Biology Department Assessment Update May 28, 2010

At this time, we would like to see:

1. any revisions you have made to your plan

2. the data you have collected

3. your analysis of the data

4. any curricular changes you are proposing as a result of that analysis.

1. At this time, we have not made any revisions to our plan.

2. Collection of more data (and 3. Analysis of data)

A. As mentioned in Step 4 of the Assessment Plan we submitted, we have begun to collect **information on our recent graduates**. For our 168 majors who graduated from 2007-2009, we have information on 120 of them (71%; mostly from a Facebook survey).

23 (19%) are in graduate programs

31 (26%) are in medical school (MD or DO programs)

9\* (8%) are in dental school (\* plus one alum recently deceased was in dental school)

14 (12%) are in professional schools in other health fields (PA, PT, Vet Med, etc.)

6 (5%) are in post-baccalaureate programs (designed for students to improve science grades before applying to professional schools in health areas)

19 (16%) are employed in areas related to Biology

13 (11%) are employed in areas not related to Biology

4 (3%) are currently unemployed

We anticipate getting information on more majors (including those who just graduated in 2010) in the near future.

B. We continued to give the ETS Major Field Test (MFT) in Biology to all majors and minors in their last Spring semester at Albion (if a student plans to graduate a semester early, he or she must take it the previous spring). We have **two sets** of data to present this year (with some analysis).

i. **Direct comparison of 11 individuals on the same ETS MFT between their first semester and last semester at Albion.** In some years, we have given the MFT to a subset of students in their first semester at Albion. Because the version of the ETS MFT is changed every five years, normally we cannot compare the same students over time.

In Spring 2010, however, our senior majors and minors took the same version of the MFT (Biology 4BMF) that 15 students had taken as first-semester students in BIOL 195 in Fall 2006. (Due to cost of the MFT, we cannot give it to all students in BIOL 195.) Hence we have some pre- and post-Albion Biology data that we can use as a direct comparison for 11 students (nine majors and two CMB minors) who took the exam in Fall 2006 and in Spring 2010 (Table 1).

The mean values and percentiles went up for overall score and for all four subscores between Fall 2006 and S2010. We cannot compare the nine assessment indicators across time for this group of eleven students as we get those scores for the entire group taking the exam rather than for individuals (group in Spring 2010 = 73 majors and minors).

Table 1.  ETS Major Field Test (Biology 4BMF) Scores for 11 Biology Majors and Minors, Fall 2006 vs. Spring 2010 (same individuals took the same exam as first-semester students and as seniors). Total scores and subscores are reported as scaled scores. (ETS reports percentiles to nearest value of 5, from low of 1st percentile to high of 95th percentile.)

                                                                                          Fall 2006      Spring 2010

**Total Mean Score** (range 120-200) 152.8      160.7

Albion Examinees’ Mean Score as percentile                          40               65

             (n = 30,854 college seniors for comparison, 2005-2009)

**Albion Institutional Mean Score as percentile**                     **40**       **80**

            (n = 425 schools, 2005-2009)

**Subscores** (range 20-100)

Presented as scaled score (individual percentile/**institutional percentile**)

Cell Biology                                                     46.4 (25/**10**)      60.6 (65/**85**)

Molecular Biology & Genetics              52.5 (45/**40**)       56.5 (55/**60**)

Organismal Biology                                      51.4 (40/**35**)       57.5 (60/**70**)

Population Biology/Ecology/Evolution                            58.5 (60/**75**)       63.5 (70/**90**)

We are very pleased by the improvement in scores in these students, and use institutional percentiles to compare this group with groups from other schools. We had a relatively strong group of first-year students take the ETS Major Field Test in Fall 2006, and they showed an increase in average overall score from 40th to 80th percentile. As first-semester students, three of these 11 students came in with very high overall scores (two in the 95th percentile, with scores of 179 and 178, and one in the 90th percentile with 173) but six students scored in the 35th percentile or lower (150 or less), with the lowest score in the 5th percentile. As seniors, the top three scored 192, 177, and 177, respectively (all 95th percentile – the top level in the comparative data) and only one student remained in the 35th percentile or lower (she moved up from 5th to 15th percentile). For more info on comparative data on ETS Major Field Tests, see <http://www.ets.org/portal/site/ets/menuitem.1488512ecfd5b8849a77b13bc3921509/?vgnextoid=f72baf5e44df4010VgnVCM10000022f95190RCRD&vgnextchannel=758232523a186110VgnVCM10000022f95190RCRD> .

In subscores, our largest increase was in Cell Biology, in which the average scores of these students moved from 10th to 85th percentile. This area has been one focus of emphasis of revision to our curriculum beginning in 2005 with funding from an NSF CCLI grant. In Molecular Biology and Genetics, the other focus area of our CCLI, average scores improved from 40th to 60th percentile. Average scores in Organismal Biology improved from 35th to 70th percentile; this area has been another focus of ours in terms of these scores and our commitment to provide a well-rounded education in Biology. Scores in Population Biology/Ecology/ Evolution were inflated in Fall 2006, due to the timing of that test. Normally, the group of incoming students would have taken the ETS test at the end of the first week of the semester. In Fall 2006, however, we did not receive the exams from ETS until halfway through the semester, after these students had taken units in BIOL 195 on Ecology and Population Genetics. Coverage of that material is reflected in the average high score (75th percentile) in Fall 2006. We are pleased to see they still showed improvement in this area as seniors, scoring in the 90th percentile.

Biology 4BMF has been given at a wide variety of institutions (n=425) in the U.S., including Adrian, Alma, Calvin, Hope, Kalamazoo, Kenyon, and Macalester, as well as larger institutions such as Grand Valley State University, and some major R1 universities. A complete list of institutions that have given version Biology 4BMF of the exam to seniors is available at <http://www.ets.org/Media/Tests/MFT/pdf/MFT%20PDFs%202007/Biology4BMFListofSchools.pdf>

ii. Data from all our seniors in 2010. We have added information for our senior majors and minors to the table below.

Table 2.  ETS Major Field Test (Biology 4BMF) Scores for Albion Senior Biology Majors and

            Minors, 2007-2010.  Total scores and subscores are reported as scaled scores; scores for

            assessment indicators are reported as percent correct.

                                                                                            2007                2008                2009    2010

**Number of Albion students tested (majors/minors)**               42/16               68/14               57/16 54/19

**Total Mean Score** (range 120-200) for Albion BIO Majors    152.5               153.8               154.0   151.5

Albion Examinees’ Mean Score as percentile                              45                    45                    45 40

             (n = 30,854 college seniors for comparison)

Albion Institutional Mean Score as percentile                              45                    50                    55 35

            (n = 425 schools)

 Total Mean Score for Albion BIO Minors                                 153.3               150.1               153.1 150.5

2007                2008             2009    2010

**Subscores** (range 20-100) for Albion BIO Majors (institutional percentile)

Cell Biology                                                     52.8 (45)         53.8 (45)         54.8 (50)      51.3 (30)

Molecular Biology & Genetics              54.2 (55)         53.4 (50)         53.6 (50)      48.8 (25)

Organismal Biology                                      50.3 (30)         53.2 (45)         51.8 (40) 51.5 (35)

Pop. Biology/Ecology/Evolution                            54.7 (55)         53.3 (45)         55.8 (60) 54.7 (55)

**Assessment Indicators** for Albion BIO Majors and Minors shown as percent correct (percentile)

1 Biochemistry & Cell Energetics                                   47 (65)             46 (60)             49 (75) 45 (55)

2 Cell Structure, Organization, and Function          56 (45)             56 (45)             54 (35) 48 (15)

3 Molecular Biology & Molecular Genetics                 49 (65)             49 (65)             47 (55) 40 (25)

4 Diversity of Organisms                                        47 (35)             51 (55)             51 (55) 48 (40)

5 Organismal – Animal Structure and Function           60 (50)             58 (35)             56 (25) 56 (25)

6 Organismal – Plant Structure and Function             38 (20)             41 (30)             42 (35) 42 (35)

7 Population Genetics & Evolution                       56 (55)             56 (55)             55 (50) 55 (50)

8 Ecology: Population, Community, Ecosystem         56 (40)             56 (40)             61 (65) 59 (55)

9 Analytical Skills                                                           51 (35)             53 (45)             52 (40) 50 (30)

# majors/minors with scores > 175 (95 percent or higher;

   comparison group of 21,681 individuals)                        1/0                   4/0                   0/0 2/1

# with scores 171-175 (90-94%)                                          2/0                   3/0                   5/1 2/0

# with scores 166-170 (80-89%)                                            4/1                   4/0                   6/2 2/1

#with scores 161-165 (70-79%)                                             4/0                   6/3                 10/1 4/1

% of majors/minors with scores of at least 70%                  26/6                 25/21               37/25 19/16

# majors/minors with scores < 151 (lowest 35%)                20/6                 34/8                 20/6 21/9

%  majors/minors with scores in lowest 35%                       48/37              50/57               34/37 39/47

We are disappointed with the scores of our seniors on the ETS MFT this year. We emphasize to students that we do want them to take the exam seriously, rather than rushing through it. This year, we had one student score in the bottom 1 percentile (121, with the lowest possible score being 120). It is possible that she got off track on her answer sheet.

C. In terms of working on analytical skills, Dale Kennedy worked somewhat on interpretation of figures (graphs) with students in Vertebrate Zoology (BIOL 227). On the final exam, students were asked to interpret the pattern of data in a figure that they had been sent ahead of time (they had not discussed that particular figure). Of the 30 students in the class, 19 interpreted the figure correctly. Most other students (10) identified the major issue/topic that the figure dealt with, but they did not explain the pattern indicated by the data in the figure. We hope to add similar exercises in other courses in the near future.

4. In Fall 2009, we began discussing a return to a three-course introductory sequence. We would retain our first two courses (BIOL 195: Ecology, Evolution, and Biodiversity, and BIOL 210: Cell and Molecular Biology) but would modify some material in BIOL 210. Our third introductory course would be a 200-level Genetics course (without lab). We consider an understanding of genetics to be critical to all areas of biology, and becoming increasingly so with an increase in areas of genetics related to both molecular biology and to population and conservation biology.

Based on scores of our students in several areas, including subscore in Molecular Biology & Genetics and Assessment Indicators 2 and 3, we are strongly interested in pursuing a required course in Genetics for all of our majors. We anticipate that almost all of our Cell and Molecular Biology minors would take such a course as well. We would still offer a 300-level Genetics course with lab for students who want more work in this area.