

## ASSESSMENT WEBSITE INFORMATION

**College: Science and Mathematics**

**Degree Program: Biological Sciences-  
Preprofessional Emphasis**

**Chair/Director: Tom Risch**

**2011 Report**

### **DATA SAY:**

The ASU Department of Biological Sciences wished to critically assess our biology majors' deficiencies as incoming freshmen and as informed juniors/seniors. We therefore administered a standardized Biology exam (Educational Testing Service, 2010) to all freshmen First Year Experience students in Fall 2011 (n=131), and to second semester juniors in Human Structure & Function II in Spring 2011 and seniors enrolled in Biology seminar in Fall 2011 (n=76). This exam reported varied indicators/descriptors for nine Biology topic areas. Differences in mean percent correct between freshmen and juniors/seniors among the topic areas ranged from only a 3% difference between the two student populations to 19% gain in knowledge over the two to three year curriculum. Highest gains were seen in the topics of cell structure/function and molecular biology/genetics; deficiencies were seen in organismal diversity and in understanding of plants.

### **SO WHAT:**

The results were disappointing in that further gains were not seen.

### **HOW WE CHANGED:**

First, we now have an indication of the areas in which we need to improve most, which will be shared with faculty. Secondly, the Biology Department Assessment Committee has already decided to use the topic areas delineated by this exam as a basis for curriculum mapping to ensure that all topic areas are not only introduced but are strengthened as students complete the required Biology curricula developed for all emphasis areas. Third, these data were further broken down into subtopics that can be shared with faculty responsible for them in their individual courses, again to ensure a strengthened approach to students' success in these areas. Finally, we plan to identically test future students to increase the statistical rigor of this study, and hopefully to reassess the same freshmen cohort for their progress once they are seniors in 2015.

### **WHAT WE GOT:**

The incoming class of 2011 will be retested in spring of 2015.



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2012 Report

### DATA SAY:

Subscores on the MCAT were not meeting competitive standards.

### SO WHAT:

Students need help and practice taking the MCAT.

### HOW WE CHANGED:

ASU co-sponsored an MCAT 4-week Preparatory Course in 2011 with UAMS Area Health Education Center Northeast. Advertising began in late December with an application deadline of April 1<sup>st</sup>.

### WHAT WE GOT:

Approximately 36 people from the area applied for the course, including 25 from ASU. Scores on the practice MCAT increased:

AVERAGE POST TEST SCORES:	Average Post Test Score	Average Improvement
Physical Science:	7.30	17.48%
Verbal Reasoning:	7.93	29.43%
Biological Science:	8.00	35.29%
Total Scaled Score:	23.24	27.26%



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**2013 Report**

### **DATA SAY:**

Critical thinking is urgent to success in the sciences and mathematics, and the faculty of the Department of Biological Sciences strives to promote critical thinking in our courses. However, more quantitative evaluation of our students' ability to think critically is needed. The American Association of Medical Colleges values the ability to think critically by physicians, and will assess this ability in medical school applicants by including a critical thinking portion on future Medical College Aptitude Tests.

### **SO WHAT:**

The Department of Biological Sciences now has a further impetus to ensure that our preprofessional students develop good critical thinking skills. However, assessing critical thinking is difficult, as a mode of thinking is difficult to define; indeed, there are several definitions of critical thinking which vary somewhat by different educational sources.

### **HOW WE CHANGED:**

The Department of Biological Sciences will lead ASU's initiative toward assessing critical thinking by administering the NSF-sponsored Critical Thinking Aptitude Test (CAT), designed by Tennessee Tech faculty and staff, to all incoming freshmen in 2013. ASU faculty from Biology as well as other ASU departments will be trained by Biology faculty who attended the NSF CAT Train the Trainer workshop to grade the students' critical thinking exams. Graded exams will be analyzed by CAT staff for various statistical parameters regarding our students. The exam will be re-administered early in the junior year to assess our ability to promote critical thinking by our students. In addition, interested Biology faculty will work with CAT staff to learn how to develop good critical thinking scenarios and questions focused on biology.

### **WHAT WE GOT:**

We look forward to testing data on our students, and to sharing with colleagues how best to address critical thinking in our individual classrooms.

