Measurement Lab

Name _____ class ___

40/1200

Objective: To learn to accurately measure lengths and volumes using the metric system; and to learn how to calculate percent error, and to learn to measure density.

Part 1	Measure the volume of the classroom door to the NEAREST 10th cm. Assume it's solid even though it has a window. Formula is Volume = L x W x H
Part 2	Measure the volume of the blue chemistry textbook to the nearest 10th cm. Assume it is a solid object. Formula is Volume = L x W x H
Part 3	Measure the mass and volume of lead metal to the nearest 100th gram, and volume by displacement to the nearest 10th mL. The metal must be dry for the scale.
Part 4	Measure the mass and volume of bismuth to the nearest 100th gram, and volume by displacement to the nearest 10th mL. The metal must be dry for the scale.

Data Table	
Textbook length, width and height.	Classroom door length, width and height.
BISMUTH metal mass in grams, volume in cm^3 or mL	LEAD metal mass in grams, volume in cm^3 or mL

There are 22 elements that are considered NONMETALS. Put the ATOMIC NUMBER for each of them in order, along with their symbols and names. Think first, use a pencil, get them right. Ask if you are unsure.

Atomic numbers	Symbol and Name	Atomic Number	Symbol and Name
1	H – hydrogen		
2	He - helium		
5			
		86	Rn - radon

The rest of the elements are METALS. Find symbols and names for the listed ATOMIC NUMBERS.
for the BLANKS, pick a few that you like, or think are funny (or scary, or weird).

Atomic numbers	Symbol and Name	Atomic Number	Symbol and Name
11		13	
22		26	
28		29	
47		50	
56		73	
74		79	
80		82	
84		92	

Lab Questions to be done on separate paper. Make sure that you do them in order.
Leave space between the questions so that I can write you comments and corrections close to your errors.

Use lots of paper please. Paper is Cheap, Knowledge is Valuable.

Show formulas and units whenever possible. Write out your math equations, you can use a calculator, but you must SHOW YOUR WORK on paper.

1	Calculate the volume of the classroom door. Use a formula.
2	The door's actual volume is 91,930 cm^3. Write the formula and calculate your % Error. Round answer to 2 digits only.
3	Calculate the volume of the textbook. Use a formula.
4	The text's actual volume is 2400 cm^3. Calculate your % Error. Round answer to 2 digits only.
5	Calculate your measured density of the lead. Round answer to 3 digits.
6	The actual density of lead is listed in table S. Calculate your % Error. Round answer to 3 digits.
7	Calculate your measured density of the bismuth. Round answer to 3 digits.
8	The actual density of bismuth is listed in table S. Calculate your % Error. Round answer to 3 digits.
9	Describe where the metals and nonmetals are located on the Periodic Table. Use a separate sentence to describe element #1.
10	The units for density for solids or liquids can be in g/mL or g/cm^3. Why are these units interchangeable?
11	Calculate the volume of 622.5 g cobalt metal. Use density formula, show your work. Round your answer to 4 digits.
12	Calculate mass of 133.0 cm^3 of copper. Use density formula, show your work. Round your answer to 4 digits.
14	If you had to explain to a friend the rules about the symbols on the Periodic Table, what are the apparent "first letter rule" and "second letter rule" for all the symbols?
15	Water has density of 1.00 g/mL or 1.00 g/cm^3. Ice can float on water. Quantitively estimate the density of ice. (that means write a number and a unit, don't tell me a story).

→ → DO NOT GO ONTO THE INTERNET. I will know and not be happy.

→ → Only use your reference tables, we use OUR constants, not internet junk.
     Do not round any numbers from the reference tables, they are "perfect".

Lab Report PAGE Order	INCLUDES THIS:	POINTS
Cover	A science title, (a funny title is optional, but would be written smaller), your name and class period, and a well worded complete sentence stating the objectives of this lab.	2
The handout	Fill in all of the boxes.	4
white paper	14 questions from lab handout	14
Conclusion: A new sheet of white paper	Straight up, say: 1. What did you measure, what did you calculate, what were your percent errors, and why did you make these errors (do you think?). 2. What science generalities can be made about this topic? 3. End big with that important last sentence.	5
This lab due date is:		25

This will get ONE well-placed staple, top left, make sure that ALL of your pages will remain intact. Make sure they are in order.
Do not staple too deep, if I can't see your work in the corners
I will have to assume it's not there and deduct some points.