

Name: _____

Chem 10, Section: _____

Lab Partner: _____

Experiment Date: _____

Lab Report: The Density of Liquids and Solids

Part A: The Density of Water

Experimental Data

	1 st Water Addition	2 nd Water Addition	3 rd Water Addition
Mass of Empty Cylinder			
Mass of Cylinder + Water			
Mass of Water only			
Volume of Water			
Density of Water			
Average Density of Water			

Temperature of Water: _____

Data Analysis

- 1) Look up the true density of water at the temperature recorded: _____
Obtain this value from http://jupiter.plymouth.edu/~jsduncan/courses/2012_Spring/Techniques/Exams/DensityOfWater-vs-Temp.pdf. Then use this to calculate the percent error in your average density of water. Show your work.

Part B: The Density of Aluminum and the Thickness of Foil

Experimental Data

Table 1 – The Density of Aluminum

Mass of Empty Beaker	
Mass of Beaker and Al pellets	
Mass of Al pellets	
Initial volume of water in cylinder	
Final volume of water and Al pellets	
Volume of Al pellets	

Table 2 – The Thickness of Aluminum Foil

Mass of Al Foil	
Length of Al Foil	
Width of Al Foil	

Data Analysis

- 1) Use your measured mass and volume of the pellets (in Table 1) to calculate the density of aluminum, in g/cm^3 . Show your work, and report your answer to the correct number of significant figures.
- 2) Look up the true density of aluminum at <http://www.chemicool.com>: _____
Use this to calculate the percent error in your experimentally determined density value. Show your work.
- 3) Use your measurements for the aluminum foil (in Table 2) along with the true density of aluminum to calculate the foil thickness, in cm. Show your work, and report your answer in scientific notation. Consider the foil to be a very flat rectangular box, where: $\text{Volume of foil} = \text{length} \times \text{width} \times \text{thickness}$

Part C: Graphical Analysis of Mass and Volume Data of an Unknown Solid

Experimental Data

ID Code of Unknown Solid: _____

	Small Cylinder	Medium Cylinder	Large Cylinder	EX Large Cylinder
Mass				
Length				
Diameter				
Calculated Volume				

Show a sample calculation for volume using your measured dimensions for the small cylinder below.

Data Analysis

- 1) On the graph paper supplied, plot “Mass (Y) versus Volume (X)” for all four cylinders measured. Staple your graph to this report form.

Instructions for Graphing Data

- Use a sharpened pencil.
- Use a ruler to draw your axes.
- Choose axis scales that make use of the entire sheet of graph paper.
- Clearly number and label your axes.
- Use “X” symbols for each plotted point.
- Draw a best-fit straight line through your data points using a ruler.
- Give your graph an appropriate title.

- 2) Choose two points on your best-fit line separated far from each other. The points chosen cannot be any of your plotted data points. Circle the two points selected on your graph, and complete the table below.

	X Value	Y Value
Point 1		
Point 2		

Now calculate the slope (m) of your best-fit line using the equation: $m = \frac{y_2 - y_1}{x_2 - x_1}$. Show your work, and report your result to the correct number of significant figures.

- 3) The value of the slope obtained above in #2 yields the density of your unknown solid, in units of g/cm^3 . Using this value, identify your unknown solid (see Procedure, Part C, #5).

ID Code of Unknown: _____

Name of Unknown: _____ True Density: _____

- 4) You are supplied with another cylinder made of the same material. If the cylinder length is 1.83 feet, calculate the mass of this cylinder, in grams. Use the true density of the solid in this calculation, and assume that the cylinder diameter is the same as all the other cylinders you measured. Show your work.

