

**Central High School
DC—Angelo State University
BIO 1307—Principles of Biology II—Spring 2022**

INSTRUCTOR CONTACT INFORMATION: Shamone Minzenmayer

Office: Tucker 117

Email: sminzenmayer@saisd.org

Phone: 325-659-3400

This is a college-level course taught in high school. This course introduces the integration between structure and function of biological organization. Students will be asked to use processes of science to apply principles of evolution, biological chemistry, energetics and homeostasis, cell structure and function, gene expression and patterns of inheritance in living systems. Observation, experimentation and investigation are emphasized. This course requires a conceptual understanding of the material rather than the simple memorization of facts. This course will challenge you to analyze and apply information, solve problems, and make connections different from the context in which they were learned. These are critical skills in biology. Students must exercise exceptional organizational skills in order to meet the demands of this course.

Course Materials

TEXTBOOK: Urry, Lisa A. 2013. *Biology in Focus*. 3rd Edition. Benjamin Cummings. Book with Mastering Biology.

LAB MANUAL: AP Investigative Labs: An Inquiry Based Approach. The College Board. 2014.

OTHER RESOURCES:

Books: Moalem, Sharon, and Jonathan Prince. *Survival of the Sickest: A Medical Maverick Discovers Why We Need Disease*. New York: William Morrow, 2007. Print.

Skloot, Rebecca. *The Immortal Life of Henrietta Lacks*. New York: Crown Publishers, 2010. Print.

Other: Internet access

A successful student in Principles of Biology should be able to achieve the following course and state core related learning outcomes:

- Describe, explain and predict natural phenomena using the scientific method (CT1, EQS1, EQS2)
- Design an experiment and complete a written description of their design, collaboratively conduct the experiment and analyze data generated to answer some component of a given causal question and defend the reasoning for conclusions drawn in the form of a lab report. (CS1)
- Collect and analyze data to evaluate relevant biological/ecological scenarios (EQS1)
- Work effectively with others to support and accomplish a shared goal. (CS1, TW2)
- Connect what she/he is learning to her/his own field (i.e. to make biology relevant to your own academic endeavors).

All of these Learning Outcomes will be assessed by:

- in class activities, lecture exams, embedded test questions, lab quizzes, and lab activities/reports

For State and Accreditation purposes this course will assess your ability to:

- CT1: Gather, analyze, evaluate and synthesize information relevant to a question or issue
- CS1: Develop, interpret, and express ideas through effective written communication
- EQS1: Manipulate and analyze numerical data and arrive at an informed conclusion.
- EQS2: Manipulate and analyze observable facts and arrive at an informed conclusion.
- TW2: Work effectively with others to support and accomplish a shared goal.

GENERAL COURSE OUTLINE--BIO 1307 & 1306

Unit 1	Nature of Science and Biochemistry
Unit 2	Cells
Unit 3	Energetics
Unit 4	Cell Communication and Cell Cycle
Unit 5	Heredity
Unit 6	Gene Expression and Regulation
Unit 7	Evolution
Unit 8	Ecology

This course is divided into seven major units that each include all four of the Big Ideas that are the fundamental framework for the AP/DC Biology Curriculum. Within each unit, the enduring understands, essential knowledge, learning objectives and science practices that will be taught as outlined below.

BIG IDEAS

- 1 The process of evolution drives the diversity and unity of life.
- 2 Biological systems utilize free energy & molecular building blocks to grow, to reproduce, & to maintain dynamic homeostasis.
- 3 Living systems store, retrieve, transmit, and respond to information essential to life processes.
- 4 Biological systems interact, and these systems and their interactions possess complex properties.

Biology is a scientific process that requires students to make observations and interpret information from the natural world. Because the process of science is such an important part of this course, students will be required to record their lab activities in a lab notebook in such a way as to mirror the process that is used in research laboratories. Students in this course meet for 50 minutes five days each week and will spend at least 40% of this time engaged in laboratory exercises. Each of the Science Practices below will be addressed throughout the course within the context of the Essential Knowledge. They are listed in the curriculum framework along with the appropriate learning objective. This document is available on my website and the College Board website. Because students will be learning the practice of being a scientist, they will conduct at least two inquiry based lab activities per Big Idea in the curriculum framework. The products of these investigations will be either a formal lab report, mini-poster presentation or a group presentation.

Science Practices

1	Concept Explanation: Explain biological concepts, processes and models presented in written format	
	1A	<i>Describe biological concepts and/or processes</i>
	1B	<i>Explain biological concepts and/or processes</i>
	1C	<i>Explain biological concepts, processes and/or models in applied contexts</i>
2	Visual Representations : Analyze visual representations of biological concepts and processes	
	2A	<i>Describe characteristics of a biological concept, process or model represented visually</i>
	2B	<i>Explain relationship between different characteristics of biological concepts, processes or models represented visually—in theoretical contexts; in applied contexts</i>
	2C	<i>Explain how biological concepts or processes represented visually relate to larger biological principles, concepts, processes or theories</i>
	2D	<i>Represent relationships within biological models, including: Mathematical models; diagrams; flow charts</i>
3	Determine Scientific Questions and methods	
	3A	<i>Identify or pose a testable question based on an observation, data or a model</i>
	3B	<i>State the null and alternative hypotheses or predict the results of an experiment.</i>
	3C	<i>Identify experimental procedures that are aligned to the question, including: identifying dependent and independent variables; identifying appropriate controls; justifying appropriate controls</i>
	3D	<i>Make observations or collect data from representations of lab setups or results.</i>
	3E	<i>Propose a new/next investigation based on an evaluation of the evidence from an experiment; an evaluation of the design/methods.</i>
4	Representing & Describing Data	
	4A	<i>Construct a graph, plot or chart (X,Y; Log Y; Bar; Histogram; Line; Dual Y; Box and Whisker; Pie) with appropriate orientation, labeling, units, scaling, plotting, type, trend line.</i>
	4B	<i>Describe data from a table or graph, including: identifying specific data points; describing trends and/or patterns in the data; describing relationships between the variables.</i>
5	Perform statistical tests and mathematical calculations to analyze and interpret data	
	5A	<i>Perform mathematical calculations including: Mathematical equations in the curriculum; means; rates; ratios; percentages.</i>
	5B	<i>Use confidence intervals and/or error bars (both determined using standard errors) to determine whether sample means are statistically different.</i>
	5C	<i>Perform chi-square hypothesis testing</i>
	5D	<i>Use data to evaluate a hypothesis (or prediction), including: rejecting or failing to reject the null hypothesis; supporting or refuting the alternative hypothesis.</i>

Develop and justify scientific arguments using evidence	
6A	<i>Make a scientific claim.</i>
6B	<i>Support a claim with evidence from biological principles, concepts, processes and/or data.</i>
6C	<i>Provide reasoning to justify a claim by connecting evidence to biological theories.</i>
6D	<i>Explain the relationship between experimental results and larger biological concepts, processes or theories.</i>
6E	<i>Predict the causes or effects of a change in or disruption to, one or more components in a biological system based on: biological concepts or processes; a visual representation of a biological concept, process or model; data.</i>

Course Sequence and Correlation to Textbook

Unit	Unit Name	Topics	Ch	Chapter Name
0/1	Nature of Science and Biochemistry	Experimental Design and Animal Behavior	1	Introduction/nature of science
			39.3-6	Animal Behavior
		1.1 Structure of Water & Hydrogen Bonding	2.5	Chemistry of Life
		1.2 Elements of Life	2.1-4	
		1.3 Intro to Biological Molecules	3	Carbon & Molecular Diversity of Life
		1.4 Properties of Biological Molecules		
		1.5 Structure & Function of Biological Molecules		
1.6 Nucleic Acids				
2	Cell Structure and Function	2.1 Cell Structure: Subcellular Components	4	A tour of the cell
		2.2 Cell Structure & Function		
		2.3 Cell Size		
		2.4 Plasma Membranes	5.1	Cell Membranes
		2.5 Membrane Permeability	5.2	Selective Permeability
		2.6 Membrane Transport	5.3-5	Passive Transport, Active Transport, Bulk Transport
		2.7 Facilitated Diffusion	5.3	Passive Transport
		2.8 Tonicity and Osmoregulation	5.3	Passive Transport
			32.4	Osmoregulation & Excretion
		2.9 Transport Mechanisms	5.3-5	Passive Transport, Active Transport, Bulk Transport
			37	Neurons, Synapses & Signaling
		2.10 Cell Compartmentalization	39.1-2	Muscle Contraction
			4.2-5	Eukaryotic Internal Membranes, Nucleus & ribosomes, endomembrane system, Mitochondria & Chloroplasts
2.11 Origins of Cell Compartmentalization	24.1	Early Earth Conditions		
	25.1	Endosymbiosis		
3	Energetics	3.1 Enzyme Structure	3.5	Protein Structure and Function
		3.2 Enzyme Catalysis	6	Metabolism Introduction
		3.3 Environmental Impacts on Enzyme Function		
		3.4 Cellular Energy	6	Metabolism Introduction
			24.2	Prokaryote Adaptations
			25.2	Animal Form & Function
		3.6 Cellular Respiration	7	Cellular Respiration & Fermentation
		3.5 Photosynthesis	8	Photosynthesis
			28.1	Plant Structure Organization
			28.3	Tissue Organization of Leaves Only
29	Resource Acquisition, Nutrition and Transport in Vascular Plants			
3.6 Fitness	all			
4	Cell Communication and Cell Cycle	4.1 Cell Communication	5.6	Cell Signaling
			31	Plant Responses
		4.2 Introduction to Signal Transduction	5.6	Cell Signaling
			32.2	Endocrine Signals Trigger Homeostatic Mechanisms In Target Tissue
		4.3 Signal Transduction	5.6	Cell Signaling
			35	Immune system
		4.4 Changes in Signal Transduction	37.4	Neurons Communicate with other cells at synapses
			32.1-2	Endocrine signals and Feedback Control
		4.5 Feedback	9	Cell Cycle
		4.6 Cell Cycle	9	Cell Cycle
		4.7 Regulation of the Cell Cycle	16.3	Cancer
13.1	DNA is the Genetic Material			
6.1A DNA Structure	13.2-3	DNA Replication and Chromosome Structure		
6.2 Replication				
5	Heredity	5.1 Meiosis	10	Meiosis & Sexual Life Cycles
		5.2 Meiosis & Genetic Diversity	10	Meiosis & Sexual Life Cycles
		5.3 Mendelian Genetics	11.1-2	Laws of Inheritance & Probability

		5.4 Non-Mendelian Genetics	11.3-4	Complex Inheritance & Human Traits
		5.5 Environmental Effects on Phenotype	11.3	Complex Inheritance
		5.6 Chromosomal Inheritance	12	Chromosomal Basis of Inheritance
6	Gene Expression & Regulation	6.1 DNA & RNA Structure	14	Gene Expression: From Gene to Protein
		6.3 Transcription & RNA Processing		
		6.4 Translation		
		6.5 Regulation of Gene Expression	15	Regulation of Gene Expression
		6.6 Gene Expression and Cell Specialization	16.1	Differential Gene Expression
		6.7 Mutations	28.2	Meristematic Growth in Plants
			14.5	Mutations and Protein Structure
		6.8 Biotechnology	13.4	Genetic Engineering
			16.2	Cloning
17	Viruses			
18	Genomes & Evolution			
7	Evolution	7.1 Intro to Natural Selection	19	Descent with Modification
		7.12 Variations in Populations		
		7.6 Evidence of Evolution		
		7.2 Natural Selection		
		7.3 Artificial Selection		
		7.4 Population Genetics	21	Population Genetics
		7.5 Hardy-Weinberg Equilibrium	22	Speciation
		7.10 Speciation		
		7.11 Extinction		
		7.13 Origin of Life on Earth	23	Patterns of Evolution
		7.7 Common Ancestry	20	Phylogenetics
7.8 Continuing Evolution				
7.9 Phylogeny				
8	Ecology	8.1 Responses to the Environment	42	Ecosystems
		8.2 Energy Flow through Ecosystems		
		8.3 Population Ecology	40	Population Ecology & Distribution of Organisms
		8.4 Effect of population Density		
		8.5 Community Ecology		
		8.6 Biodiversity	43	Global Ecology & Conservation Biology
		8.7 Disruptions to Ecosystems		

GRADING POLICY AND ASSIGNMENTS

9-weeks grade calculation:

- Exams, Labs, & Projects 70%
- Quizzes & Minor Activities 20%
- Independent Learning 10%

- All students will take the fall semester exam (*i.e. there will be no exemptions*). By taking the Semester Exam in the fall, students have an opportunity to review a good deal of material that will be on the AP exam.
- Since students will be taking the AP Exam in the spring there will be no spring semester exam (*i.e. you are exempt*) provided the student registers, prepares for & takes the AP Exam on May 14.

Where to find your assignments:

- Most of your assignments will be given to you in an electronic format. You will find these in Schoology.
- You will be keeping a digital interactive notebook to show evidence of learning.
- It is important that you get used to having much of your work online. When you go to college, many classes you take will require you to download work & submit much of your work online.
- Your textbook is online and you will have the opportunity to do weekly practice in Mastering Biology.

General Guidelines for Assignments:

- Assignments must be turned in on time (i.e. **beginning** of class on due date for paper assignments; **beginning** of school day for digital assignments).
- You should only turn in **COMPLETE** assignments. Please **do not** turn in partially completed work.
- You are expected to have your assignment **ready to turn in when you enter the classroom**. This means that the work has been organized in the correct order, stapled together & easily found in your backpack. The beginning of class is not the time to organize yourself.
- Since you will know the due dates in advance, you are expected to turn in your work the **day you return from an unexpected absence**.
- If you have a **planned absence** (i.e. school trip, college visit etc.) you are expected to turn in any assignments due **before you leave** on your trip. If you have extenuating circumstances you must communicate that with me **before** you leave on the trip.
- If you miss class on a lab day it is **your responsibility** to get the data from your group on that day. You are still required to complete the pre-lab, complete the data analysis and turn the finished product in on time.
- I reserve the right to decline to accept any late assignment.
- All work for a unit must be completed **before** the unit exam.
- It is okay if you work in study groups, but **ALL ANSWERS & ALL NOTES MUST BE YOUR OWN!**
- In general, labs and projects will **not** be accepted late.
- Independent learning will be checked in **digital notebook** frequently but randomly throughout the week. You will accumulate points for these activities for the grading period if they are done on time and show appropriate effort and reflect learning. While these activities might represent a small portion of your overall average they are **the most important part** of your learning. You have the chance to use these learning opportunities such that you will be able to do well on quizzes, labs, projects and tests. Please trust me and trust the process—you cannot skip any of this work and expect to earn an A or B in this class. We will be using class time to clear up misconceptions, model difficult processes and apply your learning. If you come to class unprepared, you will be frustrated with the process because you will not understand the concepts well enough to engage with the material. Independent learning activities will include homework assignments from mastering, cornell/sketch notes from chapter assignments, cornell/sketch notes from assigned videos and assignments from AP Classroom.
- Homework in **Mastering Biology** is assigned weekly. These must be completed on time and cannot be made up. If the score you earn is below 70 you will automatically be assigned an adaptive follow-up assignment that will be due 2 days after the original assignment. The adaptive follow up is **required**.

Quizzes

- Some quizzes are announced ahead of time (on your calendar) & will cover material you should have read, work we have done in class or something that we worked on in lab.
- Some quizzes will **not** be announced ahead of time & may be used to assess whether you have mastered important concepts that we have been working on in class. Consequently, it is important to try to manage your time & not get behind. It is also helpful to frequently review your prior work!

- Quizzes may be short answer, multiple choice or a free response question.
- If you are absent & miss a quiz, expect to take it on the day you return to class unless you have made other arrangements with me ahead of time. If you are absent on a quiz day, please expect a quiz that is in a different format than the one given while you were out.

Unit Exams:

- It is important that you keep up with your assignments & work on studying a little bit each day. There is too much information for you to try to “cram” all of your studying into a few hours before the exam. If you try to do the “cramming” method, you will hurt yourself in the long run because you will be unable to remember the material long term (i.e. for Unit Exams or the AP exam in May). You will be more likely to retain information if you **review & study your notes & textbook a little every day!**
- Exams are composed of questions that mirror what you will see on the AP exam. Many questions will present you with data &/or experiments that you have not seen before & you will be expected to **apply** the information you have learned in class. In other words, simply memorizing information from the textbook or notes will not be the most productive study method! You must **understand** the material in order to apply the concepts & or evaluate new material.
- Expect each exam to be **comprehensive** (i.e. contain material previously learned in class). Most of the exam will consist of material for that particular unit but will often contain questions from previous units.
- Exams will sometimes take two periods & **time will be limited** just as it is on the AP exam.
- Exam questions will be based on class notes, assignments, labs & the textbook.
- **All exams will be analyzed upon completion.** Directions for the analysis will be given to you after your first unit exam.
- Exam analyses are usually due one week after tests are scored and will generally be a separate grade from the exam itself.
- Analysis of errors on your exam are an important learning tool & will help you reflect on your performance & help you decide what concepts need further review.
- If you are absent on the day of an exam, you should **expect to take the test on the day you return** to class. If you have extenuating circumstances you are expected to make arrangements with me ahead of time.
- If you have questions or do not understand something please ask 😊

Student Disability Services

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA), and subsequent legislation.

The Office of Student Affairs is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability and it is the student’s responsibility to initiate such a request by contacting:

[Ms. Dallas A. Swafford](#)

Director of Student Disability Services

- 325-942-2047
- dallas.swafford@angelo.edu
- [Houston Harte University Center](#)

Title IX

Angelo State University is committed to the safety and security of all students. If you or someone you know experience sexual harassment, sexual assault, domestic or dating violence, stalking, or discrimination, you may contact ASU’s Title IX Coordinator:

[Michelle Nicole Boone, J.D.](#)

Director of Title IX Compliance

- Michelle.boone@angelo.edu
- 325-486-6357
- [Mayer Administration Building](#) 204

Student Absence for Observance of Religious Holy Days

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 Student Absence for [Observance of Religious Holy Day](#) for more information.

Incomplete Grade Policy

It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would keep you from completing course work. Documentation may be required. See ASU Operating Policy 10.11 [Grading Procedures](#) for more information.

Student Conduct Policies

Academic Integrity

Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU. [Academic Integrity](#)

Plagiarism

- Plagiarism is a serious topic covered in ASU's [Academic Integrity policy](#) in the Student Handbook.
- Plagiarism is the action or practice of taking someone else's work, idea, etc., and passing it off as one's own. Plagiarism is literary theft.
- In your discussions and/or your papers, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. It is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.
- Papers are subject to be evaluated for originality via Turnitin. Resources to help you understand this policy better are available at the [ASU Writing Center](#).

Copyright Policy

Students officially enrolled in this course should make only one printed copy of the given articles and/or chapters. You are expressly prohibited from distributing or reproducing any portion of course readings in printed or electronic form without written permission from the copyright holders or publishers.

General Policies Related to This Course

All students are required to follow the policies and procedures presented in these documents:

- [Angelo State University Student Handbook](#)
- [Angelo State University Catalog](#)