

NAME: _____

**CHM 204 General Chemistry I
Laboratory 1 September 2015**

PARTNER: _____

LAB STATION: 1 2 3 4 5 6 7 8 9 10 11 12

Experiment 1. Introduction to Lab

CIRCLE YOUR SECTION: EE (8 AM) OR FF (11 AM)

1. General appearance, purpose, and quality of pre-lab notes

5 pts

For use by the TAs: Was the main purpose/objective correctly stated?	Yes No	Score: 0 1 2
How many pages long was the lab report, not counting attached graphs, etc.?	_____	
How long was the portion attributed to pre-lab lecture (estimated to ± 0.1 page)?	_____	
Did student record in laboratory notebook thorough and detailed notes from laboratory lecture		Score: 0 1
Compared to the other reports you graded this week, how would you rate this report?		
In terms of clarity and easy-to-follow details and calculations?	Best Good Fair Poor	Score: 0 ½ 1
In terms of thoroughness (good notes, details, observations)?	Best Good Fair Poor	Score: 0 ½ 1
Score:	TA Score: ____	out of 5

2. Experimental Details, Observations, and Calculations

17 pts

Record all observations that may be important to the experiment, including things that went wrong.	____/3
Proper use of significant figures (-1 per mistake, -3 maximum)	____/3
Proper use of units (-1 per mistake, -3 maximum)	____/3
Procedures I, II, III, and IV. Were these procedures correctly performed and recorded in laboratory notebook?	____/3
Procedure V. From the handout: Did you create an x-y scatter graph as instructed and attach (including the Excel data) it to your lab report? Did you determine the slope by adding a trendline, and R ² ?	____/5

3. Results, Discussion, and Conclusion

3 pts

This discussion pertains to Procedure V: Your discussion here should be based on Step 11 from the revised instructions – where I describe how the US Mint does not use solid copper in pennies anymore. Look up the densities of copper and zinc and discuss how your results compare and what conclusions you can draw. We will read your discussion carefully.

4. Sources of error (See Syllabus)

5. Complete the on-line form before leaving lab today! See lab course website.

Enter your names (you and your lab partner's name)

What is your lab station number?

(Example: 1A, 4B, 12A, etc.)

Enter your CU e-mail address. Double-check for accuracy!

Questions 1 - 4. How many significant figures are in the value...

Questions 5 and 6. Add the following numbers together and report the answer to the correct number of significant figures. Include the units in your answer...

7. A rectangle has dimensions of.... Report the area of the rectangle to the correct number of significant figures. Include the units in your answer.

8. Suppose you wanted to determine the density of a rock. You filled the 100 mL graduated cylinder with water and read its

volume to be.... After carefully adding the rock, the volume now reads... What is the volume of the rock, including units?

9. Continuing on with the previous question, if the mass of the rock was determined to be..., what is the density of the rock, including units?

10. Are these data accurate? Are they precise?

Questions 11 and 12 are similar to Question 10.

13. Which piece of glassware is the most accurate for measuring volume?

14. Suppose you are determining the density of a metal. If your metal sample is small enough to fit into a 10 mL graduated cylinder, is there a preference...

15. Sometimes density has units of g/mL...

6. BEFORE YOU LEAVE: TA initials indicating that your station is clean and no penalty points apply: TA: _____

Earned points: Lab report (25 pts) _____

Earned points: On-line data: (15 pts) _____

Quiz score (10 pts) _____

Penalty points: (Reason: _____) _____

Total score: _____

Part V. Determining the density of a modern penny

- 1) Obtain a cup of pennies from the instructor's bench. There should be 50 pennies in the cup. Check the dates of the pennies – they should be 1983 or newer. Do not use pennies 1982 or older (these should be removed already, but check just to be sure).
- 2) Using the top-loading mini-balance, mass out ten **dry** pennies in a large **tared** weigh boat, recording the mass in your notebook.
- 3) Fill the 100-mL graduated cylinder with ~40 mL of water. Record the initial volume as accurately as possible in your notebook. You should be able to read the graduated cylinder to the nearest 0.1 mL.
- 4) Carefully add the ten coins to the graduated cylinder – angle the graduated cylinder and allow the coins to slide down the side. Dislodge air bubbles by tapping the graduated cylinder. Record the new volume to ± 0.1 mL.
- 5) Determine the mass of another 10 **dry** pennies, add them to the graduated cylinder (20 coins total) and read the volume to ± 0.1 mL.
- 6) Repeat Step 5 three more times, each time with ten more **dry** pennies.
- 7) Enter your data into an Excel Spreadsheet using this format. Do not include units in Excel cells. For example, if the volume is 25.6 mL, enter only 25.6. With units present, Excel thinks the number is actually text.

	A	B	C	D	E	F
1	Trial	Number of coins	Initial volume (mL)	Final volume (mL)	Vol of coins (mL)	Mass coins (g)
2	1	10				
3	2	20				
4	3	30				
5	4	40				
6	5	50				

- 8) The value in Column E is calculated. In Cell E2, type: =D2-C2. Then click to highlight Cell E2, copy it and paste it into Columns E3 through E5.
- 9) Your TA will now show you how to:
 - (1) Display the correct number of significant figures using Format/Cell/Number.
 - (2) Create a graph in Excel of Volume (x-axis) vs. mass (y-axis), with proper labels.
 - (3) Add a trendline – the slope is the density.
- 10) Collect the coins, blot them dry, and return to their original container.
- 11) In the early-1980s, the cost of producing a penny was more than 1 cent due to the price of copper metal. Starting in mid-1982*, the US Mint starting making pennies that were mostly zinc with a thin coating of copper. Look up the densities of copper and zinc in your lab manual and compare them to the density of the pennies you obtained from the experiment.

*http://www.usmint.gov/about_the_mint/fun_facts/?action=fun_facts2