Course Design: Contents

Course Design

Course Activities: Concepts, Investigations, Issues

The three main components of the Workshop Biology course are *concept activities*, *investigative activities*, and *issues activities*. Concept activities aim to teach students the key concepts of biology, through discovery and hypothesis-testing exercises, which are often designed to confront fundamental misconceptions. Investigative activities emphasize the skills and attitudes necessary for scientific inquiry and an understanding of current scientific controversies, and require students to evaluate, design, and conduct scientific studies and present their findings in writing. The issues activities require students to use conceptual knowledge and scientific reasoning skills, and their own values, in addressing important personal and social issues. Through library research, group discussion, writing, and class presentations, students spend much of the term exploring a current social issue that relates to the term's theme, such as pesticide regulation, forest management, or genetic engineering. Additional information about each of these kinds of activities is given in the folders on Concept and Investigative Activities and Issues Activities.

Improving Large Lectures: Assemblies

These three components are rounded out by the *assemblies*, which replace traditional large lectures. Assemblies provide the arena for students to generalize larger, more abstract knowledge structures from their concrete workshop experiences, to synthesize and construct relationships between important ideas, and to discuss further implications of their knowledge. They consist of a variety of class discussions, instructor presentations, video presentations, small group activities, and often center around some problem or issue posed by the instructor. Students come prepared for discussion by having completed a homework/reading assignment prior to the assembly, and often have had some experience in a concept lab. By requiring this kind of preparation, the assembly can focus less on simply presenting material and more on constructing meaning.

We have found that planning each assembly as a mini-course in itself, focusing on one important concept and including a variety of activities organized into beginning (motivating), middle (participating), and ending (assessment) phases to be very effective. For example, one assembly during the spring focused on nutrient cycling in ecosystems. We began with a short videotape from *Nova* on problems in American agriculture, during which the students completed a worksheet which kept their attention focused. We discussed their responses to the questions, and then the instructor presented an overview of the nitrogen and phosphorus cycles. At the middle of the period, students formed groups and discussed one of the questions from their homework, one which required synthesis of the material. After a short wrap-up discussion, the students completed their worksheet by answering two questions: "What was the most important or interesting thing you learned today," and, "What is still most confusing to you?"

This feedback has been invaluable in assessing their effectiveness and in finding out more about the needs of our students. Most importantly, the instructors have the means to try new activities and organizational strategies and add successful ones to their repertoire. Students, also, appreciate the instructors' efforts. As one put it, "They want to find out if the students are understanding, rather than just hoping they understand."

Another example of an assembly activity is included in the Concepts & Investigations section; we plan to include more in future updates. Let us know if there's a specific topic you're interested in.

Course Format

The workshop course, as it was originally designed, differed in several ways from our traditional lecture-based nonmajors course (see the table on the next page). It reversed the proportions of lab and lecture time, so that students in the workshop course spent only an hour and a half each week in a lecture hall and two hours per week in lab. This structure meant that students spent more time in smaller groups with more instructor contact, during which they had the opportunity for more discussion and feedback on their work. It gave students time to explore new concepts and ways of looking at the world, and to work together on activities of greater complexity and depth.

While our assessment of this format indicated that it was indeed much more successful than the traditional format of three 50-minute lectures and one 90-minute lab each week, we came to believe that there were inefficiencies in the workshop format that we could improve upon. We were motivated to reduce these inefficiencies because it turns out, as we suspected, that the workshop format is just not sustainable with the kinds of resources we have in a large research university. We believed we could integrate enough of the workshop philosophy and methods into a more traditional, but more efficient, format. We have now settled upon a format that many of you probably use, and one that has been in use here for some time as well: two 90-minute large-class periods (assemblies, not lectures), and one 90-minute lab. However, with the use of workshop methods, this format has proven almost as effective as the original workshop format, and is more efficient and sustainable. Because the labs occur between the two assemblies, on Wednesday, time in assembly can be used to introduce the lab on Tuesday and discuss it on Thursday. We can also use assembly time for activities such as quizzes, which were extremely inefficient to administer in the workshop.

Our major remaining concern is class size. Some of our assessment results indicate that even the educational benefits of using workshop methods in this more traditional format are sacrificed when the class gets too big—say, over 200 students. Our best results have been with this format and a class size of 75. We know that people in community colleges, who have small classes and often integrate lab and lecture time, making no distinction between them in the schedule, are having a great deal of success with workshop methods. We believe our research has shown that small classes are really the most effective learning environment for most students, and should be emphasized if possible. Even though we no longer use the small-class-intensive workshop format here, our experience with this format has helped us recognize both its costs and its benefits for us, and to learn to integrate more effective teaching methods into a more traditional class format.

Original Workshop Format

Monday	*Tuesday*	*Wednesday*	*Thursday*	*Friday*
	Assembly 9:30-11:00			
Lab 1 11:00-1:00 Lab 2 1:00-3:00 Lab 3 3:00-5:00	Lab 4 11:00-1:00 Lab 5 1:00-3:00 Lab 6 3:00-5:00	Lab 1 11:00-1:00 Lab 2 1:00-3:00 Lab 3 3:00-5:00	Lab 4 11:00-1:00 Lab 5 1:00-3:00 La 6 3:00-5:00	

Traditional Format

Monday	*Tuesday*	*Wednesday*	*Thursday*	*Friday*
Lecture 2:00-3:00		Lecture 2:00-3:00	Lab 1 9:30-11:00 Lab 2 11:00-12:30 Lab 3 12:30-2:00 Lab 4 2:00-3:30 Lab 5 3:30-5:00	Lecture 2:00-3:00

Current "hybrid" format

Monday	*Tuesday*	*Wednesday*	*Thursday*	*Friday*
		Lab 1 8:00-9:30		
	Assembly	Lab 2 9:30-11:00	Assembly	
	11:00-12:30	Lab 3 11:00-12:30	11:00-12:30	
		Lab 4 12:30-2:00		
		Lab 5 2:00-3:30		
		Lab 6 3:30-5:00		

Teaching assistants

Note that we normally have a lot of TAs in this class. Many of these are undergraduate TAs, who have taken the workshop course the previous year, found this method of teaching to be very effective for them, and are interested in continuing to participate in the project. We don't have to pay these TAs very much—sometimes they would rather do it for upper-division credit than for pay, and they get the benefit of working closely with faculty members who can later write them a nice letter of recommendation. They don't have to grade papers, if that is a problem in your institution (and in fact, most of our grading is done by the faculty and by graduate TAs), but the undergraduates are invaluable helping students in the lab and in assembly discussions.

"Coverage"

It should also be fairly obvious that we do not cover as much material in this course as many people do in their general biology courses. Fortunately, no one in our group has been particularly attached to a particular set of concepts that *must* be covered. We believe that this has been no small factor in the success of the project. Too often, we have seen curriculum development projects stall and eventually die because the faculty could not agree on what to throw out. This is most common in projects involving majors, of course, but it happens with non-majors courses too. Our group has agreed on a *small* set of fundamental principles and concepts—inheritance, protein synthesis, homeostasis, evolution, diversity—that students need to understand in order to become life-long learners. This is where the goal of making decisions about real-life issues becomes really crucial—what students need to know is dictated by what kinds of decisions they have to make. If knowing the details of the Krebs cycle, for instance, will help them make a decision about some issue, then let's do it. If not (as is probably the case), let's not worry about it. If we give them the right learning and thinking tools, they can find out things they need to know on their own, long after the course is over.

Syllabi

Examples of syllabi from each of the most recent terms of General Biology are included next. At the University of Oregon, General Biology is taught in three quarters, the first focusing on cells and genes, the second focusing on organismal physiology and development, and the third focusing on populations—ecology and evolution. The first syllabus is from BI 101, Fall Quarter 1995 (last term); currently, we are offering only one version of General Biology, the "workshop" version in the new format (see above). The second syllabus is from BI 106, Winter Quarter 95 (last winter); during this term, two versions of General Biology were offered, BI 106, in the original workshop format, and BI 102, the traditional version. The third syllabus is from BI 103, Spring Quarter 95 (last spring); during this term, only one version of General Biology was offered, also a workshop-style class in a more traditional format.

BI 101 Workshop Biology: Cells

Information Sheet and Syllabus for Fall Quarter 1995

Instructors

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Biology 101 Web page address http://zebra-fish.uoregon.edu/bi101/home.html

Course Goals

The intent of this course is to examine concepts and issues related to cellular biology but the emphasis will be on issues related to the genetics of humans. Additionally we hope that you get an appreciation and understanding for how science works by participating in scientific investigations. As this is a course for non-science majors, we will emphasize the major concepts of cellular biology and de-emphasize biological jargon. A fair amount of biological terms will be necessary so that we can communicate easily and so that you will be able to understand such people as politicians, scientists and us, all of whom are trying to convince you of the "truth". You will be expected to learn enough of the subject so that you can critically evaluate claims made by these purveyors of the truth.

Course Format

Assemblies (Tuesday and Thursday, 11:00 to 12:20, rm 100 Willamette)

Every Tuesday and Thursday all of the students in Bi 101 will meet for an assembly to explore major concepts in the area of cellular biology. Everyone should read the assigned readings **before** coming to the assembly. For some of the assemblies there will be a homework assignment that addresses questions from the readings. During some of the assemblies there will be an in-class assignment, called a participation, that will be turned in at the end of class.

Lab activities (Wednesday in rm 5 Klamath)

The lab is a small group (about 30 students) that meets once a week for 80 minutes. During the labs you will do activities that address major concepts in cellular biology, and scientific investigations where you will form hypotheses, make predictions and then test those predictions through experimentation.

Schedule

The following schedule lists the major activities planned for a given date. We will probably deviate from this, but this should give you a general idea for what will happen. Important events (exams, due dates for papers, etc.) are shown in boldface.

Week	Assembly		Lab	
	Date	**Topics and Quizzes**	**Date**	**Activities**
1	9/26 9/28	Issues in Biology Kingdoms, Issues in Genetics	Wed 9/27	discovering cells
2	10/3 10/5	Cell structure DNA structure	Wed 10/4	library and computer resources
3	10/10 10/12	Race for the Double Helix Video **Quiz #1**, paper #1 assignment	Wed 10/11	finish video introduce poster project
4	10/17 10/19	Mitosis **Paper #1 due**, scientific method	Wed 10/18	mitosis in onions
5	10/24 10/26	Protein Synthesis **Quiz #2,** design photosynthesis exp.	Wed 10/25	modeling protein synthesis
6	10/31 11/2	Meiosis Modeling Meiosis, discuss photo. exp.	Wed 11/1	conduct photosynthesis experiment
7	11/7 11/9	Mendelian Inheritance **Quiz #3,** poster references due	Wed 11/8	GCK 1, DNA Fingerprint: collect DNA
8	11/14 11/16	Sex Linkage **Paper #2 due**, Genetic counseling	Wed 11/15	GCK 2, DNA Fingerprint: run gels
9	11/21 11/23	**Quiz #4,** finalize poster Thanksgiving	Wed 11/22	DNA Fingerprint: analysis
10	11/28 11/30	Polygenic inheritance, **posters due by 5 PM** discuss pedigrees, evaluations	Wed 11/29	**Poster Session in Willamette Atrium**
final	12/6	**Final Exam** Wed, 3:15 in 100 Wil		

Evaluation

•Participations: assembly participations will be checked by the TAs and one of three "grades" will be assigned: a check (√) will indicate that the work was satisfactory, a check minus (√-) will indicate the work was lacking in some significant aspect, and a check plus (√+) will indicate an exceptionally well done paper. It is anticipated that nearly all of the scores will be checks.

•Homeworks: there will be one homework assignment a week that will be due at the beginning of your lab on Wednesdays. These will be graded with the same check (√) system used for the participations. The homework will help you to learn the material from your readings that we think is important and thus may be included on the exams.

•**Laboratory activities:** include worksheets, lab handouts and informal presentations. These will be graded with the same check (√) system used for the participations and homework.

•**Issues papers:** there will be 2 formal papers that should be no more than 2 pages, typed double-spaced. The 1st paper will be on an issue using assigned papers. The second paper will be on the same issue that you use for your poster.

•**Group poster presentation:** each of you will work with a group on an issue related to human genetics. You will have some choice in the issue you pick. Each group will produce a poster that will be presented to the class at the end of the quarter.

•**Exams:** there will be 5 short-answer exams, 4 exams given during the beginning of some assemblies (see schedule for specific dates) and a comprehensive final exam on **Wednesday, December 6 at 3:15.** The exams will cover material from all aspects of the course including: assemblies, labs, handouts and readings. There may be some material on the exams that is covered in the reading but not in the assemblies. Your homework assignments will help you to concentrate on the reading material that we think is particularly important.

Component	**Points**
Assembly participations	80 points
Homework	80 points
Laboratory activities	80 points
Issues papers:	
1st paper	80 points
2nd paper	80 points
Exams	
best 3 of 4 quizzes (100 points each)	300 points
final exam	100 points
Poster	200 points

Reading

You will be assigned various readings during the quarter. Most of the reading will be from the text, *The Nature of Life* by Postlethwait and Hopson, but there will also be articles from newspapers and journals. The text should be used as a general reference throughout the three quarters of General Biology. The specific pages are indicated in the schedule below. The readings include background material useful for preparing you for assembly and for studying for exams. We don't expect you to remember all the details in this material. A good strategy would be to skim over the material first, concentrating on the major concepts, then to read more carefully the parts relevant to the homework or the workshop. We will list any specific pages that we think are particularly important on the homework assignments.

Week	Text Readings
1	Chapter 1 pages 1-18, 22-23
2	Chapter 3 and Chapter 9
3	Chapter 9
4	Chapter 7 pages 166-182 and Chapter 1 pages 19-21
5	Chapter 10 (skim Chapter 6)
6	Chapter 7 pages 183-193
7	Chapter 8 pages 196-209, Chapter 11 pages 268-284
8	Chapter 8 pages 209-220, Chapter 11 pages 284-289
9	
10	Chapter 11 pages 271-276

Late Work

Participations are due at the end of each assembly, require that you participate in the assembly and therefore cannot be made-up. Exceptional work (i.e. two √+'s) in other participations can make-up for a missing participation.

Homework is due at the beginning of your lab session. It will be accepted up to one week after the due date but can only receive a √-. No homework will be accepted more than one week after the due date.

Lab Activities will be accepted up to one week after the due date but will be penalized 10%. No labs will be accepted more than one week after the due date. If you miss a lab because of an illness, talk to a TA about making it up as soon as you return. Most labs cannot be made up because they involve additional materials.

Posters need to be turned in on time so that they can be displayed during the poster session. Poster's are due on Tuesday November 28th at 5 PM. Posters will be accepted as late as the next day (Wednesday, November 29th) during your lab time but will be penalized 10%.

Exams cannot be made up. Everyone is required to take the final exam. Make your travel plans now as there will be no early exams. If you miss one of the 4 exams given during the quarter, we will drop that score.

Bi 106 General Biology: Organisms
Development and Physiology in Animals and Plants

Information Sheet and Syllabus for Winter Quarter 1995

Personnel

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Course Description

This is the 2nd quarter of a 3 quarter course in general biology. This version of the sequence, Bi 105-107, is part of efforts by members of the biology department to develop a new biology curriculum that involves students as active participants in the learning process. Some of you have taken Workshop Biology during the fall term (BI 105) while others took the traditional version (Bi 101). We will frequently ask for your input on how valuable you are finding what we do. We take your input seriously and often change the curriculum based on student comments. Much of what we do reflects suggestions from previous students in the workshops and your suggestions will be greatly appreciated by future workshop students. If anything is unclear, at any point during the quarter, be sure to let us know.

The intent of this course is to examine concepts and issues related to how a single cell becomes a multicellular organism (i.e. developmental biology) and how those organisms survive (i.e. physiology). The course will be broken down into two separate modules. The first module will cover developmental biology and physiology in animals and the 2nd module will be on plant development and physiology.

There are three major goals in this workshop:

- You will learn enough basic concepts and observational skills in developmental biology and physiology that you will be able to learn more about these areas on your own.
- You will have the knowledge and skills necessary to make decisions related to issues in human reproduction and development.
- You will have a better appreciation and understanding for how science works.

Course Format

Tuesday assemblies (Tuesday, 9:30 to 10:50, rm 100 Willamette)

Every Tuesday the students from all of the workshop sections will meet for an assembly in 100 Willamette to explore major concepts in the area of developmental biology and physiology. Everyone should read the assigned readings **before** coming to the assembly. There will usually be an in-class participation that will be turned in at the end of class. We think that the participations are a valuable exercise to help you to learn and think about the material covered during the assembly. It is far too easy to sit back, take notes and not really process the information presented to you during a lecture. The purpose of the participations is to make you a more active learner during the assembly.

Workshop activities (Monday/Wednesday or Tuesday/Thursday in rm 5 Klamath)

The workshop is a small group (about 30 students) that meets twice a week for 2 hours on Monday and Wednesday or Tuesday and Thursday. During the workshops you will do a variety of activities including: investigation of issues related to human reproduction and development, lab activities that address major concepts in development and physiology, and scientific investigations where you will form hypotheses, make predictions and then test those predictions through experimentation.

Textbook

The textbook is *Nature of Life, 2nd. Ed.*, by Postlethwait and Hopson. There are copies on reserve in the science library. The specific pages are indicated in the schedule below. The readings include background material useful for preparing you for assembly and for studying for exams. We don't expect you to remember all the details in this material. A good strategy would be to skim over the material first, concentrating on the major concepts, then to read more carefully the parts relevant to the homework or the workshop.

Evaluation

You will have the opportunity to demonstrate your understanding in a variety of ways. As there are many assignments that you will do for this course, **it is highly recommended that you keep all of your work in a notebook throughout the quarter.**

•**Assignments:** participations, homework and workshop activities (worksheets, handouts, informal presentations etc.) will be checked by the TAs and one of three "grades" will be assigned: a check (√) will indicate that the work was satisfactory, a check minus (√-) will indicate the work was lacking in some significant aspect, and a check plus (√+) will indicate an exceptionally well done paper. It is anticipated that nearly all of the scores will be checks. If you average √s on all of your assignments, you will receive full credit (20%) for this portion of your evaluation.

•**Investigation reports**: there will be two major investigations, one for each module: Blood Pressure Report and Plant Water-Transport Report. The reports will be typed. You will receive a handout later that explains these in more detail.

•**Issues poster:** groups of about 3 students will develop a poster that addresses an issue related to human reproduction and development. The posters will be displayed in the Willamette Atrium so that members of the workshop and the university community can view them. Each group will present the poster to their workshop and evaluate the other posters on display. We will discuss the details in class.

•**Exams:** there will be 2 short-answer exams, one for each module. The 2nd exam will be given during the final exam time, Monday March 13 @ 10:15.

Component	**Percent of Grade**
Assignments participations, homework, workshop activities (10% for animal module, 10% for plant module)	20%
Investigation reports Blood Pressure Report (10%) Plant Water-Transport Report (10%	20%
Issues poster Includes an evaluation of other posters in the class	20%
Exams 2 exams (20% each)	40%

Late Work

Participations are due at the end of each assembly, require that you participate in the assembly and therefore cannot be made-up. Exceptional work (i.e. two √+'s) in other assignments can make-up for a missing participation.

Homework will be accepted up to one week after the due date but can only receive a √-. No homework will be accepted more than one week after the due date.

Workshop assignments that are late will be accepted up to one week after the due date but can only receive a √-. No assignments will be accepted more than one week after the due date. If you miss an assignment because of an illness, talk to a TA about making up the assignment as soon as you return. Some workshop assignments cannot be made up because they involve additional materials. These assignments can be made up by exceptional work (i.e. two √+'s) in other assignments.

Investigation reports that are late will be penalized 10% for each lab meeting beyond the due date. No reports will be excepted after 3 lab meetings past the due date.

Schedule

The following schedule lists the major activities planned for a given date. We will probably deviate from this , but this should give you a general idea for what will happen. Important events (exams, due dates for papers, etc.) are shown in boldface.

Week (Date)	Assemblies Workshop Activities Text Readings
1 (1/4-1/5)	assembly: none workshop: introduction text: start readings from next week
2 (1/9-1/12)	assembly: Human Reproduction workshop: sea urchin fertilization (page 266-271) text: 290-303; 438-441; 534-550
3 (1/17-1/23)	assembly: Human Development workshop: hydra development text: 272-278; 302-313
4 (1/24-1/30)	assembly: Animal Circulation workshop: blood pressure experiment text: 279-284; 446-459
5 (1/31-2/6)	assembly: Animal Nutrition workshop: nutrient analysis text: 494-507
6 (2/7-2/13)	assembly: **Exam #1** workshop: work on poster text: begin reading for next week
7 (2/14-2/20)	assembly: Plant Structure workshop: plant structures text: 606-614; 617-628
8 (2/21-2/27)	assembly: Plant Circulation workshop: water transport experiment text: 646-661
9 (2/28-3/6)	assembly: Plant Development workshop: plant hormones text: 630-644
10 (3/7-3/8)	assembly: Plant Reproduction workshop: plant reproduction text: 614-617
Finals (3/13)	final exam time: **Exam #2** Monday 10:15 AM

Bi 103 Spring 1995
Information Sheet and Syllabus for
Ecology and Evolution: Forests

Personnel

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Course Scope and Goals

Can we save the northern spotted owl by "locking up" huge expanses of old growth timber? Is it worth the cost? Does the spotted owl really matter, anyway? If it is an indicator species, just what is it indicating? If we don't stop cutting our forests, do we have any right to tell Brazil to stop cutting theirs? Or are tropical forests, and the results of clearing tropical forests so different from what we see in the Pacific Northwest that these issues are not easily compared? These are the kinds of questions that you will address in this course.

By the end of the term, we expect that you will not only understand the significance of several fundamental concepts of ecology and evolution, but you will also appreciate how some aspects of these concepts relate directly to events in your own life, both with respect to forest issues and to ecological issues in general. In particular, we hope that you will have gained skill and confidence that will enable you to analyze, criticize, and utilize biological information that you encounter in news media when it comes time for you to make personal decisions such as how many children you want to have, what kinds of foods you want to eat, how you decide to get yourself to school or work, how you will vote on a wide range of environmental issues, or which groups you will choose to join or to give money.

Course Format

Using forest biology as our theme, we will study several major areas of ecology and evolution. The course will be broken down into three modules, each taking approximately three weeks:

module #1	Evolution, Natural Selection and Earth History
module #2	Biodiversity and Community Ecology
module #3	Populations, Behavior and Ecosystems

Each Tuesday and Thursday we will meet in room 123 Pacific for 50 minutes to explore a major area of ecology or evolution. These topics are listed on the syllabus at the end of this document. For each week there will be a reading assignment from *The Nature of Life*. There will often be homework assignments and in-class activities (called Participations) that will be collected. It is important that you come to class prepared as we will assume that you have obtained a familiarity with terms and basic concepts from the reading so that in assembly we can: show how these concepts are related; explore applications of some of these concepts; and go into more detail on some of the more difficult concepts.

Labs meet in 5 Klamath for 3 hours on Mondays, Tuesdays or Wednesdays. We will explore various concepts and issues related to the material covered during the assemblies. There will be 4 major lab handouts that you will complete and turn-in to be graded.

Evaluation

You will have the opportunity to demonstrate your understanding in a variety of ways. Each of you will fill out a contract (during the first week) indicating how you want to be evaluated. There are several items that will be considered in determining your final grade: some are mandatory and some are optional.

Mandatory Items
The following three items are required for everyone.

- **Final Project** everyone will be expected to do a project that will be turned in by Friday May 26th. The project will be worth 20% for everyone. You will receive a separate handout that explains the options for the project.

- **Labs** there will be 4 lab handouts that will be collected and graded. Each handout is worth 5% of your grade. The four labs are:
    1. Tree Identification and Natural Selection
    2. Soil Organisms
    3. Demography
    4. Behavior

- **Exams** there will be three short-answer exams given during the term. Note that there is no final exam. You will have an option of having the exams worth 36%, 44%, 52% or 60%, depending on how many optional items you choose to include in your grade. The options will be explained below.

Optional Items
I feel that the following items are all helpful. However, some of you may find that you do not want them to be considered as part of your grade. You have the option of picking one, two or all of these items to count towards your grade. Each item that you choose will reduce the percent that the exams are worth. For example: if you choose to do all three then the exams will be worth a total of 36%.

- **Participations** are activities conducted during the assemblies to help you to be more actively involved in the lectures. If you choose to have these count towards your grade, then you need to turn them in at the end of each lecture. The participations will be checked by the TAs and one of three "grades" will be assigned: a check (√) will indicate that the work was satisfactory, a check minus (√-) will indicate the work was lacking in some significant aspect, and a check plus (√+) will indicate an exceptionally well done paper. It is anticipated that nearly all of the scores will be checks. If you average √s on all of your assignments, you will receive full credit (8%) for this portion of your evaluation. It is not possible to make-up participations.

- **Homework** is designed to help you think about the concepts covered in the assemblies. If you choose to have these count towards your grade, then you need to turn them in on time and they will be graded with the same system used for participations. These will be worth 8% of your grade.

- **Tree identification quizzes** will be given during the labs. If you are interested in learning how to identify trees and have it count towards your grade you can take the two quizzes. The two quizzes will be worth a total of 8% of your grade.

Component	Percent of Grade
Mandatory Items	
Labs	20%
Tree Identification (5%)	
Soil Organisms (5%)	
Demography (5%)	
Behavior (5%)	
Project	20%
Exams	36-60%
Optional Items	
Participations	8%
Homework	8%
Tree Identification Quizzes	8%

Late Work

Participations are due at the end of each assembly, require that you participate in the assembly and therefore cannot be made-up. Exceptional work (i.e. two √+'s) in other participations can make-up for a missing participation.

Homework will be accepted up to one week after the due date but can only receive a √-. No homework will be accepted more than one week after the due date.

Lab Handouts will be accepted up to one week after the due date but will be penalized 10%. No labs will be accepted more than one week after the due date. If you miss a lab because of an illness, talk to a TA about making it up as soon as you return (it may be possible to attend another lab section). Some labs cannot be made up because they involve additional materials.

Projects that are late will be accepted until Friday 6/2 but will be penalized 10%.

Schedule

The following schedule lists the major activities planned for a given date. We will probably deviate from this , but this should give you a general idea for what will happen.

Week (Date)	Assemblies Lab Activities Text Readings
1 (3/27-3/30)	assembly: Introduction to Ecology and Evolution lab: Tree Identification 1 text: Ch 37 and Ch 15
2 (4/3-4/6)	assembly: Earth History; Evolution lab: Tree Identification 2 text: Ch 33
3 (4/10-4/13)	assembly: Natural Selection lab: Modeling Natural Selection text: Ch 33 **Exam #1 on Thursday 4/13**
4 (4/17-4/20)	assembly: Biodiversity lab: **conifers identification quiz (optional)** Soil Organisms 1 text: Ch 16-18
5 (4/24-4/27)	assembly: Community Ecology lab: Soil Organisms 2 text: Ch 35
6 (5/1-5/4)	assembly: Populations lab: Demography 1 text: Ch 34 **Exam #2 on Tuesday 5/2**
7 (5/8-5/11)	assembly: Populations; Behavior lab: Demography 2 text: Ch 34, 38
8 (5/15-5/18)	assembly: Behavior lab: Behavior 1 text: Ch 38
9 (5/22-5/25)	assembly: Ecosystems lab: **flowering-trees identification quiz (optional)** Behavior 2 text: Ch 36 **final projects due Friday 5/26**
10 (5/30-6/1)	assembly: Synthesis lab: none (Memorial Day week) **Exam #3 on Thursday 6/1**