**Lab Reports**

Scientific papers, especially lab reports, are generally very structured, concise, and written in third person. Writers and Writing Assistants can use this handout as a guide for discussing the effectiveness and completeness of a lab report. They should always compare this handout to the guidelines or grading rubric provided by the lab instructor. This handout is not intended to be a set of rules, but a resource of popular guidelines.

**Style**

- Use concise, formal language.
- Use past tense to describe the experiment.
- Unless directed otherwise by the professor, avoid the use of first-person pronouns (e.g., I, we, my, ours). Focus on the object, problem, or apparatus being studied, not the researcher.

**Suggested Order for Writing**

- This varies, but professionals who prepare research reports tend to draft the different sections in the following order: Results, Materials and Methods, Introduction, Discussion, References (Literature Cited), Abstract.
- For “cookbook” (educational) labs or when the data require very little interpretation or analysis, students may prefer to begin with the Introduction and write straight through to the Discussion/Conclusion.
- An abstract, if required, should always be written last.

**Organization**

**Title**

- The Effect of _____ on ____. This is basic format, but you can deviate depending on the experiment type.
- Lab partner name.

**Abstract**

- Major points of each section.
  - Introduction (what is being studied and why?)
  - Materials/Methods (perform study)
• Major points of each section.
  • Introduction (what is being studied and why?)
  • Materials/Methods (perform study)
  • Results (findings)
  • Discussion (how findings relate to hypothesis, meaning of results, why results are important)
• It is short (250 words)
• It is written last

Introduction
• Background information
  • Relevant theory and facts—think textbook readings, articles, lecture notes, etc.
  • Justification of the study – this is often found in the lab manual or textbook readings
  • Citations
• Central research question
  • Outline the question(s)
  • Explain why it is important or interesting in the field (check lecture notes, textbooks, and articles for help with this)
• Hypothesis and predictions
  • Provide your hypothesis clearly
  • Provide the rationale for why you believe this (use scientific knowledge to support this)
  • Alternative or null hypothesis may also be considered
• Style
  • Active or passive voice? Check with instructor.
  • Third person—avoiding pronouns may be necessary; check with instructor
  • Past tense

Methods
• Briefly describe the experimental approaches/procedures
  • Clear and concise instructions
    • Should be able to replicate the experiment based on the methods
  • Explanation of how variables were controlled
  • Number of replications (n=?)
• Analytical approaches
  • Statistical measurements (explanation of tests)
  • Identify and describe any equations or software used
• Style
  • Chronological
  • Paragraph form
  • Past tense
Results
• Explain what happened in words summarized and with figures and tables
• Reference each table/figure in the text and in the order in which they appear
• Describe important trends and key pieces of information gained
  • Highlight the most important parts that will appear no later in the discussion section
  • Statistics and statistical analyses are important here
• Were the results significant? (p>.05?)
  • If the results are unclear, do not try to imply something that cannot be supported by the data
• NO interpretations—just report the facts
• Negative or “odd” results? Make sure you identify why you are leaving certain data out of the results or address why it was omitted in the discussion section
• Figures and tables
  • Figures
    • Use appropriate graphs to identify and show trends
    • Units and labeled axis
    • Easy to read and clear
    • Error bars, p-values, etc. included when appropriate
  • Legend
    • Address all aspects of the graph (e.g., error bars, DNA markers, etc.)
    • Should be able to stand on its own without the report
• Tables
  • Column and row headings with units included
  • Only include important data (not raw) unless otherwise assigned. Check the assignment
• Organization
  • First include all the text, then all the figures/tables come at the end
  • Organize figures/tables in chronological order

Discussion
• Interpretation of the results
  • Does the experiment support your hypothesis? Avoid phrases like “this proved my hypothesis”
• Expected or unexpected results? Why/why not?
• Cover all the trends and important data points you mentioned in the results—address any negative or odd results here
• Accuracy and replicability of the results
• Discussion of errors/limitations (if appropriate)
  • Anticipate readers’ questions/concerns/criticisms and try to address these if possible
  • Here is where you could include other follow up research or studies
• Implications of your results
  • Larger context of literature and “the big picture”: ”why should you care?”
• Larger context of literature and “the big picture”: “why should you care?”
• Citations
  • If necessary to support any ideas that you reference
  • To discuss how your study relates to other existing studies or larger concepts
• Conclusion sentence
  • How does your experiment relate to others?
  • Why is your data important?
  • How can it be applied to the rest of the world?

Citations
• Check assignment for proper citation format
• Check to make sure all citations are accounted for

Final Advice
• The word “data” is plural and so requires a plural verb. (“The data show…” not “The data shows…”).
• The words “significant” and “correlation” should be reserved to those instances when a statistical analysis has been performed. Be alert for other specialized vocabulary.
• Avoid using the word “you.” You are reporting your experiment, not giving directions.
• Use acronyms only after presenting the full term with the acronym in parentheses. For example: mannitol salt agar (MSA).
• Use a space between numbers and units (e.g., 12 mg).
• Limit use of jargon or lesser-known abbreviations. Use clear definitions of technical terms and use the simplest terms when possible (e.g., say “goldfish” instead of *Carrassius Auratus*).
• Each section should be able to stand alone.
• Sections should be written in paragraph form with topic sentences and helpful transitions.