Designing Your Own Lab Experiments Handout

InLab: the lab procedure

Name: _____
Date: _____
Lab Section:_____
Lab Title: _____

Note: Once you print this page, you will have the handout version, which only contains the InLab steps for "Designing Your Own Lab Experiments." For more help or additional information, you'll need to go to the on-line version of "Designing Your Own Lab Experiments at InLab http://labwrite.ncsu.edu where you can view additional materials on-line or obtain a full printable version from the "Designing Your Own Lab Experiments" InLab SelfGuide.

1. Setting up the lab:
Take notes as you set up your experiment and calibrate instruments to help you document your experimental protocol so that you may use it later when writing the Methods section of your lab report. On a sheet of paper or in your lab manual or in a formal lab notebook, list the lab materials you'll be using and describe the set-up for this experiment. Take notes about potential sources of uncertainty so that you may refer to them when you are writing the Discussion section of your lab report. You may want to or may be required to draw and label the instrument(s) you'll be using.

2. Preparing a table or spreadsheet for recording your data:
Using the information you have gathered about the data you will be collecting and list of variables from your PreLab as a guide, create a raw data table or set up a spreadsheet for entering data from your experiment.

3. Conducting the experiment:

Conduct your experiment as set up in the PreLab and record your data in a table or spreadsheet (see question 2 above). Take detailed notes on your experimental procedures. It's also important to note any problems you have with the experiment; these notes could be useful when writing the Discussion. Describe in writing or sketch out on a sheet of paper your observations as you collect data during the experiment (observations are potentially significant things that are not reflected in the measurements: color, smell, interesting reactions, unexpected behaviors, etc.)

As you record your data, take note of any trends emerging in the data. You should be asking yourself various questions: What are the relationships among the variables? Do the data behave in the way that you had anticipated? If not, why not? You may need to consider sources of uncertainty once again. Sources of uncertainty may affect the accuracy and precision of your experimental data.

4. Visualizing the data:

Now that you have entered your data in a table or spreadsheet, you are ready to represent the data in the appropriate visual format for your lab report. Representing your data in a visual format will allow you to identify trends and relationships among variables more easily. Follow these steps:

- Establish what types of data you have, quantitative or qualitative (refer to the Resources page in the web version of this document; once there, choose "Data Types").
- Determine if the data should be represented as a table or a graph (refer to the Resources page in the web version of this document; once there, choose "Tables vs. Graphs").
- If you decide to use a graph to represent your data, determine which type of graph is one that best represents your data (refer to the Resources page in the web version of this document; once there, choose "Graph Types").
- If a table is the best format for your data, then modify the table you used to collect your data so that it is labeled and organized properly (refer to the Resources page in the web version of this document; once there, choose "Designing Tables").
- If you need help creating a spreadsheet to make a table or graph, refer to the Resources page in the web version of this document. Once there, choose "Excel Tutorial."
- Remember that the purpose of your table or graph is to summarize your findings for yourself and for others and to reveal trends in your data.

5. Using your data to solve your research problem:

Review all your data--tables, graphs, and drawings--to establish whether or not or to what degree the data support your hypothesis. Next, use what you have learned from comparing data to the hypothesis to answer your research question. State the answer as best you can in a sentence or two. Then return to the original problem you were given to solve, both the knowns and the unknowns that you defined in Question 1 of the PreLab. Does the answer to your research question resolve the unknowns and allow you to solve the problem? If so, write the solution. If your answer still does not provide a satisfactory resolution to your research question and the original problem, you may need to explore alternatives: a different experiment, a different hypothesis, a different research question.