**Check List for Density Discovery Lab Report**

* Type the lab report. Print the report and proof read it. Print the corrected copy to **turn in on Wednesday, October 23, 2013**

1. **Title Page (5 points):** Include the title of experiment, lab partners’ names, lab group color, date and period.
2. **Introduction and Background (20 points):** includes the hypothesis, any theory or important math formulas. Also explains the significance (why it was important to do this investigation) of the lab. See your lab handout, Background section.
3. **Methods (10 points):** this is your procedure. This should read like a set of instruction but written in the past tense (because the lab is over & done). Write just enough of the procedure that someone outside the class could replicate your work and your results. This is written in paragraph form. No lists please! You can say that the volume was determined by water displacement.
4. **Results (25 points)**: Includes all data, data tables, graphs, and observations of why or why not you were successful. If you have an experimental error of over 20% you need to speculate about what went wrong (the specific errors you & your lab group made). If one of your three values is way off from the other two, disregard that value and calculate the average of the two ”good” values. Explain in the results section that you suspected that one of your values was in error because it was x% (you determine x) of your valid values ( x%=[bad value/ average of the other two values] x 100)

Report data to the correct number of significant figures. You did not need to estimate.

Include a printed line graph with best fit lines (trend lines) and linear equation (y = mx + b) for each line and R2 value.

Include a printed data table that includes, mass, volume, density, deviation & Percent Deviation.

1. **Conclusion/ Discussion (40 points):** This is where you write the post lab questions and answers. Write the questions (do not change the lab questions). Answer all 6 of the lab questions.

* For all calculations: ***SHOW ALL YOUR WORK!!!***
  1. Report the density of the metal and identify the metal.
  2. Provide evidence that supports your conclusion:
  3. Line graph with best fit lines (trend lines) and linear equation (y = mx + b) for each line.
     1. What is the meaning of the slope?
     2. What is the meaning of the y-intercept (b)?
  4. R2 value for each line. Explain why the R2 value validates or invalidates your line. If your R2 value is > 0.899, you have a good trend line (validates your data points).
  5. The y-intercept should be zero but uncertainty in measurement is probably giving you a value of b ≠ 0. Is your value of b negligible? Do the 5% test. If b > 5%, try 10%. State the results of both if you use 5% & 10 %.
  6. Are your results accurate (% error < = 10%)?
  7. Is your data precise (% range < = 10%).
  8. Do you have a small mean deviation? Is the % mean deviation small (< 10%)?
  9. Is one of the values causing the numbers to be way off? What are the deviation & the % deviation of this suspected bad number? How do you know the number is bad? (Because the number has a high % deviation and is way off the trend line.)
  10. You need a good reason to reject a data value. Sometimes trend lines are inaccurate so you need more justification than a visual inspection of your graph to reject a data value.
  11. Reflection:
      1. Were you able to achieve the purpose of the experiment?
      2. If you had a prediction, were you able to accept or reject the hypothesis based on your data and the class data? In this experiment the hypothesis is if the mass & volume are known, the density can be determined and the unknown metal could be identified.
      3. Your prediction was to be able to determine the correct density and identify your metal based on the mass & volume data.
      4. Were you able to determine the correct density from your mass & volume data? Did this data lead to a correct identification of your metal? If you got 7.37 g/ mL for your silver metal density you should have identified your metal as tin (because 7.37 g/ mL is the density of tin) and you would have to say you could not correctly identify the metal as aluminum.
      5. In this case you could not reject the hypothesis because you know you made errors. However, you cannot accept the hypothesis either because you did not prove it. You would have to repeat the experiment and eliminate the errors at least twice to say you reject the hypothesis.
  12. What new learning took place?
  13. Why is this new learning important?
  14. How could you improve the experiment? How could you prevent the errors if you did the experiment again
  15. What further investigations could be done?