

**BIOLOGY 101 LAB  
BIOLOGY & SOCIETY  
SPRING 2008**

**Lab 1: Syllabus**

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**I. About This Course**

This is a one-credit laboratory science course designed to accompany the BIOL101 Biology and Society lecture course; however, you do not need to take the lecture in order to understand and

complete this lab. The laboratory meets once a week for 2 hours. BIOL 101L, if taken for a grade, can fulfill the core course requirement for the College of Arts and Sciences curriculum.

**NOTE: Labs may change. We will let you know ahead of time!**

<b>SPRING 2008</b>		
1/14 – 1/18	Lab 1	Introduction, Microscopes and Measurements
<b>1/21 – 1/25</b>	<b>NO LABS</b>	<b>Holiday</b>
1/28 – 2/1	Lab 2	Birds, Observations and Field Notes
2/4 – 2/8	Lab 3	Campus Plants
2/11 – 2/15	Lab 4	Marine Biology and Conservation
<b>2/18 – 2/22</b>	<b>NO LABS</b>	<b>Holiday</b>
2/25 – 2/29	Lab 5	Watersheds and Habitat Assessment
3/3 – 3/7	Lab 6	<b>Midterm</b>
3/10 – 3/14	Lab 7	Stream Ecology
<b>3/17 – 3/21</b>	<b>NO LABS</b>	<b>Holiday</b>
<b>3/24 – 3/28</b>	<b>NO LABS</b>	<b>SPRING BREAK</b>
4/1 – 4/4	Lab 8	Water quality testing
4/7 – 4/11	Lab 9	Community Ecology
4-14 - 4/18	Lab 10	Epidemiology
4/21 - 4/25	Lab 11	Evolution
<b>4/28 – 5/2</b>		<b>Final Exam</b>

## II. Structure of the Lab

The laboratories and related resources are available online at [www.biology.hawaii.edu/1011](http://www.biology.hawaii.edu/1011)

**Please note: if you neglect or forget to bring your lab manual to your lab, 7 points will be automatically deducted for that laboratory.**

You should read through each exercise BEFORE each lab. Except for lab 1, you will be required to complete the “critical thinking” pre-lab BEFORE you enter. It would be helpful to review your lecture notes if they are related to the lab topic. Prior to attending your lab section you should know what is to be accomplished that day and what will be required as a follow-up to the in-lab work, i.e., questions to be answered and handed in or assignments for future labs.

In the lab we require that you make observations, and think critically about the data obtained in your lab and their implications. Your Teaching Assistants will help you complete the post-experiment critical thinking about the experiments and their implications on society.

**PLEASE REMEMBER: YOU ARE RESPONSIBLE FOR PRINTING THE MANUAL AND BRINGING IT TO LAB EACH WEEK.**

## III. Grading

Laboratory grades are based on your performance in the following areas:

Lab Component	Each one is worth:
Pre-lab quizzes	5
In-class assignments	10
Homework assignments	10
Examinations	100

## IV. Pre-lab Quizzes

Each lab period will begin with a pre-lab quiz. This is to persuade you to be on time, and to ensure that you are prepared and have read the lab manual. Once the quiz begins and then you enter the room, you are late and will not be permitted to take the quiz. You will receive a “0” for the quiz.

The quizzes will be short (3-4 minutes), given at the beginning of the lab period, and pertain to that week’s lab. Each pre-lab quiz is worth 5 points. At the end of the semester, the quiz grades will be averaged as part of your final lab grade.

## V. Lab exercises

You will have exercises to complete within the lab session, as well as homework assignments. All assignments are due promptly at the start of the lab on the due date. Late material will not be accepted.

**Regular attendance is expected.** Only under special circumstances will you be able to attend a lab section other than the section in which you are registered. If valid reasons (e.g., illness, accident) prevent you from attending your normal lab session, you **MUST** notify your Teaching Assistant and present him/her any written document (e.g., doctor’s note). Your Teaching Assistant will attempt to make an arrangement for you to attend another lab section during the

same week. Please do not simply show up at another lab section without prior arrangement, as the Teaching Assistant in charge will not be prepared to admit you, and may not have enough materials or equipment. **There are no make-up labs** once the final section of each lab topic is completed.

If special circumstances (e.g., prolonged illness, bereavement) prevent you from doing lab work during the week it is scheduled, you must document the reason for your absence (e.g., doctor's note) to avoid receiving a grade of "zero" for that week's work. Consult with your Teaching Assistant if special circumstances arise. University athletes who are scheduled to travel during the semester to participate in athletic events must inform their Teaching Assistant of their travel schedule IN ADVANCE to avoid losing credit for missed lab work.

## VI. Lab Midterms and Exams

You will have two-one hundred point exams throughout the semester which pertain to the material covered in the laboratory exercises. The midterm will cover the first set of labs, while the final will cover any material presented since the first exam.

## VII. Late Assignments

No late assignments, homework or otherwise, is permitted in this laboratory course.

## VIII. Academic Conduct

Any student caught cheating or plagiarizing, will, AT A MINIMUM, receive a grade of "zero" on the falsified work. Additionally, academic misconduct can be grounds for failing

the entire course and/or being reported to the Dean of Students.

## IX. Laboratory Safety and Rules

The laboratory exercises have been designed with safety in mind. Use common sense, keep the lab clean, and be familiar with safety procedures.

- No eating, drinking, smoking, or chewing gum in the lab.
- Identify the available safety equipment, including the first aid kit.
- Return equipment & supplies to their original places after using them.
- Dispose of waste in proper receptacles. Clean up any spills immediately.
- **Clean your workspace area at your table before leaving! Cleaning materials are located near the sink.**
- Wear shoes for both indoor and outdoor laboratory exercises. **No bare feet or slippers for Lab 2, 3, 5, or 9!!**
- Report all accidents or hazards immediately.
- Don't taste, smell or touch any chemical unless told to do so by your Teaching Assistant.
- Emergency evacuation procedures: When the fire alarm sounds, prepare to leave the room and building immediately. The Teaching Assistant will be the last one to leave. If conditions are safe to do so, re-assemble by the fountain in Varney Circle, so your Teaching Assistant can be sure everyone is accounted for and is safely away from the building.

## Lab 1

### Teaching Objectives

- (1) Introduce the Scientific Method
- (2) Demonstrate making measurements without use of tools

### Student Learning Objectives

- (1) Learn how to apply the scientific method in all labs this semester
  - (2) Make measurements in distance and height without a ruler or tape measure
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## X. Scientific Method

To begin, let's go over the basics of the scientific method, and hypothesis testing. Put simply, hypothesis testing is forming questions and going about testing whether or not your assumptions can be validated.

Science is a process by which we investigate and understand the universe. This process, known as the “**scientific method**,” begins with asking questions about observations made regarding the natural universe. However, such questions in science should be properly formulated if they are to lead to practical experiments and objective scientific answers.

Question the world around you and think critically about what you experience. Pose your own questions... and strive to answer them! It's much more interesting than passively accepting information provided by others, and you will benefit much more from this lab, and in life.

It is important to ask questions based upon observations. In general, questions

that ask “How?” are preferred over questions that ask “Why?” The former lead to **hypotheses** that is experimentally testable, whereas the latter may lead to answers that imply higher purpose and design, which are outside the realm of science. A **hypothesis** is a working explanation that leads to a testable prediction. Good scientific hypotheses generalize from specific observations.

## Physical measurements

In order to estimate physical measurements, such as height and distance, we will use basic methods without equipment. We hope that they will be practical for you to use, even after you complete this semester.

### Measuring Distance

Run through the 3 courses set for you by your TA. Walk at a normal pace, counting the number of steps to complete the course. Divide the known distance of the course by the number of steps to calculate an estimate of your individual 'pace.'

Your pace =  
 (Course of known distance) / (Number of steps to complete course)  
 = \_\_\_\_\_ m

Calculate the average of the paces from the 3 courses.

### Determining Height of an Object

In order to estimate the height of an object, such as a tree or building, the following method can be used.

- Stand far enough from the tree so you can view the whole tree—top to bottom—without moving your head. Your view of the tree should be as unobstructed as possible.
- Have a friend stand near the tree.
- Hold a pencil in one hand and stretch your arm out so that the pencil is at arm's length in front of you (between you and the tree).
- Close one eye and adjust the pencil up or down so that you can sight the very top of the tree at the top of the pencil. This is easiest if you turn the pencil so that the sharpened point is pointing straight up. The tip of the pencil should thus just cover the top of the tree in your line of sight as you look at the tree "through" the pencil.
- Move your thumb up or down the pencil so that the tip of your thumbnail is aligned with the tree's base. While holding the pencil in position so that the tip is aligned with the tree's top (as in step 3), move your thumb to the point on the pencil that covers the point (again, as you look "through" the pencil with one eye) where the tree meets the ground.
- Rotate your arm so that the pencil is horizontal (parallel to the ground). Keep your arm held straight out, and make sure your thumbnail is still aligned with the tree's base.
- Have your friend move so that you can sight his or her feet "through" the point of your pencil. That is, your friend's feet should be aligned with the pencil's tip. He or she may need to move backward, sideways, or diagonally. Since, depending on the height of the tree, you may need to be some distance away from your friend, consider using hand signals (with the hand that is not holding the pencil) to tell him or her to go farther, come closer, or move to the left or right.
- Measure the distance between your friend and the tree. Have your friend pace out the distance, although this will not be as accurate. (use the conversions that you received from the Distance Estimates to determine the tree height).
- The distance between your friend and the tree is the height of the tree.  
 = (Number of steps) x (your stride)  
 \_\_\_\_\_ m

You now have been introduced to two simple ways to estimate height and distance without any special equipment. We will be using these procedures in future labs.

Figure 3. Conversion Table

<b>TO CONVERT</b>	<b>TO</b>	<b>MULTIPLY BY</b>
Feet	Meters	0.3048
Inches	Centimeters	2.54
Feet	Centimeters	30.48
Centimeters	Meters	0.01

#### **XIV. Lab 1: Homework**

[www.biology.hawaii.edu/1011](http://www.biology.hawaii.edu/1011)

- 1. PRINT MANUAL from website!**
2. Review Lab 2.

Use the online PowerPoint presentation for Lab 2 and begin to familiarize yourself with the following common campus birds:

1. Red vented bulbul
  2. Red whiskered bulbul
  3. Japanese white-eye
  4. Common waxbill
  5. Java sparrow
  6. Zebra dove
  7. Pacific golden plover
  8. Spotted dove
  9. Common Myna
  10. Red crested cardinal
3. Write a brief and concise summary of the measurement techniques you performed in today's lab. Be sure you include all measurements you obtained (example: your pace = \_\_\_m) as well.