Writing Workshop

Physics 225 – Week 4 activity

What you'll practice: learning objectives

- Writing effective technical reports which includes
    - Articulating the reasoning that connects theoretical models to laboratory activities
    - Using appropriate style and voice

Resources

Consult the background materials here for information about how to construct an effective technical report.

Activity 1: Reading and Critiquing Your Writing

Read through one of your deliverables paying special attention to the following attributes:

- What are the main points of the writing?
- What are the main questions and key claims?
- Are there any figures? If so, are they properly formatted?
- Are the methods appropriate and clearly communicated?
- Is the manuscript free of grammatical and mechanical errors that distract the reader from the main point?

Once you have read through your writing, identify any major or minor issues found in your work and document these in your lab notebook.

- *Major issues* - essential things that must be addressed. These include, but are not limited to, inconsistencies between the data and conclusions and problems with the experimental methodology used.
- Minor issues - smaller problems that don't affect the overall conclusions made but nonetheless should be addressed. These include, but are not limited to, the use of unclear language and insufficient referencing of sources.

Once you have identified the major and minor issues in your lab notebook, write a reflection (1 - 2 paragraphs) about how these issues can be dealt with and how you can minimize these issues in future writing.

Activity 2: Critiquing Figures

Exchange your group's figures created from the data collected in Week 3 with another group and write a critical review of each of the figures that addresses the following questions:

- Are the figures too crowded?
- Are the axis labels of appropriate size?
- Are data plotted as points with fits to the data plotted as lines?
- Is the equation for the fit clearly labeled and fit parameters clearly presented with units and uncertainty?
- Are symbols used for each data set presented clearly distinguishable from each other?

Once you have completed writing critical reviews for each figure, return your reviews to the other group and obtain their reviews of your figures. Use the reviews to critically evaluate your figures and make any changes that may be needed.

Activity 3: Describing your Experiment

Once you feel confident that you have created clear figures that adequately represent the result of your experiment, write a paragraph that describes how your data was collected. This description should contain enough detail so that the reader may be able to recreate the experiment and be ordered such that the methodology appears in the same order in which the data will appear in your manuscript. Lastly, avoid rehashing the details of proven methodologies (instead, provide a reference to the work in which the method was established.)

Activity 4: Describing your Figures

Take one of your figures generated from the data collected in Week 3 and analyze it in a paragraph. The type of questions that should be answered in this analysis include, but are not limited to:

- What does the graph represent?
- What is plotted on the horizontal axis?
- What is plotted on the vertical axis?
- What are the units on each of the axes?
- What patterns/trends can you see in the data?
- How do the patterns/trends relate to your hypothesis or what you would expect from the theory?

Once you have completed this description, trade with another group and provide comments on how it might be improved.

Activity 5: Discussing your Results

Once you have completely described your figures, you should be in a good place to start working on the Discussion section (generally regarded as the most important section of any scientific paper). It is in this section that you discuss your results in light of your hypothesis. Do your results agree with your hypothesis? If so, what can be inferred from this? Remember, when finalizing your Discussion section, avoid making statements that go beyond what can be supported by the data, be as quantitative as possible, and make sure that all non-standard terminology used in this section is explained in the paper's Introduction section.

Activity 6: What? So What? And Now What? - Writing a Conclusion

Now that you have a good handle on what your figures are describing, write a paragraph or two that answers each of the following questions:

- What?
    - What was the topic studied?
    - What did you learn?
    - What did you do?
    - What did you expect to find?
    - What were the differences between expectations and results?
- So What?
    - What is the purpose of studying this topic?

    - Why is this topic important?
- Now What?
    - What are the implications of your results?
    - What would you do differently?
    - How will you apply the lessons learned?

Activity 7: Writing an Introduction

Write a paragraph or two with the purpose of addressing the following questions:

- What is the problem to be solved?
- Are there any existing solutions to this problem?
    - If so, which is best? Why?
    - What is the main limitation of this solution that requires the need for further study?
- What is it that you hope to achieve in studying this problem?

Answers to these questions form the basis of the Introduction section of a scientific paper. It is in this section that the bulk of your references to others' work are made. It is also here that you set the stage and discuss the general theory behind the system under study.

Deliverables

As a group, prepare a properly formatted scientific report (please refer to the scientific report based on your work in Week 3). This report should contain the following sections:

- Title page with Abstract
- Introduction & Background
- Methods
- Results
- Discussion
- Conclusion
- References

Upload this report (as a pdf file) to the "group deliverable" submission on Blackboard. Consult the formatting guidelines and the rubric while crafting your report.