Science Writing Handout

While scientific writing is concise and objective, you are still telling a story about a scientifically relevant problem. How can you tell this story in an accessible, clear way which interests your reader?

STYLE

- Be concise: write briefly and directly. Avoid too many prepositional phrases, long sentences, and subordinate clauses.
- Use quantitative language (10.3%, 5 mL, 2 drops) rather than qualitative languages (very acidic, several drops, some solvent).
- Use words for numbers zero through nine, and use numerals for percentages, decimals, and whole numbers greater than nine (14, 29, 18.29). For a series of numbers with at least one number greater than nine, use numerals (4 to 13 participants)
- Passive/active voice: scientific writing generally uses the passive voice to call attention to the experiment rather than the researcher ("The pH was measured."). However, active voice can make the paper more direct and easier to read ("We measured the pH."). Ask your professor which voice they prefer.
- Verb tense: The experiment and procedures are already complete, so use the past tense to describe them ("The objective of the experiment was..."). The paper, general scientific theories, and equipment still exist, so describe these in present tense ("Bragg's law of diffraction is...").

AUDIENCE

- Write for your peers. If you are an undergraduate first-year physics student, provide the background knowledge, definitions, and explanations which you or one of your classmates would require to understand this paper.
- Assume your reader is smart, but not an expert. Define your terms, note the assumptions you are making, and provide context. If you are unsure whether you should provide more information, check with your professor.
- While humanities writing often includes varied language and synonyms to keep the reader engaged, there may only be one term for the scientific concept you are discussing. In this case, keep using that term, so that your reader clearly understands your meaning.

DATA

- When analyzing information, use a graph or figure rather than a table. Readers process illustrations more easily than lists of data.
- When captioning a table, place the caption above the table. When captioning a figure such as a graph or chart, place the caption below the figure. Make your captions clear, concise, and informative. They should not be complete sentences.
    - Table 2: Time-dependent temperature data for the combustion of benzoic acid
    - Figure 1: Concentration of methyl red as a function of pH at room temperature

CITATIONS

- Use parenthetical citations, not footnotes.
- Unlike humanities writing, science writing does not require you to introduce a source when you cite it. The in-text citation (e.g. Riviera et al. 47) is sufficient.

This handout was created by Carissa Martin and LaTonya Turner for the Emory Writing Center. Martin and Turner consulted handouts on science writing from writing centers at Michigan State University, Southern Illinois University, Vanderbilt University, the University of Texas at Austin, and the University of North Carolina Chapel Hill. They also compiled information from Emory professors' guidelines and class resources in the Chemistry, Biology, and Neuroscience and Behavioral Biology departments.

Writing the Lab Report

Note: This handout provides general lab report guidelines from a variety of STEM disciplines and institutions. Your professor will likely have specific requirements, so be sure to consult them with any questions.

Abstract

- The abstract shows up first, but should be written last, when you can reflect on the experiment.
- Move from general topics to specific ones. Provide a **brief** overview of the experiment, methods, and results. The abstract should be a self-contained unit capable of being understood without the benefit of the text.

Introduction

- The introduction should cover the "what" and "why" of the experiment and elaborate on any necessary background information. Its content may overlap with the abstract, but it should be more in-depth.
- Your introduction should answer the following questions:
    - What is the problem? Summarize relevant research to provide context, key terms, and concepts so that your reader can understand the experiment.
    - Why is it important? Review relevant research to provide a rationale for the investigation.
    - What solution (or step toward a solution) do you propose? Briefly describe your experiment: hypothesis, research question, general experimental design or method, and a justification of your method (if alternatives exist).
    - Ask your professor if you should include an overview of your results in the introduction

Materials and Methods

- This section includes the instructions for repeating the experiment. Be specific; give weights, times, lengths, name and explain the settings on any instruments used.
- Write chronologically and clearly. A fellow scientist with no coaching should be able to successfully repeat the experiment and get the same results.
- Do not present data or analysis here.

Results

- This section contains your data and only your data. Do not analyze your results in this section.
- If you need to transform your data (e.g. converting transmittance to absorbance), show the transformed data in the appendix.

Analysis/Discussion

- Here, you should show that you have not merely completed the experiment, but that you understand its wider implications. What do your results mean and how reliable are the conclusions you draw?
- This should be the longest and most detailed part of your lab report
- Analyze your results by comparing, contrasting, and criticizing: What worked? What didn't? Why? How does this relate to other work in your field?

Conclusion

- This is the "so what?" section of your paper. Why does your research matter?
- Write a concise, direct summary of important results and their significance in relation to prior scientific knowledge (as described in the introduction) reflecting the objectives of the experiment.
- Unlike the abstract, the conclusion should contain a summary of the error analysis from the results and discussion sections.