Format for Chemistry Lab Reports

Lab Report Format

Unless told otherwise, use the following format when writing up all lab experiments. *Each lab report consists of five clearly labeled and easily identified sections written directly into your lab notebook:*

I. Introduction/Purpose
II. Materials/Methods (Procedure) & Observations
III. Results
- Present the experimental data in data table(s) and, if applicable, use one or more graphs to show trends within the data.

IV. Analysis of Results
- Calculations (if applicable)
- Discussion of results
- Answers to assigned questions (if applicable)

V. Conclusion

Follow the guidelines below for the specific contents for each of the five sections of the lab report:

Name **Lab Partners**

Date performed

Title of Experiment

I. Introduction

- Describe the overall goal(s) of the experiment. What is it that you are trying to accomplish/determine with the experiment? This is often called the purpose of the experiment.
- Briefly summarize any relevant background information about the experiment and/or describe the theoretical principles on which the procedure is based, including all relevant chemical equations and/or algebraic equations. Explain how the lab relates to the classwork.

II. Materials and Methods & Procedure

- The "Materials and Methods" section tells how the work was done. There should be enough detail that a competent student could repeat the experiment. An outline or flow chart of the procedure is appropriate. If requested by your instructor, clearly, but briefly, describe in a step-by-step fashion the procedure used for the experiment. **Excessive detail is not required**, however another student should be able to perform the experiment from your procedure. Include any observations made during the procedure in italics.

III. Results

- Record neatly and directly into a data table all pertinent measurements that are made during the lab period.
- If a data table is provided with the lab simply cut and paste it into your lab template. Do not use a stapler, as staples are too bulky and do not hold well.
- If a data table is not included with the lab, construct a data table in your lab template so that all data is shown in an easy to read table. Pay attention to units and significant figures.
- Graphs must have a descriptive title, and each axis must be labeled with name of the variable and the unit. Remember that the controlled or independent variable is placed on the horizontal axis and the dependent variable on the vertical axis. Computer generated graphs can be cut and pasted into the report.

- Do not attempt to discuss the interpretation of your data---this should be done in the "Analysis of Results" section.

IV. Analysis of Results

- Include in this section all Calculations, analysis and discussion of your results.
- Show **all** calculations clearly, and with attention to significant figures and units for those experiments that involve calculations. Explain clearly what you are calculating...Don't leave it to the reader to figure out what is being calculated!! Examples of each calculation should be provided corresponding to the table that depicts that result. You need only show one sample calculation if that calculation is used repeatedly in the analysis of the data.
- If there are questions assigned with the lab activity, answer them clearly, but concisely with full sentences. Number your answers as the questions are numbered and make it clear to *anyone* what the question is that you are answering.
- If not addressed in the assigned questions with the lab experiment, analyze your results fully. A full analysis of the results….
  - States what conclusions can be drawn from the results and explains how you arrived at these conclusions,
  - Uses specific numerical data and/or observations gathered in the experiment to support all conclusions made,
  - Will attempt to explain why results might be inconsistent with the predictions you made (what you thought would happen before you did your study, based on a specific hypothesis or other background information),
  - Addresses the major sources of error (**Be very specific!**) and explains how these errors affect the results,
  - Addresses problems that arose in your study and how could they be avoided in the future,
  - Explains what you may have done, if anything, to improve the experiment,
  - Compares your results with those of other workers and cites the references used for comparisons,
  - Explains any exceptional aspects of your data or unexpected results,
  - Examines your results for possible errors or bias, and
  - Recommends further work that could augment the results of the study you have presented.

V. Conclusion

- Briefly, using "*bullets*", **state your major conclusions as clearly as possible. Use specific supporting examples from your results.** Your conclusion should relate directly to the purpose or goals of the experiment.
- **Use your data to support your conclusions!!** It is *not* enough to simply state in the conclusion that you calculated a salt's density or a salt's heat of solution. Always use your data support/substantiate your conclusions!! For example:
  - Density of unknown salt #342: 2.030 g/mL (9.82% error and standard deviation of 0.402 g/mL) A likely cause for the higher than expected density and the poor precision was inaccurate mass determinations due to the fact that the salt is highly hygroscopic (i.e. It rapidly absorbs water from the atmosphere.)
  - The class average for the DH_{soln} of the unknown salt: -34 kJ/mole salt (–8.3% error and Standard Deviation of 2 kJ/mole salt). The most likely cause for the lower than expected DH_{soln} was heat loss to the

surroundings due to the poor insulating properties of the coffee cup calorimeter.