

# **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 (increase enrollment). 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 (Assure and Expand Programs of Excellence, Design and Implement a P-20 Model, Continue to Strengthen our Institutional Communication and Culture).

### **B. Intended Outcomes (competencies)**

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.

### **C. Benchmarks**

- A. Students will achieve an overall gain of 0.30 on the diagnostic test. (competency 1, 2, 3)
- B. Using the scoring rubric, students should achieve an overall average score of 70 percent on the graded essay. (competency 2)
- C. The average score on the conceptual map will be 70 percent. (Competency 3)

## Assessment Results

### 1. Historical Context

Prior to 2006/07 academic year, the biology department only assessed students within the first and second semesters of Human Anatomy and Physiology. This year was the first year that the department assessment competencies crossed all biology courses offered at Arapahoe Community College.

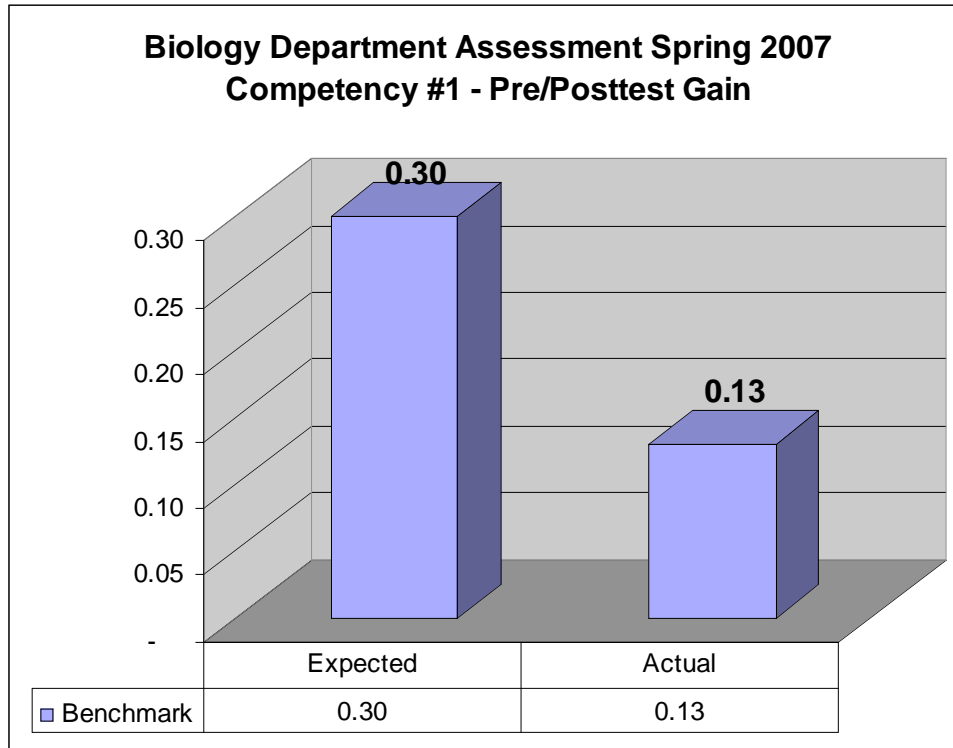
### 2. Current Year Data Results

During the spring of 2007, 315 students were administered a pretest, posttest and quiz covering the three competencies that crossed all biology courses. The results of the analysis reflected a lower than expected gain in two of the competencies while exceeding the benchmark in the third. Due to technical issues, not getting WebCT properly set up for the essay portion of the assessment, a multiple choice set of questions was substituted for competencies 2 and 3.

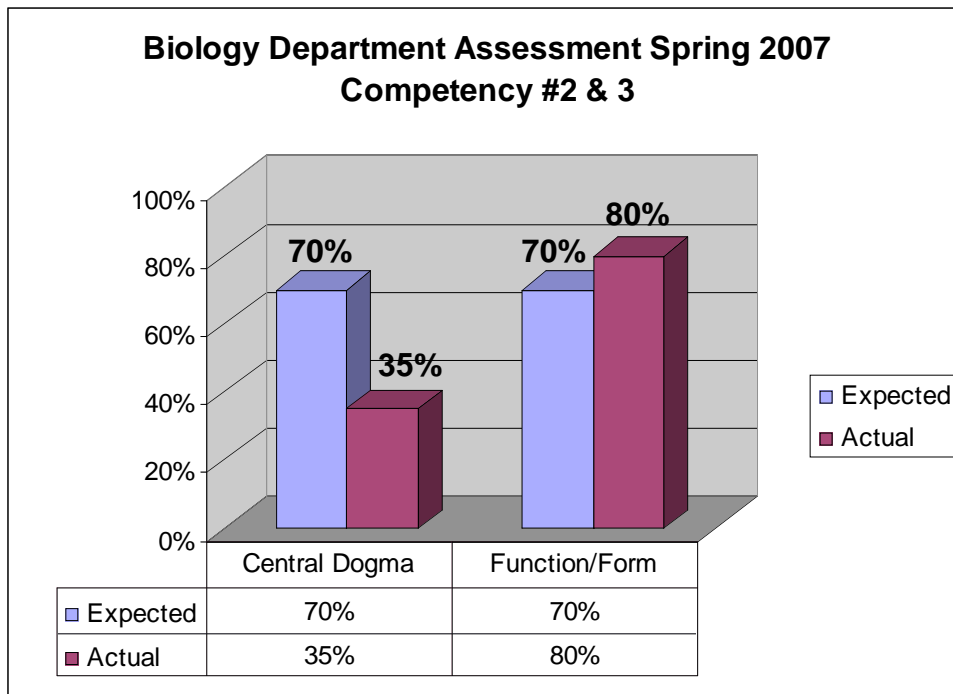
Scores for the pretest/posttest only saw a gain of 0.13 as compared to the benchmark of 0.30.

Competency #2 results only showed an average of 35% versus the benchmark of 70%. Competency #3 resulted in an average score of 80% versus the benchmark of 70%. (See Graph #1a & b – Biology Department Assessment Results.)

Graph #1a – Biology Department Assessment Results



Graph #1b – Biology Department Assessment Results



### 3. Analysis

Since this was the first year for the biology department to administer this broad of an assessment, no historical data is available for comparison purposes.

Overall competency #1 did not meet the expected benchmark of 0.30 (see graph 1a). Analysis of the results revealed:

- A. The scientific method questions, while taken directly from a current biology textbook, were too general and open to misinterpretation. The average pretest score was 59% versus average posttest score was 69%.
- B. For the metric conversion section, students scored higher than expected on the pretest (41% average) and lower than expected on the posttest (46% average). This illustrates that the students did not make any significant gain in their knowledge on how to convert within the metric system
- C. Data interpretation showed a pretest average score of 84% versus a posttest score of 85%. This showed that the biology students had a high understanding of data interpretation before entering the biology courses.

Competency #2 missed the benchmark by 35%. The use of an ordering question may have been confusing to the students (See graph 1b).

The benchmark for competency #3 was exceeded by 10% (See Graph 1b).

#### **D. Use of Results**

Since this was the first year for the biology department to assess across all biology courses the following conclusions were reached in a series of departmental meetings:

1. The assessment competencies were reevaluated and found to be lacking. One additional competency will be added to next year's assessment (cell theory).
2. The method of administering the assessment needs to be changed to a vehicle that is easy to use and grade. Hence, next year's assessment will be administered through BlackBoard using the power of fewer multiple choice questions and more fill-in the blank questions.
3. The students may have not been motivated to do their best on the pre/posttest since no course reward was offered. Next year there will be a point incentive for taking both the pre and post and conceptual quiz.
4. The biology department faculty will assist in the preparation of the assessment questions.
5. E-learning staff will assist in the preparation of the biology department blackboard shells for delivery of the department assessment.

## Part II – Assessment PLAN (2007/08)

### 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 – Quantitative reasoning).
2. All biology students will identify how structure/function applies to biological organisms.
3. Students of all biology courses will demonstrate through matching and fill-in the blank questions covering the “Central Dogma” (DNA/RNA and protein synthesis) of biology and the cell theory.

### 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 second week of classes. The posttest will be administered during the 14<sup>th</sup> week of classes. (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 14<sup>th</sup> week of the semester all biology classes will be required to complete a quiz covering the concept of function/form, “Central Dogma” of biology and cell theory. The conceptual map will be evaluated by the use of a rubric. (Covers competencies 2 & 3)

### C. Benchmarks

1. Students will achieve an overall gain of 0.30 on the diagnostic test.
2. The average score on the function/form, Central Dogma and cell theory quiz will be 70 percent.

Have you submitted a budget worksheet with this plan?

No, but I intend to once I have the worksheet.