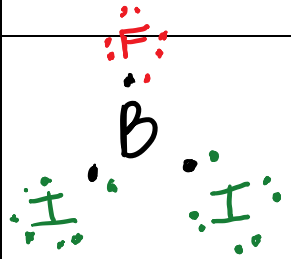
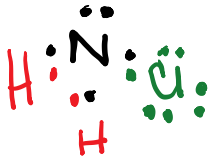
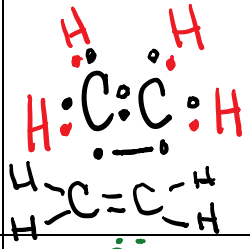
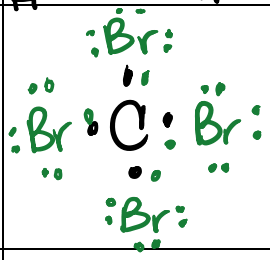
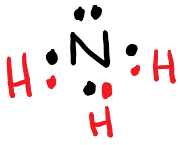
Name: _____ **Block:** ___ **Date:** _____

Homework: Molecular Shapes

1-5. Draw the Lewis Dot Diagram, illustrate and indentify the molecular shape of the following, and then indicate if it is a polar or non-polar molecule.

	Lewis Dot Diagram	Type of Bonds	Shape (name)	Polar/Non-polar Molecule
1. BFI_2		I 2.5 F 4.0 B 2.0 B 2.0 0.5 2.0 PC I	trigonal planar	 nonpolar
2. NH_2Cl		Cl 3.0 N 3.0 N 3.0 H 2.1 0 0.9 NPC PC	pyramidal	polar 
3. C_2H_4		C 2.5 C 2.5 C 2.5 H 2.1 0 0.4 NPC NPC	bi trigonal planar	non polar
4. CBr_4		Br 2.8 C 2.5 0.3 NPC	tetrahedral	non polar
5. NH_3 ammonia — longest = ≡ shortest		N 3.0 H 2.1 0.9 PC	pyramidal	 polar

1. Illustrate the hybrid orbitals for the sp^3.

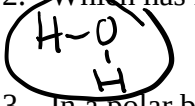
hybrid orbital - merging of orbitals when bonds form

sp^2 & trigonal planar 120°

sp^3 & tetrahedral 109.5°

sp linear 180°

2. ~~Which~~ has longer bonds H_2O or CO_2? Why?

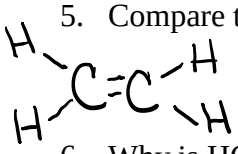


O=C=O

3. In a polar bond, electrons are shared (equally/unequally) between two atoms.

4. A molecule that is composed of only one kind of atom is a(n) monatomic

5. Compare the bonds in C_2H_4 and C_2H_2, which bonds would require more energy to break?



H-C≡C-H triple bond

6. Why is HCl a polar molecule while Cl_2 is a non-polar molecule?

Cl 3.0
H 2.1
0.9 PC

NPC

7. The polarity of a large molecule helps determine its shape.

non-polar no charge

polar partial

ionic perm. charge

Choose the best answer for the following multiple choice questions.

D 13. The distance between the nuclei of two bonded atoms is referred to as:
a. bond energy c. molecular radii
b. ionic radii d. bond length

C 14. When the bonds result in partial charges on the ends of a molecule, the molecule is referred to as:
a. ionic compound c. polar molecule
b. non-polar molecule d. none of the above

B 15. Which of the following is the correct Lewis Dot Diagram for hydrogen chloride?
a. H Cl b. H:Cl: c. H Cl d. H Cl

A 16. Which of the following is a major determining factor of molecular shape?
a. repulsive forces between shared and unshared electron pairs
b. attractive forces between shared and unshared electron pairs
c. repulsive forces between adjacent nuclei
d. attractive forces between adjacent nuclei

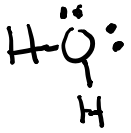
VSPER

C 17. What is the bond angle in a molecule whose central atom has formed three bonds?
a. 90˚ b. 109.5˚ c. 120˚ d. 180˚

B 18. Which of the following is a result of merging orbitals from different sublevels to form new orbitals?
a. resonance c. isomerism
b. hybrid orbitals d. polyvalence

C 19. In a triple bond how many electron pairs are shared?
a. 1 b. 2 c. 3 d. 4

B 20. In the hybrid orbital sp^3 what is the bond angle?
a. 90˚ b. 109.5˚ c. 120˚ d. 180˚



B 21. A molecule of water has how many unshared electron pairs?
a. 1 b. 2 c. 3 d. 4

A 22. The repulsion of an unshared pair of electrons is ____ a shared pair of electrons.
a. more than b. less than c. equal to d. not comparable

C 23. Which type of bond has the highest bond energy?
a. single b. double c. triple d. they are equal

A 24. A polar molecule is referred to as a:
a. dipole b. hybrid c. anion d. cation

Naming Compounds – Nomenclature

Metallic Compounds = metal + nonmetal
or
metal + polyatomic ion

Rules:

metal + nonmetal
State the name of the metal and add -ide to the end of the non-metal

metal + polyatomic ion - No changes - just name both (metal first)

$NaCl$ Sodium chloride

CaF_2 calcium fluoride
$(+2)(-1)$

Li_2O lithium oxide
$(+1)(-2)$

$MgCl_2$ magnesium chloride
$(+2)(-1)$

$K(C_2H_3O_2)$ potassium acetate

$Ca_3(PO_4)_2$ Calcium phosphate
$(+2)\quad(-3)$

* Group B must indicate Charge w/ Roman Numeral in name

$Fe^{2+\ 3+}$

FeO — iron (II) oxide — ferrous oxide

$(+2)(-2) = 0$

Fe_2O_3 — Iron (III) oxide — ferric oxide

don't have to know

$[+3]\ (-2)$

$+6\ -6$

$CrCl_4$ — Chromium (IV) Chloride

(-1)

$+4\ -4$

Ni_2S_3 — nickel (III) sulfide

$(+3)\ (-2)$