Intermolecular Force lab report

The purpose of this lab is to calculate the experimental evaporation rates of several organic compounds and water. This relates to the guiding question because by knowing the molecular structure as well as what type of intermolecular force each liquid has,it can be determined how those forces impact the evaporation rate. The two relevant types of intermolecular forces(IMF) are Vanderwaals,London dispersion and dipole-dipole,specifically hydrogen bonding.London dispersion is a temporary attraction between atoms,they only form temporary dipoles and they are the weakest intermolecular force,while hydrogen bonds take place when a hydrogen atom bonds with slightly negative atoms of another molecule and are the strongest of them all.

Hydrogen bonds are the strongest bond between molecule. When a hydrogen bond is present it becomes more difficult to break that bond between the molecules since the strength of the bond between the molecules is strong it then becomes more difficult for a solution in a liquid state to become gaseous which would entail bonds to be broken in turn would result in a slower evaporation rate. The weakest intermolecular force would be the London dispersion bond since the bond is the weakest and it is less difficult to break apart the bonds in substances that have dispersion bonds present. Since the bonds are easier to break apart, solutions that consist of dispersion forces have a faster evaporation rate; the easier it is to break the bonds the less energy is required to do so therefore the rate of evaporation is quickened. Dipole-dipole forces are stronger than dispersion but weaker than hydrogen bonding which means that its rate of evaporation is between hydrogen bonding and dispersion .

N- pentane was predicted to have higher than ethanol and propanol because its molecular weight is higher than each. We thought that methanol would be higher because of the hydrogen bonds and since the molecular weight is lower compared to ethanol.

We had guessed that the changes in temperature would continue rising at a steady rate. However, this was not the case. We had predicted that 1- butanol would have a higher temperature change compared to methanol, but not to the same extent that we collected. From the data in the table, it can be said that although both alcohols have hydrogen bonding, the one with the lower molecular weight has a much higher change in temperature.

	$T_i(℃)$	$T_{f\,(℃)}$	$t_i(\text{sec})$	$t_{f\,(\text{sec})}$	$\Delta T(℃)$	$\Delta t(\text{sec})$	$\frac{\Delta T}{\Delta t}\left(\frac{℃}{\text{sec}}\right)$
methanol	22.80	6.924	12.00	174.0	-15.88	162.0	-0.09802
ethanol	22.62	13.37	0	281.0	-9.25	281.0	-.0329
propanol	22.38	17.59	11.00	298.5	-4.79	287.5	-.0167
butanol	22.20	20.44	7.500	290.5	-1.76	283.0	-.00622
water	22.73	18.14	22.00	296.0	-4.59	274.0	-.0168
pentane	22.87	5.672	0.5000	134.5	-17.20	134.0	-.1284
acetone	22.57	6.787	0	185.0	-15.78	185.0	-.08530