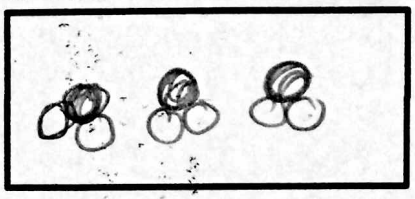
Classification of Matter Worksheet

Advanced Chemistry Name: KEY Block: _____

1. Explain what the formula of water, H_2O, tells us in your own words.

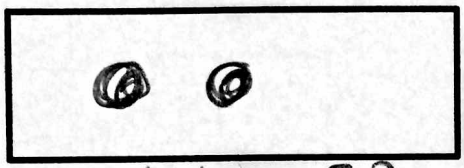
The formula for water tells us that each molecule has 1 oxygen atom and 2 hydrogen atoms.

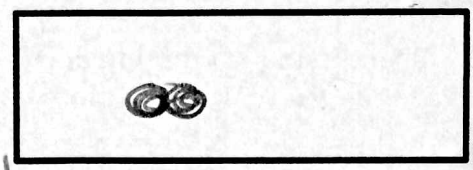
Draw a picture of at least 3 water molecules



2. What is the difference between 2N and N_2?
Draw a picture of each to support your explanation

O=N



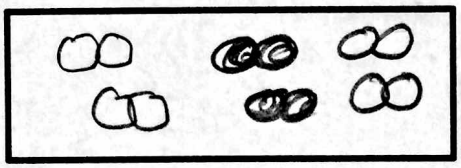


2N is a collection of 2 separate N atoms

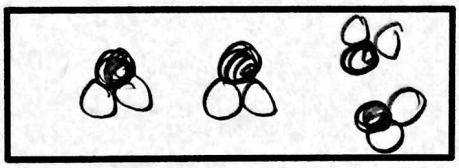
N_2 is 1 molecule of nitrogen containing 2 atoms bonded together

3. Is there a difference between a homogeneous mixture of hydrogen gas and oxygen gas in a 2:1 ratio and a sample of water vapor? Explain using microscopic level sketches (drawings).

O=H
O=O



homogenous mixture of hydrogen and oxygen gas in 2:1 ratio



water vapor H_2O (g)

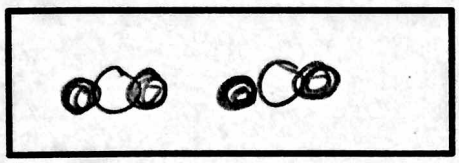
A mixture of hydrogen molecules and oxygen molecules contain the same atoms with the same ratio but they are physically mixed together

Water vapor has the same atoms with the same ratio however they are chemically bonded.

4. How do the properties of a compound, in general, compare with the properties of the elements of which it is composed? Give an example of a common compound and the elements of which it is composed to illustrate your answer.

They have completely different properties

O=O
O=C



Compound CO_2

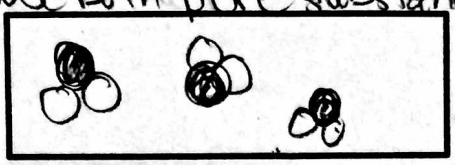
O_2
O

Elements that make up the compound
carbon + oxygen

5. Examine the water model and salt model. Water is a molecule of H2O with covalent bonds while salt is an ionic compound of NaCl described in formula units with a ratio of 1:1. Draw the sample models below and use the models to explain how they are the same and how they are different.

They are both pure substances and compounds. Water is a molecular compound and salt is an ionic compound

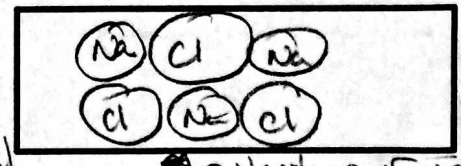
Water



O=O O=H

individual molecules

Salt



collection of ions in a 1:1 ratio

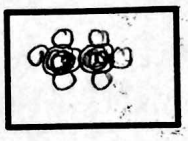
Classification of Matter Worksheet

6. Write the formula for each of the following substances, listing the elements in the order given, classify the substance and then draw a picture to illustrate each:

a. A molecule containing one nitrogen atom and three hydrogen atoms.

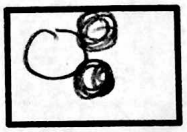
NH_3

b. A molecule containing two boron atoms and six hydrogen atoms.



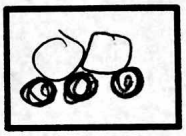
B_2H_6

c. A compound containing one calcium atom for every two chlorine atoms.



$CaCl_2$

d. A compound containing two iron atoms for every three oxygen atoms.



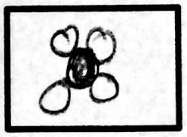
Fe_2O_3

e. A molecule containing three hydrogen atoms, one phosphorous atom and four oxygen atoms.

H_3PO_4

7. Indicate how many atoms of each element are present in the samples indicated below, classify the substance and draw the sample.

1 molecule of CH_4

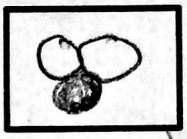


1 carbon
4 hydrogen
molecular compound

1 molecule of O_2

2 oxygen
molecular element

1 formula unit of Li_2S

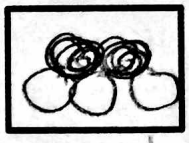


2 lithium
1 sulfur
ionic compound

2 molecules of PCl_3

1 phosphorous
3 chlorine
molecular compound

4 Formula units of Fe_3N_2



3 iron
2 nitrogen
ionic compound

3 molecules HCl

1 hydrogen
1 chlorine
molecular compound