# Biology Department

## Part I-Assessment SUMMARY (2005/2006)

### A. Biology Discipline Mission Statement:

**Mission:**

The mission of the biology department is to provide quality education to the students we serve as well as furthering the overall mission of the college

**Purpose:**

The purpose of the Biology Department is to provide educational services in the areas of biology for the residents of Arapahoe and Douglas Counties and surrounding areas. The department takes a learner-centered approach and offers courses for both full and part-time students with a focus on improving student learning. The courses support vocational programs as well as transfer requirements for science and non-science students. Community interest courses and developmental and tutorial courses are also offered. The department is committed to quality education in the areas of biological science, incorporating application of the most current theory, biology-oriented technology, and educational methods.

### B. Intended Outcomes (competencies)

After taking Human Anatomy & Physiology I and II, the student will:

1. demonstrate mastery of specific course content by taking a departmental assessment.
2. analyze data and suggest answers or solutions to problems through laboratory practical exams and quizzes.
3. demonstrate the appropriate use of technology and laboratory equipment (microscopes, blood pressure cuffs, ECG, centrifuge, etc.) through laboratory practical exams and quizzes.
4. demonstrate the approach, logic and application of the scientific method and be able to apply these principles to real-life problems.

### C. Benchmarks

All students that take anatomy & physiology I and II will take the assessment exam (competencies 1, 2 and 4). Overall Student population average will be 50% or higher on the standardized exam.

All students that take anatomy & physiology I and II will take the imbedded laboratory practicals. Overall student population average will be 70% or higher on the laboratory practical (competencies 1, 2, 3 & 4).

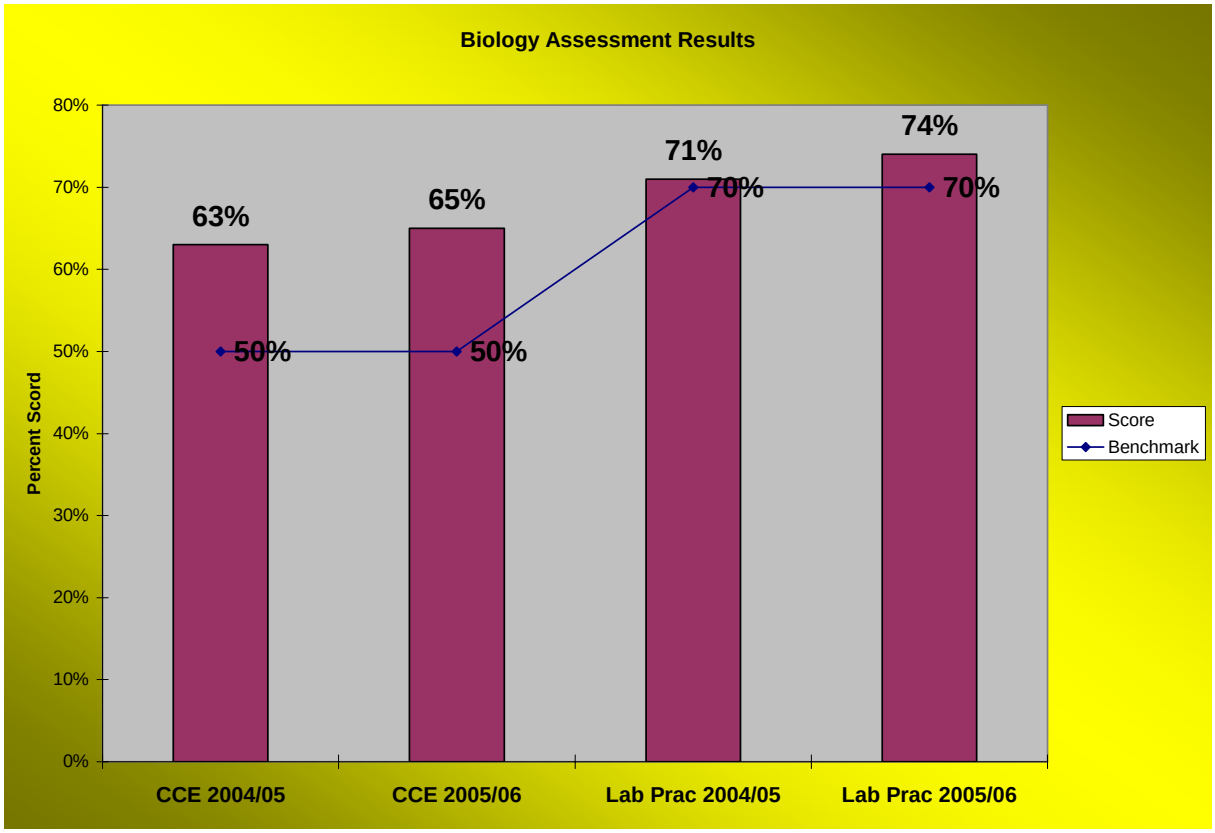
**Assessment Results**

1. **Historical Context**
   The biology department has been assessing the Anatomy & Physiology discipline for the past four years. The form of the assessment has included the use of the standardized questions from the Human Anatomy Professional Society as well as a few locally generated questionnaires and formats. These questions are used by members of HAPS to assess their anatomy & physiology programs. Fifty percent is the average score for national participants on this exam. With the added requirement of using two methods of assessment the Anatomy & Physiology I & II lab practicals were added in 2004/05. In order to better standardize the lab practicals the department the faculty lead for Anatomy & Physiology established the format and questions to meet the course competencies as outlined in Harrison & Johnson, The Human Organism – Function & Form supplemental manual.

2. **Current Year Data Results**
   During the fall ’05, and spring ’06 semesters a total of 532 students were administered the combined competency exam for all sections of Human Anatomy & Physiology I & II (Bio 201 & Bio 202). Of the 532 students 437 students took the standardized lab practicals. 95 students did not take the standardized lab practicals because they were enrolled in dihybrid sections of Bio 201 or 202. Dihybrid sections lab practicals are different due to the once a month labs versus the weekly traditional labs.

3. **Analysis**
   Based upon the aggregate score of 65% for the combined competency exam the department exceeded the set benchmark of 50%. The aggregate score of 74% for the standardized lab practicals also exceed the benchmark of 70% (see Figure 1 – Aggregate Scores for Combined Competency Exam and Standardized Lab Practicals). The assessment results did improve over the previous year.

Figure 1. 1 – Aggregate Scores for Combined Competency Exam and Standardized Lab Practicals




## D. Use of Results

While the benchmarks were met for the biology departments Anatomy & Physiology discipline these results do not provided enough detail to ascertain the specific system effectiveness of the department. These results were discussed within the department and determined not to meet the requirements of the assessment program. The department has redesigned the biology discipline assessment to meet the requirements of the assessment program at Arapahoe Community College for next year (see plan for 2006/07)

## Part II – Assessment PLAN (2006/07)

### A. Intended Outcomes

1. All biology students will be able to apply their knowledge of the Scientific Method. (Includes concept of scientific method, use of the metric system and data interpretation, including graph analysis).
2. All biology students will explain how structure/function and biological evolution apply to biological organisms.
3. Students of all biology courses will demonstrate through a conceptual map the "Central Dogma" of biology.

### B. Identify Assessment Procedures/Methods

1. The understanding of the Scientific Method, metric system, data application & interpretation will be assessed through the use of a departmental pre/posttest. The pretest will be administered during the first class meeting. The posttest will be administered during the final class meeting. (Covers competencies 1, 2 & 3)

   The pre-test and a post-test will be used to measure the students' gain in understanding of conceptual ideas. We will use the average test results scaled to 100 percent, the formula for computing the gain of is

   $$\text{Gain} = \frac{POST - PRE}{100 - PRE}$$

   where

   $POST$ = Post-Test Average Result Out Of 100

   $PRE$ = Pre-Test Average Result Out Of 100

2. During the semester all biology classes will require that the students write an essay to evaluate the students understanding of how structure/function and biological evolution relate to biological organisms. The essay will be evaluated by the use of a rubric. (Covers competency 2)
3. During the semester all biology classes will be required to complete a conceptual map of the "Central Dogma" of biology. The conceptual map will be evaluated by the use of a rubric. (Covers competency 3)

### C. Benchmarks

1. Students will achieve an overall gain of 0.30 on the diagnostic test.

2. Using the scoring rubric, students should achieve an overall average score of 70 percent on the graded essay.

3. The average score on the conceptual map will be 70 percent.