Chem I Name _____

Date _____ Per _____

Worksheet # C28: Attractions Between Molecules (Intermolecular Forces) Pages 190-193

1. What is a dipole? _____

2. What is a polar molecule? _____

_____

3. BrF, H_2O, and NH_3 are all polar molecules. Make a 3D sketch of each in the space below like you did in the molecular shapes lab (page 191 shows some good examples), showing which enc of each is ∂- and which is ∂+. (The electronegativities are on page 151 or on your little handout.)

a. BrF b. H_2O c. NH_3

4. What do you call the force that makes polar molecules stick together? _____

_____

a. What do you call one of these kinds of forces that involves a hydrogen on one molecule that's attracted to a very electronegative atom on another molecule?

_____

b. What is the most common example of this kind of bonding? _____

c. What are the three highly electronegative atoms that do this? _____

5. Carbon tetrachloride and carbon dioxide are both nonpolar molecules that are made of polar bonds. Sketch each in the space below, showing which end of <u>each bond</u> is ∂- and which is ∂+.

a. CCl_4 b. CO_2

c. How can these molecules be nonpolar even though their bonds are polar? _____

_____

6. What's the trick to figuring out whether a molecule with polar bonds is itself a polar or a nonpolar molecule? _____

7. Even though they are nonpolar molecules, is it possible for them to stick together? _____

a. Show, with pictures, what an instantaneous dipole is and how it makes nonpolar molecules att each other. (Get this picture from your lecture notes or figure 6-29).

b. What do you call this force? _____

c. What does London, England have to do with it? _____

7. Boiling points are a convenient way to compare the strengths of bonds and intermolecular forces. The stronger the bond or force the higher the boiling point. (Easy!) Use the information or table 6-7 on page 190 to complete the following table.

Substance	What makes this substance stick together when it's a liquid? Your choices: a sea of electrons positive and negative ions attracting each other a dipole-dipole force London dispersion force	Boiling Point (°C)	Rank: 1 = strongest bond or force, 10 = weakest bond or force
NH_3			
Fe			
O_2			
NaCl			
H_2O			
Cu			
MgF_2			
H_2			
CH_4			
C_6H_6			

a. _____ Considering the results of the above chart, would you say that dipole-dipole forces are ALWAYS stronger than London Dispersion Forces?

b. Why does H_2 have a lower boiling point than O_2? _____

_____

_____