Name _____ Period _____

Partner_____ Date _____

Hydrogen Bonding Lab

Prelab Questions

1) Name the three types of intermolecular forces.

2) What factors help determine a substances boiling point?

3) What three elements other then hydrogen do you need for hydrogen bonding?

4) Fill in the following table:

Substance	Formula	Structural Formulas	Molecular Weight	Hydrogen Bonds (Yes or No)
ethanol	C_2H_5OH			
1-propanol	C_3H_7OH			
1-butanol	C_4H_9OH			
n-pentane	C_5H_{12}			
methanol	CH_3OH			
n-hexane	C_6H_{14}			

Procedure

1) Put on your safety goggles and proper lab clothes. You must obey all lab rules.

2) Take a thermometer and roll a piece of filter paper around the end as shown in class. Fasten it with a small rubber band.

3) Dip it into a beaker of ethanol and let it soak in for 30 seconds.

4) Note the temperature on the thermometer and remove it from the beaker. Record it in the data table as t1.

5) Watch the temperature closely for 3 minutes. Take note of the lowest temperature measured. Record it in the data table as t2.

6) Replace the filter paper and repeat for each of the liquids.

DATA TABLE

Substance	t_2 (°C)	t_1 (°C)	Δt (t_2–t_1) (°C)
ethanol			
1-propanol			
1-butanol			
n-pentane			
methanol			
n-hexane			

Post Lab Questions

1) Two of the liquids, n-pentane and 1-butanol, had nearly the same molecular weights, but significantly different Δt values. Explain the difference in Δt values of these substances, based on their intermolecular forces. Use diagrams of the molecules.

2) Which of the alcohols studied has the strongest intermolecular forces of attraction? The weakest intermolecular forces? Explain using the results of this experiment. Use diagrams.

3. Which of the alkanes studied has the stronger intermolecular forces of attraction? The weaker intermolecular forces? Explain using the results of this experiment.