

AP/IB BIOLOGY SYLLABUS (2011-12)

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Biology Rationale

Goal

The goal of Biology is to instill in the student a curiosity about all living organisms and their interactions; to initiate a lifetime of using an organized, evidence based approach to solving problems; and to recognize the significance of biology to the understanding of all other sciences and its applications to every day lives and real world situations. ***Our abilities will be evaluated with the Standardized AP/IB Exams at the end of the year, so you must retain all concepts to be applied on this all-encompassing exam.***

Instructional Approach

Instruction and learning are organized around the 5E's Inquiry Model (Engage, Explore, Explain, Extend, and Evaluate). The teacher functions as facilitator or coach to nurture the students' growth to become independent learners. A variety of teaching strategies are used to promote inquiry, including laboratory experiments, demonstrations, direct instruction, current events, visual presentations and cooperative learning, as appropriate to the lesson and prior knowledge of the students. Time is provided to ensure that problem analysis, as well as solution strategies, are addressed. Students synthesize unifying principles from the course of study, make interdisciplinary connections, and apply these understandings to real world situations. The class meets for 2 class periods each day (94 minutes of instruction). Students are required to successfully complete courses in General Biology and General Chemistry to be eligible for enrollment in this course.

We provide opportunities for students to use technology and apply their knowledge and skills to projects and learning experiences. The students are engaged in effective techniques of reading, writing, and mathematics to extend their understandings of the content. Assessment is frequent, ongoing, and embedded in student learning experiences. We set high standards with challenging and rigorous expectations for all students and provide differentiation of instruction and learning as appropriate.

Students can obtain supplemental instruction and tutoring by coming in before school or attending TAP after school.

Course Overview

Beginning with the basic components of life, this course will build to allow the students to see life in its broadest perspective. This design is intended to help them understand the ways in which organisms effect their local environment and are affected by changes in other ecosystems, both locally and globally. The textbook for this course is Campbell and Reece's *Biology* (Sixth Edition). Instruction and investigation will center on the textbook's "Ten Themes in the Study of Life", which mesh well with the major themes of AP and IB Biology. The students are required to read the textbook chapters associated with each unit. Most of the labs associated with each unit are from the *Biology Lab Manual For Students*. We use other labs to provide a more complete laboratory experience. The students are required to generate class presentations, both individual and group. This allows them a more in-depth investigation of a topic and the opportunity to share this perspective on a topic with their fellow students.

The students are expected to use a variety of sources to supplement the textbook. Our media center provides access to subject-specific online and bound resources. Our school has multiple computer labs which permit use of computer-enhanced learning. The computers are also accessible for producing written reports and media presentations. We also utilize computer-based communication of assignments, lecture materials and supplemental materials.

Lab Component

The students will conduct labs from the *AP Biology Lab Manual for Students*. In addition, I will provide labs from other sources and opportunities of inquiry lab experiences to allow for a broader laboratory experience. The labs require 2-3 days of each 2-2.5 week unit for setup, data collection and discussion. I believe the students should participate in all aspects of the lab and have a complete understanding of the purpose for a lab within the context of the current unit. All lab reports will be written in the form of a well-designed investigation. Lab report conclusions are based on data generated during the lab and analysis questions included within the body of the AP labs or those provided for the supplemental labs.

Student Projects

I believe that students must be given the opportunity for independent learning and be allowed to share that knowledge with the other students in the class. During the First Marking Period, small groups will begin working on a Group Research Project. This is designed to give the students an experience in planning and conducting an original scientific experiment. After collecting data, the students will analyze their results and formulate conclusions. They will present their data in the form of a scientific paper.

During several of the instructional units the students will work in pairs or small groups to research a topic and create a presentation. The presentations are intended to supplement classroom instruction. As such, presenters are expected to lead a discussion of their project and be prepared to answer questions regarding the subject. They also turn in a written summary of their project. The four projects span a wide range of subject areas.

Student Evaluation

Student learning is evaluated using quizzes, unit exams, lab reports, homework and the student projects. Quizzes always contain a free-response section. This allows for the inclusion of broad-concept questions. Because the free-response questions are within the quiz format, feedback regarding the written responses is rapid. In addition, I assign free-response questions from the public-release AP and IB exams. These are done as homework so the students can learn to prioritize their thoughts and write a complete, but relatively succinct response.

Grades will be calculated using the following template:

45% Formative Assessments (Ex: Informal Labs, PBLs, Weekly Quizzes, In the News)

50% Summative Assessments (Ex: Exams, Summative Quizzes, Formal Labs)

5% Homework for Practice (Ex: Class work)

Notes::

✚ *There will be no extra credit*

✚ *Quizzes may be formative or summative- will be announced prior to quiz being given- quizzes are on Friday unless otherwise noted*

✚ *Summative assessments may not be reassessed.*

✚ *A maximum of one formative assessment may be reassessed per quarter – retakes must be completed within one week of the original quiz date.*

✚ *Make-up work must be completed as follows:*

- *Out one day – turned in one day after due date*
- *Out two days – turned in two days after due date*
- *Etc...*

Late Work Policy

- Homework/class work will not be accepted late. **It is due at the beginning of class.** Not at the end of the class/end of the day. **Zero credit will be given to late assignments.**
- Projects/labs will have a Due Date. The deadline is the following day. Projects/lab may be turned in on the deadline for a 10% reduction. After the deadline the lab/project will be worth NO CREDIT.
- Major tests/project due dates have been provided to each AP/IB Biology student. Students are expected to take each evaluation on time, even if one is absent the previous day. An unexcused absence on the day of the evaluation will result in a zero score. **If you have an excused absence you must plan on taking the evaluation before school on the day that you return.** I will be at school no later than 5:45 a.m. every morning – exam make-ups begin at 6:00 a.m. I make

a point to get all evaluations back to students the day after it was completed but cannot do so until everyone has completed the evaluation.

Academic Dishonesty

Getting help with or working together on homework and labs is acceptable, but copying someone's work is not. Cheating on labs, study guides, exams and quizzes will not be tolerated and will result in all active parties involved receiving a zero for the assignment/evaluation. Please review school policy on plagiarism and other academic dishonesty issues. Trust is a very difficult bond to form and remains very fragile. An honor code will be required to be written on all graded assignments before they are turned into the inbox.

Textbook

Campbell, Neil A. and Jane B. Reece (2008). *Biology* (8th Edition). San Francisco, CA. Pearson Benjamin and Cummings. ISBN-10: 0131356917

Course Planner

Unit	Lecture and Lab Titles	Readings	Test Date
1	<p><i>The Chemistry of Life (IB Topic 2)</i></p> <ul style="list-style-type: none"> • Water • Matter • Atomic Structure • Chemical Bonding • Biological Molecules <p>Lab: Buffer and the Control of pH (Teacher generated)</p>	Chapters 2, 3, 4 and 5	Friday September 16 th
2	<p><i>Evolution (IB Topic 4 and Option D)</i></p> <ul style="list-style-type: none"> • History of Evolution Theory • Descent With Modification • Population Genetics • Genetic Variation, Adaptation and Natural Selection • Definition of a Species • Mechanisms for Speciation • Systematics and Cladistics <p>Lab: Population Genetics and Evolution (AP Lab #8)</p>	Chapters 22, 23, 24 and 25	Friday October 7 th
3	<p><i>Animal Diversity (IB Topics 4 and 5)</i></p> <ul style="list-style-type: none"> • Simple Organic Molecules and the Origin of Life • Domain Archaea • Domain Bacteria • Domain Eukarya <p>Lab: Diversity of Protists (Teacher Generated) Student Project: Diversity of Kingdom Animalia</p>	Chapters 26, 27, 28, 31, 32, 33 and 34	Wednesday October 19 th
4	<p><i>The Cell (IB Topic 1)</i></p> <ul style="list-style-type: none"> • Comparison of Prokaryotic and Eukaryotic Cells • Cell Organelles and Internal Structure • Cellular Metabolism • Fluid Mosaic Model of the Plasma Membrane • Inter- and Intracellular Communication <p>Lab: Cell Comparison (Teacher generated) Lab: Diffusion and Osmosis (AP Lab #1)</p>	Chapters 6, 7, 8 and 11	Monday November 14 th
5	<p><i>Cellular Energetics (IB Topics 2 and 7)</i></p> <ul style="list-style-type: none"> • The Cell's Energy Currency • Glycolysis, the Krebs Cycle and Electron Transport • Photosynthesis: Light-dependent reactions • The Calvin Cycle • Link Between Photosynthesis, Cellular Respiration and the Carbon Cycle <p>Lab: Plant Pigments and Photosynthesis (AP Lab #4) Lab: Cellular Respiration (AP Lab #5) Lab: Enzyme Catalysis (AP Lab #2)</p>	Chapters 8, 9 and 10	Friday December 2 nd
6	<p><i>Genetics (IB Topics 3, 6, and 8)</i></p> <ul style="list-style-type: none"> • Basics of Cell Division • Mitosis • Cell Cycle Regulation • Meiosis and Genetic Variation • Mendelian Genetics • Role of Autosomes in Inheritance • Role of Sex Chromosomes in Inheritance <p>Lab: Mitosis and Meiosis (AP Lab #3)</p>	Chapters 12, 13, 14 and 15	Thursday December 22 nd

7	<p><i>Molecular Genetics (IB Topics 3, 6, and 8)</i></p> <ul style="list-style-type: none"> • Structure, Function and Replication of DNA • Synthesis of RNA • Translation of RNA to Protein • Post-translational Modification of Proteins • Effect of Mutations on Protein Synthesis <p>Lab: Genetics of Organisms (AP Lab #7) Student Project: Genetic Disorders</p>	Chapters 16 & 17	Wednesday January 11 th
11	<p><i>Genetic Technology (IB Topics 3, 6, 8)</i></p> <ul style="list-style-type: none"> • DNA Structure • Genetics and Viruses and Bacteria • Gene Expression • DNA Cloning • Practical DNA Analysis <p>Lab: Molecular Biology (AP Lab #6) Student Project: Genetically Modified Organisms and Their Impact on Natural Systems and Human Society</p>	Chapters 18, 19, 20, and 21	Monday January 30 th
8	<p><i>Animal Structure and Function I (IB Topics 5, 10, 12)</i></p> <ul style="list-style-type: none"> • Animal Nutrition • Circulatory System • Gas Exchange • Nonspecific Defense Responses • Specific Immunity • <p>Lab: Circulation and Gas Exchange (AP Lab #10)</p>	Chapters 40, 41, 42, 43	Friday February 10 th
9	<p><i>Animal Structure and Function II (IB Topics 5, 9, 11)</i></p> <ul style="list-style-type: none"> • Homeostasis • Mechanisms of Cell Signaling • Vertebrate Endocrine System • Pheromones • Asexual Reproduction • Sexual Reproduction • Fertilization and Zygote Formation • Embryonic Development • Morphogenesis and Differentiation 	Chapters 44, 45, 46 and 47	Friday February 24 th
10	<p><i>Animal Structure and Function III (IB Topics 5, 9, 11)</i></p> <ul style="list-style-type: none"> • Simple Nervous Systems • Initiation and Propagation of Nerve Signals • Specialization of Neurons and Supporting Cells • Vertebrate Nervous Systems • Sensory Receptors • Vision • Hearing • The Vestibular System • Chemoreceptors • Motor Mechanisms <p>Lab: Animal Behavior (AP Lab #11)</p>	Chapters 48, 49, 50, and 51	Thursday March 8 th

12	<p><i>Plants (IB Topic 13)</i></p> <ul style="list-style-type: none"> • Evolution of Land Plants • Nonvascular Plants • Simple Vascular Plants • Gymnosperms • Angiosperms • Plant Tissues and Organs • Plant Growth and Development • Plant Water Balance • The Vascular System • Absorption of Nutrients • Reproduction • Production and Response to Hormones • Environmental Cues <p>Lab: Transpiration (AP Lab #9) Lab: Flower Dissection (Teacher Generated)</p>	Chapters 29, 30, 35, 36, 37, 38 and 39	Thursday March 29 th
13	<p><i>Ecology (IB Topic 4 and Option G)</i></p> <ul style="list-style-type: none"> • Biomes • Distribution of Organisms Due to Biotic and Abiotic Factors • Behavioral Ecology • Population Ecology • Community Ecology • A Community as an Ecosystem • Human Impact on Ecosystems • Ecosystem Protection and Reduction of Human Impact <p>Lab: Dissolved Oxygen and Aquatic Productivity (AP Lab #12) Student Project: How Green is Our County? – Biodiversity, Sustainable Systems and the Role of the Community in Natural Resource Protection</p>	Chapters 50, 51, 52, 53, 54 and 55	Monday April 30 th