Intermolecular Forces – Study Guide

*section 11.3 in OpenStax*

Explain the difference between *intra*molecular forces and *inter*molecular forces:

**Dispersion Forces**

While dipole forces are present in all substances, they are the most significant type of intermolecular force only in substances that are normally nonpolar.

Explain briefly what causes an instantaneous dipole to be formed:

What is *polarizability*?

*example*: In which of the following molecules would dispersion forces be the primary type of intermolecular force?

CO N2 NH3 CO2 CCl4 HI

**Dipole-dipole Attractions**

Dipole-dipole interactions are forces of attraction between molecules which are permanently \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Explain briefly what is meant by the term *dipole*, and why would they be attracted to one another.

***Watch video tutorial on*** [***Dipole-Dipole Attractions***](http://youtu.be/aUcMfSOPPXE)

*example*: Which of the following molecules would be expected to have significant dipole-dipole interactions in the liquid state?

CO N2 NH3 CO2 CCl4 HI

**Hydrogen Bonding**

Hydrogen bonding occurs in liquids when hydrogen is bonded *directly* to one of the elements \_\_\_\_\_\_, \_\_\_\_\_\_, or \_\_\_\_\_\_.

Hydrogen bonding is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (*strongest, weakest*) of the main types of intermolecular forces.

***Watch video tutorial on*** [***Hydrogen Bonding***](https://youtu.be/B2ZMZFdPm-Q)

*example*: Which of the following molecules would be expected to undergo hydrogen bonding in the liquid state?

CH3OH H2S CH3F CH3NH2

**Ion-dipole Interactions *(not discussed in text)***

Ion-dipole interactions are the result of an electrostatic attraction between a soluble ionic compound and polar liquid.

***Watch video tutorial on*** [***Ion-Dipole Interactions***](https://youtu.be/zLcY8EAdhVQ)

*example*: Which of the following substances would be expected to have significant ion-dipole interactions with water in aqueous solutions?

CH3OH Ca(NO3)2 HCN KClO (NH4)3PO4

**End of Chapter 10 Practice Problems**

#12, 18, 21

For detailed solutions to these problems, go to the [OpenStax website](https://openstaxcollege.org/textbooks/chemistry/resources) and download the “Student Answer and Solution Guide.”