

# Degree Program Student Learning Report

Revised November 2019

## Department of Biology

### AS in Biological Sciences

For 2019-2020 Academic Year

#### PART 1

#### Degree Program Mission and Student Learning Outcomes

A. 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 is the preparation of students to achieve professional and personal goals in their respective disciplines and to enable their success in dynamic local and global communities. Our strategy is to foster an academic setting of diverse curricula that inherently incorporates an environment of service and collegiality.	The mission of the Department of Biology at Rogers State University is to support students in their pursuit of knowledge in biology and life science.	The Associate of Science in Biological Science consists of the general education curriculum and the supporting science courses. In support of the mission of the University, the school, and the department, the degree seeks to develop a student with a broad and diverse background in science and general education.

B. Align school purposes, department purposes, and program student learning outcomes with their appropriate University commitments.

University Commitments	School Purposes	Department Purposes	Student Learning Outcomes
To provide quality associate, baccalaureate, and graduate degree	The School offers innovative degrees, which focus upon	To increase the student's critical thinking and reasoning abilities.	1. Demonstrate an understanding of general cellular processes.

University Commitments	School Purposes	Department Purposes	Student Learning Outcomes
<p>opportunities and educational experiences which foster student excellence in oral and written communications, scientific reasoning and critical and creative thinking.</p>	<p>developing skills in oral and written communication, critical thinking, creativity, empirical and evidenced-based inquiry, experimental investigation and theoretical explanation of natural phenomena, and innovative technology.</p>	<p>To prepare a student to matriculate into a four-year degree program in math or science related fields or graduate</p>	<p>2. Apply understanding of the taxonomy, morphology, and physiology of the Animal and Plant Kingdoms.</p> <p>3. Demonstrate an understanding of the atom, compounds, matter, gases, solutions, atomic theory, bonding chemical reactions, and chemical kinetics.</p>
<p>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.</p>		<p>Demonstrate knowledge about the components and requirements of a safe lab environment</p> <p>To promote a positive learning environment in our classrooms and on campus.</p>	<p>4. Demonstrate knowledge about the components and requirements of a safe lab environment.</p>
<p>To provide a general liberal arts education that supports specialized academic programs and prepares students for lifelong learning and service in a diverse society.</p>	<p>The School educates its majors to think independently and have the knowledge, skills and vision to work in all types of situations and careers and communicate with all types of people.</p>	<p>To increase the student's understanding and appreciation of the biological world, and his/her ability to apply this understanding to his/her personal and professional life.</p> <p>To increase the student's ability to interpret and understand his/her world.</p>	
<p>To provide students with a diverse, innovative faculty dedicated to excellence in teaching, scholarly pursuits and continuous improvement of programs.</p>	<p>The School fosters a community of scholars among the faculty and students of the institution</p>		

University Commitments	School Purposes	Department Purposes	Student Learning Outcomes
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.	The School will offer and promote artistic, scientific, cultural, and public affairs events on the campus and in the region.	To increase the student's awareness of the benefits of incorporation of technology into science studies.  To serve as a resource for the community; utilizing the expertise of the faculty.	

## PART 2

### Revisit Proposed Changes Made in Previous Assessment Cycle

Revisit each instructional/assessment change proposed in Part 5 of the degree program SLR for the preceding year. Indicate whether the proposed change was implemented and comment accordingly. Any changes the department implemented for this academic year, but which were not specifically proposed in the preceding report, should also be reported and discussed here. Please note if no changes were either proposed or implemented or this academic year.

Proposed Change	Implemented? (Y/N)	Comments
No instructional changes were proposed for SLR 2019-2020		

## PART 3

### Response to University Assessment Committee Peer Review

The University Assessment Committee provides written feedback on departmental assessment plans through a regular peer review process. This faculty-led oversight is integral to RSU's commitment to the continuous improvement of student learning and institutional effectiveness. UAC recommendations are not compulsory and departments may implement them at their discretion. Nevertheless, respond below to each UAC recommendations from last year's peer review report. Indicate whether the recommendation was implemented and comment accordingly. Please indicate either if the UAC had no recommendations or if the program was not subject to review in the previous cycle.

Peer Review Feedback	Implemented (Y/N)	Comments
AS Biology degree program was not reviewed during previous assessment cycle.		

**PART 4**  
**Evidence of Student Learning**

Evidence and analyze student progress for each of the student learning outcomes (same as listed in Part I B above) for the degree program. See the *Appendix* for a detailed description of each component. Note: The table below is for the first program learning outcome. Copy the table and insert it below for each additional outcome. SLO numbers should be updated accordingly.

A. Student Learning Outcome						
SLO #1: Demonstrate an understanding of General Cellular processes.						
B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)	
Comprehensive Post Exam. This is the same exam given for pre/post-test evaluations for SLO # 3 but only the scores	70% of students declaring an AS in Biology major will score 70% or above on the post-exam	Administered to all students in General Cellular Biology (BIOL 1144) during both Fall and Spring terms but only the declared AS in Biology	Fall 19 and Spring 20 4 students	The total number of students in BIOL 1144 for both semesters was 98 students. Among them, we had only 4 that could be assessed for the AS in Biology and they were all enrolled for Fall 19. The average post exam score was 79.5% and 75% scored above 70%.	Y	

**A.  
Student Learning Outcome**

SLO #1: Demonstrate an understanding of General Cellular processes.

<b>B. Assessment Measure</b>	<b>C. Performance Standard</b>	<b>D. Sampling Method</b>	<b>E. Sample Size (n)</b>	<b>F. Results</b>	<b>G. Standard Met (Y/N)</b>																
<p>on the post exam are being measured.</p> <p>This pre/post exam covers scientific method and evolution, basic chemistry, biological macromolecules, cellular energetics, cellular genetics and cell reproduction.</p>		<p>students was analyzed.</p>		<p>Below are our results from this assessment cycle.</p> <p><b>Fall 18 and Spring 19</b> Post test</p> <table border="1"> <thead> <tr> <th colspan="2">Score Distribution</th> </tr> </thead> <tbody> <tr> <td>0-49%</td> <td>0</td> </tr> <tr> <td>50-59%</td> <td>1</td> </tr> <tr> <td>60-69%</td> <td>0</td> </tr> <tr> <td>70-79%</td> <td>0</td> </tr> <tr> <td>80-89%</td> <td>1</td> </tr> <tr> <td><u>90-100%</u></td> <td><u>2</u></td> </tr> <tr> <td>Total</td> <td>4</td> </tr> </tbody> </table>	Score Distribution		0-49%	0	50-59%	1	60-69%	0	70-79%	0	80-89%	1	<u>90-100%</u>	<u>2</u>	Total	4	
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Total	4																				

**H.  
Conclusions**

We have met our performance standards.

Since only declared AS in biology students were analyzed this is an extremely small sample size. We were able to assess only 4 students and even if we include last years' SLR we still only have a total of 48 students. The faculty believed this is still too small of a sample size to be statistically significant.

**A.**  
**Student Learning Outcome**

SLO #1: Demonstrate an understanding of General Cellular processes.						
B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)	
<p>Our plan is to continue to separate out the AS students and over the next few more years to increase our total numbers and cumulatively add up the results to make our assessment measurement more robust.</p> <p>The strength of this assessment measure is that we will be able to better assess just the AS majors in the future.</p> <p>The weakness of this measure is the low number of students that we are currently able to assess. Faculty cannot currently make valid instructional changes with such a low number of students assessed.</p>						

**A.**  
**Student Learning Outcome**

SLO #2: Apply understanding of the taxonomy, morphology, and physiology of the Animal and Plant Kingdoms.						
B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)	
2a. The final exam of General Botany was a comprehensive test and it covered taxonomy, morphology, and physiology of plants.	2a. At least 70% of students in General Botany (BIOL 2104) declaring an AS in Biology will score 70% or better on the final comprehensive exam.	2a. All students in General Botany will be given a comprehensive final exams pertaining to this objective but only the AS students will be analyzed by the faculty involved.	2a. 4 students assessed	2a. 3 of the 4 student scored above 70%.	Y	
2b Unit exams that assess the understanding of taxonomy, morphology, and	2b. At least 70% of students declaring an AS in Biology in General Zoology (BIOL 2205) will score	2b. All students General Zoology (BIOL 2205) will be given unit exams pertaining to this	2b.5 students assessed	2b. During the Fall 2019 and Spring 2020, Zoology had only 5 students out of 75 students were AS Biology majors. The following Table summarizes the Fall 2019 and Spring 2020 results.	Y	

**A.  
Student Learning Outcome**

SLO #2: Apply understanding of the taxonomy, morphology, and physiology of the Animal and Plant Kingdoms.

<b>B. Assessment Measure</b>	<b>C. Performance Standard</b>	<b>D. Sampling Method</b>	<b>E. Sample Size (n)</b>	<b>F. Results</b>	<b>G. Standard Met (Y/N)</b>																																										
<p>physiology of animals.</p> <p>Unit exam 1 Covers Evolution and Taxonomy</p> <p>Unit exams 2-6 cover the morphology, physiology, and phylogeny of specific animal phyla</p>	<p>70% or better on all unit exams.</p>	<p>objective and each of these unit exams will be analyzed by the faculty involved. Only the declared AS in Biology students will be reported.</p>		<p>FALL 2019 and SPRING 2020 SCORE DISTRIBUTIONS</p> <table border="1"> <thead> <tr> <th>Exam</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> </tr> </thead> <tbody> <tr> <td>100-90%</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>89-80%</td> <td>1</td> <td>2</td> <td>2</td> <td>2</td> <td>3</td> <td>1</td> </tr> <tr> <td>79-70%</td> <td>2</td> <td>2</td> <td>0</td> <td>2</td> <td>1</td> <td>3</td> </tr> <tr> <td>69-60%</td> <td>1</td> <td>1</td> <td>2</td> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>0-59%</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table> <p>Percent of students making <u>70% or better on Unit Exams for Fall 18 and Spring 19</u></p> <p>Exam 1 = 60%</p> <p>Exam 2 = 80%</p> <p>Exam 3 = 60%</p> <p>Exam 4 = 80%</p> <p>Exam 5 = 80%</p> <p>Exam 6 = 80%</p> <p>During the Fall 2019 and Spring 2020, AS students scored an average of 76.6% across all six exams. Students also showed continual improvement throughout the course exams, raising individual exam scores on average 2% better on each exam and the course progressed.</p>	Exam	1	2	3	4	5	6	100-90%	0	0	1	0	0	1	89-80%	1	2	2	2	3	1	79-70%	2	2	0	2	1	3	69-60%	1	1	2	1	1	0	0-59%	1	0	0	0	0	0	
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**A.**  
**Student Learning Outcome**

SLO #2: Apply understanding of the taxonomy, morphology, and physiology of the Animal and Plant Kingdoms.

<b>B.</b> <b>Assessment Measure</b>	<b>C.</b> <b>Performance Standard</b>	<b>D.</b> <b>Sampling Method</b>	<b>E.</b> <b>Sample Size (n)</b>	<b>F.</b> <b>Results</b>	<b>G.</b> <b>Standard Met (Y/N)</b>
				<p>80% of AS students made 70% or better on four of the six unit exams.</p> <p>In Fall 2019, a new full time professor began instructing Zoology for RSU. As such, a direct comparison of previous AS scores to current AS scores may not be an accurate comparison between years.</p> <p>Below, we present data collected from previous years of AS biology students which have completed Zoology. All of the Fall semesters from 2013-2017 are combined together and all of the Spring semesters from 2014-2019 are combined together to give an overall analysis of all students that where declared AS Biology majors. We combined the Fall semester together and Spring semesters together to also analyze any differences between the two semesters.</p> <p>Percent of students making 70% or better on Unit Exams for Fall 13, Fall 14 , Fall 15, Fall 16, Fall 17 &amp; Fall 18            Exam 1 = 61%            Exam 2 = 61%            Exam 3 = 67%            Exam 4 = 78%            Exam 5 = 83%</p>	



**A.  
Student Learning Outcome**

SLO #2: Apply understanding of the taxonomy, morphology, and physiology of the Animal and Plant Kingdoms.

<b>B. Assessment Measure</b>	<b>C. Performance Standard</b>	<b>D. Sampling Method</b>	<b>E. Sample Size (n)</b>	<b>F. Results</b>	<b>G. Standard Met (Y/N)</b>
				Exam 6 = 78% Percent of students making 70% or better on Unit Exams for Spring 14, Spring 15 , Spring 16, Spring 17, Spring 18 & Spring 19 Exam 1 = 70% Exam 2 = 70% Exam 3 = 70% Exam 4 = 83% Exam 5 = 87% Exam 6 = 87%	

**H.  
Conclusions**

2a. For Fall 19 and Spring 20 we met our performance standards on the final exam. We only assessed 4 students this academic year and the number is still not significantly large enough to make a conclusive conclusion based on the assessment result. We have had only 23 students since our SLR 2015-2016 still a statistically small number but using a cumulative number in the future and should help us eventually make for a better assessment in the future.

2b. For Fall 19 and Spring 20, we met our performance standards on four out of six unit exams. Analyzing only one year of data with a total of five students presents a challenge due to small sample size, leading to false conclusions and incorrect statistical analyses. When combining previous years SLR data, we have a total of 50 AS biology students for review. Previous years descriptive data shows that exams one and three did not continually meet standards, similar to this years data summary. In Fall 2019, a new full time professor began instructing Zoology for RSU. As such, a direct comparison of previous AS scores to current AS scores may not be an accurate comparison between years until a larger sample size of the current instructor may be accumulated across semesters between years.

**A.**  
**Student Learning Outcome**

SLO #3: Demonstrate an understanding of the atom, compounds, matter, gases, solutions, atomic theory, bonding chemical reactions.

<b>B. Assessment Measure</b>	<b>C. Performance Standard</b>	<b>D. Sampling Method</b>	<b>E. Sample Size (n)</b>	<b>F. Results</b>	<b>G. Standard Met (Y/N)</b>																						
Comprehensive Pre-Post Exam.	70% of AS in Biology students will improve on the post-test by 20% or greater over the pre-test	Pre/Post Exam given to all students in both Fall and Spring terms but only the AS biology students were analyzed.  Conducted as Pre/Post Exam.	Fall 19 3  Spring 20 0	This table summarizes the difference in student scores for the pre & post exam scores for Fall 19 and Spring 20.  Fall 19 and Spring 20 Score Distribution (Post Test Improvement) <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>0-10%</td><td>0</td></tr> <tr><td>10-20%</td><td>0</td></tr> <tr><td>20-30%</td><td>1</td></tr> <tr><td>30-40%</td><td>1</td></tr> <tr><td>40-50%</td><td>1</td></tr> <tr><td>50-60%</td><td>0</td></tr> <tr><td>60-70%</td><td>0</td></tr> <tr><td>70-80%</td><td>0</td></tr> <tr><td>80-90%</td><td>0</td></tr> <tr><td>90-100%</td><td>0</td></tr> <tr><td><b>Average gain:</b></td><td><b>38.5%</b></td></tr> </table>	0-10%	0	10-20%	0	20-30%	1	30-40%	1	40-50%	1	50-60%	0	60-70%	0	70-80%	0	80-90%	0	90-100%	0	<b>Average gain:</b>	<b>38.5%</b>	Y
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<b>Average gain:</b>	<b>38.5%</b>																										

**H.**  
**Conclusions**

Student scores on the post-test improved by an average of 79.5% for the Fall 19 and Spring 20. Our goal of at least a 20% increase was met.

Even with our small sample size, our standard was met.

**A.  
Student Learning Outcome**

SLO #4: Demonstrate knowledge about the components and requirements of a safe lab environment.

<b>B. Assessment Measure</b>	<b>C. Performance Standard</b>	<b>D. Sampling Method</b>	<b>E. Sample Size (n)</b>	<b>F. Results</b>	<b>G. Standard Met (Y/N)</b>
A laboratory exercise and worksheet will be administered to all students in Biol. 1144.	100% of the students in BIOL 1144L will complete and 100% will pass quiz over laboratory safety. This exercise requires students to learn biology laboratory protocols and safety equipment and its proper use and function. This will be a pass/fail exercise. Any student not passing the exercise will be required to repeat the exercise until they can pass.	All students in majors biology course ( BIOL 1144L) were sampled during the Fall 2019 and Spring 2020	152	Out of the 152 students, all completed the exercise with a passing grade.	Y

**H.  
Conclusions**

Our set goal was achieved and students are learning proper laboratory safety across the multiple lab sections. The department is working to establish an online lab test which will replace current onsite lab safety quiz.

**PART 5  
Proposed Instructional or Assessment Changes**

Learning outcomes assessment can generate actionable evidence of student performance that can be used to improve student success and institutional effectiveness. Knowledge of student strengths and weakness gained through assessment can inform faculty efforts to improve course instruction and program curriculum. Below discuss potential changes the department is considering which are aimed at improving student learning or the assessment process. Indicate which student learning outcome(s) will be affected and provide a rationale for each proposed change. These proposals will be revisited in next assessment cycle.

Proposed Change	Applicable Learning Outcomes	Rationale and Impact
No instructional changes are planned at this time.		

**PART 6**  
Summary of Assessment Measures

A. How many different assessment measures were used? 3

B. List the direct measures (see appendix):

- Pre/Post tests in Cellular Biology (BIOL1144)
- Unit exam scores in General Botany (BIOL2014)
- Unit exam scores in General Zoology (BIOL2205)

C. List the indirect measures (see appendix): 0



**PART 7**  
Faculty Participation and Signatures

A. Provide the names and signatures of all full time and adjunct faculty who contributed to this report.

Faculty Name	Assessment Role	Signature
Dr. Jerry Bowen	Collected data, reviewed report	 27 May 2020

Dr. Sue Katz	Reviewed the report	Sue Katz via email
Dr. Jaeho Kim	Prepared and reviewed report	26AM y. 5/28/20
Mrs. Cheyanne Olson	Reviewed report	Cheyanne Olson 5/28/20
Dr. Lisa Overall	Reviewed report	Lisa Overall via email
Dr. Mark Peaden	Collected data, reviewed report	MP 5/27/20
Dr. Jin Seo	Reviewed report	JS 5/29/20
Dr. Uduak Udoh	Reviewed report	Dr. Udoh via email
Dr. Craig Zimmerman	Collected data, reviewed report	Craig Zimmerman 5/29/20

**B. Reviewed by:**

Titles	Name	Signature	Date
Department Head	Dr. Jerry Bowen		27 May 2020
Dean	Dr. Keith Martin		6/3/2020

## Appendix

### Student Learning Outcome

Student learning outcomes are the observable or measurable results that are expected of a student following a learning experience. Learning outcomes may address knowledge, skills, attitudes, or values that provide evidence that learning has occurred. They can apply to a specific course, a program of study, or an institution. Outcomes should be worded in language that clearly implies a measurable behavior or quality of student work. Outcomes should also include Bloom's action verbs appropriate to the skill level of learning expected of students.

#### Examples:

*Students will be able to apply principles of evidence-based medicine to determine clinical diagnoses and implement acceptable treatment modalities.*

*Students will be able to articulate cultural and socioeconomic differences and the significance of these differences for instructional planning.*

### Assessment Measure

An assessment measure is a tool or instrument used to gather evidence of student progress toward an established learning outcome. Every program learning outcome should have at least one appropriate assessment measure. Learning outcomes are frequently complex, however, and may require multiple measures to accurately assess student performance. Assessment plans should try to incorporate a combination of direct and indirect assessment measures. Direct provide concrete evidence of whether a student has command of a specific subject or content area, can perform a certain task, exhibits a particular skill, demonstrates a certain quality in their work, or holds a particular value. Because direct measures tap into actual student learning, it is often viewed as the preferred measure type. Indirect measures assess opinions or thoughts about the extent of a student's knowledge, skills, or attitudes. They reveal characteristics associated with learning, but they only imply that learning has occurred. Both types of measures can provide useful insight into student learning and experiences in a program. Each also has unique advantages and disadvantages in terms of the type of data and information it can provide. Examples of common direct and indirect measures are listed below.

#### Direct Measures

- Comprehensive exams
- Class assignments
- Juried review of performances and exhibitions
- Internship or clinical evaluations
- Portfolio evaluation
- Pre/post exams
- Third-party exams such as field tests, certification exams, or licensure exams
- Senior thesis or capstone projects

#### Indirect Measures

- Graduate exit interviews
- Focus group responses
- Job placement statistics
- Graduate school placement statistics
- Graduation and retention rates
- Student and alumni surveys that assess perceptions of the program
- Employer surveys that assess perceptions of graduates
- Honors and awards earned by students and alumni.