College of Letters and Science
Assessment Report

May 1, 1998

Department or Program Name: Biology Core Curriculum

Abstract:

The Biology Core Curriculum (Biocore) is a four semester interdepartmental honors program that provides students with a broad background in biology and prepares them for graduate or professional school in diverse fields of biological science. Biocore is not a major but fulfills some or all of the biology requirements for a variety of majors in the College of Letters and Science, the College of Agriculture and Life Sciences, and the School of Education. The program consists of four lecture/lab combinations intended to be taken in sequence: Evolution, Ecology, and Genetics (301/302); Cellular Biology (303/304); Organismal Biology (323/324); and Biological Interactions (333).

Our assessment plan focuses on four methods: conducting an in-depth evaluation of one course (Biocore 324) using pre- and post-tests, surveying students as they finish the program, imbedding an integrative question into the final exam for the final course, and surveying alumni who completed the program six years ago. The first of these was accomplished during the fall of 1997. We found that students' ability to draw conclusions from data improved after they participated in the course. Students finishing the sequence during the spring of 1997 indicated on our survey that they had accomplished the goals that were listed for the program. We will repeat this survey next week with the current cohort. We intend to undertake the alumni survey during the summer of 1998.

Assessment Tools Used:

Direct Indicators

	Undergraduate Major	Graduate Program
National Exams		
Local Exams		
Capstone Course(s)		
Embedded Testing	1998	
Student Portfolios		
Review theses		
Performance Evaluations		
Pre and Post Testing	1997	

Indirect Indicators

	Undergraduate Major	Graduate Program
Student Surveys	1997, 1998	
Exit Interviews		
Alumni Surveys	1998	
Employer Surveys		
External Reviews		

Narrative:

Biocore's goals were discussed and agreed upon by the faculty committee that oversees Biocore between July, 1996 and April, 1997. Our overarching goal is that students should be able to plan, conduct, and analyze an experiment to answer a question.

1. Critical thinking

Students should be able to critically evaluate what they read or hear, applying a healthy skepticism and realizing the tentative nature of "facts." They should be able to recognize what they do not know, to use logic, to think creatively about science, and to use their knowledge to make decisions about their lives.

2. Quantitative reasoning

Students should be able to think quantitatively about biological problems and to understand such fundamentals as scales and rates. They should be able to use the fundamentals of statistics (*e.g.*, mean, variance) in analyzing data.

3. Communication skills

Students should be able to write clearly and concisely and to present and support an argument.

4. Acquiring information
Students should be able to take effective notes during lectures, to find information in books, journals, and the Internet, to make careful observations and generalize to see patterns, to design an experiment to answer a question, and to experience the process of discovery.

5. Biological content
Students should appreciate the history of biological ideas and should acquire sufficient knowledge of biological principles and processes to handle advanced courses and exams like the MCAT and GRE. The group identified the following as essential content areas: evolution by natural selection, diversity of life, ecology, energy metabolism, molecular and transmission genetics, developmental biology, and human anatomy, physiology, reproduction, and nutrition.

6. Integration
Students should be able to integrate across different levels of organization (*e.g.*, cell to organism to ecosystem), to make connections with other disciplines (*e.g.*, chemistry, physics), and to connect biology with their own lives.

Assessment Methods and Timetable

1.**Evaluation of Organismal Biology Laboratory, Fall, 1997**
The Organismal Biology Laboratory course was revised in 1997 to emphasize plant and human physiology experiments that students work in teams to design and carry out. An integral element of the design is a computerized data acquisition system that transduces, records, and displays physiological responses in real time. The system allows students to immediately analyze their data, work together to solve problems and decide what to do next, and finally, to draw conclusions from their results. Pre- and post-tests were used to assess students' ability to draw appropriate conclusions from data. These were scored by a biostatistician who did not know whether a particular test was pre- or post- or whether it was from a student who took the lecture course only or both the lecture and laboratory courses. The data showed improvement in both groups of students, but more improvement in those who took the lab.

2. Survey of students as they complete Biocore, May 9, 1997 and May 6, 1998.
We listed seven goals of the program and asked students to rate on a five point scale how well we accomplished these goals. Responses in 1997 indicated that we had accomplished all of the goals well or very well. A small percentage of students indicated that some of the goals were not achieved well, but there was no consistent pattern pointing to a particular problem. We will repeat the survey with the current cohort on May 6, 1998.

3. Integrative question on the Biocore 333 final exam, Spring 1998
Biological Interactions is the final semester of the four semester sequence and is intended to give students a chance to build on and integrate the material they have learned in the previous three semesters by applying it to some current areas of active research. We will assess students' ability to integrate and apply biological knowledge by including a real or simulated analysis problem on the final exam.

4. Alumni survey, summer 1998
We will contact students who completed the Biocore Program six years ago (most will have graduated five years ago) and ask them to fill out a survey asking how well Biocore prepared them for the courses that followed and for their present career. We will ask them to tell us what, if anything, was missing and also to comment on aspects of the program that turned out to be particularly valuable.