AP® BIOLOGY

About the Advanced Placement Program® (AP®)

The Advanced Placement Program® has enabled millions of students to take college-level courses and earn college credit, advanced placement, or both, while still in high school. AP Exams are given each year in May. Students who earn a qualifying score on an AP Exam are typically eligible to receive college credit and/or placement into advanced courses in college. Every aspect of AP course and exam development is the result of collaboration between AP teachers and college faculty. They work together to develop AP courses and exams, set scoring standards, and score the exams. College faculty review every AP teacher's course syllabus.

AP Biology Course Overview

AP Biology is an introductory college-level biology course. Students cultivate their understanding of biology through inquiry-based investigations as they explore the following topics: evolution, cellular processes — energy and communication, genetics, information transfer, ecology, and interactions.

LABORATORY REQUIREMENT

This course requires that 25 percent of the instructional time will be spent in hands-on laboratory work, with an emphasis on inquiry-based investigations that provide students with opportunities to apply the science practices.

PREREQUISITE

Students should have successfully completed high school courses in biology and chemistry.

AP Biology Course Content

The course is based on four Big Ideas, which encompass core scientific principles, theories, and processes that cut across traditional boundaries and provide a broad way of thinking about living organisms and biological systems. The following are Big Ideas:

- The process of evolution explains the diversity and unity of life.
- Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.
- Living systems store, retrieve, transmit, and respond to information essential to life processes.
- Biological systems interact, and these systems and their interactions possess complex properties.

Science Practices

Students establish lines of evidence and use them to develop and refine testable explanations and predictions of natural phenomena. Focusing on these disciplinary practices enables teachers to use the principles of scientific inquiry to promote a more engaging and rigorous experience for AP Biology students. Such practices require that students:

- Use representations and models to communicate scientific phenomena and solve scientific problems;
- Use mathematics appropriately;
- Engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course;
- Plan and implement data collection strategies in relation to a particular scientific question;
- Perform data analysis and evaluation of evidence;
- Work with scientific explanations and theories; and
- Connect and relate knowledge across various scales, concepts, and representations in and across domains.

Inquiry-Based Investigations

Twenty-five percent of instructional time is devoted to hands-on laboratory work with an emphasis on inquiry-based investigations. Investigations require students to ask questions, make observations and predictions, design experiments, analyze data, and construct arguments in a collaborative setting, where they direct and monitor their progress.

AP Biology Exam Structure

AP BIOLOGY EXAM: 3 HOURS

Assessment Overview

Exam questions are based on learning objectives, which combine science practices with specific content. Students learn to

- Solve problems mathematically — including symbolically
- Design and describe experiments and analyze data and sources of error
- Explain, reason, or justify answers with emphasis on deeper, conceptual understanding
- Interpret and develop conceptual models

Due to the increased emphasis on quantitative skills and application of mathematical methods in the questions, students are allowed to use simple four-function calculators (with square root) on the entire exam. Students also receive a formula list as part of their testing materials.

Format of Assessment

Section I: Multiple Choice | 69 Questions | 1 Hour, 30 Minutes | 50% of Exam Score

Multiple-Choice: 63 Questions

- Discrete Questions
- Questions in sets

Grid-In: 6 Questions

- Discrete Questions
- Questions integrate biology and mathematical skills

Section II: Free Response | 8 Questions | 1 Hour, 30 Minutes (includes 10-minute reading period) | 50% of Exam Score

- Long Free Response (2 questions, one of which is lab or data-based)
- Short Free Response (6 questions, each requiring a paragraph-length argument/response)

AP BIOLOGY SAMPLE EXAM QUESTIONS

Sample Multiple-Choice Question

Two flasks with identical medium containing nutrients and glucose are inoculated with yeast cells that are capable of both anaerobic and aerobic respiration. Culture 1 is then sealed to prevent fresh air from reaching the culture; culture 2 is loosely capped to permit air to reach the culture. Both flasks are periodically shaken.

*Which of the following best **predicts** which culture will contain more yeast cells after one week, and most accurately **justifies** that prediction?*

A. Culture 1, because fresh air is toxic to yeast cells and will inhibit their growth

B. Culture 1, because fermentation is a more efficient metabolic process than cellular respiration

C. Culture 2, because fresh air provides essential nitrogen nutrients to the culture

D. Culture 2, because oxidative cellular respiration is a more efficient metabolic process than fermentation.

Correct Answer: D

Sample Grid-In Question

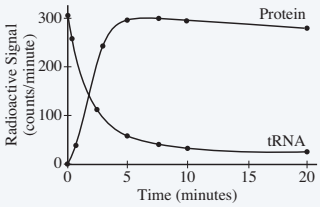
The data below demonstrate the frequency of tasters and non-tasters in an isolated population at Hardy-Weinberg equilibrium. The allele for non-tasters is recessive.

How many of the tasters in the population are heterozygous for tasting?

Tasters	Non-Tasters
8235	4328

Sample Short Free-Response Question

The role of tRNA in the process of translation was investigated by the addition of tRNA with attached radioactive leucine to an in vitro translation system that included mRNA and ribosomes. The results are shown by the graph.



*In a **short paragraph,** describe how this figure justifies the claim that the role of tRNA is to carry amino acids that are then transferred from the tRNA to growing polypeptide chains.*

Educators: apcentral.collegeboard.org/apbiology

Students: apstudent.collegeboard.org/apbiology

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