

Degree: Bachelor of Science in Biology/Secondary Teacher Certification
2023-2024 Assessment Report

	Student Learning Outcome #1	Students will demonstrate knowledge of the fundamental principles of biology.
PLAN	Assessment Method(s)	ETS Major Field Exam in Biology administered twice annually to senior-level biology majors.
	Proficiency	At least 50% of Lamar biology students will score at or above the national average for total exam score. At least 50% of Lamar biology students will score at or above the 50 th percentile nationally for total exam score.
DO	Benchmark	National mean and percentile data. ETS publishes national comparative data each fall for the previous academic year.
	Results of Assessment	Lamar Biology partially met expectations on the overall performance on the ETS MFE with 54% scoring at or above the national mean and 45% scoring at or above the 50 th percentile.
S T U D Y	Analysis of Results	A total of 41 students took the Biology MFE exam with the majority of our students scoring at or above the national average. While we did not achieve our goal of half of our students scoring in the 50 th percentile, we had several students in the next percentile bracket, indicating that we are very close to attaining our goal.

ACT	Improvement Plan for 2024-2025	There is no specific action plan associated with these outcomes as they are a reflection of overall student performance on the individual test sections used in outcomes below. Successful implementation of the plans outlined below should lead to the department achieving its goals within the next two reporting cycles.
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	Student Learning Outcome #2	Students will demonstrate knowledge of the fundamental principles of cell biology.
PLAN	Assessment Method(s)	ETS Major Field Exam in Biology administered twice annually to senior-level biology majors.
	Proficiency	<p>At least 50% of Lamar biology students will score at or above the national average for the <i>Cell Biology</i> subscore and the <i>Biochemistry and Cell Energetics</i> and <i>Cellular Structure, Organization, and Function</i> assessment indicators.</p> <p>At least 50% of Lamar biology students will score at or above the 50th percentile nationally for the <i>Cell Biology</i> subscore and the <i>Biochemistry and Cell Energetics</i> and <i>Cellular Structure, Organization, and Function</i> assessment indicators.</p>
DO	Benchmark	National mean and percentile data. ETS publishes national comparative data each fall for the previous academic year.
	Results of Assessment	<p>Lamar Biology did not meet expectations for 50% of students scoring at or above the national average for <i>Cell Biology</i> subscore (38%) and the <i>Biochemistry and Cell Energetics</i> (38%) and <i>Cellular Structure, Organization, and Function</i> (40%) assessment indicators.</p> <p>Lamar Biology did not meet expectations for students scoring at the 50th percentile or higher for the <i>Cell biology</i> subscore (38%), <i>Biochemistry and Cell Energetics</i> (38%) and <i>Cellular Structure, Organization, and Function</i> (31%) assessment indicators.</p>

S T U D Y	Analysis of Results	<p><i>Cell biology, Biochemistry & Cellular energetics, and Cellular structure, organization and function</i> have historically been weak areas of performance for Lamar students. Our current action plan to address this issue was implemented during the 22-23 reporting cycle and included major revisions to the instructional units of 1406 that covered these topics. As this is an entry level course and the students taking the MFE are seniors, there has been insufficient time for the results of these improvements to be realized in this cycle. We will continue to implement our current plan for the next two cycles.</p> <p>Enrollment in BIOL 4470 Cell Biology has decreased in recent years as well possibly due to scheduling conflicts with other biology core classes. This course provides further re-enforcement of the concepts and would help boost scores in these areas.</p>
ACT	Improvement Plan for 2024-2025	<p>The cellular respiration and metabolism module in BIOL3440 Advanced physiology will be revised and moved to earlier in the semester. The course has not been taught in two years and its rotation in the teaching carousel will be re-examined.</p> <p>BIOL1406 will continue to refine its pedagogy of these topics to increase student retention of the information.</p> <p>BIOL4470 Cell biology is adding updated and additional information on cell structure and bioenergetics to its curriculum. Efforts will be made to track the performance of students who have been through the course on this section of the MFE.</p> <p>Scheduling of biology core classes will be examined for conflicts with cell biology.</p> <p>The department is discussing reorganizing its curriculum into tracks, one of which is cellular and molecular biology. Another part of the discussion includes examining the content of the second semester of organic chemistry and potentially replacing that requirement with a semester of biochemistry.</p>

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	Student Learning Outcome #3	Students will demonstrate knowledge of the fundamental principles of molecular biology and genetics.
PLAN	Assessment Method(s)	ETS Major Field Exam in Biology administered twice annually to senior-level biology majors.
	Proficiency	<p>At least 50% of Lamar biology students will score at or above the national average for the <i>Molecular Biology and Genetics</i> subscore and the <i>Molecular Biology and Molecular Genetics</i> assessment indicator.</p> <p>At least 50% of Lamar biology students will score at or above the 50th percentile nationally for the <i>Molecular Biology and Genetics</i> subscore and the <i>Molecular Biology and Molecular Genetics</i> assessment indicator.</p>
DO	Benchmark	National mean and percentile data. ETS publishes national comparative data each fall for the previous academic year.
	Results of Assessment	<p>Lamar Biology met expectations for $\geq 50\%$ of students scoring at or higher than the national average for the <i>Molecular Biology and Genetics</i> subscore (55%) and the <i>Molecular Biology and Molecular Genetics</i> assessment indicator (55%).</p> <p>Lamar Biology partially met expectations scoring at or above the 50th percentile for the <i>Molecular Biology and Genetics</i> subscore (69%) and the <i>Molecular Biology and Molecular Genetics</i> assessment indicator (38%).</p>

S T U D Y	Analysis of Results	This area has historically been strong, partly due to many of the students being co-enrolled in genetics at the time of the exam. This ensures that the information and concepts are fresh in their minds. With the decreasing enrollment in cell biology as mentioned above, more students are enrolling in the BIOL4404 Molecular biology option. This switch is evident in the high scores for the molecular biology section.
ACT	Improvement Plan for 2024-2025	BIOL 3470 Genetics will revise and expand its instructional unit on molecular genetics. As the department lost its genetics instructor this past year we will be able to retool the curriculum to address this shortcoming.

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	Student Learning Outcome #4	Students will demonstrate knowledge of the fundamental principles of organismal biology.
PLAN	Assessment Method(s)	ETS Major Field Exam in Biology administered twice annually to senior-level biology majors.
	Proficiency	<p>At least 50% of Lamar biology students will score at or above the national average for the <i>Organismal Biology</i> subscore and the <i>Organismal – Animals</i> and <i>Organismal – Plants</i> assessment indicators.</p> <p>At least 50% of Lamar biology students will score at or above the 50th percentile nationally for the <i>Organismal Biology</i> subscore and the <i>Organismal – Animals</i> and <i>Organismal – Plants</i> assessment indicators</p>
DO	Benchmark	National mean and percentile data. ETS publishes national comparative data each fall for the previous academic year.
	Results of Assessment	<p>Lamar Biology partially met expectations for $\geq 50\%$ of students scoring at or above the national average for <i>Organismal Biology</i> subscore (57%), <i>Organismal – Animals</i> (43%) and <i>Organismal – Plants</i> (64%) assessment indicators.</p> <p>Lamar Biology partially met expectations for 50% of students scoring at or above the 50th percentile for the <i>Organismal Biology</i> subscore (67%), <i>Organismal – Animals</i> (19%), and <i>Organismal – Plants</i> (53%) assessment indicators.</p>

S T U D Y	Analysis of Results	<p>Overall, Lamar students scored well on this section, with the exception of the <i>Organismal - Animal</i> scoring. Students are exposed to the diversity of life throughout their curriculum. We continue to score well above the national average in the <i>Organismal – Plant</i> section as it is a required course that all majors take and is most often taken within a semester of taking the MFE. The lower percent on the <i>Organismal- Animal</i> assessment indicator is a little surprising given the number of animal-based courses that students take., however many of these are focused on a smaller subset of animals (e.g Ichthyology – fish), decreasing the breadth of exposure. Much of the animal diversity has been removed from BIOL1407 to make room in the curriculum for other topics (i.e ecology and physiology).</p>
ACT	Improvement Plan for 2024-2025	<p>BIOL 1407 will revise its animal form and function module and re-examine its laboratory exercises that focus on those areas. More animal diversity will be added into the curriculum.</p> <p>BIOL3460 Invertebrate zoology will include more in-class activities (e.g. worksheets and group work) to increase student retention of information. One of their largest hurdles is the unfamiliar terminology.</p>

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	Student Learning Outcome #5	Students will demonstrate knowledge of the fundamental principles of population biology, evolution, and ecology.
PLAN	Assessment Method(s)	ETS Major Field Exam in Biology administered twice annually to senior-level biology majors.
	Proficiency	<p>At least 50% of Lamar biology students will score at or above the national average for the <i>Population Biology, Evolution, and Ecology</i> subscore and the <i>Population Genetics and Evolution</i> and <i>Ecology</i> assessment indicators.</p> <p>At least 50% of Lamar biology students will score at or above the 50th percentile nationally for the <i>Population Biology, Evolution, and Ecology</i> subscore and the <i>Population Genetics and Evolution</i> and <i>Ecology</i> assessment indicators</p>
DO	Benchmark	National mean and percentile data. ETS publishes national comparative data each fall for the previous academic year.
	Results of Assessment	<p>Lamar Biology met expectations for $\geq 50\%$ of students scoring at or above the national average for <i>Population Biology, Evolution, and Ecology</i> subscore (57%), <i>Population Genetics and Evolution</i> (50%) and <i>Ecology</i> (56%) assessment indicators.</p> <p>Lamar Biology partially met expectations for $\geq 50\%$ of students scoring at or above the 50th percentile for <i>Population Biology, Evolution, and Ecology</i> subscore (57%); <i>Population Genetics and Evolution</i> (33%) and <i>Ecology</i> (40%) assessment indicators.</p>

S T U D Y	Analysis of Results	<p>While the majority of our students are performing at or above the national means for these subjects, we are not meeting our goal of the majority of them scoring in the 50th percentile or greater. Our current action plan to address this issue was implemented during the 22-23 reporting cycle and included major revisions to the instructional units of 1406 and 1407 that covered these topics. As this is an entry level course and the students taking the MFE are seniors, there has been insufficient time for the results of these improvements to be realized in this cycle. We will continue to implement our current plan for the next two cycles.</p> <p>The new student-centered learning activities modeling the roles of mutations and natural selection in evolutionary outcomes that was taught in the senior capstone course Development of Biological Thought did not have the desired effect increasing individual performance.</p>
ACT	Improvement Plan for 2024-2025	<p>In recent discussions, the department identified evolution and ecology as important “core” knowledges all biology majors should have. Plans to develop a sophomore level evolution course are moving forward. Plans to re-organize the Biology degree plan to incorporate this addition and an ecology requirement are also under discussion.</p> <p>Refinement of the instructional units on mutation & natural selection and evolution in BIOL 1406 and 1407.</p> <p>The student-centered learning activities in Development of Biological Thought will be reviewed and revised to facilitate student success in these areas.</p>

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	Student Learning Outcome #6	Students will analyze and interpret data in solving problems in the biological sciences.
PLAN	Assessment Method(s)	ETS Major Field Exam in Biology administered twice annually to senior-level biology majors.
	Proficiency	At least 50% of Lamar biology students will score at or above the national average for the <i>Analytical Skills</i> assessment indicator. At least 50% of Lamar biology students will score at or above the 50th percentile nationally for the <i>Analytical Skills</i> assessment indicator.
DO	Benchmark	National mean and percentile data. ETS publishes national comparative data each fall for the previous academic year.
	Results of Assessment	Lamar Biology met expectations for $\geq 50\%$ of students scoring at or above the national average for the <i>Analytical Skills</i> assessment indicator (57%). Lamar Biology did not meet expectations for $\geq 50\%$ of students scoring at or above the 50th percentile nationally for the <i>Analytical Skills</i> assessment indicator (33%).
S T U D Y	Analysis of Results	While the majority of Lamar students are scoring at the national mean they are still not performing well on this section. This cohort of students includes many who were subjected to the reduced learning environment associated with COVID. The critical time when the analytical thinking skills are developed were spent in the online learning environment with inconsistent mentorship and supervision.

ACT	Improvement Plan for 2024-2025	<p>BIOL 1406 and 1407 will continue to develop student centered learning activities in both lecture and lab to develop and foster analytical thinking skills.</p> <p>BIOL 3440 Advanced physiology will include more in-class activities, including think pair-share, to provide further development of analytical skills.</p>
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