



Radnor High School Course Syllabus



Advanced Biology Biology 322

I. Course Description

1.0 Credit; Unweighted

Length: Year; Format: Meets Daily

Co-requisite(s): Advanced Geometry or Geometry

Advanced Biology is a college-prep level course where learning is structured to enhance the development of higher level thinking skills using an appropriate pace and challenging content. Students are expected to work both in teams as well as independently in the writing of laboratory reports in preparation of projects. Students who have successfully completed this course are able to cover the topics listed for Biology 324 in addition to being able to apply their knowledge of Genetics to the understanding of the Human Genome Project and the ramifications of gene manipulation, genetic engineering and genetic technology as a whole.

II. Materials & Equipment

- Holt Biology Text

III. Course Goals & Objectives

Students will:

- Experience the application of the scientific method in biological sciences
- Develop proficiency in the skills necessary for working in the laboratory
- Acquire a body of knowledge regarding living organisms
- Attempt to understand man's role in the biological world
- Develop an appreciation of the diversity of life organisms
- Become acquainted with the uses of biological knowledge

IV. Course Topics (Summary Outline)

I. Biology and You (Chapter 1)

- A. Characteristics of Living Things
- B. Unifying Themes of Biology

Lab: Brine Shrimp Observations
Lab: Planaria Regeneration Lab

II. Classification of Organisms (Chapter 14)

A. Categories of Biological Classifications

B. How Biologists Classify Organisms

III. Ecosystems (Chapter 16)

- A. What is an Ecosystem?
- B. Energy Flow in Ecosystems
- C. Cycling of Materials in Ecosystems

- Lab: Owl Pellet
Movie: March of the Penguins
- IV. Biology Communities (Chapter 17)
- A. How Organisms Interact in Communities
 - B. How Competition Shape Communities
 - C. Major Biological Communities
- V. Chemistry of Life (Chapter 2)
- A. Nature of Matter
 - B. Water and Solutions
 - C. Chemistry of Cells
 - D. Energy and Chemical Reactions
- Lab: Biochemistry Lab
- Movie: 118 Green Street
- VI. Biology & You (Chapter 1) & Cell Structure (Chapter 3)
- A. Scientific Method
 - B. Use of Compound and Stereomicroscopes
 - C. Looking at Cells
 - D. Cell Features
 - E. Cell Organelles
- Lab: Surface Area to Volume Ratio
Lab: Microscope Lab
- VII. Cells and Their Environment (Chapter 4)
- A. Passive Transport
 - B. Active Transport
- Lab: Methods of Transport Lab
- VIII. Photosynthesis and Cellular Respiration (Chapter 5)
- A. Energy and Living Things
 - B. Photosynthesis
 - C. Cellular Respiration
- Lab: Fermentation
- IX. The Immune System (Chapter 40)
- A. Nonspecific Defenses
 - B. Immune Response
 - C. Disease Transmission and Prevention
 - D. Disorders of the Immune System
- Lab: Bacterial Contamination Lab
Lab: HIV Simulation Lab
- Movies: “The Danger Zone” and “And the Band Played On”
- X. Viruses and Bacteria (Chapter 20)
- A. Viruses
 - B. Bacteria
- Lab: Gross Specimens and Parasite Slides
- XI. Chromosomes and Cell Reproduction (Chapter 6)
- A. Chromosomes
 - B. The Cell Cycle
 - C. Mitosis and Cytokinesis
- Project: Flip Cards
- XII. Meiosis and Sexual Reproduction (Chapter 7)
- A. Meiosis
 - B. Sexual Reproduction
- Movie: In the Womb
Project: Flip Cards
- Lab: Brine Shrimp Observations
Lab: Planaria Regeneration Lab
- XIII. Mendel and Heredity (Chapter 8)
- A. The Origins of Genetics

- B. Mendel's Theory
- C. Studying Heredity
- D. Complex Patterns of Heredity
- Lab: Blood Typing
- Lab: Microscope Prepared Slides
- Lab: Analyzing Pedigrees

Project: Inheritance of Chromosomes

XIV. DNA, The Genetic Material (Chapter 9)

- A. Identifying the Genetic Material
- B. The Structure of DNA
- C. The Replication of DNA

Lab: Spooling DNA

Movie: The DNA Revolution

XV. How Proteins are Made (Chapter 10)

- A. From Genes to Proteins
- B. Gene Regulation and Structure

XVI. History of Life on Earth (Chapter 12)

- A. How did life begin
- B. The evolution of cellular life
- C. Life invaded the land

XVII. The Theory of Evolution (Chapter 13)

- A. Natural Selection
- B. Evidence of Evolution
- C. Examples of Evolution

XVIII. Circulatory and Respiratory Systems (Chapter 38)

- A. The Circulatory System
- B. The Heart
- C. The Respiratory System

Lab: Blood Pressure Lab

Lab: Heart Rate in Feeder Fish

XIX. Digestive and Excretory Systems (Chapter 39)

- A. Your Body's Need for Food
- B. Digestion
- C. Excretion

Lab: Digestive System Simulation

XX. Reproduction and Development (Chapter 43)

- A. Male Reproductive System
- B. Female Reproductive System
- C. Development
- D. Sexually Transmitted Diseases

Movie: In the Womb

XXI. Nervous System

- A. Neurons and Nerve Impulses
- B. Structures of the Nervous System
- C. Sensory Systems
- D. Drugs and the Nervous System

XXII. Hormones and the Endocrine System

- A. Hormones
- B. How Hormones Work
- C. The Major Endocrine Glands

V. Assignments & Grading

Common cumulative midterm

Common cumulative final

Common Labs:

Brine Shrimp Lab

Microscope Lab

Homologous Structures Lab

Biochemistry/Organic Lab

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Diffusion/Osmosis Lab
Fermentation Lab
Surface Area to Volume Ratio Lab
Plant/Animal Interrelationship
Owl Pellet Lab
Inheritance of Chromosome
DNA Extraction Lab
Electrophoresis Lab
Immunity Lab/Contamination Lab
Respiratory System Lab
Circulatory System Lab
Digestive System Lab