

BIOLOGY 100

Fall 2018

COURSE DESCRIPTION:

Survey of biology emphasizing present and future relationships of humans to their environment.

LEARNING GOALS:

- Students will be exposed to the amazing and diverse world of life by exploring the major themes of biology. Each biological theme will begin with a relevant question or a current problem applicable to everyday life.
- Students will explore, synthesize and evaluate biological concepts through inquiry-based laboratory experiments, a course undergraduate research experience, and exploration of dominant themes in biology. This investigation will begin by focusing on the structure and function of life at the chemical, subcellular and cellular levels, continuing with an examination of genetics and the mechanisms of cellular reproduction. Students will explore biodiversity including the evolutionary factors that have led to the form and function of life, and issues affecting biodiversity.

Students will be able to critically analyze biological concepts in order to make scientifically literate decisions dealing with environmental and ethical issues related to biology and the human experience.

** All of these learning goals will be underscored with the scientific method and based on relevant, inquiry-based science.*



Biological Principles & the Human Environment

Dr. Krista Slemmons

CBB 347

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<http://paleodiatom.com>

715-346-2453

Office hours:

Tues 10:00-11:00

Wed 10:00-11:00

Or by appointment

Dr. Chris Hartleb

TNR 442

715-346-3228

Office hours:

Wed 9-10;

Fri 1-2

Lecture (CBB 101):

Tues and Thur

11:00-11:50

Lab (CBB 130):

Sect. 1 Thur 8-10:50

Sect. 2 Wed 11-1:50

Sect. 3 Wed 2-4:50

Sect. 4 Thur 12-2:50

REQUIRED TEXTBOOK: *Biology for a Changing World*, Second edition, Shuster, Vigna, Tontono, Sinha

REQUIRED LAB MANUAL: *Biology 100 Laboratory Manual*
(Will be available on D2L each week of lab)
Put your lab manual in a 3-ring binder and bring it with you to **every** lab meeting.

GEP & OVERALL COURSE STUDENT LEARNING OUTCOMES (C-SLO)

All learning outcomes will be assessed in a variety of ways throughout the semester.

Weekly course student learning outcomes (W-SLO) are listed in the weekly schedule at the end of the syllabus.

Assessments for each W-SLO are listed in abbreviated form. These assessments include but are not limited to:

- SA Summative Assessment (exam)
- FA Formative Assessment (online quiz)
- P Presentation (poster / oral)
- PE Peer evaluation
- SP Scientific Paper
- CS Case Study
- ILQ Inquiry Post Lab Questions'
- TLQ Traditional Post Lab Questions
- D Debate

GEP & COURSE LEARNING OUTCOMES	EXAMPLE CLASS ASSIGNMENT(S):	ACTIVITY
1. Solve problems by applying the scientific method as it pertains to the natural world and distinguish this process from other ways of knowing.	Identify the basic principles of the scientific method in a case study involving childbed fever. Conduct self-designed, long-term experiments (photosynthesis) applying the principles of the scientific method.	Inquiry Lab Case Study Lecture Oral presentation Videos
2. Infer relationships, make predictions and solve problems by synthesizing content derived from biological principles including: <ul style="list-style-type: none"> • Cellular level functions necessary for life • Inheritance & evolutionary change • The diversity of life within an evolutionary context • The basic function of populations, communities and ecosystems. 	Infer relationships, make predictions and solve problems based on data dealing with bacterial inhibition and experimental treatments in self-designed experiment	Inquiry Lab Written scientific paper Scientific presentation
3. Evaluate social decision making in light of biological principles, particularly pertaining to aspects of your daily life and societal issues	Evaluate the legitimacy of research in terms of the scientific method and solve problems involved in five different case studies throughout the semester. Case studies involve current, real-life problems and determining solutions to those problems based on course content.	Peer evaluation Case study Independent work Written work

CRITICAL THINKING (CT) AND HONORS (H) LEARNING OUTCOMES (SECTION 3 ONLY):

PARTICIPANTS	OUTCOME	ASSESSMENT
CT & H	Recognize critical thinking as a process of identifying, analyzing, evaluating, and constructing reasoning in deciding what conclusions to draw or actions to take	<ul style="list-style-type: none"> • Critical Thinking Lesson Module • Assessment Instrument (both found on D2L)
CT & H	Identify , analyze, evaluate or construct reasoning as it is applied to general or discipline-specific questions or issues	<ul style="list-style-type: none"> • Identify reasoning from a scientific paper • Creation of an argument for labs 1-8
H	Foster intellectually curiosity through engagement in a citizen science research project	<ul style="list-style-type: none"> • Participation in the project • Poster Presentation

ASSESSMENTS/GRADING:

LECTURE:

3 Lecture exams (100 points each)	= 300 points
15 Online video lectures and Practice Quizzes (5 points))	= 75 points
20 Lectures w/clicker questions (5 points/lecture)	= 100 points
<u>7 Case Study Summary (10 points each)</u>	<u>= 70 points</u>
Subtotal	= 545 points

LAB:

8 Post-labs (20 points each)	= 160 points
2 Labs (15 points each: 5 pre-lab, 10 lab–animal & plant)	= 30 points
14 Pre-labs/Hypotheses (5 points each)	= 70 points
2 Presentations (one poster, one oral, 50 points each)	= 100 points
4 Peer evaluations (5 points each)	= 20 points
<u>1 Lab report, Bacteria</u>	<u>= 50 points</u>
Subtotal	= 390 points

Total	= 935 points
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HONORS/CRITICAL THINKING ADDITIONAL GRADES (SECTION 3 ONLY)

Citizen Science Project Proposal	=5 points
Critical Thinking Module/Quiz	=10 points
Scientific Reasoning Paper	=25 points
Summary of Project	=10 points
Poster of Citizen Science Project	=50 points

Total additional points	= 100 points
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Final grades will be assigned based on the following percentages:

A	= $\geq 93\%$	B-	= 80-82%	D+	= 67-69%
A-	= 90-92%	C+	= 77-79%	D	= 60-66%
B+	= 87-89%	C	= 73-76%	F	= < 60%
B	= 83-86%	C-	= 70-72%		

EXAMS:

Exams are cumulative but will largely deal with topics covered since the previous exam (80%). Cumulative exams result in longer retention of material (Khanna et al. 2013; Lawrence 2013). Exams will cover assigned textbook readings as well as lecture and lab material. **Make-up exams will be provided only in the case of an acceptable excuse and the discretion of Dr. Slemmons. The final exam must be taken during the week of finals unless you are graduating this semester. Graduating seniors must make arrangements with Dr. Slemmons for taking the exam early.**

Exam 1	Oct 4th
Exam 2	Nov 1st
Final Exam	Dec 18th 2:45 pm – 4:45 pm

LECTURE:

Lectures will be held twice a week. I expect you to be prepared, engaged and attentive. Some lectures will involve group or independent work based on videos that you will watch outside of class. While lecture is not mandatory, you will earn clicker points that comprise a part of your grade. If you attend every lecture, there is an opportunity

to gain extra clicker points. **Absences from lecture will result in a zero for these clicker points.**

Partial lecture notes will be provided on D2L prior to class when deemed necessary (Cornelius and Owen 2008). Providing complete lecture notes decreases student success (Noppe, 2007).

CLICKERS:

This class uses “Turning Point Cloud” to do interactive polling. You will need to purchase a Turning Technologies code from the bookstore to participate in the class. You will be able to use your own device (a laptop, tablet, or smartphone) to respond to polling.

If you do not have a device, you may check out a clicker from the **UWSP IT Service Desk in room 027 ALB, basement of the UWSP Library free of charge.**
Returning clickers: Clickers must be returned to IT Service Desk before the end of finals. Students with unreturned clickers will be billed a late fee and/or may be billed the replacement cost of the clicker.

For Service Desk hours: <http://www.uwsp.edu/infotech/Pages/HelpDesk/default.aspx>

You will need your UWSP Student ID to get your clicker.

Turning Point Account

You will need to create a Turning Technologies account in order to register your device to the class. Please use your UWSP email address to create an account here:

<https://account.turningtechnologies.com/account/>

You can find help with Turning Point Cloud here:

<https://www.turningtechnologies.com/support/turningpoint-cloud>

ONLINE VIDEOS & QUIZZES:

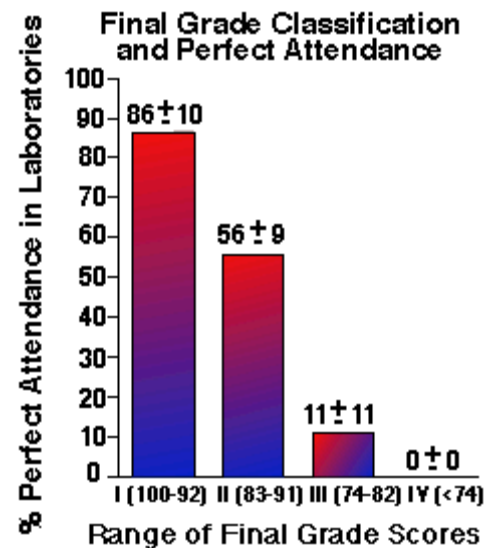
Throughout the semester, some material will be presented on D2L in a flipped classroom format. Students will be assessed on their understanding of the content provided in these videos in the form of a D2L quiz. If you fail to complete the quiz by the designated deadline, you will not be able to make up the quiz.

CASE STUDIES:

There will be seven case studies throughout the semester. Case studies involve a real-world application of some topic that we are covering in class. Case studies may be presented through online videos, a reading or participating in class discussions. Students will answer questions based on these case studies and be assessed based on their ability to apply content knowledge to a real-life scenario. After each case study, students will complete a case study exit slip on D2L.

LAB ATTENDANCE:

Regular attendance to lab is imperative for success in this course. There is a strong positive correlation between the amount of time a student spends in class and her/his



Daniloff 1994

final grade. It is **your** responsibility to get and understand the material covered during a missed lab/lecture.

Lab activities CANNOT be rescheduled. However, your lowest lab grade will be dropped. If you have a valid reason to miss additional labs please contact Dr. Slemmons or Dr. Hartleb (depending on section) as soon as possible, otherwise you will receive a zero for the lab. **If you miss a lab and an assignment was due on that day, the assignment is still due at the start of that lab (submitted to D2L). If this is not possible, arrangements should be made with Dr. Slemmons or Dr. Hartleb to turn in the assignment.**

PRELAB: Each week you are expected to read the assigned lab ahead of time and complete a set of prelab questions that assess your understanding of the lab. These questions are posted in D2L under **Quizzes**. Questions are assigned at random and therefore may be different between students. Some pre-labs will have an associated video that should be viewed prior to answering the questions. Proper preparation for lab will ensure your understandings of the concepts and your ability to work cooperatively with your lab partners.

LAB REPORT: Each week a portion of the lab will be graded. Often this is composed of the post-lab questions, a graph, data collected and/or a claim/justification. However, some portions of the lab will be solely graded based on completion. These graded sections are generally outlined in the lab manual. There is one formal lab report due based on the Laboratory 9: Bacteria. The requirements and rubrics for this report are included in the lab manual.

PRESENTATIONS: Students will present in two different formats throughout the semester: 1) a group PowerPoint (or other means of presenting) on lab results from Lab 5: Photosynthesis, and 2) a Poster presentation on a biological topic of your choosing. Those students that are **elementary education majors** will be required to create a lesson plan on a biological topic and illustrate an activity that demonstrates those learning objectives. Students that are not education majors are encouraged to create a poster that merges their discipline with that of Biology. Students will be constructing a rubric that will be used to evaluate posters. Each student will evaluate the posters of three different peers. You will be assessed on your depth and quality of peer evaluations. Requirements for these assignments are further detailed in the lab manual.

CITIZEN SCIENCE PROJECT: Those students participating in the honors program (section 3) will select and participate in a citizen science project. This will involve collecting data on a project of their choosing, analyzing that data and presenting it in the form of a poster session at the end of the semester.

LATE ASSIGNMENTS: Pre-lab questions in D2L are due at the **START** of lab each week. Post-lab questions and/or reports are due the following week at the beginning of lab unless otherwise indicated. Post-labs are submitted to D2L. Late assignments will not be accepted and will receive a zero. Extensions for D2L quizzes will not be granted. If you foresee a problem completing a quiz, please contact Dr. Slemmons prior to the due date.

E-MAIL: UWSP students are expected to check their University e-mail regularly for information from the university and/or instructors. If you are using an e-mail account other than your campus account to contact Dr. Slemmons, be sure your full name is included in the message.

**ACADEMIC
CONDUCT:**

All students are expected to follow ethical practices of neither giving nor receiving any unauthorized assistance on their work in this class. Additionally, all students are expected to not divulge the nature or content of any questions or answers on exams to any other student or groups of students. If there are suspected violations of academic misconduct, as defined by the UWSP Chapter 14.03(1) code, then the Chapter 14 policies and procedures will be invoked. See web page at http://www.uwsp.edu/admin/stuaffairs_rights/rightsChap14.pdf for details. Any student that removes an exam from the classroom may be given a failing grade for the course.

**ELECTRONIC
DEVICES:**

Cell phones should be turned **off** and **not** be displayed during labs or exam. Laptops will not be allowed during lecture. Use of laptops decreases student success (Fried 2008; Mueller and Oppenheimer 2014). No other communication or musical devices are allowed. Students needing a foreign language dictionary during exams may use one with permission from me.

**INCOMPLETE
POLICY**

Under emergency/special circumstances, students may petition for an incomplete grade. An incomplete will only be assigned at the discretion of Dr. Slemmons All incomplete course assignments must be completed within one month of the completion of the course.

INFORM YOUR INSTRUCTOR OF ANY ACCOMMODATIONS NEEDED:

UWSP is committed to providing reasonable and appropriate accommodations to students with disabilities and temporary impairments. If you have a disability or acquire a condition during the semester where you need assistance, please contact the Disability and Assistive Technology Center on the 6th floor of Albertson Hall (library) as soon as possible. DATC can be reached at 715-346-3365 or DATC@uwsp.edu.

STATEMENT OF POLICY:

UW-Stevens Point will modify academic program requirements as necessary to ensure that they do not discriminate against qualified applicants or students with disabilities. The modifications should not affect the substance of educational programs or compromise academic standards; nor should they intrude upon academic freedom. Examinations or other procedures used for evaluating students' academic achievements may be adapted. The results of such evaluation must demonstrate the student's achievement in the academic activity, rather than describe his/her disability.

If modifications are required due to a disability, please inform the instructor and contact the Disability and Assistive Technology Center in 609 LRC, or (715) 346-3365.

COMMIT TO INTEGRITY:

As a student in this course (and at this university), you are expected to maintain high degrees of professionalism, commitment to active learning and participation in this class and also integrity in your behavior in and out of the classroom.

UWSP ACADEMIC HONESTY POLICY & PROCEDURES

STUDENT ACADEMIC DISCIPLINARY PROCEDURES:

UWSP 14.01 Statement of principles

The board of regents, administrators, faculty, academic staff and students of the university of Wisconsin system believe that academic honesty and integrity are fundamental to the mission of higher education and of the university of Wisconsin system. The university has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty.

Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. Students who violate these standards must be confronted and must accept the consequences of their actions.

UWSP 14.03 Academic misconduct subject to disciplinary action.

- (1) Academic misconduct is an act in which a student:
 - (a) Seeks to claim credit for the work or efforts of another without authorization or citation;
 - (b) Uses unauthorized materials or fabricated data in any academic exercise;
 - (c) Forges or falsifies academic documents or records;
 - (d) Intentionally impedes or damages the academic work of others;
 - (e) Engages in conduct aimed at making false representation of a student's academic performance; or
 - (f) Assists other students in any of these acts.

(2) Examples of academic misconduct include, but are not limited to: cheating on an examination; collaborating with others in work to be presented, contrary to the stated rules of the course; submitting a paper or assignment as one's own work when a part or all of the paper or assignment is the work of another; submitting a paper or assignment that contains ideas or research of others without appropriately identifying the sources of those ideas; stealing examinations or course materials; submitting, if contrary to the rules of a course, work previously presented in another course; tampering with the laboratory experiment or computer program of another student; knowingly and intentionally assisting another student in any of the above, including assistance in an arrangement whereby any work, classroom performance, examination or other activity is submitted or performed by a person other than the student under whose name the work is submitted or performed.

Need Help?

Extra Help Resources

Make an appointment with me

Come see Dr. Slemmons during scheduled office hours or make an appointment for extra help.

Form study groups

Find fellow classmates or Biology majors that you form a regular group with and review material and study for exams.

Attend the review sessions at TLC.

Tutors are available to help students with lecture and lab material. Interested students are encouraged to contact the Tutoring-Learning Center.

Contact Disability Services

Students with a disability requiring accommodations should register with the Disability and Assistive Technology Center in the Learning Resource Center (the Library) and contact me at the beginning of the course.

Contact Counseling Center

The counseling center is located on the 3rd floor of Delzell Hall. These counselors can assist you with test anxiety, time management and personal struggles.

Tutoring in Math and Science (TIMS) in the Tutoring-Learning Center (TLC) offers free group and Drop-in Study Table Sessions to support you in your biology classes. In addition, TIMS offers the option for individual biology tutoring sessions. The biology tutors are UWSP students who have done well in their classes and who are here to share their successful study habits and biology content knowledge to help others succeed. Talking about biology and working problem sets together helps to clarify and solidify knowledge, and the tutors in the lab are eager to help. If you have questions about the schedule or would like to make an appointment, please visit room LRC 018 or call (715) 346-3568 for information.

SCIENCE TUTORING – FALL 2018

Name	Day	Time	Location	Cost
Drop-In Tutoring	Mon.– Thurs.	See TLC Website for Drop-In Schedule	Drop-In Tutoring Center, DUC 205	Free
Group Tutoring and Supplemental Instruction (SI)	Mon. –Fri.	See TLC Website	See TLC Website	Free
One-on-One Tutoring	Mon. – Fri.	By appointment	Sign up in TLC, 018 ALB Mon.-Fri. 9:00 a.m. - 4:30 p.m.	May have fee

SEVEN PRINCIPLES OF LEARNING (AMBROSE ET AL. 2012)

1. Students' *prior knowledge* can serve to help or hinder learning.
2. Students' *organization of knowledge* impacts how students learn and apply what they know.
3. *Motivation* determines, directs, and sustains what students learn.
4. To develop *mastery*, students must develop the skills, practice integrating them, and know when to apply them.
5. Goal-directed *practice* coupled with targeted *feedback* enhances learning.
6. Level of learner *development* interacts with “course” *climate* to impact learning.
7. To become self-directed, learners must be able to monitor and adjust their approaches to learning.

TEN THINGS PROFESSORS LOVE:

1. Students
2. Students who come to class with an open mind
3. Students who come to class to fulfill a requirement but decide to make the most of the experience
4. Students who give eye contact during lecture (and maybe even smile)
5. Students who aren't afraid to ask questions
6. Students who come to me when they need help
7. Students who tell me not just that they enjoyed my course, but why
8. Students who have their own ideas

9. Students who give me unique and powerful things to say in a letter of recommendation
10. Students who are fully engaged in the learning process

*adapted from Jane E Dmochowski, University of Pennsylvania

REFERENCES:

- Ambrose SA, Bridges MW, DiPietro M, Lovett MC, Norma MK (2010) *How Learning Works: Seven Research-based principles for smart teaching*. Jossey-Bass
- Cornelius TL, Owen-DeSchryver J (2008) Differential Effects of Full and Partial Notes on Learning Outcomes and Attendance. *Teaching of Psychology* 35: 6–12
- Fried C (2008) In-class laptop use and its effects on student learning (2008) *Computers & Education* 50 (3): 906–914
- Khanna MM, Badura Brack AS, Finken L (2013) Short- and Long-Term effects of cumulative finals on Student learning. *Society for the Teaching of Psychology* 40(3) 175-182.
- Lawrence, N. K. (2013). Cumulative exams in the introductory psychology course. *Teaching Psychology* 40 (1), 15–19.
- Mueller PA and Oppenheimer DM (2014) The Pen Is Mightier Than the Keyboard Advantages of Longhand Over Laptop Note Taking
Psychological Science. DOI: 10.1177/0956797614524581
- Noppe IC (2007) PowerPoint Presentation Handouts and College Student Learning Outcomes. *International Journal for the Scholarship of Teaching and Learning* 1(1), Article 9.

NOTE: This is a tentative syllabus. I reserve the right to make amendments to this document. Also, course materials may not be distributed or posted in any online format without permission from Dr. Slemmons.

WEEK 1: INTRODUCTION TO LIFE & THE NATURE OF SCIENCE

WEEKLY STUDENT LEARNING OUTCOMES:

- Describe the basic characteristics of life (C-SLO: #2; SA, FA)
- Evaluate the characteristics of an “organism” and determine whether it is living or non-living by assessing each characteristic of life (C-SLO: #2; SA, FA)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Sept 4	<ul style="list-style-type: none"> • Syllabus • Intro to Bio • Topic 1: Characteristics of Life Video • Demo • What is Life? 	<input type="checkbox"/> Reading: Pages 22-29 <input type="checkbox"/> Guided Questions: Characteristics of Life (<i>these questions are for your review and will not be collected</i>)	<input type="checkbox"/> Quiz: Syllabus	Sept 6
Thur Sept 6	<ul style="list-style-type: none"> • Topic 1: Chemistry of Life • Case 1: Childbed Fever & Nature of Science 	<input type="checkbox"/> Reading: Pages 1-15 <input type="checkbox"/> Guided Questions: Nature of Science	<input type="checkbox"/> Practice Quiz: Characteristics of Life	Sept 11
LAB	<ul style="list-style-type: none"> • Procedures/Syllabus • Lab 1: Scientific Investigation 		<input type="checkbox"/> Pre-Lab 1 & Excel Tutorial (bring copy of two graphs to lab) <ul style="list-style-type: none"> • Critical Thinking Lesson Module & Quiz (section 3 only) 	Start of Lab

WEEK 2: THE NATURE OF SCIENCE & THE CELL

WEEKLY STUDENT LEARNING OUTCOMES:

- Identify the main components of the scientific method and apply it to novel situations (C-SLO: #1; ILQ)
- Compare and contrast theory vs. hypothesis (C-SLO: #1; SA, FA)
- Construct testable and falsifiable hypotheses (C-SLO: #1; ILQ, FA, CS)
- Differentiate between scientific processes and other ways of knowing (C-SLO: #3; CS)
- Differentiate between plant and animal cells (C-SLO: #2, ILQ, FA, SA)
- Describe the basic structure and function of bacterial, animal and plant cells (C-SLO: #2; TLQ, FA, SA)
- Differentiate between prokaryotic and eukaryotic cells (C-SLO: #2; FA, SA, TLQ)
- Describe a disease that results from a cellular organelle mutation/malfunction (C-SLO: #2; SA, FA)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Sept 11	<ul style="list-style-type: none"> • Topic 2: Nature of Science & Scientific Method • Case 1: Childbed Fever & Nature of Science • Mystery boxes 	<input type="checkbox"/> Reading: Pages 28-32 <input type="checkbox"/> Guided Questions: Biomolecules	<input type="checkbox"/> Video/ Questions: Anatomy of an Experiment <input type="checkbox"/> Case #1 Exit Slip	Sept 13
Thur Sept 13	<ul style="list-style-type: none"> • Topic 2: Nature of Science & Scientific Method • Topic 3: Cellular structure & function • Demo 	<input type="checkbox"/> Reading: Pages 45-60, 74-91 <input type="checkbox"/> Guided Questions: Cells & Biomolecules	<input type="checkbox"/> Practice Quiz: Nature of Science	Sept 18

LAB	• Lab 2: Microscopes & Cells	<input type="checkbox"/> Post-Lab 1: Scientific Investigation <input type="checkbox"/> Pre-Lab 2: Cells	Start of Lab
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WEEK 3: BIOMOLECULES & CELLULAR RESPIRATION

WEEKLY STUDENT LEARNING OUTCOMES:

- Distinguish between the main biomolecules (C-SLO: #2; CS, SA, FA)
- Define essential nutrients (C-SLO: #2; CS, SA, FA)
- Define enzymes and explain how they work and importance in the cell (C-SLO: #2; ILQ; CS, SA, FA)
- Distinguish between catabolic and anabolic reactions (C-SLO: #2; CS, SA, FA)
- Evaluate the importance of biomolecules to human health (C-SLO: #3; CS, SA, FA)
- Summarize the main steps of cellular respiration and photosynthesis (C-SLO: #2; CS, SA, FA, P, PE, ILQ)
- Demonstrate practical application for understanding cellular respiration and photosynthesis (C-SLO: #2, 3; CS, SA, FA, ILQ)
- Draw connections between cellular respiration and photosynthesis (C-SLO: #2; P, CS, SA, FA)
- Explain the connect between photosynthesis and global climate change (C-SLO: #2, 3, SA, FA)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Sept 18	<ul style="list-style-type: none"> • Topic 3: Biomolecules • Case 2: The Peanut Butter Project & Biomolecules • Demo 	<input type="checkbox"/> Reading: Pages 114-131	<input type="checkbox"/> Video/Questions: Biomolecules	Sept 20
Thur Sept 20	<ul style="list-style-type: none"> • Topic 4: Cellular Respiration & Photosynthesis • Case 3: Killer Flea Dip & Cellular Respiration 	<input type="checkbox"/> Reading: Pages 95-110	<input type="checkbox"/> Case # 2 Exit Slip <input type="checkbox"/> Practice Quiz: Biomolecules & Cells	Sept 25
LAB	• Lab 3: Osmosis & Diffusion (<i>*lab 3 and 4 may be switched – announcements will be made via email and during lecture</i>)		<input type="checkbox"/> Post-Lab 2 <input type="checkbox"/> Pre-Lab 3	Start of lab

WEEK 4: CELLULAR RESPIRATION & PHOTOSYNTHESIS

WEEKLY STUDENT LEARNING OUTCOMES:

- Summarize the main steps of cellular respiration and photosynthesis (C-SLO: #2; CS, SA, FA, P, PE, ILQ)
- Demonstrate practical application for understanding cellular respiration and photosynthesis (C-SLO: #2, 3; CS, ILQ)
- Draw connections between cellular respiration and photosynthesis (C-SLO: #2; P, CS, SA, FA)
- Explain the connect between photosynthesis and global climate change (C-SLO: #2, 3; SA, FA)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Sept 25	• Topic 4: Cellular Respiration & Photosynthesis	<input type="checkbox"/> Guided Questions: Photosynthesis & Cellular Respiration	None	
Thur Sept 27	<ul style="list-style-type: none"> • Topic 4: Cellular Respiration & Photosynthesis • Case 4: Algal Bloom Case 		<input type="checkbox"/> Case # 3 Exit Slip	Oct 2
No LAB	No LAB		<input type="checkbox"/> Pre-Lab 5 (Submit Hypothesis & Experimental Design)	Start of lab

WEEK 5: CELLULAR RESPIRATION & PHOTOSYNTHESIS

WEEKLY STUDENT LEARNING OUTCOMES:

- Summarize the main steps of cellular respiration and photosynthesis (C-SLO: #2; CS, SA, FA, P, PE, ILQ)
- Demonstrate practical application for understanding cellular respiration and photosynthesis (C-SLO: #2, 3; CS, ILQ)
- Draw connections between cellular respiration and photosynthesis (C-SLO: #2; P, CS, SA, FA)
- Explain the connect between photosynthesis and global climate change (C-SLO: #2, 3; SA, FA)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Oct 2	<ul style="list-style-type: none"> • Topic 4: Cellular Respiration & Photosynthesis • Review 	<input type="checkbox"/> Review Guide	<input type="checkbox"/> Case # 4 Exit Slip	Oct 4
Thur Oct 4	<ul style="list-style-type: none"> • Exam I 	<input type="checkbox"/> Reading: 136-148, 155-160; 163-178	<input type="checkbox"/> Practice Quiz: Cellular Respiration /Photosynthesis	Oct 9
LAB	<ul style="list-style-type: none"> • Lab 4: Enzymes • Lab 5: Photosynthesis (set-up) • Identifying Reasoning (scientific paper; section 3) 		<input type="checkbox"/> Post-Lab 3 <input type="checkbox"/> Pre-Lab 4	Start of lab

WEEK 6: DNA TO PROTEIN

WEEKLY STUDENT LEARNING OUTCOMES:

- Identify the major players in the discovery of the structure of DNA and describe the experiments that supported their assertions (C-SLO: #2; FA, SA)
- Describe the structure of DNA and explain how it is organized and replicated in cells (C-SLO: #2; SA, FA)
- Explain how DNA can be used in genetic profiling/forensics studies and compare the benefits of using DNA to other forensics means (C-SLO: #3; CS, FA)
- Evaluate the benefits of DNA techniques to society (C-SLO: #3; FA, SA, CS)
- Describe the steps of protein synthesis (C-SLO: #2; FA, SA)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Oct 9	<ul style="list-style-type: none"> • Topic 5: DNA & Replication • Case 5: Vampire Case: DNA 	<input type="checkbox"/> Guided Questions: DNA, Protein Synthesis	<input type="checkbox"/> Practice Quiz: DNA Replication, Protein Synthesis	Oct 9
Thur Oct 11	<ul style="list-style-type: none"> • Topic 6: Protein Synthesis 	<input type="checkbox"/> Reading: 193-209 <input type="checkbox"/> Guided Questions: Mitosis & Cancer	<input type="checkbox"/> Case # 5 Exit Slip	Oct 16
LAB	<ul style="list-style-type: none"> • Lab 6: Mitosis 		<input type="checkbox"/> Post-Lab 4 <input type="checkbox"/> Pre-Lab 6 <input type="checkbox"/> Identifying Reasoning (scientific paper; sect 3)	Start of lab

WEEK 7: MITOSIS, STEM CELLS, MEIOSIS & MUTATIONS

WEEKLY STUDENT LEARNING OUTCOMES:

- Describe the process of mitosis and explain how it fits into the cell cycle (C-SLO: #2; ILQ, FA, SA)
- Explain how cell division is related to growth and reproduction (C-SLO: #2; ILQ, FA, SA)
- Identify the connection between mitosis and cancer (C-SLO: #, 2; ILQ, FA, SA, CS)
- Explain the different types of stem cells and how they can be used to cure disease (C-SLO: #2; FA, SA, CS)
- Explain how basic research is important to the discovery of treatments and cures for different cancers (C-SLO: #2; FA, SA, CS)

#3; FA, SA, CS, D)

- Evaluate social decision making in light of biological principles, particularly pertaining to aspects of your daily life and societal issues (C-SLO: #2, 3 D)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Oct 16	• Topic 7: Mitosis, Cancer, Stem Cells	<input type="checkbox"/> Reading: 228-235; 282-295 <input type="checkbox"/> Guided Questions: Meiosis	<input type="checkbox"/> Practice Quiz: Mitosis	Oct 18
Thur Oct 18	• Topic 8: Meiosis & Mutations • Case Study 6: Sex Determination in Athletes	<input type="checkbox"/> Reading: 248-254 <input type="checkbox"/> Guided Questions: Mendelian Genetics	<input type="checkbox"/> Video Lecture /Quiz: Meiosis <input type="checkbox"/> Case 6 Exit Slip	Oct 23
LAB	Lab 7: Meiosis		<input type="checkbox"/> Post-Lab 6 <input type="checkbox"/> Pre-Lab 7	Start of lab

WEEK 8: MEIOSIS & MENDELIAN GENETICS

WEEKLY STUDENT LEARNING OUTCOMES

- Describe the steps of meiosis and compare these to mitosis (C-SLO: #2; FA, SA)
- Explain how meiosis increases genetic diversity (C-SLO: #2; FA, SA, CS)
- Compare and contrast the process of gamete formation in oogenesis and spermatogenesis (C-SLO: #2; FA, SA)
- Identify different ways in which sex can be determined in humans and compare this to other organisms (C-SLO: #2; FA, SA, CS)
- Explain how crossing over of sex chromosomes can lead to variability in sex determination (C-SLO: #2; FA, SA, CS)
- Identify consequences of mutations can occur through errors in transcription (C-SLO: #2; FA, SA)
- Distinguish between point mutations and chromosomal abnormalities (C-SLO: #2; FA, SA)

- Summarize Mendel's Laws of segregation and independent assortment (C-SLO: #2; TLQ; FA, SA, CS)
- Explain how Mendel's laws relate to meiosis (C-SLO: #2; TLQ; FA, SA)
- Predict the phenotypes and genotypes of offspring from crosses involving one or two genes (C-SLO: #2; TLQ; SA, FA)
- Determine the phenotypic and genotypic probabilities in sex-linked and codominant alleles (C-SLO: #2)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Oct 23	• Topic 9: Mendelian Genetics	<input type="checkbox"/> Reading: 256-277 <input type="checkbox"/> Guided Questions: Non-Mendelian Genetics	<input type="checkbox"/> Video & Questions: Non-Mendelian Genetics	Oct 25
Thur Oct 25	• Topic 10: Genetic Engineering/Profiling, DNA mutation		<input type="checkbox"/> Biotechnology Quiz	Oct 30
LAB	Lab 5: Photosynthesis		<input type="checkbox"/> Pre-Lab 5	Start of lab

WEEK 9: GENETIC ENGINEERING & BIOTECHNOLOGY

WEEKLY STUDENT LEARNING OUTCOMES:

- List several reasons that genetically modified organisms (GMO) may be beneficial to humans (C-SLO: #3; CS, FA, SA)
- Evaluate possible dangers associated with GMOs (C-SLO: #3; FA, SA)

- Discuss how DNA profiles are evaluated for use in criminal investigations (C-SLO: #3; CS, FA, SA)
- List new uses of DNA technology (C-SLO: #2; CS, FA, SA)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Oct 30	• Topic 11: Biotechnology	<input type="checkbox"/> Review Guide	Biotechnology Practice Quiz	Nov 1
Thur Nov 1	• EXAM II	<input type="checkbox"/> Reading: 320-328 <input type="checkbox"/> Guided Questions: Darwin & Natural Selection		
LAB	• Lab 5: Photosynthesis Presentations		<input type="checkbox"/> Photosynthesis Presentations <input type="checkbox"/> Lab 9 Bacteria: Hypothesis	Start of lab

WEEK 10: EVOLUTION

WEEKLY STUDENT LEARNING OUTCOMES:

- Describe the historical importance of Darwin's journey and how these experiences lead to the formation of Natural Selection (C-SLO: #2; SA, FA)
- Explain how the four postulates of natural selection can give rise to evolution (C-SLO: #2; TLQ, SA, FA)
- Explain the four mechanisms of evolution (natural selection, mutation, genetic drift, migration) (C-SLO: #2)
- Explain and provide an example of sexual selection and explain how it fits in with ideas of natural selection (C-SLO: #2; FA, SA)
- Be able to explain how populations evolve through natural selection (C-SLO: #2; TLQ, SA, FA)
- Be able to explain the evidence for the occurrence of evolution (C-SLO: #2; TLQ, SA, FA)
- Compare and contrast the differences in the rates of evolution (punctuated equilibrium vs. gradual evolution) (C-SLO: #2; TLQ, SA, FA)
- Describe an example of evolution in action (C-SLO: #2; TLQ, SA, FA)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Nov 6	• Topic 12: Darwin & Natural Selection	<input type="checkbox"/> Reading: 302-315; 321-329; 330-367	None	
Thur Nov 8	• Topic 13: Mechanisms of Evolution • Activity	<input type="checkbox"/> Guided Questions: Mechanisms of Evolution	None	
LAB	Lab 8: Natural Selection		<input type="checkbox"/> Pre-Lab 8 <input type="checkbox"/> Lab 9 Bacteria: Set-up	Start of lab

WEEK 11: EVOLUTION & BIODIVERSITY

WEEKLY STUDENT LEARNING OUTCOMES:

- Describe the main characteristics and provide examples of the 9 phyla of organisms (C-SLO: #2; TLQ, SA, FA)
- Define biodiversity and distinguish between the three types of biodiversity (species, genetic and ecosystem) (C-SLO: #2; TLQ, SA, FA)
- Describe general patterns in biodiversity (C-SLO: #2; TLQ, SA, FA)
- Explain the Theory of Island Biogeography and apply these concepts to conservation management strategies

(C-SLO: #2; SA, FA)

- Explain threats to biodiversity and evaluate the influence of humans on variation in biodiversity (C-SLO: #2, 3; TLQ, SA, FA)
- Draw connections between evolution and biodiversity (C-SLO: #2; TLQ, SA, FA)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Nov 13	• Topic 13: Mechanisms of Evolution		<input type="checkbox"/> Practice Quiz: Mechanisms of Evolution	Nov 15
Thur Nov 15	• Topic 14: Biodiversity	<input type="checkbox"/> Reading: 372-386; 390-404 <input type="checkbox"/> Guided Questions: Prokaryotic Diversity	<input type="checkbox"/> Video Questions: Prokaryotic Diversity	Nov 20
LAB	• Lab 9: Bacteria and Protists		<input type="checkbox"/> Post Lab 8: Natural Selection <input type="checkbox"/> Pre-Lab 9: Bacteria and Protists	Start of lab

WEEK 12: BIODIVERSITY

WEEKLY STUDENT LEARNING OUTCOMES:

- Describe the main characteristics and provide examples of the 9 phyla of organisms (C-SLO: #2; TLQ, SA, FA)
- Define biodiversity and distinguish between the three types of biodiversity (species, genetic and ecosystem) (C-SLO: #2; TLQ, SA, FA)
- Describe general patterns in biodiversity (C-SLO: #2; TLQ, SA, FA)
- Explain the Theory of Island Biogeography and apply these concepts to conservation management strategies (C-SLO: #2; SA, FA)
- Explain threats to biodiversity and evaluate the influence of humans on variation in biodiversity (C-SLO: #2, 3; TLQ, SA, FA)
- Draw connections between evolution and biodiversity (C-SLO: #2; TLQ, SA, FA)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Nov 20	• Topic 14: Biodiversity	<input type="checkbox"/> Reading: 410-423 <input type="checkbox"/> Guided Questions: Eukaryotic Diversity	<input type="checkbox"/> Video/ Questions: Eukaryotic Diversity	Nov 27
Thur Nov 22	No class Thanksgiving Break			
LAB	No LAB			

WEEK 13: BIODIVERSITY & BIOGEOCHEMICAL CYCLES

WEEKLY STUDENT LEARNING OUTCOMES:

- Describe the main characteristics and provide examples of the 9 phyla of organisms (C-SLO: #2; TLQ, SA, FA)
- Define biodiversity and distinguish between the three types of biodiversity (species, genetic and ecosystem) (C-SLO: #2; TLQ, SA, FA)
- Describe general patterns in biodiversity (C-SLO: #2; TLQ, SA, FA)
- Explain the Theory of Island Biogeography and apply these concepts to conservation management strategies (C-SLO: #2; SA, FA)
- Explain threats to biodiversity and evaluate the influence of humans on variation in biodiversity (C-SLO: #2, 3; TLQ, SA, FA)
- Draw connections between evolution and biodiversity and the environment (C-SLO: #2; TLQ, SA, FA)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Nov 27	• Topic 15: Biogeochemical Cycles	<input type="checkbox"/> Reading: 486-503 <input type="checkbox"/> Guided Questions: Ecosystem Ecology & Biogeochemical Cycles	<input type="checkbox"/> Practice Quiz: Ecosystem Ecology & Biogeochemical Cycles	Dec 4
Thur Nov 29	• Topic 15: Biogeochemical cycles	<input type="checkbox"/> Reading: 448-462 <input type="checkbox"/> Guided Questions: Population Ecology		
LAB	• Lab 11 Animal Diversity and/or Lab 10: Plant Diversity		<input type="checkbox"/> Lab 8: Bacteria Paper (Due 11/30) <input type="checkbox"/> Pre-Lab 10/11: Plant & Animal Diversity <input type="checkbox"/> Post-Lab 9: Natural Selection <input type="checkbox"/> Poster Abstracts due	Start of lab

WEEK 14: POPULATION ECOLOGY

WEEKLY STUDENT LEARNING OUTCOMES:

- Describe the trends and causes of exponential and logistic growth models for populations (C-SLO: #2; SA, FA, TLQ)
- List factors limiting population growth (C-SLO: #2; SA, FA, TLQ)
- Describe human population growth and the implications of this growth (C-SLO: #2; SA, FA)
- Explain sustainability as it relates to resource management and ecological footprints (C-SLO: #2; SA, FA)
- Describe how food web interactions can alter biodiversity (C-SLO: #2; SA, FA, TLQ)
- Explain how energy is transferred from one trophic level to another (C-SLO: #2; SA, FA, TLQ)
- Define niche and compare and contrast fundamental and realized niche (C-SLO: #2; SA, FA, TLQ)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Dec 4	• Topic 16: Population Ecology	<input type="checkbox"/> Reading: 466-480		
Thur Dec 6	• Topic 16: Population Ecology • Case Study 7: Missing Seals	<input type="checkbox"/> Guided Questions Community Ecology		
LAB	Lab 12 Population Ecology		<input type="checkbox"/> Pre-Lab 12	Start of lab

WEEK 15: COMMUNITY ECOLOGY

WEEKLY STUDENT LEARNING OUTCOMES:

- Describe the trends and causes of exponential and logistic growth models for populations (C-SLO: #2; SA, FA, TLQ)
- List factors limiting population growth (C-SLO: #2; SA, FA, TLQ)
- Describe human population growth and the implications of this growth (C-SLO: #2; SA, FA)
- Explain sustainability as it relates to resource management and ecological footprints (C-SLO: #2; SA, FA)
- Describe how food web interactions can alter biodiversity (C-SLO: #2; SA, FA, TLQ)
- Explain how energy is transferred from one trophic level to another (C-SLO: #2; SA, FA, TLQ)
- Define niche and compare and contrast fundamental and realized niche (C-SLO: #2; SA, FA, TLQ)
- Evaluate social decision making in light of biological principles, particularly pertaining to aspects of your daily life and societal issues (C-SLO: #2, 3 P)

DATE	LECTURE & LAB TOPICS	READING & STUDY QUESTIONS	QUIZZES & ASSIGNMENTS	DUE
Tues Dec 11	• Topic 17: Community Ecology	<input type="checkbox"/> Case # 7 Exit Slip	<input type="checkbox"/> Practice Quiz: Population Ecology	Dec 13
Thur Dec 13	• Wrap-up & review • Honors Citizen Science Poster Session		<input type="checkbox"/> Review Guide	
LAB	Final Research Project		<input type="checkbox"/> Poster Presentations <input type="checkbox"/> Critical Thinking Lesson Module & Quiz (section 3 only)	Start of lab

WEEK 16: FINAL EXAM

WEEKLY STUDENT LEARNING OUTCOMES:

- Recognize the multiple levels of complexity at which biological systems operate, from molecules to organisms, and explain the emergent properties and processes characteristic for each level.
- Describe mechanisms for continuity of life, including the processes of inheritance, development and evolution.
- Articulate the application of biological science to meeting the needs of society, including basic research, stewardship of biodiversity, human health, and entrepreneurial innovation.

Dec 18th 2:45-4:45 CBB 101