

MIDDLESEX COUNTY COLLEGE
EDISON, NEW JERSEY

Course Title: **Biology II** Catalog #: **Bio-118**

Class Hours: 3 Laboratory Hours: 3 Credit Hours: 4

Department Chair: _____ Division Dean: _____ Date: 2007-2008

Prerequisites: Bio 117, Biology I

Textbooks for the Course:

<u>Author</u>	<u>Title</u>	<u>Publisher</u>	<u>Copyright</u>
Starr, C. & R. Taggart	Biology, The Unity & Diversity of Life 11th Edition	Brooks Cole	2006
Mader, Sylvia	<u>Inquiry Into Life</u> 12th Edition	W. C. Brown	2008

Catalog Description:

A continuation of Biology I with emphasis on supporting life processes, evolution, reproduction, adaptation, communities and ecosystems.

Course Goals:

1. To prepare students for critical understanding of the basic concepts of biology.
2. To help students understand the relationships of biology to other areas of study.
3. To emphasize the effects of biology on modern society.
4. To stimulate the students curiosity to continue to investigate scientific advances that occur and appreciate how these advances affect their lives.
5. To provide students with the scientific literacy necessary for responsible participation in society.

Course Objectives:

1. Understand the biological theories that explain the origin of life.
2. Determine what evidence is available for the theory of evolution and natural selection.
3. Apply knowledge to specific exercises in laboratory with emphasis on interpretation of data.
4. Learn correct laboratory techniques and continue the proper use of microscopes and other equipment.
5. Learn the interrelationships in communities and ecosystems.
6. Utilize the scientific method in the lecture and laboratory to analyze data.
7. Understand the historical value of science and recognize the changeability of ideas
8. Recognize the ethical and moral perspectives of Biology as related to such topics as ecology, abortion, etc.
9. Learn to accept conflicting scientific theories and to evaluate the validity of these theories.

COURSE OUTLINE

- I. Origin of Life on Earth, Evolution and Natural Selection
 - A. History and the Origins of the Earth
 - 1. Origin of life
 - 2. Geologic time scale
 - B. Mechanisms of evolution
 - 1. Gene pools
 - 2. Factors affecting gene frequencies
 - a. Mutation
 - b. Genetic drift
 - c. Natural selection
 - 3. Speciation
 - a. phyletic
 - b. allopatric
 - c. parapatric
 - d. sympatric
 - e. hybridization
 - C. Evidences for Evolution.
 - 1. Fossil record
 - 2. Homologous vs analogous structures
 - 3. Embryology
 - 4. Comparative anatomy
 - 5. Biochemistry and molecular evidences
 - 6. Biogeographical parameters
- II. Some Important Life Processes
 - A. Nutrition and Digestion
 - 1. Types of nutrition
 - a. autotrophic
 - b. heterotrophic
 - 1) common features of heterotrophs
 - a) ingestion
 - b) digestion
 - i. intracellular
 - ii. extracellular
 - c) absorption
 - d) egestion
 - c. diet- nutritional requirements
 - 1) necessary nutrients
 - 2) calorie requirements - caloric values of carbohydrates, proteins, and lipids
 - 3) BMR

2. Digestive processes (cite specific examples, including human)
 - a) mechanical
 - b) chemical
 - c) emulsification
 3. Structural adaptations
 - a) pseudopods
 - b) glands
 - c) teeth
 - d) gizzard
 - e) vacuoles
 - f) other-spiral valve, coprography, rumen
 4. Role of structures in digestion
 - a) pancreas
 - b) liver
 - c) small/large intestine (mucosa, etc.)
- B. Gaseous Exchange
1. Respiratory surfaces
 2. Exchange of gases
 - a. structural adaptations
 - 1) skin, buccal cavity, cloacal bursa
 - 2) gills
 - 3) lungs
 - 4) trachea
 - 5) spiracles
 - 6) stomata and lenticels
 2. Respiratory pigments
 - a. role of pigments in exchange
 - b. role of pigments in transport
 3. Regulation
 - a. rate
 - b. control mechanisms
- C. Movement of materials
1. Brief review of osmosis, diffusion, cyclosis, etc.
 2. Circulatory systems of animals
 - a. blood vessels
 - b. cellular components
 - c. fluid components
 - d. pumping structures
 - e. evolution of system
 - f. types of systems
 - 1) open
 - 2) closed
 3. Plant transport
 - a. translocation
 - 1) xylem
 - 2) phloem- pressure flow

- b. root pressure
 - c. transpiration
 - d. absorption of minerals and water
- D. Control mechanisms
- 1. Homeostasis
 - a. definition and examples
 - b. components involved in mechanism
 - 1) stimuli
 - 2) receptors
 - 3) integration
 - 4) transmission pathways
 - 5) effectors
 - 6) feedback
 - a) negative
 - b) positive
 - 2. Thermoregulation
 - 3. Endocrine system
 - a. anatomy
 - b. hormones and their physiology
 - c. integration of nervous and endocrine systems
 - 4. Plant growth substances
 - a) cytokinins
 - b) gibberellins
 - c) cytokinins
 - d) others
 - 5. Nervous system
 - a) evolution of system
 - b) central nervous system
 - 1) anatomy
 - 2) physiology
 - c) peripheral nervous system
 - 1) anatomy
 - 2) physiology
- E. Reproduction
- 1. Asexual reproduction
 - a. budding
 - b. fission
 - c. cuttings
 - d. runners/rhizomes
 - e. grafting
 - f. cloning
 - 2. Sexual reproduction
 - a. moneocious
 - b. dioecious
 - c. parthenogenesis
 - 3. Animal patterns

- a. structural adaptations
 - b. behavioral adaptations
 - 4. Plant adaptations
 - a. alternation of generations
 - b. life cycles
 - 1) angiosperms
 - 2) gymnosperms
 - c. structural adaptations
 - d. fruit and seed formation
 - F. Animal Reproduction and Growth
 - 1. Developmental patterns
 - a. cleavage patterns
 - b. differentiation
 - c. morphogenesis
 - 2. Special developmental patterns
 - a. metamorphosis
 - b. hormonal influences
- III. Ecology
 - A. Introduction
 - 1. Historical perspectives
 - 2. Importance of ecology
 - B. Populations
 - 1. Definitive characteristics
 - 2. Interactions
 - a. competition
 - b. limiting factors
 - c. survival strategies
 - C. Communities
 - 1. Definitive characteristics
 - a. symbiosis
 - b. predator-prey interactions
 - D. Ecosystems
 - 1. Abiotic factors
 - 2. Biotic factors
 - 3. Biogeochemical cycles
 - 4. Feeding interactions
 - 5. Trophic levels