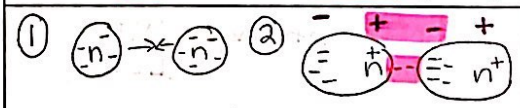
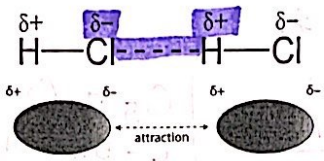
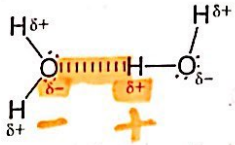
Name: Date: Pd: 1

HONORS – INTERMOLECULAR FORCES – GRAPHIC ORGANIZER

Types of Intermolecular Forces

London Dispersion Forces (LDF)	Dipole-Dipole Interactions (D-D)	Hydrogen Bonding (HB)
 • Temporary; caused by repulsion of electron clouds • Temporary dipole • All Molecules (Polar or Non)	 • + and – ends of adjacent molecules attract • Found in all Polar molec only	 • Extreme Dipole-dipole • Only found in very polar molec. (H-F, H-O, H-N) in molec.

"Like dissolves like"

Type of Compound	Intermolecular Forces			Strength of IMF	Melting/ Boiling Points	Soluble in water (Polar)?	Soluble in Oil (Nonpolar)?
	H "Bond"	Dipole-Dipole	LDF				
VERY Polar Covalent Compounds where H is bonded IN the molecule to F, O, or N	✓	✓	✓	HB Strongest	HB Highest	HB Yes (Polar)	HB NO (Nonpolar)
Polar Covalent Compounds		✓	✓	DD Middle	DD Middle	DD Yes (Polar)	DD No (Nonpolar)
All Covalent Compounds (Polar + Nonpolar)			✓	LDF Weakest (mass)	LDF Lowest	LDF Polar - Yes NP - NO	LDF Polar - No NP - Yes!

Name: Date: Pd:

Differences in Molecular Mass between molecules affects the London Dispersion Forces that they exhibit.

Effect of Molecular Mass on LDF (Molecular Mass = Mass of All Atoms in the Compound Added Together - in AMU's)	* * * * Repulsion * * * * * * More Mass = More Electrons = More Dispersion of Electrons = More Polarity of the Molecule Stronger IMF (LDF)

CO_2

C - 1 x 12.01 amu
O - 2 x 16.00 amu
> Molec. Mass: 44.01 amu

C_5H_9O

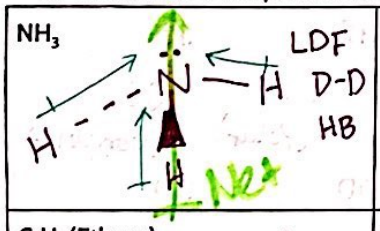
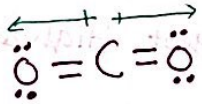
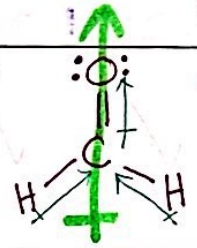
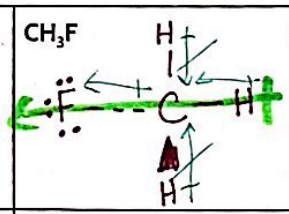
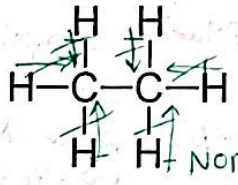
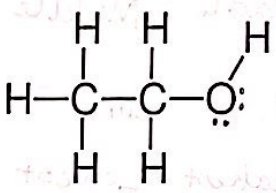
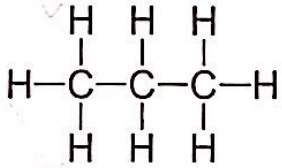
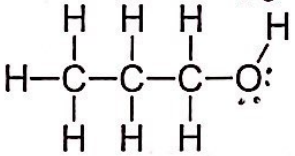
C - 5 x 12.01 amu
H - 9 x 1.008 amu
O - 1 x 16.00 amu
> Molec. Mass: 85.12 amu

IMF Analysis:

1. **What is the relationship between polarity of the molecule and strength of the IMF?**

Greater Polarity = Greater Strength of IMF

2. **Predict the IMF's present in each of the following molecules:**

NH_3  LDF D-D HB	CO_2  LDF Nc Ne +	CH_2O  LDF DD	CH_3F  LDF DD
C_2H_6 (Ethane)  LDF Nonet	C_2H_5OH (Ethanol)  LDF, DD, HB	C_3H_8 (Propane)  LDF	C_3H_7OH (Propanol)  LDF, DD, HB