

Instrumental Methods of Analysis
Alanah Fitch

Goal: To be able to chose an instrument for lead analysis using limits of detection, and, reliability, and ease of use. Problem Based Learning to monitor house dust with collaborating 6th grade children or to produce a publication quality research project on lead around a municipal waste incinerator.

Things students will be graded on:

Exams (4), all must be taken, however lowest grade may be averaged with highest to get a value for the fourth exam	400 points
<u>Informed</u> Class participation (20%)	100 points

Rounding During the Semester, Therefore Final Point Tally **WILL NOT BE ROUNDED.**

A:	90%
B	80- 89.9%
C.	70-79.9%
D.	60-69.9%

Text Teaching Instrumentation with a Single Analyte (Fitch, on Line www.luc.edu/faculty/fitch/classes/leadlab)
Optional: At bookstore

EXAM FORMAT

3 essays, 4 problem solving
Problems derived from homework and from lab
Essay may include reading a contemporary article

List of Equations (available on line www.luc.edu/faculty/fitch/classes/leadlab)
on the following pages may be xeroxed, highlighted, **but not annotated**, and brought to exams.

311 Lab

Text: Lead Lab

Materials required: lab book with carbon pages, 3.5" diskettes

Group work:

Students will work in groups of no more than 3 and no more than two groups per lab section. The group will be responsible for assigning work associated with the making of standards and the operation of each piece of equipment.

Group composition: Groups will be formed in the first week of lab. Students will interview each other for similarity of commutes and work habits in order to ensure that all members of a group can meet at some mutually agreeable time. Your best friend does not necessarily make your best lab partner in this context.

Scope of Work: Students **must pre-read** the lab. Sometimes work out of assigned class period is required. This will be compensated by cancelling lecture periods.

Each Student Will be monitored to ensure proper rotation of work.

The Weekly Reports

Labor division:

- a) Data collection, tabulation, summarizing
- b) Research
- c) Editing and Copying

are three tasks associated with each report. Each person in the group **must** rotate tasks.

Attach the following sheet to each lab (see next).

What the report looks like:

- a) introduction
- b) materials and methods
- C. reduced data (graphs and tables). Graphs are to be inserted immediately after the first reference to the graph in the text. Graphs are to be labeled 1, 2, 3, etc. with a descriptive title.
- d) **an essay that is not simply a list of answers to questions**
- e) raw data

What you turn in:

- a) The typed report
- b) Work Distribution Form, with division of labor signed by each student

- c) Carbon copy from page of labbook from each student
- d) Individual data as relevant

When you turn it in:

Next lab

Provisional grade given

Edited and redone material with the original submission containing faculty commentary must be re-turned in 1 week after faculty edits.

Two rewrites only are allowed.

What if my group drives me nuts?

The groups can/will be configured three weeks into the semester. Be frank with your colleagues about their effort. If the group doesn't think you are pulling your weight you will end up doing **ALL** the work yourself!!

Lab	Student: _____	Student: _____	Student: _____
Potatos	Data/Graphs		
	Writing/Typing		
	Research/Editing		
ADC	Data/Graphs		
	Writing/Typing		
	Research/Editing		
Pb(OH) ₂	Data/Graphs		
	Writing/Typing		
	Research/Editing		
Field Sampling	Data/Graphs		
	Writing/Typing		
	Research/Editing		
Sample Preparation	Data/Graphs		
	Writing/Typing		
	Research/Editing		
GFAA	Data/Graphs		
	Writing/Typing		
	Research/Editing		
Molecular Absorbance	Data/Graphs		
	Writing/Typing		
	Research/Editing		
IR	Data/Graphs		
	Writing/Typing		
	Research/Editing		
NMR	Data/Graphs		
	Writing/Typing		
	Research/Editing		
Mass Spec	Data/Graphs		
	Writing/Typing		
	Research/Editing		
ASV	Data/Graphs		
	Writing/Typing		
	Research/Editing		
CV	Data/Graphs		
	Writing/Typing		
	Research/Editing		
HPLC	Data/Graphs		
	Writing/Typing		
	Research/Editing		
GC	Data/Graphs		
	Writing/Typing		
	Research/Editing		

This page should be inserted with each lab report:

Method	Limit of Detection ug Pb/g solution	Linear Range ugPb/g	Interferences	Ease of Use: Solvent and/or Toxic Materials Used
Gravimetric (Chromate)				
Ion Selective Electrode				
Dithizone				
Calcein Blue				
ASV				
FAA				
GFAA				
ICP-MS				
IR				
NMR				
GC				