

Lab Report Guide

Lab reports are your way of communicating your lab experience in a professional manner. Each lab project will require you to provide evidence of your experience. In an effort to expand your experience writing in the sciences, you are asked to provide 3 complete lab reports for grading. Some of your lab report submission will be peer reviewed. The directions for the complete lab reports are provided in item 1 below. Item 2 provides the details of reporting your lab results for each of the projects. Item 3 describes the point distribution for different elements of your lab report.

1. You must submit 3 complete lab reports for grading, Lab Projects #3 (Differential Stains), Lab #4 (Differential Media / ID of Lab Stock Bacterial Cultures) and Lab #8 (Microbial Control). Follow the directions below.

A. *A complete lab report must contain all of the following items:*

- **Cover Page**
- **Introduction**

The introduction must contain an introductory paragraph explaining your reasons for completing the lab exercise. The introductory paragraph is built on the 'inverted pyramid' model: broad, general statements to begin the paragraph, ending in a statement that outlines the successive paragraphs.

For instance, if you were writing an introduction for Project 1, this statement might read as follows: During this lab students were introduced to the fundamentals of light microscopy, techniques for taking pictures under the microscope were identified, and students took pictures of Wright's stained neutrophils & lymphocytes and measured the diameter of these cells.

The following paragraphs should address one item from your topic sentence. Read about the subject in the class textbook, in the lab project documents, or on respected websites. Distill the information you learn into a well-written paragraph. Using the topic sentence from Project 1 (above) as an example, the introduction might contain 4-5 paragraphs following the introductory paragraph (i.e. the second paragraph would describe the light microscope and some insights regarding the focusing procedure; the third paragraph would cover things you want to keep in mind when using the program for photomicroscopy; the fourth paragraph would describe the neutrophil & lymphocyte in Wright's stain and their size and number.)

Ideally, this would be written BEFORE you attempt the laboratory exercise. You might consider writing the introduction prior to the lab so that you maximize your lab experience.

- **Hypothesis (Hypotheses)**

Use the "If...then" model to write the statement. You may need to write more than one hypothesis. (Continuing with the example from Project 1, you might consider writing a hypothesis: "If a Wright's stained slide of human blood is examined, there are two types of leukocytes that will comprise most of the white blood cell count; neutrophils containing a multi-lobed, purple staining multi-lobed nucleus surrounded by light pink granular staining cytoplasm, and lymphocytes, which have a large nucleus surrounded by a small area of cytoplasm." ***By

the way, you know this because of the advanced reading you did on the subject to prepare the introduction***

➤ **Methods**

List the steps in the procedure in original (not copied/pasted), numbered sentences. This information must be detailed enough so that someone reading your Methods section could repeat your experiment. Methods information is past-tense, because you have already performed these steps.

➤ **Results**

Provide a narrative of the observations you made as you collected your results. (Using the X-Y controller, the microscope stage was systematically moved across the feather edge of the stain, stopping to observe and identify white blood cells. A cell with a purple multi-lobed nucleus was observed (Figure 1). Include pictures (if photomicroscopy was used) or data tables (if numeric data was collected). Label (Figure 1 or Table 1) and title (Photo of Wright's Stained Neutrophil; 400xTM) all data figures or tables. If photos from the microscope are used be certain to include the total magnification.

➤ **Analysis**

The analysis section is your opportunity to think deeply about the observations you have made and make connections to your reasons for performing the procedure. Note trends, if they exist. Identify when the data are supported by things you have read in the literature review. Relate your analysis to your predictions (hypothesis). Discuss whether or not you were on target.

➤ **Conclusion**

Make your conclusions and describe what you learned from the lab. Identify sources of error and make recommendations for eliminating or reducing the errors. (Please note that not following directions is an avoidable source of error in college science classes). Identify possible applications for the things you learned.

➤ **References**

In this section, site any published works that you referred to in your paper in APA style (see link below). You must also have properly formatted in-text citations.

Some things you will want to remember (because you will lose points if you don't remember them☺):

1. See APA guidelines on how to properly format your lab report:
<https://owl.english.purdue.edu/owl/section/2/10/>. It is important that you become familiar with, and follow, these guidelines. The following are a few tips, but, again, look to the APA Style Guide for more details on how to format your lab report.
2. Every page should have a running head (a.k.a. page header)
3. All headings and subheadings must be **Bolded**. Headings centered. Subheadings left aligned.
4. More than 2 spelling, grammar, or writing issues result in a 10 point deduction.
5. All late assignments will incur a penalty of 10 points per day; no assignments will be accepted more than 3 days late.

4. All tables/figures must be labeled and titled.
5. When using pictures taken by the microscope camera record the TOTAL magnification used.
6. Cite your work using the APA format. All lab reports are expected to cite a minimum of one source.
8. Avoid using the first person narrative. (i.e. avoid personal pronouns in your writing)
9. Genus names are capitalized; species names are lower case. Both genus and species names are underlined or italicized.

2. Lab results will be collected for all labs. The items should be saved during lab and emailed to yourself, and your lab partner(s) if working together.

Name of Lab Project	Item for Grading	Due Date
Project 1: Lab Safety, Photomicroscopy, WBCs	COVER PAGE, HYPOTHESIS, RESULTS, ANALYSIS, CONCLUSION, REFERENCE sections. <u>Tips:</u> In Results section, insert pictures of a neutrophil and a lymphocyte, with cell diameters measured using that annotating function of the camera software. Insert pictures into Word documents, properly label and title the figures.	See course schedule
Project 2: Skill Building	INTRODUCTION, HYPOTHESIS, METHODS & REFERENCES sections. + Picture of lab equipment posted in Moodle with a description of the use of the item. + Picture of simple stain of bacteria with the diameter of one cell measured.	"
Project 3: Differential Stains	FIRST COMPLETE LAB REPORT <u>Tips:</u> The Results sections of this lab report will include a total of 9 pictures, 3 pictures each of Gram stains, acid fast stains and endospore stains. The pictures should be inserted into a Word document in a rectangle that represents the microscope slide. These three pictures, representing the 3 circles on the slide, should be properly labeled and titled. In addition to the photos, there should be a statement that summarizes your stain results. In the conclusion you will need to identify the potential stock culture bacteria.	"
Project 4: Metabolic Testing for Microbial Identity of Stock Cultures	SECOND COMPLETE LAB REPORT <u>Tips:</u> Report the results you collected, for your bacterial unknown. These results will have been reviewed by others in your lab group and by your peers in the classroom. Classroom peer reviews will be conducted by others with the same stock culture. In your Analysis, any differences between your results and either expected results or the majority of other investigators should be explained.	"
Project 5: Urine Cultures	You will choose two of the three culture projects (Projects 5, 6 & 7) to complete brief Patient Culture Lab Reports. I will provide a form that you will use for these projects.	'
Project 6: Throat	You will choose two of the three culture projects (Projects 5, 6 & 7) to	"

Cultures	complete brief Patient Culture Lab Reports. I will provide a form that you will use for these projects.	
Project 7: Wound Cultures	You will choose two of the three culture projects (Projects 5, 6 & 7) to complete brief Patient Culture Lab Reports. I will provide a form that you will use for these projects.	“
Project 8: Microbial Control	THIRD COMPLETE LAB REPORT	“

3. Grading Rubric for Lab Reports:

CATEGORY	
Cover Page (2 points)	Information provided on the cover page is correct. It is reported in the correct order in the appropriate place on the page. Lab title, your name, Date Due, Lab time, Lab partner
Hypothesis (4 points)	The purpose of the lab is summarized in the hypothesis statement. The question(s) to be answered during the lab is (are) clearly identified and stated using an 'if...then' statement(s).
Introduction (16 points)	Summarize textbook selections, laboratory introduction and appropriate lecture notes to provide the significance of performing the exercise. Includes what you are going to do, why you are performing the lab, what you hope to gain from the exercise and how this will be accomplished.
Methods (4 points)	List of procedures, listed in clear steps. Each step is numbered and is a complete sentence. Methods are written in the past tense.
Results (12 points)	A narrative of your results is provided in one or more paragraphs. Results are presented in diagrams, tables and/or graphs, which are referred to in your narrative.
Tables, Graphs, Drawings/Diagrams (12 points)	Professional looking and accurate representation of the data in tables and/or graphs. Clear, accurate diagrams are included and make the experiment easier to understand. All diagram /drawings, tables and graphs are titled and labeled neatly and accurately.
Analysis (12 points)	Results are analyzed relative to your hypothesis.
Conclusion (16 points)	Describe how the results answer the question (or not). Summary describes the skills learned, the information learned and some future applications to real life situations. Experimental errors, their possible effects, and ways to reduce errors are discussed.
Appearance/Organization (8 points)	Lab report is typed and uses headings and subheadings to visually organize the material.
Spelling, Punctuation & Grammar (8 points)	One or fewer errors in spelling, punctuation and grammar in the report.
Safety & Participation (8 points)	Lab is carried out with full attention to relevant safety procedures. The set-up, experiment, and tear-down posed no safety threat to any individual. Time was well used in the lab.