**Name: Period: Seat#:**

**Worksheet #5**

1. Describe the inter-particle forces at work in the following:

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| 1. within a water molecule H2O | 1. in a crystal of the salt NaCl |
| 1. in a solution of potassium nitrate KNO3 | 1. in diamond |
| 1. in a fiber of nylon | 1. in liquid butane |
| 1. between water molecules in ice | 1. between the two strands in the double helix of DNA |
| 1. in paraffin wax | 1. between the molecules of carbon dioxide CO2 in dry ice |
| 1. between the molecules of HCl in liquid HCl | 1. in tungsten metal |
| 1. in a solution of perchloric acid |  |

1. Which one of the following pairs of molecules would you expect to have the higher melting point in each pair of compounds below? Include a reasoning for your choices that relates to the inter-particle forces.

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| 1. Cl2 or Br2 | 1. C4H10  or C5H12 | 1. NH3  or PH3 |
| 1. Na or Mg | 1. BeO or KCl | 1. ICl or Br2 |

1. Which states or types of matter would be characterized by each of the following statements?

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| 1. High individual molecular speeds. | 1. A melting point spread over a wide temperature range. | 1. A regular repeating array of structural units. |
| 1. Molecules move with respect to one another but are held together in a condensed state. | 1. Molecules close together but having sufficiently high kinetic energies to overcome the IMFs. | 1. Valence electrons delocalized over huge arrays of atoms. |
| 1. Totally random molecular order with great distances between individual molecules. | 1. A three-dimensional network of covalent bonds. |  |

1. Acetone (C3H6O) and chloroform (CHCl3) form an unusually   
   strong intermolecular bond. Why is this?   
   Draw a picture of how the molecules attract each other.
2. Complete the following calculations. USE THESE NUMBERS:  
   *Heat of fusion of ice = 333 J/g Heat of vaporization of water = 2250 J/g*

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| 1. How much heat is required to melt 15 grams of ice at 0°C? |
| 1. How much heat is released when 100 grams of steam condenses at 100°C? |
| 1. If a system of ice and water has a mass of 12 grams, and it is converted completely to water at 0.0°C by supplying 1.33 kJ of heat, how much water was initially present? |