

# General Biology 111

## Fall 2009

### Lecturer & Coordinator:

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& by appointment (W-2-074)

Note that this  
does not start  
with "www"

Don't forget  
the final slash.

World-Wide Web Site: <http://intro.bio.umb.edu/111-112/>

### Required Materials:

1. Textbook: *Biology* by Campbell & Reece, **8th edition**. In course handouts etc., this will be referred to as *Campbell*. This is available in two versions; you should be sure to get one:
  - **The "Full Campbell"**. This is the entire 1,300+ page book. It is comprehensive and expensive. We will use the first part of this book in Bio 111; we will use the second part in Bio 112. *You should get this version of the book if you will be taking Bio 112.* This is available at the UMB Bookstore & some on-line bookstores like amazon.com.
  - **The "Skinny Campbell"**. This is only the parts of the book that are relevant to Bio 111. It includes Chapters 1 - 20, the CD-ROM, access to the Campbell website, the index, and the Table of Contents. It is substantially less expensive. *You should get this version of the book if you will not be taking Bio 112.* This is available at the UMB Bookstore only.
2. Problems Book: *A Problems Approach to Introductory Biology* by White and Mischke, 1<sup>st</sup> edition. In course handouts etc., this will be referred to as *APAIB*. This book contains practice problems (both on paper and computer-based) that will be used in lab and provide *essential* practice with the material for the exams. This is available at the UMB Bookstore & some on-line bookstores like amazon.com. *Note that there are some typos in the first printing of the book; you should see <http://intro.bio.umb.edu/apaib/> for updates. Note also that the CD-ROM that comes with the book does not work; a revised version can be downloaded from the book website and will be handed out in lecture.*
3. Lecture Handouts: Each lecture has a handout; this provides material *essential* for understanding the lecture. You can purchase a 3-ring binder with all the lecture handouts from Quinn Reprographics (Quinn LL-024). These handouts are also available for free download on the course website. I *strongly* advise you to buy the collected handouts.
4. Lab Manual: These materials are *essential* for performing the lab activities; the lab manual also contains pre-labs, worksheets, practice problems, and exams from past years. You can purchase a 3-ring binder with the entire lab manual from Atrium Reprographics Quinn Reprographics (Quinn LL-024). The sections of the lab manual are also available for free download on the course website. I *strongly* advise you to buy the lab manual.
5. iClicker Transmitter: All students must have an iClicker transmitter (see later for details) and bring it to each lecture. These are available at the UMB Bookstore *only*.

### **Course Policies:**

**Lectures:** Lectures meet in Lipke Auditorium: Mon, Weds, Fri 12:00 to 12:50; regular attendance is expected. Extra copies of handouts can be found outside W-2-074.

**Lab Sections:** Lab sections meet in W-2-030 and -032. Some labs involve hands-on activities; others involve problem-solving exercises. Lab sections will be assigned during the first week of class; you may not switch sections after that time. Attendance in lab is expected.

In an emergency, you may make up a missed lab by attending another section that meets during the same week with the permission of the TA; TAs may refuse entry to students once the section is full. You may attend only one make up lab section per semester; after that, if you attend a lab other than the one to which you have been assigned, you will be allowed to attend that lab but your pre-lab and any other materials due in that lab will not be graded.

You must read the lab manual before lab. Some labs have pre-lab exercises based on the lab manual; these are due at the start of lab and will not be accepted late. **You will not be admitted to lab unless you have a copy the lab manual, the APAIB book, and a completed pre-lab with you.**

The lab sections are as follows:

<b><u>Section</u></b>	<b><u>Time</u></b>	<b><u>Room</u></b>	<b><u>Section</u></b>	<b><u>Time</u></b>	<b><u>Room</u></b>
1	Tu 9:30 - 12:30	W-2-030	9	Th 9:30 - 12:30	W-2-030
2	Tu 9:30 - 12:30	W-2-032	10	Th 9:30 - 12:30	W-2-032
3	Tu 2:00 - 5:00	W-2-030	11	Th 2:00-5:00	W-2-030
4	Tu 2:00 - 5:00	W-2-032	12	Th 2:00-5:00	W-2-032
5	We 8:30 - 11:30	W-2-030	13	Fri 8:30 - 11:30	W-2-030
6	We 8:30 - 11:30	W-2-032	14	Fri 8:30 - 11:30	W-2-032
7	We 1:00 - 4:00	W-2-030	15	We 5:30 - 8:30 PM	W-2-030
8	We 1:00 - 4:00	W-2-032	16	We 5:30 - 8:30 PM	W-2-032

**Note:** lab sections are very full - if you do not fill out a student information sheet at the first lecture, your space in lab will be given to another student **even if you are registered for the class.**

**Readings:** Lectures and readings are designed to be complementary. Often, the emphasis of lecture will be different from the book. Although the course emphasizes lecture material more than readings, exams will draw freely from both lectures and readings.

**Discussion Section:** Tuesdays 12:30 - 1:20 in W-2-032. I will lead a group discussion of the week's material as a tutorial for you and an opportunity for me to understand how you are learning the material. Attendance is encouraged but not required.

**Exams:** There will be four exams: three 50-minute exams given in class during the semester and a comprehensive 3-hour final exam. There will be no make up exams. No conflict exams will be given. If you arrive more than 5 minutes late to an exam, but before the first person has finished the exam, you will be given as many minutes as you were late as extra time after the exam. We may offer exams held in the laboratory at the same time as the lecture exams if there is space available. We will drop the lowest grade of the three 50-minute exams when calculating your overall grade. The final exam will be scheduled during the semester. The final exam score cannot be dropped. You may bring a single 8.5 x 11 sheet of paper with whatever you want on it to each exam.

<u>Exam</u>	<u>Lectures Covered</u>
1	Introduction 1 through Genetics 7
2	Chemistry 1 through Biochemistry 9
3	Molecular Biology 1 through Cell Biology 1
Final	Introduction 1 through Cancer 5 with emphasis on Cancer 1 through Cancer 5

Exam Re-grades: Occasionally, we make mistakes when grading. If you feel that your exam was graded in error, you can request a re-grade. Instructions and notes for re-grading:

- Re-grades must be in writing; because different TAs graded different questions, neither I nor your TA can re-grade your exam “on the spot”.
- When asking for a re-grade, you should include the following:
  - Your whole exam. Do not mark on it in any way. In order to prevent cheating, we xerox or scan some or all of the exams; any marks made on your exam after it was graded and given to you in lab may be interpreted as cheating. Students who alter their answers and submit these altered answers for a re-grade will receive a grade of “F” for the course and a letter will be sent to the Dean of Undergraduate Education notifying him/her of the incident.
  - A note on a separate piece of paper (attached to your exam) explaining what needs to be re-graded. Don’t simply say, “Re-grade question 3”; you should explain why your answer deserves more credit that we gave. If it is an addition error, explain which numbers were added up incorrectly.
  - Re-grade requests that do not follow these rules will be returned without review.
- Re-grade requests must be turned in to your TA or Mark Carlson within 2 weeks of the date the exam was handed back in lab.
- Re-graded exams will be returned in lab about 2 weeks later.

Snow days: If class is cancelled due to snow, check the web site or my office phone for announcements. In general, snow days before exams will not cause the exams to be moved; if a snow day falls on an exam day, the exam will be held in the next lecture period.

Tutor-led Study Groups: There are several tutors to help students in Bio 111. Tutoring is free and open to all students. The tutors will lead weekly study group workshop sessions where they will go over that week’s APAIB problems as well as answer questions. Regular attendance is strongly encouraged.

Software from *A Problems Approach to Introductory Biology* will run on almost any computer, Mac or PC. It is also set up to run on some of the computers in the Library. In the Red lab (Healey Library UL), it is set up on the PCs only. You can access the programs from the programs menu; look in the “B. White APAIB” sub-menu; you can also run it from the CD on these computers. The software is also available on the PCs on the 4<sup>th</sup> floor of the Library and on the 2<sup>nd</sup> floor on the computers behind the Cafe.

You will need to get a new copy of the CD to run the software on a PC. You can download the CD from the book website (<http://intro.bio.umb.edu/apaib/>); I will also be handing out free copies in lecture.

# Lecture & Lab Schedule

Date	Topic	Lab & [Due Date]
W 9-Sep	Introduction 1: Overview	NONE
F 11-Sep	Introduction 2: Science as a Process	
M 14-Sep	Genetics 1: Mendel	01: Virtual Genetics Lab I
W 16-Sep	Genetics 2: Solving Genetics Problems	[VGL I report due week of 9/21]
F 18-Sep	Genetics 3: Cells, Mitosis, & Meiosis	
M 21-Sep	Genetics 4: Sex Linkage	02: LEGO Mitosis
W 23-Sep	Genetics 5: Pedigrees	Genetics Practice Problems I
F 25-Sep	Genetics 6: Solving Pedigrees & Risk	[Mitosis rept. due week of 9/28]
M 28-Sep	Genetics 7: Applications & Limitations	03: LEGO Meiosis
W 30-Sep	Chemistry 1: Atoms	Genetics Practice Problems II
F 2-Oct	Chemistry 2: Covalent Bonds	[Meiosis rept. due week of 10/5]
M 5-Oct	Chemistry 3: Non-Covalent Bonds I	04: Virtual Genetics Lab II
W 7-Oct	Chemistry 4: Non-Covalent Bonds II	Aipotu I
F 9-Oct	Chemistry 5: Water Chemistry	[VGL II report due week of 10/12]
M 12-Oct	<b>Columbus' Day</b>	05: Chemical Structures
W 14-Oct	Biochemistry 1: Macromolecules 1	
F 16-Oct	Biochemistry 2: Macromolecules 2	
M 19-Oct	<b>Exam I</b>	06: Chemical Properties
W 21-Oct	Biochemistry 3: Protein Structure I	
F 23-Oct	Biochemistry 4: Protein Structure II	
M 26-Oct	Biochemistry 5: Energy & Bonds	07: Green Fluorescent Protein
W 28-Oct	Biochemistry 6: Catalysis	[GFP report due week of 11/2]
F 30-Oct	Biochemistry 7: Enzymes & Metabolism	
M 2-Nov	Biochemistry 8: ATP & Glycolysis	08: Protein Structure
W 4-Nov	Biochemistry 9: Respiration, etc.	[Protein Structure report due
F 6-Nov	Molecular Biology 1: DNA Replication	week of 11/16]
M 9-Nov	Molecular Biology 2: Transcription	NONE
W 11-Nov	<b>Veterans' Day</b>	
F 13-Nov	Molecular Biology 3: Translation	
M 16-Nov	<b>Exam II</b>	09: Aipotu II
W 18-Nov	Molecular Biology 4: Introns & Genomes	[Aipotu II report due
F 20-Nov	Molecular Biology 5: Genes & Mutation I	week of 11/30]
M 23-Nov	Molecular Biology 6: Mutation II & Virus	NONE
W 25-Nov	Molecular Biology 7: HIV/AIDS	
F 27-Nov	<b>Thanksgiving</b>	
M 30-Nov	Cell Biology 1: Cells & Organelles	10: LEGO DNA
W 2-Dec	Cancer 1: Introduction	[LEGO DNA report due week of
F 4-Dec	Cancer 2: Growth Factors & Cell Signals	12/7]
M 7-Dec	<b>Exam III</b>	11: Aipotu III
W 9-Dec	Cancer 3: Oncogenes & Mutations	[Aipotu lab due in lab this week]
F 11-Dec	Cancer 4: Genetics & Treatment	
M 14-Dec	Cancer 5: The Big Picture	NONE

# Reading List

Lecture	Readings in Campbell	Activities on Campbell website	APAIB Problems {except these}
Introduction 1	skim 1-17	-	-
Introduction 2	18-24; 262-264	14.1 Monohybrid only	-
Genetics 1	264-267; 269-273	14.2; 14.3	Ch1: 1; 1.1.all* {1.1.2}; V1;
Genetics 2	-	-	V2; 1.3.all {1.3.4-1.3.7}; V3
Genetics 3	228-234; skim 248-257	12.2; 12.3	-
Genetics 4	286-288; 289-292; 297-300	15.1, 15.2	Ch1: 1.4.all; V4
Genetics 5	276-281	14.4	-
Genetics 6	269-270	-	Ch1:1.2.all{1.2.5};1.5.all{1.5.1}
Genetics 7	279-281; 300-302	-	Ch1: 3.8; 3.9
Chemistry 1	30-37	2.2	-
Chemistry 2	38-42; 58-66	2.3 Covalent only	Ch2: 1.1.all; C1
Chemistry 3	40-43; 46-47	4.2 Isomers only	-
Chemistry 4	39-41	-	-
Chemistry 5	50-51	-	Ch2: 1.2.all
Biochemistry 1	68-77	5.1	Ch2: 2.1.all
Biochemistry 2	77-81	-	Ch2: C3
Biochemistry 3	81-83	-	Ch2: 2.3.all; C5
Biochemistry 4	84	5.4	Ch2: 2.4.all; 2.5.all; C6
Biochemistry 5	142-148; 151-152	8.1	Ch2: 3.1.1; 3.1.3
Biochemistry 6	153-154; 326-327	-	-
Biochemistry 7	151-155	8.4	Ch2: 3.1.4; 3.1.7; C7; C8
Biochemistry 8	149-151; skim 162-169	8.3	Ch2: 3.1.2; 3.3.1-3.3.4
Biochemistry 9	Skim 170-179; skim 185-189	9.1; 9.2; 10.1	Ch2: 3.3.5-3.3.7
Cell Biology 1	94-101; 125-129	6.2; 7.1; 7.2	-
Molecular Biology 1	86-89; 305-310	5.5; 16.1	Ch3: 1.all; 2.all; C1
Molecular Biology 2	311-318	16.2	Ch3: 3.diagnostic only
Molecular Biology 3	325-334	17.1 activity; 17.2	-
Molecular Biology 4	337-344	17.4	Ch3: 4.1.all
Molecular Biology 5	334-335; 356-358; 426-434	17.3	Ch3: 4.2.all
Molecular Biology 6	344-346	-	Ch3: 4.1.all;{4.1.2};4.2.all, C2
Molecular Biology 7	381-390	-	Ch4: all
Cancer 1	242-243; 373-376	12.3, 19.2, 19.3	-
Cancer 2	206-211	11.3	-
Cancer 3	376-377	-	-

\* Note that "1.1.all" means "all problems that start with number 1.1"; in this case, it is 1.1.1 through 1.1.7. Problems in {braces} will be worked in lab.

## Readings and Activities

The readings in *Campbell* are intended to be read before the lecture listed. Because the readings do not always go in the order found in the book, it may be useful to review by reading all the sections in page order rather than the order on the reading list. The activities on the *Mastering Biology* website are intended to help reinforce the concepts learned in lecture.

The practice problems in *APAIB* are designed to be worked after the lecture listed. You will notice that some lectures have many problems while others have none. In general, by the end of the lecture listed, you have all the information necessary to solve the problems listed. Some of these problems will be worked each week in lab to show you problem-solving strategies. You do not have to do all the listed problems after each lecture; you should be sure to have done them all before the exam on that material.

**Note:** the solutions to the practice problems in APAIB are an **essential** part of the book. You should read them over carefully **after** you have written out answers to the problems in the book.

**Grades:** Your final grade will be calculated as follows:

40% hour exams (20% for each of your best 2 grades)

20% final exam

40% Lab: Your lab grade will consist of 580 points, divided as follows:

<u>Done at home &amp; handed in at start of lab</u>		<u>Work done entirely in lab</u>	
Pre-labs	11 x 10 pts = 110	VGL I Checkoff	10
VGL I Report	30	Mitosis Checkoff	10
Mitosis Report	15	Meiosis Checkoff	10
Meiosis Report	25	VGL II Checkoff	10
VGL II Report	45	Aipotu I Checkoff	10
GFP Report	25	Chemical Structures Checkoff	10
Protein Structure Report	40	Small Molecules Worksheet	20
Aipotu II Report	25	Chemical Properties Worksheet	30
LEGO DNA Report	10	Protein Structure Checkoff	20
Aipotu III Report	30	Aipotu II Checkoff	10
		GFP Checkoff	10
<u>Done in Lecture:</u>		LEGO DNA Checkoff	10
Genetics Survey	10	Aipotu III Checkoff	10
Common Ancestor Survey	10		
iClicker	35		
			Total: 170
	Total: 410		

**Due dates:** Lab reports are due as indicated in this syllabus or as modified by your TA. In cases where there is a conflict between when the Lab Manual says that a report is due and when the syllabus or TA says so, your TA is the final source; the syllabus is next. In certain cases, and only with the permission of your TA, lab reports may be turned in to the TAs mailbox in the Biology office (W-3-021) by 5:00 PM on the day that they are due. **In ALL other cases, late reports will NOT be accepted\*** – do not assume that we will grant you an exception. I have very limited flexibility; if you need an exception, it can only be granted if you come to me in advance.

\* Each student will be allowed to turn in one and only one lab report one week late for a maximum of ½ credit. Specifically, if the lab report is turned in between 1 and 7 days late (relative to the student's assigned lab section meeting time), the student's lab report will be graded; the score received will be ½ of the grade earned. Each student may do this only once per semester.

⇒ If you have computer problems with your lab report, you have several options for turning it in on time (in each case **you** are responsible for making sure that your TA receives your report):

1. Turn in a partially-complete report on time.
2. Bring your report to your TA on disk (only with your TA's permission).
3. E-mail your report to your TA as an attachment (only with your TA's permission).
4. Fax your report to the Biology office (617 287-6650); attention: your TA (only with your TA's permission).

It is always good practice to keep backup copies of lab reports on other disks to guard against hard drive crashes.

**Incompletes:** Incompletes will only be granted under certain special conditions (see Mark Carlson for details). To receive an incomplete, you must be passing the course and the work to be completed must be a well-defined unit of the course. An incomplete **must** be arranged in advance of your absence at a meeting **in person** with Brian White.

**Extra Credit:** On a limited basis, extra credit for a missed exam or lab report may be granted for contributions to the course electronic archives. This must be arranged with Mark Carlson in advance on a first-come-first-served and time available basis. Contributions include detailed exam solutions, lab write-ups, lecture notes, practice problems, etc. and must:

- (1) be entirely electronic: on Mac formatted disk in Microsoft Word format
- (2) be apropos of the material you want to make up
- (3) be useful to future generations of Bio 111 students

Only one exam or lab report can be made up in this way per student. All such projects must be arranged with Mark Carlson by Molecular Biology 5 and be completed by the last day of classes. Projects must be of sufficient quality to be accepted and continued.

**Academic Conduct:** It is important that you are familiar with the following sections of the UMass Boston 2007-2009 Undergraduate Catalog: Academic Standards, Cheating, and Plagiarism (pp. 333-334); and Student Rights and Responsibilities -- Academic Dishonesty and Misconduct (pp. 336-340). In this course, penalties for academic misconduct, including plagiarism (copying from another student, a book, or the internet), are strictly enforced. It is my policy to make the consequences of being caught cheating on a given exercise much more severe than the consequences of not turning in that particular exercise.

**iClicker** Beginning with Genetics I, at the end of each lecture, I will ask a short multiple-choice question (note that the exams will **not** be multiple-choice); these questions are designed to see if you have understood a major point from my lecture. Beginning with Genetics II, you will also be asked a question at the beginning of class based on the reading for that day.

You will submit your answer as described below; you will receive 0.5 lab points for each answer you submit, whether it is correct or not. Answers are due during the lecture on the day the question was asked; no late answers will be accepted; there are no make-ups for missed iClicker questions. After all the answers have been logged in, I will announce the correct answer. Answers are available for download from the course website. You are *strongly* advised to look at the answers *after* the lecture; the point of these questions is to get you thinking about the lecture material – that is why you get full credit for any answer, right or wrong.

**Using an iClicker** This looks like a small TV remote control. You transmit your answer to the receiver in Lipke and your answer is logged by the computer.

**You will need to register your iClicker serial number so you can get credit.** You do this through the course website (*not* the iClicker.com site). This is not ready yet; it will be ready in a week or so.

**Lecture Audio** I make a digital audio recording of each lecture and post these on iTunesU. A complete set of lecture audio from last year's Bio 111 is currently available on the website. This year's lecture audio files will replace those from last year as the lectures are given. Many students find these recordings helpful when reviewing their lecture notes. **DANGER:** these are not a substitute for attending lecture!!!

### How to access lecture audio on iTunesU:

1) Get iTunes. It is free from this site: <http://www.apple.com/itunes/overview/>  
It works for both Mac and PC. You only have to do this once.

2) Start iTunes.

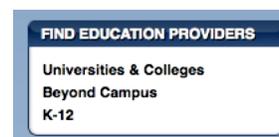
3) Click the "iTunes Store" button on the left of the iTunes window:



4) Click the "iTunesU" button under "iTunes STORE":



5) Click the "Universities & Colleges" button under "FIND EDUCATION PROVIDERS":



6) Find the "University of Massachusetts Boston" link and click it.

7) You'll find Bio 111 and 112 under "Open Courseware"

8) Click the link for the course you want. Be sure you choose the correct year.

9) Clicking on the lecture name will play it in iTunes.

10) Clicking the "Get" button will download the file to your computer and make it available to put on your .mp3 player:



**Lecture notes from Bio 111 Fall 2008** are available in Quinn Reprographics (Quinn LL-024) and on the course website listed under each lecture.

\*\*\*DANGER\*\*\* please read these notes and warnings before buying them.

Notes:

1. They are intended for people who have trouble keeping up with me in lecture; you can make notes on these pages if you like.
2. These are the notes I used in lecture in Bio 111 Fall 2008.
3. They are just what I wrote on the board, nothing more.
4. I have not edited these – they may contain errors.

Warnings:

1. These are not a substitute for lecture! There is much more to lecture than what I write on the board.
2. This year's lectures will be similar but not identical to these. You should be sure to look at what I write on the board carefully.

They may contain errors. You should go by what I write on the board this year & what you find in the book.

**Lecture Notes from this year.** I am using a Tablet PC to write notes on the screen. After each lecture, I will post these notes on the course website.

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**Studying For Bio 111** One successful strategy is to read the introduction to APAIB; it gives a productive way to use that book. You should read over the sections in Campbell; *don't try to memorize it all*, just get a sense of what's there and what it says. Then, start working through the assigned problems in APAIB and use Campbell *as a reference* when you work through the problems in APAIB.

**Tips for success in Bio 111:**

Succeeding in Bio 111 will require a substantial effort on your part. The keys to success are:

**My tips:**

- (1) Come to lecture every time. More so than many courses you have taken, the course is primarily based on lecture, not the book. The readings are designed as background and to help you understand what you didn't get in lecture. Other peoples' lecture notes are better than nothing, but there is no substitute for attending lecture.
- (2) Come to lab prepared. The TAs will assume that you have read the lab manual and/or looked over the practice problems.
- (3) Participate in lab discussions. Lab is designed to have you practice with the material from lecture. Lab sections are designed to allow your questions to be answered; be sure to take advantage of this opportunity.
- (4) Do the practice problems and write out your answers before looking at the solutions. The hardest part of problem-solving is the start and if you look at the solutions, you will never get the practice starting that you will need for the exams.
- (5) Connect with your TA and the tutors early. They are there to help you; don't wait until it's too late.

### Tips from past Bio 111 Students

- (1) "Go to lecture! Go to lab! Pay attention!"
- (2) "Read questions on exams VERY CAREFULLY!"; "Really explain yourself on exams."
- (3) "Be prepared to solve questions, not just learn facts. Pay a lot of attention because when it comes to exams you'll need to know everything (hard exams)."
- (4) "Keep up in lecture, review your notes, and do all the practice problems in the lab manual. They are really helpful."
- (5) "Go to every lecture. Make good use of Lab TA for information and questions on problem solving." "Don't fall behind. Get a tutor."
- (6) "Chill out and don't stress. It's not as hard as you might think. If you keep up with the work, you'll be fine. Do the practice problems (that's what the exams are about)."
- (7) "Use all the tools you have at your fingertips ie: lecture notes, extra question problem sets, the text, Brian's extra explanations to complex ideas (the handouts). All together, they provide you with everything you need for success."
- (8) "Best prep: read labs, lecture material prior to class. This aids in comprehension and allows you to ask informed, useful, questions in class."
- (9) "Don't neglect the textbook. It isn't emphasized but helps fill in the gaps for non-science folks like me."
- (10) "You must be absolutely certain that you want to take Biology 111 because it's hard! It requires a lot from you. You can't afford to "goof off" in this class; everything taught in lecture and lab counts."

### Using the Lecture Audio

In the Spring of 2007, I asked the Bio 112 students how they used the on-line Lecture Audio. They reported that they used it to *review* lectures, even those that they had attended. They did not use it as a substitute for lecture. I also asked the following two questions:

*What did you get from coming to lecture in person that you didn't get from the on-line audio?*

- Being able to ask questions and get clarification immediately
- Hearing other students' questions and the answers.
- Seeing animations, demonstrations, etc.
- "[only listening to the audio is like] going to lecture with my eyes closed and the lights turned out."
- "a lot easier to take notes from the board while listening to Brian teach rather than on-line. Also, I feel that I have a better understanding and remember more information in person."
- "easier to pay attention in class"
- "much easier to follow the notes if you attend lecture"

*What did you get from listening to the lecture audio that you didn't get from coming to lecture?*

- Hearing something I missed the first time.
- Reviewing.
- Being able to stop and go back over something I missed.
- Being able to go at my own pace; to rewind & fast-forward
- Being able to pause and think about what I just heard
- repetition of stuff that was hard to understand

## The “Success Project”

Every Fall, several of the students who fail the first exam go on to do well in the course. We interviewed two of them to find out how they changed their study habits so that their experiences can benefit future Bio 111 students. Here is a summary of what the interviewer found:

- The students were unprepared for the style of the exam, one student thinking it was going to be multiple-choice. They weren't prepared for the free-response style answers. Here is what he/she said (edited):  
“I guess just mainly the concepts- in the first month, I enjoyed genetics- I really enjoyed doing genetics. I was just surprised at the score I got. But I guess it's just kind of like I got carried away, and so...with just like, doing the calculations- because, in my mind, I knew, I thought I knew what I was doing, because I didn't really pay too much attention- I was like, oh I know how to cross and make Punnett's squares, this is easy- So, when it actually came to the exam, I saw he asked more specific questions, and I kind of was reading into it too fast. And it turned out I was wrong. I guess, in a way, it wasn't really what I expected- I thought it was going to be more multiple choice... 'cuz I was used to more multiple choice- And it was just all free response, filling in, and so, I'm used to taking a lot of multiple choice tests, so you can study it, but you don't really have to know the answer too well.”
- The problem book is a very valuable resource. Both students didn't really use it to study for the first exam, but they did use it to study for the second, and it helped them tremendously. The practice exam was also useful for them.  
Q: Did you, in the problem book that you have, did you use the problems and solutions in the problem book to study?  
A: I used it extensively on exam 2.  
Q: and you didn't on exam 1, and then you started after that?  
A Yeah, I did- the problem book was very helpful. And I didn't look at the answers, at all. I think I looked at them if I really wasn't sure about something-  
Q: but if you got stuck, what would you do? Would you go back to your notes?  
A: I would go back to the book or my notes.
- The students spent much more time studying for the second exam. It seems that for the first exam, they both thought that they had a better grasp of the material than they actually did, and were overconfident. More attention to studying helped them with the second exam, including spending more time writing the “cheat sheet” of in-exam notes.
- One student was very happy with the iClickers and made a point of saying that they were very helpful.
- Both students benefited from going back and checking their answers after completing the second exam.  
“...as I was doing the exam, I was thinking the same thing, I was like, “oh, this is so easy”, I was going through the pages really quick, and I turned them in, and I didn't doublecheck my answers like I did for the second one, and, like I said, I misread one of the problems that he was asking. I thought he was asking a different question, and then when I got out of the exam, and I was talking to the other students, they were like, “no, he was asking for this and that, and so I was just like, I was just really...I was just really upset.”