

BIOL 230: CELL & MOLECULAR BIOLOGY

Syllabus: Lecture & Laboratory, Cañada College, Fall 2019

Lecture (Rm. 17-205): MW, 11:10 - 12:35 PM

Lab AA (89081; Rm. 23-333): MW, 2:10-5:00 PM.

Professor (Lecture & Lab): **Nathan Staples, Ph.D.**

- **Office:** Bldg. 23, Room 357. E-mail: staplesn@smccd.edu. Phone: (650) 306-3251
- **Office Hours / Open Lab:** MW 12:40-2:00 PM & 10:30-11 AM (*by arrangement*); Tu/Th, 2-3 PM.
 - *Office hours also available by appointment! Please don't hesitate to ask!! ☺*

➤ **Course Website:** <http://accounts.smccd.edu/staplesn/biol230/>

- *Visit often for class news and information, daily lecture slides, biweekly lab quizzes, and informative links.*

➤ **Answer on your notecard:** *What is your Name, career plan, & favorite (G-rated!) hobby?*

- ❖ *What other College-Level SCIENCE courses have you taken or are you taking now? Where? When?*

❖ → **What are your 3 main educational goals for this course??**

A. **Course Information:**

➤ **** Required Materials:**

- Sadava, et al. (2017), *Life: The Science of Biology*, 11th ed. (or Vol. 1; OR 10th ed., 2014)
- Staples, Nathan C., Ph.D. (2018) *Cell and Molecular Biology Lab Manual*, 13th ed.
- 4 Red Scantrons (F-289-Par-L; long, half-sheet, 100 questions on each side); Sharpened #2 or HB pencils.
- 1 Large Blue Book (11" x 8.5") for in-class use. Pick it up at the start, and leave it at the end of each period.

- ❖ **Course GOAL:** To give you a strong fundamental understanding of biochemical and cellular structures, their functions, and how these drive the metabolic and genetic processes of every living creature: from the simplest bacterium to the very complex human animal. You will also learn how to calculate and predict outcomes in plant and animal genetics, and learn to apply molecular biology to medical and agricultural problems, biotechnology and biomanufacturing. I hope to help you become more aware and have a better understanding of the many fascinating biological and biochemical phenomena that are a part of the world we live in and are integral parts of our own bodies!!

❖ **Course Learning Outcomes:** Upon completion of BIOL 230, students should be able to:

- 1) Describe and compare the cellular macromolecules and subcellular organelles in bacteria and eukaryotes, and explain how these structures determine associated biological functions.
- 2) Explain and compare the functions and regulation of enzymes and specific organelles in cellular respiration and photosynthesis.
- 3) Compare bacterial and eukaryotic gene structure, replication, gene expression and regulation, and explain technological applications of molecular processes.
- 4) Describe and compare the processes of cellular reproduction (cell cycle, mitosis, meiosis, cytokinesis), including their regulation and relationship to Mendelian and non-Mendelian inheritance.
- 5) Apply the scientific method and current laboratory techniques to analyze cellular components and processes, and organize collected data into cohesive reports that properly reference relevant professional scientific literature.

B. STUDENT Responsibilities: *STUDENTS are expected to keep-up with ALL the reading BEFORE each day's lecture. Be IN CLASS, ON TIME, EVERY day!! Also, be sure to complete any Study Questions, practice problems, Additional Investigations, and Self-Quiz questions at the end of chapters before the next class. *** Work NOW on the posted Study Guides on the class website!!*

You will be tested primarily upon your knowledge gained in this class, and your level of comprehension and ability to apply the major concepts (So, do NOT just memorize facts and details!!). Diligence will be your key to success in this class. I want you ALL to do well and have FUN learning about the fascinating, microscopic world of cell and molecular biology!!

- *** See also tutorials and practice tests for your textbook at [LaunchPad](#), and check the course homepage for supplemental learning websites, such as www.cellsalive.com and <http://vcell.ndsu.nodak.edu>!!!!**

❖ **Attendance Policy:** There will be information covered in class that won't be in the text or online slides, and there will be assignments/quizzes and information on schedule changes that are only available if you are in class. My policy is to drop students after missing more than six class hours (4 lectures or 2 lab periods) without a documented excuse. More than 2 absences will affect your grade.

- **Attendance at ALL Lab sessions is absolutely REQUIRED – missing more than two lab sessions without a documented excuse will likely result in a failing grade in the course. Do NOT be late!! Students who arrive late for Lecture OR Lab will be the Cleanup Crew for Lab that week!! Also, your ENTIRE LAB GROUP may be required to stay until the end of lab to clean up!!! O_O
- If you can no longer attend the course, it is YOUR RESPONSIBILITY to contact the professor and to WITHDRAW from the course. Failure to do so will result in a grade of "F" on your Academic Record.

➤ You must satisfactorily pass BOTH the Lecture Exams and Lab (earning at least 60% in each) to pass this course with a C or better!!!

➤ ALL Key Course Assignments (Exams, Research Proposal/Outline/Report, e-Folio, and Lab Reports) must be satisfactorily completed ON TIME in order to pass BIOL 230!!

C. GRADING:

Information from my **lecture**, the **lab**, and from the **textbook** will be on the Exams. Lectures are organized mostly from information in the textbook, although I cover some material NOT covered in the textbook. To excel in this class you will have to READ all assigned chapters BEFORE each class!!, attend all lectures, participate in **all labs**, and answer for yourself all Review and Self-Quiz questions. Read every part of each chapter, and take serious time to study the Figures in each chapter – these usually illustrate the most important concepts in the chapter!! DRAW, DRAW, DRAW!—out every major process or concept we discuss!! WRITE it in your own words. Don't just read about it!

➤ Lecture Objectives & Study Guide Questions will be collected and graded weekly!!!

❖ ** **EXAMS**: You will be given **3 Midterm Examinations**, and a **33% Cumulative Final Exam**. Midterm exams will cover the lecture material indicated on the course schedule. Exams will be 50-60% multiple-choice questions, and 40-50% short answer/short essay questions.

For every exam, bring **a pencil** (#2/HB lead), **a blank RED scantron answer sheet (100 questions/side, answers "a-e")**, your **STUDENT I.D. CARD**, and a well-rested and ready mind!!

❖ There will be NO MAKE-UP or RESCHEDULING of Exams (except in case of verifiable emergency), so check your schedule NOW and PLAN appropriately!!

- *If you have or foresee any problems, contact Dr. Staples IMMEDIATELY!!!*

❖ **BLUE BOOKS**: During each lecture period, I will present brief questions/writing prompts for you to answer in-class. These will be written down in your Blue Books, which you must leave with me at the end of class. These will track and encourage your active thinking during class and your thorough review, study, and reading preparation before class. The Blue Books also will make up a large part of your **class participation** grade.

STUDY TIPS: **Form regular study groups!!** Discuss and explain chapter concepts with a group of fellow students, or even with your family and friends!! If you can explain course material well to a “lay person”, then you are doing VERY well in your studies!! Finally, **NEVER HESITATE to come to my OFFICE HOURS or make an appointment!!** I love to see and hear how you are doing, and any difficulties you may be having are likely shared by your fellow students. LET ME KNOW how I can help you to better learn the information, and to perform better in the class!!! ☺

- **Students receiving a C- (70%) or lower on any exam must meet with me ASAP to discuss improving performance in the course.** There will be a cumulative final at the end of the semester.
- **The most stringent grade distribution in the class will be $\geq 93\%$ = A, 93-90% = A-, 90-87% = B+, 87-83% = B, 83-80% = B-, 80-77% = C+, 77-70% = C, 69-60% = D, < 60% = F.** Grading scales may be adjusted as deemed appropriate to ensure fairness and the best possible success of each student.

3 midterms x 100 pts. each	= 300 points
1 Comprehensive Final (33% Cumulative)	= 150 points
Blue Books & In-class participation (lecture)	= 50 points
Research Paper (20 + 30 + 100 points)	= 150 points
Lab Quizzes (7x 20 pts; Drop 1 quiz)	= 120 points
Enzymes Laboratory Report	= 50 points
Pre-Lab preparation, Technique, & participation	= 60 points
Lab Final	= 60 points
Lab Notebook/Manual	= 60 points
TOTAL	= 1000 points

D. Academic Integrity: (Nathan Staples & Doug Hirzel, Biology Department, Cañada College)

Academic dishonesty consists of copying from someone else, copying from the Internet, using crib notes on exams, or handing in written reports that do not represent your own work. Any student turning in an assignment overly similar to that of another student or another author, or found committing academic dishonesty of any other type, will receive a failing grade for the assignment, and a report of the incident will be filed with the appropriate college authorities and will appear on the student’s academic record. If the infraction is serious enough, or if subsequent infractions occur, the student will also be dismissed from the class with a failing grade. For more information, see Cañada College’s Academic Integrity Policy, available on the college website.

- ***Cheating in any form will NOT be tolerated, and disciplinary action will be severely enforced by College Administration!!***
- ❖ **Do NOT PLAGIARIZE!! Especially on reports. ANY information that did not ENTIRELY originate from your own mind, or is not part of general public knowledge, MUST be FULLY CITED with Author, Date, Title, Publication, Volume and Page #s!!!!**
- **Have fun** learning, and **take pride** in what you can accomplish in this class!!! ☺

E. **BIOL 230 Research Paper: (150 points)**

Due Dates (Submit in CANVAS, using TurnItIn link):

- **Wed., 10/2:** (20 pts) Short paragraph describing research topic, with 2 professional sources.
- **Wed., 10/30:** (30 pts) Detailed outline of topic, **with references (at least 3 professional journals)!**
- **Mon., 11/25:** (100 pts) 5-7 page paper; Typed, double-spaced (with ≥ 3 references from scientific journals).
 - *Bring semi-final drafts of papers to me one week early (by 11/20/19!!) for a brief critique!! ☺*

Your assignment is to find a topic encompassed by cellular or molecular biology or genetics. A good example is a cellular process (eg: metabolism, mutation, photosynthesis), specific molecule (a specific protein, enzyme, RNA, polysaccharide, etc.) or a disease (in animal or plant) and how this disease results from malfunction or damage to the normal cellular, genetic, and/or biochemical processes in the organism. You must include in your references articles from **at least 3 CURRENT, professional scientific journals (peer-reviewed journals, less than 6 years old)**, including **at least two from PRIMARY literature**. **Primary literature** is original research articles with original experiments and data included in the authors' results.

"Scientific Journal Articles" can come from a variety of sources, and do NOT ALL need to be from professional journals. *Scientific American*, *National Geographic* and *Discover* are excellent layman's journals that are reputable. Online sources like *ScienceDirect* can be highly technical but manageable with some effort. *Other publications, like Newsweek/Time or newspapers, may be used as supplemental references, but NOT as the main 3 references, and may be good starting points to find a topic of interest!* The scientific journals *Nature*, *Science*, *Proceedings of the National Academy of Sciences*, and *Cell* are highly technical, but have sections and articles that should be understandable for an introductory cell/molecular biology student (for the bold! But these are the BEST, cutting-edge resources for you, and are likely good for some extra credit!!).

"**www.pubmed.com**" (NCBI) is a great site to find relevant articles in professional biological journals – please ***cite the authors and the journal***, and not PUBMED (a database only) itself!

Nonprofessional web sites, such as personal websites, sites for commercial products, and WIKIPEDIA are NOT likely to be reliable sources, and you will lose points for using such sites!!

Detailed Outline: Give a numbered outline in Standard Outline format (eg: Main topics under "I, II, III, etc", subtopics with "A, B, C...", supporting information with "1., 2., 3.,", and minor points and notes with "a., b., c., etc..."). This should be a COMPLETE outline of your entire paper, with as much detail as possible, and with a nearly complete list of references from professional scientific journals.

Final Paper:

- I. Include a **1-page introduction** on the background of the topic – why did it interest you, what is the history of the phenomenon/disease, and why is it important to the science of biology and to our daily lives (if applicable)? What are the *HYPOTHESES* being investigated?
- II. In **2-4 pages, summarize the current research** that has been done in this area (from each of your References Cited), and explain how it relates to what we are learning in BIOL 230. (What question/problem did the scientists address? What methods/strategy did they use to find an answer to the questions? In what form was their collected data presented, and how did they interpret their data to form conclusions??)
- III. Finally, write a **1-page conclusion** explaining the importance of recent breakthroughs in the field, the future direction of research in the field, what you learned, and any discussion or opinions you have related to the article.
 - Provide a **THOROUGH Self-Reflection**, including how you can apply what you learned to your own life and how you see the world around you. Cite specific knowledge or general concepts, or even mental or academic skills that you learned or improved from this research and writing process. See the **posted guideline on CANVAS**, and ask Dr. Staples for help! ☺

❖ **IMPORTANT POINTS to Remember for Research Reports:**

- 1) **Keep focused on CELLS, MOLECULES, and/or GENETICS.** Minimize discussions of historical, philosophical, political, environmental, patient care, and/or physiological aspects. *Spend 80-90% of your writing discussing and explaining specific PROTEINS, GENES, and other important specific cellular molecules (using their specific molecular names!) or organelles!!!!*
- 2) **Use proper, IN-TEXT CITATIONS, of CURRENT (<6 years old!!) PROFESSIONAL journals. DO NOT use general or public websites as major sources. Focus on Scientific Journals as sources, and PROPERLY REFERENCE each major source that you use!! (NOTE: a web address/URL is NOT a citation!!)**
- 3) If you choose a disease (genetic or infectious) and want to discuss treatments, **focus on the MOLECULAR/CELLULAR strategies** and molecular mechanisms of treatments.
- 4) Keep your AUDIENCE in mind: **write the report for reading by one of your fellow classmates.** So, *write for a person with good basic biological knowledge, but little/no expertise on your topic!!*

You MUST CITE the all of your references in each sentence/paragraph, even if the information is written in your own paraphrasing. A common format is: **Authors and/or Editors (year). "Title of Article." Journal Title (or Website/URL). Volume, page #'s**. If I can't find it based on your citation information, you will lose points. You MUST proofread your paper and have proper grammar – papers that have obviously not been proofread will lose points.

❖ ***If you cut and paste text, or otherwise copy, directly from the article or any other source you WILL FAIL the assignment and receive an F the course.***

❖ **To turn in a great report, properly cite your references, and avoid Plagiarism:**

1. Proofread carefully, and have someone ELSE proofread for you as well.
2. **Use at least THREE Professional, scientific journals** with original research and data to examine ("**Peer-reviewed**" professional Journals with PRIMARY data)
 - **Nearly all referenced journal articles should be LESS than SIX YEARS old!**
 - **5 points of grade for each Scientific Journal source = 15 points of report grade!**
3. **** **Be sure to CITE each sentence that does not entirely contain your own original thoughts and words (Author, Year in parentheses at end of sentence or phrase; OR a numbered endnote notation).** **** **IN-TEXT CITATIONS are preferred.** Use APA or CSE.
4. **Do not overuse quotations:** paraphrase information in your own words whenever possible! **Show your own thoughtful examination of the data and concepts.** Your grade is based on this!
5. **Make your own or copy and cite diagrams/drawings,** if you think it will be helpful to the reader.
6. All sources MUST have an **AUTHOR, DATE, TITLE, and PUBLICATION** (book, journal title & volume & page #'s, website title & date accessed). Use CSE/CBE or APA style format.
 - For examples, see:
 - **CSE:** http://bcs.bedfordstmartins.com/resdoc5e/RES5e_ch11_s1-0001.html
 - **APA:** http://bcs.bedfordstmartins.com/resdoc5e/RES5e_ch09_s1-0001.html
7. **NOTE: Search engines and databases are NOT journals** (eg: "pubmed" is a DATABASE, NOT a journal). **Be sure to cite the actual journal title, volume, year, and page numbers:**
 - eg: Abassi YA, Denis PE, Staples NC (2018). "How Cell Biology Students Will One Day Rule the World". *Journal of Cell Biology*, vol. 112, pp. 1230-1237.
 - See: http://www.nlm.nih.gov/bsd/policy/cit_format.html

- F. Laboratory Information:** Lab will take place in room 23-333 (just around the corner from my office!!) on Mondays and Wednesdays. Always follow proper chemical, sharps, and biohazard safety practices. **Lab goggles and closed-toed shoes must always be worn in the laboratory. A lab coat is also recommended.** *Goggles and coats may be purchased from the bookstore. *** Laboratory work is worth approximately 35% of your grade (350/1000 points).*
- You are expected to **come to each lab mentally prepared**: having read the daily exercises, and written into your notes (on loose-leaf paper, inserted into your binder or manual pages) a **TYPED PRE-LAB WRITEUP**:
 - The **Goal/Purpose** of the day's exercise.
 - A **BRIEF summary or outline** of the day's procedures (5-10 lines or sentences):
 - Try to answer "**What** we are doing? **Why** are we doing it?"
 - How** are we going to do it (experimental methods or strategy)?"
 - Propose a **Scientific Question**, and develop a possible answer or **Hypothesis** for part of this week's experiments (in Cause & Effect/**Hypothesis-Prediction**, or "**If , then** " format)...
 - Eg: "*If* ants like sugar more than cheese, *then* more ants will flock to a sugar cube than to a cheese cube."
 - Also, **Lab Notebooks/Manuals** will be checked regularly for completion of all fill-in sections, complete recording, calculations, and analysis of data, and for MANY of CAREFUL DRAWINGS of the specimens and data we observe. **Keep a detailed record of what you've done!** **Be sure to complete all calculations, tables, and graphs EVERY period before you leave the laboratory.** Lab Manuals/notebooks will be **collected and graded at least twice** this semester.
 - **LAB REPORTS** will be turned-in within one week of the final analysis of Experiment 6. Specific instructions will be provided during Experiment 7. **Reports must be uploaded by one member of your lab group to the TurnItIn.com link on the SMCCD CANVAS page for BIOL 230.**
 - **LAB QUIZZES** will be posted every two weeks on **SMCCD CANVAS (smccd.instructure.com)**, by each **Monday**. Quizzes will cover information from the last two weeks of laboratory, and possibly a few questions from the upcoming/current week. The quiz **MUST be completed by Wednesday evening** following the post. The lowest quiz score from your seven quizzes will be dropped.
 - ** About 1 Hour by Arrangement per week** on average is **recommended** to practice and to keep up with exercises, refining your lab technique, cultivating your organisms, and analyzing data in the Laboratory. Open lab times are often available **Mon/Wed before and after class, and Tue/Thu afternoons,** during open lab times posted by other biology instructors, and **by appointment**.
 - Many of our experiments are ALIVE!!** *If you are not attentive to some of them every 1-2 days, they might DIE and ruin your experiment!!* There is not enough time in the semester to repeat entire experiments, so if this happens, you will lose all credit related to your experiment. Keep your microbial "pets" happy during the required experiments, and they will keep you happy!!! ☺
 - Hours by arrangement can be spent visiting my Office Hours or Tutors in the Learning Center and MESA Center, and completing Internet Activities and reviewing tutorials recommended in the laboratory exercises (Part of your Pre-Lab preparation!) and given during lectures (on slides).
 - In the laboratory, we always work as **teams**. If you find that you cannot attend a laboratory session for any reason, you must **contact BOTH me AND your lab PARTNERS** as soon as possible to ensure that your experiment does not fail by neglect. Please be responsible for your experiments, and be conscientious of your lab colleagues as well!!

❖ **It is EVERY student's responsibility to CLEAN-UP after him/herself!! Each student must make sure that his/her ENTIRE bench and immediate area are clean and disinfected at the end of each period, and that ALL glassware, equipment and reagents are cleaned and placed back in their proper places for later classes to use.**

BIOL 230, Fall 2019 TENTATIVE LECTURE SCHEDULE Professor: Dr. Nathan StaplesTextbook: Sadava, Hillis, Heller & Hacker (2017). *Life: The Science of Biology*, 11th ed.**Lecture Topic: Reading Assignment (Sadava page #s):**

Wk.	Date	PART I:	BIOCHEMISTRY; CELL STRUCTURE, FUNCTION & METABOLISM:	Reading, pp.:
1	W, 8/14	Ch.1 (lab), 2	Course introduction; Characteristics of "LIFE"; Scientific Method (In lab).	1-20.
2	M, 8/19	Ch. (4), 2	Introduction to the Cell – membranes and organelles; Chemical Bonding; Chemistry of Water, pH.	22-39.
	W, 8/21	Ch. 3	Macromolecules: Condensation, dehydration reactions. Carbohydrates;	41-45; 54-58.
3	M, 8/26	Ch. 3, 4	Lipids and Membranes; Proteins; Nucleic Acids, Origins of life?- Urey/Miller. Louis Pasteur.	45-54; 59-79.
	W, 8/28	Ch. 5	Cell Structure: Cell Theory; Prokaryotic/Eukaryotic cells; Endomembrane System,	81-95.
4	M, 9/2	HOLIDAY!!	HOLIDAY: Labor Day. NO Classes!!	Ch. 5
	W, 9/4	Ch. 5	Energetic organelles, the cytoskeleton; Extracellular Matrix	95-107.
5	M, 9/9	Ch. 6	Cellular membranes, Fluid Mosaic Model, passive membrane transport.	110-120.
	W, 9/11	Ch. 6, 8	Active Membrane transport, signaling. Cellular metabolism, thermodynamics, Enzyme reactions.	120-128; 150-160
6	M, 9/16	Ch. 8, 9	Enzyme function and regulation; Harvesting Energy from glucose – Glycolysis, pyruvate oxidation.	160-169; 172-176
	W, 9/18	Ch. 9	The Krebs/TCA/Citric Acid Cycle; Electron Transport/Oxidative Phosphorylation, Fermentation. REVIEW FOR MIDTERM #1	176-191.
7	M, 9/23	MT #1	MIDTERM #1: **Ch. 1-6, 8 (100 pts.)**	
	W, 9/25	Ch. 9, 10	Metabolic Yields & Regulation; Photosynthetic pigments, Light Reactions.	193-202.
8	M, 9/30	Ch. 10	Photosynthesis: Photophosphorylation; Dark Reactions.	202-210.
		PART II:	MOLECULAR GENETICS & BIOTECHNOLOGY:	
	W, 10/2	Ch. 13	Chromosomes, genes, and genomes: The Genetic Material; DNA structure and replication; RNA. ➤ DESCRIPTION OF PROPOSED RESEARCH REPORT TOPIC due!	266-276.
9	M, 10/7	Ch. 13, 17, 18 (in lab)	Molec. DNA Replication. PCR, Sequencing; Restriction Enzymes, Electrophoresis; Hybridization, CRISPR.	276-285; 360-373; 380-396. (in lab)
	W, 10/9	FLEX DAY!	FACULTY FLEX DAY!! NO Classes!!	Ch. 13, 14
10	M, 10/14	Ch. 14	Overview of gene expression: transcription, translation, and regulation; tRNA and the Genetic Code.	288-298.
	W, 10/16	Ch. 14,15	Molecular Mechanism of Translation. Mutations and DNA-repair; Genetic diseases & Gene therapy. REVIEW FOR MIDTERM #2	298-310; 319-334
11	M, 10/21	MT #2	MIDTERM #2: **Ch. 9, 10, 13-14 (100 pts.)**	
	W, 10/23	Ch. 16	Viral & Prok. Genetics: Reproduction; Bact. Vertical & horizontal Gene Transfer. (pp. 262-265)	337-340; 345-349
12	M, 10/28	Ch. 16, 18	Prok. Gene Regulation: Operons. Molecular cloning; cDNAs as Blots/Probes.	333-349; 381-391
	W, 10/30	Ch. 16, 13	Eukaryotic Gene Regulation: Gene Structure; Telomeres, introns. ➤ DETAILED OUTLINE OF RESEARCH TOPIC due (WITH REFERENCES)!!	349-356; 282-285
13	M, 11/4	Ch. 16, 14	RNA processing, Transcriptional/Posttransc'l/Translational/Posttranslat'l Regulation	346-349; 298-309
	W, 11/6	Ch. 18, 15	Recombinant DNA & Genetic Engineering. Revolutionary applications. (in lab)	381-397; 319-334
14	M, 11/11	HOLIDAY!!	HOLIDAY: Veteran's Day. NO Classes!!	Ch. 11
		PART III:	CELL DIVISION & HEREDITY; CELLULAR COMMUNICATION	
	W, 11/13	Ch. 11 (lab)	Cell & Nuclear Division: Chromosomes, Cell Cycle; Mitosis: kinetochores; Review for MIDTERM #3	213-224 (& web)
15	M, 11/18	MT #3	MIDTERM #3: **Ch. 14, 16, & parts of 15, 17, 18 (100 pts.)**	
	W, 11/20	Ch. 11	Cytokinesis; Sexual Reproduction; MEIOSIS; Errors in Meiosis; Apoptosis. Cancer.	224-237 (& web)
16	M, 11/25	Ch. 12	Mendelian Genetics: Historical background; Mendel's scientific method; ➤ ** FINAL RESEARCH REPORT DUE!! **	240-247 (& web)
	W, 11/27	Ch. 12	Mendelian Genetics: Probabilities; Non-Mendelian Inheritance;	247-255 (& web)
17	M, 12/2	Ch.12, 15	Linkage, Recombination & Gene mapping; (Homework problems: #1-13, pp. 210-212)	255-262. 319-333.
	W, 12/4	Ch. 12, 7	Sex Linkage, Cytoplasmic inheritance; Pedigrees. Receptors, signal cascades. !!REVIEW!!!**	Ch. 12; 131-147
18	M, 12/9	Ch. 12	Sex Linkage, Cytoplasmic inheritance; Pedigrees. ***!!REVIEW FOR FINAL EXAM!!! **	255-264.
	W, 12/11	FINAL!!	** FINAL EXAM: Wed., Dec. 11, 11:10-1:40 PM in 17-205 (150 pts) **	Chs. 11-12, etc.

BIOL 230 Lab, Fall 2019 TENTATIVE LAB SCHEDULE Prof.: Dr. Nathan StaplesLab Manual: Nathan C. Staples, Cañada College (2018). *Cell & Molecular Biology Lab Manual*, 13th Ed.

Wk.	Date	Experiment	Laboratory Assignment
1	Wed, 8/14	1.1	Overview of Lab Course Requirements, Lab Safety ; Microscopy
2	M, 8/19	1.2	Scientific Method (text, Ch. 1) ; Cell Structure, Behavior & Microscopy
	W, 8/21	2.1	Identification of Cellular Biomolecules
3	M, 8/26	2.2	Gel Filtration: Separation of Biomolecules
	W, 8/28	3 (4.3)	Cell Transport: Diffusion and Osmosis (Lab Skills – Micropipetting.)
4	M, 9/2	HOLIDAY!!	HOLIDAY: Labor Day. NO Classes!!
	W, 9/4	4.1, 4.2 (4.3)	Protein Quantitation and Spectrophotometry – standard curve; Color wheel. (Lab Skills– Micropipetting.) ➤ ** QUIZ #1 - DUE Online, WED. Evening!!
5	M, 9/9	Library, Bldg. 9 (3 rd flr.)	Library tour, tutorial, & discussion of Research Report. Academic Integrity. (Meet in lab, then walk to library.)
	W, 9/11	5.1-5.2	Quantitation & Regulation of Enzyme Activity – Mushroom Tyrosinase.
6	M, 9/16	5.3	Student Inquiry: Tyrosinase activity.
	W, 9/18	(6 preview)	➤ ** QUIZ #2 DUE! **REVIEW FOR LECTURE MIDTERM 1!!
7	M, 9/23	6	Enzyme separation & Identification by Native Gel Electrophoresis; Stain & Scan gel. [MT1 in lecture]
	W, 9/25	6 analysis; 7*	Scan Gel; Data Analysis; Rf determinations. Cellular Metabolism: Fermentation & Respiration.
8	M, 9/30	8.1-8.2	Photosynthesis: Pigments and the Light Reactions; Student Inquiry.
	W, 10/2	8.2-8.4; Rpt 1	Photosynthesis: Pigments/Light Reactions/Student Inquiry; Enzymology Report Due!! ➤ ** QUIZ #3 DUE!! *** Research TOPIC DUE!!
9	M, 10/7	9	Isolation & Quantitation of Eukaryotic DNA – UV Spectrophotometry.
	W, 10/9	FLEX DAY!!	FACULTY FLEX DAY!! NO Classes!!
10	M, 10/14	9 analysis; 10.1-10.2; NB1	Graphing & Data Analysis. <u>DNA Fingerprinting I</u> : Anastasia? Restriction Digest, pour agarose gel. Prepare samples.
	W, 10/16	10.3-10.6	DNA Fingerprinting I: Anastasia? Agarose Gel Electrophoresis & Staining ➤ QUIZ #4 – DUE WED. Online! **REVIEW FOR LECTURE MIDTERM 2!!
11	M, 10/21	Text: Ch. 15, 17-18	Lecture & Discussion of Molecular methods, biotechnology. Data analysis. [MT2 in lect.]
	W, 10/23	11.1	<u>DNA Fingerprinting II</u> : Extract DNA and set up PCR reactions (D1S80)
12	M, 10/28	11.2	Agarose Gel Electrophoresis & Staining of D1S80 PCR. Rf Analysis
	W, 10/30	Chs. 15, 17-18; TBA	Lecture and Discussion of Molecular methods, biotechnology, & Genetic Engineering. ➤ QUIZ #5 - DUE WED. Online! *** Research OUTLINE DUE!!
13	M, 11/4	12 (13.1)	Transformation of bacteria, Operon regulation, & protein-ligand specificity; **TOMORROW: Examine plates & (13.1) Start pGLO+ cultures!!!
	11/6	13.2-13.4	Start GFP+ cultures 24 hours before Lab!!! Lyse cells & Purify GFP for analysis of expressed recombinant protein. Aliquot, label, & freeze protein samples.
14	M, 11/11	HOLIDAY!!	HOLIDAY: Veteran's Day. NO Classes!!
	W, 11/13	14 (online homework)	Mitosis & Meiosis; slides. Models. (Discuss Text: Ch. 11, Ch. 12) ➤ QUIZ #6 - DUE WED. Online! **REVIEW FOR LECTURE MIDTERM 3!!
15	M, 11/18	Discussion, 14	Data Analysis; Meiosis. Mendelian Genetics overview. [MT3 in lecture]
	W, 11/20	15 (online homework)	Genetics: Meiosis & Fertilization – Probabilities; Mendelian & Human Genetics; Computer Genetics.
16	M, 11/25	15, Ch. 12	Genetics Problems & Practice (Text Ch. 12; Online). **Final Research Report DUE!!**
	W, 11/27	Ch. 12	REVIEW for LAB PRACTICAL!! ➤ ** QUIZ #7 – DUE WED. Online!
17	M, 12/2	PRACTICAL & NB2!	➤ LAB FINAL Practical; Lab Manual Check (#2); Review for Lecture FINAL!!
	W, 12/4	FINAL REVIEW!!	Review genetics and Gene mapping. Review for Lecture FINAL (During Lab!)
18	M, 12/9	FINAL REVIEW!!	Review for Lecture FINAL (12/11): Part IV and Cumulative!!! (During Lab!)