

College of San Mateo  
Course Outline

- New Course  
 Update/No change  
 Course Revision (Minor)  
 Course Revision (Major)

Date: October 25, 2004

**Department:** Biology      **Number:** 100  
**Course Title:** Introduction to the Life Sciences      **Units:** 3.0  
**Hours/Week:** Lecture: 3.0      **Scheduled Lab:** none      **By Arrangement:** 1 hour per week

Length of Course

- Semester-long  
 Short course (Number of weeks \_\_\_\_\_)  
 Open entry/Open exit

Grading

- Letter  
 Credit/No Credit  
 Grade Option (letter or Credit/No Credit)

1. **Prerequisite** (Attach Enrollment Limitation Validation Form.)

none

2. **Corequisite** (Attach Enrollment Limitation Validation Form.)

none

3. **Recommended Preparation** (Attach Enrollment Validation Form.)

Recommended Preparation: eligibility for ENGL 848 and completion of READ 400 or 405 with a grade of C or higher OR concurrent enrollment in READ 400, 405, or 415 OR appropriate skill level as indicated by the reading placement tests or other measures.

4. **Catalog Description** (Include prerequisites/corequisites/recommended preparation.)

**100 Introduction to the Life Sciences (3)**

Three lecture hours plus one hour by arrangement — *ENG 848 ADD fun*  
per week. ~~Recommended Preparation: completion of READ 830 with a grade of C or higher and concurrent enrollment in READ 400 or 405 OR appropriate skill level as indicated by the reading placement tests or other measures.~~

Fundamental principles of life. The awareness of plant and animal interrelations and inter-dependencies. Examines the human role in the world of living things in relation to contemporary problems. One or more field trips may be required. (Intended for non-science majors with no previous experience in the biological sciences.) (CSU/UC\*)

**5. Class Schedule Description** (Include prerequisites/corequisites/recommended preparation.)

**BIOL 100 Introduction to the Life Sciences**

For non-science majors. Fundamental principles of life. Covers plant and animal inter-dependencies. Examines the human role in the world of living things in relation to contemporary problems. Plus one hour by arrangement per week. Possible field trip(s). (CSU/UC\*)

Recommended Preparation: eligibility for

ENGL 848 and completion of READ 400 or 405 with a grade of C or higher OR concurrent enrollment in READ 400, 405, or 415 OR appropriate skill level as indicated by the reading placement tests or other measures. (CSU/UC\*)

**6. Course Outcomes** (Identify 5-8 expected learner outcomes using active verbs.)

Upon completion of the course, the student will be able to:

- 1) Recognize and name: characteristics of living things; landmarks in the history of evolution, evolutionary relationships between different types of organisms, stages of mitosis and meiosis, types of Monera/Bacteria, Protista, Fungi, and their roles in ecosystems, atomic and molecular structures, evidence that genetic material is DNA.
- 2) Describe: interactions between Bacteria, Protista, Fungi and other organisms, success of Arthropods, chemistry of water and its importance to living systems, the eukaryotic cell cycle.
- 3) Recognize and Distinguish: classification of organisms into domains and kingdoms, major animal phyla body plans and evolutionary trends, life cycles of plants, dominant and recessive traits and variations in dominance, characteristics and functions of molecules that make up cells.
- 4) Define and compare: terms used to discuss evolution, species, ecology, species interactions and coevolution, causes of speciation, haploid and diploid states.
- 5) Identify components, describe major concepts/functions, and analyze examples of: evolution by natural selection, earth's history and landmarks in origin of life, prokaryotic and eukaryotic cells and organelles, biological membranes, vascular system of plants, seeds, flowers and fruits, DNA structure and replication, protein synthesis.
- 6) Explain: energy conversions and the role of enzymes in cellular metabolism; different types of evidence for, and the importance of different scientific fields in studying evolution; basis for, and role of variation in evolution; sexual and asexual reproduction and the role of cell division in both processes; endosymbiont hypothesis of eukaryote evolution.
- 7) Distinguish and compare processes of: energy flow and mass cycling in ecosystems, advantages and problems of aquatic and terrestrial life for plants and animals, four major plant groups and evolutionary trends, classes of vertebrates and evolutionary trends, photosynthesis and aerobic respiration, structure and function of DNA and RNA, types and consequences of mutation.
- 8) Apply rules to solve problems illustrating: use of the genetic code, Mendelian genetics.
- 9) Recognize: scientific approach to investigating phenomena; unifying theme of evolution in biology, importance of science in society's decisions.
- 10) Communicate explanations of biological phenomena in writing.

7. **Course Content** (Brief but complete topical outline of the course that includes major subject areas [1-2 pages]. Should reflect all course objectives listed above. In addition, you may attach a sample course syllabus with a timeline.)

(Attached Lecture Topics Outline)

8. **Representative Instructional Methods** (Describe instructor-initiated teaching strategies that will assist students in meeting course objectives. Include examples of out-of-class assignments, required reading and writing assignments, and methods for teaching critical thinking skills.)

Instructional Methodologies (Instructor-initiated learning strategies):

- \* Lecture accompanied by computerized demonstrations and presentation materials, transparencies, and other supplementary visual material
- \* Discussions
- \* Videos
- \* One or two field trips to a local park, Coyote Point Museum, California Academy of Sciences, or other setting suitable for the studies of natural history.
- \* Field Trip written reports.
- \* One term paper that illustrates plant and animal interrelations and inter-dependencies, or examines the human role in the world of living things in relation to contemporary problems.
- \* One service learning project involving environmental restoration or any natural history activity related to class discussion topics.

9. **Representative Methods of Evaluation** (Describe measurement of student progress toward course objectives. Courses with required writing component and/or problem-solving emphasis must reflect critical thinking component. If skills class, then applied skills.)

Multiple Methods of Evaluation (Measurements of students' achievements):

- \* 5-6 lecture exams consisting of multiple-choice questions, fill-in questions, matching, and short answer and essay questions.
- \* poster and oral presentation illustrating a current topic in s curriculum
- \* One individual field trip report
- \* Individual reflection paper on the service learning experience

10. **Representative Text Materials** (With few exceptions, texts need to be current. Include publication dates.)

Campbell, Mitchell, Reece, BIOLOGY, CONCEPTS & CONNECTIONS, Fourth Edition  
Benjamin/Cummings, 2002

Starr, BASIC CONCEPTS IN BIOLOGY, Fourth Edition, Brooks/Cole—Thomson, 2003

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# ***Biology 100, Introduction to the Life Sciences***

## Course Content, Lecture Topics

For Objectives 1, 9, and 10

- 1) Scientific method

For objectives 1 through 4

- 2) Characteristics of Life
- 3) Evolution-terms, fundamental concepts, examples
  - a) Landmarks in history of evolutionary theory; evidence for evolution
  - b) Principle of Natural Selection
  - c) Adaptations, populations, species, sympatric & allopatric speciation
  - d) Microevolution, macroevolution processes, mechanisms, importance of variation
  - e) Origin of Life: earth's history, chemical evolution, levels of organization
  - f) Prokaryotic and eukaryotic domains, kingdoms, evolutionary relationships; endosymbiont hypothesis of eukaryote evolution; evolution of multicellular organisms

For objectives 1, 6, 7, 9, and 10

- 4) Ecology-terms, fundamental concepts, examples
  - a) Community, abiotic, biotic environment, niche, producer, consumer, trophic levels
  - b) Energy flow, mass cycles, food webs & pyramids
  - c) Species interactions, coevolution
- 5) Chemistry
  - a) Atomic and molecular structure
  - b) Water chemistry, importance to living systems
  - c) Molecules of cells; interactions with water, organic substances, basic structure and characteristics of carbohydrates, lipids, proteins, nucleic acids
  - d) Proteins: diverse functions, information content/specificity
  - e) Energy conversions: metabolic pathways, role of enzymes in cell metabolism
  - f) Photosynthesis, Cellular respiration

For objectives 1, 3, 4, 5, 6, 8, 9, and 10

- 6) Molecular Biology
  - a) DNA structure, replication
  - b) RNA, genetic code
  - c) Protein synthesis
  - d) Mutation
  - e) Mendelian inheritance- terms, fundamental concepts, examples
- 7) Cells
  - a) General characteristics, prokaryotic structure, eukaryotic organelles

- b) Membrane structure and function; transport
- c) Cell division and organismal reproduction: asexual and sexual reproduction, mitosis, meiosis, haploid, diploid cells

For objectives 1, 2, and 3

- 8) Survey of traditional five kingdoms
  - a) Metabolic diversity, roles in ecosystems, interactions with humans, of Monera/Bacteria & Archaea, Protista, Fungi, Plants, Animals
  - b) Advantages, problems of aquatic and terrestrial living for algae/plants, animals
  - c) Plants: trends in evolution, characteristics of four major groups, seeds, flowers, fruits
  - d) Animals: trends in evolution, characteristics of major phyla; Vertebrates trends in evolution, characteristics of classes