

## Developmental Studies Student Learning Report (rev. 7/14)

Fall 2013 – Spring 2014

The Department of Mathematics & Physical Sciences in the School of Mathematics,  
Science & Health Sciences

# Developmental Math and Science

Effectively assessing a degree program should address a number of factors:

- 1) Valid student learning outcomes should be clearly articulated;
- 2) Valid assessment measures should be used, consistent with the standards of professional practice;
- 3) There should be evidence that assessment data are being used by faculty to make necessary instructional or assessment changes; and there should be evidence that instructional or assessment changes are being implemented to improve student learning.

### PART 1 (A & B)

#### Relationship of Degree Program Learning Outcomes to Departmental and University Missions

A. Clearly state the school, department and degree program missions.

University Mission	School Mission	Department Mission	Degree Program Mission
Our mission is to ensure students develop the skills and knowledge required to achieve professional and personal goals in dynamic local and global communities.	Central to the mission of the School of Mathematics, Science & Health Science is the preparation of students to achieve professional and personal goals in their respective disciplines and to enable their success in dynamic	The Mission of the Math and Physical Science Department is to support and facilitate the students' pursuit of knowledge and to prepare them for a future of dynamically changing technological and scientific advances. This is	Our mission in Developmental Education is to ensure that skill deficient students develop the math and science skills necessary to be successful in their college-level classes to promote their future personal and professional success

University Mission	School Mission	Department Mission	Degree Program Mission
	<p>local and global communities. Three departments comprise this School, the Departments of Biology, Health Science, and Math and Physical Science. These departments pledge to deliver existing and newly developed programs that meet student demands, and to be responsive to the evolving culture of academia in general and the sciences in particular.</p> <p>Our Strategy is to foster an academic setting of diverse curricula that inherently incorporates an environment of service and collegiality.</p>	<p>accomplished by preparing them academically in the areas of critical thinking, analytical analyses, communication through written and graphical means, and fostering thinking in terms of processes.</p> <p>This mission is also focused on integrating the above skills in their daily lives within a fast changing society and technology.</p>	<p>in their local and global communities.</p>

B. Clearly state school purposes, department purposes and degree program student learning outcomes. Align student learning outcomes with their appropriate school and department purposes, and these outcomes and purposes with their appropriate university commitments.

University Commitments	School Purposes	Department Purposes	Student Learning Outcomes
<p>To provide quality associate, baccalaureate, and graduate degree opportunities and educational experiences which foster student excellence in oral and written communications, scientific reasoning and critical and creative thinking.</p>	<p>The School will offer developmental courses that will prepare students for college careers that will enhance their quality of life. This will be accomplished by honing and developing analytical and communication skills.</p>	<p>The Math and Physical Science Department will provide courses that will hone mathematical and scientific analytical skills, creative problem solving, critical thinking and data gathering as well as process thinking. These learned skills will prepare the students to be successful in college level math and science courses.</p>	<ol style="list-style-type: none"> <li>1) Students will demonstrate mastery of mathematic skills necessary for entry-level collegiate study.</li> <li>2) Students will demonstrate mastery of scientific principles necessary for entry-level collegiate study.</li> </ol>

University Commitments	School Purposes	Department Purposes	Student Learning Outcomes
To promote an atmosphere of academic and intellectual freedom and respect for diverse expression in an environment of physical safety that is supportive of teaching and learning.			
To provide a general liberal arts education that supports specialized academic program sand prepares students for lifelong learning and service in a diverse society.			
To provide students with a diverse, innovative faculty dedicated to excellence in teaching, scholarly pursuits and continuous improvement of programs.			
To provide university-wide student services, activities and resources that complement academic programs.			
To support and strengthen student, faculty and administrative structures that promote shared governance of the institution.			
To promote and encourage student, faculty, staff and community interaction in a positive academic climate that creates opportunities for cultural, intellectual and personal enrichment for the University and the communities it serves.			

## PART 2

### Discussion of Instructional Changes Resulting from 2012-2013 Developmental Studies Student Learning Report

List and discuss all instructional or assessment changes proposed in Part 5 of last year's Degree Program Student Learning Report, whether implemented or not. Any other changes or assessment activities from last year, but not mentioned in last year's report, should be discussed here as well. Emphasis should be placed on student learning and considerations such as course improvements, the assessment process, and the budget. If no changes were planned or implemented, simply state "No changes were planned or implemented."

Instructional or Assessment Changes	Changes Implemented (Y/N)	Impact of Changes on Degree Curriculum or Budget
Essential topics, as identified by department faculty, will be identified in Science Proficiency that will be dissected from the Pre-post-test and evaluated individually.	N	
The Office of Accountability and Academics has agreed to begin tracking student success into their college-level physical science general education courses in 2014.	Y	This information was requested and received via the December 2013 Entry Level Report. Data has been included in this SLR.

### PART 3

#### Discussion of the University Assessment Committee's 2012-2013 Peer Review Report

The University Assessment Committee in its Developmental Studies Peer Review Report provided feedback and recommendations for improvement in assessment. List or accurately summarize all feedback and recommendations from the committee, and state whether they were implemented or will be implemented at a future date. If they were not or will not be implemented, please explain why. If no changes were recommended last year, simply state "No changes were recommended."

Feedback and Recommended Changes from the University Assessment Committee	Suggestions Implemented (Y/N)	Changes that Were or Will Be Implemented, or Rationale for Changes that Were Not Implemented
<p>My only large concern with this report lays in the formulation of the student learning outcomes and the alignment of assessment measures with each outcome. The only genuine SLO, in my view, is SLO #1. SLO #2 and #3 are assessment measures, not outcomes. I would split the SLO #1 into two separate SLOs and scrap #2 and #3.</p> <p>My suggestion:</p> <ol style="list-style-type: none"> <li>1) Students will demonstrate mastery of basic mathematic skills necessary for entry-level collegiate study.</li> <li>2) Students will demonstrate mastery of basic scientific principles necessary for entry-level collegiate study.</li> </ol>	Y	<p>Excellent recommendation. The SLO's were modified/edited only slightly and implemented into this year's Assessment SLR.</p>
<p>Should you elect to reformulate your SLOs like above, the measures could be aligned as follows.</p> <ol style="list-style-type: none"> <li>1) Students will demonstrate mastery of basic mathematic skills necessary for entry-level collegiate study. <ul style="list-style-type: none"> <li>• Post-test in Elementary Algebra Plus</li> <li>• Post-test in Intermediate Algebra</li> <li>• Pre-post test difference in Elementary Algebra</li> </ul> </li> </ol>	Y	<p>Implemented into this year's SLR</p>

<p>Plus</p> <ul style="list-style-type: none"> <li>• Pre-post test difference in Intermediate Algebra</li> <li>• Success of students in successive college-credit math coursework</li> </ul> <p>2) Students will demonstrate mastery of basic scientific principles necessary for entry-level collegiate study.</p> <ul style="list-style-type: none"> <li>• Post-test in Science Proficiency</li> <li>• Pre-post test difference in Science Proficiency</li> <li>• Success of students in successive college-credit math coursework</li> </ul> <p>The UAC has advocated the inclusion of frequency distribution tables of student scores in the Results column for each assessment measure. While the review team recognizes this does place extra burden on the assessment process, such a breakdown would paint a richer picture of student progress toward out learning outcomes.</p>	<p>Y</p>	<p>This was done for both Elementary Algebra and Intermediate Algebra results.</p>
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**PART 4**

**Analysis of Evidence of Developmental Studies Student Learning Outcomes**

For all student learning outcomes (as listed in Part 1 B above), describe the assessment measures and performance standards used, as well as the sampling methods and sample sizes. For each measure, document the results of the activity measured and draw relevant conclusions related to strengths and weaknesses of their performance.

<b>A. Student Learning Outcomes</b>	<b>B. Assessment Measures</b>	<b>C. Performance Standards</b>	<b>D. Sampling Methods</b>	<b>E. Sample Size (N)</b>	<b>F. Results</b>	<b>G. Conclusions</b>	<b>H. Performance Standards Met (Y/N)</b>
1) Students will demonstrate mastery of mathematic skills necessary for entry-level collegiate study.	1a. Posttest in Elementary Algebra Plus with four course objective areas of Order of Operations, Algebraic Expressions, Algebraic Equations, and Applications.	1a. 65% of the students taking both the pretest and the posttest will score at least 65% on the posttest.	1a. Students took the posttest in day, evening, and online sections taught by both fulltime and adjunct faculty on all three campuses fall and spring semesters.	1a. 206 students	Posttest results: % score # % < 20 0 0 21-30 2 1 31-40 7 3 41-50 15 8 51-64 31 15 65-70 40 19 70-80 49 24 81-90 45 22 91-100 17 8	73% of the students taking the posttest made 65% or above this year. Unlike last year, when online sections had the highest pass percentage, this year the on campus sections out-performed the online classes by 4%. The most successful objective subcategory was Order of Operations with a 80% success rate across the board. The least successful objective was Algebraic Expressions with a 66% pass rate. All objectives had a pass rate of 66% or more.	Y

A. Student Learning Outcomes	B. Assessment Measures	C. Performance Standards	D. Sampling Methods	E. Sample Size (N)	F. Results	G. Conclusions	H. Performance Standards Met (Y/N)																																	
	1b. Posttest in Intermediate Algebra with four course objective areas of Slope &Line, Functions, Systems & Equations, and Quadratic Equations.	1b. 65% of the students taking both the pretest and the posttest will score at least 65% on the posttest.	1b.Students took the posttest in day, evening, and online sections taught by fulltime and adjunct faculty on all three campuses fall and spring semesters.	1b. 255 students	Posttest results: <table border="1"> <thead> <tr> <th>% score</th> <th>#</th> <th>%</th> </tr> </thead> <tbody> <tr><td>0-10</td><td>1</td><td>0</td></tr> <tr><td>11-20</td><td>0</td><td>0</td></tr> <tr><td>21-30</td><td>1</td><td>0</td></tr> <tr><td>31-40</td><td>6</td><td>2</td></tr> <tr><td>41-50</td><td>18</td><td>7</td></tr> <tr><td>51-64</td><td>31</td><td>12</td></tr> <tr><td>65-70</td><td>33</td><td>13</td></tr> <tr><td>71-80</td><td>56</td><td>22</td></tr> <tr><td>81-90</td><td>56</td><td>22</td></tr> <tr><td>91-100</td><td>53</td><td>21</td></tr> </tbody> </table>	% score	#	%	0-10	1	0	11-20	0	0	21-30	1	0	31-40	6	2	41-50	18	7	51-64	31	12	65-70	33	13	71-80	56	22	81-90	56	22	91-100	53	21	78% of the students taking the posttest made 65% or above this year. Unlike last year when the online sections had the highest pass percentage, the on campus sections outperformed the online sections by 22%. The online sections performance was the only subgroup not meeting the standard with only a 60% pass rate. The most successful objective subcategory was Functions with an 80% success rate. The least successful objective subcategory was Imaginary Numbers & Quadratic Equations, the last two topics studied in the course, with a 66% success rate. All objectives had a pass rate of 66% or more.	Y
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	<p>1c. Pre/Post Test Elementary Algebra Plus with four course objective areas of Oder of Operations, Algebraic Expressions, Algebraic Equations, and Applications.</p> <p>1d. Pre/Post Test Intermediate Algebra with four course objective areas of Slope &amp;Line, Functions, Systems &amp; Equations, and Quadratic</p>	<p>1c. 70% of the students taking both the pretest and the posttest in Elementary Algebra Plus will improve at least 30%.</p> <p>1d. 70% of the students taking both the pretest and the posttest in Intermediate Algebra will improve at least 30%.</p>	<p>1c. Students took the posttest in day, evening, and online sections taught by both fulltime and adjunct faculty on all three campuses in the fall and spring semesters.</p> <p>1d. Students took the posttest in day, evening, and online sections taught by fulltime and adjunct faculty on all three campuses</p>	<p>1c. 206 students</p> <p>1d. . 255 students</p>	<p>1c. Pretest results:</p> <table border="1" data-bbox="1121 406 1425 714"> <thead> <tr> <th>% score</th> <th>#</th> <th>%</th> </tr> </thead> <tbody> <tr><td>0-10</td><td>24</td><td>12</td></tr> <tr><td>11-20</td><td>53</td><td>26</td></tr> <tr><td>21-30</td><td>56</td><td>27</td></tr> <tr><td>31-40</td><td>43</td><td>21</td></tr> <tr><td>41-50</td><td>16</td><td>8</td></tr> <tr><td>51-64</td><td>9</td><td>4</td></tr> <tr><td>65-70</td><td>2</td><td>1</td></tr> <tr><td>71-80</td><td>3</td><td>1</td></tr> <tr><td>&gt; 80</td><td>0</td><td>0</td></tr> </tbody> </table> <p>1d. Pretest results:</p> <table border="1" data-bbox="1121 1055 1425 1380"> <thead> <tr> <th>% score</th> <th>#</th> <th>%</th> </tr> </thead> <tbody> <tr><td>0-10</td><td>15</td><td>6</td></tr> <tr><td>11-20</td><td>47</td><td>18</td></tr> <tr><td>21-30</td><td>60</td><td>24</td></tr> <tr><td>31-40</td><td>86</td><td>34</td></tr> <tr><td>41-50</td><td>29</td><td>11</td></tr> <tr><td>51-64</td><td>9</td><td>4</td></tr> <tr><td>65-70</td><td>4</td><td>2</td></tr> <tr><td>71-80</td><td>3</td><td>1</td></tr> <tr><td>81-90</td><td>2</td><td>1</td></tr> <tr><td>91-100</td><td>0</td><td>0</td></tr> </tbody> </table>	% score	#	%	0-10	24	12	11-20	53	26	21-30	56	27	31-40	43	21	41-50	16	8	51-64	9	4	65-70	2	1	71-80	3	1	> 80	0	0	% score	#	%	0-10	15	6	11-20	47	18	21-30	60	24	31-40	86	34	41-50	29	11	51-64	9	4	65-70	4	2	71-80	3	1	81-90	2	1	91-100	0	0	<p>1c. 77% of the students taking both the pretest and the posttest improved more than 30%. When comparing these results with the posttest results in 1a, it is easy to see this shift. In the pretest scores, no one made above 80% while on the posttest scores, no one made below 20% (see 1a). The average improvement this year was 44% with a negligible difference (1%) between on campus and online students.</p> <p>1d. 81% of the students taking both the pretest and the posttest improved more than 30%. When comparing these results with the posttest results in 1b, with only two students making below 31% on the posttest compared to 122 making below 31% on the pretest. The average improvement</p>	<p>1c. Y</p> <p>1d. Y</p>
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A. Student Learning Outcomes	B. Assessment Measures	C. Performance Standards	D. Sampling Methods	E. Sample Size (N)	F. Results	G. Conclusions	H. Performance Standards Met (Y/N)
	<p>Equations.</p> <p>1e. Based on results in the Entry-Level Assessment Through Fall 2012. Report compiled by Office of Accountability and Academics.</p> <p>1f. Based on results in the Entry-Level Assessment through Fall 2012. Report compiled by Office of Accountability</p>	<p>1e. Students completing Elementary Algebra and enrolling in Intermediate Algebra will make a grade of C or higher at the same percentage rate or higher than those students who waive/clear remediation.</p> <p>1f. Students completing Int. Alg. And enrolling in College algebra (MATH 1513) or Math for Critical</p>	<p>in fall and spring semesters</p> <p>1e. Student success (A,B,C) was tracked from Elementary Algebra through Intermediate Algebra for Fall 2012 students.</p> <p>1f. Student success (A,B,C) was tracked from Intermediate Algebra through both College</p>	<p>1e. Requiring remediation: n=117 Waived or cleared remediation: n=289</p> <p>1f. MATH 1513: n=106 MATH 1503: n=4</p>	<p>1e. 64% of the students completing Elementary Algebra made a C or higher in Intermediate Algebra in the Fall of 2012 compared to 54% of the students who made a grade of C or better in Intermediate Algebra that waived or cleared remediation requirement.</p> <p>1f. 49% of the students completing Intermediate Algebra made a C or higher in College Algebra in fall 2012 compared to 56% of those students who made a grade of C or better that waived or</p>	<p>this year 45% with the on campus average of 47% out-performing the online average improvement of 33%. All subgroups improved over 30%.</p> <p>1e. a 9-year trend continues where students remediating through Elementary Algebra improve their math skill deficiencies to such an extent that they out perform on a competitive level students not requiring the first course in the remediation sequence.</p> <p>1f. These data continue a 9-year trend for students in College Algebra after completing Intermediate Algebra, are consistently performing below (about 11%) those who waive or clear remediation.</p>	<p>1e. Y</p> <p>1f. N</p>

A. Student Learning Outcomes	B. Assessment Measures	C. Performance Standards	D. Sampling Methods	E. Sample Size (N)	F. Results	G. Conclusions	H. Performance Standards Met (Y/N)
2. Students will demonstrate mastery of scientific principles necessary for entry-level collegiate study.	and Academics.	Thinking (MATH 1503) the next semester will make a grade of C or higher at the same percentage rate or higher than those students who waive/clear remediation.	Algebra and Math for Critical Thinking for Fall 2012 students.	Waived or cleared remediation:  MATH 1513: <i>n</i> =641  MATH 1503: <i>n</i> =41	cleared remediation requirement.  100% of the students completing Intermediate Algebra made a C or higher in Math for Critical Thinking in fall 2012 compared to 49% of those students who made a grade of C or better that waived or cleared remediation requirement.		
	2a. Post-test in Science Proficiency	2a. 65% of the students taking both the pretest and the posttest will score at least 65% on the posttest.	2a. Pre- and Posttest data was collected from on-ground and online sections in fall-spring 2012-13.	2a. BIOL 0123V <i>n</i> =48	2a. 68.75 % scored 65% or higher on the posttest.	2a. The performance standard was exceeded by 3.75%. Only a single section failed to meet criteria. All other sections exceeded expectations by a significant margin. All sections were taught by the same instructor.	2a. Y
	2b. Pre/Post Test in Science	2b. 70% of the students taking both	2b. Pre- and Posttest data was	2b. BIOL 0123C <i>n</i> =48	2b. Thirty-seven students increased by at least 30% between the	2b. Overall, the standard was exceeded by over 12%. If	2b. Y

A. Student Learning Outcomes	B. Assessment Measures	C. Performance Standards	D. Sampling Methods	E. Sample Size (N)	F. Results	G. Conclusions	H. Performance Standards Met (Y/N)
	<p>Proficiency</p> <p>2c. Based on results in the Entry-Level Assessment through Fall 2012. Report compiled by Office of Accountability and Academics.</p>	<p>the pretest and the posttest in Science Proficiency will improve at least 30%.</p> <p>2c. Students enrolling and completing Cellular Biology (BIOL 1144), General Biology (BIOL 1114) Biology, or Earth Science the semester after taking Science Proficiency will earn a grade of C or better at a similar rate of success compared to students taking the same</p>	<p>collected from on-ground and online sections in fall-spring 2012-13.</p> <p>2c. Student success (A,B,C) was tracked through 2012 from Science Proficiency through both Cellular Biology (majors), General Biology (non-majors), and Earth Science.</p>	<p>2c. BIOL 1114: n=3 BIOL 1144: n=3 GEOL 1014: n=3 Remediation Waived:: n=818</p>	<p>pretest and posttest. Thus, 77.1% of the students demonstrated a 30% or higher score</p> <p>2c. 2/3 (67%) students who took Science Proficiency scored a C or better in General Biology in fall 2012. 2/3 (67%) students who took Science Proficiency scored a C or better in General Cellular Biology in fall 2012. 2/3 (67%) students who took Science Proficiency scored a C or better in Earth Science in fall 2012. A combined 67% (9/12) of students who completed Science Proficiency successfully completed their subsequent college-level science course. This compares to 62% success among students taking the</p>	<p>considered by section, all but one section met the performance standard. The single section below criteria was at 53.3% (16.7% below the 70% criteria.).</p> <p>2c. A cohort of 9 students represents a relatively poor sample size from which to draw substantive conclusions. A snapshot of the past nine years (2004-2012) an annual average of 53 students require remediation in Science Proficiency (BIOL 0123) each fall semester. During that period 75% successfully completed the BIOL 0123 course. However, only 49% of those students successfully completed BIOL 1114 and 46% successfully completed BIOL 1144. Students who waived or cleared remediation during the same period indicated a</p>	<p>2c. Y</p>

A. Student Learning Outcomes	B. Assessment Measures	C. Performance Standards	D. Sampling Methods	E. Sample Size (N)	F. Results	G. Conclusions	H. Performance Standards Met (Y/N)
		courses without the remediation requirement.			same college-level courses without the remediation requirement.	75% success rate in BIOL 1114 and 58% success rate in BIOL 1144, The science faculty needs to quantify expected success rates for students taking college-level science courses following the BIOL 0123 course. Significant changes have not occurred in the courses curriculum since 2004.	

## PART 5

### Proposed Instructional Changes Based on Conclusions Drawn from Evidence Presented Above

State any proposed instructional or assessment changes to be implemented for the next academic year. They should be based on conclusions reported in Part 4 (above) or on informal activities, such as faculty meetings and discussions, conferences, pilot projects, textbook adoption, new course proposals, curriculum modifications, etc. Explain the rationale for these changes and how they will impact student learning and other considerations, such as curriculum, degree plan, assessment process, or budget. If no changes are planned, simply state "No changes are planned."

Student Learning Outcomes	Instructional or Assessment Changes	Rationale for Changes	Impact of Planned Changes on Student Learning and Other Considerations.

## PART 6

### Shared Pedagogical Insight that Improves Student Learning or Classroom Engagement

(OPTIONAL) If your department or a faculty member has developed a method or technique of teaching that seems especially effective in improving student learning or student engagement in the classroom, please provide a brief description below. More detail can be communicated during the face to face peer review session.

Description
For years I read on student evaluations of students who, although they were glad they took the developmental math classes and agreed they had learned a lot, still stated that they hated math, or hated how it made them feel, or that they wished they did not appear so stupid in the math class. This made me ponder how to deal with their lack of self-esteem and negativity towards the subject. After all, no one wants to do something that everyone knows they are no good at. For this reason I started the Math as Art Project (worth 10 extra credit points out of a course total of 1000). For the last decade, students have made posters, mobiles, pottery; rewrote songs (a la Weird Al); and written poetry and short stories on math concepts covered in my classroom or math topics related to their field of study. We even had one cake displaying all the different types of numbers we went over in the class. These have been used to decorate our primary math classroom. This has given many students a chance to shine and show their classmates that they are really good at some things! It has raised class morale, and many presenters have started being less shy about asking questions in class. Not only have the negative final comments gone down, but many students look forward to the presentations and now mention it a course highlight on their student evaluations.

**PART 7 (A & B)**



**Assessment Measures and Faculty Participation**

**A. Assessment Measures:**



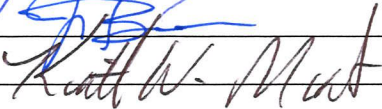
- 1) How many different assessment measures were used? Three measures per course.
- 2) List the direct measures (see rubric): Percentage of students passing the posttest at 65% or higher and (2) the percentage of students improving 30% from pretest to posttest in each of the three courses
- 3) List the indirect measures (see rubric): Student Success in subsequent college-level coursework

**B.**

- 1) Provide the names and signatures of all faculty members who contributed to this report and indicate their respective roles:

<b>Faculty Members</b>	<b>Roles in the Assessment Process</b> (e.g., collect data, analyze data, prepare report, review report, etc.)	<b>Signatures</b>
Mrs. Evalon St. John	Collect and analyze data in Developmental Mathematics	
Mrs. Sue Flaming	Collect data in BIOL 0123	

- 2) Reviewed by:

<b>Titles</b>	<b>Names</b>	<b>Signatures</b>	<b>Date</b>
Department Head	Dr. Jamie Graham		9/30/14
Department Head	Dr. Jerry Bowen		28 Sep 2014
Dean	Dr. Keith Martin		9/25/2014