

Virginia Western Community College

BIO 1

Foundations of Biology

Prerequisites

None

Course Description

Develops a basic understanding of plant and animal form, function, and relationships. Prepares students who have a deficiency in high school biology. Introduces students to the basic processes of life and science in preparation for college biology (Biology 101). Emphasis is on mastery of core concepts and processes necessary for success in college biology. Topics include important themes in biology, chemistry, metrics, structure and function of the cell and cell transport, molecules of cells, enzymes, cell respiration, and photosynthesis. The student will also be introduced to the basic structure, function, and replication of DNA.

Semester Credits: 4

Lecture Hours: 3

Laboratory Hours: 3

Required Materials

Textbook:

None required

Course Outcomes

At the completion of this course, the student should be able to:

- Describe the main themes in the study of life
- Describe the process of science using the scientific method
- Explain the chemistry of life
- Describe the basic structure and function of macromolecules of cells
- Describe the structures within and surrounding the cell, and explain their function
- Explain passive and active types of membrane transport
- Explain the basic structure and function of enzymes
- Explain the cellular processes of cell respiration and photosynthesis
- Describe the discovery of DNA and its basic function and structure

Topical Description

Chapter 1: Biology: The Science of Life

- The Characteristics of Life
- Evolution: The Core Concept of Biology
- Science: A Way of Knowing

Chapter 2: The Chemical Basis of Life

- Atoms and Atomic Bonds
- Water's Importance to Life
- Acids and Bases

Chapter 3: The Organic Molecules of Life

- Organic Molecules
- Biological Molecules of Cells

Chapter 4: Inside the Cell

- Cells Under the Microscope
- The Plasma Membrane
- The Two Main Types of Cells
- Eukaryotic Cells
- Outside the Eukaryotic Cell

Chapter 5: The Dynamic Cell

- What is Energy
- ATP: Energy for Cells
- Metabolic Pathways and Enzymes
- Cell Transport

Chapter 6: Energy for Life

- Overview of Photosynthesis
- The Light Reactions—Harvesting Energy
- The Calvin Cycle Reactions—Making Sugars

Chapter 7: Energy for Cells

- Cellular Respiration
- Outside the Mitochondria: Glycolysis
- Outside the Mitochondria: Fermentation
- Inside the Mitochondria
- Metabolic Fate of Food

Chapter 11: DNA Biology

- DNA and RNA Structure and Function

Laboratory Topics

- Introduction to the Lab
- Lab Success and Safety
- The Metric System
- Scientific Method
- Microscopy
- Macromolecules
- Diffusion
- Osmosis
- Enzymes
- Photosynthesis

Notes to Instructors

1. Departmental policy dictates that instructors do not allow students to keep tests.
2. A comprehensive final exam counting 10% of the total grade will be given at the end of the semester.
3. Syllabus should state what the course grade will be based on, such as tests, quizzes, a comprehensive final exam, and any other assignments made by the instructor.