**Chemical Bonds vs Intermolecular Forces**

<http://edtech2.boisestate.edu/lindabennett1/502/Bonds%20and%20IMFs/bonding%20jigsaw.html>

Distinguish between chemical bonds (intramolecular forces) and intermolecular forces…

Watch the [quick recap video](https://www.youtube.com/watch?v=GnswLP4t6d0&feature=related)

**Gases, Liquids, and Solids**

<http://www.chem.purdue.edu/gchelp/liquids/character2.html>

Gases, liquids and solids are all made up of atoms, molecules, and/or ions, but the behaviors of these particles differ in the three phases. Observe and describe the figures which illustrate the microscopic differences.

* Describe the arrangement of particles in a gas, liquid and solid
* Describe the movement of particles in a gas, liquid and solid

Liquids and solids are often referred to as ***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*** because the particles are very close together.

**Intermolecular Forces**

<http://www.chem.purdue.edu/gchelp/liquids/imf2.html>

Two factors determine whether a substance is a solid, a liquid, or a gas:

* If the average kinetic energy is \_\_\_\_\_\_\_\_ than the attractive forces between the particles, a substance will not condense to form a liquid or a solid.
* If the kinetic energy is \_\_\_\_\_\_\_\_\_\_ than the attractive forces, a liquid or solid will form.
* The average kinetic energy of the particles in a gas is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to overcome the forces of attraction between them. The molecules of a gas move apart when they collide.
* The average kinetic energy of the particles in a liquid (or solid) is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that the forces of attraction between them is sufficient to hold the particles close together. The molecules in a liquid (or solid) do not move apart.

**Types of Intermolecular Forces**

**This is how the activity works:**

1. You will be assigned into a “base camp” group of four people
2. You will randomly pick a number (1-4). Each person will be an expert on one of the four types of IMFs, and your random number will tell you which IMF to research.
3. You will shift to “expert camps” (all 1’s together, all 2’s together, etc.) so you will have research and learning buddies to work with.
4. You will all return to your original “base camp” where you will teach your group mate’s about your IMF and will listen and learn from them about the three you did not research.

**Each IMF works a little differently, but you will all answer these questions:**

1. What type of attraction is the basis for your IMF?
2. Is your IMF weak, strong or somewhere in between? WHY?
3. What types of common substances are held together by your IMF? (Common, real world example, please!)
4. How does your IMF directly affect and/or explain a substance’s physical properties?

**Types of Attractive Forces**

There are several types of attractive intermolecular forces:

* London dispersion forces
* Induced-dipole forces
* Dipole-dipole forces
* Hydrogen bonding, and

Additional resources:

<http://chemistry.bd.psu.edu/jircitano/IMforces.html>

<https://www.youtube.com/watch?v=90q7xl3ndJ8&feature=results_video&playnext=1&list=PL0A1469B87689AB5A>

<http://www.science.uwaterloo.ca/~cchieh/cact/c123/intermol.html>