

| LEARNING OUTCOMES | LEARNING ACTIVITIES | EVALUATION METHODS |
|--|--|--|
| 4. Explain the relationship of atoms, ions, molecules within the living and nonliving universe. | Lectures Class Discussions Field Trips Class Presentations Laboratory Activities | Laboratory Exercises and Reports Quizzes and Exams Essays |
| 5. Relate the principle parts of a cell to organism function. | Lectures Class Discussions Field Trips Class Presentations Laboratory Activities | Laboratory Exercises and Reports Quizzes and Exams Essays |
| 6. Analyze the basic processes of all cells and living organisms. | Lectures Class Discussions Field Trips Class Presentations Laboratory Activities | Quizzes and Exams Laboratory Exercises and Reports |
| 7. Apply the principles of transmission genetics to basic genetics problems. | Lectures Class Discussions Field Trips Class Presentations Laboratory Activities | Laboratory Exercises and Reports Quizzes and Exams |
| 8. Explain the relationship between gene, protein and phenotype, and the roles of proteins and nucleic acids in cell and organism functioning. | Lectures Class Discussions Field Trips Class Presentations Laboratory Activities | Laboratory Exercises and Reports Quizzes and Exams Essays |
| 9. Apply the scientific method and critical thinking skills to biological and scientific problems. | Lectures Class Discussions Field Trips Class Presentations Laboratory Activities | Laboratory Exercises and Reports Quizzes and Exams Essays Class Discussions |
| 10. Explain the important chemical and biotic influences in maintaining a stable biosphere. | Lectures Class Discussions Field Trips Class Presentations Laboratory Activities | Laboratory Exercises and Reports Quizzes and Exams Essays |
| 11. Explain the important influences on human and non-human population dynamics. | Lectures Class Discussions Field Trips Class Presentations Laboratory Activities | Laboratory Exercises and Reports Quizzes and Exams Essays |

IV.

CELL BIOLOGY

- I. Cell Theory
- II. Why Cells are Small (e.g., surface area to volume relationships)
- III. Microscopy
 - A. basic operation and use of the light microscope
 - B. importance of the electron microscope
 - Lab: Use of compound and dissecting microscope
- IV. Prokaryotic Cells: Basic Structure
- V. Eukaryotic cells: A Basic Understanding of Cell Structure and Function
 - A. Organelles: plants vs. animals; discuss distinguishing features of each
 - B. Nucleus
 - C. Endomembrane system
 - D. Cytoskeleton and movement
 - E. Extracellular matrix and cell junctions
 - F. Energy organelles
 - 1. structure and basic function of chloroplasts
 - 2. structure and basic function of mitochondria
 - Lab: Comparative microscopic view of prokaryotic and eukaryotic cells
- VI. Membranes
 - A. Membrane structure
 - B. Movement of molecules across membranes; for each, discuss the importance to human health and organisms
 - 1.

SURVEY OF ORGANISMS

Goal: A basic understanding of each taxon with lab analysis of one or two representative organisms

- I. Viruses; This Could Be Integrated with the Cell Biology Section
 - A. characteristics
 - B. the “non-living” issue
 - C. basic lytic life cycle
 - D. HIV

Possible Lab: phage infection of *E. coli*
- II. Kingdom Prokaryotae (Monera)
 - A. structure
 - B. importance to ecosystem
 1. photosynthetic bacteria
 2. decomposers
 3. symbionts: N₂ fixation

Lab: identification and observation of cyanobacteria, culture and staining of bacteria
- III. Kingdom Protista
 - A. diversity:
 1. characteristics of amoeboid protists, ciliates, flagellates, etc.

- B. Vertebrates:
1. Define chordate and vertebrate
 2. Characteristics of
 - A. fishes: focus on *Osteichthyes*
 - B. amphibians: the frog
 - C. reptiles
 - D. birds
 - E. mammals
- Lab: dissection of a rat and identification of the major organs

LEARNING MATERIALS:

Campbell, Reece & Simon. (2010). *Essential Biology* (3rd ed.). Benjamin Cummings.

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

COURSE APPROVAL:

Prepared by: Christopher J. Harendza, Ph.D. Date: 11/18/1998
Assistant Professor of Biology

Revised by: Christopher J. Harendza, Ph.D. Date: 10/26/2004

VPAA/Provost Compliance Verification: Dr. John C. Flynn, Jr. Date: 10/30/2004

Revised by: Jerry Coleman Date: 4/20/2013

VPAA/Provost or designee Compliance Verification: Victoria L. Bastecki-Perez, Ed.D. Date: 4/22/2013

Revised by: Debbie Dalrymple Date: 6/27/2016

VPAA/Provost or designee Compliance Verification: Victoria L. Bastecki-Perez, Ed.D. Date: 6/27/2016

Revised by: Debbie Dalrymple Date: 12/18/2017

VPAA/Provost or designee Compliance Verification: Date: 12/18/2017



This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.