Mighty molecule student lab sheet.

Mighty Molecule Building Name _____

Most atoms are unstable by themselves, so they bond with other atoms in certain patterns to become stable. Of the 92 natural elements, only about 25% are important to living things and only four elements make up about 95% of living things. If you can understand how these fabulous four elements bond in order to get stable, then you can comprehend a great deal about the chemistry of all living things.

The Fabulous Four

Element	Symbol	Color	Bonds to Get Stable
Hydrogen	H	Yellow	1
Oxygen	O	Red	2
Nitrogen	N	Light Blue	3
Carbon	C	Black	4

For each molecule, you will be given its common name and the number and type of each atom in the molecule. Your job as a group is to put the atoms together in a way that will form a stable molecule. When you think you have constructed a stable molecule, predict what you think the formula of the molecule should be, and draw a sketch of the molecule. The formula should include the symbol of each element and the number of atoms of each element in your molecule.

You are now ready to build some of the most important molecules on our planet. Remember, for the molecule to be stable, it must form the proper number of bonds. When you build the molecules, use sticks or springs to represent the bonds. You can form one bond (single) between two atoms or two bonds (double) and sometimes even three bonds (triple).

Procedure: Build the following molecules using the ball-and-stick models and then predict the formula for the molecule and draw a sketch of the molecule.

Name of Molecule	Atoms in Molecule	Predicted Formula	Sketch of Molecule
water	2 hydrogen 1 oxygen		
ammonia	1 nitrogen 3 hydrogen		
carbon dioxide	1 carbon		

	2 oxygen		
methane (natural gas)	1 carbon 4 hydrogen		
oxygen (as found in air)	2 oxygen		
nitrogen (as found in air)	2 nitrogen		
methanol (wood alcohol)	1 carbon 4 hydrogen 1 oxygen		
propane	3 carbon 8 hydrogen		

Guiding Questions:

1. Do all the molecules contain only single bonds? Why do you think this is the case?

2. Do all the molecules have the same shape? Why do you think this is the case?

3. Because carbon (black) is the only element that can form long chains by bonding to itself over and over, it is the backbone element of all living things. What is unique about carbon that allows it form these big chains?

4. Two of the molecules (methane and propane) that you made are used by people to as a fuel (for energy). What do each of these molecules have in common?