

TEXT: Laboratory Manual from Chemical Education Resources (Required, new, not used). Be sure to get the **CHEM-1110** copy, **not** the CHEM-1050 copy!

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 am in charge of sections 01 through 04. Dr. McClain is in charge of section 05, although I am handling all lab grading.

All sections meet for the first time August 27 - 31. 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 some 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. Always print the attachments from the proper application (EXCEL, WORD, or ADOBE). Merely printing from the GroupWise mailing system often results in a "mutated" or smaller version of the file and, if handed in, will result in a point penalty.

GRADING: Points, Points, and more Points

Each report will have a set of pre-lab questions (frequently done on WebCT), a data & analysis section, and a set of post-laboratory questions. A data/analysis section and post-lab questions appear in your manual but are often supplemented or replaced with material sent to you. Your grade will be based on the quality of your experimental work and data, the analysis of your data, and your response to the pre- & post-laboratory questions. Pre-labs will frequently be done via WebCT. The pre-labs in the lab manual should only be handed in if you are directed to do so and no WebCT questions exist. Warnings about missing pre-lab grades will probably not be issued. All labs are usually worth a total of 20 lab points (usually, 5 points each for the pre- and post-labs and 10 points for the Report and Calculations/Results).

You must complete the printed or 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 or handed in by this deadline.

The **original data sheet**, the analysis of the data, and the post-lab questions are to be submitted at 2 PM of your next lab period (except for the last lab which has a special due date). The post-lab questions need to be stapled to the **top** of this bundle, followed by the Data Sheet, any calculations that you performed, and then finally any Excel graphs that you generated. 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 the Friday of the week following the week within which it was due will be assessed a total penalty of two points. 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 can not 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 during lecture or under my office door are more likely to end up missing. Never place lab material into the campus mail system which frequently loses material.

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, including the WebCT pre-lab questions, to me. At the end of the semester, I report only the lab percentage to Dr. McClain who then uses in whatever manner he specified in his class syllabus.

REPORTS

As you work in the lab, you are to enter your data on the **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 can, and should, be neat. Messy labs will be assessed a penalty, and illegible material can 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. You may not be given an exact answer, but you will be asked questions that will help you come to a valid decision.

The pages of your report must be stapled together and your name must appear on each page. The post-lab questions should be first, with your PO Box number placed in the upper right-hand corner, followed by the data and report pages. Graphs should be stapled to the back of the report. You may be given special report pages for some exercises. This page should be placed in front of the original data sheet.

Requirements for Lab Reports (penalties 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.
3. The post-lab must go first (on top). The Data Sheets go next, followed by any calculation pages, then finished by any graphs.
4. All lab material sent to you as an electronic file **must be printed** from the application that normally opens it in Windows. This means that you should 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 must be computer generated** (preferably by EXCEL), unless you are instructed otherwise. Graphs done by hand, unless specified, are simply not accepted. 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 left-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.
7. All **calculations**, or at least a sample, must be shown either on the lab or on an extra attached sheet. This also applies to any work done by a spreadsheet.
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 the lab instructor(s) 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.

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. **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, contact your instructor and he will get it for you. 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.
5. **Use distilled water sparingly.** Fill the clear-plastic distilled water bottles 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 small portions of distilled water.
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. Try **not** to jam paper towels into expensive glassware since removal of such material may prove difficult or impossible.
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 -- liquid and solid -- must be cleaned up immediately. This is especially true around the expensive digital balances. Instructions for clean up 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 punitive measures.
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. Points will be deducted from your report grade if you dispose of chemicals improperly.

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 that commits you to obeying several safety rules. Habitual failure to "Keep the Law" will result in expulsion from the laboratory and a grade of zero for the exercise you were doing.

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. Sodium hydroxide, NaOH, is just as dangerous used as Drano as when used in the laboratory to react with an acidic solution.

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. You need to protect your eyes from the actions of your lab mates as well as from yourself.

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. Never place anything in or near your mouth while you are in lab.

Do not lift beakers with crucible tongs. You may use the beaker tongs provided or a lifting device made from a strip of paper towel. This technique will, upon request, be demonstrated in the lab.

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.

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. Take particular note of vacation times.

August 27 – 31: **TECH 600: Practicing Safety in the Chemistry Laboratory**
MISC 408: Representing Data Graphically

September 3 - 7: **Labor Day on Monday, NO LABS THIS WEEK!**

September 10 - 14: **PROP 603: Resolving a Two- Components Mixture**

September 17 - 21: **STOI 606: Determining the Empirical Formula of Magnesium Oxide**

September 24 - 28: **SYNT 347: Preparation of Strontium Iodate**

October 1 - 5: **REAC 422: Studying Chemical Reactions and Writing Chemical Equations**

October 8 – 12: **THER 609: Estimating a Heat of Neutralization**

October 15 – 19: **FALL BREAK, NO LABS THIS WEEK!**

October 22 – 26: **ANAL 503: Nine Bottles—An Adventure in Chemical Identification**

October 29 – November 2: **ANAL 618 Standardizing a Sodium Hydroxide Solution**

November 5 – 9: **TBA**

November 12 – 16: **Lewis Structures and VSEPR Theory**

November 19M, 20T and 28 – 30: **VB Theory** (This lab works around Thanksgiving Break.)

December 3 – 7: **Ideal Gas Law and Dalton's Law of Partial Pressures: Fizzy Lab**

December 11 - 14: **Final Exam period.** Classes meet on Monday. **No labs meet.**