

### Forces of Attractions– Supplemental Worksheet

1. List and explain the 3 intermolecular forces.

- 1) *Dipole-dipole forces: the resulting attractive force that exists between polar molecules in which the electron rich (partially negative) end of one molecule “lines up” with the (partially positive) electron poor end of the other molecule.*
- 2) *Hydrogen bonding: A strong dipole-dipole force that exists between a molecule in which hydrogen atom is bound to a highly electronegative atom (N, O, or F). The actual force exists between the hydrogen on one molecule and an electronegative atom on another molecule.*
- 3) *Dispersion Forces: weakest force, all condensed phases have this force, regardless of polarity. These forces exist when temporary dipole moments arise upon the electrons of one atom or molecule getting close to the electrons in another atom or molecule and due to the like charge repulsion, induce a temporary dipole moment.*

2. Identify the forces present in the following substances

- |                      |                                     |
|----------------------|-------------------------------------|
| a) Kr                | <i>Dispersion</i>                   |
| b) HBr               | <i>Dispersion, dipole</i>           |
| c) H <sub>2</sub> O  | <i>Dispersion, hydrogen bonding</i> |
| d) SrCl <sub>2</sub> | <i>Ionic, dispersion</i>            |
| e) CH <sub>4</sub>   | <i>Dispersion</i>                   |
| f) NH <sub>3</sub>   | <i>Dispersion, hydrogen bonding</i> |
| g) CO                | <i>Dispersion, dipole</i>           |

3. For each of the following pairs, which molecule would have the stronger intermolecular forces? Explain.

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|---|--|
| a) HF vs. HCl                             | <i>HF because it can form Hydrogen bonding, which HCl cannot.</i>  |
| b) CH <sub>3</sub> OH vs. CH <sub>4</sub> | <i>CH<sub>3</sub>OH because it can form Hydrogen bonding, CH<sub>4</sub> only has dispersion forces.</i> |
| c) ICl vs. CCl <sub>4</sub>               | <i>ICl because it will have dipole-dipole, CCl<sub>4</sub> only has dispersions forces.</i>              |