

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. Section 05 meets on Friday. I, Dr. Miller, 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 11 – 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 and WebCT 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.

GRADING

You earn points in this lab through good laboratory work and satisfactory completion of the pre- and post-lab questions. Neither simple attendance nor excessive effort automatically entitles you to a high grade.

There are eleven laboratory experiments which are graded. Only the ten labs with the highest scores are utilized in the calculation of your lab grade. One lab grade may be discarded if a lab was missed due to personal illness or family emergencies. Contact me if you miss two or more lab experiments for an excusable reason. If no labs are missed for excusable reasons, then the one lowest lab grade will be dropped regardless of the reason for the grade

Each experiment will normally have a pre-lab quiz on WebCT which is often, but not always, worth five points. You **must** complete the WebCT quiz by the starting time of your scheduled lab day, regardless of when you actually complete that lab. A grade of zero will be recorded for any quiz 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 direct answers 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. No pre-labs are located in our current, customized version of the lab manual.

In addition to the WebCT quiz, each lab exercise will usually have a **data & analysis** section and a set of **post-laboratory questions**. These sections, if they exist in our customized lab manual, should be completed and handed in (but check first all lab instructions). These sections, if not found in the manual, are replaced with material located on WebCT. Your grade will be based on the quality of your experimental results and your performance on all sections of the lab exercise. Each lab is worth a total of 20 lab points (frequently, but not always, 5 points each for the pre- and post-lab work and 10 points for the Report and Calculations/Results) for a total of 200 points (after dropping the lowest lab grade).

The data/analysis section and post-lab questions are graded by either a lab instructor or an assigned grader. This material is, unless you specify otherwise, returned either in lab or via the campus mail system. Direct all questions about lab grades, including the WebCT quizzes, to me. At the end of the semester, only the lab percentage is reported to Dr. McClain who then uses in the manner specified in his class syllabus.

LAB REPORTS

As you work in the lab, you are to enter your data on the **original data sheets** that are provided with the exercise. **You must submit the original data sheets**, not a recopied version of them, as a part of your completed report. Your report may not be spotless but it should be neat. Cross out bad data with only a single line, not multiple lines. Do not use any form of 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. Ask your instructor if you are uncertain about the value of a piece of information.

Requirements for Lab Reports (penalties apply when any are not met):

1. **PO Box number** goes in the upper right hand corner (above your name) of the top page.
2. **Your full, legible name must go in the upper right hand corner of each page, especially the first page and on graphs.**
3. **The post-lab goes first (on top) unless otherwise specified.** The Data Sheets go next, followed by any calculation pages, then, lastly, any graphs.
4. **You should print all lab files from their appropriate applications such as EXCEL (xls), WORD (doc), or ADOBE (pdf).** Deductions may be assessed on materials printed from some type of viewer application (such as found in GroupWise). 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.

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 fellow 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 space inside the hoods in the lab 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 (the ten commandments of lab?):

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

1. **DON'T PANIC!** Read ahead, plan, and move with deliberate thought.
2. **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.
3. **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.
4. **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.
5. **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.
6. **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).
7. **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.
8. **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.
9. **All spills of liquids or solids must be cleaned up immediately.** This is especially true around the 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.
10. Some of the wastes generated during the lab 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.

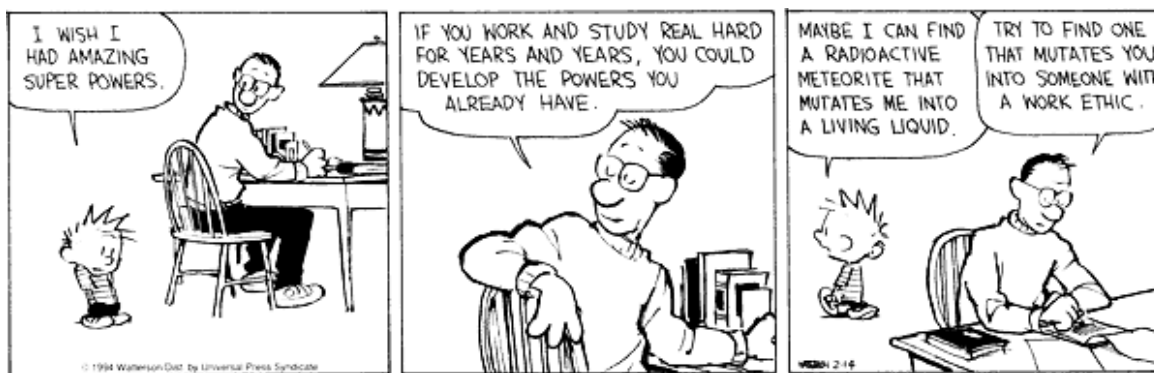
INFORMATION ABOUT ME

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 is newly married and recently finished a tour in Iraq. I, also, love Sci-Fi, but spend time on computers primarily to get them to work the way they should. I am quite enamored with 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, who loves cheese and marshmallows, has perfected a form of anti-gravity jumping while Vapor tries to imitate an inert mass.

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. 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 (what, when, and how tough is that lab):

The exercises are NOT 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. Take particular note of vacation times. Reserve ALL lab days, including those marked "TBA", for lab work!

LAB #	WEEK OF:	LAB DESCRIPTION
0	Jan. 3 th	NO LABS this week —Bible Conference
1	10 th	Malachite Green Lab: A Custom Lab [Based on techniques located in <i>ANAL 359: Spectrophotometric Analysis of Permanganate Solutions</i>] A difficult and exacting lab. Spec-20s are used. Done with partners.
2	17 th	Paper Chromatography: See WebCT, not the lab manual, for procedure. Easy for some students, difficult for others. No help found in the text. No partners.
3	24 th	TBA: Watch for possible announcements about this week.
4	31 st	PROP 507: <i>Determining Molar Mass by FP Depression in Naphthalene</i> Custom Procedure. Difficult in every way. Done in groups of three or so.
5	Feb. 7 th	KINE 429: <i>Studying the Kinetics of the Solvolysis of 2-Chloro-2-Methylpropane.</i> Custom Modifications. Easy to make mistakes. Done with a partner.
6	14 th	EQUIL 392: <i>Introducing Equilibrium.</i> Easy and done with a partner at "stations."
7	21 st	EQUIL 411: <i>Estimating the pH of Household Products.</i> Custom Modifications. Make your own Cabbage Juice. Use pH Meters . Moderate difficulty. Partners.
0	28 th	NO LABS: SPRING BREAK
8	March 7 th	EQUIL 499: <i>Studying the pH of Strong Acid, Weak Acid, Salt, and Buffer Solutions.</i> Custom Modifications. Chemical reagents are at different locations for each "part" of the lab procedure. Use pH meters . Difficult. Partners.
9	14 th	EQUIL 441: <i>Evaluating the K_{eq} for the Reaction of Iron(III) with Thiocyanate.</i> Custom Modifications. Use of Spec-20's . Difficult. Done with a partner.
10	21 st	The Thermodynamics of KNO_3 Dissolving in Water (used to be THER 512). See WebCT, not the lab manual, for procedure. Partners. Not difficult, but easy to make critical errors.
11	28 th and April 4 th	REAC 456: <i>Studying Oxidation-Reduction Reactions.</i> Partners. Easy. Done using "stations." NOTE: Labs sections are split by Easter Break and meet 3/29 – 3/31 and 4/8 – 4/9, not on the days 4/1 – 4/7.
12a	11 th	REAC 480: <i>A Sequence of Chemical Rxns: Transforming Cu - Part I</i> Custom Adaptations. No partners. Moderately difficult and long (2 weeks).
12b	18 th	REAC 480: <i>A Sequence of Chemical Rxns: Transforming Cu - Part II</i> Custom Adaptations. No partners. Post-lab is located on WebCT.
0	25 th	NO LABS. Finals Period begins on Tuesday.