

AP BIOLOGY — 8-MONTH SYLLABUS

2 Classes per Week • 8 Months • Approximately 64 Classes

Course Length	8 Months
Class Frequency	2 classes per week
Approx. Total	64 classes (8 months × 8 weeks)
Course Level	AP Biology
Focus	Cell Biology • Genetics • Evolution • Ecology • Data Analysis • AP Exam Preparation

MONTH 1 • Chemistry of Life & Cell Structure

- Week 1 — Class 1: Water, hydrogen bonding and properties of water. | Class 2: Carbon chemistry and biological macromolecules.
- Week 2 — Class 1: Carbohydrates and lipids. | Class 2: Proteins, amino acids and protein structure.
- Week 3 — Class 1: Nucleic acids and ATP. | Class 2: Enzymes, activation energy and factors affecting enzyme activity.
- Week 4 — Class 1: Prokaryotic and eukaryotic cells. | Class 2: Organelles, cell size and microscopy; Unit 1 review/test.

MONTH 2 • Cell Membranes, Transport & Cellular Energetics

- Week 5 — Class 1: Cell membrane structure and fluid mosaic model. | Class 2: Diffusion, osmosis and facilitated diffusion.
- Week 6 — Class 1: Active transport and membrane proteins. | Class 2: Bulk transport and tonicity.
- Week 7 — Class 1: ATP and energy coupling. | Class 2: Cellular respiration overview and redox reactions.
- Week 8 — Class 1: Glycolysis, Krebs cycle and oxidative phosphorylation. | Class 2: Fermentation, photosynthesis connections and assessment.

MONTH 3 • Photosynthesis, Cell Communication & Cell Cycle

- Week 9 — Class 1: Chloroplast structure and light-dependent reactions. | Class 2: Calvin cycle and carbon fixation.
- Week 10 — Class 1: Photosynthetic adaptations and limiting factors. | Class 2: Comparing photosynthesis and cellular respiration.
- Week 11 — Class 1: Cell signaling and communication pathways. | Class 2: Receptors, signal transduction and cellular responses.
- Week 12 — Class 1: Cell cycle and checkpoints. | Class 2: Mitosis, cytokinesis and cancer; AP-style assessment.

MONTH 4 • Heredity & Molecular Genetics

- Week 13 — Class 1: Meiosis and genetic variation. | Class 2: Mendelian genetics and probability.
- Week 14 — Class 1: Monohybrid and dihybrid crosses. | Class 2: Non-Mendelian inheritance and pedigrees.
- Week 15 — Class 1: DNA structure and replication. | Class 2: DNA evidence and chromosome organization.
- Week 16 — Class 1: Transcription and RNA processing. | Class 2: Translation, mutations and gene expression; Unit assessment.

MONTH 5 • Gene Regulation, Biotechnology & Evolution

- Week 17 — Class 1: Prokaryotic gene regulation. | Class 2: Eukaryotic gene regulation and epigenetics.
- Week 18 — Class 1: Biotechnology, PCR and gel electrophoresis. | Class 2: DNA sequencing and genetic engineering.
- Week 19 — Class 1: Evidence for evolution. | Class 2: Natural selection, fitness and adaptation.
- Week 20 — Class 1: Population genetics and Hardy-Weinberg equilibrium. | Class 2: Speciation, phylogeny and unit assessment.

MONTH 6 • Evolution, Ecology & Population Dynamics

- Week 21 — Class 1: Phylogenetic trees and common ancestry. | Class 2: Mechanisms of evolutionary change.
- Week 22 — Class 1: Population growth and carrying capacity. | Class 2: Density-dependent and density-independent factors.
- Week 23 — Class 1: Community ecology and species interactions. | Class 2: Biodiversity, succession and disturbance.
- Week 24 — Class 1: Ecosystems, energy flow and trophic levels. | Class 2: Biogeochemical cycles and ecological assessment.

MONTH 7 • Ecology, Organismal Systems & Data Analysis

- Week 25 — Class 1: Primary productivity and energy transfer. | Class 2: Food webs and ecological pyramids.
- Week 26 — Class 1: Plant structure, transport and signaling. | Class 2: Plant responses and reproduction.
- Week 27 — Class 1: Animal structure and homeostasis. | Class 2: Nervous and endocrine signaling.
- Week 28 — Class 1: Immune, circulatory and respiratory systems. | Class 2: Experimental design, statistics and AP data analysis.

MONTH 8 • AP Biology Comprehensive Review & Exam Preparation

- Week 29 — Class 1: Chemistry of life and cell biology review. | Class 2: AP-style MCQ practice and data interpretation.
- Week 30 — Class 1: Cellular energetics and communication review. | Class 2: Genetics and molecular biology review.
- Week 31 — Class 1: Evolution and ecology review. | Class 2: Timed AP-style FRQ practice and scoring strategies.
- Week 32 — Class 1: Full-length AP Biology practice exam and error analysis. | Class 2: Final targeted review, FRQs and exam strategy.

Assessment & AP Exam Preparation

Component	Recommended Approach
Every Class	5–10 min retrieval practice • concept instruction • diagrams/models • data analysis • AP-style questions
Weekly	Targeted practice, graph/data interpretation or short AP-style check
Monthly	Unit assessment with MCQs, experimental analysis and FRQ-style responses
Mid-Course	Cumulative assessment after Month 4 with timed practice
Final Month	Full-length practice exam, FRQ scoring, error analysis and targeted revision

Learning Outcomes

- Explain the chemical foundations of biological systems and the role of macromolecules.
- Describe cell structure, membrane function, transport and cellular communication.
- Analyze cellular respiration and photosynthesis using energy and matter flow.
- Explain cell cycle regulation, mitosis and meiosis.
- Apply Mendelian genetics, probability and molecular genetics to biological problems.
- Explain DNA replication, gene expression, regulation, mutation and biotechnology.
- Use evidence to explain natural selection, evolution and population genetics.
- Analyze population, community and ecosystem interactions and energy flow.
- Interpret experimental data, graphs, tables, models and statistical results.
- Communicate biological reasoning effectively in AP-style multiple-choice and free-response questions.

Pacing Note

This plan is designed specifically for two classes per week over eight months. Laboratory demonstrations, virtual labs, experimental design, data-analysis activities and AP-style practice can be integrated according to available time and resources.