**A Brief Explanation of the Parts of the Lab**

Title

Author

Address

Date

Abstract

1. TITLE PAGE: This page will take on the following format.

The title is the name of the Lab (it should be descriptive)

The Author is you and your address is the Physics Dept. at the Academy for Math, Engineering, and Science

The date is the day the lab is due to be handed in.

The abstract is a brief 2-3 sentience explanation of what the lab is about and what the basic result was.

1. INTRODUCTION: This is a detailed presentation of the objectives of the lab. It includes what you intend to accomplish and how it relates to previous works. This portion is critical since it is the readers first real knowledge of the study.

Note: Your handout will usually take the place of this section.

1. THEORY: This is a presentation of the theoretical considerations needed to fulfill your objectives. It includes equations, derivations, and all necessary explanations of what was needed to obtain final results. See note #2.
2. EXPERIMENTAL DETAILS: You may as well call this one how to set up the equipment and do the experiment. See note #3.
3. RESULTS: This is what happened. It includes the notes you took as you did the lab, the data tables you filled out, the calculations that you did to the data, and the graphs you made. It is ok if this section is handwritten.
4. DISCUSSION: In this section you will discuss your results in light of the theory. You will also discuss or talk about what happened as you performed that lab, and what it all means. You will expound, elaborate, and try to make the reader understand what you learned from what happened. You will talk about your data.
5. CONCLUSION: Here you concisely talk about the conclusions you draw from the lab.
6. REFERENCES: Give the listing of any references you consulted.

**How do I write the Lab?**

1. Take notes and data in class. Then do the calculations and graphs as necessary.
2. Write the discussion.
3. From the discussion and the goals and objectives of the lab, write the conclusion.
4. Write the abstract and do the title page. The conclusion will help you write an abstract.
5. Do the reference page and put it all together.

Hand in your lab write-up on the due date complete, in the correct order, and stapled at the upper left hand corner.

**Physics Labs**

The purpose of Labs in Physics is to give you a better understanding of some of the concepts that we have discussed in class. You will not be charting new ground in the field of physics, but simply exploring experimentally many of the concepts that you have already explored in notes and in your book. You are not trying to “prove” anything right or wrong. We will already know what is right. You are trying to improve lab skills, get a feel for how to record and use data, and how to properly document a laboratory experiment.

When we do a lab it is often tempting to try to be “right” with all of your answers, especially since we know what the answer should be in advance. Resist the urge. If your data does not come very close to what is expected, your job is to try to determine why you were so far off. Hopefully you will get it right the first time, but making mistakes and trying to figure out why is a large part of physics labs and is a very valuable learning experience. If something happens and you find you are very wrong, go to other in the class or to your teacher and try to figure out what you did wrong. We often learn more from our mistakes than from our successes.

Part of good lab practice is that you come to the lab very well prepared to do the experiment. I will give you the lab handout prior to the lab day. I expect you to have read the handout thoroughly, and have a good idea of what you are going to have to do before you get to the lab. Lack of preparation will result in a loss of points for the lab. Come to the lab prepared. This means having pencil, paper, graph paper, and a small straight edge for any graphing you have to do. You are also expected to have any data tables that must be filled out prepared to record data before you come to the lab.

When you come to the lab you will want to remember what you did and what happened. I expect you to take notes as you do the lab. It may be several days before you work on the lab report and you **will** forget things during that time. If you realize you have made a mistake while you are taking notes or recording data, simply draw a light line through the mistake and write a note in the margin telling what the mistake was or why it happened. DO NOT ERASE!

Each page of your lab notes should be initialed, numbered, and dated. This is for future reference to the notes. This way you remember what was done and when. If the notes are kept in a spiral notebook, please carefully cut off the fringes before you hand your notes in to me. I suggest you use a 3-ring notebook and punch holes in your pages to keep your papers organized.

Graphs should be understandable by themselves. This means lots of labels, numbers, titles, and notes if necessary.

**Lab Reports**

The following is the order that lab reports should be placed in. Reports should be typed with the exception of graphs, data tables, and in lab notes which should be in their original form.

1. Title page
2. Introduction
3. Theory
4. Experimental details
5. Results
6. Discussion
7. Conclusion
8. References

**A few words about data tables and graphs**

1. Data should be kept in tables and the tables should be prepared ahead of time.
2. Data tables should be neat and include headings and units of measurement.
3. Axis should be labeled and units shown in parenthesis.
4. Scales of only 1, 2, 5, and multiples of ten times these numbers may be used for each square. When plotting very large or small numbers you should write the numbers in powers of ten and include the power of ten in the units.
5. Small points should be circled.
6. Each data point on the graph has a certain error and thus the curve drawn should be simple, smooth, and represent a good average fit to all the data points.
7. Each graph should have a title.