

## Biology

### I. Course Description

This course is intended to give the student a first detailed look at the science of biology, including a broad overview of microbiology, biochemistry, and population biology. The student will study all five kingdoms by looking at energy conversion and life, an organism's ability to sense and respond to change, and how an organism reproduces, as well as how life is biologically classified into kingdom, phylum, class, order, family, genus, and species.

### II. Instructional Materials

- A. Wile, Dr. Jay L. and Durnell, Marilyn G. *Exploring Creation with Biology*. Apologia Educational Ministries, Inc., 2005.
- B. Aristotle. *Physics*. Oxford University Press, 1999
- C. Euclid. *The Thirteen Books of the Elements*. Dover Publications, Inc., 1956

### III. Course Goals and Objectives

#### A. First Semester

1. Memorize a four-part working biological definition of life and learn how each part contributes to our understanding of life.
2. Learn how to use a biological key.
3. Learn how to use a microscope.
4. Study how life is organized into kingdom, phylum, class, order, family, genus, and species.
5. Describe the physical characteristics of bacteria. (kingdom Monera)
6. Discuss the eating habit and asexual reproduction of bacteria.
7. Describe other characteristics of bacteria.
8. Describe conditions for bacterial growth and for preventing bacterial infection.
9. Distinguish between subkingdom protozoa, phylum sarcodina, phylum mastigophora, phylum ciliophora, phylum sporozoa, phylum chlorophyta, phylum chrysophyta, phylum phaeophyta, and phylum rhodophyta. (kingdom Protista)
10. Describe the general characteristics of fungi.
- <sup>11</sup>. Distinguish between phylum basidiomycota, phylum ascomycota, phylum zygomycota, phylum deuteromycota, and phylum myxomycota. (<sup>f</sup>ungi)
12. Define atoms and related vocabulary.
13. Define elements and molecules.
14. Describe how matter changes.
15. Describe photosynthesis.

16. Define organic chemistry.
17. Describe proteins and enzymes.
18. Describe DNA.
19. Describe the cell, including cellular functions, cytology, and the cell structure.
20. Describe how substances travel in and out of cells.
21. Describe how cells reproduce.
22. Identify Gregor Mendel.
23. Explain Mendelian genetics.

#### B. Second Semester

24. Discuss the theory of evolution.
25. Study ecology, including population, community, ecosystem, and biome.
26. Describe the phylum porifera, phylum cnidaria, and phylum annelida, phylum platyhelminthes, phylum nematoda, and phylum mollusca. (invertebrates of kingdom Animalia)
27. Describe the feeding habits, respiratory and circulatory systems, and reproductive system of an earthworm.
28. Describe the general characteristics of arthropods.
29. Describe the respiratory system, circulatory system, digestive system, nervous system, and reproductive system of the crayfish.
30. Study the class arachnida.
31. Describe the respiration and circulation, feeding habits, and reproduction and development in insects in the class insecta.
32. Describe the endoskeleton, circulatory, nervous, and reproduction systems in phylum chordata.
33. Describe some of the different classes in subphylum vertebrata.
34. Describe the anatomy and classification of kingdom Plantae.
35. Describe the physiology and reproduction of kingdom Plantae.
36. Describe some of the different characteristics of reptiles, birds, and mammals.

#### W. Course Outline

##### A. First Semester

1. Biology: The Study of Life
2. Kingdom Monera
3. Kingdom Protista
4. Kingdom Fungi
5. The Chemistry of Life
6. Research paper
7. Aristotle. *Physics*. Oxford University Press, 1999.
8. The Cell
9. Cellular Reproduction and DNA
10. Mendelian Genetics

## B. Second Semester

11. Evolution: Part Scientific Theory, Part Unconfirmed Hypothesis
12. Ecology
13. The Invertebrates of Kingdom Animalia
14. Phylum Arthropoda
15. Phylum Chordata
16. Euclid. *The Thirteen Books of the Elements*. Dover Publications, Inc., 1956.
17. Kingdom Plantae: Anatomy and Classification
18. Kingdom Plantae: Physiology and Reproduction
19. Reptiles, Birds, and Mammals

## V. Teaching Methods

- A. Reading assignments
- B. Experiments
- C. Dissections
- D. Discussion and application
- E. Multimedia, including CD-ROM and web-based materials

## VI. Evaluation

- A. Outline of text
- B. Study guide
- C. Module test
- D. Lab reports
- E. Research paper

## VII. Grading Scale

- 100-90 = A  
89-80 = B  
79-70 = C  
69-60 = D  
59 and below = F