Biology BS Annual Assessment 2020-2021

Contents

Annual Assessment 2020-2021

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 2019-2020

65

Student Minors 2019-20

Student Majors 2020-2021

62

Student Minors 2020-2021

Concentrations 2019-2020
If your program contains concentrations, please list the concentrations and the number of students identified within each concentration.

Pre-Med Preparation - 27 students

Pre-Vet Preparation - 25 students

Pre-Nursing Preparation - 2 students

*There is a discrepancy between the total number of concentrations (27 PreMed, 25 PreVet and 2 PreNursing) resulting in 54 majors, yet the number of declared B.S. majors being 65

Concentrations 2020-2021
If your program contains concentrations, please list the concentrations and the number of students identified with each concentration.

Pre-Med Preparation - 27 students

Pre-Vet Preparation - 31 students

Pre-Nursing Preparation - 1 student

*There is a discrepancy between the total number of concentrations (27 PreMed, 31 PreVet and 1 PreNursing) resulting in 59 majors, yet the number of declared B.S. majors being 62. For several years now there is a discrepancy between the number of declared Biology BS Majors and the number listed in the BS Concentrations.

Due to the fact that the Nursing Program never got fully approved and is no longer being sought as a potential major offered at William Woods, the Pre-Nursing Concentration was supposed to be removed as a possible concentration under the Biology BS. The Biology have tried and been told on multiple occassions it is being removed, and yet we apparently still have one student in that concentration.

Student Demographics

What are the program goals for student retention, persistence and degree completion? 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?

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 72.2% for students that entered during 2019/2020, so we did "Not Meet" our benchmark, but the University as a whole only had a 77.7% retention rate for this year, so our program retention is not out of line. This smaller retention rate than the University may be due toCOVID-19 and the lack of some freshman returning for their second year. We also feel the fact that the "Pre-Nursing" concentration was placed under the Biology BS degree as a "holding space" and with the program not receiving state certification, those number could have an impact on our retention numbers. In addition, Exercise Science started a "Pre-Physical Therapy" concentration, and there is the possibility we may have loss a few students to them changing their major to Exercise Science. **There is also the problem of the number of students enrolled in the three BS concentrations still does not equal the total number of declared as a Biology BS major. This inconsistency in data makes it extremely difficult to truly determine which Biology BS students are being retained and which are leaving the program.**

By our program goal mentioned above, we would expect a graduation rate ~60%. The current data shows a graduation rate of 65.2% for new students who entered 2014/2015, so our program gradation is significantly higher than the 49.8% rate for the University. Unfortunately, our graduation rate was only 33.0% for transfer students who entered 2014/2015. We have had maintaining transfer students due to admission promising they can be done in two years, even though most of our transfers require three years to complete the biology curriculum. This timeframe can be even longer if they transfer to WWU in January (Spring term) as the majority of Spring courses have a pre-requisite that was offered in the fall.

*In addition, the Pre-Nursing Concentration was only meant to be a "holding spot" for PreNursing students as the BSN program was being developed, so we knew this would affect our retention rates and our graduation rates. In February of 2020, it was announced that William Woods University was pulling the application we had at the state board for review and that WWU would only be continuing the RN to BSN on-line completion program. This left any Pre-nursing students (both incoming and second year students) with the lack of a degree to pursue here at William Woods. We know several of those Pre-Nursing students left the University in January (after the fall 2019 semester) and openly expressed they were not planning to return next fall (Fall 2020). Therefore, we know this will affect our retention rate next year and could have future effects on our Biology BS graduation rates. **We want to be sure to note the PreNursing Concentration here because we were worried about this issue at the onset making sure it is officially documented in case our retention and graduation rates are lower than except in the future assessment reports, and it is clear why we "lost" a specific sub-population of our Biology BS students.**

Optimal Enrollment

Considering current human and physical resources, what is the optimal enrollment for the program?

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?

N/A

Marketing Materials
Please reflect on the current marketing materials used for the program. Detail what documents you are reviewing and attach a screenshot of any webpages or materials that you cannot include as a document. What changes, if any should be made to the material? Are there recommendations for how or where to market the program?

The Biology faculty helped marketing develop a new page sheet in 2018-2019. In addition, the Biology faculty provided input on a new Pre-Vet poster for use at EQS Admission events and helped with revision of an article about the Equine Center for Medicine and the Pre-Vet concentration for the university magazine. The Biology faculty hope to meet with the new Director of Admission and the new head of Marketing to ensure the BA Biology Degree is being recruited to it fullest.. Many of the avenues discussed for marketing/recruiting were (al will be) for the Biology Program as a whole.

Marketing Material

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 2019.4	Information and Energy: 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.
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.

Alignment to the University Objectives
Please discuss the program alignment to the University Objectives. We do not need an artifact for each objective, but a discussion on how the program uses the Institutional Objectives as an anchor for their program curriculum.

WWU2016.1 Major Field Competence: Students will demonstrate excellence in an academic or professional discipline, and engage in the process of academic discovery.

Students are strongly encouraged to get shadowing hours and/or internships, as well as relevant professional jobs as well, during the school year, but primarily over the breaks. This is accomplished through formal and informal advising. The faculty all help with this process, as well as have classes specific to enable them to prepare for their future career (i.e. BIO 450).

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.

Much of our curriculum includes writing scientific papers, which has an ethical culture to itself. Students learn how to appropriately use other people's work, while giving them credit, and not plagiarizing. Additionally we do lots of group-work in and outside of the labs and classes that ensure our students develop the skills to respectfully and successfully work with others.

WWU2016.3 Self-Liberation: Students will develop an honest understanding and appreciation of themselves and others resulting in an ability to make individual decisions.

Though we help students get and find internships, shadowing hours, and professional work, we do not hold their hand. They must do much of the work themselves, knowing they have us as support. This allows them to safely, and autonomously, make important career and life decisions, building their self-confidence and awareness that they can do it.

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.

Our program has a strong push towards intellectual curiosity and continual learning that goes beyond information that should be learned for a test. From ethics discussions and having interesting speakers from a variety of biology backgrounds that our students are strongly encouraged to attend, to the self-designed experiments that are required in many of the biology courses (all biology students will have at least three major self-designed projects, many will have six) students have lots of opportunities to see how biology fits into the broader world. This preparation prepares our students

to participate in the global society with an understanding that biology is relevant in today's world and impacts choices and policies. Furthermore, by experiencing a broad range of biological topics and having experiencing researching topics for themselves, students will be better able to understand how they can find information out for themselves and will have the tools needed to pursuing continual learning even after they graduate.

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.

GE_Cluster_Descriptions_FINAL_Version_Approved.docx

NSSE Objectives Discussed Fall 2019

Program Alignment to NSSE Objectives

How did your program integrate the three NSSE objectives determined by the faculty this fall. The objectives were to 1) integrate more interdisciplinary work within the curriculum, 2) to connect learning to societal problems or issues, and 3) to examine the strengths and weaknesses of their (students) own views on a topic or issue. Please articulate which courses, and what assignments were assigned and how the work was assessed. Were the assignments successful? What could have made them more successful?

Our program integrated the three NSSE objectives into individual courses at the discretion of the professor. Illustrative examples of these integrative activities and their assessments are included below. The Biology Faculty will have a discussion prior to the start of the Fall 2021 semester to determine if addressing these NSSE objectives will be best served by continuing to address these individually, or if a program-wide approach to these objectives would better meet the needs of the students.

1) integrate more interdisciplinary work within the curriculum

Dr. Kimberly Keller had a strong push for interdisciplinary work in her classes. Unfortunately, due to COVID, the annual project between her Genetics class (Bio 231/232) with Dr. Antje Heese (Associate Professor) from the Biochemistry Department at the University of Missouri to participating in their research by trying to identify a mutant in the plant, Arabidopsis thaliana, using PCR genotyping. The work is cross-disciplinary and real-life, both aspects that the students found meaningful. The students' work was assessed via lab-report (and questions on the lab exam). This activity is extremely successful both in students' perceptions, and in what they learned from the activities. Dr. Keller plans to re-instate this collaborative learning activity in the 2021-2022.

Similarly, in Dr. Keller's Microbiology class (BIO303/304), our students learn about the "One Health Initiative" through a collaborative lab with Dr. Paul Schiltz and the Equestrian Department learning to do fecal Egg counts on samples from the University equine herd. As above, the interdisciplinary work was exciting to the students who got to see how biology knowledge translates into health initiatives. Dr. Keller's Molecular Biotechnology (BIO414/415) also worked with Dr. Schiltz on a Platlet-Rich Plasma protocol comparison and our students also attempted to identify a antibiotic bacteria from wound on one of the horses that would not heal.

2) to connect learning to societal problems or issues

All of our biology classes connect with societal problems or issues—these range from environmental and conservation issues (strongly addressed in Environmental Science BIO 209, Ecology BIO 330/331) to human medical and ethical challenges (strongly addressed in Genetics BIO 231/232, Microbiology Bio 303/304, Human Anatomy and Physiology BIO 314/314, and Molecular Biotechnology BIO414/415).

While many of these issues are addressed as the naturally arise from the material being learned (e.g. the ethical implications of altering DNA, the role of antibiotic overuse contributing to "superbugs", the interactions of species on each others' survival) we did seek to explicitly connect learning to societal problems or issues.

3) to examine the strengths and weaknesses of their (students) own views on a topic or issue

All of the upper-level biology classes, and many of the lower-level ones, including Gen Bio 1 and Gen BIO 2 (BIO 114/115, BIO 124/125) include a research paper or project. These projects and/or papers are assessed part-way through the course, giving the students feedback on the strength of their mastery and understanding of the topic as well as providing them information about their weaknesses in the area. This method allows students to build on their strengths and address their weaknesses prior to completing their final projects.

This feedback is given by the instructor.

A new activity that directly examined students' own views on topics was done in Human Anatomy and Physiology 2 lab (BIO 324). The students had a whole lab period where they were given a list of anatomical misconceptions, and were required to find at least one that they thought was true, and figure out why it wasn't. Similarly, they needed to explain away at least one misconception that a lab-mate had, as well as explain the reason that certain misconceptions are so prevalent. This was assessed as a lab assignment and was successful as it had students evaluate their own assumptions and investigate the strengths and weaknesses of their ideas. In the future, we anticipate using this direct method of "examine the ideas you have and explain the common errors that are made in this area" could be a valuable teaching method in numerous biology courses

Curriculum Map

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

Bachelor of Science - Core Assessment

	BIO 114	BIO 115	BIO 124	BIO 231	BIO 310	BIO 330	BIO 401	BIO 450	CHM 114	CHM 124
BIO 2019.4 Information and Energy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all life on Earth.	I	A	R	A, R			R			
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	A	R	R	R	R	A, M			
BIO.2 Interdisciplinary: Demonstrate that fundamental principles and laws of chemistry and physics are also underpinnings that govern complex living systems.	I, A	A	R	R	R	R	R		I	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.	I	A	A, R	R	R	R	M		I	R

	CHM 314	PHY 201	PHY 212	Student Performance Review
BIO 2019.4 Information and Energy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all life on Earth.				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.				A
BIO.2 Interdisciplinary: Demonstrate that fundamental principles and laws of chemistry and physics are also underpinnings that govern complex living systems.	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.	R			A

Biology BS: PreMed Concentration

	BIO 313	BIO 317	BIO 450	CHM 324	CHM 440
BIO 2019.4 Information and Energy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all life on Earth.	R	R		M	M
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.	R	R	A, M	R	R
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
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

	MAT 124	MAT 214	MAT 304	Student Performance Review
BIO 2019.4 Information and Energy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all	R	R	R	

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

Biology BS: PreVet Concentration

	BIO 303	**BIO 450**	**CHM 324**	**CHM 440**	**EQS 306**	**EQS 376**	**EQS 404**	**EQU 111**	**EQU 117**	**MAT 124**
BIO 2019.4 Information and Energy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all life on Earth.	R		R, M	M	R	R	R			R
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.	R	A, M	R	R	R	R	M	I	I	R
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 that govern complex living systems.	R		R, M	M	R	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		R	R	M	M	M			

	MAT 304	Student Performance Review
BIO 2019.4 Information and Energy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all life on Earth.	R	
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	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.		
BIO.2 Interdisciplinary: Demonstrate that fundamental principles and laws of chemistry and physics are also underpinnings that govern complex living systems.	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.		

Changes to Curriculum
Are there any changes made to the curriculum map for this academic year? If so, please describe the program changes made along with the rationale for why and the impact the change should have on student learning?

Slight changes were made to the curriculum map to align the curriculum map to our current concentration checklists; however, none of the changes to the curriculum map affected the Assessment Map.

Biology Faculty will have a discussion before the start of the Fall 2021 semester about Assessment and to determine if any of our required upper division courses should be used for Assessment.

Assessment Findings

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

BIO 2019.4 Information and Energy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all life on Earth.

BIO 115				
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) There is no score Benchmark = this test is given to our incoming Biology majors to determine the baseline for each student for the exam. Biology Majors will retake the Major Field Test exam as exiting seniors and scores will be compared in order to determine "knowledge gained" from completion of the program. Benchmark = 100% of the declared Biology Majors will take the exam (those declared at the time of test administration). been met yet? Met	100% of the students declared as Biology Majors took the MFT (n = 17).		

BIO 231				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - External Testing	Has the criterion An assessment specific quiz (BIO231) will be used to ensure that assessment questions are direct and relevant to objective 4. 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	Benchmark was Met as 70% of the students were proficient or better (n = 23)	Quiz_11_Assessment _Quiz_for_2020.docx	

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	The benchmark was Not Met as only 47% of the students received a MFT test score placing them in the 50th percentile or higher. (n = 17)	MFT_Data_for_Biology_Department_as_whole_for_report.xlsx Comparison_of_Freshman_MFT_Scores_to_Senior_MFT_Scores__Knowledge_Gained.xlsx	- Enrollment Requirements : None – we feel this is still the benchmark we want our students to reach.

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 115

Assessment Measure	Criterion	Summary	Attachments of the Assessments	Improvement Narratives
Direct - External Testing	Has the criterion Major Field Test - Section: III There is no score Benchmark = this test is given to our incoming Biology majors to determine the baseline for each student for the exam. Biology Majors will retake the Major Field Test exam as exiting seniors and scores will be compared in order to determine "knowledge gained" from completion of the program. Benchmark = 100% of the declared Biology Majors will take the exam (those declared at the time of test administration). been met yet? Met	100% of the students declared as Biology Majors took the MFT (n = 17).		
Direct - External Testing	Has the criterion Major Field Test - Section: IV There is no score Benchmark = this test is given to our incoming Biology majors to determine the baseline for each student for the exam. Biology Majors will retake the Major Field Test exam as exiting seniors and scores will be compared in order to determine "knowledge gained" from completion of the program. Benchmark = 100% of the declared Biology Majors will take the exam (those declared at the time of test administration). been met yet? Met	100% of the students declared as Biology Majors took the MFT (n = 17).		

BIO 401

Assessment Measure	Criterion	Summary	Attachments of the Assessments	Improvement Narratives
Direct - Quiz/Exam	Has the criterion An assessment specific quiz (BIO401) will be used to ensure that assessment questions are direct and relevant to objective 1. 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	This benchmark was Met as 95% of the students scored proficient or better (n=22)	BIO401_Assessment_Questions.docx	

Student Performance Review

Assessment Measure	Criterion	Summary	Attachments of the Assessments	Improvement Narratives
Direct - Proficiency Written Exam	Has the criterion Two weeks prior to assessment, students will be emailed a peer-reviewed journal article about research in the field of Ecology. On Assessment Day, students will be asked to analyze a specific figure from the article and given 15 minutes to complete the assignment in VIA. Benchmark: 70% of students scoring an average of 3/5 or higher on interview questions been met yet? Not met	The Biology Faculty redesigned this portion of the University's Student Performance Days (SPD) to be more of a data analysis component. While we are happy with the choice to include this component in our SPD as this a skill our Biology Majors will need to have in a science career, we still feel it needs the Assessment delivery needs to be tweaked in order to allow for data analysis and for content related to Biology Objective 1. While not exactly related to the content in Objective 1, Criterion was Met as 79% of the students scored an average of 3/5 or higher on their scores.	Modeling_the_status___trends___and_impacts_of_wild_bees.pdf SPR_questions_for_bees_Obj_1.docx	- Revise Assignment for Assessment: The Biology Faculty feel we almost have this Assessment Tool to the way we want it. Next year, we will have 1 journal article for this Assessment in which the content is related to the objective and still contains a Data Analysis component. - Refine Assessment Tool: This year we had multiple questions per journal article and each faculty Assessed/Scored the multiple questions they asked about their journal article and then averaged the score of the responses. This average score was then used to determine the student's average score on the questions. Next year, we plan to refine the Assessment Tool by only asking a single question (with multiple components or specific prompts). A single question would allow for all three faculty to Assess the student answers, providing a true average of their response.
Direct - External Testing	Has the criterion Major Field Test - Section: III Benchmark = Average score of 53 or higher on section,	Both of the criterions were Met on Section III of the MFT this year as the average score was 56 for the students and 82% of		

	with 60% of students scoring a 46 or higher. been met yet? Met	the students scored a 46 or higher (n=17).		
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 a 51 or higher. been met yet? Met	Both of the criterions were Met on Section IV of the MFT as the average score this year score was 54 for the students and 65% of the students scored a 51 or higher (n=17).		

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

BIO 114				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Quiz/Exam	Has the criterion Questions from the First Lecture 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	89% of the students were proficient or better (n = 44)	Assesment_ questions _Bio_114_ exam_1_2020.docx	

BIO 115				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - External Testing	Has the criterion Biology Major Field Test - Section: I There is no score Benchmark = this test is given to our incoming Biology majors to determine the baseline for each student for the exam. Biology Majors will retake the Major Field Test exam as exiting seniors and scores will be compared in order to determine “knowledge gained” from completion of the program. Benchmark = 100% of the	100% of the students declared as Biology Majors took the MFT (n = 17).		

	declared Biology Majors will take the exam (those declared at the time of test administration). been met yet? Met			
Direct - External Testing	Has the criterion Major Field Test - Section: II There is no score Benchmark = this test is given to our incoming Biology majors to determine the baseline for each student for the exam. Biology Majors will retake the Major Field Test exam as exiting seniors and scores will be compared in order to determine "knowledge gained" from completion of the program. Benchmark = 100% of the declared Biology Majors will take the exam (those declared at the time of test administration). been met yet? Met	100% of the students declared as Biology Majors took the MFT (n = 17).		

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 a 51 or higher. been met yet? Not met	Both of the criterions were Not Met on Section I of the MFT as the average score this year score was 51 for the students and only 59% of the students scored a 51 or higher (n=17).		
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 a 51 or higher. been met yet? Not met	One criterion was Met and one criterion was Not Met. The average score on Section II of the MFT this year was 54 for the students, so that criterion was Met; however, only 59% of the students scored a 51 or higher, so this criterion was Not Met. (n=17)		

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 115				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - External Testing	Has the criterion Biology Major Field Test - Section: I There is no score Benchmark = this test is given to our incoming Biology majors to determine the baseline for each student for the exam. Biology Majors will retake the Major Field Test exam as exiting seniors and scores will be compared in order to determine “knowledge gained” from completion of the program. Benchmark = 100% of the declared Biology Majors will take the exam (those declared at the time of test administration). been met yet? Met	100% of the students declared as Biology Majors took the MFT (n = 17).		
Direct - External Testing	Has the criterion Biology Major Field Test - Section: II There is no score Benchmark = this test is given to our incoming Biology majors to determine the baseline for each student for the exam. Biology Majors will retake the Major Field Test exam as exiting seniors and scores will be compared in order to determine “knowledge gained” from completion of the program. Benchmark = 100% of the declared Biology Majors will take the exam (those declared at the time of test administration). been met yet? Met	100% of the students declared as Biology Majors took the MFT (n = 17).		
Direct - External Testing	Has the criterion Biology Major Field Test - Section: III There is no score Benchmark = this test is given to our incoming Biology majors to determine the baseline for each student for the exam. Biology Majors will retake the Major Field Test exam as exiting seniors and scores will be compared in order to determine “knowledge gained” from completion of the program. Benchmark = 100% of the declared Biology Majors will take the exam (those declared at the time of test administration). been met yet? Met	100% of the students declared as Biology Majors took the MFT (n = 17).		

BIO 124				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Quiz/Exam	Has the criterion An assessment specific quiz (BIO124) will be used to ensure that assessment questions are direct and relevant to objective 3. 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	The bench was Not Met as only 57% of the students scored proficient (70% on assessed questions) or better. (n=21)	BIO124_Asessment_Questions.docx	- Enrollment Requirements: We know this group of students, as a whole, were at a disadvantage due to a large portion of their senior year in high school was virtual due to COVID-19 and have trouble adapting to college. In addition, we know the overall academic score of this freshman class is lower than it has been in the past. We hope the new Director of Admissions will make a difference for incoming classes. We do not feel any need to change this benchmark.

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Proficiency Written Exam	Has the criterion Two weeks prior to assessment, students will be emailed a peer-reviewed journal research article in the field of Molecular Structure. On Assessment Day, students will be asked to analyze a specific figure from that article and given 15 minutes to complete the assignment in VIA. Benchmark: 70% of students scoring an average of 3/5 or higher on interview questions been met yet?	The Biology Faculty redesigned this portion of the University's Student Performance Days (SPD) to be more of a data analysis component. While we are happy with the choice to include this component in our SPD as this a skill our Biology Majors will need to have in a science career, we still feel it needs the Assessment delivery needs to be tweaked in order to allow for data analysis and for content related to Biology Objective 3.	Neurogenesis_in_the_adult_human_hippocampus.pdf Transcriptional_Inhibition_of_lncRNA_gadd7_by_CRISPR__dCas9_KRAB_Protects_Spermatocyte_Viability.pdf SPR_Questions_Neurogenesis_in_the_adult_human_hippocampus.docx SPR_questions_for_the_CRISPR___Cas_Paper.docx	- Revise Assignment for Assessment: The Biology Faculty feel we almost have this Assessment Tool to the way we want it. Next year, we will have 1 journal article for this Assessment, to ensure all students are Assessed on the same content and Data Analysis. - Refine Assessment Tool: This year we had multiple questions per journal article and each faculty Assessed/Scored the multiple questions they asked about

	Not met	In an attempt to give students some choice, we offered two Journal articles for this portion of the Assessment. The student answers from one of the paper Met the criterion while the answers for the other paper did not. The Neurogenesis Paper - the Criterion was Met with 83% of the students scoring 3 or greater on the average of their answers regarding the question. (n = 23) The Transcription CRISPR paper - The Criterion was Not Met as only 67% of the students scored an average of 3/5 or higher on the questions related to the analysis of the data. (n = 6) However, if you combined the results from both papers, then the Criterion was Met as 79% of the students scored an average of 3/5 or higher on their scores.		their journal article and then averaged the score of the responses. This average score was then used to determine the student's average score on the questions. Next year, we plan to refine the Assessment Tool by only asking a single question (with multiple components or specific prompts). A single question would allow for all three faculty to Assess the student answers, providing a true average of their response.
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 a 51 or higher. been met yet? Met	Both of the criterions were Not Met on Section I of the MFT as the average score this year score was 51 for the students and only 59% of the students scored a 51 or higher (n=17).		
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 a 51 or	One criterion was Met and one criterion was Not Met. The average score on Section II of the MFT this year was 54 for the students, so that criterion was Met;		

	higher. been met yet? Not met	however, only 59% of the students scored a 51 or higher, so this criterion was Not Met (n=17)		
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 a 46 or higher. been met yet? Met	Both of the criterions were Met on Section III of the MFT this year as the average score was 56 for the students and 82% of the students scored a 46 or higher (n=17).		

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.

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	Benchmark was Met as 87% of the student interview responses were satisfactory or better. (n = 15)		
Direct - Class Assignment	Has the criterion 100% of students produce a professional CV or Resume been met yet? Not met	Benchmark was Not Met as only 93% of the students actually produced a professional CV or Resume (n = 15)		

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	This criterion was Not Met as only 59% of students reported shadowing in Summer 2020, over winter break or were in the		

	make them competitive for jobs in the medical and human healthcare related jobs and professional programs. been met yet? Not met	process of getting shadowing arranged for summer. This number is actually higher than anticipated due the strict COVID-19 Protocols established in the Healthcare professions.		

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 veterinary school specific admission factors that the individual student must meet.

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	Benchmark was Met as 87% of the student interview responses were satisfactory or better. (n = 15)		
Direct - Class Assignment	Has the criterion 100% of students produce a professional CV. been met yet? Not met	Benchmark was Not Met as only 93% of the students actually produced a professional CV or Resume (n = 15)		

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	This criterion was Met as 78% of students reported shadowing in Summer 2020 or over winter break This number is actually higher (100%) if you include those “in the process” of getting shadowing arranged for summer. This number is much higher than anticipated due the strict COVID-19 Protocols, and we feel our students truly benefitted from having a veterinarian (Dr. Paul Schiltz) to shadow.		

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.

The three Biology faculty compiled this report: Dr. Kimberly L. Keller, Dr. Robin Hirsch-Jacobson, and Dr. Sarah Greenland-White.

Our BS Biology degree has two concentrations, a PreMed concentration and a PreVet Concentration. The two concentrations are a subset of courses designed to make these students more competitive when applying to the graduate and professional programs. For the PreMed Concentration, the courses in the concentration are designed to help with entrance exams (MCAT, PCAT, DAT) that are required for admission to human health graduate and professional programs such as Medical or Osteopathy Schools, Occupational Therapy, Physical Therapy, Pharmacy, Dental, etc.). The Biology Department has based our Assessment of our program around three main areas: (1) our core Biology courses; (2) direct Data Analysis related to two Objectives; and (3) the Biology Major Field Test. Our core Biology courses include General Biology I & II (BIO114 & BIO124), Genetics (BIO231), and Evolution (BIO401). There were areas in which our BS Biology majors did not meet the benchmark for our Objectives. Our benchmarks for all of the core Biology courses were Met, except for the benchmark in BIO124, as only 57% of the students in the course scored a 70% or better on the assessment questions. The areas where our BS senior students did not meet the criterion for some of the benchmarks for the Biology Major Field Test (MFT); however, the primary reason was due to the extremely small size of the cohort. Summaries and improvement narratives are included under each assessment field within this report where we feel action is required.

There were areas in which our majors did not meet the benchmark for our Objectives. Summaries and improvement narratives are included under each assessment field within this report where we feel action is required. The main area where our students fell short of the benchmark were Sections I and II of the Major Field Test as the cohort did not score an average score of 53 or higher on these two sections. For Section I, the criterion of 60% of the students scoring a 51 or higher on the section was also not met. The Direct Written Exam questions for Objective 1 and Objective 3 were also not net; however, the reason was due to a change the Biology faculty made in the Student Performance Days and will be discussed fully below.

The Major Field Test (MFT) was given to our graduating seniors during Student Performance Days in March. Based on the MFT of the Biology BS Senior students, the average score for the cohort per section met the benchmark of a cohort average of 53 or higher for Sections II, III, and IV of MFT. Both of the criterions were Not Met on Section I of the MFT, as the average score this year score was 51 for the students (benchmark 53) and only 59% (benchmark 60%) of the students scored a 51 or higher (n=17). While none of the criterion for this section were met, the fact they just under each benchmark we feel not need to change the benchmark. We do acknowledge the fact that a poor score by one or two students has the ability to really pull down the average score for a given section. One idea the Biology faculty are considering is using a “median score” of 53 instead of the “average score” of 53 as our overall cohort tend to be small (< 20 students of graduating seniors, both BA and BS) often with a single outlier.

The benchmark of 50% of students scoring at the 50th percentile rank or higher (Objective 4) was also “Not Met” as only 47% of our students (n=17) reached that benchmark this year This is a combined score of all sections and the student’s overall performance on the exam, so we are a bit disappointed our students did not meet this criterion. While disappointing, this is not a huge concerned for the Biology faculty, as had one more BS student scored in the 50th percentile or higher the benchmark would have been “Met.” When looking at the graduating seniors as a whole (both B.A. and B.S.), it appears the benchmark would still have not been met for the MFT and in fact the percentage was even less (41% in the 50th percentile or higher). Therefore, we will definitely have discussions regarding the MFT content, as ETS has made changes to Biology MFT in the last few years to see how it aligns with our program objectives and our curriculum. We will take a hard look at the MFT to determine if we need to change any benchmarks for any of the Objectives for the 2021 – 2022 academic year. While we may or may not make changes to our benchmark, the Biology Faculty will continue to use the MFT to assess student knowledge and the effectiveness of the program.

Even with 22 Seniors taking the MFT, that number still is a relatively small cohort size in statistical terms. The problem of a small cohort for statistical significance will always exist at a university the size of William Woods, and strongly supports the usefulness of determining "knowledge added" assessment by determining "value added" to their score on the MFT. This was the first year that nearly all of our graduating seniors (20 out of 22, both BA and BS degrees) had taken the MFT as a freshman (Fall 2017 or Fall 2018) and as a senior (Spring 2021). Therefore, we have our first "large" cohort to truly look at the "knowledge added" by the curriculum in our program. We are excited that the 2021 seniors (n=20) had an average percentile rank change of 37 percentile ranks and the average percent gain from their freshman score was 893%. When looking at the percent gain of individual students, 85% of our graduating seniors (n=20) had a percent gain of 133% or higher. This means the majority of our students more than doubled their percentile ranking. All of our graduating seniors 95% showed at least some knowledge gained, the outlier was the only individual who did not show a gain. Our student with the biggest change in percentile rank went from a percentile rank of 1 as a freshman, to a percentile rank of 86 as a senior, that is a percent gain of 8500%. The same student had percent gains in the four sections of the MFT ranging from 63% to 208%. The Biology Faculty feel this truly indicates the strength of our Biology Degree curriculum and our courses are actually adding to the scientific knowledge-base of our all our Biology majors. Between the data comparison data from 2019-2020 and 2020-2021, the Biology faculty now feel we have sufficient data to assess "knowledge gained" or "value added" for our program and will making a benchmark for the this for the 2021-2022 academic year.

Over the past several years, the Biology faculty have changed our interviews and direct Objective questions for the second- and third-year Biology Majors ("tweeners") level students to a Data Analysis assessment activity. This is the second year using a data analysis assessment tool, and the Biology Faculty redesigned this portion of the University's Student Performance Days (SPD), again. We wanted this portion to be more of a data analysis component. Two weeks prior to assessment, students were emailed three peer-reviewed journal articles. On the SPD, our tweener students were asked to choose two of the three articles and then answer the subset of specific questions regarding the figures and the data for those 2 articles. Tweener students were provided SurveyMonkey links to the questions for the three articles and given 2 hours to complete the Article Reviews and shadow-survey. While we feel this was definitely a worthwhile activity, we do feel there are still some modifications required to use this as a learning tool for data analysis, as well as meet a benchmark for Objective 1 and Objective 3. This year each faculty wrote questions for the article they chose and so the questions varied in the number and rigor. Next year we plan to only have two articles, so there will be no student choice in terms of article to read and comprehend, and there will be a single question for each article (possibly with multiple parts or prompts) for each article to ensure the types of questions are more similar. This change/refinement of our assessment tools will provide help ensure our students are assessed on a more individual level of ability to analyze data and assessed equally by each faculty. This change came at the expense of Direct Written Questions portion of assessment for Objective 1 and Objective 3. As those two objectives are already assessed twice, and we are extremely satisfied with this change.

This is the fifth year we have had our incoming Biology Majors take the MFT; however, this is the four year we had them take the exam literally as they are entering the program. All incoming Biology Majors took the MFT during the third week of classes in the fall semester in BIO115, the laboratory associated with BIO114. As the data are for collection purposes only at this point, there is no benchmark attached to the scores for our "freshman." Our long-term assessment plan for the program will occur when these same students take the MFT as an outgoing senior and then we will be able use the scores on the two exams to determine "value added" of each graduating student in the Biology Program at William Woods University. The Biology faculty are excited about adding this new level of assessment of our seniors (as stated above). These data could show that while an outgoing senior may not meet the benchmarks of the MFT when comparing it to the national scores (our current assessment), the same student may improvement in their score, showing the program was successful as a whole as there would be a definite "value added" assessment.

All three of the Biology faculty have noticed the students in our classes often struggle with data analysis, so we devised a means to assess their data analysis abilities, because being able to analyze data is a required skill in a Biology/Science career. While there are definitely some changes to the assessment needed, overall we were very pleased and will be including this as part of our Student Performance Review Days, and probably incorporate it as part of assessment of Biology BS Objective 5.

Each year we have the "tweeners" group complete a short survey self-reporting their Shadowing experiences for the previous summer (Summer 2020), the Winter Break, and ant plans they are working on for Summer (2021). However, this year we decided to give the survey to everyone except our graduating students (first – third years). This also allowed our freshman to participate on SPD since the normal SPD events we schedule for them were cancelled. The Biology Faculty

liked this change and plan to keep the survey of shadowing to all of our non-graduating Biology majors. For our Biology BS PreMed majors, 59% of them report shadowing in at least on the three timeframes, while 78% of our Biology BS PreVet majors reported a shadowing experience in at least one of the three timeframes. The Biology Faculty actually are pleased with these percentages, considering summer is the most common times for students to shadow hours, and many were not able to the strict COVID-19 regulations and it include our freshman (1st years).

In terms of class assessment, the faculty have been making a concerted effort to have a specific quiz or wrote specific exam questions that more specifically addressed assessing the objective. As a whole, writing specific objective-based questions showed an increase in our assessment numbers as all benchmarks for Biology courses were "met" except for the benchmark in the BIO124 course.

Due to some major conflicts with our teaching schedules, weekly department meetings with all three Biology faculty took place much less frequently throughout the academic year than in years past. We mainly use of 100- and 200-level classes and the MFT for our assessment and have very few upper division courses as part of our assessment of the Biology Program. Current discussions during the generation of this report is that we may begin to assess at least one of our objectives (possibly Objective 3) using the required Field courses and now that we have a full-time faculty teaching the required Anatomy & Physiology courses, Physics courses, and Chemistry courses, we may want to consider assessing those as well. A comprehensive review of our Curriculum and Assessment maps will occur prior to the Fall 2021 semester to make some possible changes to ensure 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. Although we do feel strongly that writing one Assessment Report and combining the B.A. and B.S. students would be a much truer assessment of the Biology program as a whole the core course requirements between the degree programs only differ in that BS majors are required to take two semesters of Physics (with lab). In addition, we teach our Biology students as a whole, and not as whether they are a BA, BS PreMed, or BS PreVet, so it would be nice not to keep separating these report and it could possibly eliminate many of the "not met" benchmarks that are solely due to the extremely low sample sizes in the B.A. program.

Improvement Narrative List

Assessment Findings for the Assessment Measure level

<table>
<tr><td>Standard/Outcome</td><td>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.</td></tr>
<tr><td>Legend</td><td>A</td></tr>
<tr><td>Course/Event</td><td>BIO 124</td></tr>
<tr><td>Assessment Measure</td><td>Direct - Quiz/Exam</td></tr>
<tr><td>Assessment Findings</td><td>Not met</td></tr>
<tr><td>Improvement Narrative</td><td>
<table>
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Standard/Outcome	BIO 2019.4 Information and Energy: 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
Enrollment Requirements	None – we feel this is still the benchmark we want our students to reach.

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 - Proficiency Written Exam
Assessment Findings	Not met
Improvement Narrative	

Improvement Type	Summary
Revise Assignment for Assessment	The Biology Faculty feel we almost have this Assessment Tool to the way we want it. Next year, we will have 1 journal article for this Assessment in which the content is related to the objective and still contains a Data Analysis component.
Refine Assessment Tool	This year we had multiple questions per journal article and each faculty Assessed/Scored the multiple questions they asked about their journal article and then averaged the score of the responses. This average score was then used to determine the student's average score on the questions. Next year, we plan to refine the Assessment Tool by only asking a single question (with multiple components or specific prompts). A single question would allow for all three faculty to Assess the student answers, providing a true average of their response.

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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?

Due to the COVID-19 Protocols on campus, Student Performance Review (SPR) days were not two consecutive days as they have been in the past. This year one SPR day was in February and one day was in March. Departments were encouraged to try and use only one of the days and to keep our Program Assessment for only in the morning. Therefore, our schedule for Student Performance Days was greatly shortened greatly and modified to collect the required data for Assessment; however, we dropped some of normal sessions of degree and career discussions. Therefore, our Student Performance Schedule include only the following events: (1) Biology MFT for our Graduating Seniors, (2) Figure Analysis of Research Article for our second- and third-year Biology Majors (“tweeners”), (3) a survey of students self-reporting their Shadowing experiences (Summer 2020, Winter Break, plan for Summer 2021) for everyone except our graduating students (first – third years), and (4) a Research Talk followed by a Meet & Greet Session.

We have always used Student Performance Days to have our senior students take the Major Field Test (MFT) in Biology – and this year was no difference. The only difference is students were proctored remotely since the seating in all computer rooms was unable to handle the 22 Biology Seniors (5 BA and 17 BS Majors) taking the MFT. The Biology

Faculty are considering changing our benchmark from the “average score” to the median score” to help eliminate some of the issues when one student does poorly on the MFT.

This academic year, we were able to administer the MFT to the incoming class of Biology Majors in the fall by doing it the second week of classes in the fall semester in BIO115, the laboratory associated with BIO114. This change was made in order to truly capture the entry level knowledge base of each of our incoming students majoring in Biology. Of our 17 BS Biology graduating senior students who took the MFT, only 15 also took the MFT their first year in the program; therefore, this spring was their second time taking the MFT. Now we have a large cohort for BS Biology students in which were able to determine “knowledge gained/added.” At the beginning of the 2021-2022 academic year, the Biology Faculty will use data from the 2019-2020 and the 2020-2021 academic years to determine what the Benchmarks will want to use for this “knowledge-gained” portion of our assessment. This data will be a valuable assessment in addition to our current use of the MFT to evaluate the knowledge of our exiting seniors compared to other Biology majors on a national level. The data generated in BIO115 is being used simply as an entry-level baseline. There is no benchmark for this data and “Met” simply implies all students declared as majors at that time took the MFT.

We changed our interviews and direct Objective questions for the second- and third-year Biology Majors (“tweeners”) level students to a Data Analysis assessment activity. This is the second year using a data analysis year, and the Biology Faculty redesigned this portion of the University’s Student Performance Days (SPD), again. to be more of a data analysis component. Two weeks prior to assessment, students were emailed three peer-reviewed journal articles. On the SPD, students were asked to choose two of the three articles and then answer the subset of specific questions regarding the figures and the data for those 2 articles. On SPD, students were provided SurveyMonkey links to the questions for the three articles and given 2 hours to complete the Article Reviews. While we feel this was definitely a worthwhile activity, we do feel there are still some modifications to use this as a learning tool for data analysis as well as meet an objective. Therefore, next year we plan to only have two articles, so there will be no student choice in terms of article to read and comprehend, and there will be a single question for each article the students will be required to answer. This year each faculty wrote questions for the article they chose, next year we plan to write a single question (possibly with multiple parts or prompts) for each article to ensure the types of questions are more similar. This change will provide us the ability to truly assess each student’s ability to analyze data and to assess students on a more equal level. This change came at the expense of Direct Written Questions portion of assessment, and we are extremely satisfied with this change. We know we need to refine our assessment tools to help ensure our students are assessed on a more individual level and equally by each faculty.

Each year we have the “tweeners” group complete a short survey self-reporting their Shadowing experiences for the previous summer (Summer 2020), the Winter Break, and ant plans they are working on for Summer (2021). However, this year we decided to have everyone except our graduating students (first – third years) complete this survey in order for our freshman to participate on SPD since some other events were cancelled. For our Biology BS PreMed majors, 59% of them report shadowing in at least on the three timeframes, while 78% of our Biology BS PreVet majors reported a shadowing experience in at least one of the three timeframes. The Biology Faculty liked this change and plan to keep the survey of shadowing to all of our non-graduating Biology majors.

Every year during Student Performance Days we bring a speaker who gives research-based talk to the entire department and all of our Biology Majors. We still held this event this spring; however due to COVID-19 protocols, the research talk was held virtually. The Speaker was Dr. Deepa Ramamurthy, UC Berkeley Systems Neuroscientist, who gave a talk titled: " The Role of Experience in Shaping Sensation?" 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. We again held a Meet & Greet/Question & Answer “ZOOM reception” after the seminar for students to interact with the speaker. Therefore, this event is definitely something we will continue to incorporate that into our Student Performance Day schedule.

Because of COVID-19, our “Impartation of Wisdom” lunch event for just our new, incoming students and our outgoing seniors had to be cancelled. The Biology faculty definitely feel this is an event worth keeping as part of Student Performance days and hope we can have it return in next academic year. Unfortunately, due to COVID we also had to cancel our 30-minute major “Question & Answer” session in which the Biology Faculty meet with our first year Biology Major students. While not necessary for any assessment, this is definitely important in the retention of our students and will definitely reinstate this event next year.

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.
Biology_SPR_Schedule_for_March_30_2021.docx
spd_bio_talk.pptx

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?

Due to COVID-19 Senior Showcase was a bit different this year. Our entire cohort of 22 graduating Biology Seniors (5 BA seniors and 17 BS seniors), did their Senior Showcase in the Spring of 2021. Eight of these were in-person and 14 were done virtually over Zoom. Each student gave a ~10-minute presentation on a poster that they prepared. This is done like it would be for a poster session, except none of the students did original work, it was more like a poster lit review for their chosen topic.

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

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?

N/A

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.

Dr. Kimberly L. Keller - Saturday, March 27, 2021 6:00:00 PM - SNL - Murder in the Biomes: A Live Clue Game.
Join Biology in this life-size Clue game. A murder has been committed! It is your goal to find out who the murderer is. But be careful because the murderer is among you. Explore the different biomes to find the clues to who the murderer is. Limit 15 participants. Sign up for the character of your choice through the link

Dr. Sarah Greenland-White - Thursday, April 22, 2021 – 7:00:00 PM - The Cognitive Impact of Plants - Join us for a discussion of the effects of plants on mood, memory, and performance and see the results of research into this topic we did last year. Join Zoom Meeting

Dr. Robin Hirsch-Jacbson - Held 58 LEAD Events during the 2020-2021 Academic year. Here are those relating to Biology

- Nature Boost Podcast SERIES - Episode 1
- Nature Boost Podcast SERIES - Episode 2
- Nature Boost Podcast SERIES - Episode 3
- Nature Boost Podcast SERIES - Episode 4

- One Planet Documentary - One Planet is a documentary series on Netflix. Watch the "The High Seas" episode.
- Our Planet - One Planet - Our Planet; the Netflix documentary series. Watch the first episode named "One Planet"
- Our Planet - Frozen World - Our Planet is a documentary series on Netflix. Watch the "Frozen World" episode.

- Protecting Our Prairies - MO Prairie Foundation Speaker - MO Prairie Foundation (MOPF) Executive Director, Carol Davit

- Missouri Department of Conservation (MDC) Scavenger Hunt – Butterflies
- Missouri Department of Conservation (MDC) Scavenger Hunt – Reptiles
- Missouri Department of Conservation (MDC) Scavenger Hunt – Mammals
- Missouri Department of Conservation (MDC) Scavenger Hunt - Prairie & Meadow Birds
- Missouri Department of Conservation (MDC) Scavenger Hunt - Plants of Missouri

- My Octopus Teacher - Netflix Film

- David Attenborough: A Life on Our Planet - Netflix Film

- Five Senior Showcase LEAD events; three were virtual and two were in-person

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.

For the 2020-2021 academic year, the following 6 Biology students earned the Owl Achievement Award:

- Kate Doerhoff, St. Charles, Mo.
- Julia Lefarth, Eureka, Mo.
- Emily Mannion, Dardenne Prairie, Mo.
- Claire McDonald, Jefferson City, Mo.
- Katherine McDonald, Jefferson City, Mo.
- Kylie Zamboni-Cutter, Colorado Springs, Colo

Emma Pfortmiller, Littleton, CO – Received three awards:

- The Academic Service-Learning Award
- The Cockrell Award
- The Distinguished Scholar Award in Biology

Alumni Accomplishments
Please highlight special examples of any successes of recent graduated alumni (acceptance or graduation graduate school, employment or professional milestones. Include recent graduates.

Graduating Class of 2021

- Two of our 2021 Graduates were accepted to the College of Veterinary Medicine at the University of Missouri (pursuing a DVM)
- Accepted a spot in the class of 2025 at Rocky Vista University College of Osteopathic Medicine in Parker, Colorado
- Accepted and planning to attend Stephens College Physician Assistant Program
- Accepted at several school, but will be attending the University of Texas Medical Branch, Galveston, TX to pursue a Ph.D. in pharmacology and toxicology this upcoming fall
- Accepted a job as an Assistant Chemist/Microbiologist
- Applied to Dental School at UMKC – waiting to hear
- Applied to Master of Science in Anesthesia at UMKC Medical School – waiting to hear

Previous Graduates:

- (2016 alum) graduated from the University of Missouri with a Doctorate of Physical Therapy and passed his board exam
- (2017 alum) graduated from the University of Missouri School of Medicine with a Doctor of Medicine degree and will be doing a residency in Pediatrics at the University of Missouri Children's Hospital.
- (2017 alum) graduated from the University of Missouri College of Veterinary Medicine with a Doctor of Veterinary Medicine degree. She has accepted a position as an associate veterinarian at Family Vet of Lake Saint Louis.
- (2017 alum) graduated from the Purdue University College of Veterinary Medicine and Teaching Hospital with a Doctor of Veterinary Medicine degree.
- (2018 alum) graduated from Missouri State University with a Doctorate of Physical Therapy, passed his board exam, and has accepted a position with MU Health Care.
- (2018 alum) graduated from the University of Missouri with a Master of Health Administration and Master of Science in Health Informatics
- (2018 alum) graduated from the University of Missouri with a Master of Public Health
- (2019 alum) got accepted into the Physician Assistant program at Saint Louis University and will begin classes this fall

Faculty Accomplishments
Highlight special examples of faculty success in the profession/field/content area. This is for any accomplishment of a faculty activity/research/professional nature.
Dr. Kimberly L. Keller
Co-author on a publication in Microbiology Resource Announcements (MRA). Manuscript titled: "Deletion mutants, archived transposon library and tagged protein constructs of the model sulfate-reducing bacterium, Desulfovibrio vulgaris Hildenborough"

Dr. Robin Hirsch-Jacobson
Became Director of the School of Science and Health in November 2020

Assessment Rubric

Mission Statement Clearly Articulated weight: 1.000	The mission statement for the program is insightful and forward thinking. It aligns with the University Mission and learning objectives showing a clear alignment between the University and the program.	✓ The mission statement for the program clearly articulated and aligned with the University mission.	The mission statement is minimal at best.	N/A
Comment:				
Reflection on Retention weight: 1.000	✓ The program provides a detailed description on the retention numbers. The program provides new ideas on how to improve retention of their program students or articulates what they are currently doing to keep students in their program.	The program provides a basic reflection on the retention data provided.	The program does not reflect on retention data in a detailed way.	N/A
Comment:				
Defines External Accreditation Standards weight: 1.000	The program provides a detailed explanation of the accreditation organizations within the field along with all the timeline and supplemental information required for accreditation.	The program provides a basic explanation of the accreditation organizations in the field.	The program fails to provide any accreditation information.	✓ N/A
Comment:				
General Education alignment clearly explained weight: 1.000	The program provides a detailed explanation of the General Education criterial and how the basic skills learned are expanded upon in the program. Details include but are not limited to: specific courses, or activities that stretch the knowledge of the specific areas.	✓ The program provides a basic explanation of the General Education curriculum and how the skills learned are expanded in program courses.	The program provides a minimal explanation of the General Education curriculum and how the skills learned are expanded in program courses.	N/A
Comment:				
Curriculum Map alignment weight: 1.000	The curriculum map is detailed and complete.	✓ The curriculum map is complete	The curriculum map is not complete	N/A
Comment:				
Assessment of Objectives weight: 1.000	Assessment of objectives are spread out across the curriculum with a variety of assessment measures and each program objective is assessed a minimum of twice a year.	✓ Each objective is assessed a minimum of 2 times a year or an assessment rotation is explained so that all objectives are assessed. The assessments are not concentrated in one class.	The assessment map is not complete or much of the assessment happens in only one course. Not all objectives are assessed annually, nor is a plan provided on assessment.	N/A
Comment:				
Data Driven Decision-making is explained weight: 1.000	Curricular and assessment changes are articulated and validated through data based decisions. Faculty discuss the data that lead to curricular decisions being made.	✓ Curricular and assessment decisions are made based on data provided in assessment, but detailed alignment is not provided as justification for the change.	Changes are proposed and brought forth with little explanation on the data included in the decision, if data was included in the decision.	N/A
Comment:				
Documentation provided on assessment findings weight: 1.000	The program uploads all rubric and support information to support the claims in the assessment findings along with detailed instructions on the assessment process and data analysis.	✓ The program uploads all rubric and support information to support the claims in assessment findings.	The program did not upload the data to support assessment claims in the assessment findings.	N/A
Comment:				

Analysis of Assessment is complete weight: 1.000	The program completed assessment findings for each component identified, and provided a comprehensive summary of each assessment measure identified in the report.	The program completed the assessment findings for each component and provided a summary for each assessment measure.	The program did not provide a completed assessment findings for each component, nor did they complete the summary for each measure.	N/A
Comment:				
Improvement narratives are selected with intentionality weight: 1.000	The program identified Improvement Narratives that appear to move the program forward and see the bigger picture than only the specific program curriculum options	The program used the provided Improvement Narratives and selected options that made sense to the objectives and issues within the assessment.	The program did not use any improvement narratives, or the ones chosen are not aligned with assessment results.	N/A
Comment:				
Student Performance Review weight: 1.000	The program described and provided a detailed account of Student performance Review activities. Data evidence provided and detailed.	The program provided the schedule and a brief description of Student Performance Review with data of the results.	The program did not provide complete explanation on Student Performance Review nor did they provide data results.	N/A
Comment:				
Senior Showcase weight: 1.000	The program had all senior students participate in Senior Showcase and provided a detailed explanation of their expectation and the presentations presented.	The program described the Senior showcase activities and provided some evidence of what was presented.	Little to no content of Senior showcase was provided.	N/A
Comment:				
Co Curricular activities weight: 1.000	The program detailed the activities of LEAD and other co-curricular programing that was provided throughout the year. They provided numerous events for students.	The program provided a listing of LEAD events and activities provided.	The program provided little to no description of the Co-curricular activities provided throughout the year.	N/A
Comment:				
Faculty, alumni, and Student accomplishments weight: 1.000	The program provided detail updates on successes on Students, Alumni and Faculty with added information explaining the kinds of success that were experienced.	The program provided a listing of information on Students, Alumni, and faculty accomplishments.	The program provided little to no data on students, alumni, faculty accomplishments.	N/A