ADVANCED PLACEMENT BIOLOGY SYLLABUS (2021-2022)

Mrs. Alison Humphrey
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COURSE DESCRIPTION: This course follows the guidelines created by the College Board. It is designed to be equivalent to a college level introductory course. Students will be provided the opportunity to experience laboratory skills comparable to introductory college level Biology courses, including inquiry-based labs and computerized data acquisition and analysis. This class requires learning at an accelerated pace due to the amount and complexity of the required material. **A student's success will depend on the time and effort that is invested in this course.** Successful completion of the AP Biology exam can lead to either introductory biology credit or elective credit depending on the requirements of the college a student is attending.

COURSE OBJECTIVE: AP biology students will demonstrate the ability to use specific skills and processes, appropriate scientific terminology, and major biological concepts to explain the uniqueness and interdependence of living organisms, their interactions with the environment, and the continuation of life on Earth.

TEXTBOOKS: Campbell Biology, AP Edition, Reece et. al, Pearson, 12th edition (2021)
You will each have a textbook checked out to you. You are responsible for your own book's care (replacement cost $120). Laboratory Manual: AP Biology Investigative Labs: An Inquiry-Based Approach. There are various AP Biology Review Books that you may wish to consider purchasing. In addition to the text, supplemental reading materials will be given periodically.

SUPPLIES: Composition Lab Notebook**,** 3 ring notebook (2"minimum) w/dividers for handouts and Guided Reading Question Sets, 1 dedicated composition notebook (Lab/Bozeman Journal); 4 function calculator with square root key.

LOGISTICS: Class periods will be composed of lectures, labs, quizzes, projects, and exams. A premium will be put on lab work, essay composition and appropriate math problem sets. Each unit exam will model the AP Biology Exam with multiple choice questions, free-response (essay) questions – both long and short – and math grid-in problem sets.

This class will move at a very fast pace, and between labs, lectures and reviews, **there is really no way to make up a missed class or most of the labs**. It is, therefore, essential you attend every class and lab and **be prepared to participate**.

ASSESSMENT AND EVALUATION
Each student earns their grade based on the **quality of work** they complete. Each quarter grade will be determined by the percentages listed below.

40% Laboratory assignments and reports; Quizzes and FRQs	Part of the college board requirements for AP Biology is a series of inquiry-based laboratory activities; students will complete these labs along with the worksheets/ lab reports/mini posters that will be assigned along with them; Quizzes will be given often to assess learning and to encourage upkeep with the material (Reading, Guided Reading Notes, Video viewing, Pre-Labs, etc.).
60% Tests	Exams will follow after every unit and at the semester. The format for exams will follow the format of the AP Biology Exam

Grading, Grades, Cheating, Exams, Homework....

In my class, I use homework, exams, lab reports, and projects as **tools for learning**.

Students are allowed to hand in lab reports, projects, and other assignments after the due date. However, for each day an assignment is late, twenty percent of the total points will be deducted from the grade earned.

If a student earns a grade on an assignment that s/he feels is unsatisfactory, the student has the option of **fixing the assignment for some credit returned (usually 1/2 points missed).** After you submit an assignment, it will be graded and handed back to you. You will have a period of 5 days to make any corrections necessary. Your corrections will be submitted to Mrs. Humphrey for the opportunity to earn back credit. All assignments can be corrected with the exception of weekly quizzes (as these are open notes), extra credit assignments, and other assignments as determined by Mrs. Humphrey. ***Remember, the student must take responsibility for retakes. I will not remind any student of her/his impending retake. Retakes are a privilege, not a right.***

The objective in this class is to learn from mistakes made to gain mastery of the material, so I am angered and frustrated when students attempt to cheat. If a student cheats, s/he will be caught. **If students copy each other, everyone involved will be subject to an honor code violation and infractions will be dealt with according to the handbook**. If I feel that the assignments are copied, all parties will have to civilly defend themselves. I hope that I will not have to deal with cheaters. However, if cheating seems to be the norm, I will rescind the ability to make-up assignments. **(I also consider the following cheating: passing in late assignments copied from students who turned their assignments in on time and students using notes, exams, quizzes and laboratories of students who have taken my class in prior years. Do not ask an old student to 'borrow' their old Biology material.)**

If a student needs help, I will be available and happy to help before and after school. It is my dream that every student in all of my classes earn an A. In my class, student motivation is the only limiting factor in student success. If you have any questions please feel free to call me at (478-447-3984), email me (ahumphrey@southlandacademy.org), or visit me in room 211.

HOMEWORK

Textbook Reading: Very Important! Read the assigned chapters/sections nightly and take notes - **like a college student!** Stay up-to-date to be prepared for class. See this page for how to read a college text book for understanding- http://www.cornellcollege.edu/academic-support-and-advising/study-tips/reading-textbooks.shtml

HW Assignments: Besides the reading, you will have to complete guided reading notes, your Bozeman Journal, and lab exercises. You should be working on these as we work through each chapter using both the text and lectures from class. You will have chapter quizzes on the reading sets. You may use your notes on these quizzes.

Lab Assignments: Will be the main source of written work outside of class. This will be in addition to the regular readings and question sets.

ACADEMIC AND BEHAVIORAL EXPECTATIONS:

AP Biology provides students with an experience equivalent to a **college level biology course**. There are **extensive reading assignments** that the student must complete in order to be successful. It is a college course and you will be held to very high expectations and you will need to exhibit mature responsibilities just like any college freshman taking their respective Introduction to Biology class. Unlike your freshman high school biology course, the information you will learn will not be spoon-fed to you - **a lot of it you will learn yourself**. If you do not keep up with the work, the readings, and staying actively involved in lectures/discussions/lab investigations, your chances for success are slim. At all times students are expected to follow classroom and school rules, behave in a responsible and mature manner, and conduct themselves with **honor and integrity. I view this course as a team effort.** While each person needs to complete and hand in their own unique work, study groups and cooperative effort are **strongly encouraged.** You never learn something as well as you do when you have to explain it to someone else. Simulate the college experience now! Students are expected to do their own work. **Plagiarism and cheating will not be tolerated.** Students who are absent from class are responsible to pick up make-up work or stay after school to finish missed assignments. Students should schedule make-up work immediately upon their return from an absence.

AP EXAM

The AP exam for this current year will be on Wednesday, May 11, 2022. The fee for the exam is **$94***. The format for this is a 90-minute, 60 multiple-choice section and a 90-minute 6 free-response section. Exam grades are based on a scale of 1-5 (qualifying scores are considered 3 or better). Results will be e-mailed to you next July, so this will not be factored into your course grade. For more information on the course, exam, and its scoring, visit: www.collegeboard.com.

Acknowledgment

I have read and am aware of the expectations for success in AP Biology for the 2021-2022 year. This includes all policies and lab safety precautions.

1. _____

THE BIG IDEAS

The big ideas are interrelated, and they will not be taught alone. The course will connect these big ideas along with their associated enduring understandings throughout the year.

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

APPLICATION OF THE SCIENCE PRACTICES THROUGHOUT THE COURSE

As an inquiry-based learning course, AP Biology is organized to give students a basic understanding of each concept to be studied, and then have the student first conduct teacher-directed activities to experience a science practice before conducting their own student-directed experiments. We will include at least 8 of the 13 student-directed investigations as published in the "AP Biology Investigative Labs: An Inquiry-Based Approach" along with many other activities that should get students excited to carry out experiments that answer questions that they ask themselves throughout the year.

DO'S AND DON'TS FOR AP BIOLOGY FREE RESPONSE QUESTIONS:

Writing is an important skill that is required in this class. Both in lab reports and on class exams (including the Part II free-response questions on the AP Exam), you need to articulate your thoughts onto paper. The lab format will be described later on, but on all exams and other class assignments, you need to be able to compose your thoughts clearly and concisely. Below are a couple of guidelines that you should follow which should lead towards success in the written portion of the class.

DO:

Read the question **twice** before answering, and **once** after answering.
Outline the answer to avoid confusion and disorganization. Thinking ahead helps to avoid scratch-outs, skipping around, and rambling.
Define any term that you use.
Answer the parts of the question in the order called for. It is best to not skip around.
Write clearly and neatly. Unreadable answers are never given any credit.
Go into detail on the subject, and to the point.
ANSWER the question THOROUGHLY!
If you cannot remember a word exactly, take a shot at it – get as close as you can. If you don't have a name for a concept, describe the concept.
Use a black ball point pen.
Remember that no detail is too small to be included, as long as it is to the point.
If you draw a diagram, carefully label it (otherwise it gets no points) and place them in the text at the appropriate place, not detached at the end.
Bring a watch to the exam so that you can pace yourself. You have two long essays (22 minutes each) and 6 short essays (about 6 minutes each).
Understand that the exam is written to be hard –the average score on the essays are usually between 2 and 5 points. It is very likely that you will not know everything, so relax and do your best.

DON'T:

Don't waste time on background information unless the question calls for historical development or historical significance. **Just Answer the question!**
Don't ramble, get to the point!
Don't shoot the bull – say what you know and go on to the next question. You can always come back if you remember something.
Don't use pencil or an ink color other than black.
Don't panic or get angry because you are unfamiliar with the question. You probably have read or heard something about the question – be calm and think.
Don't scratch out excessively. One or two lines through the unwanted words is sufficient.
Don't write words in the margins unless it is necessary.
Don't worry about spelling a word exactly or using perfect grammar. These are not a part of the standards that the graders use.
Don't write sloppily. It is easier for a grader to miss an important word when he/she cannot read your handwriting.
Don't write introductory or closing paragraphs. This is not an English essay, it is an answer to a question.
Don't leave questions blank. Make *some* effort on every question.

Text: Campbell Biology, AP Edition, Reece et. al, Pearson, 12th edition (2021)

Units/Reading Alignments	Chapters	Approximate Class Time	Bozeman Videos	Tests*
Unit 1 – Chemistry of Life 1.1 Structure of Water and Hydrogen Bonding (pp. 43-56) 1.2 Elements of Life (pp.58-66) 1.3 Intro to Macromolecules (pp. 68-69) 1.4 Properties of Macromolecules (pp. 69-77) 1.5 Structure and Fxn of Biological Molecules (pp.77-85) 1.6 Nucleic Acids (pp. 86-89)	**Summer Reading:** 1 – Intro and Bio Foundations 2- The Chemical Context of Life 3- Water and Life 4 – Carbon and the Molecular Diversity of Life 5- The Structure and Function of Large Biological Molecules	15 days	***Water – A polar Molecule** *Water and Life ***Water Potential** ***Biological Molecules** *Polymers *Nucleic Acids DNA & RNA Parts 1&2	9/2
Unit 2 – Cell Structure and Function 2.1 Cell Structure: Subcellular Components (pp.100-101) 2.2 Cell Structure and Fxn (pp.102-121) 2.3 Cell Size (pp. 98-99) 2.4 Plasma Membrane (pp.125-131) 2.5 Membrane Permeability (pp.131-132) 2.6 Membrane Transport (132-139) 2.7 Facilitated Diffusion (pp. 134-13) 2.8 Tonicity and Osmoregulation (pp.133-134) 2.9 Mechanisms of Transport (pp. 135-138) 2.10 Cell Compartmentalization (pp. 104-108) 2.11 Origins of Cell Compartmentalization (pp. 109-110; pp. 516-517; pp. 576)	6.2-6.5 - Tour of the Cell 7- Membrane Structure and Function	13 Days	*Tour of a Cell *Cellular Variation *Eukarya ***Cellular Organelles** ***Environmental Matter Exchange** ***Why are Cells Small?**	9/24
Unit 3 – Cellular Energetics 3.1 Enzyme Structure (5.4) 3.2 Enzyme Catalysis (pp.152-160) 3.3 Environmental Impacts on Enzyme Function (pp. 155-157) 3.4 Cellular Energy (pp. 142-148; pg. 66; pp. 149-151) 3.5 Photosynthesis (pp. 184-199; pg. 203) 3.6 Cellular Respiration (pp. 163-181) 3.7 Fitness (pp. 12-128; pp 190-192; pp. 199-202; pp. 924-926)	8- Intro to Metabolism 9- Cellular Respiration & Fermentation 10.1-10.3-Photosynthesis	17 days	***Enzymes** ***Life Requires Free Energy** ***Gibbs Free Energy** ***ATP: Adenosine Triphosphate** ***Photosynthesis** ***Photosynthesis & Respiration** *Plant Pigments and Photosynthesis	10/8 10/27
Unit 4 - Cell Communication and Cell Cycle 4.1 Cell Communication (pp. 206-214; *Examples: pp206-211; 120-212; 782; 930-946; 974-993; 1055-1060*) 4.2 Intro to Signal Transduction (pp. 214-218) 4.3 Signal Transduction (pp. 219-223; *Examples: 526-528; 821-824; 289-290*) 4.4 Changes in Signal Transduction Pathways (pp. 223-225) 4.5 Feedback (pp.859-861; 982)	11- Cell Communication Ch.43 (Immune Syst), Ch.45 (Endocrine Syst), Ch.49 (Nervous Syst) 12.1-12.3- Cell Cycle	11 days	***Cell Communication** ***Evolutionary Significance of Cell Communication** *Immune System *Nervous System ***Plant & Animal Defense** *Plant Control **Signal Transduction Pathways** ***Effects of Changes in Pathways** ***Positive & Negative Feedback Loops**	11/15

4.6 Cell Cycle (pp. 229-238) 4.7 Regulation of Cell Cycle (pp. 238-243)			***Homeostatic Disruptions** ***Homeostatic Evolution** ***Cell Division** ***Cell Cycle, Mitosis, & Meiosis** *Cancer – What is it? ***Development: Timing & Coordination** ***Mechanisms of Timing & Control**	
Unit 5 – Heredity 5.1 Meiosis pp.248-253) 5.2 Meiosis and Genetic Diversity (pp. 253-260) 5.3 Mendelian Genetics (pp.262-281) 5.4 Non-Mendelian Genetics (286-288 & 292-297) 5.5 Environmental Effects on Phenotype (pp.274-275 5.6 Chromosomal Inheritance (pp. 289-292 & 297-300)	13-Meiosis and Sexual Life Cycles 14 – Mendel and the Gene Idea 15 – Chromosomal Basis of Inheritance	11 days	***Haploid vs Diploid** *Meiosis Sodaria Cross ***Mechanisms that increase Genetic Variation** ***Mendelian Genetics** ***Genotype & Phenotype** ***Genotype Expression** ***Genetic Recombination & Gene mapping** ***Advanced Genetics** *Chromosomal Genetics *Linked Genes *X-inactivation	12/16
Unit 6 – Gene Expression and Regulation 6.1 DNA and RNA Structure (pp. 305-310; 320-322) 6.2 Replication (pp. 311-319; 381-390) 6.3 Transcription and RNA Processing (pp. 325-336) 6.4 Translation (pp.337-344) 6.5 Regulation of Gene Expression (pp. 346-348; 351-366) 6.6 Gene Expression and Cell Specialization (pp. 366-377) 6.7 Mutations (pp. 344-346) 6.8 Biotechnology (396-423; 429-432 & 434-447; 556-564)	**Part I** 16.1-16.2 – The Molecular Basis of Inheritance 17.1-17.6 – From Gene to Protein 18.1-18.4 – Regulation of Gene Expression **Part II** 19.1-19.3 – Viruses 27.1-27.2 – Bacteria & Archaea 20.1-20.2 – Biotechnology 21.2 & 21.5 - Genomes 47 Animal Development	21 Days	***DNA & RNA – Parts 1&2** *DNA Replication ***Viral Replication** ***Meselson – Stahl Experiment** *Transcription & Translation *** Signal Transmission & Gene Expression** ***The Operon** ***Epigenetics** ***Gene Regulation** *Mutations *Mechanisms That Increase Genetic Variation *Molecular Biology *DNA Fingerprinting *What is CRISPR?	1/20 Part 1 2/11 Part II
Unit 7 - Natural Selection 7.1 Intro to Natural Selection (pp. 455-467) 7.2 Natural Selection (pp 469-485) 7.3 Artificial Selection (pp. 458-459; 801; 815-816) 7.4 Population Genetics (pp. 470-473; 476-480) 7.5 Hardy-Weinberg Equil (pp. 474-476) 7.6 Evidence of Evol (pp. 460-467) 7.7 Common Ancestry (pp.537-542) 7.8 Continuing Evol (pp. 507-531) 7.9 Phylogeny (pp. 542-553) 7.10 Speciation (pp. 488-504) 7.11 Extinction (pp.521-524) 7.12 Variation in Population (pp. 469-472; 1238-1246) 7.13 Origin of Life on Earth Ch.25 & pg.59)	22.2-22.3- Descent with Modification 23- The Evolution of Populations 24- The Origin of Species 25.1-25.5- Broad Patterns of Evolution 26.1-26.3,26.6 – Phylogeny and the Tree of Life 38.1 Plant Reproduction 40 Animal Form and Fxn	23 Days	*Natural Selection *Aposematic Coloration *Microevolution ***Examples of Natural Selection** ***Genetic Drift** ***Behavior & Natural Selection** *Selection ***Genetic Drift** ***Population Variation** *Solving Hardy-Weinberg Equations ***Evidence for Evolution I&II** *Comparing DNA Sequences *Essential Characteristics of Life *Cladograms ***Evolution Continues** ***Cellular Variation** ***Phylogenies** ***Speciation** ***Speciation & Extinction** ***The Origin of Life** ***Scientific Evidence** ***Abiogenesis**	2/28 Part I 3/17 Part II

Unit 8 - Ecology 8.1 Response to the Environ. (pp. 1150-1156; 1163-1167; *Examples: 821-847; 1118-1139*) 8.2 Energy Flow Through Eco. (pp. 1219-1235) 8.3 Population Ecology (pp.1170-1177) 8.4 Effect of Density of Pop. (pp. 1177-1191) 8.5 Community Ecology (pp.1194-1200) 8.6 Biodiversity (pp. 1200-1213) 8.7 Disruption to Ecosystems (pp. 1239-1261)	39.1-39.3, 39.5 Plant Response 51 Animal Behavior 52.2- Intro to Ecology 53- Population Ecology 54- Community Ecology 55- Ecosystems and Restoration Ecology 56.1-56.2, 56.4- Conservation Biology and Global Change	21 Days	*Biotic and abiotic factors *Niche ***Response to External Environments** ***Animal Behavior** *Mechanisms of timing and Control *Information Exchange *Behavior and Natural Selection ***Ecosystems** ***Environmental Matter Exchange** ***Energy Flow in Ecosystems** ***Biogeochemical Cycles** ***Populations *Exponential Growth** *Logistics Growth r and k selection ***Communities** ***Cooperative Interactions** *Ecological Succession * ***Biodiversity** ***Ecosystem Change** ***Greenhouse Effect** ***Global Climate Change**	4/12 Part I 5/3 Part II
Review		15 Days	Practice Exams Lab Review Math Review FRQ Practice	
AP Exam				5/11/22
Seniors Last Day				5/10/22
Graduation				5/20/22