1. What is the difference between intramolecular and intermolecular forces? Which one is stronger? Why is it stronger?
2. Define the three types of intermolecular forces.
3. Fill in the following table:

|  |  |  |
| --- | --- | --- |
| Type of IMF | Type of molecule that experiences this type of forces | Relative strength (rank weakest to strongest) |
| Dispersion Forces |  |  |
| Dipole-Dipole |  |  |
| Hydrogen Bonding |  |  |

1. Explain how dispersion forces work and how they can make non-polar molecules “stick” to each other.
2. Why are polar molecules attracted to each other?
3. Do all molecules that contain hydrogen having hydrogen bonding? Explain.
4. What is the relationship between boiling point and intermolecular forces?
5. Explain why water (H2O) boils at 100°C and methane (CH4) boils at -161°C.
6. Explain why a nonpolar substance does not mix with a polar substance using intermolecular forces.
7. A substance has a low boiling point and a low surface tension would you expect it to mix with water? Why or why not?
8. A substance is soluble in water and has a high boiling point. Would you expect the substance to be polar or nonpolar? Explain why.
9. Explain why water has each of the following properties
   1. Less dense as a solid
   2. High surface tension
   3. Strong adhesion and cohesion
   4. Capillary action
10. Fill in the following chart.

|  |  |  |  |
| --- | --- | --- | --- |
| Molecule | Lewis Structure | Polar or Nonpolar | Intermolecular Forces |
| oxygen difluoride, OF2 |  |  |  |
| methane, CH4 |  |  |  |
| carbon disulfide, CS2 |  |  |  |
| fluoromethane, CH3F |  |  |  |
| ammonia, NH3 |  |  |  |
| fluorine, F2 |  |  |  |
| nitrite ion, NO2**-** |  |  |  |