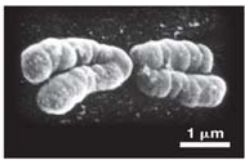


Bi 211 General Biology I: Cells

Information Sheet and Syllabus for Summer Quarter 2021

Instructor:	**Dr. Jana Prikryl**	**jprikryl@uoregon.edu**
Biology Tutors (BTUs):	**Caelan Dorstad**	**cdorstad@uoregon.edu**
	Ania Grudzien	**aniag@uoregon.edu**
Lab/class Preparator:	**Misty McLean-Schurbon**	**mistym@uoregon.edu**

Important notes about BI 211:

- **Attendance via zoom is mandatory in this remote course**, if you must miss a zoom session, it is your responsibility to let me know within one week of missing, and to inquire about makeup assignment. These assignments must be completed within 2 weeks of missing lecture.
- **Our class will communicate through the course Canvas site.** All assignments will be located there. Announcements and emails are archived there and automatically forwarded to your UO email, and can even be set up to reach you by text. Check and adjust your settings under Account > Notifications. For one-on-one communication please come to office hours or use your UO email account to email me at jprikryl@uoregon.edu.
- **Posting course material including videos, lecture notes, problems, and solutions, on any platform that is not officially affiliated with the course is prohibited and will be treated as academic misconduct and reported to the Dean of Students Office.** If you have questions about what is appropriate and what is not please ask, ignorance will not be an acceptable defense.

Student Learning Outcomes for BI 211 General Biology I: Cells

In this first course of the general biology sequence, we study biological processes from a molecular and cellular prospective. These concepts are central to understanding all other areas of biology. All organisms must accomplish two major functions: 1) extract energy from their environments to build and maintain their bodies, and 2) reproduce themselves. We start by studying the four types of biological macromolecules that build organismal bodies: carbohydrates, lipids (e.g., fats), proteins and nucleic acids (e.g., DNA). We then examine how cells obtain from the environment the building blocks for constructing these macromolecules and the energy for manipulating them to carry out body functions. Next, we examine reproductive functions, beginning with the two types of cell division, mitosis and meiosis. From there we study genetics, how traits pass from parent to offspring, starting with the structure and replication of DNA followed by how genes code for proteins. Finally, we look at the genetic basis of inheritance, including Mendelian genetics, pedigree analysis and the genetics of complex traits. Many of these topics are taught using a case-study approach, mostly using examples of genetic diseases in humans. BI 211 is a prerequisite for all the other general biology courses in the sequence (BI 212, BI 213, and BI 214).

The goals for BI 211 falls into three categories:
(1) to learn the foundational **concepts** related to cellular and molecular biology.
(2) to develop **skills** in analytical thinking that will serve students in natural science classes.
(3) to develop **career competencies** that are vital to success in any field.

Concept-based goals:

1. Biological macromolecules: To describe the chemical structures and major functions of the four major types of large biological molecules that make up all living organisms.
2. Energy Harvest Pathways: To understand energy harvest pathways, including cellular respiration, fermentation and photosynthesis, and their relevance to human disease.
3. Mitosis and Meiosis: To describe and illustrate chromosomal and cellular events during the various stages of both mitosis and meiosis, with a focus on their roles in cancer and Down Syndrome.
4. Gene Expression: To understand and describe the major processes involved in gene expression, including the mechanisms of protein synthesis, comprising transcription and translation, and how they are controlled to determine phenotype.
5. Mendelian Genetics: To understand the basis of transmission genetics and solve problems using Mendel's first and second laws; to analyze genetic pedigrees.

Skill-based goals:

1. To develop competency in the basic terminology and methodologies used in the biological sciences.
2. To learn the process of scientific inquiry and its applications.
3. To learn how to learn about biology.
4. To learn to communicate knowledge, ideas and reasoning clearly and effectively in oral and written forms.

Career Competencies:

In the natural sciences, we often define our education by the content we learned, the facts we know. But this is only one aspect of what you gain from your coursework, and arguably not the most important. After all, a lot of the knowledge you need for your career you learn on the job and a growth mindset dictates that what we know is not static but continues to evolve as our life trajectory changes.

Equally important to success are the competencies you develope, what you learn to do. Competencies are not readily apparent on your transcript, and they are not often explicitly emphasized in courses, but they are of vital importance to employers and to maintaining a growth mindset. If you can express how your education has allowed you to develop the competencies employers want, you will have a substantial advantage in interviews, on entrance essays, and when writing your resume. So, what are the competencies that employers want, and how will this class help you develop them?

Many, many, online sites discuss career competencies, sometimes referred to as Job Skills. These are generally expressed as variations on the same major themes. We will focus on the National Association of Colleges and Employers (NACE) Career Readiness Competencies. According to a 2019 survey of 172 employers, the competencies that employers' rate as most essential for career readiness are:

1. Critical thinking/problem solving (4.66)
2. Teamwork/collaboration (4.48)
3. Professionalism/work ethic (4.41)
4. Oral/written communications (4.30)
5. Digital technology (3.84)
6. Leadership (3.65)
7. Career management (3.38)

8. Global/multi-cultural fluency (2.78)

1=Not essential, 2=Not very essential, 3=Somewhat essential, 4=essential, 5=Absolutely essential

As you progress through this class please keep in mind that learning to maintain focus on difficult tasks, solve complex problems, navigate group dynamics, express yourself clearly and professionally, troubleshoot issues related to remote learning, identify how you fit into the greater scientific community, are just as important as the content you learn, and more transferable to the various avenues your life will take.

Course Prerequisites

Students taking Bi 211 need a basic competency in math and chemistry and should have successfully completed at least one college level chemistry course.

Course Format, Remote Version

Synchronous Lectures via Zoom:

Every weekday Monday-Friday, 10:00-11:50. Please access the course from the zoom link within canvas (instead of using an external link)

Zoom conduct:

Please arrive to synchronous lecture on time and stay until class is over.

Keep your video feed on, for the most part.

Keep your audio feed off, unless you are deliberately participating.

Please be engaged during synchronous lectures. Using your cell phone, tablet, or computer to check email, Facebook, surf the web etc. is inappropriate.

Lectures will include activities that help you to actively engage with the material. These activities will often be done collaboratively with a small group of students discussing the problem together for a few minutes before discussing it as a whole class. Your active participation will help you to understand the material and better prepare you for exams.

The single biggest difficulty students have in general biology is solving the kinds of problems presented in problem sets and exams. These are similar to the kinds of questions that biologists ask; they generally can't be solved by memorization of facts, but instead require the application of facts to novel situations. We will give you time to work through the practice problem sets and discuss ways to approach the problems. It will work best if you look through the problems before each session.

One of the most effective ways to master the material for this class is to engage in conversations with other students, faculty, and staff. You will have the opportunity to do this through group-work, office hours. In addition, you might find it very helpful to form study groups with your peers in which you discuss class content and work through problems together.

BTU Tutor Sessions on the class zoom site. many students find it helpful or essential to regularly visit tutoring sessions of a Biology Tutors for Undergraduates (BTU) to better understand the course material.

Videos:

Most of the course content will be delivered in 15-30 min videos. The videos have embedded questions that will encourage you to stay engaged and think deeply about the content.

Guidelines for videos:

> All videos are due by 10:00am on the due dates. Give yourself time to watch them, you will need it to answer the embedded questions.
>
> You must answer each question before moving on in the video.
>
> You can view the videos as many times as you like but you will only be allowed to answer the embedded questions once, the first time you watch the video, so please make sure you are in a space to focus on the content during your first viewing.

Labs:

Due to the remote nature of the summer session, we will not have in person labs however, we will do several of the lab activities that are suited to online conversion. These will be done during the synchronous lecture time.

Problem Sets

Ungraded Problem Sets Practice problem sets will be made available on *Canvas*. While you are not required to turn these in, you are strongly encouraged to work on the practice problems. A good learning strategy is to work on a problem set by yourself for a while to answer or at least try to answer every question, and then compare your solutions with those of a friend who is in the class. Work through the logic of the problems together, particularly problems for which you have different answers. In addition, you can get help understanding how to solve these problems in the staff office hours, and during synchronous sessions. Practice problems are very similar to the types of questions you will see on the exams; in fact, most practice problems are from previous exams. Practice problems are designed to help you master the material needed to successfully solve the graded problem sets.

Graded Problem Sets The course includes 10 graded problem sets posted on *Canvas*, due dates and times are listed in the canvas syllabus. You will submit your answers to these graded questions on *Canvas*. **No late problem sets will be accepted.** Solutions to each problem set will be posted on *Canvas* soon after each due date by looking at your score on the grades page of *Canvas*. You must do your own work on these graded questions. Copied work will be treated as academic dishonesty (see *Professional conduct* below)

Supplemental Reading

All required content for this course will be presented in the videos and in lecture. However, you may want to use the below reading to gain a broader understanding and to reinforce the concepts in the videos and in lecture.

To minimize student costs, we are using opensource texts for this class. In the past, this course used Freeman, Biological Science 5th and 6th editions. If you already own a copy of this book we have provide you with a reading list at the end of this syllabus. If you do not own this book you do not need to buy it, the content for the class is reinforced in several opensource texts, the reading lists for these are also provided at the end of the syllabus. The below links correspond to content

that reinforces aspects of each assigned video. These links will take you to Openstax Biology 2e https://openstax.org/details/books/biology-2e. If you would like even greater depth, with a focus on biochemistry, you might like OSU's opensource biochemistry text "Biochemistry Free For All" https://biochem.oregonstate.edu/content/biochemistry-free-and-easy

The work you turn in this term must be original (ie not copied from a previous term or from other students)

Exams This course has two exams: one midterms and one final. **Both exams are given during lecture time and are mandatory.** Exams will cover material from all aspects of the course including lectures, videos, and problem sets. Exams will probe a deep understanding of the concepts and principles discussed, not merely a recitation of facts, and an ability to apply the concepts to novel situations, rather than a memorization of detail. Note the dates of the final and other exams and don't plan to be gone on these days. You CAN use your personal notes on the exams but you CANNOT use the internet, problem set keys, or other people.

Exam regrade policy To be fair to all students, it is essential that all exams be graded according to the same criteria. If you wish to submit a midterm for a regrade, you must use the following guidelines. 1) Refer to the exam key available on *Canvas* to compare your answer to the key. 2) If you still wish to have a midterm exam answer regraded, you must submit a written statement to Jana within one week of the return of the exam.

Evaluation

Component of Grade	Percent
Videos with graded embedded questions (1.5% each)	**39%**
Canvas Problem Sets (3% each)	**30%**
Synchronous time participation and exercises	**11%**
Exams Midterm Exams (10%) Final Exam (10%)	**20%**

Please **do not rely on canvas gradebook to accurately calculate your grade**, it will not do so, but you can use the distributions here to accurately calculate your grade.

Learning Environment The University of Oregon is working to create inclusive learning environments. Please notify us if there are aspects of the instruction or design of this course that result in barriers to your participation. You may also wish to contact the Accessible Education Center in 155 Oregon Hall at 346-1155 or uoaec@uoregon.edu. If you have a documented disability and anticipate needing accommodations in this course, please talk to your instructors during the first week of class. Please request that the Counselor for Students with Disabilities send a letter verifying your situation.

Professional conduct

Cheating devalues the reputation of our institution, its faculty, its students, and the significance and value of your academic degree. Academic misconduct is particularly unfair for students who do their work with integrity and honor. The University Student Conduct Code defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. For example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only sources and resources authorized by the instructor. If you have any question about whether an act constitutes academic misconduct, it is your obligation to clarify the question with the instructor before committing or attempting to commit the act.

We want you to learn and to do well in the course, but we will not tolerate academic dishonesty. Sanctions for academic dishonesty can include lowering of the final grade or failure. If you find yourself in trouble, or if you are aware of academic dishonesty occurring, please talk to the instructor.

Personal crises do happen. If you are having difficulties that are interfering with your ability to do well in the class, please tell an instructor as soon as possible. We may be able to refer you to someone for help or to make special arrangements if the need is real and if you have done your best to deal with the situation in a timely manner. Don’t hesitate to call the campus crisis center (541 346-3227) if you or a friend need assistance. Finally, we promise to respect you as students and as individuals, and ask that you return that respect to us and to your fellow classmates.

We support Title IX and have a duty to report relevant information. The UO is committed to providing an environment free of all forms of prohibited discrimination and sexual harassment, including sexual assault, domestic and dating violence and gender-based stalking. Any UO employee who becomes aware that such behavior is occurring has a duty to report that information to their supervisor or the Office of Affirmative Action and Equal Opportunity. The University Health Center and University Counseling and Testing Center can provide assistance and have a greater ability to work confidentially with students.

Schedule BI 211 Summer 2020, Remote Version

	Monday	Tuesday	Wednesday	Thursday	Friday
Molecules of life and cell structure function	**21**	**22** **Videos 1 & 2** Intro to Bio molec Carbohydrates	**23** **Videos 3 & 4** Lipids Proteins **Practice set 1**	**24** **Videos 5 & 6** Nucleic Acids Cell struct/funct **PS 1 due at 5pm** **Practice set 2**	**25** **Video 7 & 8** Cell trafficking Enzymes **PS 2 due at 5pm** **Practice set 3**
Energy Harvest	**28** **Videos 9 & 10**** Intro energy harvest Anaerobic harvest **PS 3 due at 5pm**	**29** **Video 11 & 12** Aerobic harvest Photosynthesis **PS 4 due at 5pm** **Practice sets 4&5**	**30** **No new videos** **PS 5 due at 5pm**	**1** **Midterm Exam**	**2** **Videos 13 & 14** DNA Structure DNA Replication
Gene Expression (DNA to Protein)	**5** **4th of July observed**	**6** **Videos 15 & 16** Cell Cycle/ Mitosis Cancer **PS 6 due at 5pm** **Practice set 6**	**7** **Videos 17 & 18** Transcription RNA processing	**8** **Videos 19 & 20** Translation Meiosis **PS 7 due at 5pm** **Practice sets 7&8**	**9** **Videos 21 & 22** Intro to Mendel Dihybrid crosses **PS 8 due at 5pm** **Practice set 9**
Transmission Genetics	**12** **Videos 23 & 23.5** Linked genes & recombination **PS 9 due at 5pm**	**13** **Videos 24 & 25** Inheritance of sex Sex Linkage & Pedigrees **Practice set 10**	**14** **Video 26** Beyond Mendel **PS 10 due at 5pm**	**15** **No videos**	**16** **Final exam**

****getting a head start on videos 11 and 12 over the first weekend is <u>strongly</u> recommended!**

Supplemental reading: All required content for this course will be presented in the videos and in lecture. However, you may want to use the below reading to gain a broader understanding and to reinforce the concepts in the videos and in lecture.
Openstax Biology 2e: https://openstax.org/details/books/biology-2e

Background information and basic chemistry of Atoms: Openstax Biology 2e: 2.1
https://openstax.org/books/biology-2e/pages/2-1-atoms-isotopes-ions-and-molecules-the-building-blocks

Videos 1 Intro:
Background information about Hydrogen bonds, carbon compounds, functional groups, Dehydration/hydrolysis reactions: Openstax Biology 2e: 2.2 & 2.3, 3.1
https://openstax.org/books/biology-2e/pages/2-2-water
https://openstax.org/books/biology-2e/pages/2-3-carbon
https://openstax.org/books/biology-ap-courses/pages/3-1-synthesis-of-biological-macromolecules

Video 2 Carbohydrates: Openstax Biology 2e: 3.2
https://openstax.org/books/biology-ap-courses/pages/3-2-carbohydrates

Video 3 Lipids: Openstax Biology 2e: 3.3 & 5.1
https://openstax.org/books/biology-ap-courses/pages/3-3-lipids
https://openstax.org/books/biology-2e/pages/5-1-components-and-structure

Video 4 Proteins: Openstax Biology 2e: 3.4
https://openstax.org/books/biology-2e/pages/3-4-proteins

Video 5 Nucleic acids: Openstax Biology 2e: 3.5
https://openstax.org/books/biology-2e/pages/3-5-nucleic-acids

Video 6 Cell Structure Function: Openstax Biology 2e: 4.2 & 4.3 & 4.5
https://openstax.org/books/biology-2e/pages/4-2-prokaryotic-cells
https://openstax.org/books/biology-2e/pages/4-3-eukaryotic-cells
https://openstax.org/books/biology-2e/pages/4-5-the-cytoskeleton

Video 7 Cell Trafficking: Openstax Biology 2e: 4.4 & 5.4
https://openstax.org/books/biology-2e/pages/4-4-the-endomembrane-system-and-proteins
https://openstax.org/books/biology-2e/pages/5-4-bulk-transport

Video 8 Energy, Enzymes, and ATP: Openstax Biology 2e: 6.2 - 6.5
https://openstax.org/books/biology-2e/pages/6-2-potential-kinetic-free-and-activation-energy
https://openstax.org/books/biology-2e/pages/6-3-the-laws-of-thermodynamics
https://openstax.org/books/biology-2e/pages/6-4-atp-adenosine-triphosphate
https://openstax.org/books/biology-2e/pages/6-5-enzymes

Video 9 Intro to Energy Harvest: Openstax Biology 2e: 7.1

https://openstax.org/books/biology-2e/pages/7-1-energy-in-living-systems

Video 10 Anaerobic Harvest: Openstax Biology 2e: 7.2 & 7.5
https://openstax.org/books/biology-2e/pages/7-2-glycolysis
https://openstax.org/books/biology-2e/pages/7-5-metabolism-without-oxygen

Video 11 Aerobic Harvest: Openstax Biology 2e: 7.3 & 7.4 & 7.7
https://openstax.org/books/biology-2e/pages/7-3-oxidation-of-pyruvate-and-the-citric-acid-cycle
https://openstax.org/books/biology-2e/pages/7-4-oxidative-phosphorylation
https://openstax.org/books/biology-2e/pages/7-7-regulation-of-cellular-respiration

Video 12 Photosynthesis: Openstax Biology 2e: 8.1 - 8.3
https://openstax.org/books/biology-2e/pages/8-1-overview-of-photosynthesis
https://openstax.org/books/biology-2e/pages/8-2-the-light-dependent-reactions-of-photosynthesis
https://openstax.org/books/biology-2e/pages/8-3-using-light-energy-to-make-organic-molecules

Video 13 DNA Structure: Openstax Biology 2e: 14.2
https://openstax.org/books/biology-2e/pages/14-2-dna-structure-and-sequencing

Video 14 DNA Replication: Openstax Biology 2e: 14.3 & 14.4
https://openstax.org/books/biology-2e/pages/14-3-basics-of-dna-replication
https://openstax.org/books/biology-2e/pages/14-4-dna-replication-in-prokaryotes

Video 15 Cell Cycle Mitosis: Openstax Biology 2e: 10.1 & 10.2
https://openstax.org/books/biology-2e/pages/10-1-cell-division
https://openstax.org/books/biology-2e/pages/10-2-the-cell-cycle

Video 16 Cancer: Openstax Biology 2e: 10.3 & 10.4
https://openstax.org/books/biology-2e/pages/10-3-control-of-the-cell-cycle
https://openstax.org/books/biology-2e/pages/10-4-cancer-and-the-cell-cycle

Video 17 Intro to gene exp: Openstax Biology 2e: 15.2 & 15.3
https://openstax.org/books/biology-2e/pages/15-2-prokaryotic-transcription
https://openstax.org/books/biology-2e/pages/15-3-eukaryotic-transcription

Video 18 RNA processing: Openstax Biology 2e: 15.4
https://openstax.org/books/biology-2e/pages/15-4-rna-processing-in-eukaryotes

Video 19 Translation: Openstax Biology 2e: 15.1 & 15.5
https://openstax.org/books/biology-2e/pages/15-1-the-genetic-code
https://openstax.org/books/biology-2e/pages/15-5-ribosomes-and-protein-synthesis

Video 20 Meiosis: Openstax Biology 2e: 11.1 & 11.2

https://openstax.org/books/biology-2e/pages/11-1-the-process-of-meiosis
https://openstax.org/books/biology-2e/pages/11-2-sexual-reproduction

Video 21 Intro to Mendel: Openstax Biology 2e: 12.1 & 12.2
https://openstax.org/books/biology-2e/pages/12-1-mendels-experiments-and-the-laws-of-probability
https://openstax.org/books/biology-2e/pages/12-2-characteristics-and-traits

Video 22 Dihybrid cross: Openstax Biology 2e: 12.3
https://openstax.org/books/biology-2e/pages/12-3-laws-of-inheritance

Video 23 linked genes and recombination: Openstax Biology 2e: 13.1
https://openstax.org/books/biology-2e/pages/13-1-chromosomal-theory-and-genetic-linkage

Video 24 Inheritance of sex: Openstax Biology 2e: 12.2 (video 21) & 13.2 related content
https://openstax.org/books/biology-2e/pages/13-2-chromosomal-basis-of-inherited-disorders

Videos 25 & 26: Sex linkage and pedigrees & Beyond Medel: content covered, at least in part, by previous readings

If you have a copy of the Freeman book, these are the relevant readings. Note: you do not need this book for this class, we are using the Opensource text (readings above) this term. These readings are just for students that happen to have the book already.

Videos	Readings (Freeman 5th edition)
1-3	• Ch 1: read quickly to get an overview of the book and the overall structure of the field of biology. Pay particular attention to the sections on cells (p. 2-4), classification (p. 6-9), and science as a process (p. 9 - 14). It is highly recommended that you review basic chemistry principles in Ch 2. • Ch 5: read the entire chapter on carbohydrates • Ch 6: focus on pgs. 84-90 (types, structure of lipids); skim pgs. 91-93 to review diffusion and osmosis
4&5	• Ch 3: read the entire chapter on protein structure and function • Ch 4: read pgs. 57-64 for an introduction to nucleic acid structure and function
6&7	• Ch 29-33: skim over the chapters to answer questions about domains • Ch 7: read the entire chapter on cells; focus on characteristics of prokaryote and eukaryote cells (p. 107-110) and organelles (p. 110-127); skim the remainder of the chapter to gain a deeper understanding of cell dynamics • Ch 6: read about cell membranes on pgs. 88-90
8	• Ch 8: read pgs. 137-144 to focus on chemical reactions and energy; for a basic understanding of ATP and redox reactions; read pgs. 144-150 to focus on enzymes, effects of temperature and pH on enzymes
9-11	• Most students will have to carefully read Ch 9 on cellular respiration several times. Read the entire chapter fairly quickly the first time to get the general ideas and vocabulary. Then read again more carefully the specific pages that are listed. You must gain a basic understanding of the following material but don't need to memorize all of the chemicals. Pgs. 155-158 provide a nice overview of cellular respiration, pgs. 158-172 provide more detail of the processes of cellular respiration, and pgs. 172-173 discuss fermentation.
12	• Most students will have to carefully read Ch10 on photosynthesis several times. Read the entire chapter fairly quickly the first time to get the general ideas and vocabulary. Then read again more carefully the specific pages that are listed. Pgs. 176-184 provide a nice overview of photosynthesis, pgs. 184-190 (light reactions) and pgs. 190-192 (Calvin Cycle) cover the details of photosynthesis. • The Big Picture: pgs. 198-199 provides a nice overview of energy concepts
13	• Ch 4: read pgs. 58-65 on DNA structure and function
15 & 16	• Ch 12: read pgs. 219-223 for an introduction to the cell cycle; pgs. 223-228 for details of mitosis; pgs 229-232 for control of the cell cycle; pgs. 232-234 for cancer and the cell cycle • Ch 15: read pgs. 284-301; focus on pgs. 289-295 (DNA synthesis)
17-19	• Ch 16: read pgs. 304-312 for an introduction to genes, the central dogma, and the genetic code; pgs. 313-315 discuss mutations • Ch 17: read the entire chapter for the details of protein synthesis • Ch 4: read pgs. 65-68 for RNA structure and function
20	• Ch 13: read pgs. 237-246 for details of meiosis; pgs. 249-251 discuss mistakes in meiosis
21-22	• Ch 14: read pgs. 256-267; pgs. 261-263 discuss Mendel's 1st Law; pgs. 263-266 discuss Mendel's 2nd Law; B8 discusses some simple rules of probability that are useful for understanding Mendelian genetics
23	• Ch 14: read pgs. 269-271; read Quantitative Methods 14.1 on pg. 274 for creating genetic maps
24 & 25	• Ch 14: read pgs. 267-269 to focus on sex chromosomes and sex-linked inheritance; pgs. 277-279 discuss pedigrees
26	• Ch 14: read pgs. 271-272 to focus on incomplete dominance, codominance and multiple alleles

Videos	Readings (Freeman 6th edition)
1-3	• Ch 1: read quickly to get an overview of the book and the overall structure of the field of biology. Pay particular attention to the sections on cells (p. 2-4), classification (p. 6-9), and science as a process (p. 9 - 13). It is highly recommended that you review basic chemistry principles in Ch 2. • Ch 5: read the entire chapter on carbohydrates • Ch 6: focus on pgs. 119-123 (types, structure of lipids); skim pgs. 127-128 to review diffusion and osmosis
4&5	• Ch 3: read the entire chapter on protein structure and function • Ch 4: read pgs. 93-100 for an introduction to nucleic acid structure and function
6&7	• Ch 26-30: skim over the chapters to answer questions about domains and Lab #2 • Ch 7: read the entire chapter on cells; focus on characteristics of prokaryote and eukaryote cells (p. 143-146) and organelles (p. 146-162); skim the remainder of the chapter to gain a deeper understanding of cell dynamics • Ch 6: read about cell membranes on pgs. 123-125
8	• Ch 8: read pgs. 171-178 to focus on chemical reactions and energy; for a basic understanding of ATP and redox reactions; read pgs. 179-184 to focus on enzymes, effects of temperature and pH on enzymes
9-11	• Most students will have to carefully read Ch 9 on cellular respiration several times. Read the entire chapter fairly quickly the first time to get the general ideas and vocabulary. Then read again more carefully the specific pages that are listed. You must gain a basic understanding of the following material but don't need to memorize all of the chemicals. Pgs. 190-193 provide a nice overview of cellular respiration, pgs. 193-206 provide more detail of the processes of cellular respiration, and pgs. 206-207 discuss fermentation.
12	• Most students will have to carefully read Ch10 on photosynthesis several times. Read the entire chapter fairly quickly the first time to get the general ideas and vocabulary. Then read again more carefully the specific pages that are listed. Pgs. 211-218 provide a nice overview of photosynthesis, pgs. 218-223 (light reactions) and pgs. 223-226 (Calvin Cycle) cover the details of photosynthesis. • The Big Picture: pgs. 232-233 provides a nice overview of energy concepts
13	• Ch 4: read pgs. 94-101 on DNA structure and function
15 & 16	• Ch 12: read pgs. 253-257 for an introduction to the cell cycle; pgs. 257-262 for details of mitosis; pgs 263-266 for control of the cell cycle; pgs. 266-268 for cancer and the cell cycle • Ch 15: read pgs. 316-332; focus on pgs. 320-326 (DNA synthesis)
17-19	• Ch 16: read pgs. 335-343 for an introduction to genes, the central dogma, and the genetic code; pgs. 343-345 discuss mutations • Ch 17: read the entire chapter for the details of protein synthesis • Ch 4: read pgs. 101-103 for RNA structure and function
20	• Ch 13: read pgs. 271-280 for details of meiosis; pgs. 283-284 discuss mistakes in meiosis
21-22	• Ch 14: read pgs. 289-299; pgs. 292-296 discuss Mendel's 1st Law; pgs. 296-299 discuss Mendel's 2nd Law; Bioskill 4 discusses some simple rules of probability that are useful for understanding Mendelian genetics; pgs. 26-27
23	• Ch 14: read pgs. 302-305; read Quantitative Methods 14.1 on pg. 305 for creating genetic maps
24 & 25	• Ch 14: read pgs. 300-302 to focus on sex chromosomes and sex-linked inheritance; pgs. 310-312 discuss pedigrees
26	• Ch 14: read pgs. 306-307 to focus on incomplete dominance, codominance and multiple alleles

How to Succeed in General Biology

Students often ask us how to do better in the class, especially on the exams. Usually we get these questions right before the final, when it really is too late to learn all of the material that we cover in 10 weeks. Below is a checklist of things you should be doing if you want to learn the material in general biology. There is no easy, magic way to learn this material. It requires constant attention throughout the quarter.

Check List

- ☐ Did I actively participate in every synchronous remote lecture?
  We *think that the lectures are important for learning the material in this course. Just watching the videos does not substitute for attending lectures. But simply attending the lectures isn't enough. You need to be an active participant. By active, we mean that your mind needs to be actively working with the information as it is presented. If you are confused or have a question, please raise your hand. Most students find it useful to write notes to help to keep their minds on the material, but you shouldn't try to write so much that you aren't even able to think about the material.*

- ☐ Did I watch the videos and really engage in them before **every** lecture?
  You should understand everything that we put on the slides. Bring questions with you to the synchronous session..

- ☐ Did I do all of the practice problems?
  The practice problems that are posted on the course site mostly come from previous exams. They give you a good idea of your understanding of the material. They also help you to become more comfortable with solving these kinds of questions so you can perform better on the exams. Solving the problems on your own is probably the single most important thing you should do (besides coming to class) in order to be successful in this course. The problems are often not simply asking you to repeat facts that you have learned. They often ask you to apply the concepts to novel situations. That is what scientists do and we want you to do science in this course. Just like you can't learn how to play a guitar by simply reading about it, you can't learn to do science (e.g., solve problems) without practicing doing science (i.e. practicing solving problems). If you just get the answers from a classmate or staff person at help sessions without trying to solve them yourself, then you aren't practicing.

- ☐ Did I read supplemental readings in an active manner?
  The textbook presents the material in a very clear and concise manner. Much of the material cannot be understood by reading it once. You should be active as you read the material: take notes, underline key points, redraw important figures on your own. It's amazing how many evaluations we get from students that say, "I had trouble doing well in this class/" and also say "I hardly read the text at all." It is true that most of the material on the exams has been covered in the lectures. But most people need to study this material in several ways: listening in lectures, working on the concepts in labs AND reading about it.

- ☐ Did I visit the tutoring sessions?
  We don't charge for this service. ☺ You really should take advantage of the many hours we offer every week and get individual attention.

- ☐ Did I compare my answers to the exam solutions and work on the material I missed?
  If you didn't get it the first time, make sure you don't miss the problems on the. same concepts in subsequent exams. We've even been known to repeat similar questions that students missed on earlier exams. Even though you've already seen the solutions, it still is a good idea to download the unsolved problems and exam questions and work on solving them again when studying for the midterms and final.

- ☐ Did I try to make connections with the material to things I hear about and read about outside of class?
  The best students try to see the connections in other courses and parts of their lives. They are thinking about and processing the information even when they aren't specifically working on readings or problem sets for the course. We love to hear about connections you are discovering outside of the assignments.