Laboratory test report sample

Fair-use printable PDF version policies This document describes a general format for lab reports that you can adapt as needed. Laboratory reports are the most frequent type of document written in engineering and can count up to 25% of a course, but little time or attention is devoted to how to write them well. Worse, every professor wants something a little different. Regardless of variations, however, the goal of laboratory reports remains the same: to document the results and communicate their meaning. In this sense, we can describe the format and basic components of the relationship. Knowing the pieces and purpose, you can adapt to the particular needs of a course or professor. A good laboratory report does more than the current data; demonstrates the writer's understanding of the concepts behind the data. Simply recording the expected and observed results is not enough; you should also identify how and why differences occurred, explain how they influenced your experiment, and show your understanding of the principles that the experiment was designed to examine. Keep in mind that a format, however useful, cannot replace clear thinking and organized writing. You still need to carefully organize your ideas and express them consistently. Typical components Title page Abstract introduction Methods and materials (or equipment) Experimental procedure Results Discussion Conclusion References Appendices Further Reading 1. The title page must contain the experiment name, lab partner names, and date. Titles must be simple, informative, and less than ten words (e.g. not Lab #4 but Lab #4: Sample Analysis using the Debye-Sherrer Method). 2. The Abstract summarises four essential aspects of the report: the purpose of the experiment (sometimes expressed as the purpose of the report), the key results, the meaning and the main conclusions. The abstract often also includes a brief reference to theory or methodology. The information should clearly allow readers to decide whether they should read the entire report. The abstract should be a paragraph of 100-200 words (the sample below is 191 words). Purpose Key Results (i) Most significant talking point Main conclusion Short method Short one theory page 200 words MAX. Abstract sample This experiment examined the effect of line orientation and arrowhead angle on a subject's ability to perceive the length of the line, thus testing the Müller–Lyer illusion. The Müller–Lyer illusion is the classic visual illustration of the effect of the surrounding environment on the perceived length of a line. The test had to determine the subjective equality point by making sure that the subjects adjust the line segments so that they equal the of a standard line. Twenty-three subjects were tested in a design of repeated measurements with four different arrowhead angles and four line orientations. Each condition has been tested in six randomized trials. The lines to be adjusted have been pointed with outward-facing arrows of varying degrees of notes, notes, standard lines had inward pointing arrows of the same degree. The results showed that line lengths were overrated in all cases. The size of the error is increased with decreasing angles of the arrowhead. For line orientation, the overestimation was greater when the lines were horizontal. The latter is contrary to our expectations. In addition, the two factors worked independently in their effects on the subjective equality point of the subjects. These results have important implications for human factor design applications such as graphical display interfaces. 3. The introduction is more closely focusing than the abstract. It affirms the objective of the experiment and provides the reader with the context of the experiment. Indicate the topic of the relationship clearly and concisely, in one or two sentences: Purpose of the experiment Important background and/or theory Description of specialized equipment Justification of the importance of the experiment Example: The purpose of this experiment was to identify the specific element in a metal dust sample by determining its crystalline structure and atomic radius. These were determined using the Debye-Sherrer (powder camera) method of X-ray diffraction. A good introduction also provides any basic theory, previous research, or formulas that the reader needs to know. Usually, an instructor doesn't want you to repeat the lab manual, but show your understanding of the problem. For example, the introduction that followed the previous example could describe the Debye–Sherrer method, and explain that from diffraction angles the crystalline structure can be found by applying Bragg's law. If the amount of introductory material seems to be a lot, consider adding subclasses such as: Theoretical Principles or Background. Note on verbal time introductions often create difficulties for students struggling to keep verbal tenses straight. These two points should help you navigate the introduction: the experiment is already over. Use the past when you talk about the experiment. The goal of the experiment was... The report, theory and permanent equipment still exist; therefore, these get the present time: The purpose of this report is ... Bragg's law for diffraction is ... Scanning electron microscope produces micrographs ... 4. Methods and materials (or equipment) can usually be a simple list, but make sure it is accurate and complete. In some cases, simply direct the reader to a laboratory manual or standard procedure: The equipment has been set up as in the CHE 276 manual. 5. The experimental procedure describes the process in chronological order. Using a clear paragraph structure, explain all the steps where they actually happened, not as they should have happened. If your professor says you can simply declare that you followed the procedure in the manual, be sure to still document occasions when you didn't exactly follow it (e.g. In step 4 we performed four repetitions instead of three and ignored the data from the repetition). If you did it right, another researcher should be able to duplicate your experiment. 6. The results are generally dominated by calculations, tables and figures; however, you should still indicate all significant results explicitly in verbal form, for example: Tables and graphs number and title Use a sentence or two to draw attention to key points in tables or charts Provide only the result of the sample calculation status key in sentence form Using the calculated lattice parameter is then provided R = 0.1244nm. The graphics must be clear, easily readable and well labeled (e.g. Figure 1: Input frequency and capacitor value). An important strategy to make your results effective is to draw the reader's attention to them with a sentence or two, so that the reader has a focus while reading the graph. In most cases, the supply of a sample calculation is sufficient in the report. Leave the rest in the appendix. Similarly, your raw data can be entered in an appendix. Refer to appendages if necessary, indicating trends and identifying special features. 7. Discussion is the most important part of your report, because here you show that you understand the experiment beyond the simple level of completion. Explain. Analyze. Interpret. Some like to think of this as the subjective part of the relationship. By that, they mean that this is what is not easily observable. This part of the lab focuses on a matter of understanding What is the meaning or meaning of the results? To answer this question, use both aspects of the discussion: Interpretation of the analysis What do the results clearly indicate? What did you find? Explain what you know for sure based on your results and draw conclusions: what is the meaning of the results? What ambiguities exist? What questions could we raise? Find logical explanations for the problems in the data: since none of the samples reacted to the silver sheet test, then sulfide, if any, does not exceed a concentration of about 0.025 g/l. It is therefore unlikely that the rupture of the main water pipe was the result of sulfide-induced corrosion. Although water samples were received on 14 August 2000, tests could not be started until 10 September 2000. It is normally desirable to test as quickly as possible after sampling in order to avoid potential contamination of the sample. The effect of the delay is unknown. More specifically, focal and focal points of the discussion with strategies such as these: compare the expected results with those obtained. If there have been differences, how can you see that? Saying human error means you're incompetent. Be specific; for example, they could not measure accurately, the sample was not pure or contaminated, or the calculated values did not take friction into account. Analyze the experimental error. Was it avoidable? Was it the result of equipment? If an experiment fell within tolerances, you can still take into account the difference from the ideal. If the defects result from experimental experimental design how the design could be improved. Explain your results in terms of theoretical problems. University laboratories often aim to illustrate important physical laws, such as the Kirchhoff Tension Act or the Müller-Lyer Illusion. You'll usually have discussed it in the introduction. In this section, move from results to theory. How well has the theory been illustrated? Correlate the results to your experimental goals. If you have decided to identify an unknown metal by finding its lattice parameter and atomic structure, it is better to know the metal and its attributes. Compare your results to similar surveys. In some cases, it is legitimate to compare the results with classmates, not to change the response, but to look for any anomalies between the groups and discuss them. Analyze the strengths and limitations of your experimental project. This is especially useful if you have designed the thing you are testing (e.g. a circuit). 8. The conclusion can be very short in most university laboratories. State what's known Justify statement State significance Suggest further research Example: The Debye-Sherrer method identified the sample material as nickel due to the measured crystalline structure (fcc) and atomic radius (about 0.124nm). Note that after the material has been identified in the previous example, the writer provides a justification. We know it's nickel because of its structure and size. This is a good and sufficient conclusion. In general, this is enough; however, the conclusion could also be a place to discuss the weaknesses of experimental design, what future work needs to be done to extend the conclusions, or what are the implications of your conclusion. 9. References include the lab manual and any external reading you've done. Check the documentation page of this site to organize references appropriately to the field. 10. Appendices typically include items such as raw data, calculations, chart images, or tables that were not included in the report itself. Each element type must be contained in a separate appendix. Be sure to reference each appendix at least once in the report. For example, the results section might begin by noting: Micrographs printed from the scanning electron microscope are contained in Appendix A. To learn more about writing scientific articles, visit our science writing flyer. Sciences.