

AP Biology Semester I: Course Outline

I. Unit 1: Welcome to Biology

A. Chapter 1: What is Biology?

1. Lesson 1: Biology and Biologists
 - a. Topic 1: Overview
 - b. Topic 2: What is Biology?
 - c. Topic 3: How Do Biologists Study?
 - d. Topic 4: Biology as a Human Endeavor
 - e. Topic 5: Summary

B. Chapter 2: Chemical & Physical Properties of Solutions

1. Lesson 2: The Chemical Basis of Life
 - a. Topic 1: Overview
 - b. Topic 2: Elements of Life
 - c. Topic 3: Atoms and Molecules
 - d. Topic 4: Chemical Reactions
 - e. Topic 5: Summary
2. Lesson 3: Water and Life
 - a. Topic 1: Overview
 - b. Topic 2: The Nature of Water
 - c. Topic 3: Physical Properties of Water
 - d. Topic 4: Summary
3. Lesson 4: Acids, Bases and Buffers
 - a. Topic 1: Acids, Bases and Buffers

C. Chapter 3: Biomolecules

1. Lesson 5: Organic Molecules
 - a. Topic 1: Overview
 - b. Topic 2: Organic Chemistry
 - c. Topic 3: Food Energy Molecules
 - d. Topic 4: Nitrogen Containing Compounds
 - e. Topic 5: Summary
2. Lesson 6: Macromolecules
 - a. Topic 1: Overview
 - b. Topic 2: Structure and Function of Polysaccharides
 - c. Topic 3: Structure and Function of Fats
 - d. Topic 4: Structure and Function of Proteins
 - e. Topic 5: Summary

II. Unit 2: Cell Structure and Function

A. Chapter 4: Cellular Organization

1. Lesson 7: Cells: The Basics
 - a. Topic 1: Overview
 - b. Topic 2: What Are Cells?
 - c. Topic 3: Prokaryotes and Eukaryotes
 - d. Topic 4: Tools for Studying Cells
 - e. Topic 5: Summary
2. Lesson 8: More about Cells
 - a. Topic 1: Overview
 - b. Topic 2: Cellular Organelles
 - c. Topic 3: Cell Structure and Movement
 - d. Topic 4: Extracellular Structures
 - e. Topic 5: Summary

B. Chapter 5: Membranes and Transport

1. Lesson 9: Cell Membranes
 - a. Topic 1: Overview
 - b. Topic 2: Membrane Structure
 - c. Topic 3: Transport Mechanisms
 - d. Topic 4: Membrane Proteins
 - e. Topic 5: Summary

III. Unit 3: The Gene

A. Chapter 6: DNA

1. Lesson 10: DNA Discovery & Structure
 - a. Topic 1: Overview
 - b. Topic 2: Discovery

- c. Topic 3: Structure
- d. Topic 4: Implications
- e. Topic 5: Summary
- 2. Lesson 11: DNA Replication
 - a. Topic 1: Overview
 - b. Topic 2: The Mechanism
 - c. Topic 3: The Accuracy of Replication
 - d. Topic 4: Summary
- B. Chapter 7: From DNA to Protein
 - 1. Lesson 12: The Transcription of DNA to RNA
 - a. Topic 1: Overview
 - b. Topic 2: Genes Encode Proteins
 - c. Topic 3: RNA Structure and Function
 - d. Topic 4: The Initiation of Transcription
 - e. Topic 5: Elongation, Termination, and Processing
 - f. Topic 6: Summary
 - 2. Lesson 13: Translation: Protein Synthesis
 - a. Topic 1: Overview
 - b. Topic 2: Decoding RNA
 - c. Topic 3: The Components of Translation
 - d. Topic 4: The Mechanism of Translation
 - e. Topic 5: Summary
- C. Chapter 8: Types of Genomes
 - 1. Lesson 14: Eukaryotic Genomes
 - a. Topic 1: Overview
 - b. Topic 2: The Organization of Genetic Material
 - c. Topic 3: Chromatin Structure
 - d. Topic 4: The Regulation of Gene Expression
 - e. Topic 5: Summary
 - 2. Lesson 15: Viral & Bacterial Genomes
 - a. Topic 1: Overview
 - b. Topic 2: Viruses
 - c. Topic 3: Bacteria
 - d. Topic 4: Summary
- D. Chapter 9: Biotechnology
 - 1. Lesson 16: Applications of Biotechnology
 - a. Topic 1: Overview
 - b. Topic 2: Agricultural Applications
 - c. Topic 3: Medical Applications
 - d. Topic 4: Legal Applications
 - e. Topic 5: Practical and Ethical Concerns
 - f. Topic 6: Summary

IV. Unit 4: Principles of Heredity

- A. Chapter 10: The Reproduction of Cells
 - 1. Lesson 17: The Cell Cycle & Mitosis
 - a. Topic 1: Overview
 - b. Topic 2: The Cell Cycle
 - c. Topic 3: Mitosis and Cytokinesis
 - d. Topic 4: Experiment
 - e. Topic 5: Summary
 - 2. Lesson 18: Sexual Life Cycle & Meiosis
 - a. Topic 1: Overview
 - b. Topic 2: Life Cycles
 - c. Topic 3: State of Meiosis
 - d. Topic 4: Sources of Genetic Variation
 - e. Topic 5: Summary
 - f. Topic 6: Demonstration
- B. Chapter 11: Patterns of Inheritance
 - 1. Lesson 19: The Mendelian Model of Inheritance
 - a. Topic 1: Overview
 - b. Topic 2: Mendel's Experiments
 - c. Topic 3: Mendel's Law of Segregation
 - d. Topic 4: Mendel's Law of Independent Assortment
 - e. Topic 5: Summary
 - 2. Lesson 20: Extensions of Mendel

- a. Topic 1: Extensions of Mendel
- C. Chapter 12: The Chromosomal Basis of Heredity
 - 1. Lesson 21: Genes & Chromosomes
 - a. Topic 1: Overview
 - b. Topic 2: The Chromosome Theory
 - c. Topic 3: Sex Chromosomes
 - d. Topic 4: Chromosomal Abnormalities
 - e. Topic 5: Summary

V. Unit 5: Evolutionary Biology

- A. Chapter 13: The Theory of Evolution
 - 1. Lesson 22: Darwin in Historical Context
 - a. Topic 1: Overview
 - b. Topic 2: The Historical Setting
 - c. Topic 3: Darwin's Theory of Evolution
 - d. Topic 4: The Evidence for Evolution
 - e. Topic 5: Summary
 - 2. Lesson 23: Mechanisms of Evolution
 - a. Topic 1: Overview
 - b. Topic 2: Population Genetics
 - c. Topic 3: The Process of Genetic Change
 - d. Topic 4: Preserving the Diversity
 - e. Topic 5: Summary
- B. Chapter 14: The Origin of Species
 - 1. Lesson 24: Speciation
 - a. Topic 1: Overview
 - b. Topic 2: Geographic and Reproductive Barriers
 - c. Topic 3: Types of Speciation
 - d. Topic 4: The Hybrid Zone
 - e. Topic 5: The Rate of Speciation
 - f. Topic 6: Summary

VI. Unit 6: Biological Diversity

- A. Chapter 15: The Family Tree of Life
 - 1. Lesson 25: Systematics: Classifying Organisms
 - a. Topic 1: Overview
 - b. Topic 2: Naming Organisms
 - c. Topic 3: Constructing Phylogenetic Trees
 - d. Topic 4: Modern Taxonomy
 - e. Topic 5: Summary
 - 2. Lesson 26: The History of Life on Earth
 - a. Topic 1: The History of Life on Earth
 - b. Topic 2: Experiment (Dating Fossils)
- B. Chapter 16: Single-Celled Organisms
 - 1. Lesson 27: Prokaryotes
 - a. Topic 1: Overview
 - b. Topic 2: Physical Characteristics of Prokaryotic Cells
 - c. Topic 3: Prokaryotic Lifestyles
 - d. Topic 4: Two Domains: Bacteria and Archaea
 - e. Topic 5: Summary
 - 2. Lesson 28: Unicellular Eukaryotes
 - a. Topic 1: Overview
 - b. Topic 2: The Kingdom Protista
 - c. Topic 3: Protozoans
 - d. Topic 4: Plantlike Protists
 - e. Topic 5: Funguslike Protists
 - f. Topic 6: Summary
- C. Chapter 17: Still Life: Plants and Fungi
 - 1. Lesson 29: Plants and Their Relatives
 - a. Topic 1: Overview
 - b. Topic 2: Colonizing the Land
 - c. Topic 3: The Rise of Vascular Plants
 - d. Topic 4: Cones, Flowers, and Seeds
 - e. Topic 5: Summary
 - 2. Lesson 30: The Fungi
 - a. Topic 1: Overview
 - b. Topic 2: Characteristics of Fungi

- c. Topic 3: Surveys of Fungal Diversity
- d. Topic 4: Summary
- D. Chapter 18: The Diversity of Animals
 - 1. Lesson 31: An Introduction to the Animals
 - a. Topic 1: Overview
 - b. Topic 2: Animal Fundamentals
 - c. Topic 3: Body Plans
 - d. Topic 4: Protostomes and Deuterostomes
 - e. Topic 5: Summary
 - 2. Lesson 32: From Invertebrates to Vertebrates
 - a. Topic 1: Overview
 - b. Topic 2: More Protostomes
 - c. Topic 3: Deuterostomes and Early Vertebrates
 - d. Topic 4: Vertebrate Diversity
 - e. Topic 5: Summary