Effects of Intermolecular forces

Some material borrowed from:
http://lessons.chemistnate.com/effects-of-intermolecular-forces.html

Impact on Properties

Intermolecular forces control how well molecules stick together. This affects many of the measurable physical properties of substances such as:

Melting and Boiling Points

- **If molecules stick together more, they'll be tougher to break apart**
- **Stronger intermolecular forces → higher melting and boiling points**

Viscosity

- **Viscosity is a measure of how well substances flow.**
- **Stronger intermolecular forces → higher viscosity.**

Surface Tension

- **Surface tension is a measure of the toughness of the surface of a liquid**
- **Stronger intermolecular forces → higher surface tension.**

In General:

Any property affected by how well molecules of a substance “stick” to each other is impacted by intermolecular forces. The stronger the total force of attractions between molecules, the harder they are to separate, affecting all these properties.

Answering Questions about Intermolecular Force Strength

These are a favourite type of question 😊 If you are asked to rank molecules in order of melting point, boiling point, viscosity, surface tension or other affected property ... what they are actually asking is for you to rank them by strength of intermolecular forces (either increasing or decreasing)

Here is my strategy for this:

1. Look for molecules with hydrogen bonding. They will have the strongest intermolecular forces.
2. Look for molecules with dipoles. These will have the next strongest intermolecular forces.
3. Larger molecules will have stronger London dispersion forces. These are the weakest intermolecular forces BUT will often be the deciding factor in multiple choice questions.

Try the following:

Apply this strategy to the following questions. Write out your thinking!

1. List the following molecules in order of increasing surface tension: C_3H_8, CH_4, CH_3COOH, C_2H_6.

2. List the following molecules in order of increasing boiling point: Br_2, F_2, I_2, Cl_2.

3. Which has the higher vapour pressure {Note: Stronger intermolecular forces → Lower vapour pressure.}, $C_{20}H_{42}$ or $C_{30}H_{62}$?

Check how you did!

Click here for Answers.

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