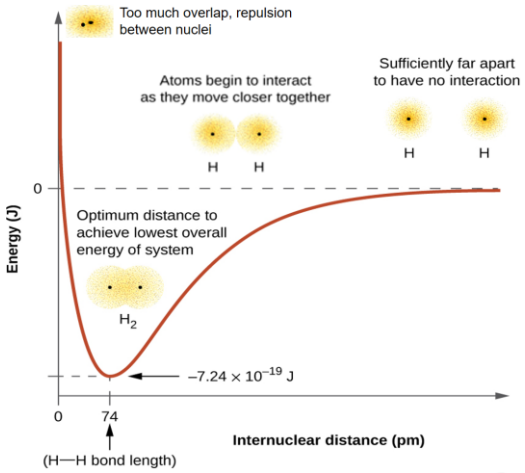
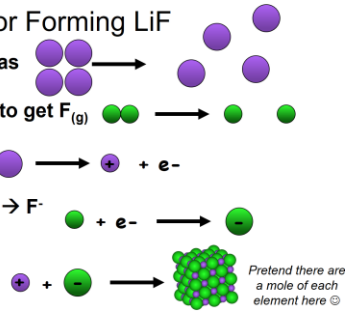
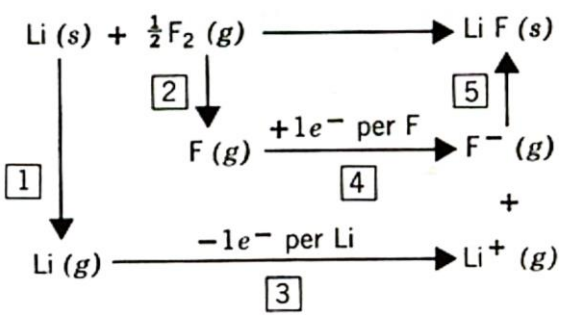
N20 – Energy of Bonding



Example: Steps for Forming LiF

1) **Turn solid Li into a gas**
   - Sublimation
2) **Break the $F_{2\,(g)}$ bond to get $F_{(g)}$**
   - Bond energy
3) **Ionize Li → Li^+**
   - Ionization energy
4) **Add an electron to F → F^-**
   - Electron affinity
5) **Form the ionic bond**
   - Lattice energy

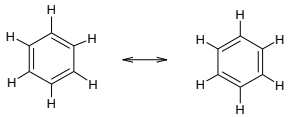


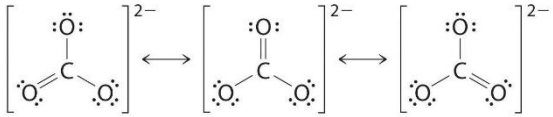


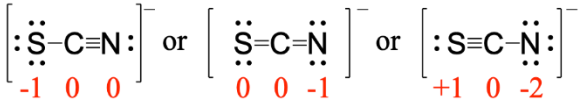
$Na(s) + ½\ Cl_2(g) \rightarrow NaCl(s)$

Lattice Energy	-786 kJ/mol
Ionization Energy for Na	495 kJ/mol
Electron Affinity for Cl	-349 kJ/mol
Bond energy of Cl_2	239 kJ/mol
Enthalpy of sublimation for Na	109 kJ/mol

N21 – Formal Charge and VSEPR







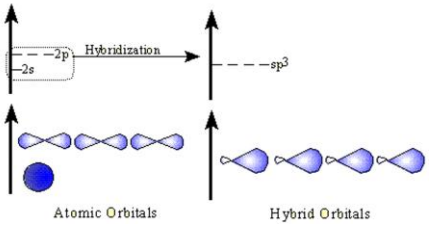
X + E	Overall Structure (Electronic Geometry)	Forms
2	Linear	AX_2
3	Trigonal Planar	AX_3, AX_2E
4	Tetrahedral	AX_4, AX_3E, AX_2E_2
5	Trigonal bipyramidal	AX_5, AX_4E, AX_3E_2, AX_2E_3
6	Octahedral	AX_6, AX_5E, AX_4E_2

"Rules" for Drawing Lewis Structures

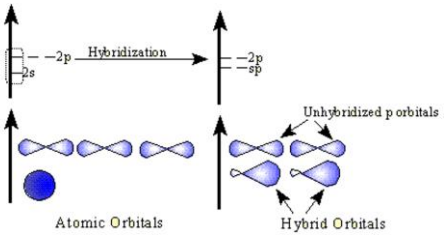
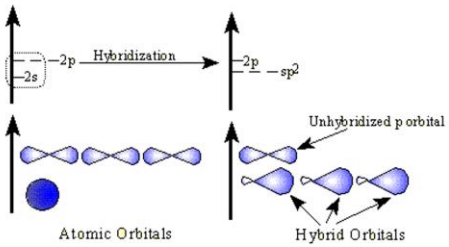
1) **Count and sum valence electrons.**
2) **Place your atoms.**
3) **Bond all atoms w/ a single bond (try simplest way 1st).**
4) **Give all atoms a full shell.**
5) **Re-count the electrons you used.**
6) **Fix if needed**
   - **Used too few? Put extras on the central atom.**
   - **Used too many? Try double or triple bonds to fix.**

N23 – Hybridization

sp^3 Hybrid Orbitals



sp Hybrid Orbitals



sp^2 Hybrid Orbitals