# Introduction to Biology I

Fall Semester
2006

# **Biology 171L**

# Personal Information Sheet

Name:

Lab Section: Lab Meets: Time Day

Teaching Assistant (TA):_____ TA e-mail _____

TA Office Hours _____

Teaching Intern (TI):_____TI e-mail _____

TI Office Hours: _____

**NOTE: You may seek assistance from ANY of the BIOL 171L Teaching Assistants and Teaching Interns during their office hours, which are held in the Biology Resource room in Dean Hall. Refer to the bulletin boards in Edm 261A or the Biology Program web page, www.hawaii.edu/biology, for a complete listing of office hours. A copy will also be posted in Dean 2 as well. Your Teaching Intern will also hold office hours the Biology Resource Room, Dean Hall 2. Please feel free to visit and ask them questions.**

If found, please return this manual to the Biology Program Office, Room 2, Dean Hall, 2450 Campus Road, University of Hawaii, Honolulu, HI 96822. The office is open M-F from 7:45 AM to 4:30 PM.

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*PLEASE RETAIN IN YOUR LAB MANUAL FOR REFERENCE*
**UNIVERSITY OF HAWAII AT MANOA**

**BIOLOGY 171L, Fall Semester 2006**
Waiver of Liability, Assumption of Risk, and Indemnity Agreement

WAIVER: In consideration of being permitted to participate in any way in Biology 171L for the Fall semester of 2006 at the University of Hawaii at Manoa (hereinafter called "Activity"), I, for myself, my heirs, personal representative or assigns, **do hereby release, waive, discharge, and covenant not to sue** the University of Hawaii, its Board of Regents, its officers, employees, and agents for any liability **from any and all claims** resulting in personal injury, accidents or illnesses (including death), and property loss arising from, but not limited to, participation in Activity.



**ASSUMPTION OF RISKS**: Participation in Activity carries with it certain inherent risks that cannot be eliminated regardless of the care taken to avoid injuries. The specific risks vary from one activity to another, but the risks range from 1) minor injuries such as scratches, bruises, and sprains, to 2) major injuries such as eye injury or loss of sight, joint or back injuries, heart attacks, and concussions, to 3) catastrophic injuries including paralysis and death.

**I have read the previous paragraphs and I know, understand, and appreciate these and other risks that are inherent in Activity. I hereby assert that my participation is voluntary and that I knowingly assume all such risks.**

**INDEMNIFICATION AND HOLD HARMLESS:** I also agree to INDEMNIFY AND HOLD the University of Hawaii, its Board of Regents, officers, employees and agents, HARMLESS from any and all claims, actions, suits, procedures, costs, expenses, damages and liabilities, including attorney's fees brought as a result of my involvement in Activity and to reimburse them for any such expenses incurred.

**SEVERABILITY:** I further expressly agree that the foregoing waiver and assumption of risks agreement is intended to be as broad and inclusive as is permitted by the law of the State of Hawaii and that if any portion thereof is held invalid, it is agreed that the balance shall, notwithstanding, continue to be in full legal force and effect.

**ACKNOWLEDGMENT OF UNDERSTANDING:** I have read this Waiver of Liability, Assumption of Risk, and Indemnity Agreement, fully understand its terms, and **understand that I am giving up substantial rights, including my right to sue.** I affirm that I am voluntarily participating in the Activity and further acknowledge that I know, understand, and appreciate the inherent risks of the Activity. I assume full responsibility for any and all injuries or damages which may occur to me as a result of the inherent risks associated with the Activity. I further acknowledge that I am signing the agreement freely and voluntarily, and **intend by my signature to be a complete and unconditional release of all liability** to the greatest extent allowed by law.

# BIOLOGY 171 LAB Syllabus FALL 2006

| DATE | LAB | LAB TITLE | PRE-LAB WORK SHEET | LAB SUMMARY DUE |
|---|---|---|---|---|
| **8/21-8/27** | 1 | Introduction and Orientation to the lab | | |
| **8/28-9/2** | 2 | Identification of Important Biological Molecules | PLW | Excel Graphs |
| **9/4-9/9** | 3 | Cell Structure | PLW | Biological Molecules |
| **9/11-9/16** | 4 | Cell Membrane Properties | PLW | Cell Structure |
| **9/18-9/23** | 5 | Enzyme Catalysis | PLW | Cell Membrane Properties |
| **9/25-9/30** | 6 | Gas Exchange | PLW | Enzyme Catalysis |
| **10/2-10/7** | 7 | The Light Reactions of Photosynthesis | PLW | Gas Exchange |
| **10/9-10/14** | | **LAB EXAM #1** | | |
| **10/16-10/21** | 8 | Mitosis, Meiosis, and Chromosomes | PLW | The Light Reactions of Photosynthesis |
| **10/23-10/28** | 9 | Mendelian Genetics | PLW | Mitosis, Meiosis, and Chromosomes |
| **10/30-11/4** | 10 | Bacteria and Protozoa | PLW | Mendelian Genetics |
| **11/6-11/11** | 10 | Population Genetics | PLW | Bacteria and Protozoa |
| **11/13-11/18** | 11 | Bioinformatics | PLW | Population Genetics |
| **11/20-11/25** | | **THANKSGIVING NO LABS** | | |
| **11/27-12/2** | | **LAB EXAM 2** | | |

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# THE LOGIC OF BIOLOGY

Biological Goals.

Biology is the scientific study of all life forms. Its basic goal is to understand how life forms work, including the fundamental processes and ingredients of all life forms (i.e., 10,000,000 species in fragile ecosystems).

Biological Questions.

The questions biology is concerned with are: What is life? How do living systems work? What are the structural and functional components of life forms? What are the similarities and differences among life forms at different levels (molecule, organelle, cell, tissue, organ, organism, population, ecological community, biosphere)? How can we understand the biological unity of living matter?

Biological Information.

The kinds of information biologists seek are: information about the basic units out of which life is constructed, about the processes by which living systems sustain themselves, about the variety of living systems, and about their structural and functional components.

Biological Judgments.

Biochemists seek to make judgments about the complex processes of maintenance and growth of which life basically consists.

Biological Concepts.

There are a number of essential concepts to understand to understand the logic of biology: the concept of levels of organization of life processes (at the molecular level, at the sub-cellular particle level, at the cellular level, at the organ level, and at the level of the total organism), the concept of life structures and life processes, the concept of the dynamics of life, the concept of the unity of life processes amid a diversity of life forms, etc...

Biological Assumptions.

Some of the key assumptions behind biological thinking are: that there are foundations to life, that these foundations can be identified, studied, described, and explained; that it is possible to use biological concepts to explain life; that it is possible to analyze and discover the structure and dynamics of living systems and their components; that all forms of life reproduce, grow, and respond to changes in the environment; that there is an intricate and often fragile relationship between all living things; that all life forms, no matter how diverse, have common characteristics: 1) they are made up of cells, enclosed by a membrane that maintains internal conditions different from their surroundings, 2) they contain DNA or RNA as the material that carries their master plan, and 3) they carry out a process, called metabolism, which involves the conversion of different forms of energy by means of which they sustain themselves.

Biological Implications.

There are specific and general implications of the present logic of biology. The specific implications have to do with the kind of questioning, the kind of information-gathering and information-interpreting processes being used by biologists today. For example, the state of the field implies the importance of focusing questions and analysis on the concepts above, of seeking key answers at all levels of life systems. The general implications are that we have the knowledge, if not always the will, to understand, maintain, and protect forms of life.

Biological Point of View.

The biological viewpoint is focused on all levels and forms of life. It sees all life forms as consisting in structures and understood through describable functions. It sees life processes at the molecular level to be highly unified and consistent. It sees life process at the whole-animal level to be highly diversified.

## 18 Ideas for Becoming a Master Student

**Idea #1**: Make sure you thoroughly understand the requirements of each class, how it will be taught, and what will be expected of you. Ask questions about the grading policies and for advice on how best to prepare for class.

**Idea #2**: Become an active learner. Be prepared to work ideas into your thinking by active reading, writing, speaking, and listening.

**Idea #3**: Think of each subject you study as a form of thinking. (If you are in a history class, your goal should be to think historically; in a chemistry class to think chemically; etc.)

**Idea #4**: Become a questioner. Engage yourself in lectures and discussions by asking questions. If you don't ask questions, you will probably not discover what you do and do not know.

**Idea #5**: Look for interconnections. The content in every class is always a SYSTEM of interconnected ideas, never a random list of things to memorize. Don't memorize like a parrot. Study like a detective, always relating new learning to previous learning.

**Idea #6**: Think of your instructor as your coach. Think of yourself as a team member trying to practice the thinking exemplified by your instructor. For example, in an algebra class, think of yourself as going out for the algebra team and your teacher as demonstrating how to prepare for the games (tests).

**Idea #7**: Think about the textbook as the thinking of the author. Your job is to think the thinking of the author. For example, role play the author frequently. Explain the main points of the text to another student, as if you were the author.

I**dea #8**: Consider class time as a time in which you PRACTICE thinking (within the subject) using the fundamental concepts and principles of the course. Don't sit back passively, waiting for knowledge to fall into your head like rain into a rain barrel. It won't.

**Idea #9**:Relate content whenever possible to issues and problems and practical situations in your life. If you can't connect it to life, you don't know it.

**Idea #10**: Figure out what study and learning skills you are not good at. Practice those skills whenever possible. Recognizing and correcting your weaknesses is a strength.

**Idea #11**: Frequently ask yourself: "Can I explain this to someone not in class?" (If not, then you haven't learned it well enough.)

**Idea #12**: Seek to find the key concept of the course during the first couple of class meetings. For example, in a biology course, try explaining what biology is in your own words. Then relate that definition to each segment of what you learn afterward. Fundamental ideas are the basis for all others.

**Idea #13**: Routinely ask questions to fill in the missing pieces in your learning. Can you elaborate further on this? Can you give an example of that? If you don't have examples, you are not connecting what you are learning to your life.

**Idea #14**: Test yourself before you come to class by trying to summarize, orally or in writing, the main points of the previous class meeting. If you cannot summarize main points, you haven't learned them.

**Idea #15**: Learn to test your thinking using intellectual standards. "Am I being clear? Accurate? Precise? Relevant? Logical? Am I looking for what is most significant?"

**Idea #16**: Use writing as a way to learn by writing summaries in your own words of important points from the textbook or other reading material. Make up test questions. Write out answers to your own questions.

**Idea #17**: Frequently evaluate your listening. Are you actively listening for main points? Can you summarize what your instructor is saying in your own words? Can you elaborate what is meant by key terms?

I**dea #18**: Frequently evaluate your reading. Are you reading the text book actively? Are you asking questions as you read? Can you distinguish what you understand from what you don't?

# Laboratory Safety

- No smoking, drinking, or eating is allowed in the laboratory
- Bare feet are not allowed in the laboratory. Always wear covered shoes.
- You should tie back your hair, if it is long.
- Broken glassware, slides, and coverslips must be disposed of in the “GLASS ONLY” boxes.
- Wash your hands after each lab and during, if necessary.
- Never taste a chemical in the laboratory unless you are specifically instructed to do so by your TA.
- Laboratory equipment should be used only after you have been instructed in its proper operation.
- Anyone attempting unauthorized experiments in the laboratory will be subject to disciplinary action.
- If you are in doubt concerning any laboratory procedure, consult with your TA. Do not act in ignorance.
- Do not run in the laboratory. An accident may cause serious injury.
- Know the locations of the first aid kit, the fire extinguisher, as well as important emergency telephone numbers. These will be pointed out for you during the first labs.
- **Report all injuries to your TA IMMEDIATELY.**

# Cleaning Up

- Properly clean any instruments or equipment you have used.
- Wash and put back any items you used.
- Wipe down your table before and after each lab period.
- Paper, glass, gravel, and other solid waste should not be disposed of in the laboratory sinks.

# CD ROM (videos) available in BIOLOGY PROGRAM

Algebra (College), An Electronic Companion
Arthropods
Biochemistry, An Electronic Companion
Biochemistry: The Chemistry of Living Things
Biology (Campbell), Interactive Study Partner
Biosphere, The
Birds: Characteristics and Adaptations
Blood and Immunity
Calculus, An Electronic Companion
Cell Structure and Function
Cellular Respiration
Chemistry of Life
Cnidarians
DNA to Protein
DNA: The Molecule of Life
Enzymes
Exploring Biology
Food Chains & Webs
Genetic Engineering
Genetics, An Electronic Companion
Human Impacts on the Environment
Inside the Cell
Leaf
Meiosis
Mendel's Principles of Heredity
Mitosis
Molecular Cell Biology, An Electronic Companion
Mollusks
Organic Compounds in Action (video)
Photosynthesis
Plasma Membrane & Cellular Transport
Pre-calculus, An Electronic Companion
Roots and Stems
Sponges
Statistics, An Electronic Companion
Vertebrates
Viruses and Bacteria

To access these materials, please see one of the Biology TAs in the Biology Resource Room, Dean Hall 2. The TA will get the disk for you and direct you to one of the computers where you can review the contents. Under NO circumstances will you be permitted to remove the CD from the Resource Room.