Biology BS Annual Assessment 2016-2017

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Annual Assessment

Biology BS

Program Profile

Program Mission Statement
Please insert your program mission statement here

A professionally oriented program with two concentrations specifically designed to both educate students in the biological sciences and prepare them for acceptance into graduate or professional programs.

Program Data

Delivery Method

Traditional On Campus (selected)
Online
Hybrid

Students Majors 2015-2016

66

Student Minors 2015-2016

Student Majors 2016-2017

63

Student Minors 2016-2017

Concentrations 2015-2016
If your program contains concentrations, please list the concentrations and the number of students identified within each concentration.

Pre-Med Concentration

Pre-Vet Concentration

*There is a discrepancy between the total number of concentrations (43 PreVet and 27 PreMed) resulting in 70 majors, yet the number of declared B.S. majors being 66

Concentrations 2016-2017
If your program contains concentrations, please list the concentrations and the number of students identified with each concentration.

Pre-Med Concentration

Pre-Vet Concentration

*There is a discrepancy between the total number of concentrations (34 PreVet and 36 PreMed) resulting in 70 majors, yet the number of declared B.S. majors being 63

Student Demographics
Program goals for student retention, persistence and degree completion are? What do the persistence numbers mean to the faculty in the program? Are your persistence numbers what you expected? If not, how could the numbers be improved? What is the optimal enrollment for the program?

Our Department has a program goal of 75% retention between freshman and sophomores, a 90% persistence per year, and with a 100% completing the program that enter their Senior year.

The retention data shows that 74.5%, though there is enough error in the data where we do not feel we can use this data to assess our benchmark. By our pogram goal mentioned above, we would expect a graduation rate ~60%. The current data shows a graduation rate of 54.5% for those students entering 2010/2011. These students entered prior to the current Biology faculty being higher, we expected to see higher rates moving forward.

*These data seem to be compiled for our BA and BS degrees, thereby negating our ability to fully assess one program over the other.

Is the Program Externally Accredited

Yes
No (selected)

External Accreditation
Name the Accrediting Agency or entity including the last review/approval. Is there an accrediting body for the field of study? If yes, what is the name of the group. Is the program seeking accreditation?If no, why?

Program Assessment

Standard/Outcome

Identifier	Description
WWU2016.1	Major Field Competence: Students will demonstrate excellence in an academic or professional discipline, and engage in the process of academic discovery.
WWU2016.2	Ethics: Students will exhibit values and behaviors that address self- respect and respect for others that will enable success and participation in the larger society.
WWU2016.3	Self-Liberation: Students will develop an honest understanding and appreciation of themselves and others resulting in an ability to make individual decisions.
WWU2016.4	Lifelong Education: Students will possess an intellectual curiosity and desire for continual learning both within and beyond formal education in preparation for participation in a global society.

Additional Standards/Outcomes

Identifier	Description
BIO.1	Evolution: Articulate knowledge that life evolved over time via mechanisms of mutation, natural selection, and genetic drift, and that there is concrete evidence for this fundamental concept _ evolution from common ancestry _ in the unity of numerous biological processes among species.
BIO.2	Interdisciplinary: Demonstrate that fundamental principles and laws of chemistry and physics are also underpinnings that govern complex living systems.

BIO.3	Diversity in structures, functions, and systems: Demonstrate and model, through reductionist and holistic approaches, the interconnectedness of life along a continuum from molecular structures to interactions among organisms and with ecosystems.
BIO.4	Information and Engergy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all life on Earth.
BIO Pre-Med.5	Construct a competitive candidacy for admission to undergraduate medical studies: integrating a strong academic record, proof of observation of medical practice, and identification of other medical school specific admission factors that the individual student must meet.
BIO Pre-Vet.5	Construct a competitive candidacy for admission to undergraduate Veterinary medical programs integrating a strong academic record, proof of observation of veterinary practices in two or more areas of the veterinary animal categories, and identification of other veterinary school specific admission factors that the individual student must meet.

General Education Alignment to Program
How do the General Education criteria align with the Program Objectives? What courses within your program build upon skills learned in general education courses (please list the program course and the general education criteria). The General Education clusters are: Critical Analysis, Creative Expression, Quantitative Inquiry, and Society & the Individual. See attached for more detailed breakdown.

Critical Analysis: (9 credit hours) – *Students apply logical and analytical reasoning skills to diverse source materials in the interest of discerning and debating aesthetic, thematic, and ethical content.*

In all biology coursework students are expected to integrate sound logical arguments with the scientific method. Students are expected to analyze and interpret general textbooks, primary scientific literature, and data. Throughout biology courses, students are expected to articulate the ethical interface of scientific practice and general societal issues, as well demonstrate integrity in their own scientific communications (oral and written).

Creative Expression: **(12 credit hours) –** *Students develop the ability to express ideas and concepts, both logically and creatively, through written, oral, reflective, and aesthetic practices utilizing various media forms.*

In all biology coursework, students are expected to demonstrate creative and independent generation of ideas based upon scientific parameters that they are presented, *e.g.* independently generating novel hypotheses regarding specific issues that they might be given. Students are expected to prepare and perform presentations on content-specific topics, in addition to extensive written technical papers and essays.

Quantitative Inquiry: (10 credit hours) – ***Students will develop and practice quantitative problem-solving skills in order to analyze and critically evaluate information in a larger context.***

Quantitative inquiry is the foundation of the entire biology program. In all biology coursework students are expected to analyze data, evaluate it critically, and to be able to generate and interpret statistics. Math courses provide students with the quantitative background to perform these activities.

Society & the Individual: (12 credit hours) – *Students integrate knowledge to articulate an understanding of diverse cultures, historical contexts, and human behaviors.*

In all biology coursework students are expected to apply their knowledge of human behavior in the context of molecular to organismal processes (*e.g.* how the human body works and thinks) in addition to the formation of new scientific ideas. Students are expected to be able to articulate that there are variable correct interpretations of authoritative scientific principles and demonstrate competency with the historical development of scientific principles – that the natural process of scientific development involves building upon the ideas of scientific progenitors.

Curriculum Map

A - Assessed
I - Introduced
R - Reinforced
M - Master

Bachelor of Science - Core Assesment

	BIO 114	BIO 124	BIO 231	BIO 310	BIO 330	BIO 401	BIO 450	CHM 114	CHM 124	CHM 314	PHY 201	PHY 212	SPR
BIO.1 Evolution: Articulate knowledge that life evolved over time via mechanisms of mutation, natural selection, and genetic drift, and that there is concrete evidence for this fundamental concept _ evolution from common ancestry _ in the unity of numerous biological processes among species.	I	R, A	R	R	R	A, M							A
BIO.2 Interdisciplinary: Demonstrate that fundamental principles and laws of chemistry and physics are also underpinnings that govern complex living systems.	I, A	R	R	R	R	R		I	R	R	I	R	A
BIO.3 Diversity in structures, functions, and systems: Demonstrate and model, through reductionist and holistic approaches, the interconnectedness of life along a continuum from molecular structures to interactions among organisms and with ecosystems.	I	A, R	R	R	R	M		I	R	R			A
BIO.4 Information and Engergy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all life on Earth.	I	R	A, R			R							A

Biology BS: PreMed Concentration

	BIO 313	BIO 317	CHM 324	CHM 440	MAT 124	MAT 214	MAT 304	BIO 450	SPR
BIO Pre-Med.5 Construct a competitive candidacy for admission to undergraduate medical studies: integrating a strong academic record, proof of observation of medical practice, and identification of	R	R	R	R	R	R	R	A, M	A

other medical school specific admission factors that the individual student must meet.									
BIO.1 Evolution: Articulate knowledge that life evolved over time via mechanisms of mutation, natural selection, and genetic drift, and that there is concrete evidence for this fundamental concept _ evolution from common ancestry _ in the unity of numerous biological processes among species.	R	R							
BIO.2 Interdisciplinary: Demonstrate that fundamental principles and laws of chemistry and physics are also underpinnings that govern complex living systems.	R	R	M	M	R	R	R		
BIO.3 Diversity in structures, functions, and systems: Demonstrate and model, through reductionist and holistic approaches, the interconnectedness of life along a continuum from molecular structures to interactions among organisms and with ecosystems.	M	M	R	R					
BIO.4 Information and Energy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all life on Earth.	R	R	M	M					

Biology BS: PreVet Concentration

	BIO 303	**CHM 324**	**CHM 440**	**MAT 124**	**MAT 304**	**EQU 111**	**EQU 117**	**EQS 306**	**EQS 376**	**EQS 404**	**BIO 450**	**SPR**
BIO Pre-Vet.5 Construct a competitive candidacy for admission to undergraduate Veterinary medical programs integrating a strong academic record, proof of observation of veterinary practices in two or more areas of the veterinary animal categories, and identification of other vetrinary school specific admission factors that the individual student must meet.	R	R	R	R	R	I	I	R	R	M	A, M	A
BIO.1 Evolution: Articulate knowledge that life evolved over time via mechanisms of mutation, natural selection, and genetic drift, and that there is concrete evidence for this fundamental concept _ evolution from common ancestry _ in the unity of numerous biological processes among species.	R							R	R			
BIO.2 Interdisciplinary: Demonstrate that fundamental principles and laws of chemistry and physics are also underpinnings	R	R, M	M	R	R			R	R	R		

that govern complex living systems.												
BIO.3 Diversity in structures, functions, and systems: Demonstrate and model, through reductionist and holistic approaches, the interconnectedness of life along a continuum from molecular structures to interactions among organisms and with ecosystems.	M	R	R					M	M	M		
BIO.4 Information and Energy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all life on Earth.	M	M	M					R	R	M		

Assessment Findings

Assessment Findings for the Assessment Measure level for Bachelor of Science - Core Assesment

BIO.1 Evolution: Articulate knowledge that life evolved over time via mechanisms of mutation, natural selection, and genetic drift, and that there is concrete evidence for this fundamental concept _ evolution from common ancestry _ in the unity of numerous biological processes among species.

Assessment Measures

BIO 124				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Final Exam	Has the criterion Questions from the lecture Final Exam (BIO124) that were relevant to objective 3 were selected for assessment. The benchmark is 70% of the students at Proficient or better. Proficient is defined as 70% or better on the assessed questions. been met yet? Met	92% of the students were proficient or better (n = 25).		

BIO 401				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Final Exam	Has the criterion Questions from the lecture Final Exam (BIO401) that were relevant to objective 3 were selected for assessment. The benchmark is 70% of the students at Proficient or better.	71.4% of the students were proficient or better (n = 25).	BIO_401_Spring_17_Assessment_data___Obj1.xlsx	

	Proficient is defined as 70% or better on the assessed questions. been met yet? Met			

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Interview	Has the criterion Students are asked a question regarding some aspect of Molecular structure in which they must answer based on the knowledge they have gained through various Biology Courses. Benchmark: Average score for all students in the major 3/5 or higher been met yet? Not met	Average score on interview question was 2.9 (scale 1 - 5, n = 25)	SP17_Student_Assessment_Interview_Questions_BS.xlsx	- Refine Assessment Tool: The average for our students was an average score of 2.9 and the benchmark for the students was an average of 3.0. While our students did not meet the benchmark, they were extremely close. As a department, we will review the question(s) we use for this assessment.
Direct - External Testing	Has the criterion Major Field Test - Section: III Benchmark = Average score of 53 or higher on section, with 60% of students scoring above 50. been met yet? Not met	Benchmark of average score of 53 or higher on section, MET. Average score was 54% (n = 18). We had two students that were definite outliers to this cohort. Without their data for the average score, this Senior cohort met or exceeded the average score of 53 or higher for this section. Benchmark of 60% of students scoring above 50 on given section was NOT MET. 50% of the students score 50 or above on section (n = 20).	Spring_17_MFT_Cohort_Data_Seniors.xlsx	- Revise Program Benchmark: Only the Benchmark of 60% of students scoring above 50 on given section was NOT MET. Only 10 out of the 20 students (50%) score 50 or above on section. This section of the Major Field Test contains a large number of questions regarding plant biology, and at this time the Biology curriculum does not contain a plant component. Department will consider lowering the benchmark for this section due to the fact there is content assessed in this section that is not covered by our curriculum.

Direct - External Testing	Has the criterion Major Field Test - Section: IV Benchmark = Average score of 53 or higher on section, with 60% of students scoring above 50. been met yet? Met	Refer to data entered for Major Field test entry under Objective 1. Benchmark of average score of 53 or higher on section was MET. Average score was 55 (n = 18). We had two students that were definite outliers to this cohort. Without their data for the average score, this Senior cohort met or exceeded the average score of 53 or higher for this section. Benchmark of 60% of students scoring above 50 on given section was also MET. 65% scored 50 or above on section (n = 20).		

BIO.2 Interdisciplinary: Demonstrate that fundamental principles and laws of chemistry and physics are also underpinnings that govern complex living systems.

Assessment Measures

BIO 114				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Final Exam	Has the criterion Questions from the lecture Final Exam (BIO114) that were relevant to objective 2 were selected for assessment. The benchmark is 70% of the students at Proficient or better. Proficient is defined as 70% or better on the assessed questions. been met yet? Met	82.9% of the of the exam questions assessed were answered correctly; however, data in the future needs to be collected on a per student basis.	WWU_Bio114_Assessment_F16.xlsx	

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**

Direct - External Testing	Has the criterion Major Field Test - Section: I Benchmark = Average score of 53 or higher on section, with 60% of students scoring above 50. been met yet? Not met	Refer to data entered for Major Field Test entry under Objective 1. Benchmark of average score of 53 or higher on section was MET. Average score was 53 (n = 18). We had two students that were definite outliers to this cohort. Without their data for the average score, this Senior cohort met or exceeded the average score of 53 or higher for this section. Benchmark: 60% of students scoring above 50 on given section was NOT MET. 50% of the students scored 50 or above on section (n = 20).		- : Only the Benchmark of 60% of students scoring above 50 on given section was NOT MET as only 50% of our students scored 50 or above on section. We feel our curriculum does cover the information assessed by this section of the MFT and that some of our students simply under performed in this section. The Department will review the types of questions used in this section to determine whether the benchmark is appropriate for this section.
Direct - External Testing	Has the criterion Major Field Test - Section: II Benchmark = Average score of 53 or higher on section, with 60% of students scoring above 50. been met yet? Met	Refer to data entered for Major Field Test entry under Objective 1. Benchmark of average score of 53 or higher on section was MET. Average score was 53 (n = 18). We had two students that were definite outliers to this cohort. Without their data for the average score, this Senior cohort met or exceeded the average score of 53 or higher for this section. Benchmark of 60% of students scoring above 50 on given section was also MET. 60% of our students scored 50 or above on section (n = 20).		

BIO.3 Diversity in structures, functions, and systems: Demonstrate and model, through reductionist and holistic approaches, the interconnectedness of life along a continuum from molecular structures to interactions among organisms and with ecosystems.

Assessment Measures

BIO 124				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Final Exam	Has the criterion Questions from the lecture Final Exam (BIO124) that were relevant to objective 3 were selected for assessment. The benchmark is 70% of the students at Proficient or better. Proficient is defined as 70% or better on the assessed questions. been met yet? Not met	52% of the students were proficient or better (n = 25).	BIO_124_Spring_17_Assessment_data___Obj_3.xlsx	- Refine Assessment Tool: The questions for this objective were too specific in scope, where many students knew some but not all of the details. To truly assess the objective the questions should assess overall concept knowledge as opposed to some of the more finite and nuanced details.

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Interview	Has the criterion Students are asked a question regarding some aspect of Evolution in which they must answer based on the knowledge they have gained through various Biology Courses. Benchmark: Average score for all students in the major 3/5 or higher been met yet? Met	Average score on interview question was 3.0 (scale 1 - 5, n = 25) Refer to data entered for Direct - Interview entry under Objective 1.		
Direct - External Testing	Has the criterion Major Field Test - Section: I Benchmark = Average score of 53 or higher on section, with 60% of students scoring above 50. been met yet? Not met	Refer to data entered for Major Field Test entry under Objective 1. Benchmark of average score of 53 or higher on section was MET. Average score was 53 (n = 18). We had two students that were definite outliers to this cohort. Without their		- : Only the Benchmark of 60% of students scoring above 50 on given section was NOT MET as only 50% of our students scored 50 or above on section. We feel our curriculum does cover the information assessed by this section of the MFT and that some of our

		data for the average score, this Senior cohort met or exceeded the average score of 53 or higher for this section. Benchmark: 60% of students scoring above 50 on given section was NOT MET. 50% of the students scored 50 or above on section (n = 20).		students simply under performed in this section. The Department will review the types of questions used in this section to determine whether the benchmark is appropriate for this section.
Direct - External Testing	Has the criterion Major Field Test - Section: II Benchmark = Average score of 53 or higher on section, with 60% of students scoring above 50. been met yet? Met	Refer to data entered for Major Field Test entry under Objective 1. Benchmark of average score of 53 or higher on section was MET. Average score was 53 (n = 18). We had two students that were definite outliers to this cohort. Without their data for the average score, this Senior cohort met or exceeded the average score of 53 or higher for this section. Benchmark of 60% of students scoring above 50 on given section was also MET. 60% of our students scored 50 or above on section (n = 20).		
Direct - External Testing	Has the criterion Major Field Test - Section: III Benchmark = Average score of 53 or higher on section, with 60% of students scoring above 50. been met yet? Not met	Refer to data entered for Major Field Test entry under Objective 1. Benchmark of average score of 53 or higher on section, MET. Average score was 54% (n = 18). We had two students that were definite outliers to this cohort. Without their data for the average score, this Senior cohort met or exceeded the average score of 53 or higher for this section. Benchmark of 60% of students scoring above 50 on given section was NOT MET. 50% of the students score 50 or above on section (n = 20).		- Revise Program Benchmark: Only the Benchmark of 60% of students scoring above 50 on given section was NOT MET. Only 10 out of the 20 students (50%) score 50 or above on section. This section of the Major Field Test contains a large number of questions regarding plant biology, and at this time the Biology curriculum does not contain a plant component. Department will consider lowering the benchmark for this section due to the fact there is content assessed in this section that is not covered by our curriculum.

BIO.4 Information and Engergy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all life on Earth.

Assessment Measures

BIO 231				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
	Has the criterion Questions from the lecture Final Exam (BIO231) that were relevant to objective 2 were selected for assessment. The benchmark is 70% of the students at Proficient or better. Proficient is defined as 60% or better on the assessed questions. been met yet? Met	n = 22, 73% of the student averaged a 60% or better on specific questions about heritable traits and molecular processes relating to DNA replication and the Molecular Central Dogma (transcription and translation).	BIO_231_Fall_16_Assessment_data___Obj_4.xlsx	

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - External Testing	Has the criterion Major Field Test - Percentile Rank (This scores students in all 4 sections of the MFT) Benchmark = 50% of students scoring in the 50th percentile or higher. been met yet? Not met	Only 35% of our students had a percentile rank of 50 or higher (n = 20). Refer to data entered for Major Field test entry under Objective 1.		- : While we did not meet our benchmark, two students had a rank of 49 percentile and two other students had a rank of 46. So, while our student did not met the requirement we feel the majority of our students did test well, especially knowing that two individuals severely under performed on this Major Field Test.

Assessment Findings for the Assessment Measure level for Biology BS: PreMed Concentration

BIO Pre-Med.5 Construct a competitive candidacy for admission to undergraduate medical studies: integrating a strong academic record, proof of observation of medical practice, and identification of other medical school specific admission factors that the individual student must meet.

Assessment Measures

Bio 450				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Interview	Has the criterion 75% or greater of the student interview responses will be satisfactory or better. been met yet? Met	n = 17, 94% of the student interview responses were satisfactory or better for Fall 2016. n = 24, 96% of the student interview responses were satisfactory or better for Spring 2017 Therefore, 95% of our student interview responses were satisfactory or better for the 2016/2017 Academic year.		
Direct - Class Assignment	Has the criterion 100% of students produce a professional CV been met yet? Met	n = 17, 100% of students produced a professional CV in Fall of 2016 n= 24, 100% of students produced a professional CV in Spring 2017 Therefore, 100% (n=41) students produced a professional CV for the 206/2017 Academic year.		

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Indirect - Survey of Students	Has the criterion 60% of students actively participating in shadowing or other volunteer roles that will make them competitive for jobs in the medical and human healthcare related jobs and professional programs. been met yet? Met	Average for all three terms is 77% (n = 13) 69% of the PreMed students had shadowed, volunteered, or performed research outside of the classroom during the summer of 2016. 62% of the PreMed students were actively involved in shadowing, volunteering, or performing research outside of the classroom during the academic year of 2016/2017. 100% of the PreMed students had shadowing, volunteering, or performing research outside of the classroom during the Summer 2017 arranged or were waiting to hear about positions.		

Assessment Findings for the Assessment Measure level for Biology BS: PreVet Concentration

BIO Pre-Vet.5 Construct a competitive candidacy for admission to undergraduate Veterinary medical programs integrating a strong academic record, proof of observation of veterinary practices in two or more areas of the veterinary animal categories, and identification of other vetrinary school specific admission factors that the individual student must meet.

Assessment Measures

BIO 450				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Interview	Has the criterion 75% or greater of the student interview responses will be satisfactory or better. been met yet? Met	n = 17, 94% of the student interview responses were satisfactory or better for Fall 2016. n = 24, 96% of the student interview responses were satisfactory or better for Spring 2017 Therefore, 95% of our student interview responses were satisfactory or better for the 2016/2017 Academic year.		
Direct - Class Assignment	Has the criterion 100% of students produce a professional CV. been met yet? Met	n = 17, 100% of students produced a professional CV in Fall of 2016 n= 24, 100% of students produced a professional CV in Spring 2017 Therefore, 100% (n=41) students produced a professional CV for the 206/2017 Academic year.		

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Indirect - Survey of Students	Has the criterion 60% of students actively participating in shadowing veterinarians and/or volunteering in other animal care avenues to make them competitive for applying to veterinarian schools. been met yet? Met	Average for all three terms is 76% (n = 11) Only 45% of the PreVet students had shadowed, volunteered, or performed research outside of the classroom during the summer of 2016. 82% of the PreVet students were actively involved in shadowing, volunteering, or performing research outside of the classroom during the academic year of 2016/2017. 100% of the PreVet students had shadowing, volunteering, or performing research outside of the classroom during the Summer 2017 arranged or were waiting to hear about positions.		

Analysis of the Assessment Process

Describe your assessment process; clearly articulate how the program is using course work and or assessment day activities for program assessment. Note any changes that occurred to that process since the previous year. Discuss what activities were successful at assessment and which ones were not as helpful and why. Please include who met to discuss the changes (unless you are a program of one person) and when you met. – Include a discussion on the process for collection and analysis of program data.

This report was compiled by the two biology faculty, Dr. Kimberly L. Keller and Dr. Robin Hirsch-Jacobson.

This was the first year of assessment using the new Biology Program Objectives.

There were a couple areas in which our majors did not meet the benchmark for certain Objectives, and summaries and improvement narratives are discussed under each assessment field. To summarize, the three main areas in which our students fell short of the benchmark were: (1) 60% of the students scoring a 50 or higher in each section of the Major Field Test; (2) 60% of the students scoring in the 50th percentile rank or higher on the Major Field Test; and (3) the interview questions connected to Objectives 1 and 3.

The Major Field Test (MFT) is given to our graduating Seniors during Student Performance Days in February. We have struggled in past years with the amount of effort our students give for this exam, as it is not associated with any particular course. While we are unclear whether it was lack of effort or other factors that led to two students performing well below the norm expected for our students on the MFT, but they performed so poorly that their data points were such extreme outliers to the rest of the cohort this year. With these two being such extreme outliers, we made the decision to remove their data before calculating the average score per section for the cohort, and in doing so; the average score for the cohort per section met/or surpassed the benchmark of a cohort average of 53 or higher. We did use their data for calculation of the 60% of students above 50 (Sections 1 -4 of MFT) and for determining if 60% were at the 50th percentile rank or higher (Objective 4), and their data is a contributing factor to those benchmarks being “Not Met.” Discussions will occur to see if there are ways to improve student effort on the MFT to have scores that do a better job of assessing student knowledge and the effectiveness of the program.

We feel the failure to meet the interview benchmarks as well as the final exam questions in BIO124 was partially due to trying to align several of our “old” assessment tools/questions to these new objectives. After a complete cycle with the new objectives, we feel we now have a better understanding of which courses and what type of data needs to be collected for each of these new objectives in order for our students to “met and/or surpass” the benchmarks next academic year. Changes in questions and benchmark reviews will occur next fall prior to the collection of data.

In addition, we look forward to the addition of Dr. Sarah Greenland-White to the department and the knowledge and enthusiasm she’ll bring. Weekly department meetings with all three Biology faculty will take place early in the fall to discuss any changes to the courses we will use for assessment and to communicate the types of data/questions we need to use for assessment purposes. Current discussions during the generation of this report is that we begin to assess at least one of our objectives (possibly Objective 3) using the required Field courses and the required Anatomy & Physiology courses. Additional discussions with the entire Biology faculty will occur this fall to insure everyone is satisfied with their respective course-specific components of the assessment of the program.

For a professions-oriented mission statement, we are satisfied with current preparation of our students, especially when you look at where our students are matriculating following graduation. Therefore, we feel only minor changes in our assessment are needed to accurately measure success of the Biology Program.

Improvement Narrative List

Assessment Findings for the Assessment Measure level

Standard/Outcome	BIO.3 Diversity in structures, functions, and systems: Demonstrate and model, through reductionist and holistic approaches, the interconnectedness of life along a continuum from molecular structures to interactions among organisms and with ecosystems.
Legend	A
Course/Event	BIO 124
Assessment	Direct - Final Exam

Measure	
Assessment Findings	Not met
Improvement Narrative	

Improvement Type	Summary
Refine Assessment Tool	The questions for this objective were too specific in scope, where many students knew some but not all of the details. To truly assess the objective the questions should assess overall concept knowledge as opposed to some of the more finite and nuanced details.

Standard/Outcome	BIO.1 Evolution: Articulate knowledge that life evolved over time via mechanisms of mutation, natural selection, and genetic drift, and that there is concrete evidence for this fundamental concept _ evolution from common ancestry _ in the unity of numerous biological processes among species.
Legend	A
Course/Event	Student Performance Review
Assessment Measure	Direct - Interview
Assessment Findings	Not met
Improvement Narrative	

Improvement Type	Summary
Refine Assessment Tool	The average for our students was an average score of 2.9 and the benchmark for the students was an average of 3.0. While our students did not meet the benchmark, they were extremely close. As a department, we will review the question(s) we use for this assessment.

Standard/Outcome	BIO.1 Evolution: Articulate knowledge that life evolved over time via mechanisms of mutation, natural selection, and genetic drift, and that there is concrete evidence for this fundamental concept _ evolution from common ancestry _ in the unity of numerous biological processes among species.
Legend	A
Course/Event	Student Performance Review
Assessment Measure	Direct - External Testing
Assessment Findings	Not met
Improvement Narrative	

Improvement Type	Summary
Revise Program Benchmark	Only the Benchmark of 60% of students scoring above 50 on given section was NOT MET. Only 10 out of the 20 students (50%) score 50 or above on

	section. This section of the Major Field Test contains a large number of questions regarding plant biology, and at this time the Biology curriculum does not contain a plant component. Department will consider lowering the benchmark for this section due to the fact there is content assessed in this section that is not covered by our curriculum.

Standard/Outcome	BIO.2 Interdisciplinary: Demonstrate that fundamental principles and laws of chemistry and physics are also underpinnings that govern complex living systems.
Legend	A
Course/Event	Student Performance Review
Assessment Measure	Direct - External Testing
Assessment Findings	Not met
Improvement Narrative	**Improvement Type** / **Summary** Only the Benchmark of 60% of students scoring above 50 on given section was NOT MET as only 50% of our students scored 50 or above on section. We feel our curriculum does cover the information assessed by this section of the MFT and that some of our students simply under performed in this section. The Department will review the types of questions used in this section to determine whether the benchmark is appropriate for this section.

Standard/Outcome	BIO.3 Diversity in structures, functions, and systems: Demonstrate and model, through reductionist and holistic approaches, the interconnectedness of life along a continuum from molecular structures to interactions among organisms and with ecosystems.
Legend	A
Course/Event	Student Performance Review
Assessment Measure	Direct - External Testing
Assessment Findings	Not met
Improvement Narrative	**Improvement Type** / **Summary** Only the Benchmark of 60% of students scoring above 50 on given section was NOT MET as only 50% of our students scored 50 or above on section. We feel our curriculum does cover the information assessed by this section of the MFT and that some of our students simply under performed in this section. The Department will review the types of questions used in this section to determine whether the benchmark is appropriate for this section.

Standard/Outcome	BIO.3 Diversity in structures, functions, and systems: Demonstrate and model, through reductionist and holistic approaches, the interconnectedness of life along a continuum from molecular structures to interactions among organisms and with ecosystems.
Legend	A
Course/Event	Student Performance Review
Assessment Measure	Direct - External Testing
Assessment Findings	Not met
Improvement Narrative	

Improvement Type	Summary
Revise Program Benchmark	Only the Benchmark of 60% of students scoring above 50 on given section was NOT MET. Only 10 out of the 20 students (50%) score 50 or above on section. This section of the Major Field Test contains a large number of questions regarding plant biology, and at this time the Biology curriculum does not contain a plant component. Department will consider lowering the benchmark for this section due to the fact there is content assessed in this section that is not covered by our curriculum.

Standard/Outcome	BIO.4 Information and Engergy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all life on Earth.
Legend	A
Course/Event	Student Performance Review
Assessment Measure	Direct - External Testing
Assessment Findings	Not met
Improvement Narrative	

Improvement Type	Summary
	While we did not meet our benchmark, two students had a rank of 49 percentile and two other students had a rank of 46. So, while our student did not met the requirement we feel the majority of our students did test well, especially knowing that two individuals severely under performed on this Major Field Test.

Program Activities

Student Performance Review

Describe the department assessment day activities if not already described previously. Please articulate the nature of the assessments are conducted, explain the process for assessment that happens on these two days. Include the schedule of assessment day for your program. What does the data and outcomes tell you? What changes will you make as a result of the data? What areas are successful for the program?

In previous years had used an internally made exam to assess our incoming Biology majors; however, this year we had our incoming Biology majors take the Major Field Test (MFT) during Student Performance days. This change was done in order to add another level of assessment, one in which we will ultimately be able to measure knowledge gained and program success by assessing our students as they enter the program and then again as they leave during their final semester using the same assessment tool. Starting the Fall of 2017, we will be administering the MFT to the incoming class of Biology Majors during the second week of class in order to truly get their entry level knowledge base. In a few years, this will add another level of assessment for our program, in addition to us currently gaging where our exiting seniors compared to other Biology majors on a national level. Since the testing of incoming students will be move to the fall, our incoming students will need some sort of activity during the Student Performance Days. All incoming Biology students will be required to attend Breakout Sessions specific to their degree in Biology.

This year our students did poorly on the Interview Questions portions associated with content related to Objective 1 and Objective 3. Under each Objective, we gave two questions and allowed students a choice as to which one they would answer. In order to assess students on a more equal level, the department will write better questions that better align with the new Objectives and eliminate choice in questions.

Part of the Individual Interviews involves questions about what the students are doing “outside of their coursework” to make them competitive in the next stage of their career. We feel this is an important time to check in with our majors and learn about their plans are for the summer. It provides an opportunity to stress the importance of shadowing, volunteering, and getting internships in order to be successful at the next stage of their careers. No changes will be made to this portion, although the plan is to incorporate gathering this information in VIA in order to make data collection for assessment easier and more direct.

Every year during Student Performance Days we bring in a Speaker who gives research-based talk to the entire department. We feel it is extremely valuable for our students to witness such talks and we attempt to alternate the area of research presented each year in order to expose our students to the variety of sub-disciplines within Biology during their 4-years here at William Woods. Our students continually provide positive feedback about the speakers and it is common to hear them discussing the talk amongst themselves for the next several days. We plan to continue this as part of our student performance days.

Overall, we are very pleased with our Student Performance Days and feel we have a schedule that allows us to assess our students in a variety of manners, and the small changes mentioned above will only serve to better our assessment efforts of the Biology program.

Student Performance Review Schedule

Upload the program schedule for students during Performance Reviews.

Student_Performance_Days_Schedule___Spring_2017.docx

Senior Showcase

Describe program Senior Showcase activities if not detailed previously in the report? What benefit does the program gain from the activities? What if any assessment of students happens during this event? What changes if any will occur due to what is learned by faculty on Senior Showcase?

Students prepare and present a poster in the style of a professional scientific conference. All students concurrently present their posters. Students gain experiences in a pseudo-professional atmosphere where they are expected to answer challenging questions by integrating prior knowledge and course content, as well as gain experience presenting complex material to a diverse group. Students are assessed on the quality of their posters, the depth of their knowledge,

and the competence of material presentation. We had 17 students present posters in the fall and 5 students present posters in the Spring.

No changes are to be implemented at this point to the Senior Showcase requirements for our Biology majors.

Assessment Rubrics
Upload rubrics used for Senior Showcase or Student Performance Reviews for student assessment.

Service Learning
Does the Program include projects/ course content that uses the philosophy of service learning?
Yes
No (selected)

Service Learning Component
If so, how is service learning infused in the coursework within your department? Is service or community engagement in the program mission? Describe the Service Learning Activities that your students and department engaged in this past year. How did the activities improve student learning? How did the activities benefit the community?

LEAD Events
Highlight lead events sponsored by program faculty that are connected to program or general education objectives for the past academic year. Include a total number of lead events program faculty sponsored.

Poster session for the BIO 450 students.

Presented at the "Academic Success" LEAD point event that was part of Orientation. The presentation talked about study and time management strategies to be successful as a college student.

Hosted an event (Not LEAD) on the Bryant Scholars pre-admissions program for the MU-School of Medicine. Faculty worked to develop this relationship and offering to our students.

Student Accomplishments
Highlight special examples of student successes in the field (academic: mentor-mentee, conference presentations, competitive internship, journal acceptance; extra-curricular: horse show championship, art exhibit). This is for any accomplishments that a student achieved outside of course work or the normal expectations of student success.

Summer 2016:

Sara Van Ausdal: Funded summer agricultural research at Iowa State University.

Alexis Bailey: Formalized summer research at Arizona State University (bioinformatics institute).

Preston Wolfe: Shadowed an orthopedic surgeon and analyzed hip replacements utilizing X-rays.

Academic Year:

Maddie McMahill performed fecal egg counts and parasite monitoring of the entire WWU Equine herd.

Lainie Buff and Maddie McMahill successfully generated sterile Platelet-Rich Plasma from equine whole blood samples.

Biology Majors: Cassie Dunn, Jessica Doran, Nic Keithley, Ashley White, Kaitlin Turner, Paige Eickhoff, and Delanie Jones all grew cancer cells and Jennifer Strosnider, Sara Van Ausdal, and Ian Mayr operated the lasers for the Physics Laser Refraction Studies and worked with Dr. Vern Hart (Physic Professor) as part of hisCox Research Fellowship.

Missouri Academy of Science – April 22, 2017. T. O'Connor, J. Strosnider, C. Dunn, I. Mayr, K. Turner, J. Doran, A. White, N. Keithley, P. Eickhoff, S. Van Ausdal, and V. Hart. T. O'Connor gave a presentation on the groups research project. **Title:** Diffusive Optical Investigations of Cellular Structure Via Scattering Analysis Using a Near-Infrared Diode Laser. Biology majors that participated in that project are highlighted in yellow.

Missouri Academy of Science – April 22, 2017. Alexis C. Bailey and Alaina A. Buff presented a poster of their research: **Title: Prevalence of Tetracycline Resistance Genes in the Oral Microbiomes of a Population of William Woods University Students.**

Summer 2017:

Sara was accepted into the D.V.M. program at Iowa State University and the University of Missouri, she matriculated into the latter.

Rebecca Smith has an internship with Missouri Wildlife Conservation

May 2017 Graduates:

Alexis C. Bailey matriculated into the NIH Postbaccalaureate Intramural Research Training Award (Postbac IRTA) in Bethesda, MD.

Alicia VanMatre was accepted into the D.V.M. program at the University of Missouri and Purdue University, she matriculated into the latter.

Kristy McElwee matriculated into the D.V.M. program at the University of Missouri.

Jessica Doran matriculated into the M.D. program at the University of Missouri.

Kaitlin Turner matriculated into the Pharm D. (Doctor of Pharmacy) program at the University of Missouri-Kansas City

Drew Olsen matriculated into the Illinois Natural History Survey (River Conservation) in Illinois.

Preston Wolfe matriculated into a Master of Biomedical Science Program at the University of Northern Colorado.

Jennifer Strosnider matriculated into a Master of Science Program at the University of Alabama

In the future, we will discuss accomplishments from May the year before to time of report. At the start of the Fall semester, we will have the students turn in a written copy of any noteworthy summer accomplishments in order to fully report our student accomplishments..

Annual Assessment Rubric

Total Score: 15/15 (100.00%)

	3.000 **Assessment Reflects Best Practices**	2.000 **Assessment Meets the Expectations of the University**	1.000 **Assessment Needs Development**	0.000 **Assessment is Inadequate**	**N/A**
Learning Objectives weight: 1.000	✓ • Detailed, measurable program learning objectives • Objectives are shared with students and faculty	• Measurable program learning objectives. • Learning objectives are available to students.	• Program learning objectives are identified and are generally measurable	• Program learning objectives are not clear or measurable	N/A
Comment:					
Assessment Measures weight: 1.000	✓ • Multiple measures are used to assess a student-learning objectives. • Rubrics or guides are used for the measures. • All measurements are clearly described. • External evaluation of student learning included.	• Assessment measures relate to program learning objectives. • Various measures are used to assess student learning. • Measures chosen provide useful information about student learning.	• Assessment focuses on class content only. • Minimal description of how the assessment relates to the objective. • Minimal assessment measures established.	• Assessment measures not connected to objectives. • Assessment measures are not clear. • No assessment measures are established.	N/A
Comment:					
Assessment Results weight: 1.000	✓ • All objectives are assessed annually, or a rotation schedule is provided. • Data are collected and analyzed to show learning over time. • Standards for performance and gaps in student learning are clearly identified.	• Most objectives assessed annually. • Data collected and analyzed showing an annual snapshot of student learning. • Data are used to highlight gaps in student learning. • Some data from non-course based content.	• Data collected for at least one program objective. • Data collection is incomplete. • Gaps in student learning not identified. • Lacking external data to support course data.	• Learning objectives are not routinely assessed. • Routine data is not collected. • No discussion on gaps in student learning. • No use of external data to support student learning. • Assessment data not yet collected.	N/A
Comment:					
Faculty Analysis and Conclusions weight: 1.000	✓ • Data is shared that incorporates multiple faculty from the program. • Discussions on data results incorporate multiple faculty. • Opportunities for adjunct faculty to participate. • Includes input from external sources when possible.	• Multiple program faculty receive assessment results. • Assessment results are discussed • Specific conclusions about student learning are made based on the available assessment results.	• Minimal faculty input about results is sought • Data not used to determine success or not to the objective. • Minimal conclusions made.	• Faculty input is not sought. • Conclusions about student learning are not identified. • N/A Program recently started or too few graduates to suggest any changes.	N/A
Comment:					
Actions to Improve Learning and Assessment weight: 1.000	✓ • All assessment methods, timetable for assessing, and evaluating the effectiveness modifications are included. • Changes to assessment are inclusive of multiple faculty. • Description of changes is detailed and and linked to assessment results.	• More than one change to assessment is proposed, timetable for assessment, and evaluating the change is provided. • Changes to assessment measures is highlighted. • Changes are realistic, with a good probability of improving learning or assessment.	• At least one change to improve learning or assessment is identified. • The proposed action(s) relates to faculty conclusions about areas for improvement. • Adjustments to the assessment are proposed but not clearly connected to data	• Lacking actions to improve student learning. • Actions discussed lack supportive data. • Lacking discussion of the effectiveness of the assessment plan	N/A
Comment:					