

# Sundown High School

## Dual Credit Biology 1408 & 1409

### *Course Overview*

In Dual Credit Biology (DC BIO) students conduct laboratory and field investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem solving. Students study a variety of topics that include: structures and functions of cells and viruses; growth and development of organisms; cells, tissues, and organs; nucleic acids and genetics; biological evolution; taxonomy; metabolism and energy transfers in living organisms; living systems; homeostasis; and ecosystems and the environment.

It is my hope that in my DC BIO class, students will develop a better grasp of biology and have a strong foundation in introductory college-level biology. I have structured the course around the four big ideas, enduring understandings, and science practices to encourage students with their understanding and appreciation for the study of life.

I believe that in order to become better humans, we must ask questions and seek answers to questions we did not even know existed. We advance ourselves through inquiry and investigation and this course will be no different.

### *Textbook Resource*

- Fowler, Roush, and Wise. *Concepts of Biology*. OpenStax and Rice University, 2020
- Campbell, Neil and Jane Reece. *BIOLOGY - 6th Edition*. New York, NY: Benjamin Cummings, 2002

### *Teaching Strategies*

As stated above, this DC BIO course is structured around the four big ideas and enduring understandings identified in the Curriculum Framework to engage students. Along with in-class instruction, the students will conduct scientific investigations that are student-led and encourage their growth in the field.

At the end of this syllabus, you will find listed the outline of the DC BIO Curriculum Framework. Please use this as a reference for this course.

### *Social and Ethical Connections*

Students will engage in discussions and activities that will allow them to connect their classroom knowledge to socially important issues. These issues will be discussed in a class setting, electronically and through research and reports. As new and more relevant topics appear, the following list is tentative.

- Cloning Research
- COVID and Viral Research

- Global Climate Changes
- Antibiotic Resistance
- CRISPR CAS9 Research

## *Laboratory Investigations*

Science is all about inquiry, and this DC BIO course will be no different. Along with teacher-led, guided lessons, at least 25 percent of instructional time will be dedicated to laboratory investigations which will emphasize the major points within the DC BIO curriculum framework. These activities will be assessed through short homework summaries or through the Brain Catalyst (bell ringers) assignments.

As with the majority of this course, the open, student led lab investigations will help spur scientific thinking and readiness for a college-level biology course. We will perform a minimum of ten inquiry based investigations from the laboratory text or other appropriate DC BIO based investigation. All levels of inquiry will be used and all seven science practice skills will be used by students on a regular basis in formal labs as well as activities outside of the lab experience. The investigations generally follow the format of a guided section, followed by a student designed, open section which allows the students to expand on their understanding of the topic within the curriculum framework. Assessments of these investigations include, but are not limited to: short pre-lab questions, embedded activity questions, lab notebook documentation, and written lab reports.

## *Technology Use*

We will use a great deal of technology in and out of the classroom. While technology is an amazing tool in science, it can also be an inconvenience or could lead to trouble if used incorrectly. When using any form of technology for this course, we will observe the district's responsible use policy. When interacting with the teacher, other students, or community members outside of the district, we will conduct ourselves in a manner respectful to all parties.

Students are expected to become proficient using G-Suite for education apps including Doc, Sheets, Slides, Sites and Classroom. We will be using these tools to communicate lab findings, analyze sample data and research and present concepts that fit within the framework.

## *Grading*

60% assessments (tests, quizzes, and projects), 40% performance (daily grades, homework, and labs). Late work will be accepted following the Sundown Student Policy.

## *Tests and Retests*

We will use a weighted scoring system, where assessments that cover more material are weighted higher. Thus, possible point values for assignments

may differ. For example, an in-class worksheet may be weighed 1x, while a unit exam may be given a weight of 2x. Thus, the unit exam is worth twice as much as an in-class worksheet in the gradebook.

## *Tests / Projects / Quizzes*

As indicated in the course outline below, we will cover a number of units, each broken into specific Game Levels. Within a Level may be a quiz, and following each Level will be a Level exam. Each Level exam will be scheduled at least two class periods after the completion of that unit. The exams may contain both new material and material from previous Levels.

Tests can be corrected and will be recorded as a second assessment grade, but will only carry a weight of 1x. Corrections will be due one week after the exam is returned. EVERYONE will do test corrections, regardless of the grade achieved. Exam grades of less than 70% will do corrections in assigned Tutorial Periods. In the event that a student achieves a grade lower than a 50%, a parent/guardian's signature is required. If the class as a whole achieves a class average of less than 60%, a re-test will be given at a later date.

Team quizzes will be taken once every two weeks and will cover material from those two weeks. The quizzes will be taken using the Quizziz.com software and are handled differently than exams. Quizziz will be taken by each student, and each student will be given an individual grade, however, team points will be earned and used within the game construct.

## *Classwork / Homework*

Unfortunately, homework is a necessary evil that everyone must endure, and I think it is an important part of learning. I can understand that each student has other classes, however it is more than possible that you will have a small homework assignment each time we meet. The assignments will not be overwhelming and, if done while the day's lessons are still fresh in your mind (i.e. the night it was assigned), should require less than an hour to complete. Typically, larger homework assignments will not be due the following class period.

If you need help with any homework, I strongly encourage you to form a study group or work with a partner. Before you ask for help, make an attempt to complete the work on your own, but remember the following: 1) when necessary, all work must be shown and 2) directly copying someone else's work is considered plagiarism and will be graded as such. If you do copy work from another student, you are only hurting yourself because you will not have the

same opportunity during quizzes and exams in which you will be required to know the same type of material as found on the homework.

Late work will follow the Sundown Student Handbook. Late work will receive a 30% reduction in final grade. After two class periods, there will be a 50% reduction in final grade. The assignment will not be accepted after three class periods have passed.

## *Daily Grades*

Daily grades may include, but is not limited to participation in classroom discussion, note taking, worksheets and labs. Brain Catalyst assignments are daily mini-quizzes given at the beginning of the class period. These Brain Catalysts will consist of a few rigorous questions based on the previous class's material or an assignment given the day before.

## *Laboratory Investigations*

Midway through the course, we will be conducting investigations regarding a multiple homicide. Each investigation will tie into the current unit. A digital portfolio will be maintained by each student culminating in enough evidence to make an indictment regarding the homicides.

## *Gamification*

Students will be grouped into working teams. Teams are intended to teach students how to work together in groups on assignments, labs, and how to study for exams. Students are encouraged to choose their groups wisely as they will be partners for an entire semester, unless a change needs to be made as determined by the teacher.

## *Student and Guardian Agreement*

I \_\_\_\_\_ have read, understand, and accept the information in this syllabus. I understand that this syllabus will not be changed during the 2020-2021 school year and my instructor will abide by the above grading policy.

\_\_\_\_\_ (student)

\_\_\_\_\_ (parent / guardian)

# Learning Outcomes

## *BIOL 1308 - Biology for Non-Science Majors I (lecture)*

1. Distinguish between prokaryotic, eukaryotic, plant and animal cells, and identify major cell structures;
2. Identify stages of the cell cycle, mitosis (plant and animal), and meiosis;
3. Interpret results from cell physiology experiments involving movement across membranes, enzymes, photosynthesis, and cellular respiration;
4. Apply genetic principles to predict the outcome of genetic crosses and statistically analyze results.
5. Describe karyotyping, pedigrees, and biotechnology and provide an example of each.
6. Identify parts of a DNA molecule, and describe replication, transcription, and translation.
7. Analyze evidence for evolution and natural selection.

## *BIOL 1108 - Biology for Non-Science Majors I (lab)*

1. Apply scientific reasoning to investigate questions, and utilize scientific tools such as microscopes and laboratory equipment to collect and analyze data.
2. Use critical thinking and scientific problem-solving to make informed decisions in the laboratory.
3. Communicate effectively the results of scientific investigations.

## *BIOL 1309 - Biology for Non-Science Majors II (lecture)*

1. Describe modern evolutionary synthesis, natural selection, population genetics, micro and macroevolution, and speciation.
2. Describe phylogenetic relationships and classification schemes.
3. Identify the major phyla of life with an emphasis on plants and animals, including the basis for classification, structural and physiological adaptations, evolutionary history, and ecological significance.
4. Describe basic animal physiology and homeostasis is maintained by organ systems.
5. Compare different sexual and asexual life cycles noting their adaptive advantages.
6. Illustrate the relationship between major geologic change, extinctions, and evolutionary trends.

## *BIOL 1109 - Biology for Non-Science Majors II (lab)*

1. Apply scientific reasoning to investigate questions and utilize scientific tools such as microscopes and laboratory equipment to collect and analyze data.
2. Use critical thinking and scientific problem-solving to make informed decisions in the laboratory.
3. Communicate effectively the results of scientific investigations.

Each syllabus should include the following Diversity Statement, Disabilities Statement, Non-Discrimination Statement and Title IX Pregnancy Accommodations Statement appropriate to the location of the course.

**Student Code of Conduct Policy:** Any successful learning experience requires mutual respect on the part of the student and the instructor. Neither instructor nor student should be subject to others' behavior that is rude, disruptive, intimidating, aggressive, or demeaning. Student conduct that disrupts the learning process or is deemed disrespectful or threatening shall not be tolerated and may lead to disciplinary action and/or removal from class.

**Diversity Statement:** In this class, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world and about ourselves. By promoting diversity and intellectual exchange, we will not only mirror society as it is, but also model society as it should and can be.

**Disability Statement:** Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Disability Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Disability Services Office. For more information, call or visit the Disability Services Office at Levelland (Student Health & Wellness Office) 806-716-2577, Reese Center (Building 8) 806-716-4675, or Plainview Center (Main Office) 806-716-4302 or 806-296-9611.

**Nondiscrimination Policy:** South Plains College does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Vice President for Student Affairs, South Plains College, 1401 College Avenue, Box 5, Levelland, TX 79336. Phone number 806-716-2360.

**Title IX Pregnancy Accommodations Statement:** If you are pregnant, or have given birth within six months, Under Title IX you have a right to reasonable accommodations to help continue your education. To activate accommodations you must submit a Title IX pregnancy accommodations request, along with specific medical documentation, to the Director of Health and Wellness. Once approved, notification will be sent to the student and instructors. It is the student's responsibility to work with the instructor to arrange accommodations. Contact the Director of Health and Wellness at 806-716-2362 or email [cgilster@southplainscollege.edu](mailto:cgilster@southplainscollege.edu) for assistance.

## *Important Exam Dates\**

Fall Semester 2020		Spring Semester 2021	
SPC First Day	August 24th	SPC First Day	January 19th
Exam One	Fri August 31st	Exam Seven	Wed Feb 3rd
Exam Two	Thurs Sept 17th	Exam Eight	Tues Mar 2nd
Exam Three	Wed Oct 7th	Spring Break	Mar 15-19
Exam Four	Tues Oct 20th	Exam Nine	Wed Mar 31st
Exam Five	Thurs Nov 11th	Exam Ten	Mon May 3rd
Exam Six	December 8th	SPC Grades Due	May 6th
SPC Grades Due	December 10th		

\*Students will be notified immediately of any changes to exam dates

## *Tentative Unit Outline*

Listed below are the tentative unit outlines, which may need to be adjusted due to time. Described in the unit outlines are brief summaries and how each unit engages in the curriculum framework. Also listed are any major DC BIO investigation(s) and how it/they fit into the curriculum framework. Keep in mind however, the investigations listed are not the only activities the student will conduct in each unit.

### **Fall Semester - 1408**

<b>Level One - Chemistry of Life</b>	
Outline	<ul style="list-style-type: none"><li>• Elements of life</li><li>• Macromolecules</li><li>• Enzyme activity</li></ul>
Texbook	Chapter 2 - Chemistry of Life
Class Periods	4
Exam Date	Friday, August 31st
Lab	Enzyme Activity

<b>Level Two - Cell Structure and Function</b>	
Outline	<ul style="list-style-type: none"><li>• Cell structures</li><li>• Cell size</li><li>• The Plasma membranes</li><li>• Membrane transport</li></ul>
Texbook	Chapter 3 - Cell Structure and Function
Class Periods	5.5
Exam Date	Thursday, September 17th
Lab	Osmosis and Diffusion



### Level Three - Cellular Energetics

Outline	<ul style="list-style-type: none"><li>● Cellular energy</li><li>● Photosynthesis</li><li>● Cellular respiration</li><li>● Fitness</li></ul>
Texbook	Chapter 4 - Cell Structure & Function Chapter 5 - Photosynthesis
Class Periods	6.5
Exam Date	Wednesday, October 7th
Lab	Cellular Respiration
Lab	Plant Pigments & Photosynthesis

### Level Four - Cell Communication and Cell Cycle

Outline	<ul style="list-style-type: none"><li>● Cell communications</li><li>● Feedback mechanisms</li><li>● Cell Cycle</li></ul>
Texbook	Chapter 6 - Reproduction at the Cellular Level
Class Periods	5
Exam Date	Tuesday, October 20th
Lab	Mitosis and Meiosis (Part 1)

### Level Five - Heredity

Outline	<ul style="list-style-type: none"><li>● Meiosis</li><li>● Mendelian genetics</li><li>● Non-Mendelian genetics</li></ul>
Texbook	Chapter 7 - Cellular Basis of Inheritance Chapter 8 - Patterns of Inheritance
Class Periods	5
Exam Date	Thursday, November 5th
Lab	Mitosis and Meiosis (Part 2)
Lab	Comparing DNA with BLAST

## Level Six - Gene Expression and Regulation

Outline	<ul style="list-style-type: none"><li>• DNA and RNA</li><li>• Transcription / Translation</li><li>• Gene expression and regulation</li><li>• Biotechnology</li></ul>
Textbook	Chapter 9 - Molecular Biology Chapter 10 - Biotechnology
Class Periods	9
Exam Date	Tuesday, December 8th
Lab	Restriction Enzymes and Bacterial Transformation

## Spring Semester - 1409

### Level Seven - Natural Selection

Outline	<ul style="list-style-type: none"><li>• Natural selection</li><li>• Population genetics</li><li>• Evidence of evolution</li><li>• Speciation</li><li>• Origin of life on Earth</li></ul>
Textbook	Chapter 11 - Evolution and Its Processes Chapter 12 - Diversity of Life
Class Periods	10
Exam Date	Wednesday, February 3rd
Lab	Artificial Selection
Lab	Mathematical Modeling: Hardy Weinberg

## Level Eight - Diversity of Life

Outline	<ul style="list-style-type: none"><li>● Prokaryotic diversity</li><li>● Eukaryotic diversity</li><li>● Protist</li><li>● Fungi</li><li>● Plants</li><li>● Animals</li></ul>
Textbook	Chapter 13 - Diversity of Microbes, Fungi, and Protists Chapter 14 - Diversity of Plants Chapter 15 - Diversity of Animals
Class Periods	9
Exam Date	Tuesday, March 2nd
Lab	Leaf structure and Transportation
Lab	Animal Dissection Survey

## Level Nine - Mammalian Anatomy

Outline	<ul style="list-style-type: none"><li>● Organ Systems</li><li>● Immunology</li><li>● Reproduction</li></ul>
Textbook	Chapter 16 - The Body's Systems Chapter 17 - The Immune System and Disease Chapter 18 - Animal Reproduction and Development
Class Periods	7
Exam Date	Wednesday, March 31st
Lab	Exercise's effect on the circulatory and respiratory systems

## Level Ten - Ecology

Outline	<ul style="list-style-type: none"><li>● Energy flow through ecosystems</li><li>● Population ecology</li><li>● Biodiversity</li></ul>
Textbook	Chapter 19 - Population and Community Ecology Chapter 20 - Ecosystems and the Biosphere Chapter 21 - Conservation and Biodiversity
Class Periods	10
Exam Date	Monday, May 3rd
Lab	Energy Dynamics (Food Webs)
Lab	Animal Behavior