AP Biology Course Overview

Content Area: **English**
Course(s):
Time Period:
Length:
Status: **Published**

School Mission Statement

The mission of Chartertech is to provide artists the opportunity to blend principles of artistic expression with cutting-edge technology, so artists will excel in academic, career, and civic pursuits and contribute to the harmony and productivity of the 21" century.

Artistic integration: Performing arts will be accessible to all artists as a skill and content area and will serve as a vehicle for imparting, enlivening, and motivating excellence in all academic topics, as well as providing a platform for learning multicultural appreciation and empathy, not just tolerance.

Technological integration: Technology will serve as the foundation for instructional delivery systems leading to knowledge acquisition, concept understanding, and skill mastery in all academic subjects. Technology will not be studied as a separate entity but infused into the very fabric of educational pursuits, exactly as it occurs in the business world. Artists will be prepared to compete in the modern workplace or post-secondary institution.

"Education has always been torn between vocational and utilitarian purposes on one hand and creative and holistic purposes on the other... We are rapidly entering a world that is hard to imagine. By developing the problem-solving skills, creativity, and discipline required in the arts, artists can prepare for life in the 21st century."

From Understanding How the Arts Contribute to Excellent Education

National Endowment for the Arts, 1991

School Goals

Goals for Arts Education:

Artists will learn the knowledge, skills, and abilities necessary to turn their passions and gifts in the arts into vocations or serious avocations.

Objective 1: Each year, each artist will take two semesters (10 credits) of career-oriented training (80 minutes per day) in their artistic major.
Objective 2: Each marking period, each artist will perform or produce frequently, in diverse settings and for diverse audiences.

Objective 3**:** Artistic instruction will be integrated into the study of all academic subjects.
Objective 4: Each year, each artist will complete at least twenty after-school "lab" hours in their artistic major. These will constitute career-oriented service to the school and/or community, and demonstrate accomplishment of the NJCCCS crosscutting workplace readiness standards.

Goal for Technology:
Chartertech will model the technology-intense workplace and artists will be able to compete successfully and perform well in a technology-intense workplace.

Objective 5: Each artist will routinely use technology in a workplace-like manner to acquire, analyze, communicate, and present information in every subject.
Objective 6: Each artist will have access to a computer every day, every class so that automated sources will be the main conduit for educational content.
Objective 7: All administrative and instructional functions of the school will be supported by the most modern technology available.

Goals for Academic Achievement:
Artists will apply themselves in the serious pursuit of knowledge and skills, especially skills in critical thinking, problem solving, decision making, and communication.

Objective 8: Each year, and to be promoted to the next grade each artist will pass five credits in English, Health, Social Studies, Science, Mathematics, and PE/Health. Between grades 9-12 artists will also complete 1year of Spanish.

Objective 9: In each academic subject, each year, each artist will complete a significant project that involves critical thinking, problem solving, decision making, and communication skills, and which demonstrates cross-content workplace readiness skills.

Objective 10: Each year artists will develop a artist resume to guide his/her academic and artistic studies and to document his/her academic and artistic accomplishments. This work will be done under the mentorship of the faculty in the artist's artistic major.

Objective 11: Academic instruction in all subjects will be highly cross-curricular, in accordance with curricula design and continuously improved by teachers, in compliance with the New Jersey Artist Learning Standards.

Course Description

Course Title:	AP Biology
Department:	Science
Prerequisite:	
Number of Credits:	5
Grade Level(s):	

Standards:	
Description of Course	**Course Description:** This AP Biology course is designed to offer students a solid foundation in introductory college-level biology. The two main goals of this course are to help students develop a conceptual framework for modern biology and an appreciation of science as a process. The primary emphasis in an AP Biology course should be on developing an understanding of concepts rather than on memorizing terms and technical details. Essential to this conceptual understanding are a grasp of science as a process rather than as an accumulation of facts; personal experience in scientific inquiry; recognition of unifying themes that integrate the major topics of biology; and application of biological knowledge and critical thinking to environmental and social concerns. By structuring the course around the four big ideas, enduring understandings, and science practices, students will develop an appreciation for the study of life, which will help them identify and understand unifying principles within a diversified biological world. What we know today about biology is a result of inquiry. Science is a way of knowing. Therefore, the process of inquiry in science and developing critical thinking skills is the most important part of this course. At the end of the course, students will have an awareness of the integration of other sciences in the study of biology, understand how the species to which we belong is similar to, yet different from, other species, and be knowledgeable and responsible citizens in understanding biological issues that could potentially impact their lives. **Text Book**: Campbell Biology, 11th Edition, 2018, Pearson/Prentice Hall **Big Ideas:** This AP course is structured around the four big ideas, the enduring understandings within the big ideas and the essential knowledge within the enduring understanding. □ **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 **Investigative Laboratory Component:** The course is also structured around inquiry in the lab and the use of the seven science practices throughout the course. Students are given the opportunity to engage in student-directed laboratory investigations throughout the course for a minimum of 25% of instructional time. Students will conduct a minimum of eight (8) inquiry-based investigations (two per big idea throughout the course). Additional labs will be conducted to deepen students' conceptual understanding and to reinforce the application of science practices within a hands-on, discovery based environment. All levels of inquiry will be used and seven science practice skills will be used by students on a regular basis in formal

	labs as well as activities outside of the lab experience. The course will provide opportunities for students to develop, record, and communicate the results of their laboratory investigations. **Explanation of Science Practices (SP):** 1. The student can use representations and models to communicate scientific phenomena and solve scientific problems. 2. The student can use mathematics appropriately. 3. The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course. 4. The student can plan and implement data collection strategies appropriate to a particular scientific question. 5. The student can perform data analysis and evaluation of evidence. 6. The student can work with scientific explanations and theories. 7. The student is able to connect and relate knowledge across various scales, concepts and representations in and across domains.

Overview & Pacing

Unit #	Major Content	Expected Time
Unit 1: Nature of Science and Chemistry of life	a. Science as a Process b. Nature of Molecules c. Properties of water d. Chemical Building Blocks of life	3 Weeks
Unit 2: Cellular Processes and Homeostasis	a. Cell Structure and Function b. Cell Membrane c. Cell Transport d. Cell Communication e. Enzymes and Metabolism	5 Weeks
Unit 3: Bioenergetics and Plant Form and Function	a. Photosynthesis b. Cellular Respiration c. Plant Structure and Function	5 Weeks
Unit 4: Genetics and Information Transfer	a. Cell Cycle and Mitosis b. Meiosis c. Mendelian Genetics d. DNA Structure and History e. Genetics f. From Gene to Protein g. Genetic Engineering	9 Weeks
Unit 5: Evolution of Life	a. Population Genetics b. Hardy Weinberg and Chi Squared c. Evidence for Evolution	3 Weeks

	d. Origin of Species e. Cladograms f. Genome Evolution	
Unit 6: Animal Structure and Function	a. Homeostasis b. Animal systems c. Nervous systems d. Endocrine System e. Immune System	3 Weeks
Unit 7: Ecology	a. Biosphere b. Organismal Behavioral and Communication with Ecosystem c. Exponential and Logistic Growth d. Density Dependent/Independent Factors e. Predator Prey Dynamics f. Communities	2 Weeks
Unit 8: After AP Exam	a. Services Learning Assignment b. Social and Ethical Concerns	