

## Lab Report Guidelines

### • Title

Self-explanatory. You must put this on the cover page of your lab report. Also include your group members, the date, and class. Also include for each section of the lab report, which group member worked on each particular section of the report.

### • Abstract

Summarize each major section of the lab report — Introduction, Experimental Procedures, Results and Data Analysis, Discussion, and Conclusion — in 1 sentence each (two if a section is complex).

Then string the summaries together in a block paragraph (the margins are indented an extra inch on both the left and right margins) in the order the sections come in the final report. This section is best completed after the lab report is written.

### • Introduction (+ Background/Purpose)

This is a paragraph that discusses background information and the purpose of the lab. DO NOT simply copy the information on your lab protocol. You may select some facts to incorporate from the provided information, but overall it should be a summary of the topic in your own words. The rest of the information for your introduction should come from class discussions, personal experience (if any) and notes. Include in this section any knowledge or observations made prior to beginning the experiment. This should be relevant information to your topic and connected to the question you will be asking.

Explain how you came up with the question from this background.  
Explain the concepts and vocabulary that will be used in the lab.

Include the necessary reactions and/or equations for the lab

The **Problem** is written in the form of a question (example: How....? What.....? Why...?) and the variables are clearly and correctly stated.

Write the question that is relevant to the objective. This must be a testable question. It must be your original question or if one is given to you, you must come up with an original testable question at the end of the lab write-up.

The hypothesis is written in the form of a statement that starts with “I think...” or “If ... then...” It should attempt to answer the problem statement above. Be sure to include the dependent and independent variables in your answer.

State what you think is going to happen followed by an **explanation** of why you think this will happen. Some scientific terms should be included.

### • Experimental Procedures

What steps are in the lab activity, IN YOUR OWN WORDS.

Write the steps you do, in numbered complete sentence format, to solve your problem  
One step should include making observations and recording data.

It should be specific enough that anyone in the class could follow the steps and do the lab successfully

The steps should be written with enough detail that it is easy for others to follow.

Are the steps of the procedure clear and easy to follow?

Mention the particular pitfalls in data taking that you discovered and managed to maneuver around.

You may need to draw the apparatus in order to refer to it later during discussion.

Draw pictures as appropriate! Always show the set up and at least two other pictures and color them.

Finally, this must include the materials used.

Give any important safety information

#### • **Observations/Data**

Are the observations you witnessed described? Qualitative as well as quantitative?

Are data for this lab listed neatly and completely in a data table or tables?

This would be written observations from the actual lab or recorded measured values on a data table that is made in class or given out. Points can be deducted for incorrect or missing units. Points can, also, be lost for lack of appropriate significant digits.

#### • **Data Analysis/Graphs**

Include in this section all data that is outlined in your design. This should include tables, graphs, and/or pictures that are appropriate to answering the question, which will aid in solving the problem. Any quantitative data should be organized in a table. You should have enough data collected to indicate good quality data. You will graph the mean/median of the data but present all of the data in your table. All tables and graphs need to be labeled appropriately with full titles and units. Be sure to include the data table the graph was made from

Title your final experimental results, standard or accepted values, if they exist, and percent errors and/or percent differences. This is a very important section of the lab. It is here that it becomes clear whether your data agree with the accepted value(s) or are self-consistent.

Are the final results listed clearly?

Include a few of your calculations in this section, e.g. one of each type. Do not show each and every calculation.

Are the calculations used in the experiment included and correctly done?

Show all work (formula, number substitution etc). **INCLUDE UNITS.**

Are all symbols defined and all units listed?

Are all the 5 parts of a graph present?

Include title, labeled axes, smooth lines through experimental data points, and slope calculations. Each graph should convey a complete message and be fully understandable without referring to any other section in the report. Further graphing rules are listed in the Theory section of Experiment #1 and other graphical techniques are developed in Experiment #2 and #3.

This will include all data collected in the form of the charts, tables, drawings, diagrams, and/or graphs to explain or demonstrate your observations in the lab. Be sure that your graphs, tables, figures, or diagrams are neatly, completely and properly labeled with a complete title. You may not create a graph on your computer – it must be hand drawn.

In addition, you should write at least 2 sentences describing your qualitative and quantitative observations.

#### • **Discussion (Analysis of Experiment)**

This section contains the answers to the lab questions or statements of what was observed and recorded. Each question should be numbered and answered in complete sentences; restate the question in your answer, or write the question and then the answer.

Answer all assigned questions with complete sentences. Answer them so that the instructor can tell what question you are answering.

What can you claim from your results and what evidence leads you to make your claim?

This should be a paragraph(s) explaining how the lab observations and results brought the concepts together.

## • Conclusion

This must be done in complete sentences and in paragraph form. This is the section where you report your results and try to tell why it turned out the way it did. This explanation needs to include relevant scientific concepts and vocabulary. You should summarize your design and results while discussing possible errors in your design, data collection, and/or limitations of the investigation.

Discuss how your results demonstrate basic principles of chemistry. Conclude whether your data agree with the accepted value(s) or are self-consistent. Give reasons for errors, personal observations, suggestions, and any other comments you feel are pertinent.

Are the results of the experiment clearly restated and summarized?

Some labs will have a prompt that will ask you to write about specific topics related to the lab.

If this is not the case, then you will need to write:

[1] What happened in the lab – was your hypothesis right or wrong

[2] What you learned (answer the problem as stated above)

[3] What further experiments might be done to further the study

[4] How this applies to what we are learning – what are the real life applications

This is also the place to mention any unanswered questions or any errors that occurred during the lab.

Based upon the theory provided, how were the results as compared to what you expected?

What happened that may have affected your results? What errors might have been made?

Are possible sources of error described?

What could have been done to lessen error? Included with this, should be how you would do it differently next time.

If appropriate calculate percent error.

If applicable, were the following ideas considered:

Amount of deviation from true values (percent error)

Accuracy and/or precision of results

## • References

List all sources, e.g. lab manual, textbook, course packet, etc.

## • Appendix

With a table of contents listing the items in the Appendix, include any paperwork used to prepare or used while performing the lab, such as any pre-lab worksheets, lab handouts or protocols, notes taken during the lab, etc.

## • Organization and Neatness of the Report

Is the report neatly formatted and concise?

Was the proper format used?

Use 8 1/2" x 11" paper and do not write on the back of the sheets.

Write legibly or type, using proper grammar. Points will be taken off for misspelled words and incorrect grammar.

## • Formatting

1.5 spacing within paragraphs

12-pt font only

1-in margins

Times, Times New Roman, Arial, Helvetica, Verdana font only