

Guide to Astronomy Laboratory Reports

Types of Laboratory Reports

In the sciences, laboratory reports generally come in two formats: a *long form* report and a *short form* report. In *Astronomy* we will use *short form* reports. However, it is worth while understanding the difference, since it helps in deciding what to include in your report.

Long form reports are written for a reader who, although scientifically skilled, is unfamiliar with the particular experiment being reported on or why it was performed. They contain enough material that a reader unfamiliar with the subject and the laboratory could reconstruct the entire experiment. They normally include a discussion of the theoretical background and context of the experiment, a complete discussion of the procedures and protocols that were followed, and a full description of the equipment used. The results are then presented and analyzed and appropriate conclusions drawn. These reports are often quite lengthy.

Short form reports are written assuming that the reader is familiar with the theoretical background of the experiment, the course text, the laboratory manual and the procedures the manual specifies, and with the equipment provided to the student or experimenter. Short form reports omit several of the background discussions present in a long form report. They do not include the theory. It is assumed that either the text or the laboratory manual have good discussions of the theory. They do not repeat the procedures or the equipment descriptions that are present in the laboratory manual. It is assumed that the reader is familiar with what the student was supposed to do. However, it is not assumed that the experimenter actually did what was specified. A short form report must contain enough discussion of the procedures so that the reader can be assured that the experimenter understood and actually did what was specified by the laboratory procedures or protocols. Deviations from or alterations to the procedures are always recorded.

A *long form* report assumes the reader was unfamiliar with the experiment and its background. A *short form* report assumes that the reader knows what was expected of the student including the procedures that were to be followed, the equipment provided, and the background of the experiment. It does not assume that the experiment was performed correctly, was understood, and worked. That must be shown in the report. In *Astronomy* we will always write *short form* laboratory reports.

General Report Requirements

A laboratory report is an example of technical writing in a scientific context. There are several features that all college-level technical writing has in common. The report must be in grammatically correct English with proper spelling, capitalization, and punctuation. A laboratory report is a *report*. It is not a journal, a diary, or a “blog”. It should be written in a moderately formal style, carefully organized, and carefully presented. It should be formatted in a manner that aids the reader in seeing and then understanding its content. Paragraph breaks and indentation should be used freely to organize the material visually.

Data and calculations should be presented in tables or columns, never embedded in running text. Numbers should always have proper units and be carefully labeled as to what quantity they represent. Differentiate between the original data and your calculations or analysis. While a good presentation often requires data to be reorganized from the original format in which it was recorded, the original data must always be included in a report. Relegate it to an appendix if it is

truly ugly and would spoil the appearance of an otherwise well organized and carefully presented report. However, *the original data must always be included with the report.*

Laboratory Report Organization

Laboratory reports should generally have a cover page and three main parts: (1) Introduction, (2) Data Analysis and Discussion and (3) Conclusion. The cover page should include the title of the experiment, the date(s) it was performed, your name, the name(s) of your lab partner(s), and the date it was submitted.

(1) The *Introduction* should contain a brief statement of the purpose or objective of the experiment as you understand it. What is being tested or demonstrated? What laws are involved? What should the outcome be? Generally, a single paragraph will suffice.

(2) The *Data Analysis and Discussion* is the heart of the laboratory report. Each answer, calculated result, and graph should be presented and its significance discussed. The discussion should relate to the objective stated in the introduction. Indicate the reliability of each result by the number of significant figures you list. Discuss sources of error and evaluate which are significant. Note that different experiments differ widely in the accuracy obtainable. The actual size of the error, 1% or 20%, is less important than a correct assessment and discussion of the result and outcome of the experiment. Your ability to take good data is important but your ability to draw correct conclusions from whatever data you took is more important. Always include your original initialed data sheet with your report, even if you copy and re-present the data in your report. You must also answer all the questions in the Manual as part of your report.

In certain Astronomy experiments (e.g.: Coordinate Systems) the “experiment” consists of a sequence of activities with specific questions to be answered that are intended to lead the student to better understanding of a series of topics. In these experiments, your “data” is your answers. Your “analysis and discussion” is the reasoning behind your answers.

(3) The *Conclusion* should be a brief paragraph of hindsight. This is where you bring together the rest of the report into a few paragraphs stating the final result, success or failure, of the experiment. This is where your final numerical results, with the proper number of significant figures and proper units, are summarized. It is vitally important that your conclusion be a valid reflection of the actual outcome you achieved. One of the worst transgressions in science is to misrepresent the outcome of an experiment.

The report should not contain an extensive discussion of theory. Your text and the laboratory manual contain enough theory. The procedure should be presented in a manner that supplements the manual rather than duplicating it. See the section on *short form* reports above. Finally, *the report must be your own work and be written in your own words* – plagiarism will not be tolerated. For further information on plagiarism and its consequences, refer to the University’s **Academic Integrity Policy** in the **Academic Regulations** section of the [Metropolitan Campus Student Handbook](#).