

Biology Program Assessment Plan, College of Science and Mathematics Developed by Helen Caprioglio, Chair of Biology (primary contact), April 2010

The **mission of the Biology Department** at Colorado State University – Pueblo is to provide quality undergraduate and graduate education for a diverse student population through our emphasis on a comprehensive course curriculum and experiential learning opportunities, such as laboratories, internships, and scientific research opportunities. The Biology Department provides the biological component of the liberal arts education for the University. We promote student understanding of biological concepts relevant to the individual and society, and foster an appreciation and understanding of scientific inquiry. Our students obtain a broad education, covering a wide variety of biological disciplines. We are committed to providing access for our students to a modern, rigorous academic curriculum and equipping graduates to succeed and make important contributions to the workforce and nation. The Faculty is committed to producing scholarly works and research with undergraduate and graduate students, and contributing our expertise to local business, industry, government, and our local campus community.

Biology Program Mission: Our learning goals include giving our students a solid grounding in the Biological Sciences and Critical thinking skills. We attempt to prepare students to go on and productively use that training in the workforce or in professional training programs after their BS degrees. Each course has specific content goals to cover a particular field of biology, as well as the scientific process, in sufficient breadth and depth for student success.

Student Learning Outcomes

1. Students will develop a broad-based knowledge of concepts and terminology in molecular, cellular, organismal and ecological biology.
2. Students will develop a supporting knowledge of concepts and terminology in the related fields of mathematics, physics and chemistry.
3. Students will develop skills in reading and interpreting the scientific literature and in presenting a synthesis of it accurately in oral and written form.
4. Students will demonstrate critical thinking and problem solving skills using experimental design and the scientific method.
5. Students will evaluate the scientific validity of information and ideas.

Curriculum

The biology curriculum has a set of core courses, plus a selection of elective courses that meet these learning outcomes. The structure of these courses requires the students to learn content knowledge, interpret and report on literature and data they have collected, as well as to evaluate scientific ideas. Various course assignments are used to allow students to demonstrate achievement of these skills.

Biology core courses are to include the following (AY 2010-11):

Course prefix	Course title	Credit hours
BIOL 171	Career Planning	1
BIOL 181/L	College Biology I/ Organismal Diversity	4
BIOL 182/L	College Biology II/ Cellular Biology	4
BIOL 201/L or BIOL 202/L	Botany or Zoology	4
BIOL 301/L	General Microbiology	5
BIOL 350	Mendelian and Population Genetics	2
BIOL 351	Molecular Biology and Genetics	2
BIOL 352	Evolutionary Biology and Ecology	3
BIOL 412/L or BIOL413/L or BIOL414/L	Cellular Biology or Plant Physiology or Vertebrate Physiology	4
BIOL 493	Seminar	1

Assessment Methods

1. Administer the MFAT exam to each senior class of Seminar (BIOL 493). National percentile for our institutional average should be $\leq 50^{\text{th}}$ percentile.
2. Administer the MFAT exam to each senior class of Seminar (BIOL 493). National percentile for our institutional average should be $\leq 50^{\text{th}}$ percentile. Also obtain ACS exam average percentiles for biology students in General and Organic Chemistry. National percentiles should be near 50^{th} percentile.
3. Students will complete written and oral reports in core and elective courses that require literature interpretation. The quality of research proposals completed in Seminar course will be used as evidence of this outcome. The peer review process used in the Seminar gives students a role in the assessment process.
4. Students will design experiments and complete lab reports in several core and elective courses, starting with BIOL 181/182 Freshman Biology. Essay exam questions are also used to measure this outcome. Many students will participate in research or field experience to

- further develop skills in the scientific method. Successful completion of quality lab reports, essay answers and research proposals by 70% or more of the students will be a measure of this outcome.
5. Student assignments in many core and elective courses will address scientific validity. This will culminate in the peer review process for the research proposal in Seminar. Meaningful evaluation by at least 70% will measure this outcome.

Assessment Results

Our assessment process includes the following:

- Instructor assessment of student learning in the classroom and modifications made each semester to course formats.
- Review of student evaluations for suggestions to improve course delivery.
- Administration of MFAT (ETS Biology exam) to assess the Biology and related knowledge of graduating seniors.
- Review of MFAT results in various topical areas and consideration of curriculum modifications to address areas of concern. Departmental discussions and planning follows to address programmatic issues and changes.
- Assessment of student oral and written presentation of Biological knowledge and process as a part of our Senior Seminar course (Biology capstone course).

This assessment is used to evaluate current effectiveness and direct changes to the Biology curriculum for improvement. Results have been included in Biology 5-year program reviews to the University and have been suggested as data for informing budget and strategic planning decisions. Future efforts will include better feedback to students themselves informing them of their progress toward the learning outcomes.

Yearly evaluation of MFAT scores and Seminar performance, as well as routine discussions of course performance during each semester, inform the department faculty on areas of strength or concern. This leads to discussion and planning of modifications to the courses or the program for targeted improvement. The department chair is responsible for initiating the steps of this on-going process, which is supported by all full-time department faculty members. The chair is then responsible for ensuring implementation of action plans the following year.

Timeline

The recent Biology yearly progress and currently planned actions are detailed below. These actions are coordinated with the ongoing assessment of student outcomes.

Academic year	Actions Taken or Planned
2007-08	Implementation of revised BIOL 493 Seminar structure with peer reviewed research proposals
2008-09	Comprehensive review of core curriculum content and student MFAT performance, as well as course performances data, which led to a proposed change in the structure and sequencing of freshman and sophomore courses.
2009-10	New courses (BIOL 181/182) and changes to major course sequencing were submitted to CAPB for approval. Course structure and text for BIOL 181/182 were determined and learning strategies and course skills focus were discussed. Revisions to botany and zoology courses also planned. Planning for new program implementation in fall 2010 fully underway.
2010-11	Implement new courses format and sequencing of major core courses. Identify specific core/elective course assignments or exam questions to be used in assessing outcomes. Develop common departmental format for lab reports and feedback to students regarding outcomes and progress.
2011-12	Assess the success of new course structure as students move into more advanced courses. Implement improvements as they are identified.