

TEXT: Laboratory Manual from Chemical Education Resources (Required, new, not used).

MEETING TIMES: Sections are listed in your course schedule and all meet in ENS 227 at 2 PM. The course designation, 1110-01, signifies that you are in lab section 01 which meets on Monday. Section 02 meets on Tuesday. Section 03 meets on Wednesday. Section 04 meets on Thursday. There are NO Friday lab sections. I am in charge of all lab preparation and all lab grading. Dr. McClain is in charge of the lectures and overall grading.

All sections meet for the first time January 12 – 15. A tentative lab schedule appears at the end of this syllabus. Changes are quite possible and you will be notified of such changes either by E-mail or in class. WebCT content, other than the pre-lab quizzes, is the responsibility of Dr. McClain, and he should be contacted with any questions that you have about WebCT.

You are responsible for checking your E-mail at least once every 24 hours since updates, instructions, and new lab material are normally delivered in this manner. Deleting or allowing my mail to expire will place you in a poor position in terms of lab success. My E-mails normally **self-delete** after two weeks of languishing in your inbox. You should save any large attachments to a local drive and then delete the original E-mail in order to save space in your inbox.

PRE-LAB WORK: Each experiment will normally have a set of pre-lab questions on WebCT which are often, but not always, worth five points. You **must** complete the WebCT pre-lab questions by two PM on your scheduled lab day. A grade of zero will be recorded for any pre-lab not taken by the deadline. There is generally a one hour time limit when taking the WebCT pre-lab quiz, and you are allowed all the typical “open-book” resources when taking this quiz (but no advice from other students). Temporary CedarNet outages are insufficient grounds for non-completion of quizzes since you have several days during which you may take a quiz. Check your quiz grades on WebCT since no warnings are issued for missed quizzes. The pre-labs in the lab manual should only be handed in if you are directed to do so.

DATA COLLECTION: As you work in the lab, you are to enter your data on the **data sheets** that are provided either in the manual or replacement sheets provided by the instructor. You must submit the **original** data sheets, not a recopied (or photocopied) version of them, as a part of your completed report. Your report may not be spotless but it can, and should, be **neat** (please, no white-out). Messy labs will be assessed a penalty, and illegible material will not be graded. Write down all information requested and any additional data that you feel might be important. If you are uncertain about the value of a piece of information, ask your instructor.

RESULTS AND ANALYSIS: Your grade on this section will be based on the quality of your experimental work and on the analysis of your data, but **NOT** on your bodily presence in lab. A data/analysis section normally appears in your manual but is often supplemented or replaced with material sent to you. Your Results and Analysis material, along with your Data Sheets and any graphs, are usually worth ten points, although this point allocation may vary without warning.

GRAPHS: All graphs, whenever possible, must be computer generated (preferably by EXCEL), unless you are instructed otherwise. Graphs done by hand are only accepted with permission and only when Excel graphs are not feasible. Graph-making was discussed in the experiment, MISC-408, which most students performed last Fall in CHEM-1110. (I will try to provide information to any students lacking graphing experience with MISC-408.) Clearly label the axes of each graph with title and units used, use appropriately sized units on the axes, place a title on the graph, and place your name on the upper right-hand corner of each page. You should observe a limit of two graphs on a single sheet, but any graph must be of a reasonable size and scale. Students who find these instructions too vague should ask for clarification before handing in any graphs. Graphs found in most scientific literature are also excellent guides.

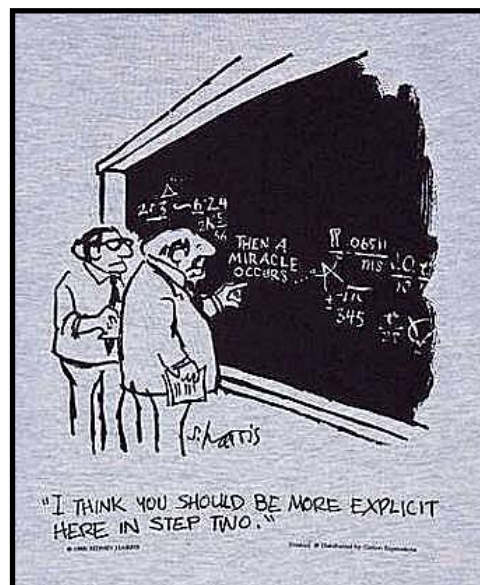
POST-LAB QUESTIONS: Post-lab questions in the manual will sometimes be assigned but are frequently replaced by questions E-mailed out to you or handed out in lab. These questions are frequently, but not always, worth five points.

HANDING IN LAB WORK; WHAT, WHEN, HOW: Your work from one lab is due at precisely 2 PM of your next regularly scheduled lab period. The post-lab questions need to be stapled to the top of this bundle with your PO Box number in the upper right hand corner for easy viewing by the campus mail workers. Your name must also appear somewhere at the top of the post-lab questions or in the blank provided. The post-lab questions are followed by the Data Sheet, any calculations that you performed, and then finally any graphs that you generated. A penalty is applied for other arrangements. A report is considered **late** if it is submitted after 2 PM and will have a one point penalty applied on the overall report grade. Labs handed in any later than 5 PM of the Thursday of the week following completion of that lab may incur an additional penalty. No further late penalties will be imposed, but **no credit** is earned for any late labs handed in after that particular lab has been returned to the class. Attempts may be made to warn students of missing material before this point is reached, but this timing cannot be guaranteed. It is advisable to make copies of all material that you hand in just in case the material goes missing. Labs should be handed in to the appropriate box in the lab or to me personally. Labs handed in to Dr. McClain or placed under my office door are more likely to end up missing. Never place lab material into the campus mail system which sometimes loses material.

GRADING AND RETURN OF LABS: The data/analysis section and post-lab questions are graded either by me or my assigned graders. This material is, unless you specify otherwise, returned either in lab or via the campus mail system. Direct all questions about lab grades to me. At the end of the semester, I report only the lab percentage to Dr. McClain who then uses it in whatever manner he specified in his class syllabus.

Requirements for Lab Reports (penalties may apply if these are not met):

1. **PO Box number** must go in the upper right hand corner (above your name) of the top page.
2. **Your full, legible name must go in upper right hand corner of each page, but especially the topmost page.**
3. **The post-lab must, unless otherwise directed, go first (on top).** The Data Sheets go next, followed by any calculation pages, then any graphs.
4. **All lab material sent to you as an electronic file must be printed from the normal Window's application that opens it in.** This typically means that you will print files from EXCEL (xls), WORD (doc), or ADOBE (pdf). Deductions will be assessed on materials printed from the GroupWise E-mail viewer application. (Contact computer services or some other geek to find out how to print files from their appropriate applications.)
5. **The papers must be stapled in the upper left hand corner.** No other method of attachment is allowed.
6. **All graphs, whenever possible, must be computer generated** (preferably by EXCEL), unless you are instructed otherwise. Graphs done by hand are only accepted with permission and only when Excel graphs are not feasible. .
7. **SHOW ALL OF YOUR CALCULATIONAL WORK! All calculations, or at least a representative sample, must be shown either on the lab or on an extra attached sheet.** This also applies to any work done by a spreadsheet. (See comic to the right.)
8. **No attached sheets should have "confetti edges" from being torn from a notebook or ring binder.**

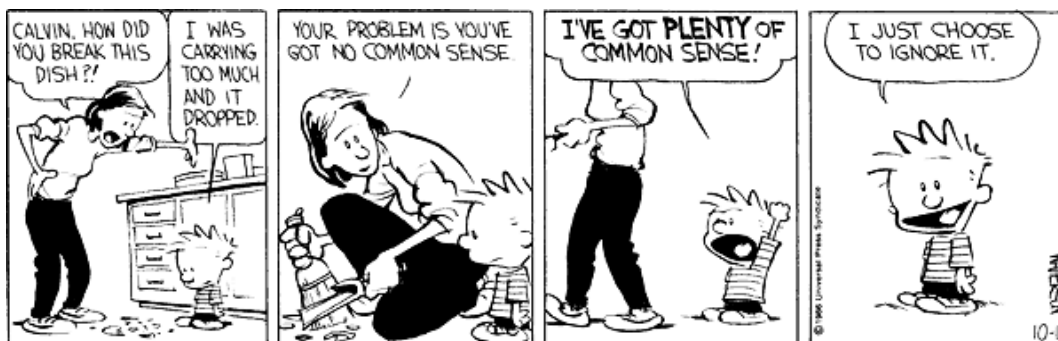


ATTENDANCE

You must complete each exercise at your scheduled lab time unless you have permission from the lab instructor. If a conflict arises with a school-sponsored activity (field trip, etc.) or if you are ill on your regular lab day, you may complete the exercise on any other lab day on which that exercise is scheduled to be done (space permitting and with permission from all the lab instructors involved). No other type of make-up lab work is permitted. You may be excused from the work if you have a written explanation for your absence and the lab instructor approves the excuse. You may be excused from a maximum of one exercise. You must consult with your lab instructor concerning any additional lab exercises missed. The physical capacity of the lab room is 24 and is rarely exceeded.

You will not be allowed to leave lab early for meetings of campus groups, for registration, for intramural sports, etc. If anyone insists that you must meet with them, contact your lab instructor and let him explain to the individual why you cannot make the meeting.

LABORATORY SAFETY



An important goal for any laboratory course is to avoid serious accidents or injuries. We can achieve that goal if we work together. You must be willing to follow several rules in addition to applying your common sense to the lab situations you face. You all should have signed a form in CHEM-1110 that commits you to obeying several safety rules. Habitual failure to follow safe laboratory practices may result in grade penalties (such as a grade of zero for that lab) and expulsion from the laboratory.

All safety regulations are important and must be obeyed; however, several will be mentioned more often than others. Safety is important both in the lab and in your daily lifestyle.

Splash-proof safety goggles must be worn continuously throughout the lab period.

These must be worn even if you wear prescription lenses mounted in frames. Any time you are handling chemicals or glassware you risk the danger of eye injury. It is just as important that you wear eye protection when you wash beakers or weigh out samples on the balance as when you work at your lab bench. Goggles also protect you from the actions of your lab-mates, not just from your own actions.

You **must** wear clothing that is consistent with good laboratory safety; therefore, the University's Class Dress Code does **not** apply to laboratory work in chemistry. Older pants, slacks, or jeans should be worn, although female students may wear longer dresses if they desire. The goal is to cover up as much of the body as possible with clothing that you do not mind having a few acid holes in. This goal is often contrary to the prevailing sense of fashion. Shorts, pants with holes already in them, sandals, open-toed shoes, or high heels must never be worn in the laboratory. Female students should ensure that hair or jewelry does not hang down into the work area. Students dressed inappropriately for lab will be required to go back to their room to redress properly. This exception to University dress codes does not extend to chapel or classes before or immediately following lab.

Leave your book bags and coats outside the lab or under the blackboard inside the laboratory (ENS 227). Coats, but not heavy book bags, may be hung on the rack inside the room. **Never** place these items on the laboratory benches or on the floor spaces near the benches, isles, or exits. Do not sit on the laboratory benches. Only place your notebooks on spaces that you have first inspected and wiped clean.

Consider hood space to be covered with the vilest of chemical substances and keep you head outside the hood door. Never place anything in or near your mouth while you are in lab. Use the beaker tongs, not crucible tongs, or a lifting device made from a strip of paper towel in order to lift and carry beakers. Note that burning-hot objects look much like room-temperature objects.

Common sense plays a major role in lab safety. If you are not sure about how to safely handle a substance or piece of equipment, ask your instructor. The lab exercises also provide some safety instruction. Specific safety precautions for the exercise of the week will be emphasized at the beginning of the lab period. Lab time can be a safe and enjoyable experience if you can relax in lab and think about what you are doing.

GENERAL LAB OPERATIONS

Good lab habits are important for your success and for your safety. The following rules apply each time you are in lab.

- 1. Avoid the temptation, no matter how great, to let any lab partner or classmate do your thinking and/or lab calculations for you!**

2. **DON'T PANIC!** Read ahead, plan, and move with deliberate thought.
3. **Attempt to use materials from a single drawer.** If you do not have an item called for in the lab procedure, check unused drawers or contact your instructor. You are not to rob drawers being used by a classmate to stock yours.
4. **Do not be embarrassed if you break something.** Have your instructor get a replacement for you. You can keep your drawer completely stocked if you will do this consistently.
5. **Clean all glassware and other equipment before leaving the lab.** This includes cleaning the counter space you used. Place, unless otherwise instructed, all material back into the appropriate student drawers or cabinets.
6. **Use distilled water sparingly and rarely rinse glassware directly under a distilled water tap.** It is each student's job to fill the clear-plastic distilled water bottles (most do not have labels) in the lab with distilled water from a verified distilled water tap (labeled DW). Clean your glassware by scrubbing it with a brush and soap solution, rinsing thoroughly with tap water and, finally, rinsing three times with small portions of distilled water. Place the damp equipment into your drawers.
7. **Look at any labels on plastic lab bottles to ensure the identity of their contents as they may contain soap water or other chemicals instead of distilled water** (especially if they are not of the clear-plastic type).
8. **You may use wet glassware most of the time.** You will be told when to use dry equipment. Do **not** jam cheap paper towels into expensive, scientific glassware since removal of such material may prove problematic.
9. **Keep all working areas in the lab clean throughout the lab time.** Use a beaker as a temporary trash can for matches, litmus paper, etc.
10. **All spills of liquids or solids must be cleaned up immediately.** This is especially true around the unreasonably expensive digital balances. Instructions for cleanup of hazardous materials will be provided at the beginning of each lab session in which the material is used. Failure to keep the lab clean will force the instructor to take measures to ensure lab cleanliness.
11. Some of the wastes generated during the lab may have special disposal procedures. We want to insure that none of these materials will be poured down the drains or put into the trash can in the lab. Labeled waste containers will be provided for many of the materials generated in the laboratory. Look for the containers and match your waste material with the correct container. Glass waste, in particular, goes into a cardboard receptacle labeled for that purpose.

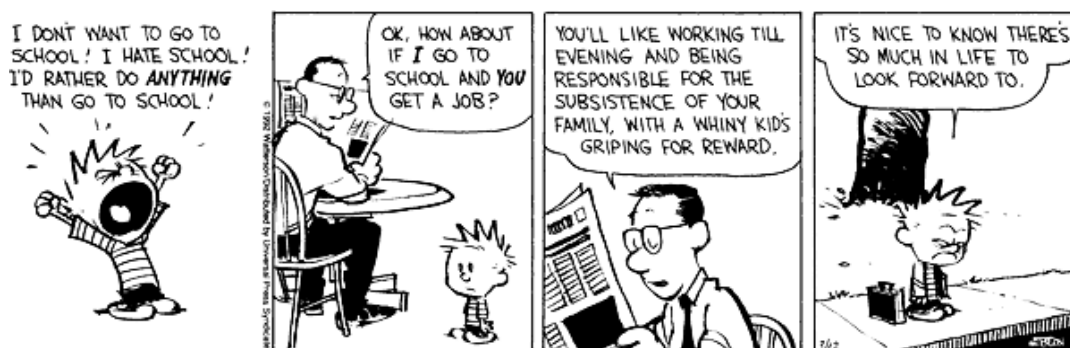
INFORMATION ABOUT ME

I have a Ph.D. in Inorganic Chemistry from the University of Colorado with undergraduate degrees from the University of Rochester and Baptist Bible College of PA. Post-graduate work was done at the University of Iowa and Hunter College of the City University of New York. Past research has been funded by NASA and the Air Force Office of Scientific Research. I have carried out basic research on precursors to thermally resistant silicon carbide ceramics, on conductive polymeric materials, and on other electrochemically active materials, including "buckyballs." The most recent work has been carried out at Wright-Patterson Air Force Base, located near Fairborn, Ohio.

My wife is a homemaker who takes care of our youngest child. My wife enjoys handicrafts including knitting, crocheting, and tatting. My adult son, who is a Staff Sergeant (Geophysics Technician) in the USAF, loves on-line gaming and Science Fiction. He just recently married and is currently stationed in a combat zone. I, also, love Sci-Fi, but spend time on computers primarily to get them to work the way they should. I am quite interested in the TV series, Babylon 5 (no longer being produced), and the software game series of Myst, Riven, RealMyst, Myst 3: Exile, URU, Myst 4: Revelations and Myst 5: End of Ages. I am a member of an on-line BBS for the support of FireFox, Mozilla and Netscape browsers. My daughter loves knitting, listening to music on her mp3 player, and taking notes in church. We have two cats, Vapor and Delenn. Delenn, the younger of the two, likes to chase any moving object while Vapor would rather spend his time eating and sleeping.

My family has made two trips to Philadelphia to see the typical historical locations and some science museums. I enjoyed the history there, especially as it related to the early American scientist, Benjamin Franklin, who coined the electrical terms of "positive" and "negative." My wife and I have also developed a taste for "Hank's Root Beer" which we occasionally have shipped in from Philadelphia.

My family has many challenges. My wife has Multiple Sclerosis, and I have been diagnosed with, among other things, Fibromyalgia. Our daughter has special, learning challenges of her own which often require extra effort. These aspects of my family sometime restrict my on-campus availability. I highly urge you to use E-mail to contact me.



LAB SCHEDULE NOTES

The exercises are NOT necessarily performed in the order in which they are organized in the laboratory manual purchased from the bookstore. Customizations and other supporting material will be placed on WebCT. Reserve ALL lab days, including those marked "TBA", for lab work! **Difficulty levels:** 1 = pretty straightforward or short lab work, 2 = harder or longer lab time, 3 = difficult lab or fairly long lab time.

LAB #	WEEK OF:	LAB DESCRIPTION
0	Jan. 4 th	NO LABS this week —Bible Conference
1	11 th	Malachite Green Lab: A Custom Lab [Based on techniques in <i>ANAL 359: Spectrophotometric Analysis of Permanganate Solutions</i>] Level = 3
2	18 th	<i>Paper Chromatography.</i> A Custom Lab, Level = 2
3	25 th	PROP 507: <i>Determining Molar Mass by FP Depression in Naphthalene</i> [Custom Procedure Provided] Level = 3
4	Feb. 1 st	KINE 429: <i>Studying the Kinetics of the Solvolysis of 2-Chloro-2-Methylpropane;</i> [Custom Modifications Provided] Level = 3
5	8 th	EQUIL 392: <i>Introducing Equilibrium,</i> Level = 1
6	15 th	EQUIL 411: <i>Estimating the pH of Household Products;</i> [Custom Modifications Provided, Make Your own Cabbage Juice, Use pH Meters] Level = 2
7	22 nd	TBA
0	March 1 st	NO LABS: SPRING BREAK
8	8 th	EQUIL 499: <i>Studying the pH of Strong Acid, Weak Acid, Salt, and Buffer Solutions;</i> [Custom Modifications Provided] Level = 3
9	15 th	EQUIL 441: <i>Evaluating the K_{eq} for the Reaction of Iron(III) with Thiocyanate;</i> [Custom Modifications Provided, Use of Spec-20's] Level = 3
10	22 rd	THER 512: <i>The Thermodynamics of KNO_3 Dissolving in Water</i> [Custom Procedure Provided] Level = 2
11	29 th	REAC 456: <i>Studying Oxidation-Reduction Reactions,</i> Level = 1
12a	April 5 th	REAC 480: <i>A Sequence of Chemical Rxns: Transforming Cu - Part I</i> [Custom Adaptations Provided] Level = 2
12b	12 th	Labs Meet on T, W, and R for Part II of REAC-480. M lab, due to Easter Break, does not meet.
12b	19 th	Monday meets for Part II of REAC 480. The T, W, and R sections are TBA for this week.
0	26 th	NO LABS: Finals Begin on Tuesday