**AP Biology Syllabus**

**2014-2015**

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**Help sessions**:

* Monday-Thursday 2:15-3:10. Make an appointment to ensure instructor availability.
* Saturday sessions in the Spring – dates TBA

**Text**: *Principles of Life* *1st Edition* and *Campbell Biology 6th edition*

**Expectations**: Now is an exciting time to be taking AP Biology. The College Board has just reviewed the new curriculum which focuses on enduring, conceptual understanding and the content that supports them. This approach will hopefully enable you to develop inquiry-based learning of essential concepts and less of the facts.

**Goals of the Course: Big Ideas and Concepts:** The AP Biology examination continues to focus on the 4 Big Ideas which has a set of Enduring Understandings which incorporate core concepts that students should retain, which is followed by the essential knowledge students must develop over the course. An emphasis will also be placed on science practices that enable students to develop and refine testable predictions and explanations.

AP Biology at our school will focus on the big ideas. Each unit is organized and taught with great attention to the Big Ideas below. Lessons are designed to interweave the Big Ideas throughout the course.

The Big Ideas are:

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

**Course Planner:** AP Biology is organized into fourteen units. Every unit is designed to integrate the topic into the four big ideas and the essential knowledge within the enduring understanding. Throughout each unit, we discuss how the unit ties back into all of the big ideas.

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| **Unit** | **Topics** | **Reference** | **Laboratories** |
| 1-Cell structure, function and cell communication | Prokaryotes vs Eukaryotes,Cell organelles (structure and function), Cell membrane (structure and function), Signal transduction pathways, G-proteins, Tyrosine kinase, role of membranes in cell signaling, secondary messengers | POL CH 4-5, 7Campbell CH 7-8, 11 | Diffusion/Osmosis LabCell Signaling Models |
| 2- Biochemistry | Water, bonding, pH, macromolecules, Protein structure and function, enzymatic activity | POL CH 2-3Campbell CH 2-5 | Enzyme Lab |
| 3- Cellular Energy (metabolism/Cell Respiration/Photosynthesis) | Metabolism, ATP, Cell respiration, Photosynthesis, evolution of alternative mechanisms of carbon fixation | POL CH 6Campbell CH 6, 9-10 | Cell Respiration Lab (probeware)Leaf disk assay Lab |
| 4- Cell Cycle, Mitosis, DNA structure,Replication, Biotechnology | Mitosis/cell cycle, DNA structure & replication, Recombinant DNA, Restriction enzymes, Bacterial Transformation, DNA gel electrophoresis | POL CH 7, 9, 13Campbell CH 12, 16, 20 | Mitosis lab – chi squareDNA Replication ActivityBacterial TransformationGel Electrophoresis |
| 5- Protein SynthesisProkaryotic and Eukaryotic Gene Regulation | Protein Synthesis, Gene regulation (prokaryotic and eukaryotic) | POL Ch 10-12Campbell CH 17-19 | Protein Synthesis/Mutation LabOperon ModelingEpigentics Lab |
| 6- Meiosis and Mendelian Genetics | Meiosis and reproductionMendelian inheritance patterns, non-mendelian inheritance patterns, Chi-square analysis, evolutionary significance of genetic variation, gene linkage | POL CH 8-9Campbell CH 14-15 | Chromosome mapping,Chi-Square lab |
| 7 - Evolution | Origin of life, Darwin & decent with modification, origin of species, adaptations, speciation, behavior patterns, genetics, sexual selection and reproductive success, phylogeny and the tree of life, Bacteria and Archae | POL CH 15-19Campbell CH 22-28 | Hardy WeinbergGreat Clade RaceBLAST labHHMI Evolution/Genetics Lab sets |
| 8 -Immune System | Non-specific immune response, inflammatory response, Humoral and Cellular immune responses | POL CH 31Campbell CH 43 | ELISA Lab |
| 9- Endocrine System | Homeostasis, temperature regulation, osmoregulation, hormones, female menstrual cycle,  | POL CH 29-30, 32, 40Campbell CH 44-46 | Homeostasis Lab |
| 10- Nervous System | Neuron structure, sodium potassium pump, action potential, synapses, neurotransmitters, chemoreceptors, photoreceptors, mechanoreceptors | POL CH 34-35Campbell 48-49 | Action Potential ModelingBrain Cap Activity |
| 11- Botany(after AP exam) | Evolution of plants, Alternation of generations, Angiosperm structure and growth, Angiosperm reproduction and growth Plant control systems | POL CH 21, 24-28Campbell CH 29-30, 35-39 | Transpiration lab |
| 12 -Ecology | Interactions between organisms and the environment, ecosystems, conservation, animal behavior | POL CH 41-46Campbell CH 50-55 | Energy DynamicsAnimal Behavior |

**Materials:**

* 3 ring binder with dividers (required daily)
* Composition book to be used as a lab notebook (required daily)
* Black or blue pen and pencils (required daily)
* Textbook
* **Some of the required outside work for this class requires the use of a computer and the internet.** If you do not have access to this equipment at home you will need to make arrangements to do some of your work before/after school in the media center or public library.

**Classroom Procedures:**

* The student will…
	+ Be responsible for one’s own property and behavior.
	+ Observe and follow rules stated in the student handbook.
	+ Bring required materials to class daily.
	+ Be prepared for class or lab by completing the required readings or assignments ahead of time.
	+ Turn in all assignments on time.
	+ Be on time for class.
	+ Refrain from eating or drinking in class. (Remember you are in a science lab.)
	+ Refrain from using cell phones or other electronic devices for the purposes of communication or entertainment.
	+ Refrain from touching any equipment unless instructed to do so by the instructor.
	+ Read, understand, sign and return the safety contract
	+ Stay awake and participate appropriately in class.
* Failure to comply with classroom behavioral expectations will result in…
	+ Teacher/student conference (hopefully this is where it ends)
	+ Contact with parents (next step)
	+ Referral to appropriate administrator (last resort)

**Assignments**:

* Assignments will be written on the whiteboard weekly. Due dates for readings, homework, labs and assessments will be posted on the board AND the AP Biology website .
* **It is the student’s responsibility to adhere to the due dates and pacing schedule provided for weekly assignments.**

**Make up Guidelines**:

* On your first day back to class you must provide proof of excused absence.
* It is the student’s responsibility to schedule make up assessments, presentations and labs. These should be made up promptly. The window for making up labs is very small due to space and the short life of lab materials.
* If a student is absent any day during a unit (including the day before the test), the student is still required to take the test on the given day.
* If a student is absent the day of a test, the student should attempt to make up the test the next day. If you do not make up the test within the time frame outlined in the Student’ Rights and Responsibilities Handbook, the instructor may give you a zero for the test. It is not fair to other students in the course to give you extended time to study and prepare for a test.

**Evaluation**

* Evaluation of this course will consist of homework, labs, quizzes, abstracts from scientific journals, projects and tests.
* All tests will consist of parts, a multiple choice section and a free response section.
* Tests will be graded on an AP sliding scale.
* Newport News Public School grading scale will be used:
	+ A = 100-90
	+ B = 89-80
	+ C = 79-70
	+ D = 69-60
	+ F = 59-0
* Each quarter grade will be determined using the following weights:
	+ Tests – 45%
	+ Quizzes – 15%
	+ Homework/Classwork/Activities/Projects– 20%
	+ Lab exercises and reports – 20%
* Semester average:
	+ 1st Quarter – 40%
	+ 2nd Quarter – 40%
	+ Semester exam – 20%

**AP Exam**

* Students are expected to take the AP exam. The AP exam scores are not received until early July. These scores are therefore not used as a part of a student’s average in the course**. The exam will be Monday, May 11, 2015 at 8:00AM.**
* Below is the AP exam format.

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| **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 |

**This syllabus is a living document and subject to change at any time by the discretion of the instructor.**