ADVANCED PLACEMENT

BIOLOGY SYLLABUS

 2017-2018

**COURSE DESCRIPTION** (The College Board)

The AP Biology course is designed to be the equivalent of a college-level introductory biology course. The intent of the course is to expose students to higher-level biological principles, concepts, and skills and allow them the opportunity to apply their knowledge to real-life applications. Students are expected to learn not by memorization of facts, but through content and concept application via the AP Biology science practices. Twenty-five percent of instructional time is dedicated to student-directed, inquiry-based lab investigations and activities.

Yes, this is a college class that is rigorous and demanding so there is no time for whining or excuse making. You are expected to put forth effort and time well beyond the classroom. Assigned reading and studying is necessary to prepare you for class discussion and participation. This is not a class that you can pick up for 90 minutes a day in school and be successful. Be prepared to dedicate at least one hour a day to this class outside of school.

**PREREQUISITES**

In order to enroll in AP Biology, you must have successfully completed Honors level biology and chemistry or have a teacher recommendation.

**AP EXAM**

On **May 14, 2018** everyone enrolled in AP Biology will take the national AP Biology exam. If you earn a score of 4 or 5 you can receive college credit for the class. Some colleges or universities will accept a 3, so check with the schools that you are interested in to see their requirements. The AP exam is divided into two sections: multiple choice and free response, each accounting for half of the exam grade. In the first section there are 63 multiple choice questions and six grid-in responses that integrate science and mathematical skills. The second section includes two long free response questions and six short free response questions. You will have three hours to complete the exam. It will be important that you keep all materials for this class until the exam.

**TEXTBOOK AND SUPPLEMENTAL RESOURCES**

Required: Biology, Campbell & Reese 10th Ed. AP Edition.

Recommended: Kaplan AP Biology 2016 (Kaplan Test Prep) or Cracking the AP Biology Exam, 2018 Edition (College Test Preparation)

**REQUIRED COURSE MATERIALS**

* Three ring binder (2 in.) with lined paper and dividers
* Composition notebook
* Colored pencils
* Blue or black ink pens/pencils
* Calculator
* Internet and printer access

**CLASSROOM EXPECTATIONS**

* Be prepared and on time.
* Be considerate of others and their property:
	+ Do not interrupt others while they are talking.
	+ Be recognized before speaking aloud.
	+ If it’s not yours, don’t touch it.
	+ If you can’t say something nice, don’t say anything at all.
* **Cell phones must be turned off and out of sight at all times**. Cell phones will be confiscated and given to administration as school policy dictates.
* Have you ID displayed properly at all times.

**CONSEQUENCES**

* Verbal warning
* Conference with teacher/parent notification
* Referral to administration
* SEVERE DISRUPTIONS WILL RESULT IN AN IMMEDIATE REFERRAL TO ADMINISTRATION.

**GRADING POLICY**

Daily assignments (homework, assignments completed in class, warm-ups) 20%

Labs (lab reports, lab notebooks, lab posters) 25%

Tests (unit tests, major projects) 40%

Quizzes (reading, vocabulary, lab quizzes) 15%

**CLASS PROCEDURES AND STUDENT EXPECTATIONS**

NOTEBOOK SET-UP- Your notebook will be one of your biggest assets to this class. I will not check it but following this set-up will be most beneficial to you.

Section 1: Syllabus, course information, weekly calendars

Section 2: Big Idea 1

Section 3: Big Idea 2

Section 4: Big Idea 3

Section 5: Big Idea 4

Section 6: Lab handouts

Section 7: Vocabulary

Section 8: Exam review

ONLINE MATERIALS- You will receive a student code to set up an account for Pearson MyLab and Mastering Biology programs. You will need to do this as soon as possible. You will be given assignments from these programs and it will also give access to the online textbook.

HOMEWORK- You will have homework **every day**. This is a fast-paced class so it is very important that you do the required reading every time it is assigned. This will prepare you for class discussion, activities, and/or labs. **You will have a quiz for every reading assignment.** You must dedicate some time to this class every day at home if you plan to be successful. Along with stated assignments, you should review class notes, study guides, and handouts every day.

QUIZZES- There will be a quiz given almost every day in class. Most quizzes will be no more than 10 questions. The quizzes may be on the assigned reading, a recent concept discussed in class, or an ongoing lab activity. BE PREPARED EVERY DAY! When you are assigned to read a section of the textbook, you should take notes on what you read. You will be able to use these notes on the quiz the following day, **only if they are hand-written**.

LATE/MISSING WORK- Any work not turned in at the assigned time will be penalized 10 percent of the assigned grade per day. No work will be accepted once the concept it covers has been tested. Homework that is reviewed or checked at the beginning of class cannot be turned in late.

ABSENSES- Attendance is very important. There is no way to truly make up what is missed in class. If you are absent, you should check your class folder. You will need to check with a classmate or my website for missed notes. You will need to arrange to make up tests after school. If you are absent on the day before an assigned test, you will be required to take it on the assigned day. Daily quizzes will also be made up after school. You have three days to make up any missed work or it will be considered late.

LABS/LAB NOTEBOOK- The College Board no longer mandates AP students to complete 12 required teacher directed labs. Beginning with the 2012 school year, you are required to complete eight inquiry based, student directed labs. This means that instead of having a set of clear cut instructions to follow, you will mostly be designing, conducting and evaluating your own lab activities. You will set up a lab notebook for designing your lab, recording data, and analyzing your results. The lab notebook will serve as the basis for formal lab reports. You will be given a format to use in your notebook. For the eight required labs, you are required to prepare formal lab reports. There will be smaller labs included throughout the year. Lab activities cannot be made up, so please be sure to be present on these days. An alternative assignment will be given if you miss a lab activity.

TESTS- Tests will follow the AP format: multiple-choice and free response. Each test will contain at least one question from a previous test. At the end of each grading period will be a cumulative test. If you do not pass a test, you make retake it for a 60 after school. You may also challenge an incorrect answer in a written response. If I find your challenge acceptable, you will receive half credit for the answer.

WORK HEADING- For all work turned in, except formal lab reports, please place the following information in the upper right corner of the paper: **your full name, date, and an assignment title**.

AFTER SCHOOL- I will be available after school on Monday and Wednesday. Please let me know if you intend to stay for make-up work or extra help on those days. If you are not in my room by 3:10 I will assume that you are not coming.

SCIENCE ARTICLES- You are required to find, read and analyze four science articles per grading period. I will assign some of the articles. Due dates will be given at the beginning of each grading period.

CHEATING- ABSOLUTELY no cheating is acceptable. If you are caught cheating in any manner, you will receive a zero with no chance to make it up and your parent will be notified. If you are caught allowing someone to copy your work, you will face the same consequences.

Plagiarism is also a form of cheating. You must cite your sources, when necessary, using APA format.

EXTRA CREDIT- Extra credit assignments will not be offered in this course. There may be bonus questions on a test from time to time. In order to do well you must complete all assignments on time and to the best of your ability.

**IF YOU DO NOT PASS AP BIOLOGY SEMINAR YOU WILL BE DROPPED FROM AP BIOLOGY.**

**ANTICIPATED SCOPE AND SEQUENCE**

The AP Biology curriculum framework is centered on four Big Ideas. Each unit of the course will is developed to encompass these ideas. The Big Ideas are:

 **Big Idea 1:** The process of evolution drives the diversity and unity of life.

**Big Idea 2:** Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.

**Big Idea 3:** Living systems store, retrieve, transmit and respond to information essential to life processes.

**Big Idea 4:** Biological systems interact, and these systems and their interactions possess complex properties.

The following is the anticipated scope and sequence of the course. Every attempt will be made to follow this sequence but changes will be made when necessary.

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit and Time Frame** | **Topics Discussed/Correlated Text Chapters** | **Enduring Understandings/Essential Knowledge Addressed** | **Associated Labs (Additional labs activities may be added.)** |
| Unit 1: Evolution/BiodiversityTime: 4 weeks | Natural SelectionForces of EvolutionEvidence of EvolutionMeasuring Evolutionary ChangeOrigin of LifeSpeciationChapters: 22, 23, 24, 25, 26 | 1A.1, 1A.2, 1A.3, 1A.4, 1B.1, 1B.2, 1C.1, 1C.2, 1C.3, 1D.1, 1D.2, 2A.2, 2C.2, 2D.1, 2D.2, 3A.1, 3A.2, 3A.3, 3C.1, 3C.2, 4A.4, 4A.6, 4B.3, 4C.3, 4C.4 | Natural Selection Simulation Investigation 2: Hardy-Weinberg ModelingEvolution and Classification |
| Unit 2: EcologyTime: 3 weeks | BehaviorPopulation DynamicsSymbiosisEcosystemsConservation BiologyHuman ImpactChapters: 51, 52, 53, 54, 55, 56 | 1C.1, 1C.3, 2A.1, 2A.2, 2A.3, 2C.1, 2C.2, 2D.1, 2D.3, 2D.A, 2E.3, 3E.1, 4A.5, 4A.6, 4B.3, 4B.4, AC.3, 4C.4 | Animal Behavior Dissolved Oxygen Investigation 10: Energy Dynamics |
| Unit 3: BiochemistryTime: 1 ½ weeks  | Review of Basic ChemistryProperties of WaterProperties of Organic MoleculesMacromolecules and FunctionEnzyme Structure and FunctionChapters: 2, 3, 4, 5 | 1D.2, 2A.1, 2A.2, 2A.3, 2C.1, 2D.1, 3A.1, 4A.1, 4B.1, 4C.1 | Water Properties Rate of Reaction/Enzyme Activity |
| Unit 4: Cell Structure and FunctionTime: 4 ½ weeks | Cell and Membrane Structure and FunctionCellular TransportNeuronsPlant TransportMitosis/MeiosisChromosomal AbnormalitiesChapters: 6, 7, 12, 13, 15, 36, 48 | 1B.1, 1D.2, 2A.1, 2A.2, 2A.3, 2B.1, 2B.2, 2B.3, 2C.1, 2C.2, 2D.1, 2E.1, 3A.1, 3B.1, 3B.2, 3D.1, 3D.2, 3D.3, 3D.4, 4A.2, 4B.2, 4C.1 | Investigation 4: Diffusion and OsmosisInvestigation 7: Cell Division: Mitosis and MeiosisInvestigation 11: Transpiration |
| Unit 5: MetabolismTime: 3 weeks | Cellular RespirationPhotosynthesisChapters: 7, 8, 9 | 1B.1, 1D.2, 2A.1, 2A.2, 2A.3, 2C.1, 2C.2, 2D.1, 2D.3, 2E.1, 3B.2, 4A.1, 4A.2, 4A.4, 4B.1, 4B.2, 4C.1 | Cell RespirationInvestigation 5: Photosynthesis FLDA |
| Unit 6: Cellular Communication and ImmunityTime: 4 weeks | Signal Transduction PathwaysEndocrine SignalingImmunology and Immune SystemEmbryo DevelopmentPlant HormonesChapters: 11, 39, 43, 45, 47 | 3D.1, 3D.2, 3D.3, 4A.4, 4B.2, 3E.2, 2E.1, 2E.2, 2D.2, 2D.3, 2D.4, 2C.1, 2C.2 | ELISA Protein Assay |
| Unit 7: GeneticTime: 3 weeks | Mendelian GeneticsHuman Genetic DiseasesChromosomal MutationsChapters: 14, 15 | 1A.2, 1A.3, 1A.4, 1B.1, 1C.1, 1C.3, 2C.1, 2D.1, 2E.1, 3A.1, 3A.2, 3A.3, 3A.4, 3B.1, 3B.2, 3C.1, 3C.2, 3C.3, 4A.1, 4A.2, 4A.3, 4A.4, 4B.1, 4B.2, 4C.1, 4C.2 | M&M Chi Square AnalysisCorn Chi Square Analysis |
| Unit 8: Molecular Biology and BiotechnologyTime: 5 weeks | DNA Structure and FunctionTranscription/TranslationProtein SynthesisGene RegulationVirusesChapters: 16, 17, 18, 19, 20, 21 | 1A.2, 1A.3, 1A.4, 1B.1, 1C.1, 1C.3, 2C.1, 2D.1, 2E.1, 3A.1, 3A.2, 3A.3, 3A.4, 3B.1, 3B.2, 3C.1, 3C.2, 3C.3, 4A.1, 4A.2, 4A.3, 4A.4, 4B.1, 4B.2, 4C.1, 4C.2 | Restriction Enzyme Analysis: Paper PlasmidInvestigation 8: Bacterial TransformationElectrophoresis: DNA Fingerprinting |
| Unit 9: Organismal Anatomy and PhysiologyTime: 4 weeks | Environmental Constraints of AdaptationsBody SystemsReproductionHomeostasisChapters: 40, 41, 42, 44, 45, 46, 49 | 1B.1, 1C.3, 1D.2, 2A.1, 2A.2, 2A.3, 2C.1, 2C.2, 2D.1, 2D.2, 2D.3, 2D.4, 2E.2, 3B.2, 3C.2, 3D.1, 3D.2, 3D.3, 3D.4, 3E.1, 3E.2, 4A.3, 4A.4, 4B.1, 4B.2, 4C.1 | Physiology of the Circulatory SystemVirtual Fetal Pig Dissection |
| **2 WEEKS OF EXAM REVIEW** |

**LABORATORY INVESTIGATIONS**

Approximately 40% of the course will be devoted to laboratory investigations and various other classroom activities that will enhance the student’s conceptual understanding of the course material. Each activity that has been selected is based on the seven science practices described in the AP Biology curriculum framework. The science practices are listed below.

**Science Practice 1:** The student can use representations and models to communicate scientific phenomena and solve scientific problems.

**Science Practice 2:** The student can use mathematics appropriately.

**Science Practice 3:** The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course.

**Science Practice 4:** The student can plan and implement data collection strategies appropriate to a particular scientific question.

**Science Practice 5:** The student can perform data analysis and evaluation of evidence.

**Science Practice 6:** The student can work with scientific explanations and theories.

**Science Practice 7:** The student is able to connect and relate knowledge across various scales, concepts and representations in and across domains.

The following table shows the correlation of laboratory investigations to be completed with the science practices and Big Ideas. It also states the method students will use to report on each investigation.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Title** | **SP 1** | **SP 2** | **SP 3** | **SP 4** | **SP 5** | **SP 6** | **SP 7** | **BI 1** | **BI 2** | **BI 3** | **BI 4** |
| Natural Selection SimulationDocumentation: Informal lab report | X | X |  |  | X |  | X | X |  |  |  |
| Hardy-Weinberg ModelingDocumentation: Formal lab report | X | X |  | X | X | X | X | X |  |  |  |
| Evolution and ClassificationDocumentation: Mini-poster | X |  | X | X | X | X |  | X |  |  |  |
| Animal BehaviorDocumentation: Mini-poster | X |  | X | X | X |  |  |  |  |  | X |
| Dissolved OxygenDocumentation: Formal lab report | X | X | X | X | X | X | X |  |  |  | X |
| Energy DynamicsDocumentation: Mini-poster | X | X | X | X | X | X | X |  | X |  | X |
| Water PropertiesDocumentation:  |  |  | X |  | X | X |  |  | X |  |  |
| Rate of Reaction/Enzyme ActivityDocumentation: Informal lab report |  | X | X | X | X | X | X |  | X |  | X |
| Diffusion and OsmosisDocumentation: Informal lab report |  | X | X |  | X | X | X |  | X |  |  |
| Cell Division: Mitosis and MeiosisDocumentation: Informal lab report | X | X | X | X | X |  | X | X |  | X |  |
| TranspirationDocumentation: Formal lab report | X |  | X | X | X | X |  |  | X |  | X |
| Cell RespirationDocumentation: Mini-poster | X | X | X | X | X | X | X |  | X |  |  |
| Photosynthesis: FLDADocumentation: Formal lab report | X | X | X | X | X | X | X |  | X |  |  |
| ELISA Protein AssayDocumentation: Mini-poster | X | X | X | X | X | X | X |  |  | X | X |
| Corn Chi-SquareDocumentation: Informal lab report | X | X |  |  | X | X |  |  |  | X |  |
| Restriction Enzyme Analysis: Paper PlasmidDocumentation: Informal lab report | X |  | X |  | X | X | X |  |  | X |  |
| Bacterial TransformationDocumentation: Formal lab report | X |  |  |  | X | X | X |  |  | X |  |
| Electrophoresis: DNA FingerprintingDocumentation: Mini-poster | X | X | X | X | X | X | X |  |  | X | X |
| Physiology of the Circulatory SystemDocumentation: Informal lab report |  | X |  |  | X |  | X |  | X |  | X |
| Virtual DissectionDocumentation: Informal lab report | X |  |  |  |  |  | X |  |  |  | X |

**LEARNING OBJECTIVES**

The following table correlates at least one unit project that will be assigned for each Big Idea with the Learning Objective(s) to be addressed.

|  |  |  |
| --- | --- | --- |
| **Project/Description** | **Unit** | **Learning Objectives** |
| Future Creature Project- Students will select an animal and research its evolutionary history, its habitat, feeding and mating habits, and current environmental conditions. Using this research, students will predict possible evolutionary changes for the animal and create a 3-D model of the future creature. | Evolution/Biodiversity | LO 1.9- The student is able to evaluate evidence provided by data from many scientific disciplines that support biological evolution.LO 1.10-The student is able to refine evidence based on data from many scientific disciplines that support biological evolution.LO 1.11- The students is able to design a plan to answer scientific questions regarding how organism have changed over time using information from morphology, biochemistry, and geology.LO 1.12- The student is able to connect scientific evidence from many scientific disciplines to support the modern concept of evolution.LO 1.31- The student is able to evaluate the accuracy and legitimacy of data to answer scientific questions about the origin of the Earth. |
| Human Impact Project- Students will consider one of a variety of human impacts on Earth’s ecosystems and compose a brief presentation of their research. | Ecology | LO 2.22- The student is able to refine scientific models and questions about the effect of complex biotic and abiotic interactions on all biological systems, from cells and organisms to populations, communities, and ecosystems.LO 2.24- The student is able to analyze data to identify possible patterns and relationships between a biotic or abiotic factor and a biological system.LO 4.9- The student is able to predict the effects of a change in a component(s) of a biological system on the functionality of an organism(s).LO 4.10- The student is able to refine representations and models to illustrate biocomplexity due to interactions of the constituent parts.LO 4.11- The student is able to justify the selection of the kind of data needed to answer scientific questions about the interaction of population within communities.LO 4.19- The student is able to use data analysis to refine observations and measurements regarding the effect of population interactions on patterns of species distribution and abundance.LO 4.20- The student is able to explain how the distribution of ecosystems changes over time by identifying large-scale events that have resulted in these changes in the past.LO 4.21- The student is able to predict consequences of human actions on both local and global ecosystems.LO 4.16- The student is able to predict the effects of a change of matter or energy availability on communities.LO 4.26- The student is able to use theories and models to make scientific claims and/or predictions about the effects of variation within populations on survival and fitness.LO 4.27- The student is able to make scientific claims and predictions about how species diversity within an ecosystem influences ecosystem stability. |
| Macromolecule Information Poster- Students will prepare and present a poster that informs others of the molecular shape, function, application, and associated disorders of macromolecules.  | Biochemistry | LO 4.1- The student is able to explain the connection between the sequence and the subcomponents of a biological polymer and its properties.LO 4.2- The student is able to refine representations and models to explain how the subcomponents of a biological polymer and their sequence determine the properties of that polymer.LO 4.3- The student is able to use models to predict and justify the changes in the subcomponents of a biological polymer affect the functionality of the molecule.LO 4.4- The student is able to make a prediction about the interactions of subcellular organelles.LO 4.5- The student is able to construct explanations based on scientific evidence as to how interactions of subcellular structures provide essential functions.LO 4.6- The student is able to use representations and models to analyze situations qualitatively to describe how interactions of subcellular structures, which possess specialized functions, provide essential functions. |
| Chromosomal Abnormalities Presentation- Students will research a disorder caused by chromosomal abnormalities and present information in the form of a PowerPoint or Prezi. | Cell Structure and Function | LO 2.5- The student is able to construct explanations of the mechanisms and structural features of cells that allow organisms to capture, store or use free energy.LO 2.10- The student is able to use representations and models to pose scientific questions about the properties of cell membranes and selective permeability based on molecular structure.LO 2.13- The student is able to explain how internal membranes and organelles contribute to cell functions.LO 2.14- The student is able to use representations and models to describe difference in prokaryotic and eukaryotic cells.LO 4.4- The student is able to make a prediction about the interactions of subcellular organelles.LO 4.5- The student is able to construct explanations based on scientific evidence as to how interactions of subcellular structures provide essential functions.LO 4.6- The student is able to use representations and models to analyze situations qualitatively to describe how interactions of subcellular structures, which possess specialized functions, provide essential functions. |
| Insecticide Case Study- Students will complete a case study on the effects of insecticides on cellular respiration. | Metabolism | LO 1.15- The student is able to describe specific examples of conserved core biological processes and features shared by all domains or within one domain of life, and how these shared, conserved core processes and features support the concept of common ancestry for all organisms.LO 1.16- The student is able to justify the scientific claim that organisms share many conserved core processes and features that evolved and are widely distributed among organisms today.LO 2.1- The student is able to explain how biological systems use free energy based on empirical data that all organisms require constant energy input to maintain organization, to grow, and to reproduce.LO 2.2 The student is able to justify a scientific claim that free energy is required for living systems to maintain organization, to grow or to reproduce, but that multiple strategies exist in different living systems.LO 2.3 The student is able to predict how changes in free energy availability affect organisms, populations and ecosystems.LO 2.4 The student is able to use representations to pose scientific questions about what mechanisms and structural features allow organisms to capture store and use free energy.LO 2.5 The student is able to construct explanations of the mechanisms and structural features of cells that allow organisms to capture store or use free energy. LO 2.12 The student is able to use representations and models to analyze situations or solve problems qualitatively and quantitatively to investigate whether dynamic homeostasis is maintained by the active movement of molecules across membranes. LO 2.13 The student is able to explain how internal membranes and organelles contribute to cell functions.LO 2.14 The student is able to use representations and models to describe differences in prokaryotic and eukaryotic cells. LO 4.4 The student is able to make a prediction about the interactions of subcellular organelles. LO 4.5 The student is able to construct explanations based on scientific evidence as to how interactions of subcellular structures provide essential functions. LO 4.6 The student is able to use representations and models to analyze situations qualitatively to describe how interactions of subcellular structures, which possess specialized functions, provide essential functions. |
| Genetics of Cancer Research Project: Students research one genetic mutation implicated in a genetic predisposition to cancer. Students determine the nature of the mutation, seating it in the context of genetic control of cell division.  | Molecular Biology/Genetics | LO 2.15 The student can justify a claim made about the effect(s) on a biological system at the molecular, physiological or organismal level when given a scenario in which one or more components within a negative regulatory system is altered.LO 2.28 The student is able to use representations or models to analyze quantitatively and qualitatively the effects of disruptions to dynamic homeostasis in biological systems.LO 2.34 The student is able to describe the role of programmed cell death in development and differentiation, the reuse of molecules, and the maintenance of dynamic homeostasis.LO 2.36 The student is able to justify scientific claims with evidence to show how timing and coordination of physiological events involve regulation. LO 2.37 The student is able to connect concepts that describe mechanisms that regulate the timing and coordination of physiological events. LO 3.7 The student can make predictions about natural phenomena occurring during the cell cycle. LO 3.8 The student can describe the events that occur in the cell cycle. LO 3.20 The student is able to explain how the regulation of gene expression is essential for the processes and structures that support efficient cell function. |
| The Bioethics of Biotechnology: Students research a particular application of biotechnological techniques and write a referenced position paper on the ethical implications of the application | Genetics | LO 3.1 The student is able to construct scientific explanations that use the structures and mechanisms of DNA and RNA to support the claim that DNA and, in some cases, that RNA are the primary sources of heritable information. LO 3.3 The student is able to describe representations and models that illustrate how genetic information is copied for transmission between generations. LO 3.5 The student can justify the claim that humans can manipulate heritable information by identifying at least two commonly used technologies. LO 3.6 The student can predict how a change in a specific DNA or RNA sequence can result in changes in gene expression.LO 3.13 The student is able to pose questions about ethical, social or medical issues surrounding human genetic disorders. |
| Communication Glogster:Students will research and study the mechanism of a single transduction pathway and apply it to a real-life scenario. The students will create a glogster poster to present to the class. | Cellular Communication | LO 3.31 The student is able to describe basic chemical processes for cellcommunication shared across evolutionary lines of descent. LO 3.32 The student is able to generate scientific questions involving cellcommunication as it relates to the process of evolution. LO 3.33 The student is able to use representation(s) and appropriate models todescribe features of a cell signaling pathway.LO 3.34 The student is able to construct explanations of cell communicationthrough cell-to-cell direct contact or through chemical signaling. LO 3.35 The student is able to create representation(s) that depict how cell-to-cellcommunication occurs by direct contact or from a distance through chemicalsignaling.LO 3.40 The student is able to analyze data that indicate how organisms exchangeinformation in response to internal changes and external cues, and which canchange behavior. LO 3.41 The student is able to create a representation that describes howorganisms exchange information in response to internal changes and externalcues, and which can result in changes in behavior. LO 3.42 The student is able to describe how organisms exchange information inresponse to internal changes or environmental cues. |
| Comparing Life Processes: Students elucidate the mechanisms by which different domains of life accomplish the major physiological processes needed to remain alive. Students create a digital presentation for their classmates as a result of their efforts. | Physiology | LO 2.15 The student can justify a claim made about the effect(s) on a biological system at the molecular, physiological or organismal level when given a scenario in which one or more components within a negative regulatory system is altered.LO 2.16 The student is able to connect how organisms use negative feedback to maintain their internal environments. LO 2.19 The student is able to make predictions about how positive feedback mechanisms amplify activities and processes in organisms based on scientific theories and models. LO 2.25 The student can construct explanations based on scientific evidence that homeostatic mechanisms reflect continuity due to common ancestry and/or divergence due to adaptation in different environments. LO 2.26 The student is able to analyze data to identify phylogenetic patterns or relationships, showing that homeostatic mechanisms reflect both continuity due to common ancestry and change due to evolution in different environments. LO 2.27 The student is able to connect differences in the environment with the evolution of homeostatic mechanisms. LO 2.36 The student is able to justify scientific claims with evidence to show how timing and coordination of physiological events involve regulation. LO 2.37 The student is able to connect concepts that describe mechanisms that regulate the timing and coordination of physiological events. LO 4.8 The student is able to evaluate scientific questions concerning organisms that exhibit complex properties due to the interaction of their constituent parts.LO 4.9 The student is able to predict the effects of a change in a component(s) of a biological system on the functionality of an organism(s).LO 4.15 The student is able to use visual representations to analyze situations or solve problems qualitatively to illustrate how interactions among living systems and with their environment result in the movement of matter and energy.  |