**Academic Year:** 2013-2014  
**Program:** Biology

**STUDENT LEARNING ASSESSMENT REPORT**

**SUBMITTED BY:** Barbara Kreutzer  
**DATE:** September 29, 2014

**BRIEFLY DESCRIBE WHERE AND HOW ARE DATA AND DOCUMENTS USED TO GENERATE THIS REPORT BEING STORED:**  
The data summary for the 2013-2014 graduating student survey (GSS), the alumni survey and biology department exit exam hardcopies are stored in the desk file drawer of the faculty member who prepared the report in the Marymount administration/assessment files. The internship documents and course documents are stored in her office file cabinet, archive box, and the department chair’s office. The electronic documents for previous learning assessment reports, GSS and biology department exit exam are stored in her office computer in the desktop Marymount/administration/assessment files and in her home computer under Desktop/Barb/MarymountHomeWorkingUse files/Administration/Assessment. Hardcopies of additional documents are stored in her office desk and white cabinet.

**EXECUTIVE SUMMARY**

List all of the program’s learning outcomes: (regardless of whether or not they are being assessed this year)

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Year of Last Assessment</th>
<th>Year of Next Planned Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Students will apply to a complex, current scientific problem, gained knowledge and experience. (Identified as an inquiry outcome.)</td>
<td>2011-2012</td>
<td>2013-2014</td>
</tr>
<tr>
<td>2. In a professional setting, students will demonstrate ability to apply knowledge gained from their Biology and Physical Science major.</td>
<td>2011-2012</td>
<td>2013-2014</td>
</tr>
<tr>
<td>3. Students will demonstrate competency in basic scientific skills such as observing safe laboratory practices and making solutions.</td>
<td>N/A (new learning objective)</td>
<td>2013-2014</td>
</tr>
<tr>
<td>4. Students will formulate hypotheses, design a project, and gather and analyze data to address scientific questions. (Identified as an inquiry outcome.)</td>
<td>2012-2013</td>
<td>2014-2015</td>
</tr>
<tr>
<td>5. Students will display an understanding of ethical dilemmas and social issues and apply their understanding to situations in professional settings.</td>
<td>2012-2013</td>
<td>2014-2015</td>
</tr>
<tr>
<td>6. Students will demonstrate scientific literacy by communicating synthesis of knowledge and critical analysis of read scientific information. (Identified as an inquiry outcome.)</td>
<td>2012-2013</td>
<td>2014-2015</td>
</tr>
</tbody>
</table>
Describe how the program’s outcomes support Marymount’s Mission, Strategic Plan, and relevant school plan:

Our program has a strong commitment to academic excellence, as well as to promote career preparation within a liberal arts framework. Through the process of building a solid foundation of knowledge in the current field of biology, developing the student's ability to interpret primary research, and providing opportunities to hone their ability to apply what they have learned in a professional setting, we give them not only an excellent education but also the tools to take advantage of opportunities for personal and professional growth. Content presented through engaging activities in our introductory through advanced science courses provide the foundational knowledge and spark interest in general biology, chemistry, physics, genetics, microbiology, parasitology, endocrinology, immunology, virology, biochemistry and environmental topics. These courses are updated frequently and often contain modules which focus on ethical, social, and global issues and are updated frequently. The labs accompanying our introductory biology, chemistry and physics courses and our lab-based courses, Bio 368 Advanced Lab Research Methods and Bio 369 Advanced Molecular Biology, give the students a strong background in laboratory techniques and are a natural inquiry based learning tool which emphasizes intellectual curiosity. Many also have service modules and opportunities associated with them. Students report back to us that they find these courses extremely helpful in internships, graduate research and entry-level jobs after graduation. Our required departmental internship is a cap-stone experience which allows the students to apply their knowledge in professional settings and provides a stepping-stone to jobs after graduation. Many of the projects in our introductory through advanced level courses require interpretation of primary research, group work and classroom presentations. Our departmental writing intensive courses, Bio 300 and BIO 368, hones the students’ technical writing skills.

Provide a brief description of the assessment process used including strengths, challenges and planned improvements:

As direct and indirect measures of our student learning objectives, we use selected questions from a senior exit exam, internship evaluations, alumni and graduating senior surveys, and rubric and information from classes as our majors move through the program. Some of these courses are BIO 151-152 General Biology for Majors, BIO 300 Writing for Science, and BIO 410 Senior Seminar. We have several strong indirect measures, including selected questions from internship evaluations, the Graduating Senior Survey (GSS) and the University Alumni Surveys and Supplemental Biology Department Alumni Surveys. Our direct measures include rubrics and required products from courses such as BIO 151-152, BIO 300 and BIO 410 and results from our exit exam. To validate and expand the direct measures, we continue to design and use rubrics which incorporate a range of defined performance standards, such as very positive, positive, somewhat positive, mainly negative and mostly negative.

To evaluate important skills often required of our graduates, we will remove a learning objective we have assessed for over six years with positive results, Learning Outcome # 3, “Students will demonstrate breadth of content knowledge in the field of biology”, and replaced it with, “Students will demonstrate competency in basic scientific skills such as observing safe laboratory practices, and making solution dilutions”. Direct measures we used to assess this learning outcome include student lab safety records and student performance in applicable lab
components of courses for upper level students. Indirect measures we used are responses on selected questions from internship, GSS, and alumni surveys. Although the indirect measures do not specifically measure the particular Learning Objective #3 skills we targeted, the selected questions closely pertain in a general, subjective way to the skills, so we feel the measures provide a valid way to indirectly evaluate the learning objective.

In our cycle of assessment, we will assess the following three learning outcomes this year. The first two we last assessed for the 2011-2012 report and the last is new and replaces an older outcome, “Students will demonstrate breadth of content knowledge in the field of biology”, which was assessed for several years with positive results.

1. Students will apply to a complex, current scientific problem, gained knowledge and experience. (Identified as an inquiry outcome.)
2. In a professional setting, students will demonstrate ability to apply knowledge gained from their Biology and Physical Science major.
3. Students will demonstrate competency in basic scientific skills such as observing safe laboratory practices, calculating metric conversions and dilutions and making solution.

Describe how the program implemented its planned improvements from last year: The last year the program assessed Learning Outcomes 1 and 2 was 2011-12. This was the first year we assessed Learning Outcome 3.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Planned Improvement</th>
<th>Update (Indicate when, where, and how planned improvement was completed. If planned improvement was not completed, please provide explanation.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Students will apply to a complex, current scientific problem, gained knowledge and experience. (Identified as an inquiry outcome.)</td>
<td>Inquiry modules were improved in several of our courses.</td>
<td>Improved, updated, and new inquiry modules were done for BIO 152 General Biology for Majors, BIO 368 Advanced Laboratory Research Methods, BIO 449 Advanced Molecular Biology, and BIO 410 Senior Seminar in 2013 and 2014. We feel the improvements contributed to our students demonstrated abilities for Learning Outcome 1.</td>
</tr>
<tr>
<td>2. In a professional setting, students will demonstrate ability to apply knowledge gained from their Biology and Physical Science major.</td>
<td>We monitored student response to perceptions of preparedness in biochemistry and botany (which contains ecology and organism biology) as well as negative</td>
<td>We monitored comments in the 2012-13 and 2013-14 University Alumni and Supplemental Biology Alumni Surveys. As we had hoped, there were fewer requests for a biochemistry</td>
</tr>
</tbody>
</table>
### Academic Year: 2013-2014
#### Program: Biology

<table>
<thead>
<tr>
<th>Comments about the lab facilities. We also bluntly encouraged our less capable students to consider a plan B in place of medical school.</th>
<th>Course. The botany course was offered only one time during the assessment period and we did not see a drop in the number of requests of topics covered in that course.</th>
</tr>
</thead>
<tbody>
<tr>
<td>In our 2012-2014 advising of program students, we became more direct in discussing options other than medical school for our lower performing students. We also placed around the department posters and other information about career options besides medical school for a B.S. in Biology.</td>
<td></td>
</tr>
</tbody>
</table>

| 3. Students will demonstrate competency in basic scientific skills such as observing safe laboratory practices and making solutions. | Not applicable. This was the first year we assessed this outcome. | Not applicable. This was the first year we assessed this outcome. |

### Provide a response to last year’s University Assessment Committee review of the program’s learning assessment report: (List each recommendation and provide a specific response to each).

For last year’s 2012-13 University Assessment Committee review, there were no suggestions that pertain to this year’s learning objectives’ assessments.

For the last year the learning objectives were assessed, in the 2011-12 University Assessment Committee review, the following suggestions were addressed:

In Critical Area 2: Assessing Learning Outcomes, Analysis – “The report could be easier to read if the results were presented in a graph or table”, graphs and tables were added.

In Critical Area 3: Improving the Curriculum using Assessment, Improving the curriculum using assessment – “The standard for Learning Outcome 1 was met, but the results seemed to indicate there are some opportunities for improvement”, many of the measures increased, so we feel the learning objective overall was strongly met.
### Outcome and Past Assessment

**Learning Outcome 1:**
Students will apply to a complex, current scientific problem, gained knowledge and experience. (Identified as an inquiry outcome.)

Is this outcome being reexamined?  [ ] Yes  [x] No

If yes, give a brief summary of previous results (including trends) and any changes made to the program.

### Assessment Activity

<table>
<thead>
<tr>
<th>Outcome Measures</th>
<th>Performance Standard</th>
<th>Data Collection</th>
<th>Analysis</th>
</tr>
</thead>
</table>
| Explain how student learning will be measured and indicate whether it is direct or indirect. | Define and explain acceptable level of student performance. | Discuss the data collected and student population | 1) Describe the analysis process.  
2) Present the findings of the analysis including the numbers participating and deemed acceptable. |

**Direct Measures**
Research Interpretation section of the exit exam

60% of participating students will achieve a score of 50% or more of the available points on the Research Interpretation section of the Exit Exam.

The Exit Exam was given and evaluated for 23 in 2013 and 20 graduating seniors in 2014 and analyzed.

The Research Reading section consisted of four questions. Please see Attachment 1 for the Exit Exam questions (# 90-# 93) and Appendix 1 for the Exit Exam Instructions and Introductory Script. A professor in the Biology and Physical Sciences Department administered and scored the test.

1) We administered a Research Reading Interpretation Section of the Exit Exam to graduating seniors. A professor in the Biology and Physical Sciences Department collected and analyzed the results. The percentage of students receiving 100%, 75%, 50%, 25% and 0% answers correct was calculated. The percent of students who answered the different questions correctly was evaluated.

2) The scores for the 2012-2013 Research Section of the Exit Exam were stronger (sixty-five percent) and the 2013-2014 were weaker (fifty-five percent), but the average of the two (sixty percent), was similar to other years. The performance standard was met. (See Appendix 2 and 3 for details.)
### Direct, con’t.

#### Senior seminar evaluation

85% of students’ seminar presentations will reflect confidence and ability to propose a research thesis topic, and interpret and discuss primary research at an excellent or good level. Research thesis topics can be based either on current literature or laboratory based research.

Capstone student seminars are presented by all department seniors as part of the coursework for BIO 410. Please see Appendix 4 for a detailed description of the course and evaluation of students. The instructor for the Senior Seminar course, evaluated the student presentations and collected the data.

1) A professor in the Biology and Physical Sciences Department analyzed the results based on the student’s score on the Discover Assessment Tool (DAT) categories I through III (see Attachment 2) and the BIO 410 instructor comments. Criteria for the scores were project focus; information selection and use; and project analysis, synthesis and presentation. Ratings of excellent received scores of 3.6 – 4.0; good received 2.6 – 3.6; fair received 1.6 – 2.6; and poor received less than 1.6. Excellent to good scores met our performance standard.

2) Twenty-nine (in 12-13) and sixteen (in 13-14) students were evaluated. In 2012-13, nineteen presentations were excellent or good of which seventeen were excellent (93.0%) and two (7.0%) were good. In 2013-14, sixteen presentations were excellent or good (100.0%) of which, 62.5% excellent and 37.5% good). No presentations were fair or poor. The performance standard was met and the quality of the presentations continued to improve.

### Direct, con’t.

#### Discovery Assessment Tool (DAT) rubric scores

There will be an increase in average DAT scores between first year and fourth year inquiry based projects.

DAT rubric analyses were done on inquiry based projects in a BIO151 first year fermentation lab, a BIO 300 second –third year scientific paper assignment, and the BIO 410 senior seminar presentation.

1) In the BIO 151 labs, the adjunct instructors were first trained and then evaluated the projects. In the BIO 300 and BIO 410 projects, the faculty teaching the course did the evaluation. Each student project received a score based on their performance on individual elements within the selected categories on the DAT rubric. See Attachment 2 for the DAT rubric. Criteria for the scores were project focus; information selection and use; and project analysis, synthesis and presentation. The scores for each individual course was pooled and averaged. The averages were then compared.
Academic Year: 2013-2014
Program: Biology

| Indirect Measures | 70% of Biology GSS respondents perceive their preparation to be good or excellent. | Individual graduating undergraduate seniors answered questions on the survey. The survey asked the student questions regarding their perceptions of their own academic preparation on learning outcomes. The questions which pertained to this outcome were used in the assessment. Out of sixteen questions, four questions pertained. Please see Appendix 6 for the questions. The University administered and collected the survey and analyzed the results. | 2) A steady improvement in average scores (from 3.2 to 4.2 in 2012-13 and from 3.0 to 4.1 in 2013-14) was seen from first year through fourth year student projects. The performance was met. See Appendix 5b for data. |
| Biology Graduation Senior Survey (GSS) - Evaluation of Preparation (See Appendix 6, applicable questions from 2010-2011 Graduating Senior Survey Biology) | | 1) The University sent the analyzed results to a professor in the Biology and Physical Sciences Department, who evaluated the analysis. From the graduating undergraduate biology respondents, the mean percent of those who answered good or excellent preparation to pertinent questions was calculated. |

2) Out of a total of thirty-nine respondents (twenty-four in 2012-13 and fifteen in 2013-14), a total average of 77.6% (90.2% in 2012-13 and 65.0% on 2013-14) responded good or excellent to the selected questions. The 2012-13 response was especially high, 90.2%. The performance standard was met. See Appendix 6 for data.

**Interpretation of Results**

**Extent this Learning Outcome has been achieved by students** *(Use both direct and indirect measure results):*
The performance standards were all met and the learning outcome was achieved. By the time our students graduated, they were able to confidently apply what they had learned to scientific problems. Our 2013-2014 class was an especially strong one and this was generally reflected in their scores.

**Program strengths and opportunities for improvement relative to assessment of outcome:**
Overall, we are pleased with the gained knowledge and skills seen as our students move through the program. Although their ability to interpret and apply information from primary research reading on the exit exam dipped slightly in 2013-14, the quality of their senior seminar presentations (which rests on their understanding and application of primary research reading) was high and the graduating seniors in the GSS indicated confidence in evaluating information (seventy-three percent felt their preparation was good or excellent), which indicated they had achieved the learning objective. The overall response of seniors on the GSS to their preparation was down from previous years, sixty-five percent as compared to an average of eighty-five percent from 2010-2012, but still better than 2009, sixty percent. Generally, the 2013-14 class was not especially strong, so we will continue to monitor the GSS and Exit Exam responses. Our conclusion that the 2013-2014 class was not especially strong is based on data which shows the 2013-14 class was a weaker class with an average 3.1 GPA, average 48.3 exit exam score, and GSS score of 47% for preparedness for finding a job in their field compared to 2012-13 scores of 3.4, 54.9, and 80%.

Discuss planned curricular or program improvements for this year based on assessment of outcome:
Many of the professors have added and are using active learning modules in their courses, which we feel contributed to the learning outcome. We will continue to use these modules and to develop new ones.
Learning Outcome 2:
In a professional setting, students will demonstrate ability to apply knowledge gained from their Biology and Physical Science major.

Is this outcome being reexamined? □ Yes X □ No

If yes, give a brief summary of previous results (including trends) and any changes made to the program.

Assessment Activity

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<td>Define and explain acceptable level of student performance.</td>
<td>Discuss the data collected and student population</td>
<td>1) Describe the analysis process. 2) Present the findings of the analysis including the numbers participating and deemed acceptable.</td>
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Direct Measures
Biology internship site supervisor evaluation of intern form

We will strive to have all student interns achieve a “4” (“good”) or above in each category of evaluation

The data came from selected questions from returned 2010-11 and 2011-12 Marymount Employer of Internship Performance and Internship Site Supervisor Evaluation of Internship Forms for department interns. Please see Appendix 7 for the highlighted selected questions. The chair of the Biology and Physical Sciences Department, collected the internship site supervisor evaluations.

1) The individual scores were pooled for the total population and entered into an Excell spreadsheet. The student’s performance was ranked either from 5 – 1, where 5 was excellent, 4 good, 3 average, 2 poor and 1 not completed due to unacceptable performance. Definitions of these rankings are as follows: an excellent evaluation was an evaluations in which all responses were completely positive, a good evaluation was almost all positive responses with a few slight reservations, an average evaluation was positive with reservations, and a poor evaluation reflected an academically unprepared student. Employer comments were noted. A professor in the Biology and Physical Sciences Department, analyzed and evaluated the assessment of internship experiences.

2) In 2012-2013, 98.7% of twenty-eight respondents
Academic Year: 2013-2014  Program: Biology

| Indirect Measures | For internship activities related to knowledge covered in our program, all students should rank their internship academic preparation as good or excellent. | The data came from returned 2010-11 and 2011-12 Marymount Student Evaluation of Internship Experience from department interns. Please see Appendix 8 for the forms. The selected questions are highlighted. The chair of the Biology and Physical Sciences Department, collected the internship site supervisor evaluations. | and in 2013-2014, 100.0% of eight returned evaluations received 5.0-4.0 or excellent-good. The comments were overwhelmingly positive. Many employers wanted to hire our students. There was an occasional comment that more technical training not expected from an undergraduate student would be necessary. The performance standard met. See Appendix 9a for data. 1) The individual responses were pooled for the total population and entered into an Excell spreadsheet (summarized in Appendix 9b). The student’s assessment of their academic preparation was ranked from 5 – 1, where 5 was excellent, 4 good, 3 average, 2 poor and 1 not completed due to lack of adequate preparation. Definitions of these rankings are as follows: an excellent evaluation was an evaluations in which all responses were completely positive, a good evaluation was overwhelming positive with a few slight reservations, an average evaluation was positive with reservations, and a poor evaluation depicted little academic preparation. Student comments were noted. A professor in the Biology and Physical Sciences, analyzed and evaluated the internship site supervisor evaluations. 2) In 2012-13, 100.0% of twenty-seven respondents and in 2013-14, 100.0% of eight respondents returned student evaluations of academic preparation for the internships was excellent or good. Students had many positive comments. Occasionally a student suggested prior technical training outside of what our program offers would have been helpful. The performance standard was |
### Indirect, con’t.

#### Selected questions on the 2012-2013 and 2013-2014 Biology Alumni Survey

| Well or adequately prepared from 85% of respondents. | Data came from the department alumni’s responses to selected questions on the Biology Department Alumni survey which was sent to graduates from 2006 – 2010 in the 2012-13 survey and 2007-2011 in the 2013-14 survey. In 2012, we began sending an electronic survey to our alumni. The survey was coordinated by the Office of Institutional Effectiveness and was called the Supplemental Alumni Survey. Please see Appendix 10 for the selected questions. | 1) The Office of Institutional Effectiveness sent the analyzed results to the professor doing the assessment in the Biology and Physical Sciences Department, who evaluated the analysis. From the graduating undergraduate biology respondents, the mean percent of those who answered good or excellent preparation to pertinent questions was calculated.

2) Of the seven respondents in 2012-13 and eight respondents in 2013-14, both years 86.0% indicated well or adequately prepared. The students commented well prepared in a number of subjects. Occasionally requested were toxicology, stronger research reading skills, statistics, and botany. The performance standard was met. |

### Indirect, con’t

#### Selected question on the 2012 – 2013 and 2013-2014 GSS

| Good or Excellent ratings on 80% of respondents to selected question | Data came from the department graduates’ responses to selected questions on the GSS. Please see Appendix 13 for the selected question. The University administered and collected the survey and analyzed the results. | 1) For each question, the percent of the population which answered good or excellent was determined. The University sent the analyzed results to a professor in the Biology and Physical Sciences Department who evaluated the analysis.

2) In 2012-13, 85.7% of seven respondents and in 2013-14, 100.0% of six respondents answered ‘Good’ or ‘Excellent’ to the selected question. The performance standard was met. See data in |
Interpretation of Results

Extent this Learning Outcome has been achieved by students (Use both direct and indirect measure results):
The performance standard was met for all measures except one year for the GSS indirect measure. In general Internship supervisors, students, graduating seniors, and alumni indicated enthusiastic confidence in our student’s ability to apply their knowledge in a professional setting. The only exception was the 2013-14 graduating seniors. We feel this exception might be because that was a weaker class who lacked confidence in their ability to get jobs in biology fields. We will continue to monitor this measure.

Program strengths and opportunities for improvement relative to assessment of outcome:
The internships provide a preliminary experience in the student’s desired profession. Our students have confidence going into and coming out of their internships. Their performance is consistently viewed by supervisors as excellent. That confidence is also seen upon graduation. In the alumni surveys, students mention several courses they wish they had had the opportunity to take at Marymount. To help us focus an upcoming faculty position search, we will systematically analyze the comments from the alumni survey and keep in mind that students are generally very confident in their ability to perform in professional setting. We will continue to monitor the learning outcome to ensure that the general student perceptions remain high.

With the implementation of new courses, we will also continue to monitor the student perceptions of preparedness in biochemistry and botany. We are pleased to have much fewer complaints about the lab facilities now that we have moved to the new Caruthers science building.

Discuss planned curricular or program improvements for this year based on assessment of outcome:
To address some of the comments from our alumni survey, we will make the following improvements. For biochemistry and botany, two courses we implemented in response to repeated student requests, we will continue to improve the active learning modules and lab components to make sure students remain confident in their learning. We will offer research reading projects in our required courses to ensure scientific literacy. We will advise our students both about the statistics course offered in the Mathematics Department which can be taken as an elective and also support the new Quantitative Science minor, which has a strong statistics component.
**Outcome and Past Assessment**

**Learning Outcome 3:** Students will demonstrate competency in basic scientific skills such as observing safe laboratory practices and making solutions.

Is this outcome being reexamined? □ Yes X □ No

If yes, give a brief summary of previous results (including trends) and any changes made to the program.

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### Assessment Activity

<table>
<thead>
<tr>
<th>Direct Measures</th>
<th>Performance Standard</th>
<th>Data Collection</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation of safety performance in selected courses</td>
<td>Less than two laboratory safety incidences will be reported by the time the students are in the upper level course.</td>
<td>The students receive lab safety training in all levels of science laboratory sections. The data came from safety records in selected introductory and upper level laboratory sections of science courses. The instructor of the laboratory section collected the data.</td>
<td>1) According to OSHA regulations and department procedures, all laboratory safety incidences no matter how insignificant must be reported by the lab instructor to the faculty member or lab coordinator in charge of the lab section through a laboratory incident form which is then archived. The incidence reports in our introductory BIO151/152 General Biology for Majors lab sections were compared our upper level BIO 368 Advanced Laboratory Research Methods sections. 2) For 2012-13 (111 students) and 2013-14 (101 students), no lab incidences were reported in either BIO 151/152 (111 students in 2012-13, and 101 students in 2013-14) or BIO 368 (25 students in 2012-13, and 24 students in 2013-14). The performance standard was met.</td>
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</tbody>
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| Direct Measures, con’t | Evaluation of making solutions in selected courses | By the time the students are in an upper level course, 75% of them will be able to make a solution correctly in an unassisted, first attempt. | The instructor for the upper level BIO 368 Advanced Laboratory Research Methods observed the ability of the students to make a solution correctly unassisted on their first attempt in their inquiry based project. | 1) As students move through the program, they receive instruction and practice making laboratory solutions correctly. In the upper level BIO 368 Advanced Laboratory Research Methods, the students must make their own solutions for their inquiry based summative research project. The instructor of the upper level BIO 368 course collected the data. A faculty member of the Biology and Physical Sciences Department analyzed the results obtained from the instructor of the upper level BIO 368,  

2) In 2012-13, twenty out of twenty-five (80.0%) and in 2013-14, nine out of eleven (82.2%) made the observed solution correctly on an unassisted first attempt. The performance standard was met. |
| Direct Measures, con’t | Evaluation by internship supervisor | 85.0% of the students will achieve a 4 or above on a selected question from the evaluation by the internship supervisor. | Many of the internships directly or indirectly require skills learned in the students’ lab sections. The data came from question number ten, which refers to the technical skills possessed by the intern, on returned 2012-13 and 2013-14 Marymount Employer of Internship Performance and Internship Site Supervisor Evaluation of Internship Forms for department interns. Please see Appendix 7 for | 1) The individual scores were pooled from both employer and supervisor forms for the total population. The student’s performance was ranked either from 5 – 1, where 5 was excellent (always satisfied), 4 good (almost always satisfied), 3 average (generally satisfied), 2 poor (often not satisfied) and 1 not completed due to unacceptable performance. Employer and supervisor rankings were pooled. A professor in the Biology and Physical Sciences Department, analyzed and evaluated the assessment of internship experiences  

2) In 2012-2013, 96.4 % of twenty-eight respondents and in 2013-2014, 100.0 % of eight returned evaluations received 5.0-4.0 or excellent-good. The performance standard was met. |
| Indirect Measures | Selected questions on the 2012-2013 and 2013-2014 GSS | Good or Excellent ratings on 80% of respondents to selected questions | Data came from the department graduates’ responses to selected questions on the GSS. Please see Appendix 12 for the selected questions. The University administered and collected the survey and analyzed the results. | 1) For each question, the percent of the population which answered good or excellent was determined. The University sent the analyzed results to a professor in the Biology and Physical Sciences Department who evaluated the analysis.  
2) In 2012-13, 93.8% of twenty-four respondents and in 2013-14, 65.0% of fifteen respondents answered 'Good' or 'Excellent' to the selected questions. The performance standard was robustly met for 2012-2013, but not for 2013-2014. The 2013-14 class was a weaker class with an average 3.1 GPA, average 48.3 exit exam score, and GSS score of 47% for preparedness for finding a job in their field compared to 2012-13 scores of 3.4, 54.9, and 80% which we think led to a lower perception of ability to apply their technical knowledge. Please see Appendix 11 for the data. |
|---|---|---|---|
| Indirect, con’t | Selected question on the 2012-2013 and 2013-2014 Biology Alumni Survey | Well or adequately prepared from 85% of respondents. | Data came from the department alumni’s responses to a selected question on the Biology Department Alumni survey which was sent to graduates from 2006 – 2010 in the 2012-13 survey and 2007-2011 in the 2013-14 survey. In | 1) The Office of Institutional Effectiveness sent the analyzed results to the professor doing the assessment in the Biology and Physical Sciences Department, who evaluated the analysis. From the graduating undergraduate biology respondents, the mean percent of those who answered good or excellent preparation to pertinent questions was calculated.  
2) Of the seven respondents in 2012-13, 85.7% |
Academic Year: 2013-2014
Program: Biology

2012, we began sending an electronic survey to our alumni. The survey was coordinated by the Office of Institutional Effectiveness and was called the Supplemental Alumni Survey. See Appendix 13 for the selected question.

Responded well or adequate preparation. Of the six respondents in 2013-14, 100.0% indicated well or adequately prepared. The performance standard was met. Please see Appendix 13 for the data.

Interpretation of Results

Extent this Learning Outcome has been achieved by students *(Use both direct and indirect measure results)*:
From direct measures of observations of students’ competency in basic scientific skills in the university labs and internship experiences as well as indirect measures of the perception of graduating seniors and alumni, the learning objective was well achieved.

Program strengths and opportunities for improvement relative to assessment of outcome:
Our program provides many opportunities for the students to develop safe and useful technical skills through instruction and exercises in the lab. We see this in the generally positive responses of the students and their internship supervisors. However, much less than eighty percent (65%) of the graduating seniors who answered the 2013-14 GSS had good or excellent for the selected GSS questions for technical preparation. The percent was significantly less than the 93.8% of the year before. The 2013-14 graduating class was weaker than the past few years. We will continue to monitor this learning objective to see if the trend continues. Although the performance standard for the direct measure, ‘Evaluation of making solutions in selected courses’ was met, we would like to see a higher percentage of students in upper level courses who could correctly accomplish the very basic technique of making solutions.

Discuss planned curricular or program improvements for this year based on assessment of outcome:
We will continue to monitor the GSS scores for the selected questions to make sure they improve.

A complete student learning assessment report includes appendix of rubrics, survey questions, or other relevant documents and information.