



UNIVERSITY OF NORTHERN COLORADO

Extended Campus

College of Natural & Health Sciences
School of Biological Sciences

UNC Dual Enrollment with Bennett High School

BIO 110-679: Biology-Atoms to Cells (4 credits; LAC, gtP*)
Fall 2020

Contact Information:

Mrs. Jennifer Goodnight, MS

Phone: 720-951-2690

Email: jenniferg@bsd29j.com

Office Hours: Please schedule with me any day after school. (M-R)

Text (required): “Campbell Biology, 9th edition” by Reece, Urry, Cain, Wasserman, Minorsky, Jackson
Lab Manual with supplemental Class Materials (required): Lab Manual written by Dr. Ginger Fisher
– a copy will be provided for you.

COURSE DESCRIPTION:

Examines the unifying theme of life, evolution, and explores how biologists study life. Explores the fundamental molecular, cellular and genetic principles characterizing plants and animals. Includes cell structure, function and the metabolic processes of respiration and photosynthesis, as well as cell reproduction and basic concepts of heredity. The course includes a laboratory experience.

COURSE OBJECTIVES:

- Recognize terminology, specific facts, experimental methodologies, and general concepts related to basic chemistry, cell structure and function, cell reproduction, bio-energetics and genetics.
- Read, analyze and apply the concepts learned to interpret new situations.
- Distinguish between principles and purposes of procedures and techniques introduced in the laboratory.
- Describe the role of research in the biological sciences and its impact on society.
- Employ the scientific method to the extent of formulating a hypothesis, designing a set of experiments with controls, analyzing results and deriving conclusions.
- Interpret and manipulate data in a variety of formats, such as graphs, tables and charts.
- Select and apply contemporary technologies to solve problems or compile information.
- Write and speak clearly and logically in presentations, labs, and essays.

ATTENDANCE:

Students are expected to attend ALL lectures and labs, take all tests on time and as scheduled. Missed assessments, labs, or due assignments can only be made up/accepted with prior instructor approval.

YOU MUST contact ME directly via email, phone, or directly speak with me PRIOR to your absence to be eligible for any make up work. Some labs may not be possible to make up, attendance is critical. ALL work is due at start of class, on the date specified – no exceptions.

VERIFY ENROLLMENT IN COURSE! Within the first week of school, go to your UNC account and verify you are truly enrolled in this course AND do not have any holds on your account. If you owe UNC any prior balance, or if any of your paperwork is not complete, you will not be enrolled.

LECTURE CONDUCT

UNC's policies and recommendations for academic misconduct will be followed. During class, talking on the phone, texting, listening to an iPod, talking with fellow students, and doing other work not related to class is not permitted. If you are doing any of these activities, you will be asked to leave the lecture hall immediately. Lectures will start and end on time, so come to class a few minutes early to get settled and ready to begin. If you find you are running late, quietly enter the back of the classroom and slip into a row with minimal commotion. Please treat me and your fellow students with consideration and basic courtesy.

CELL PHONES

Please be courteous and turn your cell phone OFF at the beginning of class. If your phone rings during class, or you are texting, you will be asked to leave the lecture hall immediately.

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, and using banned material while taking exams. The penalty for cheating or plagiarism is a zero for the course.

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.

Students with Disabilities- Any student requesting disability accommodation for this class must inform the instructor giving appropriate notice. Students are encouraged to contact the Bennett High School Counseling Office to certify documentation of disability and to ensure appropriate accommodations are implemented in a timely manner.

***Liberal Arts Core & Colorado gtPathways.** This course satisfies 4 credits of Area 6 (Physical & Life Sciences) of the UNC Liberal Arts Core. This course has been approved by the Colorado Commission on Higher Education for inclusion in the Colorado Guaranteed Transfer Program, gtP. gtP courses automatically transfer to any public institution in Colorado and will continue to count toward general education or other graduation requirements for any liberal arts or science associate or bachelor's degree program IF a grade of C- or higher is recorded. Statewide articulation agreements prescribe specific general education and degree requirements in the following professional degree programs: business, early childhood, elementary education, engineering and nursing. Most other courses not approved for the

gtP designation will also be accepted in transfer by other institutions but may not fulfill general education or degree requirements.

Dropping or Withdrawing from a UNC Dual Credit Course

Note: Drop and withdrawal dates for the courses at your school can be found on your [dual enrollment page for your high school](#) or by speaking with the high school instructor.

Please use the [Dual Enrollment Drop & Withdrawal Form](#).

- You can drop your course up until the designated Drop Deadline. The course will be removed from your transcript and you will receive a full tuition refund.
- After the Drop Deadline, and up until the Withdrawal Deadline, you can withdraw from your course. The course will remain on your transcript with a grade of “W” (this does not impact your GPA), and there is no tuition refund.
- After the withdrawal deadline, you are unable to be removed from the course. The course will remain on your transcript with the grade that you have earned, and there is no tuition refund.
- If you stop attending the course but fail to officially withdraw from the course(s), you will be responsible for full tuition and fees and the course grade will remain on your transcript.

GRADING SCALE

4.0 = A = 90 – 100% of possible points	(Distinguished)
3.0 = B = 80 – 89%	(Above Average)
2.0 = C = 70 – 79%	(Competent)
1.0 = D = 60 – 69%	(Below Average)
0.0 = F = less than 60%	(Failing)

NOTE: Student must pass with a C or better or reimburses Bennett High School District full tuition.

GRADE DETERMINATION:

Unit Exams	30%	(lowest grade will be dropped)
Final Exam	10%	
Quizzes	15%	
Laboratory	25%	
Homework	15%	
Research Presentation	5%	

EXAMS

Each of the exams will cover the course material presented in lecture, textbook, and lab. The final exam will be a comprehensive review of all material covered throughout the semester. Essentially, the final exam covers the entire semester. The format for all exams will be multiple choice with some short answer. The lowest unit exam grade will be dropped. You are required to bring a #2 pencil and an eraser. You will NOT be allowed to listen to your iPod or other portable device, so do not bring them to class. Do not plan to leave BHS before the final exam date, as no early finals will be given. Attendance is mandatory for all exams and the exam dates are not negotiable. If you miss an exam without prior notification and approval, you will receive a zero for the exam. Because the lowest exam grade of the unit exams is dropped, there are **NO MAKE-UP EXAMS**. It is therefore in your best interest to take all exams in case you experience an emergency and need to miss one later in the semester.

HOMEWORK/ONLINE ACTIVITIES

Homework assignments will be provided through the textbook and supplemental materials through class. You may use your lecture notes, the text or any other resource to aid you in completing the homework.

Homework must be submitted on the due date, in order for you to receive credit. **No make-up or late homework assignments will be accepted.**

No late work is accepted:

All lab reports and assignments must be handed in on-time. On-time is defined as, by the deadline time, at the start of class, on the date due. **NO credit will be given for late lab reports or assignments turned in past the instructor designated due date.** All test dates are posted on the schedule provided. Be prepared and be on time.

BHS Broken Lab Equipment Policy:

There is a list of commonly used lab glassware and their associated prices. If an item is broken during lab, it is your responsibility to replace that piece of glassware, this will be accomplished by paying the cost of the item broken.

Weather or Emergency Closures:

Should BHS school be officially cancelled (because of inclement weather, etc.), assignments/exams due/to occur during that cancellation will be due/occur the next scheduled class session.

Study time and commitment:

College level science courses customarily require at least 2 to 3 hours of time outside of actual class (for reading, studying, and preparation) for each hour spent in class. Students whose schedules cannot accommodate this level of commitment for whatever reason (work, family obligations, etc.) are unlikely to be successful in this class. **YOU MUST READ THE TEXT TO SUCCEED IN THIS CLASS.**

Close Readers

- 1. Read Carefully & Get the Gist**
 - ✓ What is the text mainly about?
 - ✓ What questions are you asking yourself?
 - ✓ What do you notice right away?
 - ✓ Circle words that you don't understand.
 - ✓ Use context clues to figure out unknown words.
- 2. Read Again & Dig Deeper**
 - ✓ Why did the author write the text?
 - ✓ What text features stand out?
 - ✓ Underline key vocabulary words.
 - ✓ Summarize the text.
- 3. Read One Last Time & Think**
 - ✓ What inferences did you make about the text?
 - ✓ What connections did you make to the text?
 - ✓ Use the text to answer questions.
 - ✓ Gather text evidence from the text.

Start Reading *UP CLOSE* Then Move Towards the Bigger Meaning

- 1** - Words
- 2** - Sentences
- 3** - Complete Text

What does this mean...you will likely need to read a chapter 3x before you truly understand the material. This does not mean you read three times in a row. The best method involves reading one day, reading again the next day, and then reading again on a third day. This allows your brain time to process and reflect upon the information being presented.

Additional helpful tips:

READ assigned materials BEFORE class and COME TO CLASS!

Study often, study in small chunks, use your online resources!

DO THE HOMEWORK

Teach someone else what you learned that day.

Secure a study buddy/group – Know how to contact your study partner outside of class.

ASK QUESTIONS!!!

**COURSE and LAB SCHEDULE
(L)**

Wk	Day	Date	Lecture Topic	Chp.(s)	Lab Topic
Theme 1			Intro to Life		
1	T-R	Week 1	Welcome to BIO: studying life	1	Lab #1 Scientific Method
2	M-R	Week 2	Evolution – the Unifying Theme	22,25	Quiz: Chp 1 (1/16) Lab #2: Literature Review and Critique
3	M-R	Week 3	Evolution – the Unifying Theme	25, 26	Lab #3: Microscopes and Dilutions
4	M-R	Week 4	Chemistry of Life	2,3	Quiz: Chps 22, 25, 26 (1/29) Lab #4: Research Proposal and Design
5	M-R	Week 5	Carbon and Functional Grps	4	Quiz: Chps 2,3 (Mon 5 th) EXAM #1 Chp 1,22,25,26,2,3 (2/9)
Theme 2			Biomolecules and Cells		
6	M-R	Week 6	Large Biological Molecules	5	Lab #5: Graphing and Data Analysis Quiz - Chps 4,5 (2/16)
7	M-R	Week7	Tour of the Cell, Membrane Structure and Function	6,7	Lab #6: Research Projects – Final Design
8	M-R	Week 8	Introduction to Metabolism	8	Lab #7: Research Projects - set up 2/26 analyze 3/2 Quiz – Chps 6,7 (3/2)
9	M-R	Week9	Con't: Intro to Metabolism		Quiz – Chp 8 (3/6) EXAM #2 Chps 4-8 (3/8)
Theme 3			CELL PROCESSES		
10	M-R	Week10	Cell respiration and Photosynthesis	9, 10	Lab #9: Research Projects – set up 3/12 analyze 3/16
11	M-R	Week 11	Cell Communication	11	Lab #10: Research Projects – set up 3/19 analyze 3/23 Quiz – Chps 9,10 (3/20)
12	M-R	Week 12	Spring Break		
13	M-R	Week 13	Mitosis and Meiosis Case Study – Mitosis/Meiosis	12,13	Lab #11: Final Lab Report Work Time
14	M-R	Week 14	Mendel & Chromosomal Inherit	14	Quiz – Chps 11, 12, 13 (4/9) EXAM #3 Chps 9-13 (4/13)
Theme 4			GENETICS		
15	M-R	Week 15	Mendel & Chromosomal Inherit	15	Lab #12: Final Lab Report Work Time
16	M-R	Week 16	DNA Replication & Protein Synthesis	16, 17	Quiz: Chps 14,15 (4/23)

17	M- R	Week 16	Gene Regulation and Biotechnology	18, 20	Quiz: Chps 16, 17,18 (5/3) Take Home Quiz: Chp 20 (due 5/7)
					Lab #13: Presentations 5/7 EXAM #4 Chps 14-18,20 (5/9) FINAL EXAM Fri 5/11

BIO 110-673 LABORATORY Syllabus

Fall 2019

GENERAL INFORMATION

Lab Instructor:

Jennifer Goodnight, MS
Email: jenniferg@bsd29j.com

Laboratory Text:

Required:

BIO 110 Lab Manual with Supplemental Lecture Materials. You must purchase, will be available in class for purchase. Must bring daily to class. Laboratory notebook – composition lab notebook

Objectives

The student:

1. Will demonstrate ability in critical thinking
2. Will collect, organize and interpret data
3. Will understand some of the quantitative methods needed to interpret data
4. Will demonstrate skills in observation

OVERVIEW OF LAB STRUCTURE

For the first 5 weeks labs will focus on learning specific techniques such as microscopy, dilutions, etc. You will gain experience to work with the model organism for the course, the marine planktonic copepod *Tigriopus californicus*. You will also be drafting a proposal for the experiments that you will conduct during the later portion of the semester. The lab manual contains background information on the copepods as well as areas of potential research, where the answers to basic questions are still unknown. Then, working in groups, you will choose an area of research, develop a testable hypothesis, and design a series of experiments to test this hypothesis.

During weeks 7-11, you will work on your own experiments with *T. californicus*. Twice during this period, your group will present to the class your progress to date, any problems that you are having, and any conclusions that you are able to make at that point in your experiment. Following the group presentations, you will then continue to work on your experiment. During your work time, your lab notebook will be checked and assigned a grade. Weeks 13-15 will allow for final lab report work time and week 18 is designated for group presentations.

See Course and Lab Schedule Document for Weekly Lab Topics

Homework: Homework questions for Lab activities will always be due 1 week from lab activity – this will typically be the beginning of the next lab class. No late work will be accepted. For these exercises, copying word for word from your lab partner or other students will not be accepted and will be considered plagiarism. The penalty for plagiarism is a zero for the entire course, both lecture and laboratory. In addition, the finding of plagiarism will be reported to the Dean of Student's Office.

Research Question: The purpose of the research question is to get you started on the process of defining your ideas and narrowing down your area for experimentation. As a group, you should discuss which variables of the copepods are the most interesting to you all and from there, which aspects of these you may want to investigate.

Rough Draft of Proposal and design: The rough draft must include exactly what you are planning to do and have support from the primary literature. More detail on this is provided in the lab manual.

Final Draft of Proposal: The final proposal is the completed version of the rough draft of the proposal. It must include exactly what you are planning to do and have support from the primary literature and include corrections that were suggested from the rough draft. More detail on this is provided in the lab manual.

2 Weekly Updates: During the research phase, twice your group will provide an oral presentation on the research conducted thus far. More detail on this is provided in the lab manual.

Lab Notebook: You will work as 3-to-4-member teams for the copepod research. **However, you will each keep your own notebook.** If you want to be successful at doing lab work, it is very important that you keep a detailed notebook. Your lab notebook will be graded during lab, so you must keep it up to date. More detail on this is provided in the lab manual.

Final Lab Report: Each group will write up one combined lab report based on their research project. This will be in the format of a scientific research journal article. You will receive a total grade for the lab report, but 80% of that grade will be your individual contribution and 20% will be a group grade. The individual grade will be based on your writing style as well as the content of the section that was your primary responsibility. No late reports will be accepted.

Final Presentation: At the end of the semester, each group will give a professional presentation of their research project. You will be required to make PowerPoint slides that present your material, and the presentations will be given in the same format as a scientific meeting. Each person must present their portion of the material as part of the group presentation. The time frame for each presentation is 12-15 minutes with 3-4 minutes for questions. As is the case at a real scientific conference, you will not be allowed to go over the time limit.

In addition to the lab activities published in the lab manual, you will be required to complete the following online labs and investigative cases. Purchasing the textbooks (Campbell) access code will give you access to these activities. Please note the due dates! These activities will be done on your own time, you just need access to the internet and a computer. We will not allocate any in-class time for these online activities.

Online labs:	<u>Due:</u>
1- How do Environmental changes affect a pop?	8/27
2- How are space rocks analyzed for signs of life?	9/3
3- How does acid precipitation affect trees?	9/10
4- What factors determine the effectiveness of drugs?	9/17
5- Practice test.	9/24
6- What is the size and scale of our world?	10/1
7- How to salt concentrations affect cells?	10/8
8- How is the rate of enzyme catalyts measured?	10/15
9- How is the rate of cellular respiration measured?	10/22
10- How is the rate of photosynthesis measured?	10/29
11- How do cells communicate with each other?	11/5

These lab activities are published by the books' authors and require data analysis, graphing as well as extended discussion and thorough analysis of data the student interprets. Each lab activity has a duration of approximately one hour.

Investigative cases:	<u>Due:</u>
1. Blood money	10/8

2. As the stomach turns	10/15
3. Do you eat dirt?	10/22
4. Drugland	10/29
5. Fad diets and Metabolic regulation	11/5
6. Java water	11/12
7. Life in the city	11/19
8. Murder by atkins	12/3
9. My twin sister	12/3
10. Outbreaks	12/9
11. Steroids	12/9

These investigative cases are published by the author of the textbook, they require that the students think outside of the box, analyze and interpret various biological situations. Each investigative case requires approximately one hour to complete.

During our bi-weekly lab sessions, you will also participate in the following in class lab activities:

- 1. Compare and contrast eukaryotic, prokaryotic and plant cells by staining each cell type (Simple stains) and observing under the microscope. Students are required to interpret and analyze their stained slides and be able to recognize the structures in those slides.**
- 2. Testing for macromolecules lab activity. Identification of known samples and procedures.**
- 3. Osmosis (Cell Membrane)**
- 4. Diffusion (Cell membrane) Concentration**
- 5. Simulated Urine Analysis Clinical Concepts**
- 6. ABO blood typing/Forensic applications**
- 7. Mitosis and meiosis cell staining/identification of phases**
- 8. Organelles lab activity**
- 9. Mitochondrial staining activity, mtDNA analysis**
- 10. DNA extractions bacterial and genomic**
- 11. Water, cohesion, adhesion and specific heat**
- 12. Photosynthesis- two lab sessions**
- 13. Cellular Respiration- two lab sessions**
- 14. Homeostasis lab**
- 15. DNA and RNA molecular structures**
- 16. Working DNA replication lab**
- 17. Kidney dialysis**
- 18. Testing of sensory organs**
- 19. Bacterial cell culture**
- 20. Prokaryote cell stain**
- 21. Endospore Stain**
- 22. Introduction to Biotechnology**
- 23. Introduction to pH as it pertains to biological systems**
- 24. Organelles**
- 25. Simulated Disease transmission**
- 26. Sheep heart dissection**

27. Detection of leukemia Elisa

28. Detection of HIV and Lyme disease

Attendance – Since the lab provides hands-on experience, you are expected to attend all of your laboratory sessions. The lab activities account for 25% of your course grade. There are NO makeup laboratories. Therefore, it is critical that you attend all labs.

LAB POLICIES

Safety – Please review the safety policies located at the beginning of your lab manual and follow these policies at all times. Note that food or drinks are not permitted in the laboratory at any time.

Cell Phones – Please be courteous to your fellow students and your instructor and put all cell phones on silent before entering lab. Talking or texting on cell phones in the lab or stepping outside to take a call is NOT permitted.

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, and using banned material while taking exams. The penalty for cheating or plagiarism is a zero for the course.

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