1a. The average mass of a copper atom is 1.05558×10^{-22} grams (this was discovered by experiments culminating in 1909). What is the mass of 6.02×10^{23} copper atoms; in other words, what is the mass of 1 mole of copper atoms?

b. Copper's atomic mass can be written as _____ or _____

2a. The average mass of a lithium atom is 1.153×10^{-23} g.
What is the mass of 6.02×10^{23} lithium atoms; in other words, what is the mass of 1 mole of lithium atoms?

b. Lithium's atomic mass can be written as _____ or _____.

3a. What is the atomic mass (or "molar mass") of aluminum (Al)?_____
b. What is the atomic mass (or "molar mass") of Gold (Au)?_____
c. How does 1.00 mole of aluminum compare to 1.00 mole of gold: (circle the *answer* for each)

Which has more atoms?	*the aluminum*	*the gold*	*these contain the same # of atoms*
Which has more mass?	*the aluminum*	*the gold*	*these have the same mass*

4a. Calculate the molar mass of water.

b. Calculate the mass of 0.110 moles of water.
(in other words, convert 0.110 moles of water into grams.)

c. How many moles of water are in 43.1 grams of water?
(in other words, convert 43.1 grams of water into moles.)

5a. Calculate the molar mass of potassium carbonate; K_2CO_3.

b. Convert 0.0582 moles of potassium carbonate into grams.

c. Convert 300. grams of potassium carbonate into moles.

6. The first compounds containing noble gases were synthesized in the early 1960's. These included $XeFPtF_5$, $XeFPt_2F_{11}$, XeF_4, and XeF_2. All of these compounds are unstable.

a. What is the chemical name for XeF_4?_____

b. What is the percent fluorine (by mass) in XeF_4? (according to the periodic table masses.)

7a. Calculate the molar mass of chlorine. (hint: HOFBrIN<u>Cl</u>)

7b. How does 1.00 mole of H_2O compare to 1.00 mole of Cl_2? (circle the *answer* for each)

Which has more molecules?	*the H_2O*	*the Cl_2*	*they contain the same # of molecules*
Which has more atoms?	*the H_2O*	*the Cl_2*	*they contain the same # of atoms*
Which has more mass?	*the H_2O*	*the Cl_2*	*they have the same mass*

8. What if you had a mole of chemistry worksheets?

a. Given that 1 sheet of paper is 0.011 cm (or 0.00011 m) thick, how tall would a stack of 1 mole of worksheets be? Report answer in meters.

b. Would the height of the worksheet stack (in part (a)) be greater than the following distances:

_____ Distance from the earth to the moon: 3.8×10^8 m

_____ Distance from the earth to the sun: 1.4×10^{11} m

_____ Distance to the nearest star (besides the sun); Alpha centauri system: 4×10^{16} m

_____ Diameter of our galaxy: 9×10^{20} m

_____ Distance to the edge of the observable universe: 4×10^{26} m

c. What if you stacked the worksheets end-to-end the long way? How tall/long would the stack be, in <u>meters</u>? Note: the length of one sheet of paper is 11 inches, or 28 cm, or 0.28 m.

9a. If you have 0.500 moles of CO_2, how many molecules is this?

b. A beaker contains 9.32×10^{24} molecules of water. How many moles is this?

c. Our classroom contains approximately 7.8×10^{27} air molecules. How many moles is this?

d. An aluminum block contains 0.109 moles of aluminum. How many atoms of aluminum is this?