

## SYLLABUS

AP Biology

QSI Virtual School

<https://learn.qvs.qsi.org/>

Semester/Term: 2022/23

### Instructor Information

Instructor: Christi Kitchens

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Online Office Hours: By appointment

Physical Location: Round Rock Texas (Central Time Zone)

Skype: christi.kitchens

Zoom: <https://us04web.zoom.us/j/3371776671?pwd=SW81clJKOGkxa3NlNkFEWHBRSihIUT09>

Teams Classroom: Where class meetings are held (students will be enrolled upon course start)

Preferred Method of Communication: Email or Teams message for students (email for parents)

### Course Description

AP Biology is designed to be the equivalent of a two-semester college introductory biology course usually taken by biology majors during their freshman year. This science course is for students who are highly motivated and have a strong interest in science. Major topics of study include biochemistry, cells and cellular processes, cellular energetics, genetics, evolution, classification, information transfer, ecology, and interactions. As in college biology, the AP Biology course is designed to have both a lecture and a lab component. Labs conducted by AP Biology students are the equivalent of those experienced by college biology students. At the completion of this course, students can take the College Board's AP Biology exam. Some students may earn college credit if they earn high enough marks on this exam. In class, we will practice exam questions in each unit to prepare for the AP Biology exam. Students are expected to demonstrate critical thinking skills through their answers to multiple-choice questions, free response questions, in their case studies and other discussion forums and laboratory work.

AP Biology includes two essential components: science practices and course content. Both are extensively defined in the AP course and exam description. The science practices are central to the study and practice of biology. Students will learn and apply these practices on a regular basis over the span of this course. The content is grounded in four "big ideas", which are crosscutting concepts that build conceptual understanding and spiral throughout the course. In short the components of the course are:

- **BIG IDEA 1: EVOLUTION (EVO):** The process of evolution drives the diversity and unity of life. Evolution is a change in the genetic makeup of a population over time, with natural selection as its major driving mechanism. The process of evolution explains the diversity and unity of life, but an explanation about the origin of life is less clear.
- **BIG IDEA 2: ENERGETICS (ENE):** Biological systems use energy and molecular building blocks to grow, reproduce, and maintain dynamic homeostasis. Cells and organisms must exchange matter with the environment. Organisms respond to changes in their environment at the molecular, cellular, physiological, and behavioral levels. Living systems require energy and matter to maintain order, grow, and reproduce. Organisms employ various strategies to capture, use, and store energy and other vital resources. Energy deficiencies are not only detrimental to individual organisms but they can cause disruptions at the population and ecosystem levels. Homeostatic mechanisms that are conserved or divergent across related organisms reflect either continuity due to common ancestry or evolutionary change in response to distinct selective pressures.
- **BIG IDEA 3: INFORMATION STORAGE AND TRANSMISSION (IST):** Living systems store, retrieve, transmit, and respond to information essential to life processes. Genetic information provides for continuity of life, and, in most cases, this information is passed from parent to offspring

via DNA. Nonheritable information transmission influences behavior within and between cells, organisms, and populations. These behaviors are directed by underlying genetic information, and responses to information are vital to natural selection and evolution. Genetic information is a repository of instructions necessary for the survival, growth, and reproduction of the organism. Genetic variation can be advantageous for the long-term survival and evolution of a species.

- **BIG IDEA 4: SYSTEMS INTERACTIONS (SYI):** Biological systems interact, and these systems and their interactions exhibit complex properties. All biological systems comprise parts that interact with one another. These interactions result in characteristics and emergent properties not found in the individual parts alone. All biological systems from the molecular level to the ecosystem level exhibit properties of biocomplexity and diversity.

### Course Prerequisites

Students must have completed first year biology and either completed chemistry or concurrently be enrolled in a chemistry class, and display a keen interest in science as an evolving process This course is normally only open to students in 11<sup>th</sup> or 12<sup>th</sup> grade (secondary III-IV)

### Materials

The textbooks used in the course are:

1. OpenStax Biology for AP® Courses (further referred to as “Open Stax”), available for free download at <https://openstax.org/details/books/biology-ap-courses>
2. Campbell, A. Malcolm, Laurie J. Heyer, and Christopher J. Paradise. Integrating Concepts in Biology. 2016. Trunity, Inc. (in integrated lessons in the course)
3. Sometimes chapters from: Jane B. Reece, Lisa A. Urry, Michael L. Cain, Steven A. Wasserman, Peter V. Minorsky, Robert B. Jackson Campbell Biology 9<sup>th</sup> Edition, 2010 or 11<sup>th</sup> Edition, 2017. These are referred to as “Campbell Chapter.”

### Texts will be supplied.

Online Lab Resources:

- Labster.com online simulations (Instructions for students and technical requirements can be found on the moodle under the Text book and Lab Simulations Tab) Students will receive email invitations from Labster to set up the account once the teacher has enrolled the student onto the Labster platform.
- <https://www.ncbi.nlm.nih.gov/BLAST> compares nucleotide or protein sequences
- <https://phet.colorado.edu/> PhET simulations of different Biological processes
- Various other Lab simulations to be used as needed and at teacher discretion

### Technology Information and Requirements

- Computer with internet access and up to date Java installed.
- Please see the technical requirements for Labster on the moodle as this will be a main source of required lab work during the course
- Working MS Word and Excel
- Working program that will read PDF files
- Working Microphone and Camera for video conferencing
- Graphing calculator, TI-83 or TI-84+ recommended
- Scanning ability (Can be via free app on cell phone. I use Scannable (free), but there are others)

### Course Grading and Feedback

#### Grading Policies

QVS Virtual School is a member of Quality Schools International. At our organization we follow the Glasser model of mastery learning. This means that students need to show mastery of units before they

are allowed to pass them. This means that they student must demonstrate that s/he understands the concept inside and out. I design my courses with this in mind. All of my assessments are geared towards allowing student to demonstrate that they have mastered the unit. Each class has ten (10) units in it, and all units must be passed at the A or B level for the student to move on.

Every unit has a start date and an end date per your course calendar. When a unit starts the QVS teacher enters a "P" for all students into QMS to indicate the unit is in progress. When the unit ends the QVS teacher enters an "A" or a "B" depending on the level of mastery. If the student did not master the unit, the teacher will enter a "D." As stated in the QVS handbook:

- D – "deficient in effort" This grade communicates that the student is not meeting expectations about the amount of work submitted in a given time period.

If the student does not master the unit where a "D" was assigned when future units start, the teacher will continue to enter "P's" for those new units indicating that this is the unit in which the course has since progressed. A "P" entered for any unit after a "D" is NOT an indication that the student is working in that unit, it is an indication of where the student should be in the course.

- Example of QMS grades for a student who completed the first two units, but not the third unit while the course has moved to unit 4 per the course calendar:

- o E01: B, E02: B, E03:D, E04:P

- Example of a QMS grades for a student who completed the first two units but not the third and the fourth unit while the course has moved into unit five per course calendar:

- o E01: B, E02: B, E03:D, E04:P, E05:P

- Example of a student who is still working in unit three in February:

- o E01: B, E02: B, E03:D, E04:P, E05:P, E06:P, E07:P

The teacher will decide based on the course, how much time will pass before a "D" is entered into QMS. This should be applied evenly for each student. However, an extended period of time (possibly no more than one week) should not pass before a "D" is entered into QMS for a student who is demonstrating this behavior. If a "D" grade is resolved yet the student is five units behind, then the next unit which was a "P" will now become a "D." This pattern will continue until the student is back on pace with the course.

Per teacher's professional judgement and individual circumstances and course progress options, a teacher may stop a student from working in a unit and have him/her start the next unit without finishing the previous one. To indicate this the teacher will place an "H" into QMS. The teacher will communicate with the student that the unit is "on hold" and direct the student to the unit where they should be working.

If a student does not make sufficient effort to complete an assignment, parents will be contacted immediately. In addition, students may be required to complete extra assignments to provide them with the extra time and instruction to demonstrate that they understand the material.

To fully benefit and fulfill the purpose of an upgrade, I expect upgrades to be submitted in a timely fashion. The QVS policy states that upgrades must be completed by the end of the next unit or the Unit in question will remain at the B Mastery grade. At a time in which the student is caught up on the current unit, the student will be allowed to work on any previous units.

Please do not assume that doing an upgrade assignment or revision means that you will automatically get the upgrade: you always have to show A-level work to receive an A.

### **A and B Level Mastery:**

To receive a B for any unit, you must master all of the B level assignments and score at least AP 3 for the quizzes and final assessments. AP 3 is generally assigned at ~58% or higher. Unless otherwise indicated, all assignments are assumed to be B level assignments.

To receive an A for any unit, you must master all of the B level assignments, A level assignments (if assigned) and score at least an AP 4 or 5 for the quizzes and final assessment. AP 4 is generally assigned at ~68% or higher and AP 5 ~ 75% or higher.

### **Feedback**

I strive to return feedback on all submissions within 24 hours, however, work submitted on Friday or over the weekend might take a little longer.

### **Unit Completion**

Units will be completed in the order presented on the moodle. If a unit is not mastered, the student will remain in that unit until such a time that the unit has been mastered prior to moving forward to the next unit. The teacher will assist struggling students in any way possible to aid with understanding and mastery so that the student is able to move to the next unit, however, it is the students responsibility to reach out to the teacher for additional help immediately if the student has a question or is struggling with a concept.

### **June Unit Completion**

Only 2 Units will be allowed to be completed during the month of June, therefore, it is important that 8 units are completed by the end of May in order to complete the course on time.

### **Course content**

**\*Disclaimer: Online courses are a work in progress and are constantly changing. AP BIO is currently under reconstruction. The course work outlined below is current, but I reserve the right to add, delete or change lessons, assignments, project, assessments or other activities as needed to best serve the students learning. The syllabus will be updated as needed and should be available (as updated) via the link provided on the moodle.**

**\*Prior to most lessons there are AP Daily Videos assigned, however not listed below. It is important that you watch these videos by highly experienced AP Chemistry Teachers to help you understand the content.**

**\* There are also OpenStax AP Biology Chapter files included prior to the pertinent lessons. It is your responsibility to engage yourself in reading the material provided.**

**\*Topic Questions are required assignments to assess your knowledge of the different AP course elements. Although these are required, they are formative only and cannot count towards grades per College Board policy.**

**\*All assignments, activities, case studies, labs are assumed to be Mastery (B) level unless otherwise noted as A level or Above Mastery.**

**\*All Quizzes will be scored for Mastery or Above Mastery according to the information provided in the instructions for each quiz, unless otherwise noted.**

**\*All Final Assessments will be scored for Mastery or Above Mastery based on the following scale: Mastery (~58 – 68%) and Above Mastery (~78%-100%) Corresponding AP scores will be provided with the feedback for each assessment. Above Mastery on the assessment is required to achieve Above Mastery for the unit, in addition to the Above Mastery assignments within the unit.**

Units will be completed in the order presented on the moodle. A student will not be allowed to move to the next unit until the previous unit has been Mastered.

- All Lab reports **MUST** be written in the lab report template provided on the moodle unless otherwise stated in the instructions for the assignment.

**Case Studies** will be used to teach and assess critical thinking skills.

Case studies are selected from HHMI, <https://www.biointeractive.org/classroom-resources>, and the National Center of Case Studies, <http://sciencecases.lib.buffalo.edu/cs/about/>

## **Unit 1: INTRODUCTION AND BIOCHEMISTRY**

### **Week 1 Introduction to Scientific Inquiry and Introduction to AP Biology**

Introduce yourself to the AP Class

Teams Call

Enrol yourself in the AP classroom

Pre-Course Assignment Upload (This should be submitted prior to the end of week 2 to keep from getting locked out of Week 3 and forward.

Read the AP Bio Fall 19 course description and the AP skills in Science PDF

Lesson 1A Activity: Introduction

Lesson 1B Activity: Important Concepts of Biology

Lesson 1C Activity: Steps to the Scientific Method

Introductory Lesson 1 Quiz

Design Experiment (A level)

### **Week 2 The Chemical Context of Life**

Lesson 1 Activity: The Chemical content of Life.

Lesson 1 Quiz

Chemistry Help: Videos links to help you recall chemistry (optional)

Extra help: Elements form compounds (optional)

Extra help: Chemical bonding (optional)

E01 Review of Chemistry Quiz

E01 Lesson 1 Structure of Water and Hydrogen Bonding

E01 Lab Acid and Base Simulation (Linked to E10 SP 2)

Discussion forum: Water and Life

E01 L1 (AP 1.1) Topic Questions

Introduction to Science Practices and Lesson 1 Quiz

### **Week 3 Science Practices (SP)**

Week 3 Introduces the AP Biology Science Practices and will culminate over the course to show Mastery of Unit 10

**Readings:**

A Science Practice: what is it and how will it be assessed in your exam  
Data in Science dimensional analysis, significant figures, and the SI system  
Quantitative skills in AP: Math and Data (from AP Quantitative Skills in Science)  
Data Graphing (from AP Quantitative Skills in Science)  
TABLES quick reference: how to make them  
Graphs: quick reference: how to draw them

### **Lessons and Assignments:**

Lesson SP 1 Concept Explanation

Lesson\_SP 4 Math and Science

Week 3 Assignment SP 4.1 Science and Math

Lesson SP 4 Data collection, Tables, and Graphing

Week 3 SP 3 and 4.2 The Ground has Gas Data Nugget Activity (B and A level)

Lesson\_SP 4 Box and Whisker Plot with questions

Week 3 SP 4.3 Box and Whiskers Plot BME activity upload

Video Lesson SP 5 Statistical Tests and Data Analysis

Video Lesson Statistics for Science

Video Lesson Standard Deviation

Video Lesson Standard Error

Video Lesson Chi Squared Test

Video Lesson SP 6 Argumentation

Interactive link to “How Scientist Build an Argument”

E01/E10 Free Response Question on Scientific Inquiry

Week 3 Forest and Climate Change Data Nuggets (SP 1,3,4 and 6) (B and A level)

### **Week 4: Biochemistry**

E01 L2 Elements of Life and Biological Macromolecules

Lesson 1 Quiz

E01 L3 Structure, Function and Properties of Carbohydrates and Lipids

E01 L4 Structure, Function and Properties of Proteins

E01 L5 Structure, Function and Properties of DNA, RNA and Nucleic Acids

Lessons 2-5 (AP 1,2-1,5) Topic Questions

E01 L5 Similarities and differences between the structure of DNA and RNA (B and A level)

E01 L2-5 Concept Map of Biological Macromolecules TSW 2,3,4,5 and 6

E01 Patterns Matching Activity

E01 Lessons 3,4 and 5 Quiz

E01 (AP U1) MCQ Progress Check

E01 (AP U1) FRQ Progress Check

E01 Units Assessment on the AP classroom

### **Unit 2: A TOUR OF THE CELL**

The cell is the basic unit of life. Cells contribute to the organization of life and provide the environment in which organelles function. Organelles in turn provide compartmentalization and organize cellular products for dispersal and waste for disposal. Cells have membranes that allow them to establish and maintain an internal environment. These membranes also control the exchange of material with the cell's external environment—an important, foundational concept. The maintenance of the internal and external conditions of a cell is called homeostasis. Student understanding of these concepts will be necessary in later units when the focus of instruction shifts to cellular products and by-products and when students learn why cellular exchange of energy and materials matters.

## **Week 5: A Tour of the Cell: Structure and Function**

E02 Introductory Lesson A Activity: Microscopy

E02 Introductory Lesson B Activity: Structural and Functional Adaptations in Prokaryotes

E02 Lesson 1 Part 1 Activity: Compartmentalization: Prokaryotes vs Eukaryotes TSW 10 and 11 (AP 2.10, 2.11, ENE 2.K and 2.L, EVO 1.A and 1.B)

E02 Lesson 1 Part 1 Cell Detective Activity TSW 11 (AP 2.11, EVO 1.A and 1.B, SP 6.B)

E02 Lesson 1 Part 2 Endosymbiosis TSW 11 (AP 2.11, EVO 1.A and 1.B, SP 6.B)

E02 L1 P2 Endosymbiosis Activity TSW 11 (AP 2.11, EVO 1.A and 1.B, SP 6.B)

E02 Lesson 2 Cell Size: Surface Area to Volume Ratio TSW 3 (AP 2.3, ENE 1.B and 1.C, SP 5.A.d and 2.D.a)

Cell Size Sketch note - A way to remember

E02 L2 Cell Size: Surface to Volume Ratio Lab Activity TSW 3 Mastery Level Assignment (Linked to E10)(AP 2.3, ENE 1.B, 1.C, SP 5.A.d, 6.B)

E02 Lesson 3 Cell Organelles Structure and Function TSW 1 and 2 (AP 2.1, 2.2, SYI 1.D, 1.F, SP 1.A and 6.A)

E02 Lesson 3: Cytoskeleton

Tour of an animal and plant cell videos

E02 L3 Animal Cell Assignment TSW 1B, 2B, 10B, 11B

E02 L 1-3 Plant Cell Activity TSW 1B, 2B, 10B, 11B

E02 What are advantages and disadvantages of compartmentalization in cells assignment

E02 Lesson 3: Feedback loops

E02 Lesson 3: Homeostasis

E02 Lesson 3: Energy Requirements

E02 Lesson 1-3 Quiz

E02 L 1-3 Case Study: Little Girl Lost; A Case Study on Defective Cellular Organelles (Above Mastery- A level) (SP 1.B, 2.A, 5.D.b, 6.E.b)

E02 Lesson 3 Labster: Cell Structure and Internal Organelles (Mastery Level Assignment) TSW 1 and 2 (AP 2.1, 2.2, SYI 1.D, 1.E, 1.F, SP 1.A)

E02 Lessons 1-3 Topic Questions on AP Classroom

## **Week 6: Membrane Structure and Function**

E02 Lesson 4 Plasma Membrane TSW 4 (AP 2.4, ENE 2.A, 2.B, SP 2.A)

E02 L4 Plasma Membrane Assignment TSW 4 (AP2.4, ENE 2.A, 2.B, SP 2.A) B level Mastery

E02 Lesson 5 Selective Permeability and Membrane Transport TSW 5,6,7,8,9 (AP 2.5 - 2.9, ENE 2.C, 2.D, 2.E, 2.G, 2.H, 2.I, 2.F, 2.J, SP 6.E)

E02 Labster: Cell Membrane and Transport TSW 5, 6, 7, 8 (AP 2.5, 2.6, 2.7, 2.8, ENE 2.C, 2.E, 2.G, 2.J, SP 1.B, 2.A, 6.E.b). B Level Mastery

E02 Lesson 5 (continued) Understanding Water Potential TSW 6 (AP 2.8)

E02 Lesson 5 Membrane Transport and Tonicity Assignment TSW 5,6,7,8,9 (AP 2.5-2.9, ENE 2.C-2.J, SP 6.E). B Level Mastery Level

E02 Lesson 5 Tonicity and Osmosis Assignment TSW 6 (AP 2.8, ENE 2.H, 2.I, SP 1.A, 1.C, 2.A, 2.C, 2.D.b, 6.E (a,b) Mastery Level

E02 Lesson 5 Understanding Water Potential Calculations Assignment TSW 6 (AP 2.8, ENE 2.H, 2.L, SP 2.B (a,b), 2.D, 5.A.a, 6.E (a,d)) B Level Mastery

E02 Lesson 4-5 Topic Questions on the AP Classroom

E02 Lesson 5 Quiz

E02 Water Can Kill Case Study TSW 5,6,7,8,9 (AP 2.5 - 2.9, ENE 2.C, 2.D, 2.E, 2.G, 2.H, 2.I, 2.F, 2.J, SP 1.C, 6.E)(A and B Level)

E02 Cell Homeostasis Lab. (A and B level Assignment) TSW 6 and 8 (AP 2.8, ENE 2.H, 2.I, SP 3.D, 4.A, 5.D.b)

E02 Unit Progress Check MCQ on AP Classroom

E02 FRQ Progress Check on AP Classroom

E02 Cell Structure and Function Review

E02 Final Assessment on the AP Classroom

E02 Final Grade

### **Unit 3: CELLULAR ENERGETICS**

Students build on knowledge gained in Unit 2 about the structure and function of cells, focusing on cellular energetics in unit 3. Living systems are complex in their organization and require constant energy input. This unit will provide students with the knowledge necessary to master the concepts of energy capture and use. Students work through enzyme structure and function, learning the ways in which the environment plays a role in how enzymes perform their function(s). Students gain a deeper understanding of the processes of photosynthesis and cellular respiration, knowledge they will use in Unit 6 while studying how cells use energy to fuel life processes.

#### **Week 7: Metabolism and Enzymes**

E03 Lesson 1 Introduction to Metabolism TSW 4 (AP 3.4, ENE 1.H)

E03 Lesson 2 Enzymes TSW 1, 2 and 3 (AP 3.1, 3.2, 3.3, ENE 1.D, 1.E, 1.F, 1.G, SP 1.B, 6.E.c)

E03 Lesson 2 Enzymes Assignment 1 TSW 1 and 2 (B level)

E03 Lesson 2 Enzymes Activation Energy Assignment TSW 2 (AP 3.2, ENE 1.E, SP 2.A)(B level)

E03 Lesson 2 Enzyme Inhibition Assignment TSW 1, 2 (AP 3.1, 3.2, ENE 1.D, 1.E, SP 1.A, 2.A) (B level)

E03 Enzyme Activity Lab TSW 3 (AP 3.3, ENE 1.F, 1.G, SP 1.B, 1.C, 2.B, 3.C, 3.D, 3.E.a, 4.A, 4.B, 5.D, 6.A, 6.B, 6.C, 6.E) A and B level Mastery

E03 Lesson 2 Enzyme Inhibition Data Analysis Practice TSW 2 (AP 3.2, ENE 1.F, SP 4.A,4.B, 6.A, 6.B) (A level)

E03 Lessons 1 and 3 Topic Questions on the AP Classroom

#### **Week 8: Photosynthesis**

E03 Lesson 3 Part 1 Introduction to Photosynthesis. TSW 5, 7 (AP 3.5, 3.7, ENE 1.I, 1.J. SYI 3.A, SP 6B, 6C)

E03 Labster: Photosynthesis: Algae Pigment Analysis TSW 5 (AP 3.5, ENE 1.J, SP 3.D, 4.B, 6.A, 6.E) Mastery Level

E03 Lesson 3 Part 2 Photosynthesis TSW 5 and 7 (AP 3.5, 3.7, ENE 1.I, 1.J. SYI 3.A, SP 6B, 6C)

E03 Lesson 3 Part 3 Photosynthesis Evolutionary Adaptations TSW 5 and 7 (AP 3.5, 3.7, ENE 1.I, 1.J. SYI 3.A, SP 6B, 6C)

E03 Lesson 3 Photosynthesis Animation Activity TSW 5

E03 Labster: Photosynthesis: Electron Transport Chain TSW 5 (AP 3.5, ENE 1.J) Mastery Level

E03 L3 Photosynthesis Assignment TSW 5 (AP 3.5, ENE 1.J) Mastery

E03 Photosynthesis Virtual Lab TSW 5 (AP 3.5, ENE 1.I, 1.J, SP 1.C, 2.C, 3.C.a, 3.D, 4.B.c, 5.D, 6.B, 6.D, 6.E.c) A and B Level Mastery

E03 Lesson 3 Topic Questions on the AP Classroom

E03 Lesson 3 Quiz

#### **Week 9: Cellular Respiration**



E03 Lesson 4 Part 1 Introduction to Cellular Respiration TSW 6 (AP 3.6, ENE 1.K, 1.L)  
E03 Lesson 4 Part 2 Aerobic Cellular Respiration TSW 6 (AP 3.6, ENE 1.K, 1.L)  
    E03 Labster: Cellular Respiration: Glycolysis TSW 6 (AP 3.5, ENE 1.J) Mastery Level  
    E03 Labster: Cellular Respiration: The Krebs Cycle TSW 6 (AP 3.5, ENE 1.J) Mastery Level  
    E03 Labster: Cellular Respiration: The Electron Transport Chain TSW 6 (AP 3.5, ENE 1.J) Mastery Level  
    E03 L4 Cellular Respiration Labeling Activity TSW 6 (AP3.6, ENE 1.K, 1.L)  
E03 Lesson 4 Part 3 Anaerobic Cellular Respiration TSW 6 and 7 (AP 3.6, 3.7 ENE 1.K, 1.L)  
    E03 Yeast Fermentation Lab Simulation Activity TSW 6 (AP 3.6, ENE 1.L, SP 3.D, 6.B, 6.D, 6.E) Mastery Level  
    E03 Rate of Respiration Virtual Lab TSW 6 (AP 3.6, ENE 1.K, ENE 1.L, SP 3.D, 4.B, 6.A, 6.B, 6.C) A and B Level Mastery  
    E03 Lesson 4 Quiz  
    E03 Lesson 4 Case Study: Mystery of the 7 Deaths TSW 6 (AP 3.6, ENE 1.K, 1.L, SP 1.C, 2.B.b, 6.D, 6.E) A and B level)  
E03 A Level Project  
Review Energetics and Answering AP Style Questions in Energetics  
E03 FRQ Progress Check on the AP Classroom  
E03 MCQ Progress Check on AP Classroom  
E03 Final Assessment  
E03 Final Grade

## **Unit 4: CELLULAR COMMUNICATION AND THE CELL CYCLE**

In this unit student will explore the nature of cell communication. Cells can communicate through direct contact with other cells or via short distance chemical signalling (paracrine contact), long distance chemical signalling (endocrine). To do so, cells generate, transmit, receive, and respond to chemical signals. The structure and function of the plasma membrane (receiving the signal), responses in the cell (signal transduction pathways) and responses of cells (change in gene expression and cell function or programmed cell death) will be discussed. To establish homeostasis, feedback regulation is important in the timing and coordination of biological mechanisms. Examples of cell-cell contact are found in the immune system; neurotransmitters in the nervous system are local regulators (short distance), while hormones like insulin, and testosterone are long distance transmitters.

The Cell Cycle is a highly regulated series of events that regulate the growth and reproduction of cells. Students study the different phases of the cell cycle and consequences of disturbances of the cell cycle.

### **Week 10: Cellular Communication**

E04 Lesson 1 Types of Cell Signaling TSW 1 (AP 4.1, IST 3.A, 3.B, SP 1.B)  
E04 Lesson 2 Cell Communication: Reception TSW 1 and 2 (AP 4.1, 4.2 IST 3.A, 3.B, 3.C, 3.D SP 1.B)  
E04 Lesson 3 Cell Communication: Signal Transduction TSW 2 (AP 4.2, IST 3.C, 3.D, SP 1.A)  
    E04 Labster: Signal Transduction: How cells communicate TSW 2,3 and 4 (AP 4.2, 4.3, 4.4, IST 3.S, 3.D, 3.E, 3.F, SP 1.A, 6.C, 6.E) Mastery Level  
E04 Lesson 4 Cell Communication: Signal Responses TSW 2 and 3 (AP 4.2, 4.3, IST 3.B, 3.C, 3.D, 3.E, 3.F, SP 6.C)  
    E04 L4 Basic Signal Transduction Pathway Part 1 TSW 2 (AP 4.2, IST 3.C, SP 1.A) Mastery  
    E04 L4 Phosphorylation in the Signal Transduction Pathway Part 2 TSW 2 (AP 4.2, IST 3.C, 3.D, SP 1.A) Mastery

- E04 L4 Secondary Messengers in the Signal Transduction Pathway Part 3 TSW 1,2 (AP 4.1, 4.2, IST 3.A, 3.B, 3.C, 3.D, SP 1A., 1.B) Mastery
- E04 Lesson 5 Cell Communication: Changes in Signal Transduction Pathways TSW 4 (AP 4.4, IST 3.G, SP 6.E)
- E04 L1-5 Exploring Cell Communication TSW 1 and 2 (AP 4.1, 4.2, IST 3.A, 3.B, 3.C, 3.D, SP 1.A, 1.B, 6.E) Mastery Level
- E04 L5 Disease of Faulty Neural Cell Communication TSW 4 (AP 4.4, IST 3.G, SP 6.A, 6.B) Mastery Level

### **Week 11: Cellular Communication**

- E04 L5 Disease of Faulty Hormonal Cell Communication TSW 4 (AP 4.4, IST 3.G, SP 6.A, 6.B) Mastery Level
- E04 Mouse Party Activity Above Mastery (AP 4.1-4.4, SP 1.C)
- E04 Cell Communication: HOW HIV INFECTS CELLS Above Mastery (SP 1C, 2A, 2B, 2D)
- E04 Lesson 6 Cell Communication: Single Celled Organisms TSW 1 (AP 4.1, IST 3.A, 3.B, SP 1.B)
- E04 Lesson 7 Feedback TSW 5 (AP 4.5, ENE 3.A, 3.C, SP 6.E)
  - E04 Lesson 7 Case Study on feedback regulation (AP 4.5, ENE 3.A, 3.B, 3.C, SP 1.C, 2.B, 3.A, 6.E) Mastery
  - E04 Lesson 1-7 (AP 4.1-4.5) Topic Questions on the AP Classroom
  - E04 Lesson 1-7 Quiz
- E04 Lesson 8 The Cell Cycle TSW 6 (AP 4.6, IST 1.B, 1.C)
  - E04 L8 Label Cell Cycle TSW 6 (AP 4.6) Mastery
  - E04 L8 Mitosis Terminology TSW 6 (AP 4.6, IST 1.B, 1.C) Mastery

### **Week 12: The Cell Cycle**

- E04 L8 Mitotic Phases TSW 6 (AP 4.6, IST 1.B, 1.C) Mastery
- E04 Lesson 8 Cell Cycle Activity TSW 6 (AP 4.6, IST 1.B, 1.C) Mastery
- E04 Mitosis Virtual Lab TSW 6 (AP 4.6, IST 1.B, 1.C, SP 4.A, 5.A, 6.A) Mastery
- E04 Lesson 9 Control of the Cell Cycle TSW 7 (AP 4.7, IST 1.D, 1.E, SP 6.E)
  - E04 Lesson 9 Eukaryotic Cell Cycle and Cancer TSW 7 (AP 4.7, IST 1.D, 1.E, SP 6.E) A and B level Mastery
  - E04 Lessons 8-9 (AP 4.6, 4.7) Topic Questions on AP Classroom
  - E04 Lesson 8 and 9 Quiz
- E04 MCQ Progress Check on the AP Classroom
- E04 FRQ Progress Check on AP Classroom (Self Score Required)
- E04 Final Assessment on AP Classroom
- E04 Final Grade

## **Unit 5: GENETIC BASIS OF LIFE**

In this unit the student will examine meiosis and Mendelian genetics through the development, analysis, and interpretation of genetic crosses, pedigrees, Chi-square problems and laboratory experiments. Genetic disorders and chromosomal mutations will also be addressed.

### **Week 13: Genetic Basis of Life**

- E05 Lesson 1 Meiosis and Genetic Diversity TSW 1 and 2 (AP 5.1, 5.2, IST 1.F, 1.G, 1.H, SP 1.B, 3.A)
- E05 Lesson 1 The Process of Meiosis Questions 5.1 and 5.2

E05 Labster: Exploring Human Reproductive Cells Mastery Level TSW 1 and 2 (AP 5.1, 5.2, IST 1.F, 1.G, 1.H, SP 1.B)

E05 Lesson 1 Quiz

E05 Lesson 2 Part 1 Mendelian Genetics TSW 3 AP 5.3, EVO 2.A, IST 1.I, SP 6.E.c

Link to Genetics Practice with Pigeons (Optional, if needed)

E05 L2 Mendelian Genetics Mastery (B Level) TSW 3 (AP 5.3, SP 2D, 4B) pptx

E05 L2 Mendelian Genetics Part 2 Mastery TSW 3 (AP 5.3, SP 2D, 4B)

E05 Lesson 2 Part 2 Statistical Analysis TSW 3 (AP 5.3, EVO 2.A, IST 1.I, SP 5.C, 6.E.c)

E05 Lesson 2 Part 2 Chi Squared Analysis (AP 5.3, EVO 2.A, IST 1.I, SP 5.C)

E05 Labster: Mendelian Genetics TSW 3, 6 (AP 5.3, 5.6, EVO 2.A, SYI 3.C, IST 1.I, SP 6.E.b, 6.E.c)

E05 Lesson 2 Topic Question (AP Classroom)

### **Week 14: Genetics: Basis of Life**

E05 Lesson 3 Non-Mendelian Genetics TSW 4 (AP 5.4, IST 1.J, SP 5.A, 5.C)

E05 Lesson 3 Chromosome and Gene Lab Mastery TSW 4 (AP 5.4, SP 2D, 5A)

E05 Lesson 3 Chi Squared Analysis with Non-Mendelian Genetics (Linked to E10 SP 5.C)

E05 Lesson 3 Topic Questions (AP Classroom)

E05 Lesson 2 and 3 Quiz

E05 Genetics Drosophila Fly Lab TSW 3,4 (A and B level) (AP 5.3, 5.4) (Linked to E10 SP 2.D, 3.A, 3.E, 5.A.b, 5.C, 5.D.a, 5.D.b, 6.E.c)

E05 Lesson 4 Environmental Effects on Phenotype TSW 5 AP 5.5, SYI 3.B SP 1.C

E05 Lesson 4 Phenotypic plasticity TSW 5 Mastery (AP 5.5, SYI 3.B, SP 1.C)

### **Week 15: Modern Understandings of Inheritance**

E05 Lesson 5 Chromosomal Inheritance TSW 6 AP 5.6, SYI 3.C, SP 6.E.b

E05 Lesson 5 Chromosomal Inheritance Assignment TSW 6 (AP 5.6, SP 2.D) Mastery

E05 Lesson 5 Chromosomal Inheritance Pedigrees TSW 6 (AP 5.6, SP 2.B, 2.D)

E05 Lesson 4 and 5 Topic Questions (AP Classroom)

E05 Lesson 4 and 5 Quiz

E05 Skin Color Assignment Above Mastery TSW 4, 5, 6 (AP 5.4, 5.5, 5.6 SP 1.C, 2.B, 2.C, 4.B, 6.A, 6.B, 6.C, 6.E)

E05 MCQ Progress Check (AP Classroom)

E05 FRQ Progress Check (AP Classroom)

E05 Final Unit Assessment (AP Classroom - self scored)

E05 Final Grade

## **Unit 6: GENE ACTIVITY AND BIOTECHNOLOGY**

Progressing from the continuity of life to gene expression, in Unit 6 students gain in-depth knowledge about nucleic acids and their role in gene expression. Students receive a finer focus on the comparison between the structures of DNA and RNA. This unit highlights how an individual's genotype is physically expressed through that individual's phenotype. Understanding protein synthesis (transcription and translation) is vital to answering essential questions about gene expression. Regulation of gene expression and cell specialization are instrumental in ensuring survival within an individual and across populations.

### **Week 16 : DNA replication and transcription)**

E06 Lesson 1 DNA and RNA Structure TSW 1 (AP 6.1, IST 1.K, 1.L, SP 1.C)  
E06 Labster: DNA Structure and Function TSW 1 (AP 6.1, IST 1.K, 1.L)  
E06 Lesson 2 DNA Replication TSW 2 (AP 6.2, IST 1.M, SP 2.B)  
E06 Lesson 1 and 2 Case Study: Identifying the Molecule of Inheritance TSW 3, 4, 6 (AP 6.3, 6.4, 6.5, IST 1.N, 1.O, 2.A, 2.B, 2.C, SP 3.B, 3.C, 3.D, 5.D)(Mastery)  
E06 Lesson 1 Quiz  
E06 Lesson 3 Transcription and RNA Processing TSW 3 (AP 6.3, IST 1.N, SP 2.B)  
E06 Labster Introduction to Protein Synthesis TSW 3 (AP 6.3, 6.4, IST 1.N)  
E06 Lessons 1-3 (AP 6.1-6.3) Topic Questions on AP Classroom

### **Week 17: Translation and Gene Expression**

E06 Lesson 4 Translation TSW 3 (AP 6.4, IST 1.O)  
Transcription and Translation Interactive Website  
E06 Transcription and Translation TSW 3 (AP 6.3, 6.4, IST 1.N, SP 2.C, 2D) Mastery  
E06 Lesson 5 Regulation of Gene Expression TSW 5 and 6 (AP 6.5, IST 2.A, 2.B)  
E06 Modeling the Regulatory Switches of the Pitx1 Gene in Stickleback Fish TSW 5 and 6 (AP 6.5, 6.5, IST 2.A, 2.B, 2.C, 2.D, SP 2.A, 2.C, 6.E)  
E06 Lesson 6 Regulation of Gene Expression by Eukaryotes TSW 5 and 6 (AP 6.5, 6.6, IST 2.A, 2.B, 2.C)  
E06 Lesson 6 How Does DNA Determine the Traits of an Organism? TSW 4 and 7 (AP 6.4, 6.7, IST 1.O, 2.D, 4.B, SP 2.C, 2.D, 6.E) Mastery  
E06 Labster: Gene Expression: Using sequencing to unveil a gene linked to obesity TSW 5,6 (AP 6.5, 6.6, 6.8 IST 1.P, 2.A, 2.B, 2.C, 2.D SP 2.C, 6.A, 6.D)  
E06 Lesson 5 and 6 Quiz  
E06 Lessons 4-6 (AP 6.4-6.6) Topic Questions on AP Classroom

### **Week 18: Mutations and Biotechnology**

E06 Lesson 7 Mutations TSW 7 (AP 6.7, IST 2.E, 4.A, 4.B)  
E06 Labster: Cancer: Impact of BRCA mutations TSW 7 (AP 6.7 IST 2.E, 4.A, 4.B) Mastery  
E06 Lesson 7 Mutations Assignment TSW 7 (AP 6.7, IST 2.E, 4.A, 4.B, SP 1.C, 2.C, 6.B, 6.E.a) Mastery  
E06 Lesson 7 Gene and Chromosome Mutation Assignment TSW 7 (AP 6.7, IST 2.E, 4.A, 4.B, SP 1.C, 2.C, 6.B, 6.E.a) Mastery  
E06 Lesson 1 - 7 Quiz  
E06 Lesson 8 Biotechnology TSW 7 (AP 6.8, IST 1.P, SP 6.D)  
E06 Lesson 8 Restriction Enzyme Simulation Lab TSW 8 (AP 6.8)(Linked to E10 SP 2.B.b, 3.D, 6.D, 6.E.b)  
E06 Lesson 8 Lab Gel Electrophoresis Lab Simulation TSW 8 (AP 6.8, IST 1.P)(Linked to E10 SP 3.D, 6.A, 6.D).pdf  
E06 Lessons 7-8 (AP 6.7, 6.8) Topic Questions on AP Classroom

### **Week 19: Final Assessments Gene Expression and Regulation and Biotechnology**

E06 L8 Above Mastery Case Study: Cut it Out, Editing DNA with CRISPR-Cas9 (SP 1C, 6A, 6E)  
E06 MCQ Progress Check on the AP classroom  
E06 FRQ Progress Check on the AP classroom  
E06 Final Assessment (AP Classroom)  
E06 Final Grade

## **Unit 7: NATURAL SELECTION**

The concepts in Unit 7 build on foundational content from previous units as students discover natural selection, a mechanism of evolution—the theory that populations that are better adapted to their environment will survive and reproduce. Thus, the evolution of a species involves a change in its genetic makeup over time. In this unit, students study the evidence for and mechanisms of evolutionary change. Students also learn what happens when a species does not adapt to a changing or volatile environment and about the Hardy-Weinberg equilibrium as a model for describing and predicting allele frequencies in non-evolving populations. Students will learn to calculate and draw conclusions about the evolution, or lack thereof, of a population from data related to allele frequencies.

## **Week 20 : Natural Selection Week 1: Evolution and the origin of species**

E07 Lesson 1 Introduction to Natural Selection and Evolution TSW 1, 2, 3 and 9 (AP 7.1, 7.2, 7.3, 7.6, EVO 1.C, 1.D, 1.E, 1.F, 1.G, 1.M, 1.N, 2.B, SP 1.B, 2.A)

E07 Rock Pocket Mouse Act 1 Mastery TSW 1, 2, 4, 10 (AP 7.1, 7.2, 7.4, 7.10, SP 1.A, 1.B, 1.C, 2.B, 2.C, 6.A, 6.B)

E07 Rock Pocket Mouse Act 2 Above Mastery TSW 1, 2, 4, 10 (AP 7.1, 7.2, 7.4, 7.10, SP 1.A, 1.B, 1.C, 2.B, 2.C, 6.A, 6.B)

E07 Lesson 1 Natural Selection and Environmental Effects Lab Simulation TSW 2 (AP 7.2, EVO 1.E, SP 1.B, 4.A, 4.B, 6.B, 6.C, 6.D)

E07 Lesson 2 Speciation TSW 10 (AP 7.10, EVO 3.D, 3.E, 3.F, SP 6.E, 2.B)

E07 Lesson 2 Natural Selection with Mutations (AP 7.1, 7.2, 7.4, 7.12, EVO 1.C, 1.D, 1.E, 1.H, 1.I, SYI 3.D, SP 1.D, 2.A, 4.A, 4.B, 6.C)

E07 Labster: Evolution: Identifying a Deep Sea Creature TSW 6 (AP 7.6 SP 1.A, 1.C, 2.D)

E07 Lessons 1 and 2 (AP 7.1, 7.2, 7.3, 7.6, 7.10) Topic Questions on AP Classroom

## **Week 21: The Evolution of Populations**

E07 Lesson 3 Phylogeny TSW 9 (AP 7.9, EVO 3.B, 3.C, SP 2.D)

E07 Lesson 3 Do you see what eye see Case Study TSW 9 (AP 7.9, EVO 3.B, 3.C, SP 1.C, 2.D, 6.E) Mastery

E07 Lesson 4 Common Ancestry TSW 7 (AP 7.7, EVO 2.C, SP 6.E)

E07 Lesson 3 and 4 Cladograms and Phylogenetic Trees Learning Activity TSW 9 Mastery

E07 Lessons 3 and 4 Analyzing Phylogenetic Trees TSW 9 (AP 7.7, 7.9, EVO 2.C, 3.B, SP 2.D, 6.B, 6.E)

E07 Lesson 3 and 4 BLAST Lab TSW 6, 9 (AP 7.7, 7.9, EVO 2.C, 3.B, 3.C, SP 2.A, 2.D) Mastery

E07 Lesson 3 Phylogeny Quiz on AP Classroom

E07 Lessons 3 and 4 (AP 7.7 and 7.9) Topic Questions on AP Classroom

## **Week 22: Phylogenies and the History of life on Earth**

E07 Lesson 5 Population Genetics and the Hardy-Weinberg Equation TSW 4, 5, 12 (AP 7.4, 7.5, 7.8, 7.12 EVO 1.H, 1.I, 1.J, 1.K, 1.L, 3.A, SYI 3.D SP 5.A)

E07 Lesson 5 Hardy-Weinberg Equilibrium Calculations TSW 5 (AP 7.5, EVO 1.K, SP 5.A.a) Mastery

E07 Lesson 5 Population Genetics and Hardy-Weinberg Quiz on AP Classroom

E07 Lesson 5 Case Study: "Antibiotic Resistance: Can We Ever Win?" TSW 8, 10 (AP 7.4, 7.8, 7.10, EVO 1 and 3, SP 3.A, 4.A, 5.B, 5.D, 6.D, 6.E) Mastery and Above Mastery Components

E07 Lesson 6 Origins of Life and Extinctions TSW 11, 13 (AP 7.11, 7.13, EVO 3.G, 3.H, 3.I, 3.J, SYI 3.E)

Interactive Extinctions Website to learn more about Extinction History

E07 Lesson 6 Case Study: "Spark of Life" TSW 13 (AP 7.13, SYI 3.E, SP 2.B, 2.C, 3.C, 6.D, 6.E)  
Mastery and Above Mastery  
E07 Lessons 5 and 6 (AP 7.4, 7.5, 7.8, 7.11, 7.12, 7.13) Topic Questions on AP Classroom

### **Week 23: Natural Selection Final Assessments**

E07 Labster: Evolution: Founding theories and principles. TSW 1, 2, 3, 4, 5, 7, 9, 10 (AP 7.1, 7.2, 7.3, 7.4, 7.5, 7.7, 7.9, 7.10)  
E07 MCQ Part A Progress Check on AP Classroom  
E07 MCQ Part B Progress Check on AP Classroom  
E07 FRQ Progress Check on AP Classroom  
E07 Final Assessment on AP Classroom  
E07 Final Grade

## **Unit 8: ECOLOGY**

As a culmination of this course, Unit 8 brings together all other units to show how a system's interactions are directly related to the system's available energy and its ability to evolve and respond to changes in its environment. When highly complex living systems interact, communities and ecosystems will change based on those interactions. The more biodiversity present in a system, the more likely that system is to maintain its health and success in the face of disruption. Energy flows through systems; the rate of flow determines the success of the species within the systems. By this point in the curriculum, a student should be able to accurately determine what happens within biological systems when disruptions occur.

### **Week 24: Animal Behavior and Introduction to Ecology**

E08 Introduction to Ecology  
E08 Lesson 1 Responses to the Environment TSW 1 (AP 8.1, ENE 3.D, IST 5.A)  
E08 Lesson 1 Animal Behavior: Marginal Foraging Bees Lab Simulation TSW 1 (AP 8.1, ENE 3.D, IST 5.A, SP 1.C, 3.C, 3.D, 4.A, 4.B, 5.D, 6.A, 6.B, 6.C, 6.D, 6.E)  
E08 Lesson 1 Quiz  
E08 Lesson 2 Part 1: Energy Flow Through Ecosystems TSW 2 (AP 8.2, ENE 1.M, 1.N, 1.O)  
E08 Lesson 2 Part 2: Energy Flow Through Ecosystems TSW 2 (AP 8.2, ENE 1.M, 1.N, 1.O)  
E08 Lesson 2: Plant Transpiration Lab TSW 2 (AP 8.2, ENE 1.N, 1.O, SP 3.C, 3.D, 4.B, 6.A, 6.B, 6.C, 6.E)  
E08 Above Mastery Calculating GPP and NPP Lab Activity (SP 3.C, 5.A)  
E08 Lesson 2 Quiz  
E08 Lessons 1 and 2 (AP 8.1, 8.2) Topic Questions on AP Classroom

### **Week 25: Food webs and Population Ecology**

E08 Lesson 3 Population Ecology and Effect of Density on Populations TSW 3 and 4 (AP 8.3, 8.4, SYI 1.G, 1.H, SP 4.A, 5.A)  
E08 Lesson 3 Concept Map of factors influencing population size TSW 3 (AP 8.4, SYI 1.H)  
E08 Lesson 3 Patterns of change in population size TSW 3 (AP 8.3, SYI 1.G)  
E08 Lesson 3 Reproducing like rabbits TSW 3 and 4 (AP 8.3, 8.4, SYI 1.G, 1.H, SP 4.A, 5.A)  
E08 Lesson 3 Populations: Random Sampling Lab Activity Linked to E10 (SP 2.D, 3.D, 3.E, 4.B.c, 5.A)  
E08 Lesson 3 Quiz  
E08 Lesson 3 (AP 8.3, 8.4) Topic Questions on AP Classroom

### **Week 26: Community Ecology and Ecosystem and Restoration Ecology**

E08 Lesson 4 Community Ecology and Biodiversity TSW 5, 6 and 7 (AP 8.5, 8.6, ENE 4.A, 4.B, 4.C, SYI 3.F, 3.G)

E08 Lesson 4 Case Study: The Wolf, The Moose and The Fir Tree TSW 5 (AP 8.5, ENE 4.A, 4.B, 4.C, SP 3.A, 3.E, 4.B, 5.D, 6.A, 6.D)

E08 Lesson 4 Food Webs Lab Simulation Assignment TSW 1,3,4 and 6 (AP 8.1,8.2,8.5, ENE 1.M, 1.O, 3.D, 4.A, 4.B, 4.C, IST 5.A) (Linked to E10 SP 1.A,1.B,3.A,5.D,6.A,6.E.a and 6.E.c)

E08 Lesson 4 Quiz

E08 Lesson 5 Part 1 Disruptions to Ecosystems TSW 8 (AP 8.7, EVO 1.O, SYI 2.A, 2.B, 2.C)

E08 Lesson 5 Part 2 Human Activities that Affect Ecosystems TSW 8 (AP 8.7, EVO 1.O, SYI 2.A, 2.B, 2.C)

E08 Labster: Landscape Ecology: Determine the persistence in a spatially heterogenous landscape TSW 6, 7, 8 (AP 8.3, 8.6, 8.7, SYI 1.G, 2.C, SP 1.C, 2.D, 3.D, 6.D, 6.E)

E08 Lesson 5 Quiz

E08 Lessons 4 and 5 (AP 8.5, 9.6, 8.7) Topic Questions on AP Classroom

### **Week 27: Global Change and Biodiversity**

E08 Lesson 6 Part 1: How Evolution creates Biodiversity

E08 Lesson 6 Part 2: Evolution of Niches and Species

E08 Lesson 6 Part 3: The Sixth Mass Extinction

E08 Lesson 6 Evolution and Biodiversity Linking Units 7 and 8 (SP 4.B)

E08 Evolution and Biodiversity (Bringing it all together) Quiz

E08 Above Mastery Animal Behavior Research Assignment "Adoption isn't just for Humans"

E08 MCQ Progress Check on AP Classroom

E08 FRQ Progress Check on AP Classroom

E08 Final Assessment on AP Classroom (Self Score)

E08 Final Grade

## **Unit 9: EXAM PREPARATION**

This unit is designed to prepare students to take the College Board AP Biology test.

### **Week 28 – 30 AP Biology Exam Prep: Let's Get Started**

AP Biology Exam Information

AP Bio Student Exam Info Site: College Board

AP Biology Equations and Formulas Sheet

AP Biology Course and Exam Description

Varsity tutors FREE AP Bio Diagnostic and Practice Exams

AP BIO Interactive Study Guide

### **College Board Review Sessions:**

E01 Unit Review Chemistry of Life, Cell Structure and Function Session 1

Everything You Need to Know about Cellular Energetics | Live Review Session 2

Understanding Cell Communication & the Cell Cycle | Live Review Session 3

Studying Meiosis & Diversity | Live Review Session 4

Examining Gene Expression & Regulation | Live Review Session 5

AP BIO Unit 7 Natural Selection Review Part 1 (College Board)

AP BIO Unit 7 Natural Selection Review Part 2 (College Board)

Ecology & the Biological Mechanisms Involved in Growth | Live Review Session 8

Sample Free Response Questions and Explanations

AP Bio FR questions test strategies. What types of questions can you expect in the FR section of the exam

AP Biology E09 LAB EXPERIMENTS and why it's important to review them

**AP BIO MCQ Mock Exam - required**

**AP Biology FRQ Mock Exam - required**

**Selected Bozeman Science Videos and Other Topic Specific Websites based on past questions**

Exponential Growth

Chi-squared Test

Solving Hardy Weinberg Problems

Hardy-Weinberg Punnett Squares

Miller-Urey Experiment

DNA Replication

Proteins

Biological Molecules

Immune Response

Operon

Thermoregulation



Osmoregulation

Free Energy

Cellular Organelles

Photosynthesis and Respiration

Communities

Populations

Population Variation

Biotic and Abiotic Factors

Science Practice: Analysis & Evaluation of Evidence

Science Practice: Models and Representations

Lab : Population Genetics and Evolution

Science Practice : Scientific Questioning

Science Practice: Data Collection Strategies

Advanced Genetics

### **Exam Prep Additional Resources and Graded Practice**

AP Biology Final Review Questions Answered by Mr Anderson

AP Biology Penguins Insta Review

Kahn academy AP Biology

**E09 AP BIO Practice Exam (Read Directions First) - required**

E09 FINAL GRADE

### **Unit 10: SCIENCE PRACTICES**

Science practices form the basis of many tasks on the AP Biology Exam.

This unit is designed to be open all year, in order to keep the focus on science practices while biology content is being studied. These practices have been spiralled throughout the course, providing the students with an integration of practices into the course content with sufficient repetition to prepare students to transfer those skills when taking the AP Biology Exam. The rubric above will be used to assess the students during the year.

College Board Science practices

AP Bio Science Practice 1: Concept Explanations  
AP Bio Science Practice 2: Visual Representations  
AP Bio Science Practice 3: Questions and Methods  
AP Bio Science Practice 4: Representing and Describing Data  
AP Bio Science Practices 5: Statistical Tests and Data Analysis  
AP Bio Science Practice 6: Argumentation  
E10 Final Grade

## **Tentative Course Schedule**

Students complete IOL prior to being enrolled into their main QVS course.

Students follow the work schedule as sent in the work calendar 2022-2023.

Students are advised to follow the order of lessons and activities in each week. The knowledge gained in each lesson or activity will help them better understand the next one. Jumping around between lessons and assignments does not lead to successful learning.

## **Attendance Policy**

Students should spend (at least) 5 periods per week on this course in school, (equivalent of 225 minutes per week). Students are expected to spend 2 hours per day on this course.

Students are expected to submit work daily, when assignments are submitted in bulk feedback time increases (a maximum of 2 assignment graded per day) and this will impact their pace in the course.

## **Classroom Behavior expectations**

For synchronous communication:

School appropriate attire; camera on at all times; microphone muted on login

For asynchronous communication:

Replies to classmates are to include critical thought related to the topic of discussion, and should be at least 3 - 5 sentences in length. Use of proper netiquette is required in all responses. Fonts, bolding, and punctuation affect how text is perceived. Avoid making blanket statements such as, "good job", as these serve no purpose in further enrichment of learning. Encouragement is purposeful, but please pair this with critical thoughts related to the topic at hand.

## **Academic honesty**

Students should always notify their teacher when they collaborate on a laboratory investigation or on other tasks. Collaborating on projects and laboratory investigations is possible and encouraged.

Reports should be written individually unless explicit permission of group report writing has been given. Copying of answers from other students or other sources will be reported to parents, monitor, and QVS director.

Multiple instances of plagiarism can lead to removal from the course.

## **Other Information**

**AP Biology Exam = Wednesday May 10, 2023**