Advanced Placement Biology Course Guidelines

"Gie me ae spark O'Nature's fire, That's a'the learning I desire." – Robert Burns

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The Course :
The Advanced Placement program offers a rigorous academic challenge and a unique opportunity to explore the limits of critical thought, knowledge and creativity. This will hopefully be a rewarding experience for all who participate. This course is designed to be the equivalent of a college introductory biology course usually taken by biology majors during their first year. Some AP students, as college freshmen, are permitted to undertake upper-level courses in biology or to register for courses for which biology is a prerequisite. Other students may have fulfilled a basic requirement for a laboratory science course and will be able to undertake other courses to pursue their majors.

AP Biology will include the topics regularly covered in a college biology course for majors or in the syllabus from a high-quality college program in introductory biology. The textbook used for AP Biology is used by college biology majors and most of the labs performed are equivalent of those done by college students. The course is designed to be taken by students after the successful completion of a first course in high school biology and one in chemistry. It aims to provide students with the conceptual framework, factual knowledge, and analytical skills necessary to deal critically with the rapidly changing science of biology.

The two main goals of AP Biology are to help students develop a conceptual framework for modern biology and to help students gain an appreciation of science as a process. The ongoing information explosion in biology makes these goals even more challenging. Primary emphasis in an Advanced Placement Biology course will be on developing an understanding of concepts rather than on memorizing terms and technical details. Essential to this conceptual understanding are the following: a grasp of science as a process rather than as an accumulation of facts; personal experience in scientific inquiry; recognition of unifying themes that integrate the major topics of biology; and application of biological knowledge and critical thinking to environmental and social concerns. Students are **expected** to perform at college level on all their work, and you should **expect** that all work, quizzes and tests will be at a college level. Students are must be prepared for each class session by reading the assigned chapter(s), studying their notes and coming to class prepared to ask questions.

The culminating goal is to pass the AP exam with a 3 "qualified" or better achievement in May. Most of the exam is based on course content, but critical thinking skills are required. The exam is scored from 1-5; 5 being "exceptionally well qualified". A significant portion of the exam involves open ended responses, which may involve the demonstration of an understanding of scientific (biology) specific content, conceptual knowledge, experimental design, graphing, data analysis, prediction, etc. We will work on these skills throughout the year.

With that said, just like in college and in the real world, attending class, being on time to class, and meeting deadlines are essential to success in AP Biology. You are in college-level class, and you will be treated as such.

- Additional information about the Advanced Placement Program® can be obtained from www.collegeboard.org
- Excerpts taken from "Advance Placement Course Description - Biology." College Entrance Examination Board and Education Testing Service, 1996.
- Portions modified from the AP Biology Handbook written by Tricia Glidewell for the Marist School.

Class Expectations:
►Come to class prepared - in order to facilitate class discussions and reduce lecture time in favor of labs and knowledge enhancing activities, you must complete all required assignments. AP assignments are not 'busy work'; they are designed to help you learn difficult material.

►Come to class! The work we will be doing during class cannot be replicated at home, labs in particular. You have committed to an advanced class and that requires your presence in the classroom.

►Study at home – the convention for college courses is 3 hours of independent study for each hour of class. In order to have productive class discussion you must review the material at home.

►No whining! This is a college level course. It will be challenging. It will require a significant amount of time outside of class.

►Stay off your phone during class! Do not use your phone as a source of entertainment during class.

►Yes, you have to write in complete sentences. Yes, you have to show your work. Yes, you have to do a lot of Math. Yes, you are expected to show a higher level of understanding on ALL of your assignments. No, you may not write in 'text-speak'

►Cheating is unacceptable in any form. Cheating includes, but is not limited to: copying homework, copying lab analysis answers, plagiarizing written assignments, copying test answers, use of electronics to find test answers. If copying occurs then all people involved will receive a zero on the assignment. You are in class to learn and succeed on the spring exam. Cheating DOES NOT help you learn.

►Most classes will start with a short warm up or a quiz. If you are late to class or in the case of an absence you must come into class promptly to make up the quiz.

►You are responsible for your table and lab station. Keep them clean and organized to make lab breakdown easier at the end of class. Lab groups will not be dismissed until their lab station is cleaned completely.

* All rules and school procedures set forth in the administration be upheld in this class.

Text: Campbell, Neil A. **Biology (AP Edition)** 9th Edition, The Benjamin/Cummings Publishing Company, Inc. Redwood City, California. 2011.

Materials : Students are expected to come to class each day with the following:
Pencils Black ink pens Binder (to organize your learning materials)
Highlighters (at least 3 colors) Non-programmable, 4-function calculator with square-root function Colored pencils or Markers (would be helpful)

Supplemental Materials : AP Biology study books are **highly recommended**. Make sure you get one that is for the new curriculum. Anything published earlier than 2012 will not be helpful in preparation for the new test, which was given for the first time in May of 2013.

Grading : Formal Assessments (Labs, Quests, Min Assessments, Projects, Exams) → 70% Informal Assessments (classwork) → 30%

Participation: Always be prepared for class so you can fully participate. The goal is to promote more discussion and small group analysis of information, more lab time, and less lecture time. For this to work, you must be committed to completing the work required outside of class, and to actively participating during class time.

Labs: The new curriculum includes more emphasis on inquiry based labs.

Homework: Homework should be completed every night. Usually it will consist of reading assignments, viewing review videos (Bozeman biology etc.), taking notes, finish labs, completing study guides, FRQ's, DBQ's, Journal Abstracts etc. Even if an assignment is not given, you are expected to spend time reviewing content each night. AP Biology is a challenging class and can't be just 'picked up' during class time. You need to invest the time outside of class to be successful in class.

Note Taking : You will need a binder for the notes and handouts you will receive. Bring this to class every day. It is wise to take detailed notes during class discussions. Reviewing and rewriting your notes on a regular basis is an excellent way to study. It is your responsibility to review your notes every day!!!

Absences/ Make Up: AP courses are fast paced and cover a significant amount of content each day, particularly on lab and test days. It is extremely important that you attend class every day. If you are ill call a friend or email Mr. G. You are still responsible for the content covered in class on the day of your absence. Students are allowed to make up missing work. Ten percent of the grade will be subtracted for every day the assignment is late with a maximum of 50% credit. If the student has not made up the work within the designated time, the student will receive a zero for the work. In the event that you are absent from school it is **your** responsibility to get the information presented during class as well as any assignments given. Students that are absent from class will be given 5 class days/periods to make up the work after which time the late policy takes effect. Lab Activities and other activities that have a time limit – possible alternate arrangements will be made and/or alternate assignments. If you are absent on the day a lab or assignment is due then you are required to turn it in upon your return to class.

Electronic Devices: Students are discouraged from using their cell phones as calculators or as mp3 players and will **never** be allowed during exams.

Test Structure : Tests are a large part of your grade (similar to a college course) and it is important that you prepare for them. Keeping current with lessons throughout the semester will help with test preparation. Tests in this class will be fewer in number than in a regular class, however, they will be more comprehensive. Each unit will be followed by an exam. There will also be quizzes given during individual units. Tests in this class are patterned after the actual AP exam including many AP exam questions (please see description below). Students are encouraged to focus on understanding important relationships, processes, mechanisms, and potential extensions and applications of concepts. Less important is the memorization of specialized terminology and technical details. For example, understanding how protein structure affects enzyme action is more important than memorizing a list of enzyme names. Questions on AP Biology Exam will test students' abilities to explain, analyze, and interpret biological processes and phenomena more than their ability to recall specific facts.

The AP Exam: Monday, May 8, at 8:00 am. This date has been determined by The College Board, and is non-negotiable. The actual AP exam is 3 hours long and includes both a 90-minute multiple-choice/Grid In section and an 80-minute free-response section that begins with a mandatory 10-minute reading period. The multiple-choice/Grid In section accounts for half of the student's exam grade, and the free-response section accounts for the other half.

Section I: Multiple-Choice Section - Part A consists of 63 multiple-choice questions that represent the knowledge and science practices outlined in the *AP Biology Curriculum Framework* that students should understand and be able to apply. **Part B** includes 6 grid-in questions that require the integration of science and mathematical skills. For the grid-in responses, students will need to calculate the correct answer for each question and enter it in a grid on that section of the answer sheet. Section I tends to examine the student's understanding of representative content and concepts drawn from across the entire course, while Section II tends to encompass broader topics. The number of multiple choice questions taken from each "big idea" reflects the approximate percentage of the course as designated in the course description above.

Section II: Free-Response Section - Students should use the mandatory reading period to read and review the questions and begin planning their responses. This section contains two types of free-response questions (short and long), and the student will have a total of 80 minutes to complete all of the questions. Within Section II, the long free response questions are worth 10 points each. 3 short free responses will be worth 4 points each, while the other three are worth 3 points each. The answers to the free-response questions must be in complete sentences; outlines alone or unlabeled and unexplained diagrams alone are not acceptable.

Review the AP Biology Exam Format

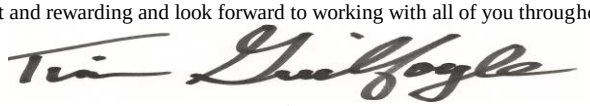
Section I		
Question Type	**Number of Questions**	**Timing**
Part A: Multiple Choice	63	90 minutes
Part B: Grid-In	6	
Section II		
Question Type	**Number of Questions**	**Timing**
Long Free Response	2	80 minutes + 10-minute reading period
Short Free Response	6	

Just because something is DIFFICULT
Doesn't mean you shouldn't TRY
It means you should just try HARDER
-Unknown

Honor System : Any work, unless specified by me, will be on your honor that it is your work. Learn, understand and be able to differentiate the following definitions.
Collaboration - getting together to exchange ideas. **Cheating** - getting together to exchange answers and/or using another person's answers.

"We are what we repeatedly do. Excellence, then, is not an act, but a habit." - Aristotle

I believe that you will find this class to be both difficult and rewarding and look forward to working with all of you throughout the coming year.



Tim Guilfoyle

AP Biology Curriculum Outline:

The following is an overview of the main concepts that we will be covering this year. Each 'Big Idea' has Enduring Understandings (EU) and sub points for each EU. Although the outline does not go into detail on each sub point, it will help you to know what the important understandings are for each section. The chapters are included in parenthesis after each sub point. At the end are the science practices that will be emphasized this year through labs and class activities.

Big Idea 1 – Evolution: The process of evolution drives the diversity and unity of life

EU 1A – Change in the genetic makeup of a population over time is evolution

1. Natural selection is a major mechanism of evolution
2. Natural selections acts on phenotypic variations in populations
3. Evolutionary change is also driven by random processes
4. Biological evolution is supported by scientific evidence from many disciplines, including mathematics

EU 1B – Organisms are linked by lines of descent from common ancestry

1. Organisms share many conserved core processes and features that evolved and are widely distributed among organisms today
2. Phylogenic trees and cladograms are graphical representations of evolutionary history that can be tested

EU 1C – Life continues to evolve within a changing environment

1. Speciation and extinction have occurred through the Earth's history
2. Speciation may occur when two populations become reproductively isolated from each other
3. Populations of organisms continue to evolve

EU 1D – the origin of living systems is explained by natural processes

1. There are several hypotheses about the natural origin of life on Earth, each with supporting scientific evidence
2. Scientific evidence from many different disciplines supports models of the origin of life

Big Idea 2 – Biological systems utilize free energy and molecular building blocks to grow, to reproduce and to maintain dynamic homeostasis

EU 2A – Growth, reproduction, and maintenance of the organization of living systems require free energy and matter

1. All living system require constant input of free energy
2. Organisms capture and store free energy for use in biological processes
3. Organisms must exchange matter with the environment to grow, reproduce, and maintain organization

EU 2B – Growth, reproduction and dynamic homeostasis require that cells create and maintain internal environments that are different from their external environment

1. Cell membranes are selectively permeable due to their structure
2. Growth and dynamic homeostasis are maintained by the constant movement of molecules across membranes
3. Eukaryotic cells maintain internal membranes that partition the cell into specialized regions

EU 2C – organisms use feedback mechanisms to regulate growth and reproduction, and to maintain dynamic homeostasis

1. Organisms use feedback mechanisms to maintain their internal environments and respond to external environmental changes
2. Organisms respond to changes in their external environments

EU 2D – Growth and dynamic homeostasis of a biological system are influenced by changes in the system's environment

1. All biological systems from cells and organisms to populations, communities and ecosystems are affected by complex biotic and abiotic interactions involving exchange of matter and free energy
2. Homeostatic mechanisms reflect both common ancestry and divergence due to adaptation in different environments
3. Biological systems are affected by disruptions to their dynamic homeostasis
4. Plants and animals have a variety of chemical defenses against infections that affect dynamic homeostasis

EU 2E – many biological processes involved in growth, reproduction and dynamic homeostasis include temporal regulation and coordination.

1. Timing and coordination of specific events are necessary for the normal development of an organism, and these events are regulated by a variety of mechanisms
2. Timing and coordination of physiological events are regulated by multiple mechanisms
3. Timing and coordination of behavior are regulated by various mechanisms and are important in natural selection

Big Idea 3 – Living systems store, retrieve, transmit and respond to information essential to life processes

EU 3A – Heritable information provides for continuity of life

1. DNA and in some cases RNA, is the primary source of heritable information
2. In eukaryotes, heritable information is passes to the next generation in processes that include the cell cycle and mitosis or meiosis plus fertilization
3. The chromosomal basis of inheritance provides an understanding of the pattern of passage (transmission) of genes from parent to offspring
4. The inheritance pattern of many traits cannot be explained by simple Mendelian genetics

EU 3B – Expression of genetic information involves cellular and molecular mechanisms

1. Gene regulation results in differential gene expression, leading to cell specialization
2. A variety of intercellular and intracellular signal transmissions mediate gene expression

EU 3C – The processing of genetic information is imperfect and is a source of genetic variation

1. Changes in genotype can result in changes in phenotype
2. Biological systems have multiple processes that increase genetic variation
3. Viral replication results in genetic variation, and viral infection can introduce genetic variation into the hosts

EU 3D – Cells communicate by generating, transmitting, and receiving chemical signals

1. Cell communication processes share common features that reflect a shared evolutionary history
2. Cells communicate with each other through direct contact with other cells or from ad distance via chemical signaling
3. Signal transduction pathways link signal reception with cellular response
4. Changes in signal transduction pathways can alter cellular response

EU 3E – Transmission of information results in changes within and between biological systems

1. Individuals can act on information and communicate it to others
2. Animals have nervous systems that detect external and internal signals, transmit and integrate information, and produce responses

Big Idea 4 – Biological systems interact, and these systems and their interactions possess complex properties

EU 4A – Interactions with biological systems lead to complex properties

1. The subcomponents of biological molecules and their sequence determine the properties of that molecule
2. The structure and function of subcellular components and their interactions provide essential cellular processes
3. Interactions between external stimuli and regulated gene expression result in specialization of cell, tissues, and organs
4. Organisms exhibit complex properties due to interactions between their constituent parts
5. Communities are composed of populations of organisms that interact in complex ways
6. Interactions among living systems and with their environment result in the movement of matter and energy

EU 4B – Competition and cooperation are important aspects of biological systems

1. Interactions between molecules affect their structure and function
2. Cooperative interactions within organisms promote efficiency in the use of energy and matter
3. Interactions between and within populations influence patterns of species distribution and abundance
4. Distribution of local and global ecosystems changes over time

EU 4C – Naturally occurring diversity among and between components within biological systems affects interactions with the environment

1. Variation in molecular unites provides cells with a wider range of functions
2. Environmental factors influence the expression of the genotype in an organism
3. The level of variation in a population affects population dynamics
4. The diversity of species within an ecosystem may influence the stability of the ecosystem

Science Practices (skills that are required for scientific study)

1. Use representations and models to communicate scientific phenomena and solve scientific problems.
    a. Create representations and models of natural or manmade phenomena and systems in the domain
    b. Describe representations and models of natural or manmade phenomena and systems in the domain
    c. Refine representations and models of natural or manmade phenomena and systems in the domain
    d. Use representations and models of analyze situations or solve problems qualitatively and quantitatively
    e. Re-express key elements of natural phenomena across multiple representations in the domain
2. Use mathematics properly
    a. Justify selection of mathematical routine to solve problems
    b. Apply mathematical routines to quantities
    c. Estimate numerical quantities
3. Engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course
    a. Pose scientific questions
    b. Refine scientific questions
    c. Evaluate scientific questions
4. Plan and implement data collection strategies appropriate to a particular scientific question
    a. Justify the selection of the kind of data needed to answer a particular scientific question
    b. Design a plan for collecting data to answer a particular scientific question
    c. Collect data to answer a particular scientific question
    d. Evaluate sources of data to answer a particular scientific question
5. Perform data analysis and evaluation of evidence
    a. Analyze data to identify patterns or relationships
    b. Refine observations and measurements based on data analysis
    c. Evaluate the evidence provided by data sets in relation to a particular scientific question
6. Work with scientific explanations and theories
    a. Justify claims with evidence
    b. Construct explanations of phenomena based on evidence produced through scientific practices
    c. Articulate the reasons that scientific explanations and theories are refined or replaced
    d. Make claims and predictions about natural phenomena based on scientific theories and models
    e. Evaluate alternative scientific explanations
7. Connect and relate knowledge across various scales, concepts and representations in and across domains
    a. Connect phenomena and models across spatial and temporal scales
    b. Connect concepts in and across domains to generalize or extrapolate in and/or across enduring understandings and/or big ideas