

BIOLOGY

I. Course Description

This course is a hands-on first look at the Science of Biology. It provides a broad overview of microbiology, biochemistry, and population biology. This course is composed of both classroom instruction and laboratory investigations.

II. Course Goals and Objectives – Students will:

- A. see God's hand at work through Biology;
- B. understand the scientific definition of life;
- C. learn the basic aspects of chemistry that make life possible;
- D. learn the basic structure and functions of the cell;
- E. investigate cellular reproduction;
- F. learn the mechanisms of genetic replication ;
- G. understand the theory of evolution and its fallacies ;
- H. understand ecosystems;
- I. investigate the different organism "kingdoms" of Monera, Protista, Fungi, Animalia, and Plantae;

II. Course Outline-Students will:

- A. study the scientific definition of life
 - 1. DNA
 - 2. Energy conversion
 - 3. Reproduction
- B. study Biological Classification
 - 1. Characteristics used to separate organisms into kingdoms
 - 2. Biological Keys
 - 3. Experiment on biological keys
- C. study the components and use of a microscope
- D. investigate Kingdom Monera (bacterial) organisms
 - 1. metabolism
 - 2. asexual and sexual reproduction
 - 3. experiments with pond life
- E. investigate Kingdom Protista (protozoa and algae) organisms
 - 1. subkingdom protozoa
 - 2. experiment with protozoa
 - 3. subkingdom algae
 - 4. experiment with algae
- F. investigate Kingdom Fungi (fungi) organisms
 - 1. classification of Kingdom Fungi
 - 2. experiment with class Basidiomycetes
 - 3. experiment with yeast and fermentation
 - 4. experiments with mold and mildew
- G. study the basic building blocks of matter
 - 1. physical change
 - 2. experiment with osmosis and diffusion
 - 3. chemical change
 - 4. organic chemistry
 - 5. experiment with an enzyme
- H. study the cell
 - 1. cellular functions
 - 2. cell structure
 - 3. experiment on cell structure
 - 4. cell energy production and protein synthesis
- I. study basic genetics
 - 1. Mendel's experiments
 - 2. Punnett squares
 - 3. pedigrees
 - 4. experiment with a dihybrid cross

5. experiment with sex linked traits
 6. experiment with environmental factors
- J. study evolution
1. Darwin's theory
 2. micro and macro evolution
 3. fossil record
 4. molecular biology
- K. study ecosystems
1. energy
 2. symbiosis
 3. the water, oxygen, and carbon cycles
 4. experiment with CO₂ and the greenhouse effect
- L. investigate Kingdom Animalia (animals) organisms
1. symmetry
 2. phylums Porifera, Cnidaria, Annelida, Platyhelminthes, Nematoda, Mollusca
 3. experimental observation of a sponge
 4. experimental observation of a hydra
 5. experimental observation of a planarian
 6. experimental dissection of an earthworm
- M. study the phylum Arthropoda
1. general characteristics
 2. class Crustacea, Arachnida, Chilopoda, Diplopoda, and Insecta
 3. experimental dissection of a crayfish
 4. experiment with insect classification
- N. study the phylum Chordata
1. subphylums Urochordata, Cephalochordata, Vertebrata
 2. classes Agnatha, Chondrichthyes, Osteichthyes, Amphibia
 3. experimental dissection of a perch
 4. experimental dissection of a frog
- O. investigate Kingdom Plantae (plants) organisms
1. plant anatomy
 2. macroscopic/microscopic structure of a leaf
 3. experiment with leaf identification
 4. experiment with leaf color
 5. experiment to microscopically investigate leaves and stems
 6. plant classification
 7. vascular and non-vascular plants
- P. investigate plant physiology and reproduction
1. plant physiology
 2. plant water absorption and transport
 3. insectivorous plants
 4. plant reproduction
 5. experiment in flower anatomy
 6. experiment with fruit
- Q. investigate Reptiles, Birds, and Mammals
1. class Reptilia, Aves, Mammalia
 2. order Rhynchocephalia, Squamata, Testudines, Crocodylia
 3. dinosaurs
 4. experiment with bird embryology
 5. experiment in bird identification

IV. Instructional Material

Textbook – Exploring Creation With Biology by Dr. Jay L. Wile and Marilyn F. Durnell, Apologia Educational Ministries, Inc., 2001

V. Teaching Methods

- A. Class presentation and discussion
- B. Class Notebook
- C. Laboratories

VI. Evaluation

- A. Chapter tests
- B. Graded notebook
- C. Mid term exam
- D. Final exam

VII. Grading Scale

- 90-100% =A
- 80-89% =B
- 70-79% =C
- 60-69% =D
- Below 60% =F