PS 100
Experiment 12: Covalent bonds and forces between molecules Date_____

Name (print)_____ NetID _____

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Objective: To gain a better understanding of the properties of covalent materials, how the bond characteristics explain these properties, and how the composition and shape of molecules influences the forces between molecules.

1. Build the following 6 molecules and sketch images of them below.

O_2	HCl	CO_2	H_2O	NH_3

C_4H_{10} Also Known As $CH_3(CH_2)_2CH_3$ and butane

2. For the molecules you drew above, decide which are polar and which are not. If the molecule is polar label the positive and negative side, if it is not polar write "NP".

3. Which of these molecules would dissolve completely in water, and which wouldn't mix with water well?

4. What characteristics would all of the molecules listed above have in common? What are the electrons in covalent bonds doing to cause each of these characteristics?
a)

b)

c)

5. As a solid, does H_2O behave more like an ionic material or a metal? Why? What characteristic of the bonds between molecules is responsible for this behavior.

6. An organic molecule called polyethylene has a formula $CH_3(CH_2)_nCH_3$ where the n means that there is some large number of repeats of the CH_2. In other words, it looks like the butane molecule you built, but has a lot more carbons. This material is better known as plastic wrap. It is flexible and stretches. What could allow it to behave like this? What characteristic of the intermolecular forces would allow a covalent material to be malleable?