Spring 2004 Inquiry Formal Proposals

Goals
The goals of the inquiry project are to give you an opportunity to develop and practice your skills in identifying and solving real problems (i.e. doing science). Rather than be handed an experimental exercise, you will design and carry out your own experiments. The inquiry project is a chance to be creative and to do something that interests you.

Overview
The inquiry projects will be done as a group effort with your lab partners. All materials that need to be submitted and your scores (with the exception of individual effort evaluations) will all be on a group basis. You have submitted your ideas for your project (the pre-proposal). You now need to submit a detailed, formal proposal. You can begin your work as soon as you’ve submitted your formal proposal and we have materials compiled for you..

You can begin work on your projects while we are conducting scheduled exercises the weeks of March 22 and March 29. There will be no more scheduled exercises after that. The rest of the semester will be devoted solely to inquiry projects. You will still be expected to be in lab during your scheduled lab period throughout the rest of the semester but we will also be switching to an open lab format where you will be able to come in virtually any time of the day, as fits your schedules and experimental needs.

You want to start experiments early because experiments frequently don’t work on the first attempt. Students in the past had gotten into trouble because they thought their protocol was easy and quick so they waited to last minute to do it. Their experiment failed and they then ran out of time and ended up with either no or only partial data. Allow enough time to redo and/or redesign your experiment based upon preliminary results.

The oral presentation of inquiry projects will be schedule for the last week of classes (date yet to be set). The due date for the final paper remains in negotiations.

Inquiry Proposal & Hypothesis
No research project is undertaken until a proposal of the intended research is prepared and peer-reviewed. A good research proposal includes background information on the subject to be studied, a statement of the problem to be addressed, the hypothesis (or hypotheses) that will be tested, how that hypothesis will be tested (i.e. Materials & Methods) and a timeline for completion of the various steps in the research.
Formal Proposal Guidelines — (Proposal due Monday March 22)

Once we have approved your project you need to write a detailed, formal proposal. This will serve to organize your work and help us supply you with materials.

1. **Project Summary/Introduction:** The summary should be 200 words or less and should be a self-contained description of the work. *Make sure you include your final hypothesis (if your project is hypothesis driven).* It should contain references to the objectives of the research, overview of the methods to be used, and the scientific significance of the work. Remember that your audience consists of scientifically literate readers (me and Shannon!). *Be sure to cite any references upon which you based your study and include complete hardcopies of all references cited.*

2. **Materials and Methods:** This section should include a complete list of all materials needed for your project. Include numbers and total amounts of items that will be needed—be as thorough as possible. Make sure you include the components of any solutions required, as well as primer sequences and other important information. You should also include a step-by-step protocol for each method or procedure that you will use like that included in your lab manual (i.e. We want to see both an overview of your methods in the Introduction and also detailed protocols in the Methods section). *Again, cite any references you got protocols from and submit hardcopies of those papers with your proposal.*

3. **Timeline:** *Include a timeline with an outline of when you plan to work.* Remember to include ample time to repeat and trouble-shoot problematic procedures. It is a good idea to work up a distribution of labor for your team. Keep in mind that timelines and distributions of labor are only guidelines to help you organize and plan strategies. The nature of doing science will likely force you to eventually deviate from your original plan.

The above should help you organize your project into a workable form. Because we are working under time constraints (as all scientists are), it is important that you are as organized as possible. Keep careful notes in a lab notebook - now is the time to put all your notebook practice to good use! Careful organization and record-keeping are key components of successful research. *We will continue to collect your notebook carbons throughout the inquiry process.*
BS/LBS159H, SS’04

20 points

Introduction 6 points
Materials and Methods 6 points
Time Line 5 points
References 3 points

Introduction (6 pts)
  Background Science (3 pts)
  Hypothesis if applicable or problem statement clearly stated (1 pt)
  Rationale, approach and significance (1 pt)
  Overall coherency (1 pt)

Materials and Methods (6 pts)
  Materials list (2.5 pts)
    Is the list complete and are amounts rational?
  Protocols 2 pts

Time Line (5 pts)
  Is the timeline well thought out and reasonable? (5 pts)

References (3 pts)
  Citations properly cited in text (1 pt)
  Citations properly formatted and consistent (1 pt)
  Proving hard copies (1 pt)