Identify which intermolecular force(s) are at work (if only one substance is listed, resume forces between two molecules of that substance):

1. NaCl in H_2O

2. H_2

3. H_2O

4. CH_4

5. CO_2

6. NH_3

7. Li^+ in CH_3OH

8. HF

Make a drawing of the above #'s:

1.

3.

5.

Comparing strengths of intermolecular forces

I. For the following:
   A. List the IMFs in each molecule (DD, dipole-dipole; ID, ion-dipole; LD, London dispersion; HB, hydrogen-bonding)
   B. Indicate which molecule has stronger intermolecular forces

1. CH_3OCH_3 vs. H_2O

2. C_6H_{14} vs. CH_4

3. CH_3OH vs. CH_3SH

4. HF vs. HCl

5. Br_2 vs. ICl

6. $CHCl_3$ vs. $CHBr_3$

7. $CH_3CH_2CH_2OH$ vs. $CH_3CHOHCH_3$

II. Which are most polarizeable: O, S, Se, Te?

III. Put the following in order of increasing polarizeability: $GeCl_4$, CH_4, $SiCl_4$, SiH_4, $GeBr_4$

Challenge question: Do molecules with strong IMFs tend to be solids and liquids or gases? Why? Hypothesize.

IV. Order the following from <u>HIGHEST</u> to <u>LOWEST</u> viscosity.

a) NO_2 w/ NO_2, H_2O w/ H_2O, F_2 w/ F_2, Xe w/ Xe, Na^+ w/ H_2O

b) H_2O w/ H_2O, NH_3 w/ NH_3, HF w/ HF, Br_2 w/ Br_2, I_2 w/ I_2, CO w/ CO

V. A) For each molecule pair, list the types of IMFs possible for each
B) Circle the molecule that you predict will have the higher melting point
C) Give a brief explanation for your choice

1. $CH_3CH_2CH_2OCH_2CH_2CH_3$ vs. CH_3OCH_3

2. N_2 vs. NO_2

3. $CH_3CH_2CH_2CH_2CH_3$ vs. CH_3CH_2OH