

Biology Syllabus

General Course Information

Instructor: TBD

Course Web Site: TBD

Supplemental Text: TBD

Course Description

The Biology course is a first-year course in biology at the high school level. The course emphasizes a multi-representational approach to algebra, with concepts, results, and problems being expressed graphically, analytically, and verbally. The course uses four themes to organize important concepts throughout the course: science, technology, and society; evolution; the relationship between structure and function; and science as a process.

The Biology course involves the scientific study of living organisms. The course considers the interactions among the vast number of organisms that inhabit planet Earth. It presents the basic form and function of these organisms, from cells to organ systems, from simple viruses to complex humans. It delves into interactions between organisms, and between an organism and its environment. It also looks into how biotechnology is used to improve our health and daily lives.

Course Overview

The following topics are covered by the Biology course: basic chemistry; the structure, organization, and energetics of the cell; genetics; evolution; taxonomy; microorganisms; fungi; plant biology; animal biology; environmental biology.

Course Objectives

After completing this course students will be able to:

- Understand basic biochemistry
- Understand the makeup and energetics of plant and animal cells
- Determine basic inheritance patterns
- Understand the basic classification of organisms
- Understand the form and function of microorganisms
- Understand the form and function of plants
- Understand the form and function of animals
- Understand the workings of human biological systems
- Understand biology as it relates to the Earth's environment

Assessment

Each lesson section includes a set of multiple choice review questions, which are completed and graded on-line with immediate feedback. There is an on-line multiple choice quiz at the end of each chapter.

Course Prerequisites

Knowledge at a K-8 pre-algebra course level. Knowledge at a K-8 general science course level. Reading skills at a K-8 level.

Course Technical Specifications

PC -

CPU: 400 MHz Pentium II or better; Pentium III or better recommended.

Memory: 128 Mb or more.

Operating system: Windows 98 or higher

Connection Speed: 56k modem or better; DSL or cable modem recommended.

Browser: Internet Explorer 6 or higher; Netscape 6 or higher.

Required Software: Quicktime 6.2 or higher; Flash Player 7 or higher.

Macintosh -

CPU: 200 MHz PPC or better; G3 or better recommended.

Memory: 128 Mb or more for Mac OS 8.6-9.2; 256 Mb or more for Mac OS X.

Operating system: Mac OS 8.6 or higher (Mac OS X for G3 or higher)

Connection Speed: 56k modem or better; DSL or cable modem recommended.

Browser: Internet Explorer 5 or higher (Mac OS 8.6-9.2); Netscape 6 or higher (Mac OS 8.6-9.2); Safari 2.0 or higher (Mac OS X); Firefox 1.5 or higher (Mac OS X)

Required Software: Quicktime 7 or higher; Flash Player 7 or higher.

Course Schedule

First Semester -

Week 1: Studying Biology

Week 2: Chemistry of Living Things

Week 3: Cell Theory & Organization

Week 4: Cell Theory & Organization

Week 5: Cell Division

Week 6: Cell Energetics

Week 7: Cell Energetics

Week 8: Cell Energetics

Week 9: Catabolic Pathways

Week 10: Catabolic Pathways

Week 11: DNA

Week 12: DNA

Week 13: Genomes & Sexual Reproduction
Week 14: Genomes & Sexual Reproduction
Week 15: Inheritance, Genes & Chromosomes
Week 16: Inheritance, Genes & Chromosomes
Week 17: Inheritance, Genes & Chromosomes
Week 18: Biotechnology

Second Semester -

Week 19: Darwin & Evolution
Week 20: Darwin & Evolution
Week 21: Origins of the Species
Week 22: Taxonomy and Classification
Week 23: Microorganisms
Week 24: Microorganisms
Week 25: Fungi & Plant Evolution
Week 26: Plant Structure & Nutrition
Week 27: Plant Reproduction, Development & Control
Week 28: Introduction to animals
Week 29: Animal Systems I
Week 30: Animal Systems I
Week 31: Animal Systems II
Week 32: Animal Systems II
Week 33: Animal Systems III
Week 34: Animal Systems III
Week 35: Ecology & Conservation
Week 36: Ecology & Conservation

Biology - Course Outline

First Semester -

- I. Introduction to Biology
 1. Studying Biology
 - A. Biology & Biologists
 2. Chemistry of Living Things
 - A. Elements, Atoms & Molecules
 - B. Water & Life
 - C. Acids, Bases & Buffers
 - D. Biochemistry
- II. The Cell
 1. Cell Theory & Organization
 - A. The Basics
 - B. More about cells
 2. Membranes and Transport

- A. Cell membranes
- B. Purification of hemoglobin
- 3. Cell Division
 - A. Cell Cycle and Mitosis
 - B. Cell division & cancer
- 4. Cell Energetics
 - A. Cellular energy currency
 - B. Enzymes as catalysts
 - C. Photosynthesis
- 5. Catabolic Pathways
 - A. Glycolysis
 - B. Cellular Respiration

III. Genetics

- 1. DNA
 - A. DNA basics
 - B. DNA to protein
- 2. Genomes & Sexual Reproduction
 - A. Eukaryotic genomes
 - B. Bacterial genomes
 - C. Sexual life cycle & Meiosis
- 3. Inheritance, Genes & Chromosomes
 - A. Mendelian inheritance
 - B. Extensions of Mendel
 - C. Genes & Chromosomes
- 4. Biotechnology
 - A. Principles of biotechnology
 - B. Applications

Second Semester -

IV. Evolution, Taxonomy & Microorganisms

- 1. Darwin & Evolution
 - A. Darwin in History
 - B. Mechanisms of evolution
 - C. Population Genetics
- 2. Origins of the Species
 - A. Speciation
- 3. Taxonomy and Classification
 - A. Systematics
 - B. History of Life
- 4. Microorganisms
 - A. Viruses
 - B. Prokaryotes
 - C. Unicellular eukaryotes

V. Plant Biology & The Fungi

1. Fungi & Plant Evolution
 - A. The fungi
 - B. Plant evolution
2. Plant Structure & Nutrition
 - A. Plant structure
 - B. Plant nutrition
3. Plant Reproduction, Development & Control
 - A. Plant reproduction & development
 - B. Plant control

VI. Animal Biology

1. Introduction to animals
 - A. Animal diversity
 - B. Animal form & function
2. Animal Systems I
 - A. Skeletons & muscles
 - B. Circulatory & respiratory systems
3. Animal Systems II
 - A. Nervous systems
 - B. Endocrine system
 - C. Reproduction & development
4. Animal Systems III
 - A. Digestive and waste systems
 - B. Body defenses

VII. Environmental Biology

1. Ecology & Conservation
 - A. Ecology
 - B. Ecosystems
 - C. Conservation biology