



WILLIAM WOODS
UNIVERSITY

Biology BS Annual Assessment 2023-2024

BIOLOGY BS ANNUAL ASSESSMENT 2023-2024 **1**

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Annual Assessment 2023-2024

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 2023-2024

55

Student Majors 2022-2023

54

Student Minors 2023-2024

Student Minors 2022-2023

Concentrations 2023-2024

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

PreMed Concentration: 28

PreVet Concentration: 27

Concentrations 2022-2023

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

PreMed Concentration: 20

PreVet Concentration: 34

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 the persistence numbers what the program expected? If not, how could the numbers improve?

The Biology 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. By our program goals mentioned above, we would expect a graduation rate ~60%.

Thanks to a new Institutional Research Officer, we have much better retention, persistence, and graduation data than in years past. For the first time in a long time, the number of declared PreMed and PreVet Concentrations is equal to the number of students seeking a BS degree.

We just below our goal of 75% retention, as 70% of BS majors that started Fall 2022 returned this past fall. We had 4 students that started as a Biology major; however, changed to a new major making the students that started as BS Biology Majors staying at William Woods at 90%.

With the current data, it is hard to get a persistence number; however, we did have a 6-year graduation rate (2017 - 2023) of 60.87% that graduated with a Biology Degree, which meets our goal.

6 Year Graduation Rate - First Time Full Time Freshman Fall 2017 – Fall 2023	Total = 23	Rate
Graduated Within Major	13	56.52%
Graduated Within Department	14	60.87%
Graduated Within University	16	69.57%
Did Not Graduate	17	30.43%

Optimal Enrollment

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

60

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

Admissions and Marketing Materials

Reflect on the current marketing materials used for the program. Please attach screen shots of the website or any material you are referencing in this section. What changes, if any, should be made to the material? Are there recommendations on how to modify the current material?

We have no major concerns with the biology website, although there is a still photo we would like removed (see screen shot attached). In the past few years, we have worked to update it and it is better now. We have no recommendations to modify the current material. However, we do want to ensure that the marketing department understands the strengths of our programs beyond PreMed and PreVet so they can speak to all potential students when they do outreach events. We should have more students enrolled in our Biology BA and have made numerous suggestions in the past five years about marketing to 4-H, FFA, and Hunting Clubs. To that end, we have had meetings with Admissions but are always willing to have others if needed. Plus, we have **requested** additional meetings with marketing to discuss our program, as there has again been turnover in the Marketing Department.

Marketing Material

Program Assessment

Standard/Outcome

Identifier	Description
WWU2021.1	Knowledge and Scholarship: Demonstrate current knowledge and educational expertise in an academic or professional discipline engaging students in the process of academic discovery.

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 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.

Alignment to the Institutional Objectives

Please discuss the Program alignment to the Institutional Objectives. Specific evidence is not to be uploaded, but discussion is expected of the assignment, and intentionality of how the objective is met with program curriculum.

The Biology Program is strongly aligned with the University Objectives.

Objective 1. The knowledge and scholarship the Biology Program fosters is excellent. From the first required classes, all the way through the program, students take rigorous classes, design and carry out self-designed research projects, examine current research, practice biological techniques, and learn the background and methodology needed to be competent biologists, researchers, scientists, and informed individuals.

Objective 2. The Biology Program strives to be inclusive. This includes sponsoring events where students early in their academic experience can receive advice and guidance from faculty or upper classmates. One of these events is our annual fall retreat where the entire biology faculty and student body attends. This is an opportunity for all the biology students to hear about interesting projects or internships fellow classmates did, as well as a chance to outline their individual biology path. The biology faculty help guide students through their academic plans, and upper classmates provide support and suggestions. This activity helps unify the participants in the biology program, encourages inclusion, and reduces the likelihood that a student “falls through the cracks”. Another way we encourage inclusion is via our annual “impartation of wisdom” lunch that we sponsor in the spring. At this lunch, the senior biology students and the freshman biology students come together to eat (faculty are not present aside from brining the meal), and the freshmen ask the seniors a series of questions about their experiences with the program, their advice, and their suggestions. This activity allows for “real” conversations (students are not recorded, and the faculty is not there to overhear the answers). This has been a positive and inclusion-building event. Seniors can reflect on their experiences, and the freshmen feel more connected to the program and each other. In addition, programmatic knowledge and advice is passed down in a natural way. A more formal way in which inclusion is promoted is via the formation of lab groups in our laboratory classes. Lab groups work together during the three-hour blocks of instruction time, helping each other and providing peer-to-peer support. They often also meet outside of labs to work on their projects and study together.

Objective 3. The biology program also promotes creativity. This is closely related to both the first and second objectives. As students engage in rigorous scholarship, they have the background they need to synthesize ideas creatively. As students work with others, they are appreciative of other ideas they can use those perspectives to arrive at creative solutions, ideas, and experiments. While we understand that creativity is not an “assignable” goal, we strive to encourage it via the open-ended research projects we require in most classes, the promotion of internship opportunities, and the laboratory assignments in which there isn’t one right answer, rather there is a problem that the students must solve in whichever creative and scientifically appropriate way they choose.

Objective 4. We hope that this area of intellectual inquiry is one of our strongest points. From research projects that students and faculty members work on together (whether that be mentor-mentee projects, honors research experiments, Cox grant projects, or one-off “huh, that’s interesting let’s look into it” projects) we foster an environment of intellectual inquiry. The fantastic thing about biology is that there are ways to get answers to questions people have. So much in biology is still not known—there is a lot of “low-hanging-fruit”. That is, there are many questions we have the tools to answer but have not been investigated yet. We work in our classes to expose students to the tools needed to find the answers for themselves, and then expect them to demonstrate that ability. In the lab courses, students conduct research projects in which they synthesize information and come to conclusions, and they design experiments where they are the ones to collect the data and analyze it. Doing so promotes intellectual inquiry and the understanding that they can solve problems by themselves. Plus, a new way we have begun to promote intellectual inquiry is via the Biology Journal Club. This is an optional (but recommended) class in which students read scientific papers and then practice discussing, arguing, and drawing their own conclusions from the research of others.

Institutional_objectives_2.docx

General Education Alignment to Program

How do the General Education criteria align with Program Objectives? What courses within the program build upon skills learned from general education courses (please list the program course and the general education criteria)?

Written and Oral Communication: The dissemination of information in Biology is through peer-reviewed scientific journals and poster and oral presentations at various conferences. In all biology coursework, our students are expected to independently generate novel hypotheses regarding specific issues that they might be given and perform research to test it. Students are expected to prepare and perform presentations on content-specific topics where oral communication is important. In addition, students are expected to write extensive technical papers and essays over certain biological topics, so written communication is extremely vital in the sciences. The biology faculty feel that written communication is so important in our discipline that starting fall 2024, all Biology Majors will be required to add a 1-credit “writing intensive” component to one of their upper division Biology courses.

Information Literacy and Historical Perspective: Scientific knowledge builds on information discovered by performing research. Therefore, being able to understand the historical research of a given topic and whether the information a student is finding is from a credible source are skills used daily by biologists. For scientists, historical perspective and information literacy go hand in hand in understanding from reputable sources the research and knowledge already know so we can design experiments to add to the field.

Natural Science and Mathematics: The natural sciences seek to understand how the world and universe around us works. There are five major branches: astronomy, physics, chemistry, Earth science, and biology. As one of the major branches, it is obvious that this General Education component is literally the foundation of the Biology Program. In all biology coursework students are expected to analyze data, evaluate it critically, and to be able to generate and interpret statistics. As mathematic courses provide students with the quantitative background to perform these activities, our majors are required to take additional math courses beyond the Gen Ed course to be successful. Therefore, having a solid mathematical background from General Education is imperative to be successful as a biologist.

General Education Tier 2:

Expression & Invention: 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. The scientific method is based on creative thinking to determine an experiment to test a hypothesis and being innovative in the experimental design. Testing a hypothesis is all about risk taking, because while the hope is always that there will be a “significant difference” between the control and the experimental group, yet often there is no significant difference. But all scientific breakthroughs were done because a scientist took a risk and tested their hypothesis.

Inquiry & Analysis: Inquiry is the foundation of the entire biology program. In all biology coursework students are expected to design an experiment, collect data, analyze and evaluate the data critically, and to be able to generate and interpret the statistics performed. In all biology coursework, students are expected to integrate sound logical arguments with the scientific method. Students are expected to read, analyze, and interpret general textbooks, primary scientific literature, and data.

Cultures & Communities: Understanding the historical background, the current controversies, and the multiple perspectives of an issue has an important place in a biology program. We address this in part by requiring “issue” research papers in many of our classes— students are welcome to take whichever position they want on a scientific issue, but they must articulate what the controversy is and why it exists. 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.

NSSE Objectives Discussed Spring 2022

Program Alignment to NSSE Objectives

Faculty discussed the most recent NSSE results in spring of 2022 and identified universal objectives for all academic content. Please articulate what the program is doing to further students' knowledge and skills in the following areas: 1C- Explained course material to one or more students; 2E - Tried to better understand someone else's view by imagining how an issues looks from his/her perspective; 4C-Analyzing an idea, experience, or line of reasoning in depth by examining its parts; 4D- Evaluating a point of view, decision, or information source. Please describe the activities used and the impact on student learning.

The Biology program is working to further students' knowledge and skills in all of the NSSE areas listed. Illustrative examples of these integrative activities and their assessments are included below.

1C. Many of our courses are lab-based. Within these labs students have ample opportunity to explain ideas to each other. Working together to understand a concept and take the next steps in an experiment is vital for becoming a competent scientist. We are proud that our program emphasizes that during labs, as well as in other ways. One way that we are working on moving forward is creating a study space within the Cox (Science) Building, specifically so that students can meet and work together, studying and learning together.

2E. This objective is more commonly thought of with non-science based courses. However, understanding the historical background, the current controversies, and the multiple perspectives on an issue has an important place in a biology program. We address this in part by requiring “issue” research papers in many of our classes— students are welcome to take whichever position they want on a scientific issue, but they must articulate what the controversy is and why it exists. As a program we have started a Biology journal club. While not required, this bi-weekly meeting provides an opportunity for students to debate and examine biological, social, environmental, and medical issues from multiple perspectives.

4C. This is our area to shine! Biology specifically, and science more generally builds on many small parts being understood together. This can happen over the course of one class—e.g. for instance the concepts of diffusion, bulk flow, and gas pressure all coming together into a more complex picture of gas transfer in the lungs and at the level of the tissues in one class, or it can happen over several classes—e.g. information about cell signaling that was learned in an introductory class and then further refined in Cell and Molecular biology becoming relevant in an upper-level elective as students learn about how certain substances can act as endocrine disruptors. The short answer is to say we work hard as a faculty to have our courses build on each other. We are confident in our course series and progression and meet with our students individually and as a group to help them build a course of study that will best enable them to scaffold their knowledge from one course to the next.

4D. In our classes we require research papers that use scientifically credible sources. In Bio 114 we address what is and what is not a scientifically credible source. One of the activities that addresses this is peer-review session where students in Bio 114 review a research paper from one of their classmates. One of the things they look for in this review session is the credibility of the sources cited. This activity seems to enable students to better evaluate their own research papers even more than it provides useful feedback to their classmates for whom they are reviewing their papers.

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
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	
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	

	CHM 114	CHM 124	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.	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	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 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-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	R	R	R	R	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							
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					

Biology BS: PreVet Concentration

	BIO 303	CHM 324	CHM 440	MAT 124	MAT 304	EQU 117
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	
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	R	R	R	R	I
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					
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	
BIO.3 Diversity in structures, functions, and systems: Demonstrate and model, through reductionist and holistic approaches, the	M	R	R			

interconnectedness of life along a continuum from molecular structures to interactions among organisms and with ecosystems.						
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	EQU 118	EQS 376	EQS 404	BIO 450	SPR
BIO 2019.4 Information and Energy: Demonstrate knowledge of major conserved metabolic, signaling, heritable, and molecular processes of all life on Earth.		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	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			
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.	R	M	M		

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 and course changes that have occurred in EQS portion of Concentration; however, none of the changes to the curriculum map affected the Assessment Map.

Assessment Findings

Assessment Findings for the Assessment Measure level for Bachelor of Science - Core 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.				
Assessment Measures				
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 students that were declared as Biology Majors at time of MFT took the exam (n = 26)		
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?	100% of students that were declared as Biology Majors at time of MFT took the exam (n = 26)		
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?	Benchmark was Met as 82% of the students received a Proficient (70%) or higher on the Assessment Quiz (n=11)	2023_24_BIO401_assessment_results.pdf	

	Met			
SPR				
Assessment Measure	Criterion	Summary	Attachments of the Assessments	Improvement Narratives
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? Not met	Not Met as the average was only a 48; however, the second part of Benchmark was Met as 80% scored a 46 or higher. (n=10)		- Revise Program Benchmark: As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024
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? Not met	Not Met as the average was only a 51; however, the second part of Benchmark was Met as 70% scored a 51 or higher.		- Revise Program Benchmark: As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024

Standard/Outcome				
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 - 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? Not met	Benchmark was not met, as only 64% of students scored a 70% or better. N=47		- Curriculum Revision: This year, the questions were taken from the final as opposed to the test immediately after they learned that material. In the past students easily met the benchmark, though I am realizing that they might not have retained the information long-term. In the future I plan to reinforce the concepts for longer-term retention.
BIO 115				
Assessment Measure	Criterion	Summary	Attachments of the	Improvement Narratives

			Assessments	
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 students that were declared as Biology Majors at time of MFT took the exam (n = 26)		
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 students that were declared as Biology Majors at time of MFT took the exam (n = 26)		

SPR				
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	Not Met as the average for this section was only 42 and only 10% of the students scored a 51 or higher. (n=10)		- Revise Program Benchmark: As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024
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	Not Met as the average for this section was only 47 and only 30% of the students scored a 51 or higher. (n=10)		- Revise Program Benchmark: As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024

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.

Assessment Measures

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 students that were declared as Biology Majors at time of MFT took the exam (n = 26)		
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 students that were declared as Biology Majors at time of MFT took the exam (n = 26)		
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 students that were declared as Biology Majors at time of MFT took the exam (n = 26)		

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	Benchmark was Met as 82% of the students received a Proficient (70%) or higher on the	2023_24_124_assessment_results.pdf	

	70% of the students at Proficient or better. Proficient is defined as 70% or better on the assessed questions. been met yet? Met	Assessment Quiz (n=22)		
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SPR				
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	Not Met as the average for this section was only 42 and only 10% of the students scored a 51 or higher. (n=10)		- Revise Program Benchmark: As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024
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	Section II: Not Met as the average for this section was only 47 and only 30% of the students scored a 51 or higher. (n=10)		- Revise Program Benchmark: As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024
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? Not met	Section III: Not Met as the average was only 48; however, the second part of Benchmark was Met as 80% scored a 46 or higher. (n=10)		- Revise Program Benchmark: As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024

Standard/Outcome

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

Assessment Measures

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 students that were declared as Biology Majors at time of MFT took the exam (n = 26)		

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 78% of students scored a 70% or higher on the final Assessment Quiz. (n = 23)	BIO231_Genetics_Quiz_11_Scores.pdf	

SPR				
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	Not Met as only 20% of students scored at the 50th percentile or better. But 60% of the BS majors scored at or above the 40th percentile. (n=10) Data/Results from MFT is in the Excel attached here. This Data is what was used to determine any MFT Assessment Measurement.	Assessment_Version___Comparison_of_Freshman_MFT_Scores_to_Senior_MFT_Scores_Knowledge_Gained.xlsx	- Revise Program Benchmark: As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024
Direct - External Testing	Has the criterion MFT – Increase in Percentile Rank. Benchmark = 100% of our students will show an increase in	Met – As 100% of the BS Seniors not only had an increase in their Percentile Rank from their Freshman; but 100% had		

	their Percentile Rank from their Freshman to Senior year, and at least 80% will have a 10 Percentile Rank increase or more. been met yet? Met	a % change of >117% (n=6, as we did not have Freshman data for 4 of our BS seniors)		
Direct - External Testing	Has the criterion MFT – Increase in Sub scores. Benchmark = 100% of our students will show an overall increase in the average of their four sub scores from their Freshman to Senior year, and at least 80% of will have an increase in three of the four sub score sections I - IV. been met yet? Met	Met – As 100% of our BS students showed an overall increase in the average of their four sub scores from their Freshman to Senior year, and 83% of them had an increase in 3 of the 4 sub score sections. (n=6)		

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

Standard/Outcome				
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	PreMed 100% scored Satisfactory (>3.5/5) on their Mock interview with two Faculty (n=3)	BIO450_Mock_Interview_Scores.pdf	
Direct - Class Assignment	Has the criterion 100% of students produce a professional CV or Resume been met yet?	100% of PreMed students produce a professional CV or Resume (n=3)		

	Met			
SPR				
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? Not met	Not Met as only 42% of the PreMed majors had shadowing experience either over the Summer of 2023 or during the 23–24 academic year. (n=19)		- Refine Assessment Tool: As nearly ~40% of the PreMed Majors were incoming freshman, we are not surprised and are not concerned about this not met, especially since we have several international students where shadowing requirements are very different. Also, while Human Health Professional and Graduate programs encourage shadowing, most do not have specific shadowing requirements. The Biology faculty will continue to stress the importance of shadowing to our PreMed majors.
	Has the criterion On Student Performance Day, "tweener" students will be asked to read a specific article provided to them by the faculty and then analyze it by answering a series of questions. Students are given 3 hours to complete the assignment. Benchmark: 70% of students scoring an average of 70% or higher on article questions been met yet? Not met	For pre-med students 37% were proficient or better (n=8)		- Refine Assessment Tool: I believe the reason that the benchmark was not met in by many students is because many of the students did not take the assignment seriously. It is not graded, and they know that. The answer to one of the figure questions was pretty clearly written in the text and it seemed like the ones that got that correct, actually read the article and did better overall. Those that missed that question, generally did poorly overall. I believe that next time we should consider giving them the article in advance and having an "entrance quiz" as they walk in the door that ensures they've read the article. This will hopefully allow us to get a more accurate measure of our students' abilities.

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

Standard/Outcome
 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.

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? Not met	Not Met as only 67% of PreVet students scored a Satisfactory or better (>3.5/5) on their Mock interview with two Faculty (n=3)		- Curriculum Revision: Enforce importance of Interview Skills in BIO450
Direct - Class Assignment	Has the criterion 100% of students produce a professional CV. been met yet? Met	100% of PreVet students produce a professional CV or Resume (n=3)		

SPR				
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	Only with Seniors was Benchmark Met, returning PreVet majors was 54.5%. As nearly 50% of the PreVet Majors were incoming freshman, we are not surprised or concerned about this not met especially since 91% of the current students are in the process of obtaining shadowing experience over summer.	Biology_Shadowing____ ALL_BIO_MAJORS_2024.pdf	
	Has the criterion On Student Performance Day, "tweener" students will be asked to read a specific article provided to them by the faculty and then analyze it by answering a series of questions. Students are given 3 hours	Met as 75% of the tweener pre-vet students were proficient (70%) or better (n=12)		

	to complete the assignment. Benchmark: 70% of students scoring an average of 70% or higher on article questions been met yet? Met			
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Analysis of the Assessment Process

Describe your assessment process; clearly articulate how the program uses coursework and or Student Performance Review for program wide assessment. Note any changes that occurred to the process since the previous year. Discuss what activities were successful 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.

For the Biology Program Assessment, we use a mixture of Biology courses in our Core Curriculum, the ETS Biology Major Field Test, Scientific Journal Analysis, and Surveys to assess our Biology students. The Biology Faculty are overall quite satisfied with how we assess the Curriculum, and besides a few minor changes to curriculum and/or Benchmark adjustments, we plan to make no change to our overall assessment plan.

We consider our four core Biology Courses to be BIO114/115 & BIO124/125 (Biology for Majors I & II), BIO231/232 (Genetics), and BIO401 (Evolution). BIO114, BIO124, and BIO231 are the first three Biology courses every Biology major (BA or BS) is required to take and then BIO401 is our required Senior capstone course. All four courses use either a Biology Objective specific quiz or exam questions to assess the students in the course. Three of the four course assessments were met this academic year; where only BIO114 did not meet the 70% of students scoring a 70% or higher on the assessment questions. For the course this year, the questions were taken from the final as opposed to the test immediately after they learned that material. In the past students easily met the benchmark, though we are realizing that they might not have retained the information long-term. In the future, Dr Greenland-White plans to reinforce the concepts for longer-term retention.

During the Student Performance Review (SPR) day, our Seniors take the ETS Biology Major Field Test which allows us to compare the knowledge base of our seniors compared to the other students nationally. For the BS program, 20% of the students did not meet scoring in the 50th percentile or higher (n=10); however, 60% of the BS majors scored at or above the 40th percentile. In addition, six of our graduating students also took the exam as an incoming Freshman, so we were able to assess the “knowledge-gained” from the program. While our students did not meet several of the benchmarks that we had set in terms of the Average for a section subscore and a certain % of the students obtaining a certain section score as a Senior, we did see significant increases in “knowledge-gained” from the program. In terms of “knowledge-gained”, 100% of the BS Seniors had an increase in their Percentile Rank from their Freshman; but 100% had a % change of >117%. (n=6, as we did not have Freshman data for 1 of our BS seniors). In the four sections subscores, 100% of our BS Seniors showed an overall increase in the average of their four section subscores from their Freshman to Senior year, and 83% of them had an increase in all 4 of the section subscores. This large increase in scores from their Freshman to Senior year on a standardized exam, the Biology faculty feel our Biology curriculum is strong and students are able to increase their “knowledge gained” quite significantly.

For Sections I – Cell Biology and Section II – Molecular Biology and Genetics, the benchmarks for the average score and the student’s individual subscores were not met. This result is bit alarming, as the majority of BS seniors plan to apply and go to professional and graduate program based in the health profession (PreMed and PreVet). In fact, in Section II the BS students scored lower than they did as freshman. For Section III – Organismal Biology and Section IV – Population Biology, Evolution and Ecology, the average score of the cohort was not met; however, the second part of benchmark was met as 80% scored 46 or higher for Section II and 70% of the students scored a 51 or higher (n=10). Overall, while the scores of the BS Seniors mostly showed improvement from their freshman year, compared to other Biology students nationally ours underperformed.

As the Assessment for the Concentration Objective, the BS students are assessed on if they have an up-to-date Resume/CV, received an overall score of 3.5 or higher on a Mock interview with Faculty, and participated in the Research Article analysis (tweeners). For this 100% made a Resume/CV in BIO450 and 83% scored a 3.5 or higher on their Mock Interview (n=6) – which was 67% for PreVet and 100% for PreMed students. We were disappointed that only 60% of our BS Tweeners scored a 70% or higher on the research article analysis (n=20); which was 38% for PreMed (n=8) and 75% for PreVet (n=12). We believe the reason that the benchmark was not met by the BS tweeners as a whole was because many of the students did not take the assignment seriously. It is not graded, and they know that. The answer to one of the figure questions was pretty clearly written in the text and it seemed like the ones that got that correct, actually read the article and did better overall on the analysis questions. Those that missed that question, generally did poorly overall. The faculty believe that next time we should consider giving them the article in advance and having an “entrance quiz” as they walk in the door that ensures they’ve read the article. This will hopefully allow us to get a more accurate measure of our students’ abilities.

It is important for students entering health -based careers to shadow to understand the day-to-day expectations for that profession. Of our PreVet majors, 60% of them had shadowing experience either the Summer of 2023 or during the academic year (n=25). It only with the Seniors 100% shadowing that the Benchmark was Met, as returning PreVet majors was 54.5%. As nearly 50% of the PreVet Majors were incoming freshman, we are not surprised or concerned about this not met especially since 91% of the current students are in the process of obtaining shadowing experience over summer. In contrast, only 42% of the PreMed majors had shadowing experience either over the Summer of 2023 or during the 23–24 academic year (n=19). As nearly ~40% of the PreMed Majors were incoming freshman, we are not surprised and are not concerned about this not met, especially since we have several international students where shadowing requirements are very different. Also, while Human Health Professional and Graduate programs encourage shadowing, most do not have specific shadowing requirements. The Biology faculty will continue to stress the importance of shadowing to our PreMed majors.

The Biology faculty attempt to meet weekly throughout the semester, and we will use one of our first meetings in the fall of 2024 to look at our MFT data from the last three to four years and make adjustments to the Benchmark in regards to all four sections and the overall percentile rank as we feel is needed. But as mentioned above, Biology faculty feel we have a strong and competitive curriculum and our students increase their “knowledge gained” scores quite significantly. In addition, the Biology faculty share responsibility in terms of collecting course data, rotating the Research assignment for our Tweeners, and getting a Speaker to give a Research talk at SPR days. The Biology faculty truly work as a cohesive unit to provide support to all of our Biology majors, enthusiastically teach our areas of expertise, and all want our Biology Majors to be successful – and we feel the results in this Assessment Report speak to the fact we are creating an environment conducive to learning.

Improvement Narrative List

Assessment Findings for the Assessment Measure level

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	BIO 114	
Assessment Measure	Direct - Quiz/Exam	
Assessment Findings	Not met	
Improvement Narrative	Improvement Type	Summary
	Curriculum Revision	This year, the questions were taken from the final as opposed to the test immediately after they learned that material. In the past students easily met the benchmark, though I am realizing that they might not have retained the information long-term. In the future I plan to reinforce the concepts for longer-term retention.

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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					
	<table border="1"> <thead> <tr> <th>Improvement Type</th> <th>Summary</th> </tr> </thead> <tbody> <tr> <td>Revise Program Benchmark</td> <td>As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024</td> </tr> </tbody> </table>	Improvement Type	Summary	Revise Program Benchmark	As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024
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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					
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Legend	A
Course/Event	Student Performance Review
Assessment Measure	Direct - External Testing
Assessment Findings	Not met
Improvement Narrative	

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Course/Event	Student Performance Review	
Assessment Measure	Direct - External Testing	
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Legend	A	
Course/Event	Student Performance Review	
Assessment Measure	Direct - External Testing	
Assessment Findings	Not met	
Improvement Narrative	Improvement Type	Summary
	Revise Program Benchmark	As this has not consistently been met for several years, Biology Faculty will consider change this benchmark starting Fall 2024

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	Not met	

Findings					
Improvement Narrative					
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Standard/Outcome	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.					
Legend	A					
Course/Event	Student Performance Review					
Assessment Measure	Indirect - Survey of Students					
Assessment Findings	Not met					
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Standard/Outcome	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.					
Legend	A					
Course/Event	BIO 450					
Assessment Measure	Direct - Interview					
Assessment Findings	Not met					
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Improvement Type	Summary					
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Program Activities

Student Performance Review

Describe the department Student Performance Review activities if not already articulated. Please describe the nature of the assessments conducted as well as the process of assessment happening 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?

Student Performance Review (SPR) days have officially been reduced to one day. Our Student Performance Schedule include the following events: (1) Biology MFT for our Graduating Seniors, (2) Analysis of Research Articles for our second- and third-year Biology Majors (“tweeners”), (3) a survey of students self-reporting their Shadowing experiences (Summer 2023, Winter Break, plan for Summer 2024) for everyone, (4) CLA Exam for our Graduating Seniors (University Assessment), and (5) an “Impartation of Wisdom” luncheon with our new/incoming majors and our graduating seniors. Our planned Speaker cancelled at the last minute, so there was no Research Talk as there has been in the past.

We always use the SPR Days to have our senior students take the Major Field Test (MFT) in Biology. Thirteen Biology Seniors (3 BA and 10 BS Majors) took the MFT this past February. The Biology Faculty are considering changing some of our benchmark from the “average score” to the median score” to help eliminate some of the issues when a single student in the cohort does poorly on the MFT.

This academic year, we again 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 13 Biology graduating senior students who took the MFT this February, only 9 also took the MFT their first year in the program (7/10 BS students and 2/3 BA students). For those nine students, we were able to determine “knowledge gained” while attending WWU. This is the four academic year of a large amount of entering MFT data and exiting MFT data of our seniors, therefore our current Benchmark is only 100% of the students will show a gain in knowledge between the two exams, with 80% increasing by more than 10% - and we achieved that benchmark. We also included the Benchmark for this “knowledge-gained” in the four subsections for our assessment. 100% of our students will show an overall increase in the average of their four subscores from their Freshman to Senior year, and at least 80% of will have an increase in three of the four subscore sections I - IV. This data was 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. Since the data generated in BIO115 is being used simply as an entry-level baseline there is no specific benchmark for the scores on this exam, “Met” simply implies all students declared as majors at that time took the MFT.

The second- and third-year Biology Majors (“tweeners”) students were required to complete a Research Paper Analysis Assessment activity. This was the second year in which we provided our students with a short, peer-reviewed journal article. These students were given three hours and asked to read the journal article and answer the subset of specific questions regarding the figures and the data for the article. This assessment activity is currently under Objective 1 and Objective 3; however, we feel it is better to move the assessment to Objective 5 in order to widen the content area of the journal articles we can use for this assessment. 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.

This is the fourth year that our first – third years students (first – third years) complete a short survey self-reporting their Shadowing experiences for the previous summer (Summer 2023), the Academic Year/Winter Break, and plans they are working on for Summer (2024). This is the first year we incorporated two questions about Shadowing experiences for the previous summer (Summer 2023), the Academic Year/Winter Break for our graduating Seniors. For our BS PreMed majors, only 42% of them report shadowing in a single timeframe, while 60% of our Biology BS PreVet majors reported completing a shadowing experience in either the previous summer (Summer 2023) or the Academic Year/Winter Break timeframes. We expect to see these numbers return to above our 60% Benchmark in the following year. The Biology Faculty liked this change of including the freshman/new majors in this survey and plan to keep the survey of shadowing to all of our non-graduating Biology majors.

Unfortunately, we were unable to hold an in-person research talk this year. 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. Therefore, this event is definitely something we will continue to incorporate into our Student Performance Day schedule.

A new favorite part of SPR days is our “Impartation of Wisdom” lunch event for just our new/incoming students and our outgoing graduating seniors. The Biology Faculty gave the “new” students a set of questions as a conversation starter and we definitely feel this helped make it a very successful event as you could hear the buzz of conversation down the hall. While this event is not necessary for any assessment, this is definitely important in the retention of our students and will definitely have this event each 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 within the now one day SPR event, 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_Department_SPR_Day_Schedule___Spring_2024.pdf

Senior Showcase/Symposium

Describe program activities used to highlight Senior achievement. What benefit does the program gain from the activities? What if any assessment of students happens during this event?

The primary activity that showcases student achievement is that our graduating seniors present a poster during the Symposium for Research, Scholarship, and Creativity. They do most of the work on their poster during BIO 450, Biology Practicum, the previous Spring semester. This year, however, a subset of the students put additional hours of their own time into conducting original research. I believe this was a significant improvement, and moving forward this will be required of our seniors.

The program gains several benefits from this activity.

- Students get to experience a poster session. This is a multidisciplinary event with around 80 posters and is also a LEAD event. The atmosphere is fantastic for our students.
- Students design and present their poster giving them the ability to learn how to communicate science from start to finish.
- They present to other students and faculty, so they must be able to answer a range of questions from basic to complex.

The assessment is done in conjunction with BIO 450, Biology Practicum, and BIO 401, Evolution. BIO 450 assesses their poster to about midway for those who do their own research whereas BIO 401 assesses how their finished product looks, and how well they presented it. Starting next year, BIO 401 will also need to assess the quality of their independent research, data collection, and data analysis.

Tools used for Assessment

Upload rubrics or other Assessment based tools used by the program that are important to the assessment process.

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?

Co-Curricular and LEAD Events

Describe Co-Curricular and LEAD events sponsored by program faculty. This includes LEAD and other events meant to engage students and foster learning outside of the classroom.

The Neuroscience class (BIO343) presented “All about the neuroscience” to Fulton Public Middle School “Project Extra” students, Fulton Missouri, 2024.

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 accomplishment a student achieved outside of course work or the normal expectation of student success.

Alyson Cook – Accepted to three Vet School, and has decided to attend University of Missouri College of Veterinary Medicine start August 2024.

Alumni Accomplishments

Please highlight special examples of any successes of recently graduated alumni (acceptance or graduation graduate school, employment or professional milestones).

Kate Doerhoff (Class of 2021) on December 17, 2023, graduated as a Physician Assistant from The Stephens College Master of Physician Assistant Studies program, Columbia, MO

Kayton Coffee (Class of 2020) on May 7, 2024, graduated with her Doctor of Optometry (OD) from Southern College of Optometry, Memphis, TN

Remi Johnson (Class of 2020) on May 10, 2024, graduated with her DVM from the College of Veterinary Medicine at the University of Missouri, Columbia, MO

Kira Conklin (Class of 2020) on May 10, 2024, graduated with her DVM from University of Illinois at Urbana-Champaign College of Veterinary Medicine, Champaign, IL

Phil Kulpinski (Class of 2018) on May 31, 2024, graduated with his DPM from the Dr. William M. Scholl College of Podiatric Medicine at Rosalind Franklin University, Chicago, IL

Faculty Accomplishments

Highlight special examples of faculty success in the profession/field/content area. This is for any accomplishment of a faculty member that is research or professional in nature.

Greenland-White, S. E. (2023) “Teaching to Different Levels” Talk at the 2023 Faculty for Undergraduate Neuroscience Workshop “Re-imagining Neuroscience Education”. Bellingham Washington.

Hirsch-Jacobson, R. and E. Gardner (2024) School of Science and Health, William Woods University. Urbanization and Pathogenic Infection: An Observational Study of Infection in Urban and Rural Plantago major Populations.

Keller, K. L. (October 2023) Grant Reviewer for the North-Central Region of Beta Beta Beta, various student grant proposals for undergraduate research funding for their research

Assessment Rubric

	3.00 Exceeds	2.00 Meets	1.00 Falls Below Expectations	N/A
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 Student Demographics, Retention, and Degree Completion Data weight: 1.000	✓ The program provides a detailed description on the enrollment, retention, persistence and degree completion 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 enrollment, retention, persistence, and degree completion data provided.	✓ The program does not reflect on enrollment, retention, persistence, and degree completion data in a detailed way.	✓ N/A
Comment:	detailed and complete			
Marketing Materials weight: 1.000	✓ The program outlines the successes and needs in regards to marketing. Detailed suggestions on how to market the program and what niche areas that are program specific would benefit the marketing strategy.	✓ The program discussed the general marketing strategy for the program.	✓ The program provided little to no discussion on the marketing materials or approach to how to market the program.	✓ N/A
Comment:				
Alignment to University Objectives weight: 1.000	✓ The program provides a detailed explanation of how program courses align to the Institutional Objectives. This explanation details specific courses, or activities that coordinate with the intent of the Institutional Objectives.	✓ The program provides a basic explanation of how program courses align to the Institutional Objectives. This explanation provides a minimal understanding of how the program is aligned to the Institutional Objectives.	✓ The program provides little to no explanation of how program courses align to the Institutional Objectives.	✓ N/A
Comment:				
General Education alignment clearly explained weight: 1.000	✓ The program provides a detailed explanation of the General Education criteria 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:				
NSSE Objectives weight: 1.000	✓ The program provided a detailed listing of activities and assessments used within the program that focused on the identified NSSE objectives. The activities and assessments were divided out within the curriculum and impacted different cohort groups.	✓ The program provided a basic explanation of the activities and assessments used within the program that focused on the identified NSSE objectives.	✓ The program provided minimal explanation of the activities and assessments used within the program that focused on the identified NSSE objectives.	✓ N/A
Comment:				
Curriculum Map alignment and changes weight: 1.000	✓ The curriculum map is detailed and complete. All Changes made to the curriculum map are detailed with supporting rationale for the decision..	✓ The curriculum map is complete. Changes made to the curriculum map are explained with some explanation as to why the changes were implemented.	✓ The curriculum map is not complete and little to no explanation on curricular changes was provided.	✓ N/A
Comment:				
Assessment Map 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	✓ An overview of program assessment is provided with details on the specific successes and challenges from the year. A detailed review of how assessment was administered over the academic year is clearly outlined.	✓ A basic overview of program assessment is provided with some details on the successes and challenges from the year. A basic review of how assessment was administered over the academic year is outlined.	✓ A basic overview of program assessment is not provided with little to no discussion on the administration of assessment over the academic year.	✓ N/A
Comment:	Reviewer was not able to find the data from the in house exam but did find the MFT comparison data on the seniors. Did not find data on the incoming cohort. All course based data was present.			

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:	the program provided a detailed explanation on the process of assessment and the various classes and faculty involved.			
Analysis of Assessment 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 and LEAD 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
Comment:				

Appendix: Supplemental Data

Name	Student	BA in Biology Biology PreMed Biology PreVet	BS BS	TOTAL SCORE	Percentile Rank	1	2	3	4
	A	BS Biology PreMed		149	40	45	58	52	43
	B	BS Biology PreVet		151	46	38	41	54	61
	C	BS Biology PreVet		157	63	57	58	50	61
	D	BS Biology PreMed		153	52	42	58	56	52
	E	BA in Biology		159	69	48	68	60	56
	F	BS Biology PreMed		143	25	38	34	46	52
	G	BA in Biology		163	78	59	44	62	77
	H	BS Biology PreMed		142	21	48	34	35	52
	I	BS Biology PreMed		145	28	35	47	46	52
	J	BS Biology PreVet		150	44	48	47	48	56
	K	BA in Biology		130	4	23	27	21	52
	L	BS Biology PreVet		149	40	38	47	62	43
	M	BS Biology PreMed		138	13	35	50	35	41

Subscore 1: Cell Biology

Subscore 2: Molecular Biology and Genetics

Subscore 3: Organismal Biology

Subscore 4: Population Biology, Evolution and Ecology

	Total score (Range is 120-200)	Overall 2024 (percentile)	Raw score Section 1 2024	Raw score Section 2 2024	Raw score Section 3 2024	Raw score Section 4 2024
B	151	46	38	41	54	61
C	157	63	57	58	50	61
J	150	44	48	47	48	56
L	149	40	38	47	62	43
A	149	40	45	58	52	43
D	153	52	42	58	56	52
F	143	25	38	34	46	52
H	142	21	48	34	35	52
I	145	28	35	47	46	52
M	138	13	35	50	35	41
E	159	69	48	68	60	56
G	163	78	59	44	62	77
K	130	4	23	27	21	52
	148	40	43	47	48	54

BS Only	Total score (Range is 120-200)	Overall 2024 (percentile)	Raw score Section 1 2024	Raw score Section 2 2024	Raw score Section 3 2024	Raw score Section 4 2024
B	151	46	38	41	54	61
C	157	63	57	58	50	61
J	150	44	48	47	48	56
L	149	40	38	47	62	43
A	149	40	45	58	52	43
D	153	52	42	58	56	52
F	143	25	38	34	46	52
H	142	21	48	34	35	52
I	145	28	35	47	46	52
M	138	13	35	50	35	41
	148	37	42	47	48	51

Section I	Not Met = Only 10% scored a 51 or higher and the average for this Section was only a 42	n=10
Section II	Not Met = Only 30% scored a 51 or higher and the average for this Section was only a 47	n=10
Section III	Met = 80% scored a 46 or higher; but Not Met as Average was 48	n=10
Section IV	Met = 70% scored a 51 or higher; but Not Met as Average was 51	n=10

BIO124 - Biology for Majors II	Quiz #10	%	Zeros removed as these were students who did not take the quiz	# Students who got 70% or better	% of student getting below 70% excluding 0's	% students getting 70% or better
Student 1	0	0	100	18	4	0.82
Student 2	10	100	100			
Student 3	0	0	100			
Student 4	10	100	100			
Student 5	8	80	100			
Student 6	6	60	100			
Student 7	4	40	100			
Student 8	8	80	100			
Student 9	10	100	80			
Student 10	10	100	80			
Student 11	8	80	80			
Student 12	8	80	80			
Student 13	8	80	80			
Student 14	6	60	80			
Student 15	8	80	80			
Student 16	0	0	80			
Student 17	10	100	80			
Student 18	0	0	80			
Student 19	0	0	60			
Student 20	8	80	60			
Student 21	0	0	60			
Student 22	8	80	40			
Student 23	0	0	0			
Student 24	6	60	0			
Student 25	0	0	0			
Student 26	10	100	0			
Student 27	8	80	0			
Student 28	10	100	0			
Student 29	8	80	0			
Student 30	10	100	0			

BIO401 - Evolution

	Quiz #10	%	Zeros removed as these were students who did not take the quiz	# Students who got 70% or better	% of student getting below 70% excluding 0's	% students getting 70% or better
Student 1	0	0	100	9	2	0.82
Student 2	9	90	100			
Student 3	8.5	85	95			
Student 4	10	100	90			
Student 5	9	90	90			
Student 6	6	60	90			
Student 7	9	90	90			
Student 8	6	60	90			
Student 9	9	90	85			
Student 10	10	100	60			
Student 11	9.5	95	60			
Student 12	0	0	0			
Student 13	9	90	0			

Quiz 11 – ASSESSMENT Quiz in BIO231 Genetics – Fall 2023

Points	2	3	2	3	4	3	3	__ / 20	%
Student	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Total	Grade
A	2	3	2	3	4	3	3	20	100
B	2	3	2	3	4	3	3	20	100
C	2	3	2	3	4	3	3	20	100
D	1.5	2.5	2	3	4	3	3	19	95
E	2	2.75	1.75	3	3.5	3	3	19	95
F	2	2.75	2	3	4	2	3	18.75	93.75
G	1.75	3	2	3	4	3	2	18.75	93.75
H	2	3	2	3	4	1.5	3	18.5	92.5
I	2	2.5	2	3	4	2.5	2.5	18.5	92.5
J	2	3	0.5	3	4	3	3	18.5	92.5
K	1.5	2.5	1	3	4	2.5	3	17.5	87.5
L	2	2.5	1.5	3	3.5	2	3	17.5	87.5
M	2	2	2	3	4	2.5	1.5	17	85
N	1.75	2	1	3	4	2	3	16.75	83.75
O	2	2.5	0	3	4	3	2	16.5	82.5
P	2	2.5	2	3	4	1	1.5	16	80
Q	1.5	3	2	3	4	1	1	15.5	77.5
R	1.5	3	1	3	4	0	3	15.5	77.5
S	2	3	0	0	4	3	1	13	65
T	1.5	2	2	3	2	1	1	12.5	62.5
U	1.75	2	1.75	2	2	1	1	11.5	57.5
V	0	1.5	1	0	3	1	1	7.5	37.5
W	2	1.5	0	0	0	0	0	3.5	17.5

78% of students scored a 70% or higher on the final Assessment Quiz. (n = 23)

BIO450 Biology Practicum - Mock Interviews with Faculty Spring 2024

Reviewer 1					
	Criteria 1	Criteria 2	Criteria 3	Criteria 4	AVG
PreVet	4.5	5	5	4.5	4.75
PreVet	3	4	5	3	3.75
PreVet	3	3.5	4	3.5	3.50
PreMed	3.5	3.5	4.5	3	3.63
PreMed	3.75	3	4.5	3.5	3.69
PreMed	3	3.5	4	3.5	3.50
BA	3	3.5	4	3.75	3.56
BA	4.5	4	5	4.5	4.50

Reviewer 2					
	Criteria 1	Criteria 2	Criteria 3	Criteria 4	AVG
PreVet	4	4.5	5	4.5	4.50
PreVet	3	4	4	4	3.75
PreVet	2.5	3	3.5	3.5	3.13
BA	3.5	4.5	4	4	4.00
PreMed	3	4.5	4	4	3.88
PreMed	3	4	4	4	3.75
BA	2.5	3	3	3	2.88
PreMed	4	4	4	4	4.00

	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Criteria 1	Criteria 2	Criteria 3	Criteria 4	AVG
PreVet	4.5	5	5	4.5	4	4.5	5	4.5	4.63
PreVet	3	4	5	3	3	4	4	4	3.75
PreVet	3	3.5	4	3.5	2.5	3	3.5	3.5	3.31
PreMed	3.5	3.5	4.5	3	3.5	4.5	4	4	3.81
PreMed	3.75	3	4.5	3.5	3	4.5	4	4	3.78
PreMed	3	3.5	4	3.5	3	4	4	4	3.63
BA	3	3.5	4	3.75	2.5	3	3	3	3.22
BA	4.5	4	5	4.5	4	4	4	4	4.25

Class 75% scored Satisfactory ($\geq 3.5/5$) on their Mock interview with two Faculty (n=8)

PreVet 67% scored Satisfactory ($\geq 3.5/5$) on their Mock interview with two Faculty (n=3)

PreMed 100% scored Satisfactory ($\geq 3.5/5$) on their Mock interview with two Faculty (n=3)

Biology Department SPR Day – Spring 2024 – Wednesday, February 2024

Events are **REQUIRED** of all Biology Majors

Time	Group	Event	Room	Faculty in Charge
10:00am – 12:00pm	Graduating Seniors	Biology Major Field Test	Cox200	Dr. Robin Hirsch-Jacobson
10:00 – 2:30pm	ALL Biology Majors	On-line Survey about Shadowing <i>Seniors don't leave MFT until they do it</i>	Online – check email	Dr. Kimberly Keller
10:00am – 12:00pm	2nd and 3rd years	Journal Article Review/Data Interpretation/ Figure Analysis Bring your Laptop Computers	Cox209	Dr. Kimberly Keller
12:30 – 1:30pm	Graduating Seniors & First years	Impartation of Wisdom Lunch	Cox 300	Dr. Sarah Greenland-White
1:30 – 2:00pm	First years	Advice I wish someone had told me when I was a 1st year	Cox 300	Dr. Sarah Greenland-White
2:00 – 3:30pm	Non-transfer, Senior status	University-wide CLA Testing	Cox200	Dr. Kimberly Keller
6:00 – 7:00pm	All Biology Majors	Talk **name** and person	Dulany Library Auditorium	Dr. Sarah Greenland-White

Graduating Seniors = Graduating Biology majors who are currently enrolled in BIO401 (Evolution)

Non-transfer, Senior status = Student with Senior status (90+ earned credit hours) that did not transfer into WWU (See your advisor if unsure)

2nd and 3rd years = Biology students who have completed BIO231/ 2332 (Genetics) but are **NOT** enrolled in BIO401 (Evolution)

First years = Incoming majors whose Biology courses this academic year have been the Biology for Majors I and II series (BIO114/115 & BIO124/125) and these students have **NOT** taken BIO231/232 (Genetics)

UG – BS PreVet Shadowing Survey

NON-Seniors Actually Shadowed Summer or Academic Year

- Yes 12
- No 10

Seniors Actually Shadowed Summer or Academic Year

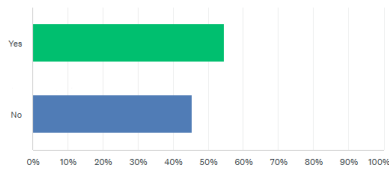
- Yes 3
- No 0

ALL PreVet Concentration Students that Actually Shadowed during Summer 2023 or during the 23–24 Academic Year

- Yes 15
- No 10
- = 60% of PreVet Majors

Do you have a current resume or curriculum vitae?

Answered: 22 Skipped: 0



ANSWER CHOICES	RESPONSES
Yes	54.55% 12
No	45.45% 10
TOTAL	22

Met as 60% of the PreVet majors had shadowing experience either the Summer of 2023 or during the academic year. (n=25)

Only with Seniors was Benchmark Met, returning PreVet majors was 54.5%. As nearly 50% of the PreVet Majors were incoming freshman, we are not surprised or concerned about this not met especially since 91% of the current students are in the process of obtaining shadowing experience over summer.

Summer 23

11 Yes 4 8 10 11 12 15 16 17 19 20 21
 11 No 1 2 3 5 6 7 9 13 14 18 22

Academic Year

8 Yes 4 10 11 12 13 15 16 17
 14 No 1 2 3 5 6 7 8 9 14 18 19 20 21 22

Summer

6 Yes 4 9 10 11 13 16
 2 No 3 7
 14 In Planning 1 2 5 6 8 12 14 15 17 18 19 20 21 22

UG – BS PreMed Shadowing Survey

NON-Seniors Actually Shadowed Summer or Academic Year

- Yes 4
- No 10

Seniors Actually Shadowed Summer or Academic Year

- Yes 4
- No 1

ALL PreMed Concentration Students that Actually Shadowed during Summer 2023 or during the 23–24 Academic Year

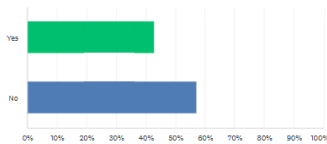
- Yes 8
- No 11
- = 42% of PreMed Majors

Not Met as only 42% of the PreMed majors had shadowing experience either over the Summer of 2023 or during the 23–24 academic year. (n=19)

As nearly ~40% of the PreMed Majors were incoming freshman, we are not surprised and are not concerned about this not met, especially since we have several international students where shadowing requirements are very different. Also, while Human Health Professional and Graduate programs encourage shadowing, most do not have specific shadowing requirements. The Biology faculty will continue to stress the importance of shadowing to our PreMed majors.

Do you have a current resume or curriculum vitae?

Answered: 14 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	42.86%	6
No	57.14%	8
TOTAL		14

Shadowed Summer or Academic Year

Yes 4
No 10

Summer 23

2 Yes 13 5
12 No 14 12 11 10 9 8 7 6 4 3 2 1

Academic Year

4 Yes 13 **11 6** 5
10 No 14 12 10 9 8 7 4 3 2 1

Summer

3 Yes 11 8 5
2 No 9 2
9 In Planning 14 13 12 10 7 6 4 3 1

UG – Biology BA Shadowing Survey

NON-Seniors Actually Shadowed Summer or Academic Year

- Yes 1
- No 4

Seniors Actually Shadowed Summer or Academic Year

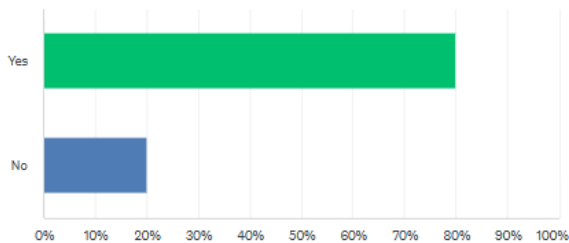
- Yes 1
- No 2

Total PreVet Concentration Actually Shadowed Summer or Academic Year

- Yes 2
- No 6
- = 25% of BA Majors

Do you have a current resume or curriculum vitae?

Answered: 5 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	80.00%	4
No	20.00%	1
TOTAL		5

Shadowed Summer or Academic Year

Yes 1
No 4

Summer 23

1 Yes 3
4 No 1 2 4 5

Academic Year

0 Yes
5 No 1 2 3 4 5

Summer 24

2 Yes 1
0 No 2
3 In Planning 3 4 5