

**Central High School  
DC—Angelo State University  
BIO 1106—Principles of Biology II—Fall 2021**

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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*. 1<sup>st</sup> 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	<b>Concept Explanation: Explain biological concepts, processes and models presented in written format</b>	
	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	<b>Visual Representations : Analyze visual representations of biological concepts and processes</b>	
	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	<b>Determine Scientific Questions and methods</b>	
	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	<b>Representing &amp; Describing Data</b>	
	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	<b>Perform statistical tests and mathematical calculations to analyze and interpret data</b>	
	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>

<b>Develop and justify scientific arguments using evidence</b>	
<b>6</b>	<b>6A</b> <i>Make a scientific claim.</i>
	<b>6B</b> <i>Support a claim with evidence from biological principles, concepts, processes and/or data.</i>
	<b>6C</b> <i>Provide reasoning to justify a claim by connecting evidence to biological theories.</i>
	<b>6D</b> <i>Explain the relationship between experimental results and larger biological concepts, processes or theories.</i>
	<b>6E</b> <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	Ch	Chapter Name
1	Nature of Science and Biochemistry	1	Introduction/nature of science
		39.3-6	Animal Behavior
		2	Chemistry of Life
		3	Carbon
2	Cell Structure and Function	4	A tour of the cell
		5.1-5.5	Membrane Structure & Function
		24	Early Life and Diversification of Prokaryotes
		25	Origins of Eukaryotes
		32.3-4	Osmoregulation & Excretion
		37	Neurons, Synapses & Signaling
3	Energetics	39.1-2	Muscle Contraction
		6	Intro to Metabolism
		7	Cellular Respiration
		32.1	Feedback & Thermoregulation
		8	Photosynthesis
		28	Plant Structure and Function
		29	Resource Transport
4	Cell Communication and Cell Cycle	42	Ecosystems
		5.6	Cell Signaling
		32.2	Endocrine
		35	Immune System
		9	Cell Cycle
		13.1-13.3	The Molecular Basis of Inheritance
5	Heredity	16.3	Cancer
		10	Meiosis & Sexual Life Cycles
		11	Mendelian Genetics
6	Gene Expression & Regulation	12	Chromosomal Basis of Inheritance
		14	Protein Synthesis
		15	Regulation of Gene Expression
		13.4	Biotechnology
		16.1-2; 36.4	Development
		17	Viruses
7	Evolution	18	Genomes and their evolution
		19	Descent with Modification
		21	Population Genetics
		22	Speciation
		23	Patterns of Evolution
8	Ecology	20	Phylogenetics
		40	Population Ecology & Distribution of Organisms
		41	Species Interactions
		43	Global Ecology & Conservation Biology

## GRADING POLICY AND ASSIGNMENTS

### Each student's six-week's grade will be based on the following:

Exams, Labs, Projects and Abstracts	70%
Classwork, Reading Quizzes and Homework	30%

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 and takes the AP Exam on May 9.

### General Guidelines for Assignments:

- These assignments must be turned in on time (*i.e.* at the **beginning** of your class on the due date).
- 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.
- Assignments are graded and returned very quickly. Once I return graded work to students, only ½ of the points may be earned on the assignment.
- I reserve the right to decline accepting 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 AND ALL NOTES MUST BE YOUR OWN!**
- You will be given a calendar at least one six weeks ahead of time and will not be given verbal reminders of when work is due.

### Textbook Reading and Note-taking

- You will be expected to read and take notes on each chapter. These notes will be turned in for a grade and oftentimes may be used on quizzes.
- I will provide you information on how to effectively take notes from a textbook with a method called Cornell Notes and SQWR. Please use the assigned method when preparing your notes.

### Homework Assignments

- Many homework assignments will be done through **Mastering Biology**. You will be given instructions on how to access MB during the first week of school.
- Assignments must be **completed on time** and cannot be made up.
- These assignments are meant to help you practice skills we will be working on in class. Most assignments will allow you to access hints to help you resolve misconceptions so that you learn the correct information.
- There will be many times that you will be assigned homework over concepts we haven't covered in class. You should always read the chapter in the book and complete the Cornell notes or SQWR **BEFORE** working on the homework assignment. Class time is meant to help you think critically about the material you are learning and to clear up misconceptions. You will be better able to learn if you take the time to prepare yourself before you come to class by thoroughly reading, taking notes and completing the homework.
- If you fail the assignment, the system will automatically assign to you an **adaptive assignment**. The adaptive assignment is due 2 days after the original assignment. You are **required** to complete the adaptive assignment and it would be a really good idea to do it as soon as possible so that you can learn where you are having problems.
- Some of the homework sets are long but they are not timed. It would be wise to work on the homework a little bit each day so that you may finish it without having to rush through the material.

### Video Notes

- You will usually have a set of short instructional videos to watch each week. You are expected to watch the videos and **take notes** in your spiral. Video notes will be checked each Friday at the **beginning** of class.
- These videos are meant to supplement classroom instruction and will allow us to explore topics in class more deeply. The videos are also a very good tool for test review for many students.

## Paper Summaries

- Current scientific literature relevant to the topics being discussed are assigned to be read and summarized for each unit.
- Papers that are available to be read are posted on my website in each unit.
- Specific instructions for completing abstracts will be presented to you.
- You are **required to prepare two summaries** for each unit and will be given the opportunity to prepare 2-3 extra summaries for extra credit.
- You are expected to summarize the paper in your own words! Do not take several sentences from the paper and piece them together!
- Abstracts will be graded based on two criteria:
  - (1) Completing the assignment in the correct format
  - (2) Thoroughness and ability to accurately summarize information in the paper
- These assignments **must be turned in on time** (*i.e. by the assigned time to www.turnitin.com*).
- Since these are considered major assignments, **you may not turn them in late.**

## Lab Assignments

- Directions for formal lab write-ups will be given to you before the first lab write up. You will not prepare a formal report for every lab.
- These assignments **must be turned in on time** (*i.e. at the beginning of your class on the due date*). These are considered major assignments and cannot be turned in late.
- **Pre-labs are not accepted late** for any reason and will result in your inability to participate in the lab!!
- Some lab activities cannot be made up because the materials will not keep very long, but you are still responsible for completing the lab questions or write up. If you are absent on a lab day, you are expected to get lab data from someone in class in order to complete the lab and turn it in on the due date.

## Quizzes

- Most quizzes are announced ahead of time (on your calendar) and 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 and 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 and not get behind.
- Quizzes may be short answer, multiple choice or a free response question from a previous AP Exam.
- Many quizzes will be completed on **Mastering Biology**. These will be timed and cannot be turned in late or made up.
- If you are absent and 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.

## Unit Exams:

- It is important that you keep up with your assignments and 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 and study your notes and 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 and/or experiments that you have not seen before and you will be expected to apply the information you have learned in class.
- 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 and time will be limited just as it is on the AP exam.
- Exam questions will be based on class notes, assignments, labs and the textbook.
- **All exams will be corrected** when they are returned. Directions for correcting will be given to you after your first unit exam.
- Corrections are usually due one week after tests are returned.
- Exam corrections will be a SEPARATE GRADE and you will keep your original exam grade!
- Corrections are an important learning tool and will help you analyze your performance and 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.

### **Using Turnitin.com**

- We will use the website: [www.turnitin.com](http://www.turnitin.com) for many written class assignments including labs, projects and frq's. This is anti-plagiarism software purchased by SAISD. You will probably be using it in more than one of your classes this year. When you submit your work to this website, the program compares your work to everyone else in the class and to several thousand website entries for similarities. The percent similarity and location of similarities are reported to the instructor. I am choosing to use the software to encourage everyone to think for themselves!
- You should almost always have a 0% similarity. You should never have anything over a 10% similarity (this would account for quotes etc...)
- You will be given specific directions when work should be turned into this service. Plan ahead for computer problems!! You will **not** be able to turn in work late when we use this program! You will usually be asked to turn in a hard copy of your work as well as uploading a digital copy to turnitin.com

## ***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.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student's responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at [ADA@angelo.edu](mailto:ADA@angelo.edu). For more information about the application process and requirements, visit the Student Disability Services website at [www.angelo.edu/ADA](http://www.angelo.edu/ADA). The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

**Dallas Swafford**

**Director of Student Disability Services**

Office of Student Affairs

325-942-2047

[dallas.swafford@angelo.edu](mailto:dallas.swafford@angelo.edu)

Houston Harte University Center, Room 112

## ***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 Boone**

**Director of Title IX Compliance**

325-486-6357

[michelle.boone@angelo.edu](mailto:michelle.boone@angelo.edu)

Houston Harte University Center, 112C

## ***Academic Honesty (Code of Student Conduct)***

**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.

The College of Science and Engineering adheres to the Statement of [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.

***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 absence for observance of a religious holy day (ASU OP 10.19)***

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence