

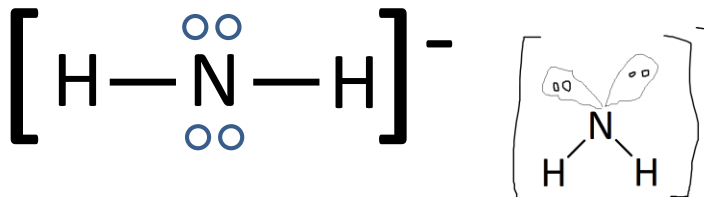
Name _____

Shapes of Molecules – Honors Chemistry I Study Guide

Part I: Shapes of Molecules (4 points each)

Draw a Lewis structure of each molecule or ion – if there are multiple resonance structures, show them all. The central atom of each molecule or ion will be underlined> as a hint. Use the Lewis structure (and sketch, if necessary) to classify the geometry of each molecule as one of the following: Linear, Bent, Triangular, Pyramidal, Tetrahedral.

EXAMPLE: NH₂⁻ Geometry: BENT



H₂S

AsCl₃

AlF₃ (Note: aluminum has an incomplete octet in this molecule)

AlH₄⁻

N₃⁻ (N-N-N)

NO₂⁻ (Note: there are 2 resonance structures. The 'real' structure of the ion is an average between them)

Name _____

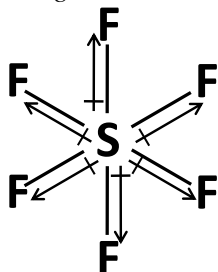
H 2.1	
Li 1.0	Be 1.5
Na 0.9	Mg 1.2

B 2.0	C 2.5	N 3.0	O 3.5	F 4.0
Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0

Part II: Polar vs Nonpolar Molecules (8 points each)

Sketch each molecule's shape and NAME the bonding geometry. Use the electronegativity chart above to draw dipole vectors for all polar bonds in the molecule, whenever the electronegative difference ≥ 0.5 . Determine whether the dipoles all cancel out due to symmetry, making the molecule NONPOLAR, or whether there is a net dipole that makes the molecule POLAR.

EXAMPLE: SF₆



Octahedral geometry – the S-F dipoles cancel out in pairs. The SF₆ molecule is **NONPOLAR**.
2 pts each for naming geometry, sketching shape, drawing dipoles, determining overall polarity

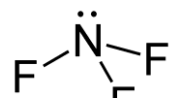
SF₂

C₂H₂

CH₂F₂

Part III: Intermolecular Forces

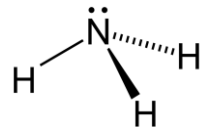
Check off all intermolecular forces found in a sample of each substance (12 points):



Dipole-Dipole (Yes/No)

Hydrogen Bonding (Yes/No)

London Dispersion (Yes/No)



Dipole-Dipole (Yes/No)

Hydrogen Bonding (Yes/No)

London Dispersion (Yes/No)



Dipole-Dipole (Yes/No)

Hydrogen Bonding (Yes/No)

London Dispersion (Yes/No)



Dipole-Dipole (Yes/No)

Hydrogen Bonding (Yes/No)

London Dispersion (Yes/No)

Please rank the above substances, NF₃, NH₃, N₂, and H₂ in order of **increasing** boiling point. (2 points)