear (AB_2U_3) linear (AB_2U_3)
6	 octahedral	sp^3d^2 (90°, 180°)		SF_6 SeF_6 PF_6^- BrF_5[d] XeF_4[d]	octahedral octahedral octahedral square pyramidal (AB_5U) square planar (AB_4U_2)

[a] *The number of locations of high electron density around the central atom. A region of high electron density may be a single bond, a double bond, a triple bond, or an unshared pair. These determine the electronic geometry, and thus the hybridization of the central atom.*

[b] *Contains two double bonds.*

[c] *Contains a triple bond.*

[d] *Central atom in molecule or ion has unshared pair(s) of electrons.*

[e] *Bonding involves resonance.*

[f] *Contains one double bond.*