BIO 110: Integrative Biology 1

Fall 2020

Classroom: Zoom – synchronous

https://agnesscott.zoom.us/j/99656070958?pwd=TWUzNlVkSENaWGtYcGkzU3RMRGowQT09

Meeting ID: 996 5607 0958

Passcode: 992075

**You must use your Agnes Scott Email to log into the zoom

Dr. Jennifer Larimore

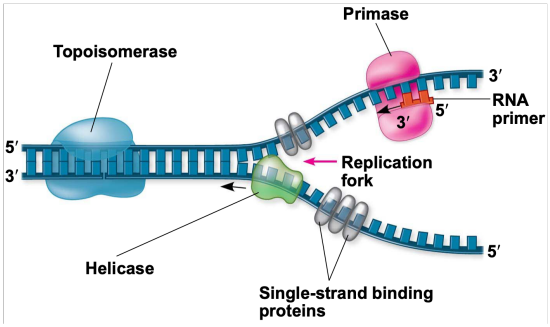
Website: ilovebrains.org

LinkedIn: Jennifer Larimore

Email: jlarimore@agnesscott.edu

Office: 201 West BSC

Office hours: Office hours: Zoom Appointment Only; 1PM – 2PM is set aside on T/TH for zoom appointments. If those times don't work, send an email with 3 time options and I will let you know what works. You can also request an appointment on the Canvas calendar during the office hours if that is easier.



Course description: In this course, we will explore a number of core topics in biology including biochemistry, cell biology, genetics, gene expression, evolution, and ecology. Biology is a rapidly growing and expanding discipline. Because biologists are discovering new things every day, we have selected some of the most significant topics to cover in this course.

Devote ample time to independent study outside of class.

Purpose and Plan:

Why are you taking this class? What purpose does this class serve for you? What are your personal goals for this class? What will it take to achieve these goals? Why are these goals important to you? You need to be able to answer these questions for each class you take – because the work will get hard and you will need to remind yourself what you are aiming for at the end of the semester. Set your goal and then make a plan to achieve that goal. Post that goal in your course text or notebook.

Good Habits: Learning throughout the semester:

Preparing for tests and actually learning the material in Bio 110 and every other class you'll take, for that matter is made infinitely easier and more enjoyable if you establish an organized system for approaching the lecture and reading material early on in the semester.

SCHEDULE time and STICK to it:

Based on assignments for both lecture and lab, you will spend 8-10 hours studying for this class outside of class time. Please come see your instructor early in the semester if you are struggling. *The lecture portion of Biology 110 is a 3 credit course. Additionally, you need to be co-enrolled in the 1 credit Biology 110 lab. BIO 110 and SUMMIT: BIO 110 Counts towards Leadership Skills Across the Liberal Arts.*

Add time to your Google Calendar each week for this course. Those time slots will vary based on your level of understanding, but in general, they should be about an hour each.

(1) read the assigned reading and take notes on it,

(2) listen to the lecture and take excellent notes,

(3) complete the DRQ ahead of time in case you have questions you need to ask before submitting it,

(4) to meet with your study group to review the lecture and prepare for the quiz. Each lecture topic should have 4 time slots,

(5) to complete the bigger projects. Schedule several different time slots for the semester projects/assignments to give yourself plenty of time to work on these assignments (and so they don't sneak up on you).

Do not change those times. Make those times a habit - time that is carved out for this class and your success. This class will cover topics you will be expected to retain in your upper level science classes. So it isn't enough to just do well on the test in this class - you will need this information to do well in your upper level classes as well.

Essential course materials and Textbook:

Biology in Focus, Second Edition, Person Publishing, by Lisa A. Urry, Michael L. Cain, Steven A. Wasserman, Peter V. Minorsky, Jane B. Reece. ISBN-13: 978-0321962751 | ISBN-10: 0321962753. Please note this text is also used for Biology

111. PowerPoints as well as other important information will be posted to Canvas. MP3s for the lecture will be available through the Google Drive folder for this class. In order to access the Google drive folder, you must be using an Agnes Scott email address.

Course objectives: The American Association for the Advancement of Science - with support from National Science Foundation - described the concepts and competencies that form the necessary foundation for science majors (Vision and Change in Undergraduate Biology Education: A call to Action. ISBN#: 978-0-87168-741-8). The objective of Biology 110 is to cover these concepts through our topic explorations and exercise these competencies through assignment.

Concepts**:** 1. Evolution 2. Structure and Function 3. Information flow, exchange, and storage 4. Pathways & transformations of energy and matter and 5. Systems
Competencies - You will develop the ability to: 1. Apply the process of science 2. Use quantitative reasoning 3. Use modeling and simulation 4. Tap into the interdisciplinary nature of science 5. Communicate and collaborate with other disciplines and 6. Understand the relationship for science and society

Skill Objectives – Skills you will gain from this course that advance your development as a scientist (and you can put on your CV and personal statements).

1. Critical thinking/Problem Solving – through weekly in class application of knowledge and through analyzing papers, students will develop their ability to think critically about potential solutions to scientific questions.
2. Oral Communication – through group presentations, students will develop their ability to communicate science.
3. Written Communication – through the Wiki assignment, and in class assignments, students will develop the ability to write scientifically.
4. Teamwork/Collaboration – working with a team for presentations and a team for in class assignments will enable the students to practice real-world teamwork and leadership competencies that are taught as a part of SUMMIT.
5. Digital Technology – students will learn how to navigate various online resources to complete assignments and collaborate with peers. Students will actively use Canvas, PubMed, Google Drive and Power point.

Grades: Your grades will be posted to Canvas regularly so you are aware of your standing in the course. Your final grade will be calculated using the following point breakdown:

Use of Sources Assignments	5 points
Science Career Assignments	10 points
Quizzes	90 points *(19 quizzes x 5 points each, dropping the lowest quiz grade)*
Assisted Reading Quest.	100 points *(19 lectures + syllabus, 20 total x 5 points each)*
Test Points	220 points *(4 tests and 1 cumulative final)*
Class Activities	95 points *(19 activities x 5 points each, dropping the lowest grade)*
D-Portfolio Writing	25 points
D-Portfolio Presentation	25 points

Total points: 570 points total **Your instructor may assign additional points*

The following grading scale will apply for converting numerical grades into final letter grades:
93 to 100: A
90 to 92.9: A-
87 to 89.9: B+
83 to 86.9: B
80 to 82.9: B-
77 to 79.9: C+
73 to 76.9: C
70 to 72.9: C-
67 to 69.9: D+
63 to 66.9: D
60 to 62.9: D-
Lower than 60: F

***your grade is not weighted. Your grade is calculated by total points earned divided by totals points possible, multiplied by 100. You can simply add the total points you earned so far and divide by the total points possible so far. Multiple that number by 100 to get your grade currently in the class. You can also use the same math to figure out what you need to get on a test in order to pull your grade up.*

CLASS ORGANIZATION AND FLOW:

Prior to class:

1. **READ** the assigned chapter (see syllabus schedule, or the ARQ/DRQ for that lecture, or the date on the calendar when that lecture will be discussed). The chapter will contain material that is explained differently and supports the lecture. Read and take notes on the chapter (not just highlight) *prior* to listening to the recorded lecture. Hand-written notes will allow you to retain the information more than highlighting or simply reading. When you read, don't look at your phone or email. Focus on what you are reading. Bring those notes to class.

2. **LECTURE:** Open the lecture PDF and create an outline for note taking before listening. Listen/watch to the assigned lecture MP3 file for that topic (available through a link on Canvas) and minimize distractions so you can pay attention. While listening, take notes – putting information in your own words. Add notes from the chapter. And bring those notes to class. If you have questions regarding the lecture or chapter, feel free to email your professor before class or talk with the learning assistants assigned to this class. You can also talk to your team about any questions you have. But you are responsible for the information in the lecture and the chapter for the quiz.

**Why did we record the lectures? Science education after college will require you to teach yourself the information. With a flipped classroom, you will begin to learn that skill. Medical schools and graduate schools will expect you to come to class knowing much of what was assigned in reading and your class time will take that information further. To prepare you for that type of learning, we have recorded the lectures. This allows you to take the lectures at your own pace. Everyone can get through the lecture - the person who has had AP Biology and the person who didn't have any biology in high school can listen at their own pace and get the same information out of the lectures. Further schooling won't necessarily give you lectures. Because this is college and not graduate school, we have provided these recorded lectures as an aid so you can learn how to study and teach yourself these topics.*

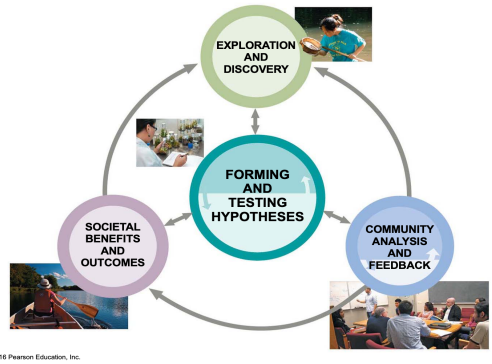
3. Complete the **ASSISTED READING QUESTIONS (ARQs) or Directed Reading Questions (DRQs)** which are based on the book and the lecture. Answer the questions *after* you listen to the recorded lecture outside of class and after you read the assigned chapter. This will help you review what you know and what you need to review (consider using these questions as a test). ARQs are turned in on Canvas 36 hours prior to class. Bring your ARQ to class as they may assist in the in class activity. There will be no late work accepted or time extensions. If Canvas is down, email your ARQ before the due date to receive credit. Your lowest ARQ grade will be dropped. ARQs again are a tool to help you learn how to study and teach these topics to yourself. They will allow you to focus on what the professor feels is important.

4. **QUIZZES.** Before your class, you will take a lecture quiz online. Quizzes will be open 24 hours prior to class. You will have 20 minutes to take the quiz. You may use any notes or ARQs to answer quiz question. This quiz will cover the recorded lecture material and assigned chapter material. There will be no make-up quizzes. Your lowest quiz grade will be dropped. Quizzes will allow you analyze your knowledge, practice the type of test questions - all so you can prepare best for the upcoming tests. They are application questions, multiple choice.

In Class:

GROUP IN CLASS ACTIVITIES are meant to practice and apply what was learned in the lecture. These will be completed in teams during the lecture time and turned in on Canvas and graded as a group. Because this will be completed in break out rooms in Zoom, I will not be recording our Zoom sessions. There is a Google Doc that will have class announcements, questions, and agenda items. If you are not present, you will be given a 0 for that in class assignment. If you have to miss a class, email me PRIOR to that class and we can arrange something. Use your notes, your ARQs and your book. Being able to apply what you learned through the lectures will be necessary to remember the information for your time in BIO 111, your upper level courses, and for your science career. In class activity will be due 24 hours after course time. Only students who are enrolled in the course have access to Zoom or the materials for this course.

Figure 1.19



ONLINE AND HYBRID EXPECTATIONS

Only students who are enrolled in the course have access to Zoom or the materials for this course.

Online and hybrid classes allow for flexibility and convenience. But online and hybrid classes require certain learning traits from you, the student.

1. Persistence and independence – You need to work daily on every class and persist through challenges. When you run into a challenge, make sure you seek help! Remember this is your education and only yours. What you put into it is what you get out of it.
2. Effective Time-Management. Because you need to spend time daily on this class, make sure you schedule that time to make sure you manage your time well! Develop a daily to do and a long term plan for completing the major assignments.
3. Remember that your professors want to help – but as we are wearing masks or on zoom, we may not pick on the usual non-verbal cues students give us. In a typical classroom, we pick up on confused looks or blank stares. As we don't have those cues, reach out! Email or talk to your group or a learning assistant. Enagge with the online discussions!
4. Be aware of the software needs and make sure you know how to navigate those programs required for the course. Reach out to ITS or a friend or a YouTube how to video for the software/programs for the class.
5. When you are engaging in course material, find a good study space. Turn off your cell phone, be in a comfortable space, minimize any distractions, no TV or games, etc.

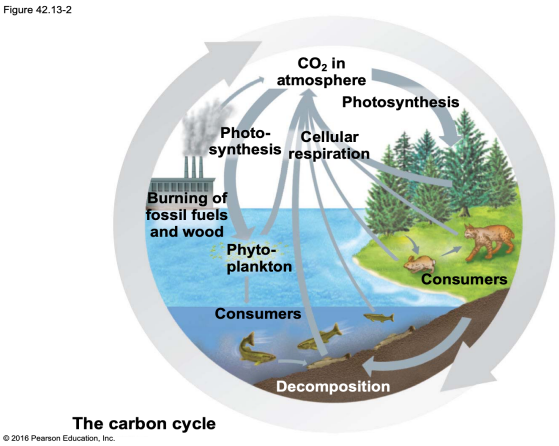
Tests:
Tests will consist of multiple choice and short-answer questions that evaluate your knowledge. They will be application questions. Tests will be open note. There are 4 tests for this course (one for each unit of study) and one final exam. The final exam will be cumulative. See schedule for test dates. All of the tests will be online.

Test Tips:
Developing good study strategies early on will save you lots of time and frustration over the next four years and beyond. You may find that the way you studied in high school doesn't work as well in college, where exams test whether you can apply and extend what you've learned rather than regurgitate minute details. A small amount of time every day is more effective than late-night marathon sessions. If a longer, intensive study session is needed, do it two nights before a test to guarantee a full night's rest.

1. **Form a study group:** Study groups, if well structured, can be the most effective and time efficient way to review. Some tips on how to make a great study group: **Size:** Study groups that are too big tend to get disorganized, and if some students are more comfortable with the material than others some may not get all their questions answered. Most students find groups of 2 to 5 friends works best. **Prepare:** It's important to review the material before coming to a study group. This could merely be skimming your notes to identify confusing areas, but you should make a list of questions to bring to the group. **Organize:** Assign each person a specific section (topic, lecture, etc.) to study and explain to the group. If you have to explain something to a group, you are sure to understand it. **Group dynamic:** Don't let one person dominate the conversation or get sidetracked by other distractions.

2. **Start studying early:** Review notes and make a study guide. Have an organized system for reviewing your notes. Here's my own personal strategy: **Outline lecture notes:** Read through your class notes and write down main ideas in outline form, including some specific details that you think you'll forget. I like to put these study guides together at the end of the semester to make studying for the final easier. Color-coding (by topic or importance) is also useful.
Use textbook/reading notes: If you see anything surprising or particularly relevant to lecture material, or find a useful diagram, reference it in the margin of your lecture notes outline. **Flashcards:** Use flashcards with vocabulary from the DRQs and the chapter as well as some basic questions to quiz yourself. **Draw your own diagrams:** After studying your lecture notes, try to tie the material together by putting it in picture form (without looking at your notes.)
Write your own test. If you had 20 (or 50, or 100) questions that you could ask about this information – what would you ask? What topics are the most important? How would you ask questions about each of these topics? Knowing what will be on a test is a difficult skill – but, with practice, you should be able to figure it out.

Review: Review all your lab notes. Labs and lectures are intended to overlap. Lab may be a space that can help shed light. **Lectures** Your instructor is the one giving the exam, so pay close attention to what they find most important and interesting. **ARQs/In Class Activities** Review all your material for the section. Your assignments cover the topics your instructor believes to be most important.



3. AFTER studying: Do practice problems and textbook questions. Go to review sessions. Bring questions when you go to a review session; otherwise, it will be a waste of time. Explaining the material to friends is one of the best ways to study and identify the things you don't know.

4. After the test:
It's not over yet! Some things you should do after an exam: Review questions you got wrong, talk to the professor if you're unhappy with your grade and save study guide to build on all semester.

About Bio 110 exams:
Format: Tests are usually composed of multiple choice and a few fill in the blank. **Grading:** Don't get discouraged if you don't do well on your first test or quiz. Many instructors will reward you in your final grade if they see improvement throughout the semester.

Other odds and ends:
It's never too early to start thinking about the summer. Agnes Scott has an amazing undergraduate research program; if you're at all interested in research, start thinking about which professor you might like to work with. You will need a really strong personal statement and CV/resume as these experiences are competitive.

Four additional assignments for BIO 110 (Each has their own section on Canvas):

1. **Use of Sources Assignment**

For this assignment, you will need to read the following: *Knowing and Avoiding Plagiarism During Scientific Writing* P Mohan Kumar, N Swapna Priya, [...], and M Nagasree. There is a series of questions to answer after you read the article. The due date will be posted to Canvas which is where you will upload your answers. This is individual work.

2. **Science Career Assignment**

For this assignment, you will be reading "Guide to Life Science Careers" and answering questions based on and 2 appointments: an appointment with the Office of Internships and Career Development for your career assessment and drafting your resume with Dr. Molly Embree. This is also individual work

3. **Digital portfolio "Wiki" assignment: (3 Parts) (Outline, Written Essay, and Team Presentation)**

Biology 110 includes a team project that utilizes your digital portfolio. We will be exploring diversity of life through team projects focused on non-vertebrate organisms. Student teams of approximately 5 students will each prepare a wiki-style entry on their assigned organism (or team of organisms). Each student is responsible for one category of the wiki entry. The 5 categories correspond to the core concepts outlined by the American Association for the Advancement of Science and the National Science Foundation (see pg. 1 of syllabus). You will put your contribution to the wiki on your D-portfolio and present your contribution in class. More details on this assignment can be out in a document posted to Canvas and below.

4. **CV or Resume and Personal Statement**

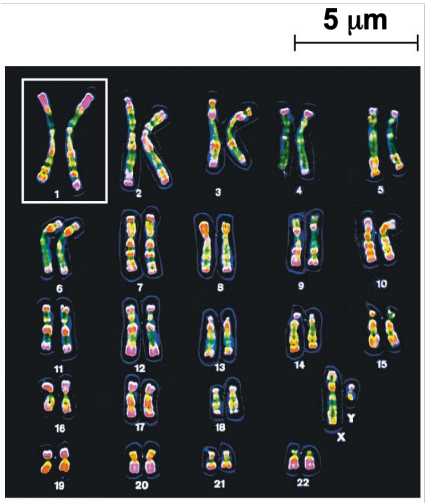
This assignment is meant to ensure that what you learn in this class is reflected in your career documents.

Academic Honesty for your work as a scientist:

You are responsible. Review each course syllabus for the professor's expectations regarding course work and class attendance. Violations of the honor code results in consequences ranging from failure of the assignment, failure of the course, to expulsion from the college. You should speak with your professors if you need clarification about any of these policies.

You are expected to read the article and complete the assignment (see schedule for due date): Knowing and Avoiding Plagiarism During Scientific Writing by P Mohan Kumar, N Swapna Priya,1 SVVS Musalaiah, and M Nagasree. Ann Med Health Sci Res. 2014 Sep-Oct; 4(Suppl 3): S193–S198. If you have any questions about that article, please email your professor.

By placing your name on ANY assignment, you are stating that you completed that assignment with academic honesty. Cheating in this class may keep your grade where you want it, but it will not help your career long term – you cannot cheat the GRE or the MCAT. You have to learn this material in order to succeed in science. Additionally, academic dishonesty is reported to medical schools and graduate schools as per their request. Finally, anyone caught cheating relinquishes the privilege of asking for a letter of recommendation from the professor and will receive a 0 on the assignment. Acts of academic dishonesty will be turned over to Honor Court.



Plagiarism: do attribute all ideas taken from other sources; this shows respect for other scholars. Plagiarism can include portraying another's work or ideas as your own, buying a paper online and turning it in as if it were your own work, or not citing or improperly citing references on a reference page or within the text of a paper. Passing off someone else's work as your own represents intellectual fraud and theft, and violates the core values of our academic community. Plagiarism is passing off any work that is not yours as your own work ** EVEN WITH A CITATION***. If you are using a source and citing the source, the information from that source STILL must be reworded in your own voice. Putting a citation behind a statement gives ownership to that source, but, if you do not reword that information, it is plagiarism. Do not cut and paste from the slide, your book, your neighbor, Wikipedia, or the internet. To further your science education, you need to be able re-word science in your own voice. If your answers are not your own, you will receive a 0 for the assignment. **All cases of academic dishonesty will be turned into Honor Court.**

Intellectual Fraud: do not falsify or create data and resources or alter a graded work without the prior consent of your professor. This includes making up a reference for a works cited page or making up statistics or facts for academic work.

Cheating: do not allow another party to do your work/exam, or submit the same or similar work in more than one course without permission from the course instructors. Cheating also includes taking an exam for another person, looking on another person's exam for answers, using exams from previous classes without permission, or bringing and using unauthorized notes or resources (i.e., electronic, written, or otherwise) during an exam. Cheating also includes when you help another student complete a take home exam, give answers to an exam, talk about an exam with a student who has not taken it, or collaborate with others on work that is supposed to be completed independently.

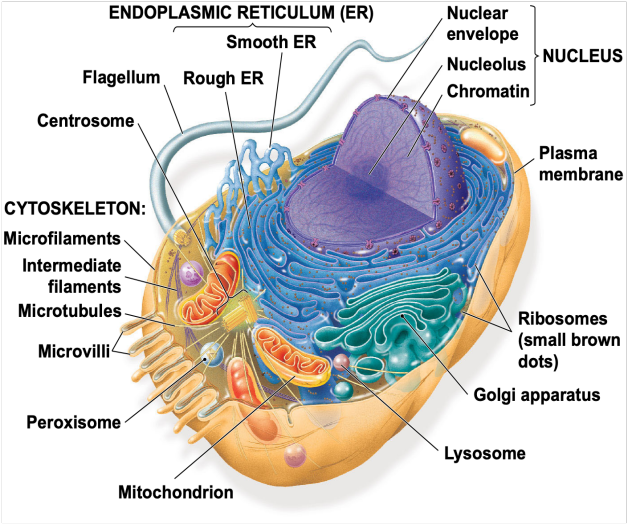
CLASS MANAGEMENT:

Email: Instructors will make announcements regularly via email. **It is your responsibility to check your Agnes Scott email account daily.** When responding to a professor via email, take care that your email is professional.

Canvas: You can access the calendar in Canvas. And that calendar can be shared with your Google Calendar. There is a discussion board where you can use the class to answer questions or get in touch with the professor. The modules contain each of the pieces of the course. The syllabus item lets you see this syllabus and the schedule.

Technology: Cell phones should be in the silence mode prior to entering the classroom or lab.

Course evaluations: At the end of the semester you will receive an email asking you to submit an evaluation of the course. Please give feedback! Your input is important to the college as a whole and to us as instructors. We take your comments very seriously.



ADA: Agnes Scott College seeks to provide equal access to its programs, services and activities for people with various abilities. If you will need accommodations in this class, please contact the Office of Academic Advising and Accessible Education (404-471-6150) to complete the registration process. Once registered, please contact me so we can discuss the specific accommodations needed for this course.

Title IX: For the safety of the entire community, any incidence of or information about sexual misconduct must be reported immediately to Title IX Coordinator Marti Fessenden (mfessenden@agnesscott.edu, 404-471-6547) or Deputy Title IX Coordinator Karen Gilbert (kgilbert@agnesscott.edu, 404-471-6435).

Inclusion: This course adheres to the principles of diversity and inclusion integral to the Agnes Scott community. We respect people from all backgrounds and recognize the differences among our students, including racial and ethnic identities, religious practices, and gender expressions. We strive for our campus to be a safe space in which all students feel acknowledged and supported. At the same time, we understand that course content, critical inquiry, and classroom dialogues give us opportunities to examine topics from a variety of perspectives. Such discourse is a defining feature of a liberal arts education, and can compel debates that challenge beliefs and positions, sometimes causing discomfort, especially around issues related to personal identities. While we uphold and preserve the tenets of academic freedom, we request and invite your thoughtful and constructive feedback on ways that we can, as a community of learners, respectfully assist and challenge one another in our individual and collective academic work.

Content warning: This course will explore cell biology, genetics, ecology and evolution, which might raise issues of racism, sexism, classism, heterosexism, cissexism, ableism, and other kinds of privilege. I invite you to come see me if want more information. If you feel you will be unable to fully participate in the course requirements, set up a meeting with the course instructor to determine appropriate accommodations.

BIO 110 – D-Portfolio Encyclopedia of Life assignment. There are 3 parts to this assignment: The Outline, The Writing Assignment and The Team Presentation. Each group member will be assigned one of this topics. Each group will be assigned a research model organism.

NSF/AAAS Vision and Change: Core Concepts (Categories for the diversity of life assignments) (Also in the assignment on Canvas).

Evolution

The diversity of life evolved over time by processes of mutation, selection, and genetic change. Darwin's theory of evolution by natural selection was transformational in scientists' understanding of the patterns, processes, and relationships that characterize the diversity of life. Because the theory is the fundamental organizing principle over the entire range of biological phenomena, it is difficult to imagine teaching biology of any kind without introducing Darwin's profound ideas. Inheritance, change, and adaptation are recurring themes supported by evidence drawn from molecular genetics, developmental biology, biochemistry, zoology, agronomy, botany, systematics, ecology, and paleontology. A strong preparation in the theory of evolution remains essential to understanding biological systems at all levels. Themes of adaptation and genetic variation provide rich opportunities for students to work with relevant data and practice quantitative analysis and dynamic modeling. Principles of evolution help promote an understanding of natural selection and genetic drift and their contribution to the diversity and history of life on Earth. These principles enable students to understand such processes as a microbial population's ability to develop drug resistance and the relevance of artificial selection in generating the diversity of domesticated animals and food plants. ***Examples of topics of evolution for the assignments:*** why are the organisms used as model systems – in other words, how are they connected to humans through evolution? Diversity within the organism that make different populations unique, mutations/adaptions that have aided the organism.

Structure and function

Basic units of structure define the function of all living things. Structural complexity, together with the information it provides, is built upon combinations of subunits that drive increasingly diverse and dynamic physiological responses in living organisms. Fundamental structural units and molecular and cellular processes are conserved through evolution and yield the extraordinary diversity of biological systems seen today. Understanding of biological regulatory systems and communication networks has become increasingly sophisticated, yielding knowledge about the functional responses of the components of those systems and networks at differing scales, from the molecular to the ecosystem level of organization. Knowledge of relationships between biological structure and function is informed by design approaches from engineering and from models based on the quantitative analysis of data. The application of tools from the physical sciences often facilitates our understanding of biological structure–function relationships. For example, anatomical analysis of body morphology and function by means of a biomechanics approach and robotics (e.g., Spenko et al., 2008) provides a venue for discussing the interface between applied physics and biology in an undergraduate biology course. Rational drug design strategies offer useful case studies emphasizing the importance of the basic structure–function concept. For instance, elucidating the molecular structure of a target protein such as HIV protease has provided the basis for novel approaches to the discovery of drugs, leading to important antiretroviral therapies to treat AIDS. ***Examples of topics of structure and function for the assignments:*** structures that help with function of the organism – fish tales, fruit fly eyes, rabbit fur, limb development, etc. Structures may be internal anatomy.

Information flow, exchange, and storage

The growth and behavior of organisms are activated through the expression of genetic information in context.

The convergence of systems approaches and powerful bioinformatics tools has dramatically expanded our understanding of the dynamics of information flow in living systems. From gene expression networks to endocrine mechanisms for physiological regulation, and from signal transduction and cellular homeostasis to biogeochemical cycling, all may be understood in terms of the storage, transmission, and utilization of biological information. Moreover, the collection, archiving, and analysis of information about living organisms and their components has created an extraordinary breadth and diversity of data that facilitate analyses of how information flows through systems. Real-time analytical approaches facilitate the study of cellular dynamics in response to environmental changes. Studies of the dynamics of information flow raise questions about topics such as the storage of genetic information and the transmission of that information across generations. All students should understand that all levels of biological organization depend on specific interactions and information transfer. Information exchange forms the basis of cell recognition and differentiation, the organization of communities from microbial assemblages to tropical forests, and the mating behavior of animals. The introduction of the topic of information exchange offers undergraduates many opportunities to learn how scientists apply quantitative skills and tools in the management and analysis of large data sets. ***Examples of topics of Information flow, exchange, and storage for the assignments:*** comparing genomes of the organism. Are proteomes defined for the organism? Are transcriptomes defined for the organism? Is there something special/different/unique about the genome? What percent similarity between the organism and humans is shared?

Pathways and transformations of energy and matter

Biological systems grow and change by processes based upon chemical transformation pathways and are governed by the laws of thermodynamics.

The principles of thermodynamics govern the dynamic functions of living systems from the smallest to the largest scale, beginning at the molecular level and progressing to the level of the cell, the organism, and the ecosystem. An understanding of kinetics and the energy requirements of maintaining a dynamic steady state is needed to understand how living systems operate, how they maintain orderly structure and function, and how the laws of physics and chemistry underlie such processes as metabolic pathways, membrane dynamics, homeostasis, and nutrient cycling in ecosystems.

Moreover, modeling processes such as regulation or signal transduction requires an understanding of mathematical principles. For example, knowledge of chemical principles can help inform the production of microorganisms that can synthesize useful products or remediate chemical spills, as well as the bioengineering of plants that produce industrially important compounds in an ecologically benign manner. These are topics of intense current interest. ***Examples of topics of pathways and transformations of energy and matter for the assignments:*** is there anything unique about the energy requirements for this organism? How does the organism contribute to the carbon cycle? To biomes?

Connections to society – NOT a Vision & Change category, but using for this project

Humans rely on living systems in both obvious and subtle ways. For this category, we expect you to explore the ways in which your organism or team of organisms benefits or impacts human life on earth. This can be via relationships with human health and medicine, culture, religion, historical importance, art etc. ***Examples of topics of connections to society for the assignments:*** how is this organism viewed by society? How has it been used in society? Why is it a model organism?

Systems – SKIPPING THIS ONE FOR THIS PROJECT – but placed here because of how it is used in the course! See Connections to society instead. *Living systems are interconnected and interacting.* As defined in *A New Biology for the 21st Century* (NRC, 2009), systems biology seeks a deep quantitative understanding of complex biological processes through an elucidation of the dynamic interactions among components of a system at multiple functional scales. A systems approach to biological phenomena focuses on emergent properties at all levels of organization, from molecules to ecosystems to social systems. Mathematical and computational tools and theories grounded in the physical sciences enable biologists to discover patterns and construct predictive models that inform our understanding of biological processes. Through these models, researchers seek to relate the dynamic interactions of components at one level of biological organization to the functional properties that emerge at higher organizational levels. Systems biology provides rich opportunities for all students to learn about scientific inquiry and, because of the complex nature of the research involved, to practice in a multidisciplinary context. For example, early applications of systems biology to ecosystem processes resulted in useful simulation models.

Outline Assignment Instructions

When: Due Friday 10/9 by 5PM (late work not accepted). If Canvas is down, email your outline before the deadline.

What: 1-page outline (**not** the 500 word final document) turned in on Canvas as a Word Doc

Grading: 5 points. Your grade will be based on whether the instructions were followed, and whether material is appropriate for the category you're covering. There is a rubric on Canvas in the assignment and in the rubric section.

1**. Read the example wiki entry posted to Canvas.** Note that you are responsible for only ONE of these sections based on a NSF/AAAS category within biology (collectively, your team will do all or nearly all sections depending on team size). You are responsible for dividing up the sections; pay attention to whether one section should NOT be covered by your team (e.g., connections to society in some cases, see Canvas).

2. **Read the 'Category Descriptions' and consider your assigned category.** Do some broad, initial internet searching to figure out what could fit this category in your species. Then use PubMed to find some scientific articles. Track the sources you find useful that you will want to use in your final paper.

3. Once you've decided what you will cover that fits your categorical topic, **do some focused background research.** You can use internet sources, but you are also encouraged to search the primary literature like you learned in lab with the barn swallow project.

4. **Prepare a 1-page outline** that demonstrates your organization of the information and gives an idea of what information you will include. When I prepare an outline (which I always do when writing papers for publication!!!), I typically write a sentence that describes what I want to accomplish in each paragraph and then a few bullet points under that tag line which give me a 'roadmap' through the related material. Your wiki entries (~500 words) will likely be 3-6 paragraphs in length.

Your Outline Should Include

Top Left Corner: Your name, Your Professor's name, Your Organism, and Your Diversity of Life Category

1. Introduction with 3-4 bullet points of introductory material
2. Topic for Paragraph 1 with 4-5 bullet points
3. Topic for Paragraph 2 with 4-5 bullet points
4. Topic for Paragraph 3 with 4-5 bullet points
5. Conclusion with 3-4 bullet points

Where possible put the source of the bullet point to help you later

5. Along with your outline, you should **include 5 sources.** These can be websites or citations of papers. Primary literature might be helpful to you, and so will magazines and more popular science coverage. If you need help searching the literature, please refer to the Bio 110 lib guide on the McCain Library website, or set up an appointment with the instructional librarians (can be done directly on the library website!) to get some assistance.

Citation Style:
Scientists use journal formats for their citation style so we will as well.
Visit: Journal of Molecular Biology (JMB). Then Click on Author Guidelines. Then click on references. Here is the website for JMB reference style:
https://www.elsevier.com/journals/journal-of-molecular-biology/0022-2836/guide-for-authors
That is the format for your citations.

BIO 110 – D-Portfolio Diversity of Life assignment: <u>Writing Assignment for D-Portfolio</u>
Each student will prepare a wiki style writing entry on 1 category of the diversity of life (as was assigned for the outline). Your writing will be worth 25 points total.

<u>Due</u>10/23 by 5PM. No late work accepted. If Canvas is down, email the assignment before the deadline.

The rubric is on Canvas in the assignment and in the rubric section of Canvas.

Each Writing Assignment Should Contain the following:

1. Top Left Corner: Top Left Corner: Your name, Your Professor's name, Your Organism, and Your Diversity of Life Category
2. Introduction to your organism and your category.
3. 2-3 Paragraphs with well supported statements that describe/explain that particular caegtory for your organism.
4. Conclusion that summarizing your material.
5. The body of the assignment should be 450-500 words with a minimum of 10 sources.

Diversity of Life Writing Assignment Criteria	**10: Excellent**	**9-7: Good**	**6-4: Fair**	**3-1: Poor**
1. Organization (10 points)	• Clear flow of topics • Easy to follow • Diagrams clearly labeled • Good balance of text and graphs or pictures	• Generally easy to follow – may require rereading for clarity • Diagrams present • Fair balance of text and graphs or pictures	• Sections unclear or inappropriate • Takes effort to follow thoughts and ideas • Diagrams absent or unclear • Mainly or all text	• Sections unclear or absent • No flow of ideas • Cluttered, messy • Diagrams absent/ Majority is text
2.Science Content (10 points)	• All necessary information • Information well-explained • No excess information that is distracting • All abbreviations are defined	• Most of the necessary information • Information mostly explained • Majority of the information is not distracting • Most abbreviations are defined	• Some of the necessary information • Information partially explained • Excess information is mildly distracting • Some abbreviations are defined	• Little to none of the necessary information • Information is not explained • Excess information is distracting • abbreviations are not defined
1.Sources – number and format (2 points)	• 2 points All 10 sources present and used		• 1 point - 5-7 sources present and used	• 0 points - Less than 5 sources used
2.CWS (2 points)	• 2 points if a CWS slip is added to end of the writing assignment file			• 0 points if there is no CWS slip
3.Length Requirement met (1 point)	• 1 point if the length requirement is met			• 0 points if the length requirement is not met.

When you go to the CWS, they should be reviewing your final draft. Take this instruction sheet with you and let them mark up the rubric to give you a general idea of your grade on the final draft. Incorporate any changes they suggest. Visit the CWS at least 2 weeks before the final paper is due to give yourself plenty of time to make any changes.

The CWS tutor should also sign a slip for you for the session. Take a picture of their rubric grading and the CWS slip for your tutoring session. Add that image to the last page of your assignment.

BIO 110 – D-Portfolio Diversity of Life Team Presentations

Due 11/13 by 5PM

Each team will prepare a brief presentation on the diversity of life. For that organism, each team member will report on the category they used for the writing assignment. Each team member will highlight some (not all) of the facts covered in their writing assignment in just 1 slide.

The slide each team member presents should be balanced with a diagram or image and some bullet points covering the topics that the team member will discuss. Your presentation will be worth 25 points total according to the rubric below. You will be graded individually based on your section (using the rubric below. The presentation should include a title or introduction slide, 1 slide for each team member, and a conclusion or wrap up slide. The team will prepare a 5-7 minute presentation on organism and the diversity of life and record the presentation. The recorded presentation should be submitted online. A PDF of the slide presentation is also due online. On the last slide of the presentation, there needs a CWS slip saying your practiced your presentation at the CWS before you recorded it.

Grading Rubric: (Also on Canvas in the assignment and in the rubric section).

Team Presentation Criteria	**5: Excellent**	**4: Above Average**	**3: Average**	**2: Below Average**	**1: Poor**
1. Organization (5 points)	•Clear flow of topics •Easy to follow •Diagrams clearly labeled •Good balance of text and graphs or pictures	•Generally easy to follow – may require rereading for clarity •Diagrams present •Fair balance of text and graphs or pictures	•Sections unclear or inappropriate •Takes effort to follow thoughts and ideas •Diagrams unclear •Mainly or all text	•Sections unclear •Takes effort to follow thoughts and ideas •Cluttered, messy •Diagrams absent/ Majority is text	•Sections absent •No flow of ideas •Cluttered, messy •Diagrams absent/ Majority is text
2. Science Content (5 points)	•All necessary information •Information well-explained •No excess information that is distracting •All abbreviations are defined	•Most of the necessary information •Information mostly explained •Majority of the information is not distracting •Most abbreviations are defined	•Some of the necessary information •Information partially explained •Excess information is mildly distracting •Some abbreviations are defined	•Little of the necessary information •Information is not explained •Excess information is distracting •abbreviations are not defined	•none of the necessary information •Information is not explained •abbreviations are not defined
3. Oral presentation (5 points)	•Well-rehearsed •appropriate articulation, voice volume •Did not use notes	•Rehearsed •Adequate articulation, voice volume generally adequate •Did not use notes	•Rehearsed •Lacking in one of areas: articulation, voice volume •Read from the notes frequently	•Obvious lack of rehearsal •Poor articulation and poor voice volume •Read from the notes frequently	•Obvious lack of rehearsal •Poor articulation and poor voice volume •Read entirely from the notes
4. CWS (5 points)	Had CWS proof-read the final draft an review the presentation				Did not go to the CWS
4.Peer Evaluation (5 points)	This team member contributed a lot to the project and worked well with others	This team member contributed to the project and worked well with others	This team member contributed some to the project and mostly worked will with others	This team member contributed a little to the project and worked will with others some of the time.	This team member contributed nothing to the project and did not work will with others

Each member of the team will rate the other members of the team as well as rate themselves using the categorites on the rubric. Your score will be an average of your team's peer evaluation.

Fall 2020 Schedule (And Available on the Calendar in Canvas)
**Dates are subject to change

Date	Lecture #	Topic	Quiz	Reading Prior to Class	Assignments
T 8/18		No Class			
TH 8/20	First Day of Class	PRE-TEST			
T 8/25	Syllabus Lecture	Syllabus/ Class Success/ Study Skills/Resources		syllabus	
TH 8/27		Group Agreements			
T 9/1	#1 - 40 min	Biological Themes	L1 quiz	Chapter 1	
TH 9/3	#2 - 17 min	Chemistry of Biology	L2 quiz	2 and Kareklas 2016	
F 9/4					Use of Sources Assignment Due
T 9/8	#3 - 30 min	Biological Molecules	L3 quiz	3	
TH 9/10	#4 - 32 min	Population Ecology	L4 quiz	40 and Dantzer 2013	
F 9/11	**ONLINE**	**Test #1 on Foundations of Biology (lectures 1 - 3)**			
T 9/15	#5 - 27 min	Species Interactions	L5 quiz	41	
TH 9/17	#6 - 33 min	Ecosystems and Energy	L6 quiz	42	
T 9/22	#7 - 24 min	Descent with modification	L7 quiz	19	
TH 9/24	#8 - 44 min	Population evolution	L8 quiz	21	
T 9/29		Wiki project - Share draft digitally with your group BEFORE class			Email Draft to group
TH 10/1		Ecology and Evolution Review			
F 10/2	**ONLINE**	**Test #2 on Ecology and Evolution (Lectures 4 - 8 majority, some quest lecture 1-3)**			
T 10/6	#9 - 33 min	The Cell	L9 quiz	4	
TH 10/8		No Class - Fall Break			
F 10/9		Wiki Outline due			Wiki Outline due
T 10/13	#10 - 22 min	The cell cycle	L10 quiz	9.0 - 9.2	
TH 10/15	#11 - 10 min	Cell Cycle Regulation	L11 quiz	9.3	
T 10/20	#12 - 29 Min	DNA replication and structure	L12 quiz	13 and Meselson and Stahl 1958	
TH 10/22	#13 - 27 min	Mendelian Genetics	L13 quiz	11.1- 11.2	
F 10/23					Wiki Writing Assignment due

T 10/27		The Cell Review			
TH 10/29	#14 - 22 min	Extensions of Mendelian genetics	L14 quiz	11.3 - 11.4	
F 10/30	**ONLINE**	**Test #3 on the Cell (Lectures 9 - 12)**			
T 11/3	#15 - 28 min	Meiosis and sexual life cycles	L15 quiz	10	
TH 11/5	#16 - 15 min	Chromosomal basis of inheritance	L16 quiz	12.0 - 12.2	
F 11/6					Scientific Career Assignment Due
T 11/10	#17 - 10 min	gene linkage, and abnormalities	L17 quiz	12.3 - 12.4	
TH 11/12	#18 - 13 min	Transcription	L18 quiz	14.1-14.3	
F 11/13					Wiki Group presentation Assignment Due
T 11/17	#19 - 19 min	Translation	L19 quiz	14.4 - 14.5	
TH 11/19		Genetics Review			
F 11/20	**ONLINE**	**Test # 4 - Genetics (Lectures 13 - 19)**			CV or resume and personal statement
T 11/24	Last Day of Class	CV or resume and Personal statement			
TH 11/26		No Class - Thanksgiving			
Wed Dec 2 - Mon Dec 7		**Cumulative Final during finals week - 100 points**			