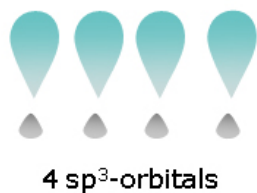
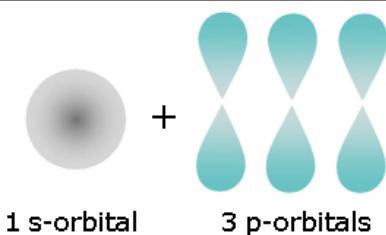
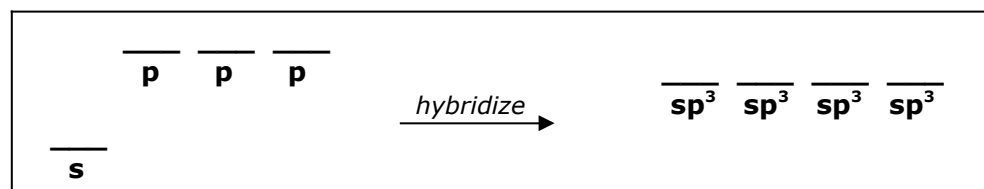


Valence Bond Theory and Hybrid Atomic Orbitals

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4 e⁻ domains around CBA

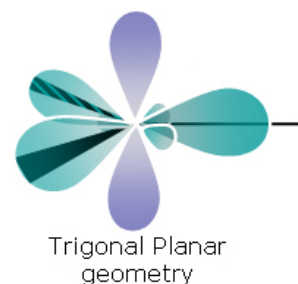
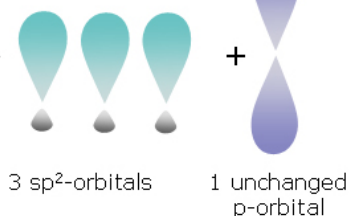
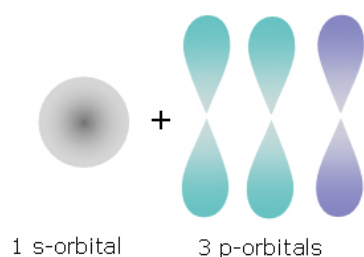
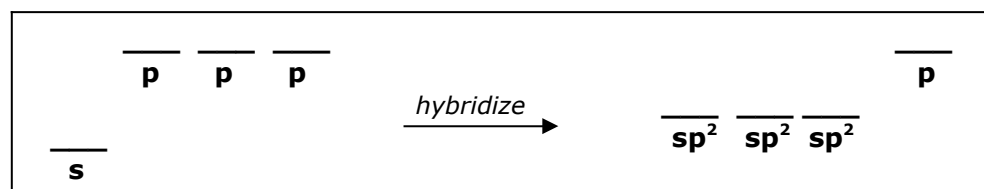
We need four orbitals arranged in a tetrahedral shape (109.5°)



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3 e⁻ domains around CBA

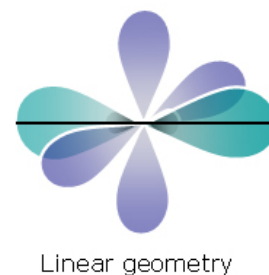
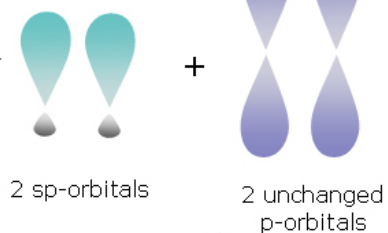
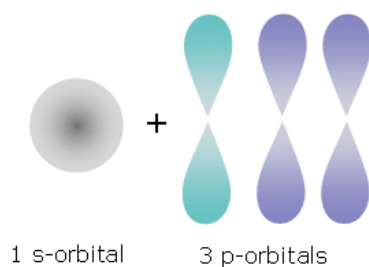
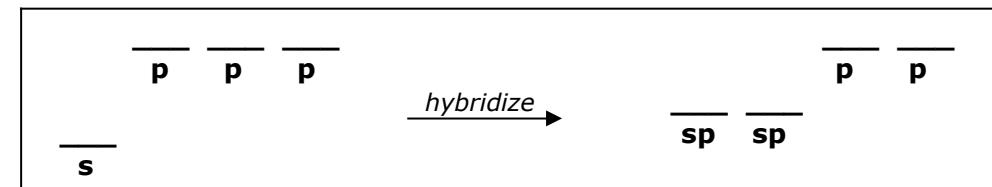
We need three orbitals arranged in a trigonal planar shape (120°)



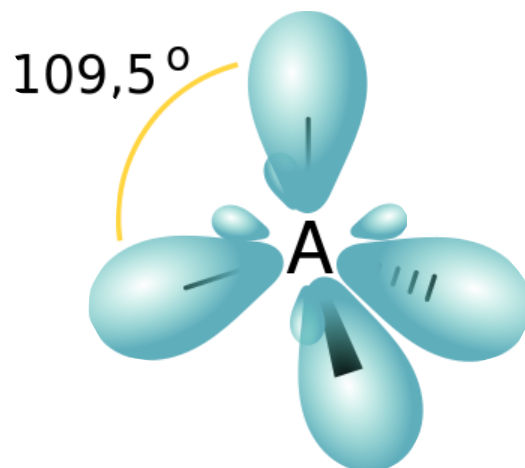
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2 e⁻ domains around CBA

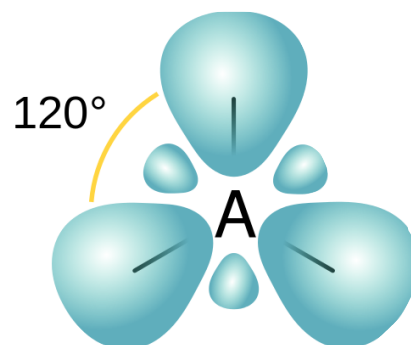
We need two orbitals arranged in a linear shape (180°)



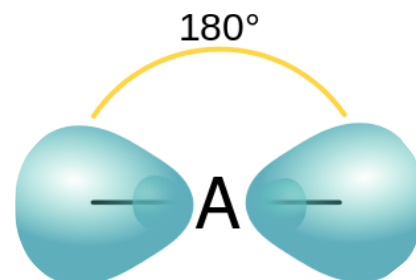
four sp^3 orbitals



three sp^2 orbitals



two sp orbitals



Practice: use valence bond theory to answer the following questions regarding the bonding in a caffeine molecule. (Structure shown at right).

- What is the hybridization of atom A? _____
- What is the hybridization of atom B? _____
- Describe the bond labeled C in terms of orbital overlap.

