AP BIOLOGY SYLLABUS 2021-2022

Bastrop High School

Dear APBiology Students and Parents,

This Syllabus has been prepared for you so you will become familiar with the AP Program® and AP Biology and understand the requirements for success. I have included as much information as possible to help you.

The AP Program® is designed to allow high school students to obtain college credit &/or advanced placement in college. The credit is earned by examination. The AP Exam is given in May to over 200,000 students. The score range is 1-5. A score of 3 is usually acceptable to most colleges & universities. About 70% of the students who take the exam earn a 3 or better. Most of the exam is based on course content, but critical thinking skills are required to successfully complete the majority of the exam. Much of the exam involves lab-based questions, which will involve an understanding of experimental design, graphing, data analysis, prediction, etc. We will work on these skills throughout the year.

Since this course is a college-level course taught to high school students it is very demanding. Universities expect the course to be the equivalent of a freshman Biology majors course. Universities differ in their acceptable exam score requirements depending on whether the student plans to major in science or not. If you are concerned about this contact the college or university you plan to attend & find out their policy.

For those of you who are not familiar with AP courses, you should be aware of some expectations beyond what is required in a regular course. **All students are encouraged to take the AP exam***.* The exam date is **Wednesday, May 11, 2022 at 12 noon**. Each student will be required to read & learn materials outside of the text that might not be covered in lecture. Each student will be required to learn to use & read current scientific literature. Students will need to spend time outside class to study, read & work on assignments.

Attendance is extremely important in AP Biology. Material is covered very quickly & in much more detail than in Biology/Biology Honors. Excessive absences for whatever reason (excused or unexcused) will jeopardize your chances of success in this course. Lab work is almost impossible to make-up & will be included on unit tests. If students are absent on a lab day, they may not understand the concepts well enough to answer questions on quizzes & tests. It is important if you are absent to find a time to see me during tutorials to discuss the material you missed. I understand that some students are necessarily busy with extracurricular activities & I will do my best to schedule major labs & tests around the majority of the students. Time management is an extremely important skill to learn & is best learned before being on your own at a university.

We will be using the Internet quite frequently in this course. While it is not required that you have internet access from home, it would be very helpful. Students who cannot connect from home can use the computers in the school library, the public library, & the classroom.

# AP BIOLOGY GENERAL COURSE DESCRIPTION

**2021-2022**

This is a college-level course taught in high school. At the end of the year, students are given a standardized exam, which will determine their eligibility for college credit. Students must exercise exceptional organizational skills in order to meet the demands of this course.

The course is organized into major instructional areas as shown below. The material reflects the curriculum standards set by the College Board for this course.

# GENERAL COURSE OUTLINE

Unit 1 Nature of Science & Biochemistry

Unit 2 Cell Structure and Function

Unit 3 Energetics

Unit 4 Cell Communication and Cell Cycle

Unit 5 Heredity

Unit 6 Gene Expression and Regulation

Unit 7 Evolution

Unit 8 Ecology

This course is divided into eight major units that each include all four of the Big Ideas that are the fundamental framework for the AP Biology Curriculum. Within each unit, the essential knowledge, learning objectives & science practices that will be taught as outlined below.

**BIG IDEAS**

| 1 | EVO | The process of evolution drives the diversity & unity of life. |
| --- | --- | --- |
| 2 | ENE | Biological systems utilize free energy & molecular building blocks to grow, to reproduce, & to maintain dynamic homeostasis. |
| 3 | IST | Living systems store, retrieve, transmit, & respond to information essential to life processes. |
| 4 | SYI | Biological systems interact, & these systems & their interactions possess complex properties. |

Biology is a scientific process that requires students to make observations & interpret information from the natural world. Because the process of science is such an important part of this course, students will be required to record their lab activities in a lab notebook in such a way as to mirror the process that is used in research laboratories. Each of the Science Practices below will be addressed throughout the course within the context of the Essential Knowledge. They are listed in the curriculum framework along with the appropriate learning objective. Because students will be learning the practice of being a scientist, they will conduct at least two inquiry based lab activities per Big Idea in the curriculum framework. The products of these investigations will be either a formal lab report, mini-poster presentation or a group presentation.

**Science Practices**

| **1** | **Concept Explanation: Explain biological concepts, processes and models presented in written format** |
| --- | --- |
| **1A** | *Describe biological concepts and/or processes* |
| **1B** | *Explain biological concepts and/or processes* |
| **1C** | *Explain biological concepts, processes and/or models in applied contexts* |
| **2** | **Visual Representations : Analyze visual representations of biological concepts and processes** |
| **2A** | *Describe characteristics of a biological concept, process or model represented visually* |
| **2B** | *Explain relationship between different characteristics of biological concepts, processes or models represented visually—in theoretical contexts; in applied contexts* |
| **2C** | *Explain how biological concepts or processes represented visually relate to larger biological principles, concepts, processes or theories* |
| **2D** | *Represent relationships within biological models, including: Mathematical models; diagrams; flow charts* |
| **3** | **Determine Scientific Questions and methods** |
| **3A** | *Identify or pose a testable question based on an observation, data or a model* |
| **3B** | *State the null and alternative hypotheses or predict the results of an experiment.* |
| **3C** | *Identify experimental procedures that are aligned to the question, including: identifying dependent and independent variables; identifying appropriate controls; justifying appropriate controls* |
| **3D** | *Make observations or collect data from representations of lab setups or results.* |
| **3E** | *Propose a new/next investigation based on an evaluation of the evidence from an experiment; an evaluation of the design/methods.* |
| **4** | **Representing & Describing Data**  |
| **4A** | *Construct a graph, plot or chart (X,Y; Log Y; Bar; Histogram; Line; Dual Y; Box and Whisker; Pie) with appropriate orientation, labeling, units, scaling, plotting, type, trend line.* |
| **4B** | *Describe data from a table or graph, including: identifying specific data points; describing trends and/or patterns in the data; describing relationships between the variables.* |
| **5** | **Perform statistical tests and mathematical calculations to analyze and interpret data** |
| **5A** | *Perform mathematical calculations including: Mathematical equations in the curriculum; means; rates; ratios; percentages.* |
| **5B** | *Use confidence intervals and/or error bars (both determined using standard errors) to determine whether sample means are statistically different.* |
| **5C** | *Perform chi-square hypothesis testing* |
| **5D** | *Use data to evaluate a hypothesis (or prediction), including: rejecting or failing to reject the null hypothesis; supporting or refuting the alternative hypothesis.* |
| **6** | **Develop and justify scientific arguments using evidence** |
| **6A** | *Make a scientific claim.* |
| **6B** | *Support a claim with evidence from biological principles, concepts, processes and/or data.* |
| **6C** | *Provide reasoning to justify a claim by connecting evidence to biological theories.* |
| **6D** | *Explain the relationship between experimental results and larger biological concepts, processes or theories.* |
| **6E** | *Predict the causes or effects of a change in or disruption to, one or more components in a biological system based on: biological concepts or processes; a visual representation of a biological concept, process or model; data.* |

**Course Sequence & Correlation to Textbook**

| **Unit** | **Unit Name** | **Ch** | **Chapter Name** |
| --- | --- | --- | --- |
| 1 | Nature of Science and Biochemistry  | 1 | Introduction/nature of science |
| 51.1-4 | Animal Behavior |
| 2 & 3 | Chemistry of Life |
| 4 & 5 | Carbon |
| 2 | Cell Structure and Function | 6 | A tour of the cell |
| 7 | Membrane Structure & Function |
| 25.1; 27 | Early Life and Diversification of Prokaryotes |
| 28 | Origins of Eukaryotes |
| 44.1-3; 40.2 | Osmoregulation & Excretion |
| 48 | Neurons, Synapses & Signaling |
| 50.5-6 | Muscle Contraction |
| 3 | Energetics | 8 | Intro to Metabolism |
| 9 | Cellular Respiration |
| 40.1 | Feedback & Thermoregulation |
| 10 | Photosynthesis |
| 35.1-4 | Plant Structure and Function |
| 36.1-5;37.2-3 | Resource Transport |
| 55 | Ecosystems |
| 4 | Cell Communication and Cell Cycle | 11.1-4 | Cell Signaling |
| 45.1-2 | Endocrine |
| 43.1-4 | Immune System |
| 12 | Cell Cycle  |
| 16.1-3 | The Molecular Basis of Inheritance |
| 18.5 | Cancer |
| 5 | Heredity | 13 | Meiosis & Sexual Life Cycles |
| 14 | Mendelian Genetics |
| 15.1-4 | Chromosomal Basis of Inheritance |
| 6 | Gene Expression & Regulation  | 17 | Protein Synthesis |
| 18.1-3;20.3-4 | Regulation of Gene Expression |
| 20.1 | Biotechnology |
| 18.4; 20.3;47.1-2; 46.5 | Development |
| 19 | Viruses |
| 21 | Genomes and their evolution |
| 7 | Evolution | 22 | Descent with Modification |
| 23 | Population Genetics |
| 24 | Speciation |
| 25.2; 25.4-6 | Patterns of Evolution |
| 26 omit 26.4 | Phylogenetics |
| 8 | Ecology | 52.1-4;53.1-5 | Population Ecology & Distribution of Organisms |
| 54 | Species Interactions |
| 56.1-5; 53.6 | Global Ecology & Conservation Biology |

**GRADING POLICY & ASSIGNMENTS**

**How to contact Ms. Dollery:**

Room 822, Science Building

Google Classroom: tlo6u4i

Email: edollery@bisdtx.org

Phone: 512-772-7200 (school phone)

**Materials Needed for Class:**

* **Large (2-3in) 3 ringed binder** to keep materials in at home.
* **Pocket folder or small 3 ring binder** to keep daily materials for class.
* **1 composition Notebook** to complete labs and hands on activities at the stations
* Pen, pencil, extra notebook paper
* Internet access for online homework & access to reading material.
* Any other material that would be useful to you for studying or time management: planner, notecards, post it notes, highlighters, several pen colors etc…

**Each student’s six-week’s grade will be based on the following:**

Exams, Labs, Projects & Abstracts 60%

Classwork, Reading Quizzes & Homework 40%

All students will take the fall semester exam *(i.e. there will be no exemptions).* By taking the Semester Exam in the fall, students have an opportunity to review a good deal of material that will be on the AP exam. Since students will be taking the AP Exam in the spring there will be no spring semester exam *(i.e. you are exempt)* provided the student registers, prepares for & takes the AP Exam on May 11th. If you do not take the AP Exam on May 11th, you will be taking the spring semester exam.

**Where to find your assignments:**

* Most of your assignments are found in the Google Classroom (join code: tlo6u4i)
* Assignments will also be located in the AP College Board Classroom (join code: 7VQA2J). Pre-Assessment and tests will be used through the AP College Board Classroom.
* When absent from class, check the Google Classroom. Quizzes, FRQs, and tests will be completed in tutorials as soon as possible.
* All scientific papers to read for abstracts are also found on the website and there is no need to print these.
* It is important that you get used to having much of your work online. When you go to college, many classes you take will require you to download work & submit much of your work online.

**General Guidelines for Assignments:**

* Assignments must be turned in on time.
* If you turn in assignments after your class period has ended, it is **considered late**.
* Since you will know the due dates in advance, you are expected to turn in your work the **day you return from an absence**.
* First day an assignment is late, 30 points will be deducted from the grade (max grade of 70). Second day an assignment is late, 10 additional points will be deducted from the grade (max grade of 60). Third day an assignment is late, 10 additional points will be deducted from the grade (max grade of 50).
* **After three days, the assignment will no longer be accepted to be graded.**
* Absences are subject to the absence policy.
* If there are extenuating circumstances, you need to speak with Ms. Dollery as soon as possible to develop a solution for excessively late assignments.
* **Do not wait until the last week of the six weeks to help your grade.** Ms. Dollery teaches more than one course and has other responsibilities on campus at BHS.

**Textbook Reading & Note-taking**

* You will be expected to **read & take notes** on assigned chapters. Failure to read and complete notes will reflect on daily quiz grades.
* AP Biology students may choose a note-taking format of their choice to take notes over the assigned reading.
* Notes are recorded in the interactive notebook and checked weekly.

**Video Notes**

* You will usually have a set of short instructional videos to watch each week. You are expected to watch the videos & **take notes**. Instructions for note taking format will be provided.
* These videos are meant to supplement classroom instruction & will allow us to explore topics in class more deeply. The videos are also a very good tool for test review for many students.
* Video notes are recorded in the interactive notebook and checked weekly.

**Paper Summaries—Abstracts**

* Current scientific literature relevant to topics being discussed are assigned to be read & summarized for each unit.
* Papers that are available to be read are posted in the Google Classroom. Outside articles will not be accepted for grading.
* Specific instructions for completing abstracts will be presented to you.
* You are **required to prepare two summaries** for each unit.
* You are expected to summarize the paper **in your own words**! Do not take several sentences from the paper & piece them together!

**Lab Assignments**

* Directions for formal lab write-ups will be given to you before the first lab write up. You will ***not*** prepare a formal report for every lab.
* All lab assignments **must be turned in on time***.*
* **Pre-labs are to be completed on time before conducting a lab.** If your pre-lab is not completed, no participation in the lab. You will need to see Ms. Dollery for data from the lab during tutorials.
* Some lab activities cannot be made up because the materials will not last very long, but you are still responsible for completing the lab questions and your final report.
* If you are absent on a lab day, you are expected to see Ms. Dollery in tutorials to get data from the lab. You are still responsible for completing the lab questions or final product of the lab experiment.

**Quizzes**

* Some quizzes are announced ahead of time & will cover material you should have read, work we have done in class or something that we worked on in the lab.
* Some quizzes will **not** be announced ahead of time & may be used to assess whether you have mastered important concepts that we have been working on in class. Consequently, it is important to try to manage your time & not get behind. It is also helpful to frequently review your prior work!
* Quizzes may be short-answer, multiple choice or a free response question from a previous AP Exam.
* If you are absent & miss a quiz, make arrangements to attend tutorials to make up the quiz. Please keep in mind the district policy on make-up time for absences.
* Quizzes are a daily grade and cannot be retaken.

**Unit Exams:**

* It is important that you keep up with your assignments & work on studying a little bit each day. If you try to do the “cramming” method, you will hurt yourself in the long run because you will be unable to remember the material long term (i.e. for Unit Exams or the AP exam in May). You will be more likely to retain information if you **review & study your notes & textbook a little every day!**
* Exams are composed of questions that mirror what you will see on the AP exam. Many questions will present you with data &/or experiments that you have not seen before & you will be expected to **apply** the information you have learned in class. In other words, simply memorizing information from the textbook or notes will not be the most productive study method! You must **understand** the material in order to apply the concepts & or evaluate new material.
* Exam questions will be based on class notes, assignments, labs & the textbook.
* If you are absent on the day of an exam, you should make arrangements to attend tutorials. Please keep in mind the district policy on make-up time for absences. An alternate version of the exam is given as the make-up exam.