the recovery or use the standard addition method.

Proposals

Once you have decided on an idea for your special project, the next step is to write a short proposal. The proposal will help you organize your own thoughts about what you will need to do to have a successful project, and it will serve as the basis of discussion between your team and the staff member who will be the Consultant on the project. Your proposal must also have a list of all chemicals or special materials that you'll need for your project (some may need lead time to order).

Your team must submit a proposal (one proposal per team) that includes the following information:

A. A sheet with one or two paragraphs that provide an overview of your project and list the overall objectives and the hypothesis you wish to test and.

B. One copy of each reference article that you found in “the literature” and plan to use as a basis for your project.

C. The completed table of information which is found at the end of this document, plus any additional material requested on that sheet.

Your special project proposal is due for review at the end of the lab period dedicated to the preparation of proposals. We will use your written proposal to judge the feasibility of the project and make appropriate suggestions. On the basis of the proposal, your team will be assigned a Consultant who will help you throughout the project. You should meet with your Consultant well before the actual start of lab work on your project.

Datasheets

Once your plan is final, but before you start lab work, you will be asked to prepare and submit a “datasheet” (similar to those used in the other experiments) listing the samples and standards and data to be recorded.

Oral Reports

Each team will make an oral report of 10-15 minutes to the class during the last lab period. Each member of the team is expected to contribute. Team presentations tend to be more effective when each team member is given an entire topic to present (e.g., introduction, methods, results, etc.) and the number of transitions between speakers is minimized. Characteristics of an exceptional
presentation are listed on the CH 461 web page. The oral presentation should cover the following points:

Overall objectives and hypotheses
- Overall objectives and hypotheses clearly and succinctly stated
- Background or context clearly presented, clear why someone would be interested
- Idea shows originality, consistent with time and resources available

Experimental design
- Design appropriate to address hypotheses with enough replicates for meaningful test of hypothesis
- Design appropriate for time available
- Design clearly presented, easy to follow

Results
- Just the right amount of detail in tables and figures
- Easy to follow
- Problems encountered and solutions

Conclusions
- Conclusions clearly and succinctly stated
- Conclusions supported by data and appropriate statistical tests applied to data
- All assumptions, approximations and simplifications stated explicitly (i.e., come absolutely clean on any short-cuts)
- Any editorial comments explicitly separated from data and conclusions
- Next steps – what you would do if you had it to do over again or had another full month / term to work on the project

A data projector (Power Point) and an overhead projector will be available.

Written Reports
A written report (one per team) is due at 1:00 PM on Monday of finals week. Your written report should follow this basic outline, but it can be somewhat modified to fit your particular investigation.
I. Abstract. A one or two paragraph summary with one or two sentences devoted to each of the following: a statement of the problem, the methodology used, the results (especially numerical results) and the significance of the results.

II. Introduction. Include any relevant background material about the type sample analyzed or analyte determined and analytical procedure chosen and the justification for the project. Pertinent literature should also be discussed.

III. Experimental
   a. A complete description of blank, standard, and sample preparation procedures.
   b. A description of the instrumentation used and experimental conditions. There is no need to review the standard operation of the instrument. If you use an experimental setup equivalent to that used in class, just reference the experimental writeup. Any modifications to a standard procedure or instrumentation should be discussed in detail. **The explanation should be detailed enough** that another student in the class could reproduce your results by following only the material in your laboratory report.

IV. Results. The raw data taken in your laboratory notebook should be attached as well as hard copies or charts of spectra, etc. All data should be summarized in tables along with mean and standard deviation data and the number of data points used in the calculations. The detection limit and precision of analysis should be reported. Exemplary calculations should be included. **All tables and figures should be numbered and have titles.** In the text, refer to tables and figures by number.

V. Discussion. Summarize the results and discuss their significance. Compare to literature values where possible. Estimate the uncertainty in your results and discuss using scientific reasoning probable sources of error. Indicate any improvements that could be made.

VI. References. All relevant literature should be listed with a complete reference citation. See the ACS Style Guide or Supplemental Materials course web page for format.