

# BIOLOGY 100

Fall 2017



## 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.*

**Required textbook:** *Biology for a Changing World*, Second edition, Shuster, Vigna, Tontono, Sinha

**Required lab manual:** *Biology 100 Laboratory Manual* (Available for purchase in the University Bookstore)  
Put your lab manual in a 3-ring binder and bring it with you to **every** lab meeting.

## Biological Principles & the Human Environment

Dr. Krista Slemmons  
TNR 463  
kslemmon@uwsp.edu  
<http://paleodiatom.com>  
715-346-2453  
Office hours:  
Tuesday 10:00-11:00  
Wednesday 10:00-11:00  
Thursday 10:00-11:00  
Or by appointment

Dr. Terese Barta  
TNR 465  
tbarta.uwsp.edu  
715-346-4241  
Office hours:  
Monday 2:00-3:00  
Thursday 3:00-4:00

**Lecture (TNR 170):**  
Tuesday and Thursday  
11:00-11:50  
TNR 120

**Lab (TNR 254):**  
Sect. 1 Thur 8-10:50  
Sect. 2 Wed 11-1:50  
Sect. 3 Wed 2-4:50  
Sect 4 Fri 8-10:50

## GEP & Courses Learning Outcomes

GEP & Course Learning Outcomes	Example Class Assignment(s):	Teaching Pedagogy
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 <b>synthesizing</b> content derived from biological principles including: <ul style="list-style-type: none"> <li>• Cellular level functions necessary for life</li> <li>• Inheritance &amp; evolutionary change</li> <li>• The diversity of life within an evolutionary context</li> <li>• The basic function of populations, communities and ecosystems.</li> </ul>	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

**Grading:****LECTURE:**

3	Lecture exams (100 points each)	= 300 points
8	Online video lectures (5 points/lecture, 8 lectures)	= 40 points
25	Lectures w/clicker questions (4 points/lecture)	= 100 points
<u>11</u>	<u>Practice Quiz (5 points each)</u>	<u>= 55 points</u>
	Subtotal	= 495 points

**LAB:**

6	Post-labs (20 points each)	= 120 points
2	Labs (15 points each: 5-pre-lab, 10 lab—animal & plant lab)	= 30 points
10	Pre-labs (5 points each)	= 50 points
2	Presentations (one poster, one oral, 50 points each)	= 100 points
1	Peer evaluation	= 25 points
<u>1</u>	<u>Lab report, Bacteria</u>	<u>= 50 points</u>
	Subtotal	= 375 points

<b>Total</b>	<b>= 870 points</b>
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**Final grades will be assigned based on the following percentages:**

A	= ≥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.**

**Exam 1**      **Oct 5<sup>th</sup>**

**Exam 2**      **Nov 2<sup>nd</sup>**

**Final Exam**   **Dec 21<sup>st</sup> 10:15 am – 12:15 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 “Clickers” to do interactive polling. Questions asked during lecture are worth points. These questions may either be points that are gained by simply answering the question (i.e. no right or wrong responses) or by selecting the correct response. A total of 100 points can be gained through clicker questions. As a result, it is imperative that you attend class and bring your clicker. Clicker questions cannot be made up if you miss a lecture. You are required to lease a clicker from the UWSP’s

Help Desk. You will need your UWSP Student ID. UWSP's Help Desk is located in the basement of the Library. Help Desk website: <http://www.uwsp.edu/infotech/helpdesk/>. An \$8 semester lease fee will be automatically added to your UWSP student bill.

**Important:** Your clicker can be used in any class that requires clickers for the semester.

**Returning clickers:** Clickers must be returned to UWSP's Help Desk in LRC, room 025 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.

**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.

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

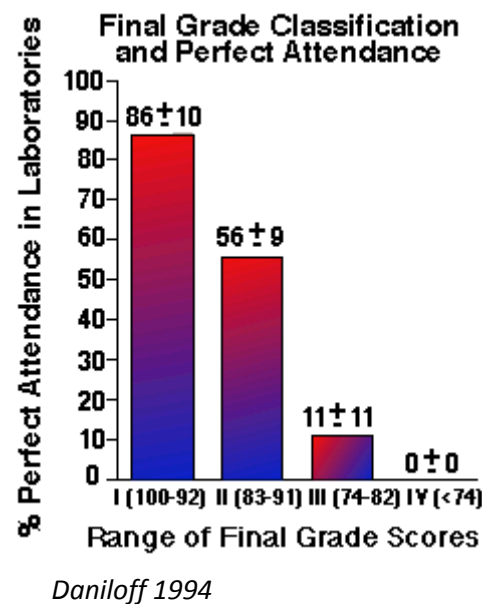
**Lab activities CANNOT be rescheduled.** However, your lowest lab grade will be dropped. If you have a valid reason to miss additional labs please contact Dr. Slemmons or Dr. Barta (depending on section) as soon as possible, otherwise you will receive a zero for the lab. **If you miss a lab and an assignment 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. Barta 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 8: 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.

**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](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 6<sup>th</sup> floor of Albertson Hall (library) as soon as possible. DATC can be reached at 715-346-3365 or [DATC@uwsp.edu](mailto: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 3<sup>rd</sup> 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 2017

Name	Day	Time	Location	Cost
Drop-In Tutoring	Mon.– Thurs.	. <a href="#">See TLC Website</a> for Drop-In Schedule	Drop-In Tutoring Center, DUC 205	Free
Group Tutoring and Supplemental Instruction (SI)	Mon. – Fri.	<a href="#">See TLC Website</a>	<a href="#">See TLC Website</a>	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

## STUDENT LEARNING OUTCOMES:

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

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Sept 5	<ul style="list-style-type: none"> <li>• Syllabus</li> <li>• Intro to Bio</li> <li>• What is Life?</li> <li>• Chemistry of Life</li> <li>• Characteristics of Life Video</li> <li>• Demo of Life</li> </ul>	<input type="checkbox"/> Quiz: Syllabus.....Sept 7 <input type="checkbox"/> Reading: Pages 22-29.....Sept 7 <input type="checkbox"/> Guided Questions: Characteristics of Life.....Sept 7 <input type="checkbox"/> Practice Quiz: Characteristics of Life .....Sept 7
LAB	<ul style="list-style-type: none"> <li>• Procedures/Syllabus</li> <li>• Lab 1: Scientific Investigation</li> <li>• Excel tutorial</li> </ul>	<input type="checkbox"/> Pre-Lab 1.....start of Week 1 Lab
Thursday Sept 7	<ul style="list-style-type: none"> <li>• Case 1: Childbed Fever &amp; Nature of Science</li> </ul>	<input type="checkbox"/> Video & Questions: Anatomy of an Experiment.....Sept 12 <input type="checkbox"/> Reading: Pages 1-15.....Sept 12 <input type="checkbox"/> Guided Questions: Nature of Science.....Sept 12 <input type="checkbox"/> Practice Quiz: Nature of Science... Sept 12

# WEEK 2: THE NATURE OF SCIENCE & THE CELL

## STUDENT LEARNING OUTCOMES:

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

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Sept 12	<ul style="list-style-type: none"> <li>• Mystery boxes</li> <li>• Nature of Science &amp; Scientific Method</li> </ul>	<input type="checkbox"/> Reading: Pages 28-32.....Sept 14 <input type="checkbox"/> Guided Questions: Biomolecules... Sept 14 <input type="checkbox"/> Video & Questions: Biomolecules. Sept 14
LAB	<ul style="list-style-type: none"> <li>• Lab 2: Microscopes &amp; Cells</li> </ul>	<input type="checkbox"/> Post-Lab 1.....start of Week 2 Lab <input type="checkbox"/> Pre-Lab 2.....start of Week 2 Lab

Thursday Sept 14	<ul style="list-style-type: none"> <li>• Cellular structure &amp; function</li> <li>• Cell Membrane &amp; transport</li> <li>• Cell wall vs membrane Demo</li> </ul>	<input type="checkbox"/> Reading: Pages 45-60, 74-91 ..... Sept 19 <input type="checkbox"/> Guided Questions: Cells..... Sept 19
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## WEEK 3: BIOMOLECULES & CELLULAR RESPIRATION

### STUDENT LEARNING OUTCOMES:

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

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Sept 19	• Case 2: The Peanut Butter Project & Biomolecules	<input type="checkbox"/> Reading: Pages 114-131 ..... Sept 21
LAB	• Lab 3: Osmosis & Diffusion	<input type="checkbox"/> Post-Lab 2.....start of Week 3 Lab <input type="checkbox"/> Pre-Lab 3.....start of Week 3 Lab
Thursday Sept 21	• Case 3: Killer Flea Dip and Cellular Respiration	<input type="checkbox"/> Reading: Pages 95-110..... Sept 26

## WEEK 4: CELLULAR RESPIRATION & PHOTOSYNTHESIS

### STUDENT LEARNING OUTCOMES:

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

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Sept 26	• Cellular respiration (cont)	<input type="checkbox"/> Guided Questions: Photosynthesis & Cellular Respiration..... Sept 28 <input type="checkbox"/> Practice Quiz: Cellular Respiration..... Sept 28

LAB	• Lab 4: Enzymes	<input type="checkbox"/> Post-Lab 3.....start of Week 4 Lab <input type="checkbox"/> Pre-Lab 4.....start of Week 4 Lab
Thursday Sept 28	• Case 4: Algal Bloom Case, Review Photosynthesis	<input type="checkbox"/> Video & Questions: Photosynthesis.....Oct 3

## WEEK 5: CELLULAR RESPIRATION & PHOTOSYNTHESIS

### STUDENT LEARNING OUTCOMES:

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

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Oct 3	• Cellular respiration • Review	<input type="checkbox"/> Review Guide.....Oct 5
LAB	• Lab 5: Photosynthesis (set-up)	<input type="checkbox"/> Post-Lab 4.....start of Week 5 Lab <input type="checkbox"/> Pre-Lab 5 (Hypothesis).....start of Week 5 Lab
Thursday Oct 5	• Exam I	<input type="checkbox"/> Reading: 136-148, 155-160; 163-178.....Oct 10

## WEEK 6: DNA TO PROTEIN

### 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)
- Describe the structure of DNA and explain how it is organized and replicated in cells (C-SLO: #2)
- 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)
- Evaluate the benefits of DNA techniques to society (C-SLO: #3)
- Explain the steps of protein synthesis (C-SLO: #2) Describe the process of protein synthesis
- 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)
- Evaluate the benefits of DNA techniques to society (C-SLO: #3)

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Oct 10	• Case 5: Vampire Case: DNA to Protein	<input type="checkbox"/> Guided Questions: Protein Synthesis .....Oct 12 <input type="checkbox"/> Practice Quiz: DNA Replication, Protein Synthesis.....Oct 12

LAB	• Lab 6: Mitosis	<input type="checkbox"/> Pre-Lab 6.....start of Week 6 Lab
Thursday Oct 12	• Protein Synthesis (cont)	<input type="checkbox"/> Reading: 193-209 .....Oct 17 <input type="checkbox"/> Guided Questions: Mitosis & Cancer .....Oct 17 <input type="checkbox"/> Practice Quiz: Mitosis .....Oct 17

## WEEK 7: MITOSIS, STEM CELLS, MEIOSIS & MUTATIONS

### STUDENT LEARNING OUTCOMES:

- Describe the process of mitosis and explain how it fits into the cell cycle (C-SLO: #2)
- Explain how cell division is related to growth and reproduction(C-SLO: #2)
- Identify the connection between mitosis and cancer(C-SLO: #2)
- Explain the different types of stem cells and how they can be used to cure disease (C-SLO: #2)
- Explain how basic research is important to the discovery of treatments and cures for different cancers (C-SLO: #3)

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Oct 17	• Mitosis, Cancer, Stem Cells	<input type="checkbox"/> Reading: 228-235; 282-295 .....Oct 19 <input type="checkbox"/> Guided Questions: Meiosis.....Oct 19 <input type="checkbox"/> Video Lecture/Quiz: Meiosis.....Oct 19
LAB	• Lab 7: Mitosis	<input type="checkbox"/> Post-Lab 6.....start of Week 7 Lab <input type="checkbox"/> Pre-Lab 7.....start of Week 7 Lab
Thursday Oct 19	• Mitosis & Meiosis • Case Study 6:Sex Determination in Athletes	<input type="checkbox"/> Reading: 248-254.....Oct 24 <input type="checkbox"/> Guided Questions: Mendelian Genetics.....Oct 24

## WEEK 8: MEIOSIS & MENDELIAN GENETICS

### STUDENT LEARNING OUTCOMES:

- Describe the steps of meiosis and compare these to mitosis (C-SLO: #2)
- Explain how meiosis increases genetic diversity (C-SLO: #2)
- Compare and contrast the process of gamete formation in oogenesis and spermatogenesis(C-SLO: #2)
- Identify different ways in which sex can be determined in humans and compare this to other organisms (C-SLO: #2)
- Explain how crossing over of sex chromosomes can lead to variability in sex determination (C-SLO: #2)
- Identify consequences of mutations can occur through errors in transcription (C-SLO: #2)
- Distinguish between point mutations and chromosomal abnormalities(C-SLO: #2)
  
- Summarize Mendel's Laws of segregation and independent assortment (C-SLO: #2)
- Explain how Mendel's laws relate to meiosis (C-SLO: #2)
- Predict the phenotypes and genotypes of offspring from crosses involving one or two genes (C-SLO: #2)
- Determine the phenotypic and genotypic probabilities in sex-linked and codominant alleles (C-SLO: #2)

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Oct 24	• Mendelian Genetics	<input type="checkbox"/> Practice Quiz: Mendelian Genetics .....Oct 26 <input type="checkbox"/> Reading: 256-277 .....Oct 26 <input type="checkbox"/> Guided Questions: Non-Mendelian Genetics
LAB	• Lab 5: Photosynthesis	<input type="checkbox"/> Pre-Lab 5.....start of Week 8 Lab
Thursday Oct 26	• Genetic Engineering/Profiling	<input type="checkbox"/> Video & Questions: Non-Mendelian Genetics .....Oct 31 <input type="checkbox"/> .....Oct 31

## WEEK 9: GENETIC ENGINEERING & BIOTECHNOLOGY

### STUDENT LEARNING OUTCOMES:

- List several reasons that genetically modified organisms (GMO) may be beneficial to humans (C-SLO: #3)
- Evaluate possible dangers associated with GMOs (C-SLO: #3)
- Discuss how DNA profiles are evaluated for use in criminal investigations (C-SLO: #3)
- List new uses of DNA technology (C-SLO: #2)

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Oct 31	• Biotechnology	<input type="checkbox"/> Review Guide .....Nov 2
LAB	• Lab 5: Photosynthesis	<input type="checkbox"/> Photosynthesis Presentations .....start of Week 9 Lab <input type="checkbox"/> Lab 8: Hypothesis .....start of Week 9 Lab <input type="checkbox"/> Lab 8: Set-up .....start of Week 9 Lab
Thursday Nov 2	• EXAM II	<input type="checkbox"/> Reading: 320-328 .....Nov 7 <input type="checkbox"/> Guided Questions: Darwin and Natural Selection .....Nov 7

## WEEK 10: EVOLUTION

### 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)
- Explain how the four postulates of natural selection can give rise to evolution (C-SLO: #2)
- 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)
- Be able to explain how populations evolve through natural selection (C-SLO: #2)
- Be able to explain the evidence for the occurrence of evolution (C-SLO: #2)
- Compare and contrast the differences in the rates of evolution (punctuated equilibrium vs. gradual evolution) (C-SLO: #2)
- Describe an example of evolution in action (C-SLO: #2)

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Nov 7	• Darwin & Natural Selection	<input type="checkbox"/> Reading: 302-315; 321-329; 330-367.....Nov 9
LAB	• Lab 8: Bacteria	<input type="checkbox"/> Pre-Lab 8 .....start of Week 10 Lab
Thursday Nov 9	• Natural Selection & Mechanisms of Evolution	<input type="checkbox"/> Guided Questions: Mechanisms of Evolution.....Nov 14

## WEEK 11: EVOLUTION & BIODIVERSITY

### STUDENT LEARNING OUTCOMES:

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

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Nov 14	• Mechanisms of Evolution	<input type="checkbox"/> Practice Quiz: Mechanisms of Evolution.....Nov 16
LAB	• Lab 9: Natural Selection	<input type="checkbox"/> Pre-Lab 9: Natural Selection.....start of Week 11 Lab <input type="checkbox"/> Lab 8: Bacteria Paper.....start of Week 11 Lab
Thursday Nov 16	• Biodiversity	<input type="checkbox"/> Reading: 372-386; 390-404.....Nov 21 <input type="checkbox"/> Guided Questions: Prokaryotic Diversity.....Nov 21 <input type="checkbox"/> Video & Questions: Prokaryotic Diversity.....Nov 21

## WEEK 12: BIODIVERSITY

### STUDENT LEARNING OUTCOMES:

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

- Draw connections between evolution and biodiversity (C-SLO: #2)

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Nov 21	• Biodiversity	<input type="checkbox"/> Reading: 410-423.....Nov 28 <input type="checkbox"/> Guided Questions: Eukaryotic Diversity.....Nov 28 <input type="checkbox"/> Video & Questions: Eukaryotic Diversity.....Nov 28
LAB	• NO LAB	
Thursday Nov 23	• NO CLASS	

## WEEK 13: BIODIVERSITY & BIOGEOCHEMICAL CYCLES

### STUDENT LEARNING OUTCOMES:

- List several reasons that genetically modified organisms (GMO) may be beneficial to humans (C-SLO: #3)
- Evaluate possible dangers associated with GMOs (C-SLO: #3)
- Discuss how DNA profiles are evaluated for use in criminal investigations (C-SLO: #3)
- List new uses of DNA technology (C-SLO: #2)

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Nov 28	• Biogeochemical Cycles	<input type="checkbox"/> Reading: 486-503.....Nov 30 <input type="checkbox"/> Guided Questions: Ecosystem Ecology & Biogeochemical Cycles. ....Nov 30 <input type="checkbox"/> Practice Quiz: Ecosystem Ecology & Biogeochemical Cycles.....Nov 30
LAB	• Lab 10: Plant Diversity	<input type="checkbox"/> Pre-Lab 10: Animal Diversity.....start of Week 13 Lab <input type="checkbox"/> Post-Lab 9: Natural Selection.....start of Week 13 Lab
Thursday Nov 30	• Biogeochemical cycles	<input type="checkbox"/> Reading: 448-462.....Dec 5 <input type="checkbox"/> Guided Questions: Population Ecology.....Dec 5

## WEEK 14: POPULATION ECOLOGY

### STUDENT LEARNING OUTCOMES:

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

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
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Tuesday Dec 5	• Population Ecology	<input type="checkbox"/> Reading: 466-480.....Dec 7
LAB	• Lab 11: Plant Diversity	<input type="checkbox"/> Pre-Lab 11: Plant Diversity .....start of Week 14 Lab
Thursday Dec 7	• Population Ecology, Case Study 7: Missing Seals	<input type="checkbox"/> Guided Questions: Community .....Dec 12 Ecology.....

## WEEK 15: COMMUNITY ECOLOGY

### STUDENT LEARNING OUTCOMES:

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

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Dec 12	• Community Ecology	<input type="checkbox"/> Practice Quiz: Population Ecology.....Dec 14
LAB	• Final Research Project	Poster Presentations .....start of Week 15 Lab
Thursday Dec 14	• Wrap-up & review	<input type="checkbox"/> Review Guide .....Dec 21

## WEEK 16: FINAL EXAMS

### 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.

DATE	LECTURE/LAB TOPIC	ASSIGNMENTS
Tuesday Dec 21 10:15-12:15	• Final Exam	<input type="checkbox"/> Review Guide .....Dec 21