

INTRODUCTION TO BIOLOGY 1A LABORATORIES

INTRODUCTION

Scientific research is an organized system of inquiry that allows the researcher to make the best possible estimate of how natural processes work. The purpose of the laboratory part of this course is to give you hands-on experience with scientific investigation and introduce you to some of the tools of Cell and Molecular Biology.

A copy of the course syllabus and schedule will be handed out during the first class meeting. You are expected to keep abreast of the schedule and come to lab prepared for the day's topic. Should the need arise to modify the syllabus throughout the semester, you will be notified of any and all relevant changes.

HOW THE LAB WILL BE STRUCTURED

You will perform all laboratory work with a partner or a group. Some labs will involve groups of two, others groups of four. The purpose of group work is to learn to work in a collaborative setting as you perform complex experiments. The key to successful partnership is cooperation and communication. Both of these elements have been shown to greatly improve student learning, performance, and enjoyment in the science laboratory. Keep in mind that all partners are equal, have a right to express their views, and have a responsibility to contribute to the team effort. You are responsible for choosing your own partners, though it is not necessary to work with the same partners every lab.

If you find that you and your partners are having conflicts and not working well together, you should bring this to the instructor's attention. Every effort will be made to optimize your learning by making your partnership work smoothly and efficiently.

Since optimum teamwork depends on both team members being present, attendance will be taken at the beginning of each lab period. You are expected to read the lab experiment before coming to class. There may be pre-lab quizzes to verify your preparation.

Once you and your partners have completed the lab experiment and gathered the necessary data, you will prepare a *Lab Report*. In most cases, preparation of this report will have to occur after the regularly scheduled lab period. Lab reports will consist of written answers to questions that are given at the end of each assignment. Answers to the questions must be preceded by the question or question number, with the answer given in complete sentences (and paragraphs where appropriate). Reports must be neatly presented and typed. Graphs and tables should be prepared with a spreadsheet program such as *Excel*. For full credit, you must give a complete answer to the question (hint: write to convince the reader that you did the experiment, that you understand how and why you did it, and that you understand the significance of the results). On occasion, a quiz will be given in place of lab report. I will let you know at the beginning of the lab period if you will have a quiz or whether you will write up a lab report. Either way, each lab

period will be worth 10 points. If a lab spans more than one period, the report will be worth more points. For example, a three-period lab will be worth 30 points.

COMPUTERS AND THE BIOLOGY 1A LAB

You will be expected to be able to use a spreadsheet program such as Microsoft *Excel* for data analysis and presentation. PC and Mac notebook computers will be available in the biology lab during select lab meetings. The Computer Technology Center (CTC) and other open access computer labs on campus are available for word processing and spreadsheet analysis with both Mac and PC platforms. Alternatively, if you own your own laptop computer, you may bring it in to lab to produce and analyze your data.

HOW THE LAB PERIOD WILL BE STRUCTURED

INTRODUCTION. Each lab period will begin with an introduction by the instructor that includes the objectives of the day's experiment, the equipment involved, and any changes in protocol. It is essential that all team members be present for all of this presentation. Pre-lab quizzes may also be given at this time.

PLANNING. Following the instructor's introduction, lab partners will meet and work out the details of how the experiment will be carried out.

PERFORM THE EXPERIMENT. Lab partners set up the equipment and perform the experiment.

CLEAN-UP. Lab partners clean up and put all equipment away.

LABORATORY SAFETY RULES

The microorganisms used in this course are of little or no risk to healthy people working with them, provided standard microbiological practices are followed. In order to maintain safe conditions in the laboratory, the following rules must be observed:

1. No drinking or eating. There is to be no drinking or eating in the laboratory at any time.
2. Clothing. Always wear a labcoat, old shirt or apron when you are working in the lab. This is done to protect your clothing from accidental contamination and to prevent accidental staining of your clothing. Your labcoat can be folded and kept in your drawer. After the first week, you will not be permitted to work in the lab without wearing your labcoat. Gloves and eye protection should always be worn in the lab whenever you are handling cultures. If you have long hair, tie it back or put it up. Hair hanging loose is a contamination hazard and can catch fire in the Bunsen burner flame.
3. Work Area. Decontaminate the countertop at the beginning and end of each laboratory period with the disinfectant provided. Dispose of the paper towels used for cleaning the countertop in your autoclave can, not in the garbage can.
4. Culture Handling. You must assume that all the cultures you work with are potentially pathogenic and handle them appropriately. Culture tubes and petri dishes are to be marked with your name or initials, experiment number and date. Petri dishes are kept in mesh baskets and culture tubes in racks. Place your cultures only on those shelves marked for your lab section.
5. Culture Disposal. Unless you are told otherwise, used stock cultures are to be returned to the appropriate rack at the front of the classroom. If another manner of stock culture disposal is

to be used, the lab instructor will describe the appropriate method. When you have completed observations on your experimental cultures, the cultures should be disposed of in plastic autoclave bags and placed in the container in the autoclave room. Regularly check the incubators and refrigerators and discard any old cultures that you might have forgotten. They begin to smell after a short time and they take up needed space. Cultures, pipettes, slides, media, and any other lab. materials are never to be discarded in garbage cans. Cultures are not to be removed from the laboratory under any circumstances. Failure to follow this rule will result in immediate dismissal from the class.

6. Hand Washing. Make it a practice to wash your hands frequently while working with cultures. At the end of lab or prior to leaving the lab for any reason, wash your hands well with soap.
7. Accidents and Spills. Notify the instructor immediately if there is a fire, culture spill, broken glass or injury. Note the location of the fire extinguisher and the emergency shower. Use the Bunsen burners carefully and avoid reaching over the flame. Spilled cultures should be flooded with disinfectant and then covered with paper towels. Leave the towels on the spill for at least 15 minutes, then dispose of the towels in autoclave bags in the contaminated waste container, NOT in the garbage can. Make sure that you notify the instructor.
8. Pipetting. Never pipette by mouth.
9. Visitors. Only students enrolled in the class should be in the laboratory (please do not bring children, friends, spouses, pets, etc. to lab).
10. Personal Care. Be sure to notify the instructor if you are or become pregnant, have allergies, are taking immunosuppressive drugs, have an immune system disorder, are diabetic, or have any other medical condition that might necessitate special precautions in the lab.

Failure to observe these safety rules can result in immediate dismissal from the class.

WHAT YOU WILL NEED TO BRING TO EVERY CLASS MEETING

In addition to coming to lab on time, you will need to come prepared. You are expected to read the scheduled lab experiment before the lab meeting.

YOUR LAB MANUAL EXERCISE

This is important. Each student must have her or his own manual to refer to and work from.

WRITING IMPLEMENT AND A NOTEBOOK OR BINDER

You will be recording data and taking notes during the lab. Be sure to have a notebook or binder to write in.

USB PORTABLE STORAGE (THUMB DRIVE)

Many of the experiments we will perform will produce data from the laptop computers in lab. You will want to be able to bring home this data so that you can write up the lab reports. USB storage devices will allow you to transport data back and forth between any computers on

campus. Alternatively, if you own your own laptop computer, you may bring it in to lab to produce and analyze your data.

WHAT YOU WILL NEED TO PURCHASE AND STORE IN THE LAB

You will be assigned cabinet space that will be locked before and after class for storing your supplies. Starting with the next lab period, you will need to have the items below.

LAB COAT

This can be a loose-fitting shirt or smock. You need to wear something to protect your clothing from possible contamination and stains.

LAB SAFETY GOGGLES

You will be required to wear safety goggles when you work with microorganisms or certain reagents. Satisfactory goggles may be purchased in the campus bookstore, or at various hardware stores (Orchard's has good ones for about \$5). If you wear regular glasses, you will still need to wear safety goggles over them.

GLOVES

You will also be required to wear lab gloves (surgical gloves) to protect you and to keep your experiments from being contaminated. The best kind are *non-powdered, nitrile* gloves. Latex gloves work well too, but some students may be allergic to latex. Also, latex will not protect you as well as the nitrile gloves. Gloves may also be purchased in the campus bookstore, or at various hardware stores.