

**Welcome to AP Biology**

**Teacher:**  Mrs. Bottum Room: G127

**Contact:**  bottums@fortschools.org phone: 920-563-7811 x 1131

**Text:** 1. Campbell Biology AP Edition 10th edition

 2. AP Biology Investigative Labs: An Inquiry-Based Approach. New York: The College Board, 2012.

**Online Resource: -** MasteringBiology

* Electronic version of textbook
* Tutorials, Coaching Activities, PowerPoint Presentations (?), Practice Tests, Assignments etc.
* Syllabus
* Lab Info
* Goal is to use this site for all of our needs; in case this site is not sufficient I have established a Schoology site for AP biology (see below)

 

 Access: Go to [www.PearsonSchool.com/Access](http://www.pearsonschool.com/Access) enter first 6 digits of access code

 Access Code: SSNAST-STONK-STEYR-DAYAN-CENTO-AIDES

 Follow prompts and select the following textbook:

####  Campbell, Biology 10e AP® Edition MasteringBiology

 Select student registration

 Course ID: MBBOTTUM61259

* Schoology
* Register by going to [www.schoology.com](http://www.schoology.com)
* Access code is 497H5-KKBM4
* Powerpoint presentations

**Personal Electronic Devices**

Please remove headphones/ earplugs before entering classroom. Store and keep all PEDs in your backpack for the entire duration of class. Close to bell-time is classroom time - not PED time.

Focus on what is happening in class, socialize with your classmates. Allow your peers to experience the benefit of getting to know you. Do not hide in your PED.

**I will confiscate your electronic equipment and keep it until the end of the day if I see it used without permission. Please do not use this room as a charging station.**

**Course Objective and Structure:**

The AP biology course is designed to be the equivalent of a 2 semester college introductory course. Its goal is to help you discover concepts of modern biology rather than merely memorizing countless number of facts. The curriculum is framed around 4 big ideas/concepts:

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

Due to the large amount and detail of the material to be covered, the rigor and pace of this course is extremely high and requires your constant focus and attention. You will explore the question ‘ How do we know what we know’ by investigating the following 8 units:

Unit 1: The Chemistry of Life Unit 2: The Cell

Unit 3: Cell Processes: Energy and Communication Unit 4: Heredity

Unit 5: From Gene to Protein Unit 6: Evolution and Phylogeny

Unit 7: Biodiversity Unit 8: Ecology

**The following are guidelines that are intended to make this a successful experience for you:**

1. ***Reading***

Look at your textbook (...yes, it is a fat one!) and give it a big hug. It will be your best (closest??) friend for the next 9 1/2 months. It is an absolute necessity that you read all assigned chapters and work through them using the online reading guide. It will serve as a resource and reference; our discussions and notes will make a lot more sense if you have prior knowledge of the topic.

**2. MasteringBiology**

This is an online tool based on our textbook and designed for AP biology students. You and I both will learn to use the site together. It has a tremendous amount of resources and I encourage you to navigate and use the site on your own. My goal is to assign activities and reviews for each chapter

**3.** ***Note taking***

Take notes each and every period. Review your notes daily with the help of the textbook and write down any questions you have. I will post my powerpoints online - print them out and use them as a note-guide.

**4*. Homework/assignments***

The purpose of homework is to familiarize yourself with the material and to practice what you have learned in class. Please understand that you are not doing homework for me. Take this as an opportunity to see whether you understand the material.

**5. Study Groups**

Consider forming a small group of 3-4 students that meets regularly to discuss homework, assignments, labs etc. ‘Talking Biology’ helps you see where you are at, what misconceptions you or others might have and makes the learning process more enjoyable. Make sure to choose a group that will be productive.

***6. Late policy***

Due to the high pace of this course, avoid ‘tangoing’ with this policy at all cost. It will be difficult to play catch up and to stay afloat for the current material at the same time.

In case that you do however find yourself behind, here is the policy:

All assignments are due on or before the deadline. I will not accept any late assignments after the assignment has been discussed or we have moved to the next topic. The purpose of assignments is to check your understanding of the material.

**7.** ***Absence***

In case you are absent, you are responsible for any and all missed material. It is your responsibility to find out what was covered in class to get someone’s notes and to inform yourself about any upcoming quizzes r tests. If you are absent the day of a quiz or test, you need to take the test/quiz the day you return to school on your own time.

***8. Essay Wednesdays***

Given the volume of material to cover we will have very limited time to work on essay questions in class. In order to practice scientific writing we will tackle essay questions on Wednesday mornings from 7-7:40 ish starting sometime mid/end September. Participation is not mandatory however I highly recommend attending these sessions in order to both review material and to prepare for the AP test.

**9. Evaluation:**

Tests At end of each quarter. Questions will be of multiple choice and free response format taken from previous AP exams, covering previous coursework; cumulative

Quizzes Multiple choice format and essay, covering 2-3 chapters and labs

MasteringBiology Assignment completion is checked and recorded and some are graded

Essays See Essay Wednesdays

Lab work Lab reports will be graded; format will be announced

**There are no extra credit projects.**

*Quarter:*

Formal assessments (85%): Tests, quizzes, projects, lab conclusions, essays

Practice and informal assessment (15%): Daily classwork, practice & homework, essays, online assignments

*Semester:*  45% first quarter, 45% second quarter, 10% final exam

 B+ 88-86 C+ 78-76 D+ 68-66

A 100-93 B 85-82 C 75-72 D 65-63 F < 60

A- 92-89 B- 81-79 C- 71-69 D- 62-60

Grades are accessible on powerschool and are updated regularly.

**NE** no evidence; used when a) no work has been turned in or it has been turned in with nothing completed and b) a formal assessment piece is missing (0%)

**I** incomplete; used to reflect partial completion of practice/ informal assessment (no lower than 50%)

**NP** non-proficient (50%); used when a formal assessment reflects that the student does not meet the content objectives/standards

**Lab work:**

About 25% of class time you will be engaged in investigative laboratory work. Labs will be inquiry based, student-directed investigations. The labs are intended to increase content knowledge as well as to solidify the following common science practices (SP):

***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.*

There will be at least two laboratory experiences per big idea selected from the list below from the AP Biology Investigative Lab Manual: An inquiry-based approach (2012). These labs will be spread throughout the school year some will require an early start of or longer stay after class. Consult your lab manual for more detailed information regarding each lab. Lab findings will typically be discussed in class and a written reports must be handed in. The following tables show which labs cover a given big idea as well as the application of science practices in each of the labs:

|  |
| --- |
| **Big Idea 1: Evolution** |
|  | SP1 | SP2 | SP3 | SP4 | SP5 | SP6 | SP7 |
| Lab 1Artificial Selection/Wisconsin Fast Plants | X | X |  |  | X |  | X |
| Lab 2Mathematical Modeling/Hardy WeinbergHHMI: Allele and phenotype frequencies in rock pocket mouse population | X | X |  |  | X |  |  |
| Lab 3Comparing DNA sequences to understand evolutionary relationships with BLAST | X |  |  |  | X |  |  |
| Investigative lab of your choice addressing concepts of evolution (teacher consent) |  |  |  |  |  |  |  |

|  |
| --- |
| **Big Idea 2: Cellular Processes; Energy and Matter** |
|  | SP1 | SP2 | SP3 | SP4 | SP5 | SP6 | SP7 |
| Lab 4Diffusion and Osmosis |  | X |  | X | X |  |  |
| Lab 5Photosynthesis | X | X | X | X |  | X | X |
| Lab 6Cellular Respiration | X | X | X |  |  | X | X |
| Investigative lab of your choice addressing concepts of cellular processes, energy and matter (teacher consent) |  |  |  |  |  |  |  |
| **Big Idea 3: Genetics and Information Transfer** |
|  | SP1 | SP2 | SP3 | SP4 | SP5 | SP6 | SP7 |
| Lab 7Cell Division - Mitosis and Meiosis | X |  |  |  | X | X | X |
| Lab 8Biotechnology - Transformation | X |  | X |  | X | X | X |
| Lab 9Biotechnology - Restriction Enzyme Analysis/DNA Fingerprinting |  |  | X |  |  | X |  |
| Investigative lab of your choice addressing concepts of genetics and information transfer (teacher consent) |  |  |  |  |  |  |  |

|  |
| --- |
| **Big Idea 4: Interactions** |
|  | SP1 | SP2 | SP3 | SP4 | SP5 | SP6 | SP7 |
| Lab 10Energy Dynamics | X | X | X | X | X | X | X |
| Lab 11Transpiration | X | X |  | X |  | X | X |
| Lab 12Fruit Fly Behavior | X |  | X | X | X | X | X |
| Lab 13Enzyme Activity |  |  |  |  | X | X | X |
| Investigative lab of your choice addressing concepts of interactions (teacher consent) |  |  |  |  |  |  |  |

**Course Outline:**

SG - Study/reading guides. Composed of questions and tasks intended to facilitate retention of material

Student media activities: Assigned and self-directed on-line activities (MasteringBiology)

HHMI - Howard Hughes Medical Institute biointeractive

|  |
| --- |
| UNIT 1- Chemistry of Life (Big Idea 2, 3, 4) |
| Topic | Activity | Assignment | Assessment |
| * Structure of Atoms
* Types of Chemical Bonds
* Water and role in biology
* Functional Groups
* Structure and Function of Macromolecules
* Enzymes
* Energy
 | 1. Student presentations: Properties of water
2. Journal Article and Questions
3. Molecular models of macromolecules
4. Amino acid/protein folding kit
5. Case-study: Picture Perfect
6. Student media activities pertaining to covered topics
7. Osmosis and diffusion lab
 | 1. Chemistry Review sheet/summer assignment
2. SG cha. 2-5
3. Lab report osmosis and diffusion
4. AP essay question
 | 1. Chemistry Test
2. Multiple Choice Test
 |

|  |
| --- |
| UNIT 2- The Cell (Big Idea 1, 2, 3, 4) |
| Topic | Activity | Assignment | Assessment |
| * Eukaryotic versus prokaryotic cells
* Sub-cellular organization
* Organelle structure and function
* Membrane structure and function
* Cellular differentiation and specialization
* Stem cells
* Cancer
 | 1. Student presentation on comparison of structure and function of cells from different kingdoms
2. Student research and presentation on diseases related to cell organelles
3. Student presentation on stem cell use and research
4. Journal article and questions
5. Modeling cell membrane
6. Student media activities pertaining to covered topics
7. Ethical concerns regarding use of embryonic stem cells
8. The Economist: Microbes maketh man - article and questions
9. HHMI: Stem cells and diabetes activity
 | 1. SG cha. 6,7,11
2. Bioterrorism: Ricin essay and other biological toxins
3. AP essay questions
4. Lab report lab 7
 | 1. Multiple Choice Test
2. Essay questions
 |

|  |
| --- |
| UNIT 3 - Cell Processes: Energy and Communication (Big Idea 1, 2, 3, 4) |
| Topic | Activity | Assignment | Assessment |
| * Enzyme kinetics
* ATP cycle
* Anaerobic cellular respiration
* Aerobic cellular respiration
* Fermentation
* Light reaction
* Calvin cycle
* Photosynthetic adaptations
* Cell signaling
* Endocrine system
* Immune system
* Nervous system
 | 1. Student presentation on structure and function of cell and organelle membranes
2. Toothpickase - lab
3. Lab 13 - Enzyme activity
4. Lab 5 - Photosynthesis
5. Lab 6 - Cellular respiration
6. Lab 12 - Fruit fly behavior
7. Use a hydrogen fuel cell to show how the flow of electrons in both CR and PS generates energy
8. Investigate the process of CR using molecular models
9. Investigate the process of PS using molecular models

Journal article and questionsCase study: Bean BrewHHMI: Biochemistry and cell signaling pathway of the Mc1r geneStudent media activities pertaining to covered topics  | 1. SG cha. 8,9,10, 45, 48,
2. Lab reports labs 5,6, 12, 13
3. AP essay questions
 | 1. Explain the process of PS using molecular models
2. Explain the process of CR using molecular models
3. Multiple choice test
4. Essay questions
 |
| UNIT 4 - Heredity (Big Idea 1, 2, 3, 4) |
| Topic | Activity | Assignment | Assessment |
| * Cell cycle
* Mitosis
* Meiosis
* Mendelian genetics
* Inheritance patterns
* Chromosomal structure and function
* Genetic diseases
* Chi-Square
 | 1. Lab 7: Mitosis and meiosis
2. Chi-Square Analysis - M&M lab
3. Drosophila inheritance - computer simulations
4. Student media activities pertaining to covered topics
 | 1. Lab report lab 7
2. Chi-Square Analysis report
3. SG cha. 13-15
 | 1. Chemistry Test
2. Multiple Choice Test
 |

|  |
| --- |
| UNIT 5 - From Gene to Protein (Big Idea 1, 2, 3, 4) |
| Topic | Activity | Assignment | Assessment |
| * Structure and Function of DNA and RNA
* DNA replication
* Translation
* Transcription
* Mutation
* Regulation of gene expression
* Genetics of viruses and bacteria
* Genetic diseases
 | 1. Compare and contrast process of replication to polymerase chain reaction
2. HHMI: Molecular genetics of color mutations in rock pocket mice **(CR4c)**
3. HHMI: How novel icefish genes can improve human health
4. Lab 8: Transformation
5. Lab 9: Restriction enzyme analysis/DNA fingerprinting
6. Human beta globin gene activity MSOE
7. HHMI: Bacterial ID lab
8. Student media activities pertaining to covered topics
 | 1. SG cha.
2. Lab reports lab 8, 9
 | 1. Multiple choice test
2. Essay questions
 |

|  |
| --- |
| UNIT 6 - Evolution (Big Idea 1, 2, 3, 4) |
| Topic | Activity | Assignment | Assessment |
| * History of planet Earth
* Mechanism for evolution
* Evidence for evolution
* Natural selection
* Speciation
* Endosymbiotic theory
 | 1. Compare structure of proteins involved in cellular respiration of various organisms to show evolutionary relationships using BLAST and NCBI Time line - evolution of life on Earth
2. HHMI: Natural selection and evolution of rock pocket mouse population
3. HHMI: Natural selection in humans - sickle cell mutation and protection against malaria
4. HHMI: Birth and death of genes
5. Lab 2: Hardy Weinberg
6. HHMI: Biodiversity and evolutionary trees
7. Student media activities pertaining to covered topics
 | 1. Lab report lab 2
2. SG cha. 22-26
3. AP essay question
 | 1. Multiple choice test
2. Essay questions
 |

|  |
| --- |
| UNIT 7 - Biodiversity (Big Idea 1, 2, 3, 4) |
| Topic | Activity | Assignment | Assessment |
| * Animal structure
* Animal reproduction
* Evolutionary trends in animals
* Plant structure
* Plant reproduction
* Evolutionary trends in plants
* Fungi
* Protist
 | 1. Investigate plant structure and rate of transpiration in plants of different biomes
2. Compare adaptation of antarctic ice fish to those living in Wisconsin
3. HHMI: Viscosity of icefish and non-icefish blood
4. Comparison of animal and plant defense mechanisms
5. Comparison of gas exchange in aquatic and terrestrial animals
6. Interpretation and development of cladogram
7. Student media activities pertaining to covered topics
 | 1. SG cha. 40-42, 44, 461. SG cha. 35-39
2. AP essay question
 | 1. Multiple choice test
2. Essay questions
 |

|  |
| --- |
| UNIT 8 - Ecology (Big Idea 2, 3, 4) |
| Topic | Activity | Assignment | Assessment |
| * Population dynamics
* Communities and ecosystems
 | 1. HHMI: Mosquito life cycle activity
2. Student presentation: Mosquitos as human or equine disease vectors
3. Dissolved oxygen and primary aquatic activity lab
4. Students investigate and report on the symbiotic relationship between termites and protists
5. Lab 10: Energy Dynamics
6. Student media activities pertaining to covered topics
7. Student investigation and report: Invasive species in Wisconsin - origin, impact and eradication measures
8. Students investigate the use of algae as a realistic source of energy
 | 1. SG cha. 50-55
2. AP essay question
3. Report on dissolved oxygen lab
4. Lab report lab 10
 | 1. Multiple Choice Test
2. Essay question
 |