



The New York City Department Of Education

Columbia Secondary School for Math, Science & Engineering

*A Public School, Community and University Partnership By Challenging
Academics - A Passion for Reason and Knowledge - Strength in Diversity*

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AP® Biology Syllabus – 2020-2021

Instructor Information

Course: AP Biology

Google Classroom code: **212sljc**

Credit: Year-long (1 credit)

Class duration: 90 minutes (Monday & Thursday), 45 minutes (Tuesday, Wednesday, Friday)

Instructor: Prof. Bulalang

Phone: (212) 666-1278 ext. 4071

Email: ibulalang@columbiasecondary.org & ibulalang@schools.nyc.gov

Website: www.profbulalang.com

Textbook

Reece, Jane et al, Campbell Biology (8th Edition), AP Edition, Benjamin Cummings, 2011.

Course Overview

AP Biology is a year-long course which is designed to be taken by students after the successful completion of both high school biology and chemistry. AP Biology includes those topics regularly covered in a college introductory biology course and differs significantly from the standards-based, high school biology course with respect to the kind of textbook used, the range and depth of topics covered, the kind of laboratory work performed by students, and the time and effort required of the students. The textbook used by AP Biology is also used by college biology majors and the kinds of labs done by AP students are similar or equivalent to those done by college students. AP Biology is a course that aims to provide students with the conceptual framework, factual knowledge, and analytical skills necessary to deal critically with the rapidly changing science of biology. This course is designed to prepare students for the Biology College Board Advanced Placement Exam.

AP Exam: Friday, May 14, 2021 @ 8:00am

It is expected that all students enrolled in class will register and take the AP Biology exam. There is an additional cost for taking the exam. This amount will be determined at a future date based on varying factors. Assistance may be available. Additional information about the exam will be provided at a future date. Given its rigorous nature, we will spend time during the year talking about exam strategies, looking at questions from previous tests, and reviewing important concepts. In addition, the typical format of our unit tests will be much the same as the AP test.

Required Materials: (must bring to class everyday)

- 2 College Ruled/Margin Spiral Notebooks 100 sheets (11" x 8 1/2")
- Two 2" 3-Ring View Binder, Letter Size, Black (for lab and lecture)
- Calculator (minimum of scientific, can be same as math)
- Pens, Pencils, Erasers, Highlighters, Metric Ruler, Scissors, glue stick
- White lab coat, long sleeves

Expectations for Success / General Class Expectations

- Come to class every day on time
The difficulty and intense nature of this class makes it incredibly difficult for students to catch up after missing class.
- Complete the required reading assignments PRIOR to coming to class
The immense amount of content will require much initial comprehension outside of class time.
- Follow laboratory safety rules and adhere to the Safety Contract.
- All other expectations align with the Student Contract:
 - Cellular phones, and other distracting devices are not to be used during class.
 - No food, drink, candy, or gum is allowed in the classroom
 - No charging of cell phones in the classroom.

Remember, AP Biology is a rigorous course which demands dedication and personal responsibility from each student. Due dates will be provided for any projects, labs, and assessments, but to do well throughout the course students are strongly encouraged to complete nightly readings and study each day's lecture notes on their own time.

Classroom Management

- Discipline will be handled within the classroom as often as possible for minor disturbances
 1. The student will be asked to stop their behavior
 2. If the behavior does not change the student's parents will be contacted and guidance counselor.
 3. The student will be removed from class and sent to an administrator.
- Additional discipline will follow the Student Contract.

Attendance & Late Work

- **Late work will not be accepted if excused note is not provided.**
- It is your responsibility to make up missed work. It is your responsibility to know what you missed in class. Check your pupilpath account, Google Classroom or ask your lab partner.
 - For late laboratory reports, 10 demerits per day will be issued.

Grades

- Weighted based on assignment type for each Marking Period:

- Tests	30%
- Laboratory	15%
- Activity	15%
- Project	10%
- Do Now	20%
- Credit	5%
- *Conduct	5%

(*attendance, ability to follow rules, class behavior, class participation, meeting deadlines, school uniform)

- Grade book is updated daily and uploaded on pupilpath.com

The Big Ideas

The AP Biology Curriculum is framed around four Big Ideas. Each Big Idea has a set of core concepts called Enduring Understanding. These are the main topics used to guide the AP Biology course curriculum. The outline below illustrates the AP Biology Curriculum Big Ideas and the Enduring Understandings topics covered in class.

Big Ideas	Enduring Understanding
One: The process of evolution drives the diversity and unity of life.	<ul style="list-style-type: none">A. Change in the genetic makeup of a population over time is evolution.B. Organisms are linked by lines of descent from common ancestry.C. Life continues to evolve within a changing environment.D. The origin of living systems is explained by natural processes.
Two: Biological systems utilize energy and molecular building blocks to grow, reproduce, and maintain homeostasis.	<ul style="list-style-type: none">A. Growth, reproduction, and maintenance of the organization of living systems require free energy and matter.B. Growth, reproduction, and dynamic homeostasis require that cells create and maintain internal environments that are different from their external environments.C. Organisms use feedback mechanisms to regulate growth and reproduction, and to maintain dynamic homeostasis.D. Growth and dynamic homeostasis of a biological system are influenced by changes in the system's environment.E. Many biological processes involved in growth, reproduction, and dynamic homeostasis include temporal regulation and coordination.
Three: Living systems retrieve, transmit, and respond to information essential to life processes.	<ul style="list-style-type: none">A. Heritable information provides for continuity of life.B. Expression of genetic information involves cellular and molecular mechanisms.C. The processing of genetic information is imperfect and is a source of genetic variation.D. Cells communicate by generating, transmitting, and receiving chemical signals.E. Transmission of information results in changes within and between biological systems.
Four: Biological systems interact and these interactions possess complex properties.	<ul style="list-style-type: none">A. Interactions within biological systems lead to complex properties.B. Competition and cooperation are important aspects of biological systems.C. Naturally occurring diversity among and between components within biological systems affects interactions with the environment.

The Big Ideas, cont.

Since these ideas are interrelated, they will not be taught in isolation, but will instead be connected by linking the enduring understanding from one Big Idea to another wherever practical. Examples of additional activities and how the Big Ideas will be connected to one another are shown below. There will be many more activities presented here.

Big Idea 1

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

- Students will be provided with amino acid data sets and will be required to order them on a cladogram to correctly show evolutionary history and speciation.
- BI 3 Living systems retrieve, transmit, and respond to information essential to life processes.
- Students will discuss similarities and differences in the process across different domains.

Big Idea 2

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

- Students will compare and contrast anaerobic and aerobic respiration pathways.
- BI 1 The process of evolution drives the diversity and unity of life.
- BI 4 Biological systems interact and these interactions possess complex properties.
- Students will draw a model of organelles involved in helping a plant obtain a constant input of free energy to illustrate and identify the evidence that mitochondria and chloroplasts evolved from free-living organisms.

Big Idea 3

EU 3.A Heritable information provides for continuity of life.

- Students will conduct a fruit fly genetics laboratory involving the crossing of two or more genes in order to determine whether the selected traits follow Mendelian patterns of inheritance.
- BI 1 The process of evolution drives the diversity and unity of life.
- Students will review the experimental designs leading to the demonstration that DNA is the genetic material for all living organisms on Earth.
 - Discussion of mechanisms that increase genetic variation and the relationship to evolutionary fitness

Big Idea 4

EU 4.A Interactions within biological systems lead to complex properties.

- Animated Investigation: How do Abiotic Factors Affect Distribution of Organisms? - Students will use a simple model for observing ecological impact that occurs when single abiotic factors are changes. By changing abiotic factors, data can be collected and analyzed. (www.campbellbiology.com), Chapter 52
- BI 3 Living systems retrieve, transmit, and respond to information essential to life processes.
- Students will identify cellular components (such as ribosomes) and explain how individual parts come together to allow for a complex functioning (such as protein synthesis).

Laboratory Component & Science Practices

In addition to the Big Ideas, the AP Biology course is also structured around inquiry in the lab and the use of the seven science practices. The experience is used to emphasize that biology and science is a process involving the development of a hypothesis, collection of data, and analysis of results.

To ensure the laboratory component of the course is met, a minimum of 25% of class time will be devoted to lab work. A minimum of two inquiry-based investigations will be conducted per Big Idea as required by the course. Inquiry labs are taken from *AP Biology Investigative Labs: An Inquiry-Based Approach* (below). Because the Big Ideas are interrelated, the inquiry-based investigations will not necessarily be conducted in this order. In addition to these inquiry-based labs, additional labs will supplement these to emphasize and deepen understanding of content covered in class.

The Seven Science Practices (SP)

The student can (is):

1. Use representations and models to communicate scientific phenomena and solve scientific problems.
2. Use mathematics appropriately.
3. Engage in scientific questioning to extend thinking or to guide investigations within the context of the course.
4. Plan and implement data collection strategies appropriate to a particular scientific question.
5. Perform data analysis and evaluation of evidence.
6. Work with scientific explanations and theories.
7. To be able to connect & relate knowledge across various scales, concepts & representations in and across domains.

The table below illustrates how each of the 13 inquiry labs relate to the science practices and the big ideas. Only science practices that will be emphasized have been checked. Most of the inquiry labs use all of the practices.

Description	SP1	SP2	SP3	SP4	SP5	SP6	SP7	BI1	BI2	BI3	BI4
Investigation 1 Artificial Selection	X	X			X		X	X			
Investigation 2 Hardy-Weinberg Investigation	X	X			X			X			
Investigation 3 Comparing DNA Sequences with BLAST	X				X			X		X	
Investigation 4 Diffusion & Osmosis		X		X	X				X		X
Investigation 5 Photosynthesis	X	X	X	X		X	X		X		
Investigation 6 Cellular Respiration	X	X	X			X	X		X		
Investigation 7 Cell Division: Mitosis & Meiosis	X				X	X	X	X		X	
Investigation 8 Bacterial Transformation	X		X		X	X	X	X		X	
Investigation 9 Restriction Enzyme Analysis			X			X				X	
Investigation 10 Energy Dynamics	X	X	X	X	X	X	X				X
Investigation 11 Transpiration	X	X		X		X	X		X		X
Investigation 12 Fruit Fly Behavior	X		X	X	X	X	X				X
Investigation 13 Enzyme Activity					X	X	X		X		X

Laboratory Component & Science Practices, cont.

Students will maintain a written record of investigations conducted. In addition, they will be asked for the following throughout the course:

- Formal lab reports that emphasize the development and testing of a hypothesis; collection, analysis, and presentation of data; and a clear discussion of results.
- Model representations illustrating the main investigation components; presenting to small groups or the whole class; fielding questions.

Social & Ethical Concerns

It is essential that students connect their classroom knowledge to socially important issues. AP Biology will allow students to learn about, and discuss, many issues in a variety of formats. Issues will be discussed in a class setting, both live and electronically. Discussion formats may include online forums, research papers, debate, and presentations on current topics having social or ethical issues associated with them. Since the goal is to discuss timely events, the list below is simply an illustration of news issues that continually appear, but will not necessarily be discussed during class.

- Stem Cell Research (Big Idea 3)
- Global Warming (Big Idea 4)
- Antibiotic Resistance and the Problems with Improper Antibiotic Use (Big Idea 1)
- Genetically Modified Food (Big Idea 3)
- Use of Genetic Information (Big Idea 3)

Homework & Readings

Reading the textbook can be expected daily, including over weekends and vacations. Most assignments will be problems from previous collegeboard exams and from the text book, however there will be handouts in class on occasion. All classwork assignments will be handed in and graded. All student data and list of all assignments are posted on Google Classroom, pupilpath.com for student reference. Class work are also uploaded on www.profbulalang.com.

Readings for class include chapters from the textbook. Scientific abstracts and papers are assigned with the purpose of showing how discoveries are made and demonstrate that science is the process. Articles found in science magazines and online news sources may also be assigned to promote discussion about social and environmental concerns.



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2020-2021

AP Biology

Parent and Student Contract

By signing this contract, the parent and the student acknowledge that they have read the syllabus for AP Biology class at Columbia Secondary School and that they *understand* and *agree* to the commitment necessary to be successful in this course.

Please complete the information below and return this statement of understanding to Prof. Bulalang by **Friday, Sept. 4th**.

Parent or Guardian

Phone number: _____

Email address: _____

Student Name (Print)

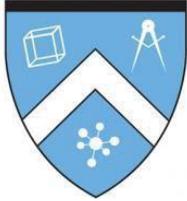
Student Signature

Date

Parent or Guardian Name (Print)

Parent or Guardian Signature

Date



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September 4, 2021

Dear Parent/Guardian,

Your child _____ is presently enrolled in AP Biology in which animal dissection is part of the classroom instruction. Dissection is defined as “the manipulation of preserved animals or animal parts for scientific study, which includes incising and may be followed by inspecting, touching, handling, and mounting.”

In compliance with the New York State Education Law 809, any student **expressing a moral or religious objection to the performance or witnessing of the dissection of an animal**, either wholly or in part shall be provided the opportunity to complete an alternative project that does not include the use of specimens. The student’s parent or legal guardian must **substantiate that objection in writing**.

Columbia Secondary School offers students alternatives to animal dissection should their parent wish their child abstain from these activities. Alternatives to animal dissection may include, but are not limited to: computer programs, plastic models, videos, and charts. Alternative dissection techniques are designed to provide the student with knowledge similar to what is expected to be gained by students in the course who perform, participate in, or observe the dissection.

Students who have opted out of animal dissection exercises are given information on specific activities and resources to use as their alternative assignment. These students are also provided assistance with their alternate task. Students exercising this choice shall not be penalized in any manner, such as by receiving a lower grade or a more arduous alternative project. Testing and evaluation under such circumstances should be designed to measure the student’s knowledge of the course objectives, rather than the process of dissection itself.

If you do not wish your child to participate in animal dissection activities as described within the course, please complete and sign the form attached to this letter and return it to your child’s teacher.

Sincerely,
Prof. Bulalang
AP Biology Teacher

DISSECTION OPT-OUT/CONSENT FORM

I do not wish for my child to participate in animal dissection activities. Instead, I want my child to be provided approved alternatives to animal dissection.

I give my child consent to participate in animal dissection activities.

Name of Student	
Science Class	AP Biology
Parent/Guardian's Name	
Address	
Phone Number	
Signature	
Date	

Please print all information with the exception of your signature