



Lakewood High School 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.

Prerequisites: Student should have completed Honors Biology and Honors Chemistry with a B or better. Students should have completed Biology and Chemistry with an A. In some cases a student can take Chemistry concurrently with AP Biology.

Laboratory Requirements: 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.

MAJOR THEMES IN THE COURSE:

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.
 - *Example: development of antibiotic-resistant disease-causing bacteria*
 - *Example: mitosis consistently replicates cells in an organism; meiosis (and hence sexual reproduction: results in genetic variability)*
- Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.
 - *Example: the energy of sunlight, along with carbon dioxide and water; allows plant cells to make organic materials, synthesize chemical energy molecules, and ultimately release oxygen to the environment*
- Living systems store, retrieve, transmit, and respond to information essential to life processes.
 - *Example: control of body temperature by the brain; control of cellular environment*

- Biological systems interact, and these systems and their interactions possess complex properties.
 - *Example: microscopic organisms can live in a symbiotic relationship in the intestinal tract of another organism; the host provides shelter and nutrients, and the microorganisms digest the food*
 - *Example: biotechnology and the development of the Hepatitis B vaccine and genetically modified plants; environmental consequences of toxic wastes or global warming*

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.