

Why have a laboratory notebook? Isn't this just busy work? Don't worry; I'll remember what I did in lab. I'll just write down my results on scratch paper and fill in the details later. We have all made these comments about laboratory notebooks. Lab notebooks are not the students (nor the professors) favorite part of laboratory or research classes. However, communication is an essential part of conducting laboratory experiments. We gain practice in keeping notebooks in classes so we know how to do it when we work in research laboratories. Much of the value of collecting experimental data is lost if proper records are not kept. If methods and results are not clearly written and recorded, this information cannot be effectively transmitted to other scientists (including your professor). Notebooks contain your data whether good or bad, observations from your experiments, and form the basis for every scientific paper you write. Notebooks are legal records for documenting drugs, biologics and medical device research under FDA guidelines. **The following guidelines should be strictly adhered to for the recording of laboratory exercises.**

Your laboratory notebook should be an accurate record of what you do in the lab, and should contain notes and calculations as well as appropriate comments regarding the experiments. **A major function of a lab notebook is to allow another competent scientist to reproduce EXACTLY your experiment.**

This course uses an electronic lab notebook (ELN). You have received an email with a link to access the notebook and register for the **LabArchives** (host of our ELN). Your notebook will be graded based on the formatting (shown below), completeness and the statement in bold above. No grade will be assigned for neatness, but a disorganized lab notebook will be penalized. You will have notebook checks throughout the semester. Your notebook will also be spot checked prior or during lab to ensure that you have prepared for that day's experiments and maintain the work as you go..

Finally, when taking notes for the lab (lecture or self made notes), these should each have their own entry in the lab book.

A. **Experiment Entry.**

- For each experiment YOU will create a lab page assigned to that experiments. You will create the appropriate headings and a rich text box for each page. You will edit the rich text box and add additional elements to document your experiments, results and conclusions.

B. **Date**

- Done automatically! The ELN time stamps all entries using the National Institute of Standards and Technology standard time.

C. **Title**

- Headings have been added to each page. You may edit these or add additional title bars, but use an intelligent title, not just the name of the experiment copied from the laboratory manual. Pick a title that describes the content of your work. Particularly important for multi-day experiments.

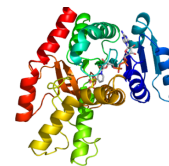
D. **Introduction/Purpose**

- This section should include a two or three sentence statement of the purpose(s) and objective(s) of the exercises being performed.

E. **Materials / Procedure / Protocol or Methods**

- Write a description of procedures used including any deviations from the information presented in the laboratory handout.
- **If there is a published exact protocol, then reference the protocol or procedure AND include a simple outline, flow chart or description of the referenced protocol. DO NOT copy & paste the protocol into the notebook.**
- When you have to repeat a routine operation several times, such as a protein assay, you can skip the details and link to the specific page in the ELN where the complete procedure was originally described.

The title, introduction/purpose and materials and methods sections should be completed before coming to lab. (Deviations from the information presented in the laboratory handout will be recorded as you perform the laboratory experiments.)



F. **Data and Results – Including Analysis**

- All data and observations that are generated should be recorded in your laboratory notebook at the time of the exercise. If you upload a photo, you **MUST** include a figure title and legend to explain the significance of this data. This should include any tables, graphs, formulas or other information from the laboratory manual. Your data analysis should be performed as soon after the conclusion of an experimental procedure as possible and before the next lab period. Any tables of the data collected that day and graphs of that data should be included if appropriate. This section should include all calculations, averages and corrections to the recorded data.
- All information should be neatly presented with graphs and tables labeled appropriately. Graphs can be prepared using iPad apps or your own computer and uploaded to the appropriate ELN page.

G. **Discussion and Conclusions**

- This section should include any interpretations, conclusions, or suggestions regarding the results of that day's exercise. A discussion of the expected results and why they were or were not obtained should be included. **THIS IS NOT A SUMMARY OF EVERYTHING THAT HAPPENED DURING THE EXPERIMENT THAT DAY. THIS IS A DISCUSSION OF THE DATA AND FINAL RESULTS.**
- A good discussion might include:
 1. What were the major points illustrated by the data?
 2. Do the results agree with previously published works?
 3. Is the data contradictory in itself?
 4. Does your research have potential for follow-up experiments?
 5. Do your results support or disprove your hypothesis?
 6. Are your results dramatically different than what was anticipated and if so why?

H. **References**

- Include any references that were consulted for the experiment or cited in the report. Minimally, this should include your laboratory manual.
- References should be presented in alphabetical order by the last name of the first author.

Other Notes:

1. For this lab, you will use the electronic notebook from LabArchives. If you have any questions regarding access to this ELN ask your instructor.
2. Since this is a course, taking notes in the laboratory notebook is allowed. Simply place these in a rich text box on the relevant ELN page, including a header above the notes with a descriptive title.
3. Number and label all tables and graphs with a title indicating what they are intended to represent.
 - A. Tables are numbered and titled above the table.
 - B. Figures are numbered and titled below the figure.
4. This is not a personal diary and references to that effect should not be included.
5. Show your calculations in the data/results section. Often if an experiment does not work it can be tracked down to a miscalculation.
6. Remember your results from the exercise are important. You are not being graded on the outcome of experiments therefore you should strive for the most accurate and intelligent representation of your data possible.
7. **Copy and pasting printed methods from the web does not count as a written protocol.** You can certainly refer to it, but do NOT just copy and paste.