Intro / Discussion of Student Choice Experiments

CU- Boulder

**CHEM-4181**
Instrumental Analysis Laboratory

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Spring 2007

*Notes will be posted on course web page*

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**Business Items**

- Recruitment of Learning Assistants for Fall’07
- NO class on Monday Mar 5th
- Next class is Monday Mar 12th
  - Maybe also Wed Mar 14th if needed
- Will send email with these dates
- Many labs being turned in late
- Quality of labs / writing poor in some labs
  - Can get bonus points by improving a lab with the writing center
    - Lab that has been turned in & graded
    - Turn in a revised version after working with WC
    - Can do it for 1 lab per group
Student Choice Experiments

• Capstone for the course
  – You’ve learned the techniques on the 8 prepared experiments
  – Now it is time to find an analysis problem and apply a technique or combination or techniques to get an answer
    • Choose a chemical analysis problem to address
    • Formulate a hypothesis to test
    • Design an experiment to test the hypothesis
    • Conduct the experiment
    • Analyze the results
    • Submit a final report.
  – Reminder: only course instrumentation can be used. You can’t use instruments available to you elsewhere (research lab, company, etc.)
• Typically the challenge is for students to find and define a feasible analysis problem

Tips for Student Choice Experiments I

• March 21 to April 21
  – Spring Break (March 26-30)
  – Last lab day is April 21, need to check out
    • No grade if waste is not disposed of (acc. EPA regulations)
  – Presentations April 23-May 4
    • Some groups will go much earlier than others (randomly)
• Prefer groups of 2, will allow individual projects
  – Groups can combine people from different sections
  – NO extra credit for doing it alone
• You shouldn’t try to cure cancer in 3 weeks
  – Feasible experiments!
  – A relatively complex analysis
  – A simpler analysis, but done more times, thinking about your data
    • E.g. Cd in soil vs. distance to roadways
Tips for Student Choice Experiments II

- Can’t propose the same as one of 8 labs
  - Even if thinly disguised
- No biohazards (blood, urine, etc.)
- No large costs (> $100)
- Avoid very complex matrices, extractions
- Many SCP have data which is statistically very poor
- You can come Tue, Wed, Thu (no matter what group you were in)
  - TAs will keep schedule for instruments (GC-MS)
- Check that your instrument can do what you are proposing to do
  - Manuals, TAs, Bill Eberle, Jose
    - Some manuals posted on class webpage, others available in lab

Reminder of Procedure and Dates

- By 10:00 AM Mon Mar 12: email to TAs & Jose w/ groups
- By 9:00 AM Fri Mar 16
  - email sent to TAs & Jose, explaining your idea
  - We will give you feedback about whether idea is ok, or if you need to find new one
- By 9:00 AM Wed Mar 21
  - 2-3 page proposal sent electronically to TAs & Jose
    - 1 page introduction/motivation:
      - Question / hypothesis
      - Sample collection and storage
      - Properly cite AT LEAST 1 journal article
    - 1 page on analytical procedure & instrument
      - Properly cite AT LEAST 1 journal article
    - 1 page on chemicals needed, safety aspects, and waste generated
      - We will review the proposals and inform you of problems
Some examples from last year

- Formaldehyde in foods and its effect on L-arginine
- Heavy metal concentrations in lettuce vs. chewing tobacco
- Mobilization and plant uptake of metals as a result of acid rain
- N concentration in Dave’s garden before and after adding fertilizer
- Caffeine and theobromine in several brands of chocolate
- Ag in snow from cloud seeding
- Acrylamide in food by GC-MS

*These are examples, not a list to choose from!*

Points for Student Choice Exp (210/870)

- Proposal: 20 points
- Creativity of your experiment: 20 points
- Effort you put forth to complete your project: 25 points
- Final report on project: 100 points
  - Format shown in the example report (see page 66).
- In-Class presentation (10-minute): 45 points
- Fun of solving a problem through chemical analysis: priceless
Clicker Question

- Do you already have an idea for your student choice project?
  A. Yes
  B. Partially
  C. No