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Welcome to Biology 101!

Biology 101 is an introduction to biology at the college level that is intended to serve both majors and non-majors. It is assumed that students in this class do not have a great deal of practice with biology and that any prior experience is likely to be several years ago. Biol 101 students are expected to take a very active role in their learning by completing readings and homework before class, coming to class ready to participate directly with peers and through in-class technology, and reviewing routinely for quizzes and exams. In this highly-structured course, we have evidence that every student can achieve if they are motivated to be an active learner!

Note: The professor reserves the right to make changes to the syllabus, including project due dates and test dates (excluding the officially scheduled final examination), when unforeseen circumstances occur. These changes will be announced as early as possible so that students can adjust their schedules.

Class Meeting Information

Time: Monday and Wednesday 3:35-4:50pm
Location: Genome Science Bldg. 100

About the Professor and Office Hours

Professor: Dr. Mara Evans
Email: mara1@email.unc.edu
Office: Wilson Hall room 104A (next to Coker Hall)
Office Phone: (919) 843-7107
Office Hours: See "Sakai Sign-up" for weekly available times.
-Additional group hours will also be announced periodically via Sakai

Office Hours: I really hope that you will meet with me at least once this semester. Even if you've never been to office hours before, please come see me (my schedule is more open early in the semester than later). You can come alone or sign-up with a friend. You can come in to talk about the course, study skills, mental health issues, your background, you career, advice for future courses to take, etc. I'm a Carolina First advocate, safe-zone trained (LBGTQ), and I'm an advocate for Covenant students, Chancellor Science Scholars, transfer students, international students, continuing education students, underrepresented minority students, first year students, sophomores, students with silent and physical disabilities, students that require oxygen…ANY student!

Did you know? Asking for help is a sign of strength and self-care! Please ask for help early and often! Small problems are easier to cope with than escalated issues, please do not wait until the end of the semester to ask for help.

Reserving a meeting time. Check "Sign-up" tool on Sakai menu to reserve a slot. My hours for each week will show about 5-6 days before each block of appointments. Come alone or with a friend. I may add hours some weeks as my schedule allows or see individuals outside of these hours if necessary; walk-ins welcome but may need to wait. If you can't make these hours, we can schedule a time. Just send me an email!

Peer Mentors and Supplemental Instruction

Peer support via Forums: I'll have hundreds of students this semester and know I cannot give you all the individual attention you deserve. I'll ask that you become a community of scholars to help answer questions about the course logistics and course content. Forums are the tool that will help us do this and will help you find study buddies. I and the Supplemental Instructors, graduate Teaching Assistant and course mentors will be checking in through the forums occasionally, but it is expected that you will answer each other's questions. I'll be taking notice of students who are engaging here.

**Visit the Overview site of Sakai to see how to sign up for course.care, to keep track of available tutoring hours!

Supplemental Instruction (SI): Your SI review sessions will be offered about 2-3 times a week. Each session will be scheduled for 1 hour. The times and location of these sessions will be posted on Sakai in the second week of class with a link to live updates on course.care. You are not required to attend SI, but it is highly recommended, since this is your opportunity to get more

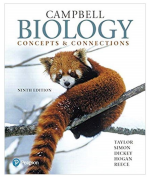
"one-on-one" attention for this course. Plus, we have data that suggests students that attend score on average half a grade better than peers who don't attend. I suggest you fit one into your schedule early in the semester and attend weekly as if it is a required class.

Peer Mentors: We'll have several peer mentors helping in class as we work on activities. Peer mentors are folks you can call over during class and meet up with outside of class for a review. See Sakai and course.care for more information about each mentor's contacts and hours outside of class.

Bio Cell with Biology Specialist: Feel you need a more basic review and more in-depth help? Two sessions are offered each week (Tuesday and Friday) with Robin Blanton, a highly experienced Academic Learning Coach. Attend these free, weekly sessions sponsored by the Learning Center. Learn more and sign up for the weekly sessions here.

Required Resources

Textbook and Digital Access: *Campbell Biology, Concepts and Connections*, 9th Edition with Modified Mastering Biology, ebook, and Learning Catalytics by Taylor, Simon, Dickey, Hogan, and Reece.



The UNC bookstore will email you with details about what to purchase so you have access on the first day (this includes a 14-day grace period without payment). Ultimately you need access to Mastering Biology (online), Learning Catalytics (online) and some form of the book (either ebook or physical, or both). We have worked closely with Pearson and the UNC Boostore to provide you with the most cost-effective options. Note: there are hard-copy books on reserve at the Undergraduate Library.

Required reading: Particular chapters are required (see Guided Reading Questions—GRQs-- for specific details). You should read and answer the GRQs ***before*** completing Mastering Biology homework assignments.

What You Should Bring to Class Every Day

1. **Completed Guided Reading Questions (GRQs)** that you finished before class and can use as a reference. Find these posted on Sakai. **You may only submit your GRQs as a PDF or a Word document. Assignments submitted as Pages (Apple product) will not receive credit.**
2. **Blank Class Outlines** (printed that you can hand-write on or a tablet you can write/draw on). Note: educational research shows that students in a highly-structured course like this learn more by handwriting notes.
3. **Extra blank paper for drawings, notes, activities etc.** (or tablet computer for drawing)
4. **A smart-device:** enabled for UNC wi-fi and Learning Catalytics access. I prefer you use a smart phone for ease/space, but a laptop or tablet will work too.

Note: You may NOT rely on cellular service. You must have your device connected to UNC-Wifi—be sure to do this for any devices you might use in class before the first day: http://help.unc.edu/help/connecting-to-the-uncnetwork-getting-started/

Course Components Making Up Final Grade

Homework via Mastering Biology (9% of your grade): Homeworks will be due generally every Sunday and Tuesday night by 11:55 PM (see detailed schedule). Some assignments will take you as little as 20 minutes and others will take over an hour with the animations and short tutorials interspersed in the homework. It is your responsibility to start it in a timely fashion, so that you finish it by 11:55 PM. **I recommend submitting your work at least 20-30 minutes before the due time to account for internet and loading issues**. **Late homework will receive zero credit,** even though you can still do them for practice. See my Goal #1 below and realize that I am trying to help you to succeed by giving you these regular assessments. Assignments post about one week before they are due. Note: These questions are often lower level and not equivalent to exam questions. They are meant to help you learn/practice.

Quizzes via Mastering Biology (9% of your grade): You will be required to do online timed quizzes in Mastering Biology (Quizzes). These are meant to give you practice for answering questions in a timed situation, more predictive of how you might do on an exam than a typical HW.

Missed quizzes = 0%. Unlike other assignments, quizzes post only about 3 days before they are due. I recommend marking your personal calendar with these due dates today!

Notes:

- Once a quiz is started you must complete it and you cannot go backwards to edit previous questions.
- Students registered with ARS who receive extended time will receive accommodations on quizzes too.
- Access Mastering at: www.pearsonmylabandmastering.com (Instructions for registering are delivered via email from the UNC Bookstore. Course code is in this email and the "overview" on Sakai, too.)

Participation (7% of your grade): Most of this grade will come from Learning Catalytics (4%), but attendance, completion of practice exams, surveys, Guided Reading Questions (GRQs) and in-class and group assignments will also be a part of this grade (3%). To participate, we'll use Learning Catalytics (accessed through Mastering Biology) through your smart device. Note: these questions are to be done in class, you will receive a zero on this portion of your final grade if you are found to be answering questions from a distant location.

How is LC graded? Questions will be participation-based (not graded for correctness). A few points will be dropped for all students to accommodate occasional absence, tech problems, athletic travel, lateness, etc. Please do not email me to tell me you were absent; we will have so many opportunities for participation that missing one or two days in the semester will not affect your grade (I will end up dropping a few points for every student to make accommodations for this for ALL students). If you have multiple, excused absences or an extended illness please make sure I know (see information about excused absences below under **Individual Exams**).

How are GRQs graded? GRQs are graded for completion. They should be completed before doing Mastering assignments and must be uploaded via Sakai by 11:55PM on Sunday and Tuesday evenings. ***I recommend submitting GRQs 20-30minutes before the deadline to allow for loading and internet issues**.* You must submit the GRQs as either a PDF or a Word document. If you take a picture of a figure submit as a JPEG. **Assignments submitted as Pages (an Apple product) will not receive credit.** I also recommend carefully labeling your files with the matching GRQ number. If you accidentally submit the wrong GRQ file to the wrong assignment you will not receive credit for the assignment.

Individual Exams (75% of final grade): There will be three mid-semester exams given during the regular semester, and a cumulative final exam. The format will be multiple choice and short answer. Your lowest **midterm** exam score will be dropped, your final exam grade will count towards your final grade no matter the score. Only the final exam is cumulative, although some objectives around scientific thinking skills will be tested on each exam. Each semester exam will cover the material specified on the course schedule. For all exams, you will need your PID number as identification on your exam sheet. Additionally, you may be asked to verify your identity, so it is required that you bring your one-card to each exam. Failure to produce a One-Card if asked may result in a zero on that exam.
**Students who use ARS: I will upload the file and ask that the exam be scanned and emailed to me as a PDF.

Make-Up Exams. You may only be excused from an exam (and eligible for a make-up) if the Dean of Students excuses your absence. Information about excused absences can be found here: https://odos.unc.edu/student-support/class-absences. If you find that you are going to miss an exam for a University sanctioned excused absence please let me know immediately and be prepared to show documentation! Make up exams for students who qualify will be entirely different from the exams given in class and must be completed within an academic week of the original exam date.

How Is Your Grade Determined?

If you take all three semester examinations:

The lowest exam grade is dropped and the total for the semester = (0.25 x exam) + (0.25 x exam) + (0.25 x final exam) + (0.09 homework average) + (0.07 participation score) + (0.09 quiz score)

If you take any two semester exams:

Both the exams you took will count and the total for the semester = (0.25 x exam) + (0.25 x exam) + (0.25 x final exam) + (0.09 homework average) + (0.07 participation score) + (0.09 quiz score)

Converting your final average to a letter grade:

A = 93-100	C+ = 77 – 79.9
A- = 90-92.9	C = 73-76.9
B+ = 87- 89.9	C- = 70-72.9
B = 83-86.9	D = 60-69.9

B- = 80- 82.9 F = 59.9 or less (or a score of 45% or less on the final exam)

Note: there will be no changes to HOW your final average is calculated at the end of the semester…so please don't ask.

Common Student Concerns:

Many students have been told that Biol 101 is a "weed out" course. Of course this is not true, but why does it have this reputation?

In fact the average grade in this class is in the C+/B- range; this is not bad-- it is average. Yet, students also earn D's and F's in this class. This is absolutely shocking to first year students who have, in the past, received A's in their high school classes for memorizing course material.

You may also be wondering…is there a pre-determined number of students that receive a C, D, or F?

Absolutely not. In theory, if the whole class earns A's, then the whole class is given A's. So why don't all students do as well as they think they will when they walk into class on the first day? My experience tells me that:

1. Some students do not have the active learning and studying skills that they should already have at the college level (It often takes these students an exam or two for them to recognize this.) We can fix this together.
2. Some students do not actually put in the effort that is necessary (even though they may think they are putting in a big effort). You can fix this if you are honest with yourself.

A Few Other Notes:

Digital Etiquette: This course will require you to use your laptop and/or cell phone during class time. Research suggests that the human brain is not as excellent as multitasking as we think it is. Please be respectful of your classmates and restrict your use of digital devices to course content only. If we see that you or your peers are distracted, we will ask you to put your devices away or ask you to leave the class, and you may forfeit your ability to earn participation points that day. There will be times when you have completed your work or answered a poll question, but your peers have not. We ask that you assist your peers when appropriate or use the time to review your notes while you wait. I understand that your devices connect you to your friends and family (a wonderful thing!) but the classroom should be a place apart, however briefly (even if it seems like an eternity to you), from the outside world and distractions. You will learn more if you concentrate on the course while you are here and your classmates will thank you for not impeding their ability to learn.

Should you take notes by hand or type? Research suggests taking notes by hand (paper or tablet) is the best way to learn in a highly structured course like this! No matter how messy your handwriting or notetaking is -- TAKE NOTES BY HAND! You will have class outlines that you should write and draw on. Much of biology is about drawing, so typing just won't be useful. Ideally, you will use your smartphone, if you have one, for Learning Catalytics and not bring a laptop. Powerpoints will only be posted after class.

Sakai Site (you will need your onyen to log on): This site will have postings from my lectures such as outlines, power point slides, and supplemental material I mention in lecture. I will also post announcements/send emails regarding student concerns on this site. It is your responsibility to check it and your UNC email account daily for any course announcements.

Groups

Students learn more when they work in small groups of peers to discuss issues and solve problems*. By the end of January, you will be assigned to a group of 2 – 3 students. You will have an opportunity to fill out a form for a seating preference (fill out this form by January 22 at 5pm). In every class meeting, you will sit with your group in a designated area. We encourage you to get to know your group members because you will work with them throughout the semester. We will not be able to accommodate requests to sit with specific people/friends unless tied to an ARS accommodation.

**In some instances, working face to face with other people is very difficult for some learners. Please send me an email if you have enormous anxiety about group work so we can discuss accommodations and strategies.*

Collaborating with others is an important skill in all professions, and we are available to help you to solve interpersonal problems that may arise within your group. If you are experiencing conflict with your group members, you may decide to invoke the "Terminator Clause." When you work in a group, it is possible that some team members will contribute more than will others. Over time, this can be a critical problem if one person demonstrates a lack of commitment to the team (e.g., failing to contribute to group assignments). In such an instance, we reserve the right to "terminate" that member.

Terminating involves a two-step process: First, the team (in consultation with Dr. Evans) gives the wayward member a warning that includes the wayward teammate negotiating with the entire team about how he or she is going to be a better teammate. Second, if the member continues to behave inappropriately, they will be terminated from the group. Assignments from the point of termination to the end of the semester will be completed as an individual. Bad their tendencies early, so let a problematic group member know his or her behavior is not acceptable early.

Course Goals

1. This course should prepare you to succeed in future science courses. You should learn how to be an active learner in the lecture hall and you should learn how to actively study. Educational research has shown that students in this course who do reading/ homeworks before class, actively participate in class, and review notes regularly can and will succeed. Feeling underprepared because of your background? The course is designed to equalize your readiness before class—while you may take several hours reading and preparing, another student may need less time. Yet when you get to class, your effort will pay off as we practice these concepts together and you gain confidence in your ability! How do you know you are learning? When you make mistakes, you identify what you don't know. Making mistakes is KEY to learning. It makes more sense to make mistakes on homeworks and in-class when the stakes are very low, rather than on an exam, right?

And what if you don't plan to take any more science classes? Active learning and studying are skills needed for any discipline. You can achieve these goals through practice. Most students enter college very skilled at remembering and understanding (Regurgitating memorized information.) True learning will take place, when you are challenged to apply, analyze, evaluate, and synthesize. I will challenge you to do this. You might find this difficult and uncomfortable, but you will be learning!

2. This course should provide you with the concepts and skills that make up the scientific field of biology. For those of you continuing in biology, this is just the tip of the iceberg. For others, this might be your one and only biology course! Our goal will be to touch upon many topics, finding common themes in the chapters we cover. Thoroughly learning the principles is about making connections between material learned at the beginning, middle, and end of the semester! Practice is key to building a foundation of knowledge (and that is why you do Guided Reading notes, Mastering Biology, in-class activities, quizzes, SI, etc.).

Specifically, by the end of the semester you should be able to:

- *Identify examples and name FIVE core themes of biology*
- *Evaluate a scientific study and determine if its design is sound so as to evaluate science around vaccines, pseudoscience, etc.*
- *Make conclusions from data and draw graphs and models from data/information given to you.*
- *Describe the new properties that emerge at each level of hierarchy of life (from small organic molecules through ecosystems and some ways these systems are kept in balance.*
- *Explain what "food" is and compare and contrast animals and plants in how they obtain and transform the matter and energy.*
- *Describe the flow of information in various signaling pathways and in the flow from DNA to proteins.*
- *Explain how life on earth evolved and how adaptations relate to survival, reproduction, and intra- and inter-specific interactions.*
- *Detail examples of adaptations in the animal body in which "structure fits function" at the cellular and whole body level*

3. This course should excite you about biology. Throughout the semester I hope you will ask yourself and me, why is this relevant to me? Some lessons will be more obvious as they relate to health and medicine. I hope that the biology that we learn this semester will cause you to ask more questions. You might even leave with more questions than answers! I'll continually encourage you to read about biological issues and advances in the popular media. If I succeed in getting you to read some articles on your own, I will be a happy professor!

How will you THRIVE this semester?

I **believe students thrive when they:**

- Take full advantage of the breadth and depth of our curriculum
- Set academic and personal goals
- Take responsibility for their education, choices, & decisions

How *successful* students have done well in this course: They…

1. always read the textbook for each corresponding homework while answering Guided Reading Questions (GRQs). They pay attention to what they are reading and reflect on what they are unsure about. They do NOT spend time making their own extensive outlines, they use the GRQs only.
2. complete their Mastering Biology homework assignments with plenty of time to make mistakes and think through the questions. They are not too focused on the grade they get on homeworks because they value the homeworks and videos as a tool to learn.
3. attend each class session prepared, stay engaged by hand-writing notes, and interact with peers that encourage them to participate and learn.
4. are brave and vulnerable. What do I mean? They are willing to make mistakes, take chances drawing a model wrong, are willing to attempt questions by themselves before checking in with a peer, are willing to talk to a classmate they don't know.
5. review after each class for about 15-20 minutes to reflect on what was learned and what they still have questions about.
6. study before each Mastering Biology quiz and practice exam, so as to prepare for them like a real exam.
7. review (on their own) every question from Mastering HW, GRQs, Quizzes, Learning catalytics, class, etc. to see if they could TEACH it to someone else. Successful students don't just simply get the right answer and move on, they are able to explain how someone arrives at this answer.
8. attend S.I., mentoring hours, tutoring hours, or study groups routinely because once they have done the work alone, they can collaborate and learn even more from others. (They use Piazza and class time to meet peers.)
9. have a system for planning and keeping track of all deadlines.
10. are able to state what resources are available and where to find them.

Know Your Resources: Assignments/schedule are on the following pages. All hours/locations for office hours, S.I., mentoring, tutoring etc. will be posted on the front page of Sakai. Changes will be sent out via announcements. All materials you need (GRQs, outlines, powerpoints, old exams) are found in the resources folder of Sakai.

I Want to Help You: Reach me through office hours, after class, or by email. I am a really nice person…nobody to be scared of!! Come see me after the first exam if you did not do well. What suggestions can I have for you if you wait until you did poorly on all three exams?

How to prepare for an exam? Use GRQs, class outlines, Learning Catalytics questions, Power Point slides. Be able to explain, draw, compare etc. (See following page with ideas about how you demonstrate you know something.) READING is NOT studying. Studying involves blank paper, explanations, drawings, etc. Don't forget the importance of sleep before an exam!

Uphold the honor code. Academic integrity is at the heart of Carolina and we all are responsible for upholding the ideals of honor and integrity. The student-led Honor System is responsible for adjudicating any suspected violations of the Honor Code and all suspected instances of academic dishonesty will be reported to the honor system.

Diversity is Valued. The Department of Biology values the perspectives of individuals from all backgrounds reflecting the diversity of our students. We broadly define diversity to include race, gender identity, national origin, ethnicity, religion, social class, age, sexual orientation, political background, and physical and learning ability. We strive to make this classroom and this department an inclusive space for all students.

Approach to Class Meetings

Before Class:

- **Read** the assigned pages and c**omplete all** Guided Reading Questions (complete them in full sentences)
- Do the Modified Mastering Biology Assignment (ideally without looking at your notes!)

During Class:

- Have the outline printed, bring a smart-device, be prepared to take very messy notes. You can re-write your notes after class. **Your notes should be messy because you will make mistakes and that's ok!**
- Be prepared to answer all the questions posed to you first without looking at your notes. Before you check your notes, as a group member or flag down a peer instructor
- Keep a running list of questions you have about the current topic (these are a study guide)

After Class

- Attend an SI session, meet with a peer mentor, go to bio tutoring, attend BioCell, meet with a study group: do as many of these things as your schedule allows on a regular basis!
- Use quizzes to see what you know throughout the semester.

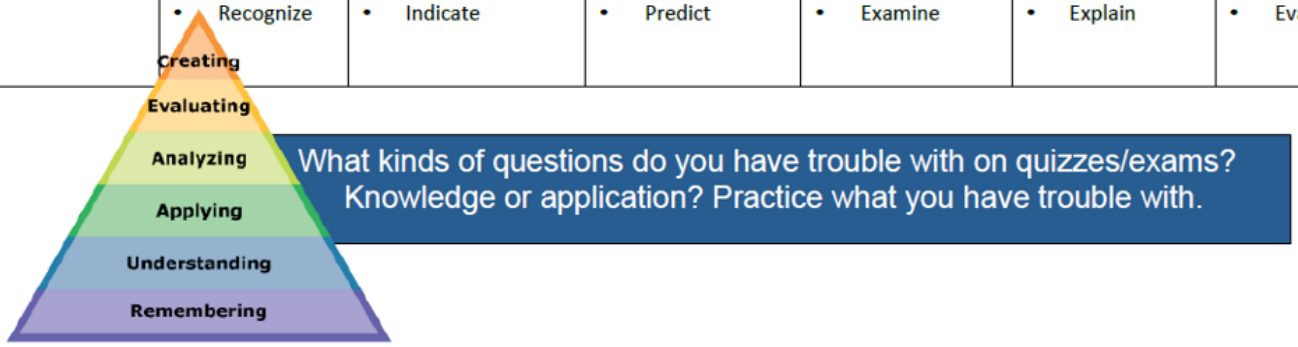
- Study a little biology every day. Start with the question “what did I learn today?” and see how much you can recall without looking at your notes. Then download the powerpoint slides once they are available and go through them again.
- Clean up your lecture notes and identify areas of uncertainty → these are questions you can ask to your peer instructors or on the forum page!

Be Active in Your Studying

Words to implement when you study.

When studying, try drawing, contrasting, arranging, etc.

Type (Level)	Knowledge (1)	Comprehension (1)	Application (2)	Analysis (3)	Synthesis (3)	Evaluation (3)
Bloom's Definition	Remember previously learned information.	Demonstrate an understanding of the facts.	Apply knowledge to actual situations.	Break down objects or ideas into simpler parts and find evidence to support generalizations.	Compile component ideas into a new whole or propose alternative solutions.	Make and defend judgments based on internal evidence or external criteria.
Verbs	• Arrange • Define • Describe • Duplicate • Identify • Label • List • Match • Memorize • Name • Order • Outline • Recognize	• Classify • Convert • Defend • Describe • Discuss • Distinguish • Estimate • Explain • Summarize • Generalized • Give example(s) • Identify • Indicate	• Apply • Sketch • Choose • Compute • Demonstrate • Discover • Dramatize • Employ • Illustrate • Interpret • Write • Modify • Predict	• Analyze • Appraise • Breakdown • Calculate • Categorize • Compare • Contrast • Criticize • Diagram • Differentiate • Relate • Distinguish • Examine	• Write • Rewrite • Categorize • Reorganize • Combine • Comply • Compose • Construct • Create • Design • Develop • Formulate • Explain	• Predict • Argue • Assess • Justify • Interpret • Compare • Conclude • Contrast • Defend • Describe • Judge • Estimate • Evaluate



Course Schedule

Course Schedule & Topics for Discussion

For each assignment, you have a “Guided Reading Assignment (GRQ)” found on Sakai with the same title that you should do **before** doing Mastering Homework. (GRQs will give you the specific pages to read from the text, etc). The GRQs are due via the "Assignment" tab on Sakai before each class.

The idea is that Mastering will reinforce what you have independently learned from the reading. If you simply hunt and peck through the text to find the answers without doing the reading, you are missing a large chunk of information I expect you to be familiar with. You are ultimately responsible for information in GRQs as if these have the lecture content. Not doing these = missing at least a third or one-half of the course content.

Due dates are subject to change (example: if weather or technology fails us) but exam dates will not change unless the University is closed. **Late homework assignments = 0% **I recommend turning in Mastering AND GRQs 20-30 minutes before the posted deadline to account for possible uploading and WiFi issues.****

UNIT 1: BIOCHEMISTRY & CELL BIOLOGY

Learning Objectives:

- What makes science, science?
- How are the macromolecules of life (matter) put together, utilized, and broken down in a cell?
- How is energy transformed in the process?

Class Meeting Date	Lesson Assignment **Due 11:55 PM the night before class** unless otherwise noted** **Do GRQs first** (readings listed in GRQ) and then do Mastering. (*All GRQs turned in via Sakai Assignment tab as either PDF, JPEG or Word document*)	Class Meeting Objectives
Wed Jan 8	**First Day of Class** • Register for Mastering with your UNC email account • Print/read syllabus and schedule	• Introduce yourself to someone and obtained one class contact. • Reflect on ideas about what makes a class inclusive for all learners. • Reflect on the kinds of concepts you will learn in class by completing the pre-test. • Describe the expectations for being prepared for our future classes
Mon Jan 13	**Lesson 1** GRQs first and then Mastering assignments both by the names: 1. Introduction to Mastering 2. Exploring Life and the Process of Science Be sure to bring your printed class outlines	• Distinguish science from unjustified claims and explain how science is iterative. • Describe elements of research design and how they impact scientific findings/conclusions (e.g. identify strengths and weaknesses in research related to bias, sample size, randomization, experimental control) • Interpret data and choose best way to communicate data in graphs. • Formulate a testable hypothesis and design a controlled experiment and explain the necessity of replicates.
Wed Jan 15	**Lesson 2** GRQs first then and Mastering assignment: • Macromolecules: Structure and Function	• Name and explain the five major themes of biology. • Classify polysaccharides based on their structure/function in plants and animals and describe how monomers join to form them. • Define lipids and explain their functions and properties in polar or non-polar solvents. • Draw protein structure and depict the consequence of mutations on normal structure and function. • Explain the molecular forces that hold protein structure together and how they can be disrupted. • Identify how the human body uses macromolecules from food.
Mon Jan 20	**Martin Luther King, Jr Day - No Class**	
Wed Jan 22	**Research Consent Participation Form** (on Sakai in Tests & Quizzes) **Lesson 3** GRQs and Mastering: • A Tour of the Cell	• Predict structures of the prokaryotic cell that would be antibiotic targets. • Describe how a protein is synthesized and exported from a cell how disease can be caused when this process goes awry. • Explain how insulin-producing cells are like dysfunctional factories when a person is diabetic (type 1 or type 2).
Mon Jan 27		

	Quiz 1 (on Mastering; timed; only one try per question on quizzes, do quiz before lesson 4) • ***Note:*** *Quizzes only post about 3 days before they are due.* **Lesson 4** GRQs and Mastering: • Structure and Function of Membranes	• Interpret experiments about protein production and make conclusions about why protein production is impaired in cystic fibrosis. • Categorize molecules that cross membranes freely and those that do not and the consequence of synthetic molecules crossing cell membranes freely. • Discriminate between passive transport, active transport, and bulk transport of molecules across a membrane.
Wed Jan 29	**Reflections on Learning Survey** (on Sakai in Tests & Quizzes) **Lesson 5** GRQs and Mastering: • Cell Signaling Via Hormones	• Predict how water will move via osmosis and explain why this is critical to your cells. • Describe how the two types of chemical signaling mechanisms affecting target cells differently. • Apply the two mechanisms of chemical signaling to insulin signaling and sex hormone signaling.
Mon Feb 3	**Lesson 6** GRQs and Mastering: • Energy and Enzymes and Cellular Respiration	• Explain the importance of enzymes in metabolism and how they are inhibited. • Explain how ATP does work. • List the inputs and outputs of aerobic cellular respiration and describe the big picture for why cells use this process. • Explain how coenzymes are reduced during respiration and how this contributes to ATP formation. • Describe big picture of cellular respiration and how it relates to breathing.
Wed Feb 5	**Lesson 7** Mastering and GRQs: • Cellular Respiration	• Diagram the major stages of aerobic respiration, noting the location in the cell and the inputs and outputs of each stage. • Explain how a H+ gradient and oxygen are both necessary for oxidative phosphorylation. • Describe anaerobic respiration pathways and differentiate them from aerobic pathways.
Mon Feb 10	**Quiz 2** (on Mastering; timed; only one try per question on quizzes, do quiz before lesson 8) **Lesson 8** GRQs and Mastering: • Photosynthesis **Practice Exam 1 on Sakai** • **Due **Monday Feb 10** at 11:55pm • Cumulative Unit 1 exam prep with questions very similar to those on exam.	• Describe where the mass of a tree comes from and explain how the “mass” is made. • Explain how trees are carbon sinks. • Describe the two parts of photosynthesis and the inputs and outputs of both parts. • Explain what kind of sunlight is used by the plant and why sunlight is necessary. • Explain photophosphorylation in the light reactions of photosynthesis, and describe how photophosphorylation is similar and different from the oxidative phosphorylation in aerobic respiration.
Wed Feb 12	**EXAM 1**	• Study powerpoints, GRQs, quizzes, class notes and all your LC questions!

	• Covers all material in Unit 1	• Also, check out the dynamic study modules and "Study Area" on Mastering for more Qs.

UNIT 2: GENETICS & MOLECULAR BIOLOGY

Learning Objectives:

- How do cells store, transmit and use genetic information to make proteins?
- What are the consequences for organisms when these processes go awry?

Class Meeting Date	Lesson Assignment **Due 11:55 PM the night before class** unless otherwise noted** **Do GRQs first** (readings listed in GRQ) and then do Mastering. (*All GRQs turned in via Sakai Assignments as a PDF, JPEG or Word document*)	Class Meeting Objectives
Mon Feb 17	**Lesson 9** GRQs and Mastering: • Mitosis, Development, and cancer Don't forget to print your new outlines	• Contrast asexual and sexual reproduction in outcome and types of organisms/cells that use each • Recognize/draw the stages of mitosis, contrasting animal and plant cells and explain the consequences of specific stages of mitosis failing. • Describe how cell division plays a role in development. • Explain how cells know when it is time to divide/not divide. • Explain how cancer cells disobey the rules that normal cells follow in the cell cycle and in cell growth. • Explain the significance of a mutated BRCA-1 gene in terms of risks and consequences and the "utility" of a gene test for actionable genes.
Wed Feb 19	**Lesson 10** GRQs and Mastering: • Meiosis	• Define haploid, diploid, and homologous chromosomes and be able to calculate the diploid and haploid number when given an illustration of a cell. • Draw how variation arises during meiosis from independent orientation at metaphase I. • Describe some ethical and medical issues arising from Downs Syndrome testing.
Mon Feb 24	**Quiz 3** (on Mastering; timed; only one try per question on quizzes) **Lesson 11** GRQs only (no mastering): • Patterns in Inheritance I	• Construct Punnett squares. • Determine mode of inheritance of a pedigree (autosomal dominant or recessive or X-linked recessive). • Calculate probabilities when given pedigrees.
Wed Feb 26	**Lesson 12** GRQs and Mastering: • Patterns in Inheritance II	• Design genetic crosses that determine if a trait is dominant or to determine an individual's genotype. • Recognize and/or solve problems that are non-Mendelian variations of inheritance (incomplete dominance, co-dominance, multiple alleles, pleiotrophy, and polygenic traits)
Mon Mar 2	**Exam 1: Reflection, Self-assessment, and Exam Item Analysis** (on Sakai in	• Draw a basic model of DNA, being able to point out where DNA variation is part of the structure.

	Tests & Quizzes) **Lesson 13** GRQs only: • Flow of Genetic Information I	• Distinguish what makes somatic cells in the body similar and what makes them different. • Trace a specific DNA sequence all the way to a protein. • Calculate the variations in code that lead to the same protein. • Calculate variation in proteins of same size.
Wed Mar 4	**Quiz 4** (on Mastering; timed; only one try per question on quizzes) **Lesson 14** GRQs and Mastering: • Flow of Genetic Information II **Practice Exam 2 on Sakai** • **Due **SATURDAY Mar 14** at 11:55pm • Cumulative Unit 2 exam prep with questions very similar to those on exam.	• Transcribe and translate two different alleles of a gene. • Define an allele. • Describe different types of mutations. • Use genetic and molecular data to determine an individual's phenotype.
Mon Mar 9	**Spring Break - No Class**	
Wed Mar 11	**Spring Break - No Class**	
Mon Mar 16	**Exam 2** • Covers all material in Unit 2	• Study powerpoints, GRQs, class notes and all your LC questions • Also, check out the dynamic study modules on Mastering and the "Study Area" in Mastering for more Qs.

UNIT 3: ANATOMY & PHYSIOLOGY

Learning Objectives:

- How do the emergent properties of immunity, reproduction, and digestion arise from interacting components of these systems?

Class Meeting Date	Lesson Assignment **Due 11:55 PM the night before class** unless otherwise noted** **Do GRQs first** (readings listed in GRQ) and then do Mastering. (*All GRQs turned in via Sakai Assignments. Submit as PDF, JPEG or Word document only*)	Class Meeting Objectives
Wed Mar 18	**Lesson 15** GRQs and Mastering: • Immunity Don't forget to print your outlines.	• Describe the basic components of the immune system. • Compare and contrast humoral and cell-mediated immunity. • Explain how vaccine's work with the adaptive immune system
Mon Mar 23	**Lesson 16** GRQs and Mastering: • Reproduction part I	• Describe the structure and function of male and female anatomy. • Discuss prevention and consequences of various STDs.

Wed Mar 25	**Lesson 17** GRQs and Mastering: • Reproduction part II	• Illustrate how the hormones and anatomy of the reproductive age female change over a month-- with and without pregnancy. • Explain how the pill prevents pregnancy.

UNIT 4: BIODIVERSITY

Learning Objectives:

- Why and how is biodiversity maintained through ecological interactions?
- How does biodiversity arise through evolution?
- How do we identify and measure evolutionary processes?
- What mechanisms drive evolution?

Class Meeting Date	Lesson Assignment **Due 11:55 PM the night before class** unless otherwise noted** **Do GRQs first** (readings listed in GRQ) and then do Mastering. (*All GRQs turned in via Sakai Assignments as PDF, JPEG or Word document).*	Class Meeting Objectives
Mon Mar 30	**Quiz 5** (on Mastering; timed; only one try per question on quizzes, do quiz 5 before lesson 18) **Lesson 18** GRQs and Mastering: • Phenology and Species • Guest Lecture: Dr. Allen Hurlbert	• Determine if two organisms are from the same species; be able to explain the benefits and draw-backs of different definitions of a species • Explain the uses for the biological species concept of species and its limitations. • Explain the factors that determine the timing of life cycle events for a species
Wed April 1	**Lesson 19** GRQs and Mastering: • Populations	• Explain how scientists estimate population size • Use the exponential growth model to calculate population growth. • Compare and contrast logistic and exponential models of growth. • Explain the difference between density dependent and independent population change
Mon April 6	**Lesson 20** GRQs and Mastering: • Community Interactions	• Distinguish levels of hierarchy in ecology and which levels include abiotic interactions with organisms. • Explain the consequence of two species have the identical niche. • Describe and give examples of five types of community interactions.
Wed April 8	**Quiz 6** (on Mastering; timed; only one try per question on quizzes; do quiz 6 before lesson 21) **Lesson 21** GRQs and Mastering: • The microbiome **Practice Exam 3 on Sakai**	• Compare/contrast germ free and conventionally raised mice. • Explain why the community of microbes that live in our intestines can be considered a second “digestive system” for the human host. • Provide evidence that a change in diet affects the microbial community within the mammalian gut. • Provide evidence that the composition of gut microbes can cause obesity and reflect on the impact of this idea in human health and physiology.

	• **Due **Saturday April 11** at 11:55pm • Cumulative exam prep with example questions very similar to those on exam.	
Mon April 13	**Exam 3** • Covers all of Unit 3 and Part of Unit 4	• Study powerpoints, GRQs, class notes and all your LC questions • Also, check out the dynamic study modules on Mastering and the "Study Area" in Mastering for more Qs.
Wed April 15	**Lesson 22** GRQs only : • How Populations Evolve I	• Distinguish components of the theory of natural selection that are true vs. common misconceptions. • Distinguish creationist and naturalistic views and what polls about evolution tell us about Americans and countries worldwide. • Explain what science is and why the study of evolution is a science. • Explain Darwin's ideas about natural selection and how his ideas were better understood once combined with Mendel's work. • Define how microevolution is measured.
Mon April 20	**Lesson 23** GRQs and Mastering: • How Populations Evolve II	• Explain the conditions that must be met for non-evolution. • Perform Hardy Weinberg calculations and determine if a population is in HW equilibrium or not. • Explain how genetic drift, mutation, gene flow and natural selection affect allele frequency in a population. • Recognize what form of microevolutionary force is a driving force in examples of evolution.
Wed April 22	**Lesson 24** **Quiz 7** (on Mastering; timed; only one try per question on quizzes) GRQs and Mastering: • Common Ancestors **Practice Exam 4 on Sakai** • **Due **Saturday May 2** at 11:55pm • Cumulative exam prep with example questions very similar to those on exam.	• Define the conditions that lead to speciation. • Distinguish various reproductive barriers that keep species separate. • Construct a phylogenetic tree when given morphological data and a list of organisms. • Wrap up Citizen Science Project • Wrap up course
Mon May 4	**Final Exam** • 4PM-7PM (room 100 in Genome Sciences) • Cumulative (~70 Multiple Choice questions and 1 page of short answer)	• Review objectives from each class • Review powerpoints • Review quizzes and exams and Mastering • Be active in your studying by quizzing yourself • Retake Practice Exams 1, 2, & 3 as well as the Practice Final Exam