

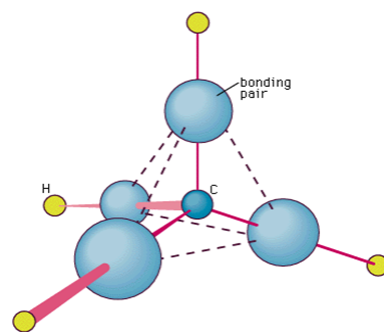
Topic 2: Shape Diagrams for Molecular Compounds

Stereochemistry -

- study of 3D configuration of molecules

VSEPR theory

- Valence Shell Electron Pair Repulsion theory
- Pairs of electron stay as far away from each other as possible

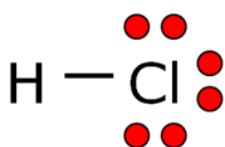


According to VSEPR Theory

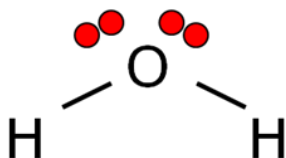
- Only valence electrons on the central atom are important for molecular shape
- Valence electrons are paired.
- Bonded electron pairs and lone pairs are equal
- Electron pairs repel each other
- Molecular Shape is determined when e⁻ pairs are a max distance apart

VSEPR shapes

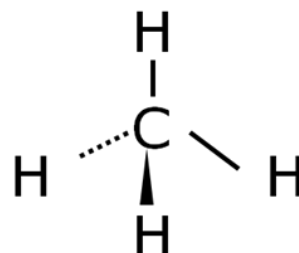
1. Linear



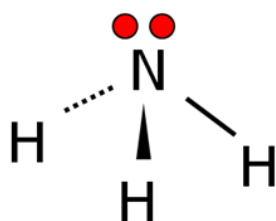
2. V-shaped



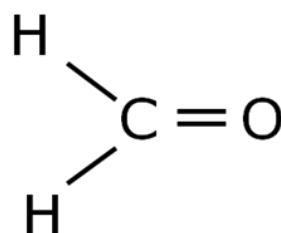
3. Tetrahedral



4. Trigonal pyramid



5. Trigonal planar



Patterns in VSEPR Theory

- Linear if:
 - Only two atoms involved or;
 - Central atom w/ no lone pairs bonded to 2 atoms.
- V-shaped if:
 - Central atom has 2 atoms bonded to it and 1 (or 2) lone pairs
- Tetrahedral if:
 - Central atom has 4 atoms bonded to it
- Trigonal planar if:
 - Central atom has 3 atoms bonded to it and no lone pairs
- Trigonal Pyramid if:
 - Central atom has 3 atoms bonded to it and 1 lone pair

Shape	# of Bonded Atoms on Central Atom	# of Lone Pairs on Central Atom
Linear	i. No central atom	n/a
	ii. 2 atoms	0
V – Shaped (Bent or Angular)	i. 2 atoms	1 or 2
Trigonal Planar	i. 3 atoms	0
Trigonal Pyramid	i. 3 atoms	1
Tetrahedral	i. 4 atoms	0

Steps to creating a VSEPR shape

- Draw Lewis and Structural diagrams
- Look at central atom and see how many atoms are bonded and how many lone pairs
- Examine previous chart to determine shape
- Draw VSEPR shape diagram

Examples: Draw the Lewis and Shape Diagrams for the following molecules

