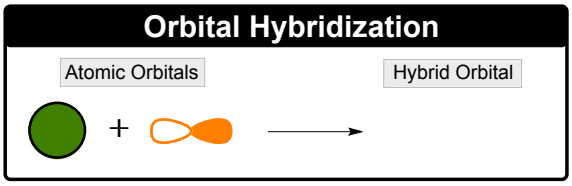
CONCEPT: HYBRIDIZATION

- Hybridization represents the idea of valence shell atomic orbitals _____ to form *hybrid orbitals*.
  - □ In order to form more bonds and increase stability, elements must hybridize their atomic orbitals.



- The hybridization of a central element can be connected to its number of electron groups.

Hybridization

Electron Groups	Electron Geometry	Hybridization	Add It Up	Hybridized Orbitals	Unhybridized Orbitals
2	**Linear**		___ + ___ = ___	p_x p_y p_z	
3	**Trigonal Planar**		___ + ___ = ___	p_x p_y p_z	
4	**Tetrahedral**		___ + ___ = ___	p_x p_y p_z	
5	**Trigonal Bipyramidal**		___ + ___ + ___ = ___	p_x p_y p_z d_{yz} d_{xy} d_{xz} $d_{x^2-y^2}$ d_{z^2}	
6	**Octahedral**		___ + ___ + ___ = ___	p_x p_y p_z d_{yz} d_{xy} d_{xz} $d_{x^2-y^2}$ d_{z^2}	

EXAMPLE: Determine the hybridization of the sulfur atom within SBr_4.

PRACTICE: HYBRIDIZATION

PRACTICE: How many of the following molecules have sp^3d^2 hybridization on the central atom?

$SeCl_6$ $XeCl_4$ IF_5 $AsCl_5$

a) 3 b) 1 c) 2 d) 4

PRACTICE: How many unhybridized orbitals does the beryllium atom possess in $BeCl_2$?

a) 2 b) 3 c) 1 d) 0

PRACTICE: Draw and determine the hybridization and unhybridized orbitals for the following covalent compound.

$KrBr_4$ Hybridization:

Unhybridized Orbitals: