BIO 11O: Atoms to Cells

Fall 2022

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WELCOME

Congratulations - you made it to college and to your first biology course! This is an amazing accomplishment, and you should be proud that you are here. I am excited that I have the privilege to work with you as we start this journey together. I love biology (*perhaps a bit too much*) and can't wait to share with you how fascinating the study of living things really is. My goal for you is that by the end of this course you will be a successful college student and well on your way to becoming a great scientist. I am here to help so please let me know what I can do on my end to make this goal a reality.

COURSE OVERVIEW

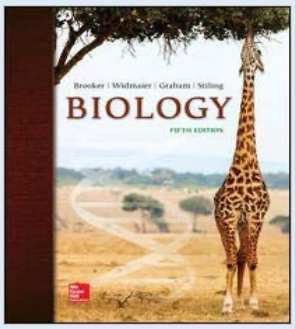
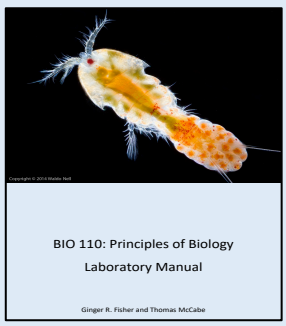
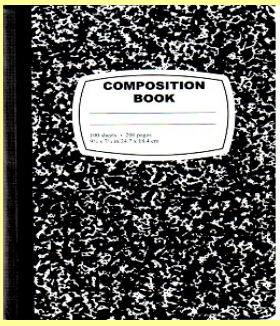
This course will meet three days a week in the lecture room, and you will meet once a week in your lab sections. The lecture material is organized into four units where we will start with the smallest units (atoms) and move up to larger functioning units (cells) as the semester progresses. During the lecture time, you will not just sit and passively listen. There will be clicker questions to answer, topics to discuss, and problems to solve in our case studies. This means that you need to do some work before class to be ready to participate. You will need to read the chapter and answer the homework questions before we cover that topic in class so that you know where we are headed for the day. Don't worry, the homework is based on effort, and I don't expect you to already know the material. I just want you to come to class with a little knowledge that we can then expand on and apply during class time.

COURSE PURPOSE

Have you ever thought about how all the parts of a cell work together? Did you ever wonder how DNA makes you who you are? Have you ever thought about what scientists *really* do? This course will give you insight not only into the basics of biology but also allow you the opportunity to design your own research project and start the process of becoming a scientist. By the end of this course, you will be able to (1) Describe and apply the basic principles of the discipline, (2) Discuss and demonstrate how scientists solve problems in the discipline, (3) Evaluate the validity of scientific arguments, (4) Collect, organize, and interpret data and (5) Demonstrate skills in observation. These are all skills that will help you in future coursework and in your future careers. Although it may seem like a lot at the beginning, I have no doubt that by the end of the course you will be able to do all of these things and be ready to continue your scientific adventures.

Big Journeys Begin with Small Steps

COURSE MATERIALS

TEXTBOOK	CLICKER	LAB MANUAL	COMPOSITION NOTEBOOK
Biology by Brooker, 5th ed. This is an eBook and the cheapest option is to purchase it and the Connect homework directly through Canvas. To do this, click on the first homework link in the Canvas site for the BIO 110 course and enter your credit card information there. **DO NOT PURCHASE A HARD COPY USED BOOK!** **IF YOU PURCHASE FROM AMAZON OR OTHER SITE, IT USUALLY IS NOT THE CORRECT BOOK WITH THE HOMEWORK ACCESS**	(Choose ONE option) Option 1: Purchase access to the REEF app on your phone. More details about how to do this are provided on Canvas which you will have access to at the start of the semester. Option 2: Purchase an iClicker with a mobile access card. These are available at the UNC bookstore but will be more expensive than the REEF app in option 1.	The laboratory manual for this course will be provided for you on Canvas free of charge. If you do not plan on bringing your laptop to lab, you will need to print out the lab manual. I recommend that you use a service such as Fed-Ex Kinko's or UPS and have it printed for you.	This is simply a blank notebook that you will use as your lab notebook when conducting your experiments. It can be purchased at the UNC bookstore or any office supply store. It just needs to be a notebook that is separate from your notes for other classes.
			

CANVAS

For this course, I have placed all course materials on Canvas (https://www.unco.edu/canvas/), which is UNC's learning management system. Here you can find all of the PowerPoints for lecture, the lab manual, links to the homework and everything else. Please check this site regularly as this is my primary means of communication with you.

Nature is Anything but Simple

ASSIGNMENTS

Exams

Each of the first three exams will cover approximately 1/4 of the course material presented in lecture and in the textbook. The final exam will include both the last 1/4 of the material presented as well a comprehensive review of all material covered throughout the semester. Essentially, the final exam covers the entire semester. All exams are in multiple choice format, and you need to bring a pencil and a picture ID to class on exam day. **The date for the final exam is Wednesday, December 7th from 1:30-4:00PM.** The other exam dates are listed in the schedule and these will not change. This allows you to plan your study time accordingly. For the first three exams, I will drop the lowest exam grade. This allows you to recover from a less than stellar performance on an exam or allows you miss an exam if you have an emergency. If you have an emergency, you will be given a zero for the exam and then this will become your lowest grade and will be dropped. For this reason, there are no make-up exams for this course, I simply drop the grade you missed.

Quizzes

There are weekly quizzes designed to help you study the material in small chunks rather than waiting until the exam and then cramming. The quizzes will be *due each Sunday by 11:59PM*. You can use your text or notes and will have 30 minutes to complete the 10 questions. These quizzes need to be done independently and working with other students will be considered cheating.

Homework

At the beginning of each new chapter that we cover in class, a homework assignment will be provided on Canvas. This assignment is designed to help you identify knowledge gaps, and prepare you for class. You will need to complete and submit this assignment BEFORE you come to class on the day we begin that new chapter. The due dates for all of these are listed in the schedule and the links to the homework are in Canvas. If you miss an assignment, you can still review the material to help you learn, but the grade will remain a zero. *To access the homework*, click on the link for the homework assignment in Canvas. This will take you to a site to register and add your UNC email address. You will then be asked to provide the code that you purchased. If you have not yet purchased a code, you may do so at this time. One you have access, answer the practice questions provided until you have reached 100% completion. If you have technical issues with the homework assignment, please call the McGraw Hill technical support at 1-800-331-5094. They will work with you and provide you with a case number.

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Clickers/REEF app

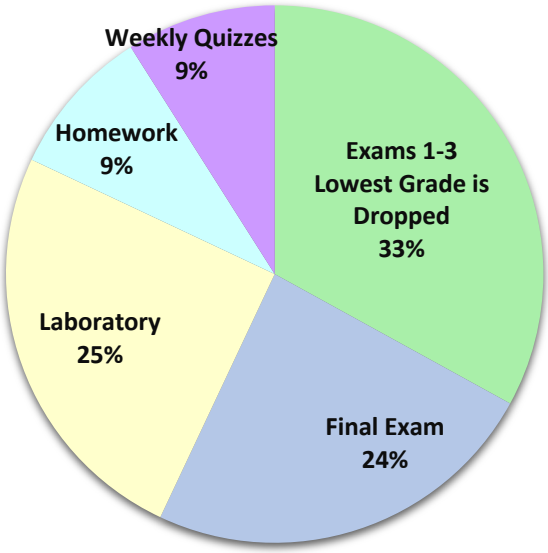
The clickers or REEF app that we use will enable you to answer questions during class, participate in the case studies, and earn extra credit. There will be a set number of questions throughout the semester, and you will be given up to 5 extra credit points on the final exam based on the total number of questions you answer. For example, if you answer 100% of the questions, you will get 5 points. If you answer 85% of the questions, you will get 4.25 points. To answer these questions, you will need to use the iClicker REEF app either on your phone or your laptop. This will require that you register your app and link it to this specific course. To do so, click on Modules, Start Here, Register Your Clicker, and follow the directions provided there. All clickers must be registered by September 2nd. If you need to miss class due to illness or quarantine, you must notify me *ahead of time* to get an optional assignment to complete instead of the polling quiz or clicker questions.

Laboratory

I am incredibly excited about the laboratory in this course! No longer will you just follow a series of instructions to get a specific result that you already know should occur (that is NOT real science). Instead, you will be asking questions that no one knows the answer to, designing experiments to answer this question, collecting and analyzing the results and drawing conclusions. You will get to do REAL science!! You will be given a model organism, the planktonic copepod *Tigriopus californicus,* and your lab group will come up with your own questions and devise a way to answer them. Rest assured that you will have lots of guidance from your lab instructor as you begin your first foray into real science. Your lab session meets once a week with the exception of the weeks of Labor Day and Thanksgiving. You will be given a separate syllabus for the lab and will be expected to follow all guidelines listed therein.

GRADING

Grades in the course are based on a weighted system rather than total points. The weights can be seen in the chart below. Your current grade will always be posted in Canvas so you know where you stand at any time.



Letter grades will be assigned as follows:

90-100%	A
80-89%	B
70-79%	C
60-69%	D
<60%	F

Just Keep Swimming!

STUDENT SUPPORT

What should I do to be successful in this course?

- Recognize that this course will take a large amount of time. You will need to do readings, homework, attend class and lab, and study. It is expected that you will be spending 2-3 hours outside of class for every hour in class. College truly is a full-time job.
- Study often and regularly. One of the biggest challenges will be how much material we cover and how quickly we do so. The solution to this is to keep up with the notes and study daily. Pretend that we have a test every Monday and study accordingly. If you wait until a few days before the exam to start studying, you will be overwhelmed by the amount of material and less likely to be successful.
- Be engaged. Come to class ready to learn, participate, take notes, and discuss concepts. Leave that cell phone in your bag!
- Ask questions. Ask lots of people lots of questions. Ask those sitting near you, your lab partners, your lab instructor, tutors, supplemental instructors, ME!!!!

BEFORE CLASS	DURING CLASS	AFTER CLASS
• Read the chapter • Do the homework • Note difficult concepts • Print out the lectures	• Stay engaged • Take notes • Ask questions • Discuss Clicker questions	• Recopy notes in your own words • Find answers to questions • Study as if there was a weekly quiz

What should I do if I need help?

- Come see me. I have office hours which are specifically set aside as a time when I can meet with you. Feel free to stop by to go over exams, ask questions, chat about biology, etc. I can also meet with you at other times, but I do have quite a few meetings and classes, so email me ahead of time to find a time that work for both of us. I didn't learn how useful it was to go to office hours until I was in graduate school, so learn from my mistakes and come see me! Details about the times and locations of my office hours can be found on Canvas under the Start Here module.

- Ask your lab instructor. These individuals are wonderful sources of knowledge, not only about biology but also about being a student. Remember that they were once in your shoes and were able to be successful, so learn from them.
- UNC offers FREE tutoring for students in this course. Take advantage of it by going to the tutoring center (Michener L-149) and sign up for a time.
- UNC also offers FREE Supplemental Instruction (SI) sessions for this course. These are group sessions to help review the material and are led by a student who was successful in this very course. Times/locations for these sessions will be posted on Canvas.

Be like the Proton – Stay Positive

POLICIES

Academic Integrity: As members of a scholarly community dedicated to healthy intellectual development, students and faculty are expected to share the responsibility for maintaining high standards of honesty and integrity in their academic work. All material for this course must be your work and no one else's. Cheating or plagiarism in any form will not be tolerated. This includes, but is not limited to, copying someone else's work, clicking in for an absent student, and using banned material while taking exams. The penalty for cheating or plagiarism is a zero for the course. UNC's policies and recommendations for academic misconduct will be followed. For additional information, please see the Student Code of Conduct.

Honor Code: all members of the University of Northern Colorado community are entrusted with the responsibility to uphold and promote five fundamental values: Honesty, Trust, Respect, Fairness, and Responsibility. These core elements foster an atmosphere, inside and outside of the classroom, which serves as a foundation and guides the UNC community's academic, professional, and personal growth. Endorsement of these core elements by students, faculty, staff, administration, and trustees strengthens the integrity and value of our academic climate.

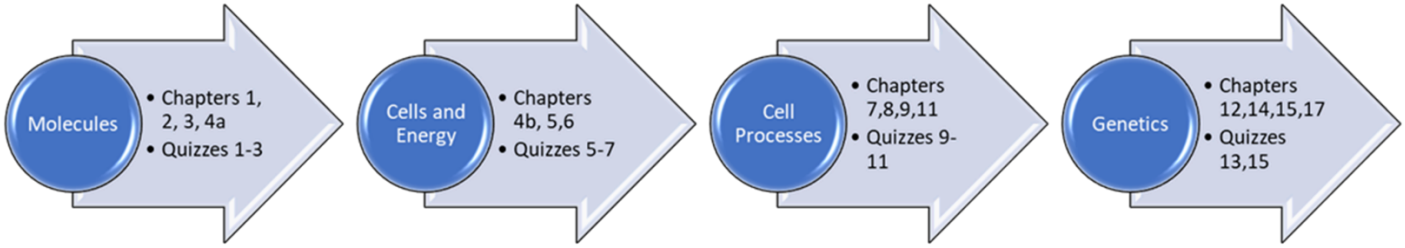
Disabilities: Disabilities are not a reflection of your intelligence or who you are, they are a reflection of how your brain works. If you know or think that you have any learning or physical disabilities, please contact our Disability Resource Center. This will help you gain access to resources and also let me know how I can best accommodate your needs.

Disability Resources: It is the policy and practice of the University of Northern Colorado to create inclusive learning environments. If there are aspects of the instruction or design of this course that present barriers to your inclusion or to an accurate assessment of your achievement (e.g., time-limited exams, inaccessible web content, use of videos without captions), please communicate this with your professor and contact Disability Resource Center (DRC) to request accommodations. Office: (970) 351-2289, Michener Library L-80. Students can learn more about the accommodation process at https://www.unco.edu/disability-resource-center/

Portable electronic devices: Please extend courtesy to me and fellow students by putting away your cell phones during class. They are a distraction to you and other students and prevent you from being fully engaged in class. Please step out of the classroom if you need to receive a call during class.

Preferred pronouns/methods of address: If you have a nickname, or a preferred pronoun that is different from what I may assume, please let me know, and I will do my best to follow your preferences. You may address me as Professor Fisher, or Dr. Fisher (preferred pronouns: she, her).

Course Description: Welcome to *a study of life*! This course examines biological principles from cells to communities, especially structure and function. You will explore genetics, metabolism, physiology, and homeostasis. This course will help build a foundation of knowledge about how all living organisms from a simple yeast cell to a gigantic blue whale live and survive. Although this course fulfills one of the general education requirements, it is not recommended for non-science majors.



The Only Place Success Comes Before Hard Work is in the Dictionary

Wk	Day	Date	Lecture Topic	Chapter	Quiz
			INTRODUCTION AND MOLECULES		
1	M	22-Aug	Introduction - what is life?		
	W	24-Aug	Studying Life		
	F	26-Aug	Case Study Science Methods	1	Week 1
2	M	29-Aug	Chemistry of Life	2	
	W	31-Aug	Small Molecules		
	F	2-Sep	Case Study - Too Much Aspirin		Week 2
3	M	5-Sep	LABOR DAY NO CLASS		
	W	7-Sep	Carbohydrates and Lipids	3	
	F	9-Sep	Proteins and Nucleic Acids		Week 3
4	M	12-Sep	Case Study - Brains and Broncos		
	W	14-Sep	Chemical Evolution	4a	
	F	**16-Sep**	**EXAM 1**		
			CELL STRCTURE AND WORK		
5	M	19-Sep	Cells - types and principles	4b	
	W	21-Sep	Cells - organelles		
	F	23-Sep	Cell Structure and Disease		Week 5
6	M	26-Sep	Case Study- Infection Diagnosis		
	W	28-Sep	Membranes Structure and Chemistry	5	
	F	30-Sep	Membrane Synthesis and Transport		Week 6
7	M	3-Oct	Case Study- Ecstacy		
	W	5-Oct	Thermodynamics and Enzymes	6	
	F	7-Oct	Enzyme Control and Pathways		Week 7
8	M	10-Oct	Case Study - Fire and Fish		
	W	**12-Oct**	**Exam 2**		
			CELLULAR METABOLISM		
	F	14-Oct	Cellular Respiration	7	
9	M	17-Oct	Case Study - Metabolic Murder		
	W	19-Oct	Anaerobic Respiration and Fermentation		
	F	21-Oct	Case Study Fun in Fermentation		Week 9
10	M	24-Oct	Photosynthesis	8	
	W	26-Oct	Case Study Photosynthesis		
	F	28-Oct	Cell Communication	9	Week 10
11	M	31-Oct	Case Study THC and Memory		
	W	2-Nov	Nucleic Acid Structure and DNA Replication	11	
	F	4-Nov	Case Study Dracula		Week 11
12	**M**	**7-Nov**	**Exam 3**		
			GENETICS		
	W	9-Nov	Transcription	12	
	F	11-Nov	Translation		Week 12
13	M	14-Nov	Gene Regulation	14	
	W	16-Nov	Case Study - Schizophrenia		
	F	18-Nov	DNA Mutation and Cancer	15	Week 13
14	M	21-Nov	Mitosis and Meiosis	16	
	W	23-Nov	THANKSGIVING: NO CLASS		
	F	25-Nov	THANKSGIVING: NO CLASS		
15	M	28-Nov	Simple Mendelian Inheritance	17	
	W	30-Nov	Other forms of inheritance and pedigrees		
	F	2-Dec	Case Study - TBD		Week 15
16	**W**	**7-Dec**	**FINAL EXAM 1:30-4:00PM**		

Institutional Help Is Available!

Food Insecurity and Basic Needs

UNC offers assistance to students facing food insecurity through an on- campus food pantry. The Bear Pantry is located in University Center 2166A, and is open for regular hours throughout the semester. Please visit www.unco.edu/bear-pantry for more information. Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is also urged to contact Student Outreach and Support (SOS) for assistance. SOS can assist students during difficult circumstances which may include medical, mental health, personal or family crisis, illness or injury. SOS can be reached at sos@unco.edu or via phone at 970-351-2796.

Title IX

UNC is committed to providing a safe learning environment for all students that is free of all forms of discrimination and sexual harassment, including sexual assault, domestic violence, dating violence, and stalking. If you (or someone you know) has experienced or experiences any of these incidents, know that you are not alone. UNC has staff members trained to support you in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, helping with legal protective orders, and more. Please be aware all UNC faculty and most staff members are "responsible employees," which means that if you tell a faculty member about a situation involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking, they must share that information with the Title IX Coordinator, Larry Loften. Larry or a trained staff member in the Office of Institutional Equity and Compliance (OIEC) will contact you to let you know about accommodations and support services at UNC as well as your options for pursuing a process to hold accountable the person who harmed you. You are not required to speak with OIEC staff regarding the incident; your participation in OIEC processes are entirely voluntary. If you do not want the Title IX Coordinator notified, instead of disclosing this information to your instructor, you can speak confidentially with the following people on campus and in the community. They can connect you with support services and help explore your options now, or in the future.

- UNC's Assault Survivors Advocacy Program (ASAP): 24 Hr. Hotline 970-35-4040 or www.unco.edu/asap
- UNC Counseling Center: 970-351-2496 or www.unco.edu/counseling
- UNC Psychological Services: 970-351-1645 or www.unco.edu/cebs/psych_clinic

If you are a survivor or someone concerned about a survivor, or if you would like to learn more about sexual misconduct or report an incident, please visit www.unco.edu/sexual-misconduct or contact the Office of Institutional Equity and Compliance (970-351-4899). OIEC is located on the third floor of the University Center in room 3060.

Equity and Inclusion Statement

The University of Northern Colorado embraces the diversity of students, faculty, and staff, honors the inherent dignity of each individual, and welcomes their unique perspectives, behaviors, and worldviews. In this course, people of all races, religions, national origins, sexual orientations, ethnicities, genders and gender identities, cognitive, physical, and behavioral abilities, socioeconomic backgrounds, regions, immigrant statuses, military or veteran statuses, size and/or shapes are strongly encouraged to share their rich array of perspectives and experiences. Course content and campus discussions will heighten your awareness to each other's individual and intersecting identities. If you would like to report an incident or learn more about identity-based discrimination/harassment, please visit www.unco.edu/institutional-equity-compliance

INSTITUTIONAL OUTCOMES

Liberal Arts Curriculum & GT Pathways

he Colorado Commission on Higher Education has approved BIO 110 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT-SC1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to http://highered.colorado.gov/academics/transfers/gtpathways/curriculum.html

This course is a part of the Liberal Arts Curriculum at UNC and fulfills 4 credit hours of the Natural & Physical Sciences category. The Colorado Commission on Higher Education has approved BIO 110 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT-SC1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to http://highered.colorado.gov/academics/transfers/gtpathways/curriculum.html

UNC's LAC outcomes in Natural & Physical Sciences are aligned with the State of Colorado's GT Pathways student learning outcomes, competencies, and content criteria for SC1. This includes CDHE competencies and student learning outcomes in Inquiry & Analysis and Quantitative Literacy.

LAC Natural & Physical Sciences Learning Outcomes + GTP Competencies & SLOs	Course Mapping
Inquiry & Analysis: **Inquiry is a systematic process of exploring issues/objects/works through the collection and analysis of evidence that results in informed conclusions/judgments. Analysis is the process of breaking complex topics or issues into parts to gain a better understanding of them.** **Student Learning Outcomes (SLOs)** ***Students should be able to:*** **4. Select or Develop a Design Process** **a. Select or develop elements of the methodology or theoretical framework to solve problems in a given discipline.**	**Will be completed via lab 1 and 3 and a case study.**

5. Analyze and Interpret Evidence **a. Examine evidence to identify patterns, differences, similarities, limitations, and/or implications related to the focus.** **b. Utilize multiple representations to interpret the data.** **6. Draw Conclusions** **a. State a conclusion based on findings.**	
Quantitative Literacy: **Competency in quantitative literacy represents a student's ability to use quantifiable information and mathematical analysis to make connections and draw conclusions. Students with strong quantitative literacy skills understand and can create sophisticated arguments supported by quantitative evidence and can clearly communicate those arguments in a variety of formats (using words, tables, graphs, mathematical equations, etc.).** **Student Learning Outcomes (SLOs)** ***Students should be able to:*** **1. Interpret Information** **a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).** **2. Represent Information** **a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).**	Will be completed via test #1

Content Criteria for Natural & Physical Sciences (GT-SC1)	**Course Mapping**
1. The <u>lecture content</u> of a GT Pathways science course (GT-SC1 or GT-SC2): **Students should be able to:** **a. Develop foundational knowledge in specific field(s) of science.** **b. Develop an understanding of the nature and process of science.** **c. Demonstrate the ability to use scientific methodologies.** **d. Examine quantitative approaches to study natural phenomena.** *(If the course does not have a lab, do not include #2 below.)* **2. The <u>laboratory content</u> of a GT Pathways science course (GT-SC1):** **Students should be able to:** **a. Perform hands-on activities with demonstration and simulation components playing a secondary role.** **b. Engage in inquiry-based activities.** **c. Demonstrate the ability to use the scientific method.** **d. Obtain and interpret data, and communicate the results of inquiry.** **e. Demonstrate proper technique and safe practices.**	**Will be completed via test #2** **Will be completed via lab #3**

The Colorado Commission on Higher Education has approved BIO 110 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT-SC1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to http://highered.colorado.gov/academics/transfers/gtpathways/curriculum.html