

WKS
VSEPR

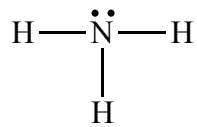
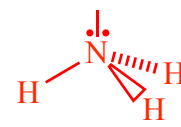
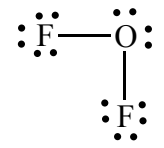
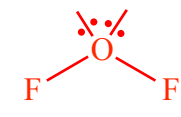
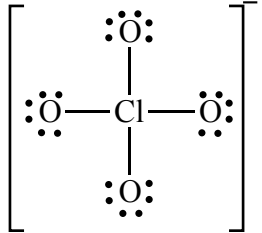
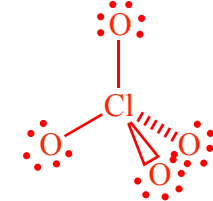
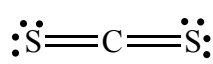
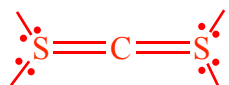
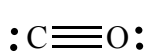

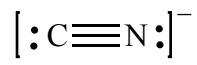

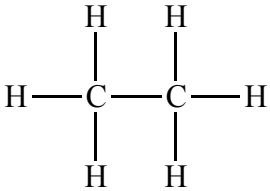
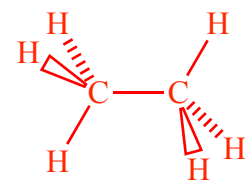
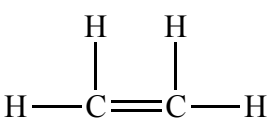
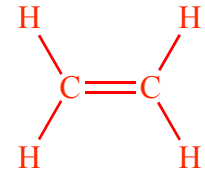


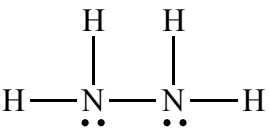
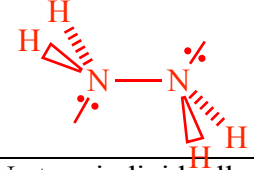
NAME Answer Key
Period _____ Date _____

VSEPR Instructions

1. Start with (or determine) the Lewis Structure of the molecule.
2. Determine the number of Electron Regions
 - Any single, double or triple bond counts as a *single* region
 - Lone pairs of electrons count as a single region per pair
3. Identify the arrangement of Electron Regions (Electron Geometry)
4. From the number of lone pair regions, identify the specific Molecular Geometry
 - Molecular geometry is a subset of Electron Geometry
 - Any molecule with no lone pairs has the same Electron Geometry and Molecular Geometry
5. Draw the molecules in 3-D
 - The bond angles should be 180° (linear), 120° (trigonal planar) or 109.5° (tetrahedral)
 - Note: you do NOT need to use the “wedges” and “hashes,” but there must be NO 90° angles!
 - For lone pair electrons on atoms other than H or halogens, use a line straddled by two electrons
 - You do not need to draw lone pairs on halogens (there should be none on H)
 - You do not need to draw brackets or charge on the 3D drawing for polyatomic ions

For the following molecules (with Lewis Structure from the previous worksheet), indicate both the electron and molecular geometry, provide the 3D drawing, and indicate the approximate bond angle at the central atom.

Molecule	Lewis Structure	# e ⁻ Regions/ Electron Geometry	# Lone Pairs/ Molecular Geometry	3D Drawing	Bond Angle
1. CF ₄		4 Tetrahedral	0 Tetrahedral		109.5°
2. N ₂		2 Linear	1 Linear		N/A
3. NO ₂ ⁺		2 Linear	0 Linear		180°
4. NO ₂ ⁻		3 Trigonal Planar	1 Bent		<120°
5. CO ₃ ²⁻		3 Trigonal Planar	0 Trigonal Planar		120°

Molecule	Lewis Structure	# e ⁻ Regions/ Electron Geometry	# Lone Pairs/ Molecular Geometry	3D Drawing	Bond Angle
6. NH ₃		4 Tetrahedral	1 Trigonal Pyramidal		<109.5°
7. OF ₂		4 Tetrahedral	2 Bent		<109.5°
8. ClO ₄ ⁻		4 Tetrahedral	0 Tetrahedral		109.5°
9. CS ₂		2 Linear	2 Linear		180°
10. CO		2 Linear	1 Linear		180°
11. CN ⁻		2 Linear	1 Linear		180°
12. C ₂ H ₆ * (H ₃ CCH ₃)		4 Tetrahedral	4 Tetrahedral		109.5°
13. C ₂ H ₄ * (H ₂ CCH ₂)		3 Trigonal Planar	3 Trigonal Planar		120°
14. C ₂ H ₂ * (HCCH)		2 Linear	2 Linear		180°
15. N ₂ H ₄ * (H ₂ NNH ₂)		4 Tetrahedral	3 Trigonal Pyramidal		<109.5°

*For 12-15, both central atoms have identical geometry. Look at each C or N atom individually to determine the electron and molecular geometry.