

How to write a lab report

This document is to help students taking general science classes that require lab reports. Lab reports are essentially a mini version of original research papers written by practicing scientists. Their purpose is to document the experiments you've done. Lab reports should be (1) written in a way that can be replicated by someone else and (2) include an analysis of your experiment that demonstrates a clear understanding of the experimental background and interpretation of the data collected. Although each discipline (biology, psychology, computer science, physics etc.) may require specific formatting and required sections, this guide is to help with the general flow and format of a university level lab report.

This chart will help you format the general structure of a research style lab report. For more information, visit the University of Regina Research Style Lab Report Structure page found [here](#).

Section	Purpose	Content
Title	Summarizes the work presented in your paper	Should be informative, specific, descriptive and concise. Identifies the content of the paper, and if possible indicates the key findings in your study ¹ .
Abstract	Gives the reader a sneak peak of your paper.	In a single paragraph (~250 words), you should include: your research question (hypothesis) and rationale behind the study/purpose, brief description of your experiment, summary of major findings and the central conclusions ¹ . In other words, a concise summary of your report. Generally written last. *There are generally no citations in this section!
Introduction	Gives relevant background information on the question you are answering in your paper and clearly outlines the purpose of your study and why it's important	Should include general knowledge on the general topic being discussed and what we know so far (i.e., cite previous studies that are directly related to your topic in this section!). This is a good section to introduce the reader to terms and definitions they need to understand your paper. Include a clear rationale for your experiment ¹ . Your hypothesis (educated

		guess of the expected outcome) will come at the end of your introduction.
Materials and Methods (sometimes also called “Methods”)	Summarizes experimental setup and data collection and analysis activities (e.g., what you did to produce the data that is analyzed in the results section)	Should include enough information that the study can be replicated , in as few words as possible ¹ . Describe what you did (in past tense) as succinctly as possible. If you followed a protocol written by someone else, you need to cite that protocol. This section can be tricky—see how published papers write their methods sections for inspiration.
Results^a	Presents your analyzed data (not <u>raw data</u>) to your reader.	Include visual summaries (tables/figures) and written descriptions of the trends observed in your results that answer the question you are posing in of your study. Include descriptions of any unexpected or contradictory results ¹ .
Discussion^a	Interpretation and evaluation of your results.	Should clearly answer the central question(s) in your introduction (hypothesis), notes/discusses interesting or unexpected findings (do the results support or refute your hypothesis?), and relate the results to the general understanding of the field. Data analysis (including statistical significance) should appropriately described, and should include meaningful suggestions for future studies ¹ . This section is written differently than other sections, consider a matching style.
Conclusion^b	Discusses major findings	Captures the focus of your paper, summarizes the main aspects of your paper and paraphrases the purpose, connects main result back to the introduction and provides recommendations for future studies. ¹
References/ Literature Cited	Documents all sources used in your study (in-text citations).	Includes a complete reference list that identifies the original sources referenced in your report. The format of your in-text and references cited section will depend on the style of formatting you are asked to use, and will vary by discipline. Each type of source (e.g., webpages, scholarly articles, text books) will formatted differently in your references cited section. For lab reports, most of your citations should be from primary sources (i.e., peer reviewed/scholarly articles that are first-hand accounts of original experiments). Only include references cited in your research report¹

1. <https://moodle.uregina.ca/urbiolabreport/lab-report-structure>

10 common lab report mistakes²

1. Writing the entire report the night before it is due
 - You need time to edit your paper! Otherwise it's a first draft.
 - Try to write your analysis of the results and materials and methods within a day or two of your completing the lab activities
 - i. Use your lab notebook and lab manual if available
2. Writing a report with no clearly defined purpose in mind
 - A clear and defined central purpose (in your intro) will **justify** all the work you did
 - A clear and defined central purpose will help **focus** your discussion
3. Writing the report in the order it is presented
 - Instead of starting with the abstract or introduction and moving towards the discussion, start by writing your methods section and analyzing your results first.
4. Including information in the introduction and discussion sections that are not directly related to the study being presented
 - Only include information that is directly related to your study. I.e., what you did, why you did it, what you found and what you think it means
5. Confusing the analysis and interpretation (i.e., mixing up results and discussion)
 - Results = trends, Discussion = why these trends happened and what they **mean**
 - Alternatively, some professors will ask that you combine the Results and Discussion sections. In this case, you would write a Conclusion section.
6. Presenting raw data in the results and/or not using visual representations of data in the results
7. Not putting statements in the results
 - Support statements with references, data or examples
 - Clearly address the purpose of your study with actual statements (i.e., what are the **key** results you want to highlight? In other words, what is the "take home message?")
8. Presenting the same result in two or more ways
 - Present the same data only once!
 - Choose an appropriate visual (table **OR** graph) for data you are presenting. **Do not present the same information in both table and graph visuals.** You can have multiple visuals, but they should be analyzing different parts of your data (i.e., no repetition).

9. Writing a discussion that has no interpretations

1. <https://moodle.uregina.ca/urbiolabreport/lab-report-structure>
2. <https://moodle.uregina.ca/urbiolabreport/common-errors>
 - a. Some professors will ask that you combine your Results and Discussion sections
 - b. Written if the Results and Discussion sections are combined

- Interpreting results means providing a scientific meaning for the results
 - i. For example: if you are performing an experiment to answer a biological question, you should include the biological relevance of your results
- 10. Assuming unexpected or unusual results are due to human error
 - Unusual/unexpected results make science interesting! Critically think about why these happened as opposed to thinking you made a mistake. Perhaps there is more we can learn from investigating these results further. This is good information to add when suggesting future avenues for extending research.