

27.5: Guide for writing a lab report

27.5.0.1: Abstract

Write a few short sentences briefly summarizing what you did, how you did it, what you found and whether anything went wrong in your experiment.

27.5.0.1: Procedure

Describe relevant theories that relate to your experiment here, and the steps to carry out your procedure.

Consider the following questions:

- What are the relevant theories/principles that you used?
- What equations did you use? Show how you modeled your experiment.
- What materials, equipment and/or tools were necessary in making your measurements?
- Where was this experiment conducted?
- How did you make your measurements? How many times did you make them?
- How did you record your measurements?
- How did you determine and minimize the uncertainties in your measurements? Why did you choose to measure a specific quantity in a certain way?

27.5.0.1: Prediction

It can be useful to predict the value (and uncertainty) that you expect to measure before conducting the measurement. You should report on this initial prediction in order to help you better understand the data from your experiment.

Consider the following questions:

- Predict your measured values and uncertainties. How precise do you expect your measurements to be?
- What assumptions did you have to make to predict your results?
- Have these predictions influenced how you should approach your procedure? Make relevant adjustments to the procedure based on your predictions.

27.5.0.1: Data and Analysis

Present your data. Include relevant tables/graphs. Describe in detail how you analysed the data, including how you propagated uncertainties. If the data do not agree with your model prediction (or the prediction from your proposal), examine whether you can improve your model.

Consider the following questions:

- How did you obtain the “final” measurement/value from your collected data?
- How did you propagate uncertainties? Why did you do it that way?
- What is the relative uncertainty on your value(s)?

27.5.0.1: Discussion and Conclusion

Summarize your findings, and address whether or not your model described the data. Discuss possible reasons why your measured value is not consistent with your model expectation (is it the model? is it the data?).

Consider the following questions:

- Were there any systematic errors that you didn't consider?
- Did you learn anything that you didn't previously know? (eg. about the subject of your experiment, about the scientific method in general)
- If you could redo this experiment, what would you change (if anything)?

27.5.1: Guide for reviewing a lab report

27.5.1.1: Summary

Summarize your overall evaluation of the report in 2-3 sentences. Focus on the experiment's method and its result. For example, “The authors dropped balls from different heights to determine the value of g ”. You don't need to go into the specific details, just

give a high level summary of the report. If the report is unclear, specify this.

27.5.1.2: Review

Consider the following questions:

- Is the the procedure well thought-out, clearly and concisely described?
- Do you have sufficient information that you could repeat this experiment?
- Does the report clearly describe how different quantities were measured and how the uncertainties were determined?
- Does the report motivate why the specific procedure was chosen? (e.g. to minimize uncertainties).
- Does the experiment clearly state how uncertainties were propagated and how the data were analyzed?
- Do you believe their result to be scientifically valid?

27.5.1.3: Overall Rating of the Experiment

Give the report an overall score, based on the criteria described above. Use one of the following to rate the proposal and include a sentence to justify your choice.

- Excellent
- Good
- Satisfactory
- Needs work
- Incomplete

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