

## Laboratory Assignment Guidelines – CHEM 101A – Fall 2018

Laboratory work is an essential part of a standard science course. Your laboratory grade (representing 20% of your total course grade) will depend on your adherence to the following guidelines. These are designed to improve and assess your abilities in the laboratory. Furthermore, the lab experience is designed to develop your techniques and analysis, in preparation for your profession.

### Pre-Laboratory

Please refer to the Lab Schedule for the complete listing of the semester laboratory activities by lab day. The experiment number is what is listed in the Zumdahl Lab Manual, 10<sup>th</sup> Edition. You should read through the experiment before attending the laboratory, so you know what you are doing before you come to lab. Any assigned pre-laboratory questions must be turned in at the beginning of the lab activity, unless otherwise announced. Preparation is essential for completing the lab activity in the time allotted (3 hrs 10 minutes), and performing successfully.

### Laboratory and the Laboratory Notebook

Always practice good lab safety, as outlined in the Manual (pages xvi – xxv) and the Safety Agreement you received and signed.

Please follow the procedure, as outlined in the James Zumdahl Lab Manual, unless an addendum is provided. **Do not use the Results/Observations sheets in the Zumdahl Lab Manual.** You will use your laboratory notebook to keep a record of your all of your experimental data and observations (i.e. results for each lab). Use the following guidelines for keeping your lab notebook.

1. The carbon-duplicate laboratory notebook required comes with page numbers. In practice, you should never remove pages from a lab notebook. The carbon-duplicate lab notebook, however allows you to turn in the duplicates (labeled “copy”).
2. Write in your lab notebook only in ink. If you make a mistake, or copy down something wrong, neatly cross it out (do not use white-out or pencils).
3. Write your name, chemistry course number, and semester/year on the cover of the lab notebook. Use a label, if necessary.
4. Using pen only, neatly record all of your results and observations in the notebook on the original page (not the carbon page) during the lab experiment. Use the protector sheet to avoid copying your page to other pages.
5. Sometimes, the Zumdahl Lab Manual will have specific questions or request specific observations in the procedure. Be sure to address these in your data pages.
6. Each experiment begins on a new page of your lab notebook. Write the Experiment number / title, along with the date, at the top of the page.
7. The notebook is gridded for easy construction of data tables and rough graphs, as necessary. To assist in developing a lab report (post-lab), divide your notes into the following four sections:
  - a. Procedure (you may simply refer to the Zumdahl procedure, but note changes/addenda here)
  - b. Data/observations (provide observations, use hand-drawn tables, create graphs)
  - c. Calculations/Graphs—show your work. Graph axes should be scaled, labeled (unit/dimension). Use straight edge for linear trends.
  - d. Brief Conclusion (based on the data/evidence).
  - e. Post-lab questions

8. Turn in your lab data (carbon duplicate pages labeled “copy” with all data and calculations) at the beginning of the next lab meeting. The bulk of the grade is based on accurate data, calculations, and conclusions.

## **Post-Laboratory**

### **Labs Not Requiring Lab Report**

Most of our labs do not require a lab report. For these labs, turn in the carbon copy of the notebook pages at the beginning of the following lab period, along with any assigned post-laboratory questions. These labs are worth **15 points**. If the lab assignment is turned in late, then post-laboratory questions will receive zero credit.

### **Labs Requiring a Lab Report**

Some experiments require a lab report—these are indicated in the laboratory schedule. These labs are worth **35 points**. Laboratory reports are due at the beginning of the lab, one week, following the date of the lab activity. **Each business day the lab is turned in late will result in a 10% deduction from the total score of the lab. Minimally, lab data sheets may be turned in for a maximum of 10 points out of 35.**

The lab report is the formal communication of the lab experiment, and draws upon the information recorded in the lab notebook. A poorly done experiment, with poor data-gathering and poorly written observations will obviously lead to a poor lab report. The report should convey to the reader in a clear manner, what the purpose of the investigation was, what the results/observations were, and how the findings were interpreted. The lab report should be neither too wordy, nor too concise, so as to clearly convey the actualities of the experiment. Examples of lab reports will be provided by your instructor.

For each experiment, each student must prepare his/her own **unique** lab report, which must include all **duplicate pages from the lab notebook**. The lab report must be type-written on one side of each page. Points will be deducted for illegibility, failure to include necessary details, specifically requested calculations, graphs, and the components described below:

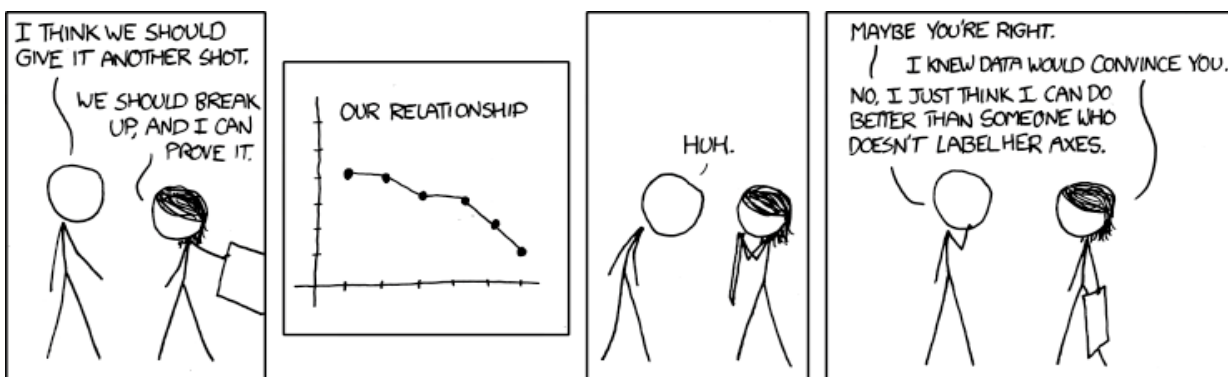
1. **Title Page.** (page 1) In the center of the page, roughly midway down, you should include your name, course number, experiment title, and lab partner. The bottom of Title Page must include the following:

**Purpose:** One or two sentences which identify the purpose of the investigation, and methods employed. The Objective described in the Zumdahl lab manual will help with this.

**Results:** A short list of the final result(s) (percent yield, unknown result), which was the primary goal of the lab activity.

The remaining components of the lab report below, should be included after page 1.

2. **Procedure.** Normally, the experimenter would write this out completely, in doing an experiment from scratch. You may refer to the Zumdahl manual using standard citation methods. If addenda to the procedure are provided, you should write these out, in addition to the citation.
3. **Data/Observation.** This section consists, of unknown codes, substances/quantities used. Generally, quantitative data should convey numerical information, in clear, neat form, using tables. Qualitative data/observations should convey to the reader details in paragraph form, with clear sentences. The lab notebook sheets guide this section.



<https://xkcd.com/833/>

4. **Calculations/Graphs.** Each type of numerical calculation should be represented. Repeated calculations may be generalized using a formula (be clear!). Graphs should be neatly drawn up, or generated, using software programs. Do not simply use any graphs from your lab notebook. You must clearly label each axis with measurement/unit! Multiple graphs on one page should be labeled to identify each.
5. **Discussion/Error Analysis.** Include answers to any assigned Post-Lab Questions here. This section will include evaluation and interpretation of the results. Some of the following questions that may be answered in this section are:
  - How do these results compare with the standard/accepted results?
  - What are the limitations of the investigation?
  - What types of inherent errors are inevitable in the experiment?
  - What is the reliability of the equipment in making the experimental measurements?
  - What specific student errors were present?
6. **Conclusion.** Here we state whether or not the purpose of the experiment was accomplished, along with how the experiment/methods could be changed to improve reliability.

### Academic Dishonesty and Lab Reports

As stated earlier, laboratory assignments are individual to each student. Every student must write his/her own lab write-up or unique lab report. Two lab partners will collect the same data, but each must write his/her own unique lab report. This means, each person must draw his/her own conclusions, and provide his/her own unique discussion and reflection of the lab results. Lab reports that are nearly identical will have substantial grade reductions with the possibility of receiving zero credit.