Course Description

AP Biology is a year-long course that is designed to prepare students for the Advanced Placement Exam in Biology. The course is designed around the new AP Biology curriculum framework that focuses on the Big Ideas in biology and their connections. The curriculum provides a basis for students to develop strong conceptual understanding in biology and the opportunity to integrate that knowledge through inquiry-based activities and laboratory investigations. There is less memorization and more content depth. Reading skills are extremely important for the format of the new test.

The AP Biology curriculum is structured around four Big Ideas: Evolution, Energy Processes, Information and Interactions. These ideas encompass the core principles and theories of all living systems. To master the concepts, students will learn through modes of: Tests, quizzes, labs, activities, video lectures, current event articles, and scientific journals.

AP Exam College Credit Colleges vary in what score they will accept for credit. Generally a student needs to score at least a 4 for credit, but some schools will accept a 3. Check with the schools you are applying to for details.

The AP Exam The AP exam is given in mid-May and this year it will be Monday May 9, 2016 at 8:00 am. It administered by the College Board and is given in a secure room somewhere in the district. There is a fee for taking the exam.

Prerequisites Successful completion of biology and chemistry. Excellent work habits and self-motivating behavior is a must. Come prepared every day.

Materials

1. 3 ring binder notebook for notes and to keep track of all of your misc. papers. It should have lined paper and graph paper.

   Suggested Tab Dividers/ Not required
   a. Introduction
   b. Evolution
   c. Biochemistry
   d. The Cell
   e. Metabolism
   f. Genetics
   g. Diversity & Physiology
   h. Interactions
   i. Review

2. Lab Report Paper: Graph paper that you will keep in a blue folder. Some colleges will request to see a Lab Notebook, so we will follow a format that is conducive to our investigations and one that will adhere to College Board standards. The teacher may provide this folder for you.

3. Internet Access: We use several websites to support coursework.

4. A simple four function calculator with square root function (no graphing or scientific calculators).

5. Textbook: AP Edition of Biology (9th edition) by Campbell & Reece © 2011. All students will receive a hardcopy of the textbook that has a companion CD-ROM. BOTH the text AND CD are to be returned at the end of the school year otherwise fees will be charged for both. Please put a cover on this book.
Class Rules
My rules are congruent with those laid out in the beginning of your student handbook. Fundamentally, those rules boil down to four:

1. Respect everyone and everything in this school.
2. You are here to learn. Effort is required.
3. **You** are expected to do your own work.
4. You may not interfere with anyone else’s right to follow Rules 1, 2 and 3.

Specific school policies are also enforced in this class.

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. Missed labs cannot be made up and will receive a score of zero.
- **Study at home** – the convention for college courses is 3 hours of independent study for each week 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. If you don’t like biology, this is not the class for you.
- **Typically, I expect that since we have been over this at this particular moment in time and space that I do not need to repeat myself to a group of students who are taking a college-level course.** If I do need to repeat myself more than once, you will find yourself in an uncomfortable situation where you will be asked to leave the classroom.

Assessments

- **Tests:** These will be given per unit completed. Tests are modeled on the AP exam, and include a series of multiple-choice, mathematical “grid-in” questions, and constructed response questions of varying lengths. Unit test material will also comprise previous material.
  - There is also the potential for Lab Practicals – you will work with a partner to develop an experiment we have not previously done in class. You will then report your findings to the rest of the class through a presentation.

- **Labs:** You are required to complete every lab that we conduct. Lab time will be a minimum of 25 percent of total instructional time. These lab activities will be major, long-term, experiences that will involve the development of a particular protocol to answer a question of your own creation, the collection of data, and the generation and publishing of a documentation of your lab experience (typically a lab report, or a presentation).

- **Quizzes** will be announced and unannounced. Many will cover the reading or video lectures required for homework. This is to check understanding and make sure students are keeping up with the material.
  - Some quizzes will be open notes where students will be allowed to use their Interfacing/Notes. In these situations, while students are quizzing, the teacher will check their notebooks for their effort and activity. 60% of the quiz will be on the interfacing activity and the other 40% will be on the actual quiz answers. If the student did not take notes/interact with the topic, the highest grade the student can earn on that quiz is a 60.

- **General Assignments:** All other work that is done in this class falls into the category of general Assignments. General assignments are not always "graded", but feedback will be provided.
Late work: Late work will not be accepted. It is strongly recommended that you attend class every day in a timely fashion. Excessive lateness or absences will make it very difficult for you to keep up with the workload of this course. If you are absent, it is your responsibility to makeup all assignments. “I was absent” is not an excuse for missing an assignment (unless I excuse you). All assignments are posted on the class calendar, which is accessible from all course websites. Please discuss missed work with me as soon as you return to class. Work done during absences is due one day after your return to class. You must also make arrangements to makeup any labs, quizzes or tests as soon as you return to school.

Grade Calculations
You and your parents will be able to access your course grade on-line. Your grade is calculated as follows:

<table>
<thead>
<tr>
<th>Summative Assessments (Tests, Projects, Major Assessments)</th>
<th>60%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labs</td>
<td>25%</td>
</tr>
<tr>
<td>General (quizzes, homework, in class assignments)</td>
<td>15%</td>
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</tbody>
</table>

Academic Honesty
You are encouraged to work together to study course content. I do not expect fully original answers for pre-discussion questions or similar content interfacing documentation. You are allowed to collaborate on lab exercises. Data among lab partners is expected to be identical. With these two exceptions, all work done in this class is expected to be original or attributed to its original source in either the APA or IEEE format. Any violation of this will result in an automatic 0 on the assignment in question. Cheating on exams, or plagiarism on any other item, will result in an automatic 0, mandatory change of seating, academic referral and notification of parents, notification of guidance counselor, notification of grade-level administrator and the inability to ever receive a college recommendation from me for all parties involved.

General Course Flow
We meet every school day for the rest of the year. The time is structured as follows:

- Content Discussion - Content discussion is unavoidable. To make this as non-boring as possible, you are expected to interface with the content prior to coming to class. It is expected that you have done this, and the style of the discussion is based on this assumption. To wit, I don’t just talk at you. I ask you questions about the content that you interfaced with before you came to class, and you answer them. Everyone gets a turn to demonstrate that they know what they are talking about. **Very few things will make you feel worse in this class than not knowing what you are talking about because you did not hold up your end of this deal. It will seem like I am displeased with you, because I will be. You will not feel good about this, and neither will I. Most likely you will need to stay after class to have a discussion about it.**

- Other Things - Content discussion takes up no more than one half of our time together on any day that we are together. Following content discussion, we move in to a variety of other tasks depending on the day. This could include, a lab, an activity, a quiz, or all three. Whatever it is, the expectation is that you will do your very best, focused, effort on whatever it is that we are doing.
A note about the exams:

The AP Biology exam will assess your ability to think like a scientist, along with your understanding of the course content (what's in the textbook). This will also be true of any in-class assessments, and many of the in-class projects. To that end, there will be situations and content on exams that will not be specifically discussed in class prior to their appearance on exams. This is very different than many other types of courses you might have taken.

A good rule of thumb is that any content covered in the material you are responsible for reading/viewing/watching in the content homework could appear on an exam, regardless of whether or not we have discussed it specifically in class. The take-home message for you is that independent reading/viewing/watching is absolutely crucial, and must be done if you want to succeed.

Course Websites

- Class Website- http://ccs.schoolwires.net//Domain/4138 All-purpose course hub. All other course materials and the calendar can be accessed through here. QR code below is provided for your convenience:

![QR Code](https://via.placeholder.com/150)

- Remind: If you’d like to sign up for class updates/reminders, you can either download the Remind App on your phone or simply text our class code to this number- 81010
  
  o AP Biology Remind Class Code → @608apbio

College Board Topic Outline
The course is organized into four “Big Ideas” that are then broken down into Enduring Understandings, then Essential Knowledge and followed by the Learning Objectives.

<table>
<thead>
<tr>
<th>Big Idea</th>
<th>Enduring Understanding</th>
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<tbody>
<tr>
<td>#1: Evolution – The process of evolution drives the diversity and unity of life.</td>
<td>1A: Change in the genetic makeup of a population over time is evolution.</td>
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<td>1B: Organisms are linked by lines of descent from common ancestry.</td>
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<td></td>
<td>1C: Life continues to evolve within a changing environment.</td>
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<td></td>
<td>1D: The origin of living systems is explained by natural processes.</td>
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<tr>
<td>#2: Energy &amp; Homeostasis – Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.</td>
<td>2A: Growth, reproduction and maintenance of the organization of living systems require free energy and matter.</td>
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<td></td>
<td>2B: Growth, reproduction and dynamic homeostasis require that cells create and maintain internal environments that are different from their external environments.</td>
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<td></td>
<td>2C: Organisms use feedback mechanisms to regulate growth and reproduction, and to maintain dynamic homeostasis.</td>
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<td></td>
<td>2D: Growth and dynamic homeostasis of a biological system are influenced by changes in the system’s environment.</td>
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<td></td>
<td>2E: Many biological processes involved in growth, reproduction and dynamic homeostasis include temporal regulation and coordination.</td>
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<td>#3: Genetics – Living systems store, retrieve, transmit, and respond to information essential to life processes.</td>
<td>3A: Heritable information provides for continuity of life.</td>
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<td>3B: Expression of genetic information involves cellular and molecular mechanisms.</td>
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<td>3C: The processing of genetic information is imperfect and is a source of genetic variation.</td>
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<td>3D: Cells communicate by generating, transmitting and receiving chemical signals.</td>
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<td></td>
<td>3E: Transmission of information results in changes within and between biological systems.</td>
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<tr>
<td>#4: Interactions &amp; Ecology – Biological systems interact, and these systems and their interactions possess complex properties.</td>
<td>4A: Interactions within biological systems lead to complex properties.</td>
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<td></td>
<td>4B: Competition and cooperation are important aspects of biological systems.</td>
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<td></td>
<td>4C: Naturally occurring diversity among and between components within biological systems affects interactions with the environment.</td>
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Science Practices to be addressed in this course
The science practices capture important aspects of the work that scientists engage in, at the level of competence expected of you, an AP Biology student
1. The student can use representations and models to communicate scientific phenomena and solve scientific problems
2. The student can use mathematics appropriately
3. The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course
4. The student can plan and implement data collection strategies appropriate to a particular scientific question
5. The student can perform data analysis and evaluation of evidence
6. The student can work with scientific explanations and theories
7. The student is able to connect and relate knowledge across various scales, concepts, and representations in and across domains.
<table>
<thead>
<tr>
<th>Unit Topic</th>
<th>Chapters Covered</th>
<th>Lab Experiences</th>
<th>Big Idea</th>
</tr>
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<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td></td>
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</tbody>
</table>
| Introduction | 1 | • Brine Shrimp Hatching Lab  
• Inquiry Cubes | • Evolution  
• Energy & Homeostasis  
• Interactions & Ecology |
| Unit 2: Evolution | 22-25 | • Strawfish & Hardy-Weinberg  
• AP Lab 1: Artificial Selection  
• Kitchen Cladograms  
• AP Lab 3: BLAST  
• Case Study | • Evolution  
• Genetics  
• Interactions & Ecology |
| Unit 3: Biochemistry | 2-5 | • H₂O Lab  
• Macromolecule Activity | • Evolution  
• Energy & Homeostasis  
• Interactions & Ecology |
| Unit 4: The Cell (Structure, transport, communication & division) | 6-7, 11-13 | • AP Lab 13: Enzyme Catalysis  
• AP Lab 4: Diffusion & Osmosis  
• Chemistry of Membranes | • Evolution  
• Energy & Homeostasis  
• Interactions & Ecology |
| Unit 5: Cell Energetics | 8-10 | • AP Lab 5 Photosynthesis  
• AP Lab 6: Cellular Respiration  
• 7 Deaths Case Study | • Evolution  
• Energy & Homeostasis  
• Interactions & Ecology |
| Unit 6: Classical Genetics | 14-15 | • Genetics of Organisms *(Drosophila)*  
• Wisconsin Fast Plants | • Evolution  
• Energy & Homeostasis  
• Genetics  
• Interactions & Ecology |
| **Second Semester** | | | |
| Unit 7: Molecular Genetics | 16-21 | • AP Lab 8: Bacterial Transformation  
• AP Lab 9: Gel electrophoresis  
• Case Study | • Evolution  
• Energy & Homeostasis  
• Genetics  
• Interactions & Ecology |
| Unit 8: Biological Diversity | 26-34 | • Case Study  
• Phylogenetics | • Evolution  
• Energy & Homeostasis  
• Interactions & Ecology |
| Unit 9: Plant Form & Function | 35-39 | • AP Lab 11: Transpiration | • Evolution  
• Energy & Homeostasis  
• Interactions & Ecology |
| Unit 10: Animal Form & Function | 40-51 | • AP Lab 12: Animal Behavior  
• Biochemical Evidence for Evolution Lab | • Evolution  
• Genetics  
• Interactions & Ecology |
| Unit 11: Ecology | 52-56 | • Nutrient Cycles Activity  
• Food Webs & Biological Magnification  
• Cabbage Butterfly & Fast Plants | • Evolution  
• Energy & Homeostasis  
• Interactions & Ecology |
| AP Exam Review | Cumulative | Case Studies | • Evolution  
• Energy & Homeostasis  
• Genetics  
• Interactions & Ecology |
| AP Exam | Cumulative | Monday, 5-9-16 | |