

Guide to developing a Genetics Laboratory Notebook

Overview

Your formal lab notebook will be maintained electronically for this course as a “Post” on our course website bio2345.biology.gatech.edu. A complete **rubric** for a strong notebook is on the last page of this document.

Your lab notebook should contain clear, organized, and detailed notes each week. Your notebook must include an introduction to each experiment, detailed explanations of the methods you used, reasons for conducting particular methods, results of experiments you complete, explanation of analyses, and summaries of conclusions. Lab notebooks will be monitored and commented on regularly, and graded at the end of the semester. Your notebook will be graded on content, accuracy, and completeness according to the rubric in the lab manual. A thorough lab notebook will be fundamental to write accurate lab write-ups. In your notebook, **you are to write in your own words**, even if you are working with a team on the experiment. Proofread all data carefully. Tables and figures *may* be shared within your team but we encourage you to critically examine the work of others for accuracy—if a teammate made a mistake that you preserve in your notebook and work, you become responsible for that error as well. Data analysis is best done collaboratively rather than by one member of the team. Proofread all data and entries carefully.

Steps to creating an effective notebook

1. In lab, you may take notes in lab by hand in any format you find convenient. For any experimental procedure, it is wise to record the start and stop times so that you can plan your lab time for a future experiment that uses the same technique.
2. For every week, create a new notebook entry on T-square. The title should include the date and a descriptive title (e.g., “1-Jul – Characterize E coli strains”).
3. State the objective of the lab at the top for quick reference (e.g., Mini-preps of bacterial culture to isolate cloned plasmid DNA from *E. coli*), and likewise your hypothesis
4. After each lab, update your electronic notebook with the date, your lab partner’s name, and the relevant information from the lab.
5. Include all information that someone else would require to replicate your experiment exactly as you did it, including equipment, media, strains or organisms, protocol instructions and reference to protocols, and comments that help *explain* the steps in the protocol.
Ex: Keep *Taq* polymerase on ice at all times to prevent destabilization or premature enzymatic activity.
Ex: Contrary to protocol, samples left at room temperature for 15 minutes between first and second incubation at 37C.
6. Record your raw data, condense them into a summary statistics, table or figure, and then explain them (results). Raw data belong in your notebook, but may be linked electronically instead of entered directly into the Lab Notebook entry.
7. Briefly discuss your findings. State your conclusion. Note if you need to repeat the experiment or are ready for the next step, and what that next step is.
8. Include information on how to complete certain frequently used protocols, how to operate equipment, etc. In any lab setting, you are expected to be able to operate equipment after being taught, but if you don’t recall the details, please ask again rather than risk injury to yourself or damage to expensive lab equipment.

Setting up your notebook

To create a lab notebook entry, follow the instructions at:

<http://bio2345.biology.gatech.edu/>

Common elements for a lab notebook entry (note that you won’t have all of these each week!):

Title, Date, Lab partner, Objective, Question/Hypothesis, Experimental Design (treatments, controls), Protocols/Equipment/Supplies, Data, Data Summary, Data Analysis, Data Interpretation, Conclusion

Some comments

The most important piece of equipment you will use when working in lab is your lab notebook. Because science is built upon the premise that results are reproducible, scientists are required to record detailed information so others can reproduce their work. The notebook should therefore contain a record of everything you have done in lab that contributes to an experiment. It should be an accurate account of what you did, why you did it, when and how you did it, what the results were, and what these results mean.

Never leave the lab without completing your notes on that day's work, and then transfer them to the notebook within a short time.

Lab Notebook Rubric

Each <i>entry</i> is	Performance
1. organized logically so that the reader can interpret the experiment, with titles and captions to explain content.	out of 4 points
2. concise (says what must be said in as few words as possible)	out of 4 points
3. accurate (reflects what happened in the lab) and hyperlinks link to correct files.	out of 4 points
Each <i>experiment</i> contains	Contents
4. a descriptive title , date , and the names of your lab partners	out of 2 points
5. the objective of the lab or experiment	out of 1 points
6. Question being addressed and/or hypothesis	out of 2 points
7. the experimental design that you used, in detail	out of 2 points
8. treatments and positive/negative controls	out of 2 points
9. the numbered protocol(s) you used, in detail	out of 2 points
10. the data you collected, appropriately annotated and labeled	out of 2 points
11. a clear summary of the data (table, figure, or text as appropriate)	out of 2 points
12. analysis and interpretation of the data (statistical or written, as appropriate)	out of 2 points
13. brief conclusion for quick reference	out of 1 points

Total possible: 30 points

Lab notebooks should be updated **within 24 hours of lab** (25% of notebook grade) and will be monitored and commented on regularly, and graded periodically. Your final notebook will be graded on content, accuracy, and completeness according to the rubric in the lab manual (75% of notebook grade).