

Freshman Research Initiative- research methods Dr. Reichler Fall 2009

Inquiry 1: (2 weeks)

Proposal due in your lab on Th 9/10 or M 9/14

Written and Oral presentations due in your lab on Th 9/24 or M 9/28

This inquiry will be observational only. You will not use chemicals or any advanced data collecting equipment. The main data collection tool will be your eyes. You will work by yourself to develop, carry out, and analyze an experiment. You should be able to collect your data primarily through observation. Other than that, you are free to design an experiment to your liking.

Coming up with an original idea and then actually carrying out some experiments can be intimidating. Of course it may also be exhilarating because you can be as creative and imaginative as your mind will take you. Start with a question you would like to answer. Then imagine some hypotheses and think about what data would allow you to disprove these hypotheses. If everything seems too complicated or needs very complex data collection, simplify your question, and try again. Once you get to a workable idea, remember you only have 2 weeks between proposal and report submission, finish developing your idea by writing it up.

You may want or need to search the scientific literature to help with forming a question, developing hypotheses, and/or figuring out how to test your hypotheses.

Proposal Format:

At the top of the page include your name and lab time. A cover sheet, etc., is not necessary.

1. Question

State succinctly and clearly the question you will try to answer.

2. Hypotheses

Give all of the reasonable hypotheses that you can think of. This may require some research.

3. Experiment

a. Describe how you will collect data. What data will you collect? Where, when, and how will you collect the data?

b. Include how your data will allow you to eliminate your hypotheses.

4. References

If you used any references to develop your question, hypotheses, and/or experiment(s), be certain that you cite them. Remember, when doing research, using other's ideas is fine and necessary, but using someone else's idea without citing them is plagiarism.

You should print your proposal and bring it to lab for approval.

(see next page for written and oral report format)

Inquiry Written Report Format:

The written report for your inquiries will be formatted similarly to a scientific research article. I have included the basic information that you need in each section.

Title- Concisely describe your experiment.

Author(s)- For inquiry 1 this is just you. Please also include which lab time you are in.

Abstract- Summarize your work. Include your question and final conclusion. Do not exceed 250 words.

Introduction- Give background information about your question and hypotheses.

Results- Describe your results including any tables or figures that you need to explain your results along with any data analysis that you performed. Include any problems that kept you from collecting the necessary data.

Discussion- Explain your results. If you did more than one experiment, explain how the results are or are not in agreement. What is your final conclusion? Were you able to eliminate all but one hypothesis? Were the results surprising or unexpected? Are your results different from other similar studies? What future experiments might help clarify or expand on your findings?

Materials and Methods- Describe how you carried out the experiments. Include the protocols you followed and any analysis you performed. Give enough detail so that someone else could replicate your results.

References- Cite other work that you used to develop your question, hypotheses, and/or experiment(s). This information should be specifically cited in the text of your report, and then the full citation given here. The specific format is up to you, but should include: author name(s), article title, journal or book title, volume and page number, and year of publication

Staple your signed/approved proposal to the back of your written report.

Oral Report Format:

Everyone will present a brief, about 5-7 minute, summary of your research. For the inquiry 1 presentations we will use the document camera that can display printed pages on the screen. For your presentation you will need to print:

- a title page with a title for your presentation and your name
- an introduction page with your question and hypotheses
- figures, tables, graphs (do not put too many per page, make it readable from the back of the room)
- Conclusions with your answer and/or other conclusions, problems, etc.

These will be the visual aids to help in your presentation. Make them readable from the back of the room. They should have useful information, but not be so overloaded and busy so they are unreadable.