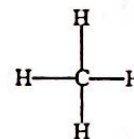
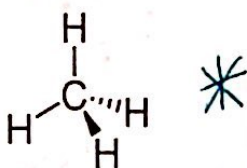
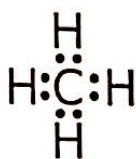


Name: Key

Date:

Pd:

**HONORS: Unit 6 - Molecular Geometry and IMFs Review**Which Lewis dot structure is most correct for  $\text{CH}_4$ ? Why?Why?  $\text{CH}_4$  is tetrahedral so it is 3D

	$\text{CH}_3\text{Br}$	$\text{O}_2$	$\text{NF}_3$	$\text{H}_2\text{S}$
1. Draw the Dot Diagram with Dipole Vectors				
2. Draw Dipole (if needed)		No Dip. No Net		
Molecular Shape	Tetrahedral	Linear	Trig. Pyra.	Bent
Bond Angles in Molecule	$109.5^\circ$	$180^\circ$	$107^\circ$	$105^\circ$
Is the molecule polar?	yes	NO	yes	yes
Which IMFs are present in this molecule?	LDF DD	LDF	LDF DD	LDF DD

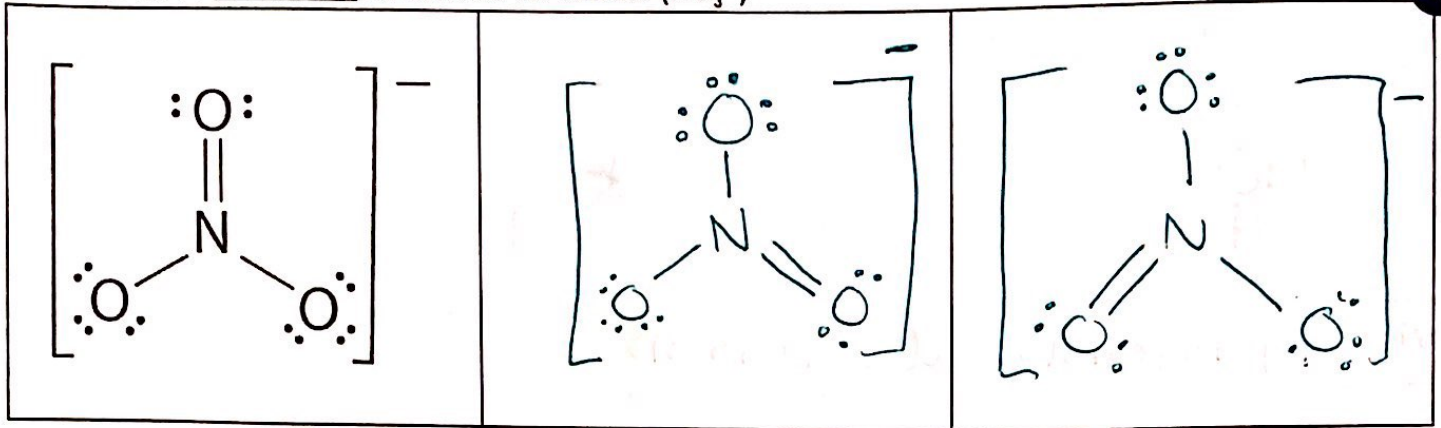
Complete the following table regarding naming of covalent compounds:

Dichlorine monoxide	$\text{Cl}_2\text{O}$
Oxygen difluoride	$\text{OF}_2$
Dihydrogen monosulfide	$\text{H}_2\text{S}$

How many unshared pairs of electrons are on the central atom of an  $\text{NH}_3$  molecule?

1

Draw the three resonance structures for Nitrate ( $\text{NO}_3^{1-}$ )



Draw a diagram (show what the molecules are doing!) for each of the following properties of water. Explain how the properties of water lead to each type of interaction.  $\text{O} = \text{H}_2\text{O}$

Property	Diagram	Explanation
Surface Tension		$\text{H}_2\text{O}$ @ surface of liquid has HB that holds them together
Adhesion		$\text{H}_2\text{O}$ uses HB to <u>Ad</u> attract other Polar objects
Cohesion		$\text{H}_2\text{O}$ attaches to other $\text{H}_2\text{O}$ w/ HB <u>Co</u>

Define the following:

- Electronegativity: attraction of an atom for electrons
- Polarity: possessing a + and - end  
(sp?)

What happens to the molecules of a substance when a substance is melted or boiled? Why do we use melting point and boiling point to test the strength of IMF's?

They spread out so the stronger the IMF, the higher the MP + BP

Why is distillation an effective method for separating substances with different polarities?

Boil liquids and they separate based on BP so it is directly linked to IMFs (polarity)

When forming covalent bonds, if an atom has 5 valence electrons how many chemical bonds can it form, assuming it is not an exception to the octet rule?

- a. 1      b. 2      c. 3      d. 4

Using your knowledge of intermolecular forces, explain why the boiling point of  $\text{NH}_3$  ( $-33.3^\circ\text{C}$ ) is higher than the boiling point of either  $\text{N}_2$  ( $-183^\circ\text{C}$ ) or  $\text{H}_2$  ( $-252.9^\circ\text{C}$ )

B/c it has HB + the other two only have LDF

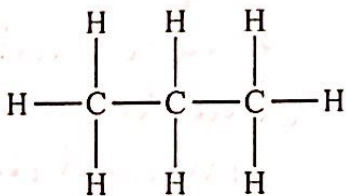
- Why does  $\text{N}_2$  have a higher boiling point than  $\text{H}_2$  if they are both nonpolar?

Larger mass

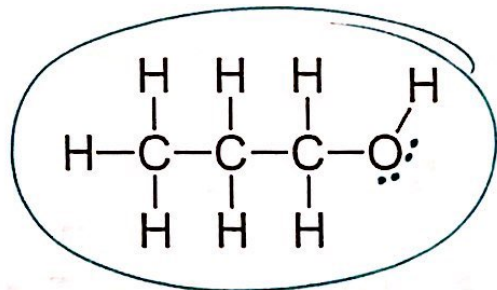
Predict whether or not the following substances would dissolve.

Test Tube #	Solvent (Dissolving Medium)	Molecular Polarity	Solute (What is dissolving)	Molecular Polarity	Will it dissolve?
1	Water	Polar	Acetone	Polar	✓
2	Oil	Nonpolar	Water	Polar	NO
3	Acetone	Polar	Oil	Nonpolar	NO
4	Oil	Nonpolar	Oil	Nonpolar	✓

Which of the following would you expect to have the highest boiling point: Propane ( $\text{CH}_3\text{CH}_2\text{CH}_3$ ) and Propanol ( $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ )? Why?



Propanol b/c it is polar + has HB



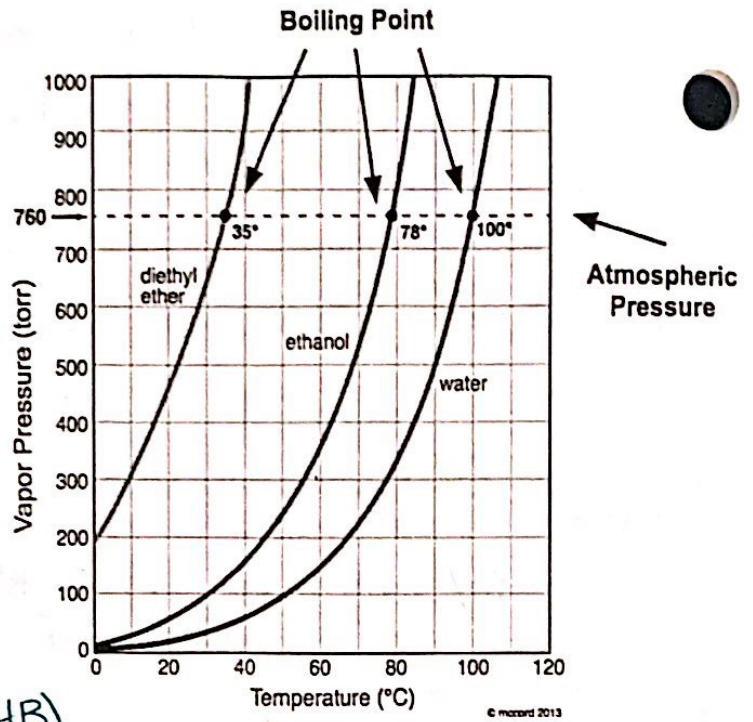
~~Explain how soap allows water to remove oils from your skin, hair, dishes, etc.~~

SKIP

Use the graph to the right to answer these questions:

- Which substance is most likely to be nonpolar?  
Diethyl ether
- What IMF's would that substance have?  
LDF only
- Explain your reasoning.  
Nonpolar molecules can't have DD or HB
- Why do you think ethanol and water have higher boiling points than diethyl ether?

B/c they have stronger IMFs (DD/HB)



For each diagram, identify which IMF is being shown and explain your reasoning.

Diagram	IMF shown	Explanation
	<u>HB</u>	<u>Strong polar molecules use D-D interactions to attract</u>
	<u>DD</u>	<u>Polar molecules attract each other b/c of +/-</u>
	<u>LDF</u>	<u>temporary polarity of repulsion of e- cloud leads to induced dipole</u>

Arrange the following in order of increasing melting point: KCl, CO<sub>2</sub>, CH<sub>3</sub>OH, CH<sub>3</sub>Br. Explain how you arrived at your answer.

- ① KCl, CH<sub>3</sub>OH, CH<sub>3</sub>Br, CO<sub>2</sub>  
 /      ② /      ③ /      ④ /  
 Ionic    HB      DD      LDF only

1 = strongest

