Academic Program Assessment Report

Assessment is a term commonly used to encompass the process of gathering and using evidence to guide improvements.

SACSCOC requires that an institution "identifies expected outcomes, assesses the extent to which it achieves these outcomes, and provides evidence of seeking improvement based on analysis of the results".

Be sure to SAVE your progress as you work!

Academic Program
Biology, B.S.

Submission Due Date
Fall 2025: October 1, 2025

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Program Goal

Goal

Goal 1

Program Goals are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

Program Goal
Students will demonstrate an understanding of evolution, structure and function relationships, information flow and exchange, pathways and transformations of energy and matter, and the interconnectedness within and among living systems.

Pillar of Success Supported
High-Demand, Market-Driven Programs

Outcomes

Outcome 1

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?

Student Learning Outcome

Enter Outcome
Percent of selected questions about evolution on the Major Field Test (MFT) in biology on which the percent of Lander students answering correctly was as high or higher than the national percent of students answering correctly.

Timeframe for this Outcome
Academic Year 2024-2025

Performance Target for "Met"
Over the past five years, the average percent of Lander students answering the question correctly was as high or higher than the percent of students answering the question correctly nationally on 60% of the questions.

Performance Target for "Partially Met"
Over the past five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on at least 50% but fewer than 60% of the questions

Performance Target for "Not Met"
Over the last five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on fewer than 50% of the questions

Assessment Measure Used
Major Field Test in Biology

Frequency of Assessment
Every fall and spring semester to students enrolled in BIOL 499

Data Collected for this Timeframe (Results)
64%

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative
Calculated as a five-year rolling average, the percent of Lander students answering questions about evolution on the MFT was as high as or higher than the national average on 64% of the questions. Students met expectations for this outcome (> 60%). As is true in every cohort of biology majors now, each student taking the MFT this year had completed an evolution course (either our BIOL 303 Evolution course or a course that transferred in as equivalent) during their degree program. Every student in this cohort (who completes their biology courses in our department) will have had the benefit of our revised introductory biology curriculum (now BIOL 111/112) and required diversity course (BIOL 213 or BIOL 214) which also cover topics in basic evolutionary biology. The students taking the MFT during this assessment cycle and cycles since 2020 have had extensive coursework in evolution, which has led to students doing quite well in this category, scoring better than the national average on between 50 and 81% of questions in the 8 years this data has been collected.

This is the first year the outcomes for goal 1 have been reported as a five-year rolling average, rather than an individual year. The percent of Lander students taking the MFT in Fall 2024 and Spring 2025 answering questions about evolution on the MFT was as high as or higher than the national average on 56% of the questions. If the data were reported for a single year, this goal would be partially met. However, this cohort was slightly smaller than average, and we think it is likely that any differences in scores are due to stochastic effects.

We will continue to monitor the MFT scores of students on questions related to evolution. If students do not meet expectations for several consecutive years, we will address weaknesses in the curriculum.

Resources Needed to Meet/Sustain Results
An “Item Information Report” of the MFT from the ETS, which can be purchased for $350 per year is required to sustain results. Resource identified as needed in 2017-2018, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025 assessment reports.

Explanation of How Resources Will Be Used
The item information report will allow biology students at Lander to be compared to students nationally specifically for questions relating to evolution. The biology department will use this data to determine which specific areas of the program need improvement. Additionally, results from questions related to evolution will be shared with the relevant instructors so that those faculty members can focus instruction in specific areas needing improvement.

Outcome 2

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Percent of selected questions about structure and function relationships on the Major Field Test (MFT) in biology on which the percent of Lander students answering correctly was as high or higher than the national average percent of students answering correctly.

Timeframe for this Outcome
Academic Year 2024-2025

Performance Target for "Met"
Over the past five years, the average percent of Lander students answering the question correctly was as high or higher than the percent of students answering the question correctly nationally on 60% of the questions

Performance Target for "Partially Met"
Over the past five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on at least 50% but fewer than 60% of the questions

Performance Target for "Not Met"
Over the last five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on fewer than 50% of the questions

Assessment Measure Used
Major Field Test in Biology

Frequency of Assessment
Every fall and spring semester to students enrolled in BIOL 499

Data Collected for this Timeframe (Results)	Score (Met=3, Partially Met=2, Not Met=1)
47%	1

Comments/Narrative
Calculated as a five-year rolling average, the percent of Lander students correctly answering questions about the relationship between structure and function on the MFT was as high as or higher than the national average on 47% of the questions. Students did not meet expectations in this category (under 50%). However, this year the percent of Lander students answering correctly was as high or higher than the national average on 63% of questions, an improvement over last year's score, when Lander students did better than the national average on 53% of questions, and a dramatic improvement over two years ago when the number was only 21%. The data for this outcome are extremely variable, and over the 8 years it has been collected, the percent of Lander students correctly answering questions about the relationship between structure and function was as high or higher than the national average on between 21% and 68% of the questions.

One possible explanation for the range of scores is that the biology curriculum is structured so that students are required to take one course emphasizing the relationship between structure and function, but that course can focus on plants, animals, or cells. Questions on the MFT span all areas, and unfortunately, the specific information students acquire in one course does not apply to other courses for this outcome. We do, however, know that students are retaining knowledge about the specific classes that they take. For example, students who take one or two classes about plants do significantly better than the national average on questions about plants on the MFT. Similarly, students who take two classes focusing on cell biology do dramatically better than the national average on cell-related questions on the MFT. While the biology faculty will continue to look for ways to emphasize the relationship between structure and function, the limitations of the data available from the MFT (i.e., we cannot know how each student answered each question) may mean that we will continue to have variable results on this objective.

Resources Needed to Meet/Sustain Results
An "Item Information Report" of the MFT from the ETS, which can be purchased for $350 per year is required to sustain results. Resource identified as needed in 2017-2018, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025 assessment reports.

Explanation of How Resources Will Be Used
The item information report will allow biology students at Lander to be compared to students nationally specifically for questions relating to structure and function. The biology department will use this data to determine which specific areas of the program need improvement. Additionally, results from questions related to structure and function will be shared with the relevant instructors so that those faculty members can focus instruction in specific areas needing improvement.

Outcome 3

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Percent of selected questions about information flow and exchange on the Major Field Test (MFT) in biology on which the percent of Lander students answering correctly was as high or higher than the national average percent of students answering correctly.

Timeframe for this Outcome
Academic Year 2024-2025

Performance Target for "Met"
Over the past five years, the average percent of Lander students answering the question correctly was as high or higher than the percent of students answering the question correctly nationally on 60% of the questions

Performance Target for "Partially Met"
Over the past five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on at least 50% but fewer than 60% of the questions

Performance Target for "Not Met"
Over the last five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on fewer than 50% of the questions

Assessment Measure Used
Major Field Test in Biology

Frequency of Assessment
Every fall and spring semester to students enrolled in BIOL 499

Data Collected for this Timeframe (Results)
59%

Score (Met=3, Partially Met=2, Not Met=1)
2

Comments/Narrative
Calculated as a five-year rolling average, the percent of Lander students correctly answering questions about information flow and exchange on the MFT was as high as or higher than the national average on 59% of the questions. Students partially met expectations in this category (50-60%). This result has been exactly the same (i.e., Lander students are better than the national average on 59% of questions) for the past three years. Our results indicate that student understanding of information flow and exchange in biological systems is close to but generally falls short of fully meeting expectations.

All of the students taking the MFT in the past 8 years had completed a genetics course (either our BIOL 312 Genetics course or a course that transferred in as equivalent) during their degree program. Every student since the 2020-2021 cohort (who completes their biology courses in our department) will have had also the benefit of our revised introductory biology curriculum (now BIOL 111/112), and at least one upper-level biology course emphasizing information flow and exchange. However, understanding information flow and exchange requires not only memorization of facts, but also the ability to synthesize material learned throughout the curriculum. As a result, these will likely continue to be difficult concepts for students. While the department was not able to offer Advanced Genetics in the 2024-2025 academic year, we do plan to offer it this spring, which will provide students with an opportunity to further explore topics related to information flow and exchange. We will continue to monitor student success after these changes have been implemented.

Resources Needed to Meet/Sustain Results
An “Item Information Report” of the MFT from the ETS, which can be purchased for $350 per year is

required to sustain results. Resource identified as needed in 2017-2018, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025 assessment reports.

Explanation of How Resources Will Be Used
The item information report will allow biology students at Lander to be compared to students nationally specifically for questions relating to information flow and exchange. The biology department will use this data to determine which specific areas of the program need improvement. Additionally, results from questions related to information flow and exchange will be shared with the relevant instructors so that those faculty members can focus instruction in specific areas needing improvement.

Outcome 4

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Percent of selected questions about the pathways and transformations of energy and matter on the Major Field Test (MFT) in biology on which the percent of Lander students answering correctly was as high or higher than the national average percent of students answering correctly.

Timeframe for this Outcome
Academic Year 2024-2025

Performance Target for "Met"
Over the past five years, the average percent of Lander students answering the question correctly was as high or higher than the percent of students answering the question correctly nationally on 60% of the questions

Performance Target for "Partially Met"
Over the past five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on at least 50% but fewer than 60% of the questions

Performance Target for "Not Met"
Over the last five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on fewer than 50% of the questions

Assessment Measure Used	**Frequency of Assessment**
Major Field Test in Biology	Every fall and spring semester to students enrolled in BIOL 499
Data Collected for this Timeframe (Results)	**Score (Met=3, Partially Met=2, Not Met=1)**

52% 2

Comments/Narrative
Calculated as a five-year rolling average, the percent of Lander students answering questions about the pathways and transformations of energy and matter on the MFT was as high as or higher than the national average on 52% of the questions. Students partially met expectations in this category (50% - 60%). If only this year is considered, the results are similar and Lander students did better than the national average on 50% of questions.

Since 2021/2022, the five-year rolling average varies from 47% to 54%, indicating that students are usually not meeting or only partially meeting the objective. These data indicate a persistent weakness in the biology students' understanding of pathways and transformations of energy and matter in biology. We will continue to track student success and find specific ways to address these topics throughout the relevant courses in our curriculum. These results will be discussed with the faculty teaching relevant courses to find ways to better introduce and reinforce these concepts throughout our curriculum. Similarly to other outcomes for this goal, understanding the pathways and transformations of energy and matter requires not only memorization of facts, but also the ability to synthesize material learned throughout the curriculum, these will likely continue to be difficult concepts for students.

Resources Needed to Meet/Sustain Results
An "Item Information Report" of the MFT from the ETS, which can be purchased for $350 per year is required to sustain results. Resource identified as needed in 2017-2018, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025 assessment reports.

Explanation of How Resources Will Be Used
The item information report will allow biology students at Lander to be compared to students nationally specifically for questions relating to the pathways and transformations of energy and matter. The biology department will use this data to determine which specific areas of the program need improvement. Additionally, results from questions related to pathways and transformations of energy and matter will be shared with the relevant instructors so that those faculty members can focus instruction in specific areas needing improvement.

Outcome 5

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Percent of selected questions about interconnectedness within and among biological systems on the Major Field Test (MFT) in biology on which the percent of Lander students answering correctly was as high or higher than the national average percent of students answering correctly.

Timeframe for this Outcome
Academic Year 2024-2025

Performance Target for "Met"
Over the past five years, the average percent of Lander students answering the question correctly was as high or higher than the percent of students answering the question correctly nationally on 60% of the questions

Performance Target for "Partially Met"
Over the past five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on at least 50% but fewer than 60% of the questions

Performance Target for "Not Met"
Over the last five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on fewer than 50% of the questions

Assessment Measure Used
Major Field Test in Biology

Frequency of Assessment
Every fall and spring semester to students enrolled in BIOL 499

Data Collected for this Timeframe (Results)
57%

Score (Met=3, Partially Met=2, Not Met=1)
2

Comments/Narrative
Calculated as a five-year rolling average, the percent of Lander students answering questions about the interconnectedness of biological systems on the MFT was as high as or higher than the national average on 57% of the questions. Students partially met expectations (50% - 60%) in this category.

Using the five-year rolling average, students met the outcome twice and partially met the outcome twice since 2021/2022. Overall, biology students demonstrate an understanding of the interconnectedness of biological systems and we are optimistic that with continued coverage of these topics throughout the courses in our major students will continue to be successful on this outcome.

Resources Needed to Meet/Sustain Results
An “Item Information Report” of the MFT from the ETS, which can be purchased for $350 per year is required to sustain results. Resource identified as needed in 2017-2018, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025 assessment reports.

Explanation of How Resources Will Be Used
The item information report will allow biology students at Lander to be compared to students nationally specifically for questions relating to the interconnectedness of biological systems. The biology department will use this data to determine which specific areas of the program need improvement. Additionally, results from questions related to information flow and exchange will be shared with the relevant instructors so that those faculty members can focus instruction in specific areas needing improvement.

Goal Summary

Goal Summary/Comments
This is the first year results from the MFT have been reported as a five-year rolling average instead of for individual years. Students met expectations for 1 of 5 outcomes, partially met expectations for 3 of 5 outcomes, and did not meet expectations for 1 of 5 outcomes. When we devised this goal, we knew it was a lofty one with an overall ambition of ensuring that Lander students are better than the national

average in the five core concepts in biology: evolution, structure and function relationships, information flow and exchange, pathways and transformations of energy and matter, and the interconnectedness within and among living systems.

This data has been collected from the MFT for the past 8 years. Although students have generally done better in one area (i.e., evolution) than others (e.g., structure/function), there is no significant difference in student performance between any of the sections. Additionally, there is no significant positive or negative trend in any of the areas in the time we have been collecting data. As we collect more data and the disruptive effects of COVID are farther behind us, we may be able to detect differences and trends in our data so that our department can focus our energies in particular areas.

We are, however, quite pleased with how Lander students do on the MFT overall. The MFT can be broken into 9 assessment indicator scores, which test students on 9 different areas of biology. This year, the Lander students' scores were higher than the national mean scores for all 9 categories.

Changes Made/Proposed Related to Goal
Three years ago, members of the assessment committee decided to discontinue the collection of data in courses taught in the program and concentrate efforts on collecting and interpreting the results of the MFT for this goal in order to make comparisons across cohorts easier to interpret. For all outcomes, however, success continues to vary from year to year. With a relatively small number of students taking the MFT each year, it is difficult to determine whether these fluctuations represent real changes in student mastery of concepts or are simply stochastic fluctuations in intrinsically noisy data. One way to minimize noise in the data is to report the 5-year rolling average for each outcome. This is the first year we have used this metric to measure success for this goal. We plan to continue to report data for each outcome as a 5-year rolling average so that we can get a clearer picture of the outcomes most in need of improvement. I will present the results of the program assessment to the department and we will continue to think carefully about ways that we can better address the most difficult concepts in multiple courses throughout our curriculum.

Upload Rubrics/Other Files

Goal 2

Program Goals are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

Program Goal
Students will be able to apply appropriate quantitative reasoning, models, and simulations to classic and novel problems in biology.

Pillar of Success Supported
High-Demand, Market-Driven Programs

Outcomes

Outcome 1

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Percent of selected questions requiring quantitative reasoning on the Major Field Test (MFT) in biology on which the percent of Lander students answering correctly was as high or higher than the national average percent of students answering correctly

Timeframe for this Outcome
Academic Year 2024-2025

Performance Target for "Met"
Over the past five years, the average percent of Lander students answering the question correctly was as high or higher than the percent of students answering the question correctly nationally on 60% of the questions

Performance Target for "Partially Met"
Over the past five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on at least 50% but fewer than 60% of the questions

Performance Target for "Not Met"
Over the last five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on fewer than 50% of the questions

Assessment Measure Used
Major Field Test (MFT) in biology (questions related to quantitative reasoning)

Frequency of Assessment
Every fall and spring semester to students enrolled in BIOL 499

Data Collected for this Timeframe (Results)
56%

Score (Met=3, Partially Met=2, Not Met=1)
2

Comments/Narrative
Calculated as a five-year rolling average, the percent of Lander students answering questions requiring quantitative reasoning on the MFT was as high as or higher than the national average on 56% of the questions. Students partially met expectations (50% - 60%) for this outcome. However, if the only the 2024/2025 cohort is considered, the percent of Lander students answering questions requiring quantitative reasoning on the MFT was as high as or higher than the national average on 71% of the questions
We have been tracking this outcome long enough to report the 5-year rolling average from 2021-2022 (48%), 2022-2023 (49%), and 2023-2024 (44%). The 5-year rolling average from 2024-2025 is a dramatic improvement and indicates that students are currently partially meeting expectations. However, our data still indicates a persistent weakness in the ability of biology majors to use quantitative reasoning.

Resources Needed to Meet/Sustain Results
An “Item Information Report” of the MFT from the ETS, which can be purchased for $350 per year is required to sustain results. Resource identified as needed in 2017-2018, 2018-2019, 2019-2020, 2020-

2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025 assessment reports.

Explanation of How Resources Will Be Used
The item information report will allow biology students at Lander to be compared to students nationally specifically for questions relating to quantitative reasoning. The biology department will use this data to determine which specific areas of the program need improvement. Additionally, results from questions related to the quantitative reasoning will be shared with the relevant instructors so that those faculty members can focus instruction in specific areas needing improvement.

Goal Summary

Goal Summary/Comments
Now that we have a number of years to compare, it is clear that students' quantitative reasoning skills vary across cohorts, but that overall, students struggle with quantitative reasoning. We will continue to track student success and find specific ways to address these topics throughout the relevant courses in our curriculum.

One potential reason that students do sometimes struggle with this outcome is that often the questions on the MFT related to quantitative reasoning require that they also feel comfortable with the system in which the quantitative reasons skills are addressed. It is also possible that students are less likely to believe that they will be successful on quantitative questions. Throughout our program, we have a subset of majors that have extremely high quantitative literacy, but that is not the norm. Many of our students struggle with quantitative reasoning skills, and this is one of the reasons we feel that this is a particularly important skill to stress throughout our curriculum. The first course that biology majors complete is BIOL 111 and we have worked to include practice with quantitative skills in as many places as possible throughout the lecture and lab portions of the course. In their sophomore-level evolution course, they also encounter many quantitative projects and assignments. They have at least two specific quantitative exercises in each unit (in addition to the quantitative skills that are embedded throughout the course). At least anecdotally, we think that once students realize that math, numbers, and related skills are a part of biology, they become more willing to practice these skills. A number of their upper-level group and elective courses are also heavily quantitative. We will continue to seek out every possible opportunity to include assignments and projects that relate to this goal throughout our curriculum because quantitative literacy is essential to students of science.

Changes Made/Proposed Related to Goal
Three years ago, members of the assessment committee decided to discontinue the collection of data in courses taught in the program and concentrate efforts on collecting and interpreting the results of the MFT for this goal to make comparisons across cohorts easier to interpret. This is the first year we have reported the 5-year rolling average for this outcome and we plan to report this revised metric going forward.

One strategy to improve quantitative reasoning in biology students is to involve more in the process of undergraduate research projects. Although we cannot look specifically at the questions related to quantitative reasoning, we have found that students who participate in research have significantly higher MFT scores than students who do not, even when controlling for entrance standardized test scores. There are an increasing number of biology faculty mentoring undergraduate research projects, which may improve MFT scores in coming years.

Additionally, curricular changes have the potential to improve quantitative reasoning MFT scores. For the past three years, MATH 121 has been a co-requisite for BIOL 111. We hope that taking introductory math along with biology will provide students with a stronger quantitative foundation, which can be applied in later courses. Additionally, faculty in the department have revised the sophomore-level classes, evolution and botany, to teach students how to analyze data with the statistical software R. Although R is a

powerful software, using it requires a steep learning curve. Students will be forced to think analytically about data, which may improve quantitative reasoning.

Upload Rubrics/Other Files

Goal 3

Program Goals are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

Program Goal
Students will be able to explain and apply the process of science by formulating testable hypotheses, designing experiments, and collecting and analyzing data to draw conclusions about the degree to which data support their hypotheses.

Pillar of Success Supported
High-Demand, Market-Driven Programs

Outcomes

Outcome 1

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Percent of selected questions about the process of science on the Major Field Test (MFT) in biology on which the percent of Lander students answering correctly was as high or higher than the national average percent of students answering correctly

Timeframe for this Outcome
Academic Year 2024-2025

Performance Target for "Met"
Over the past five years, the average percent of Lander students answering the question correctly was as high or higher than the percent of students answering the question correctly nationally on 60% of the questions

Performance Target for "Partially Met"
Over the past five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on at least 50% but fewer than 60% of the questions

Performance Target for "Not Met"
Over the last five years, the average percent of Lander students answering the questions correctly was as high or higher than the national average on fewer than 50% of the questions

Assessment Measure Used
Major Field Test (MFT) in biology (questions related to the process of science)

Frequency of Assessment
Every spring semester to students enrolled in BIOL 499

Data Collected for this Timeframe (Results)
55%

Score (Met=3, Partially Met=2, Not Met=1)
2

Comments/Narrative
Calculated as a five-year rolling average, the percent of Lander students answering questions about the process of science on the MFT was as high as or higher than the national average on 55% of the questions. Students partially met expectations (50% - 60%) for this outcome. These results are similar to the results for the 2024-2025 academic year cohort (53%).

We have been tracking this outcome long enough to report the 5-year rolling average from 2021-2022 (63%), 2022-2023 (61%), 2023-2024 (52%), and now 2024-2025 (55%). Using this metric, the students are consistently meeting or partially meeting expectations for this outcome. However, while the trend is not significant, it is possible that student scores in this section are decreasing. Student scores for 2023-2024 (27%) were the worst since we began collecting this data, so the 2024-2025 scores (53%) indicate an great improvement. We will continue to monitor student performance and look for longer-term patterns. We will also continue actively seek ways to increase student involvement in the process of science throughout the program.

Resources Needed to Meet/Sustain Results
An “Item Information Report” of the MFT from the ETS, which can be purchased for $350 per year is required to sustain results. Resource identified as needed in 2017-2018, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025 assessment reports.

Explanation of How Resources Will Be Used
The item information report will allow biology students at Lander to be compared to students nationally specifically for questions relating to the process of science. The biology department will use these data to determine which specific areas of the program need improvement.

Goal Summary

Goal Summary/Comments
For this program goal, students partially met expectations for the assessed outcome. We hope that the progress we saw in this goal this year is indicative of a larger trend. We believe that student progress and success on this goal will improve because of the amount of coverage and exposure to the process of science throughout their time in the program.

We will continue to track student success and find specific ways to address these topics throughout the relevant courses in our curriculum. For example, the Biology Department emphasizes the process of science in both class and laboratory instruction. Labs, particularly in BIOL 111-112 are primarily inquiry based, guiding students through the steps of the scientific process. Students learn to carefully observe natural phenomena, ask questions, form hypotheses, design experiments, and analyze and interpret the results of their experiments. Although the process is highly structured for these introductory classes, these courses provide the first step in scaffolding the skills students need to explain and apply the process of science. Additionally, the courses in the biology seminar series (BIOL 299, 399, and 499) are focused on reading, analyzing, and interpreting peer-reviewed journal articles in biology. The seminars

expose students to the scientific process, and move students from understanding (BIOL 299) to analyzing and evaluating (BIOL 399) to synthesizing (BIOL 499) the process of science. Other courses within the biology department have revised the curriculum in various ways to emphasize the process of science. Additionally, several upper-level course instructors have incorporated course-embedded research to ensure that students repeatedly engage in the process of science (from project proposals, to carrying out research projects, to creating presentations of their research results).

Changes Made/Proposed Related to Goal
Three years ago, members of the assessment committee decided to discontinue the collection of data in courses taught in the program and concentrate efforts on collecting and interpreting the results of the MFT for this goal to make comparisons across cohorts easier to interpret. This is the first year we have reported the 5-year rolling average for this outcome and we plan to report this revised metric going forward. We would like to collect data in the same way for several years to enable longitudinal comparisons, so will not change data collection methods next year.

The biology department emphasizes benefit that participating in undergraduate research projects has for student understanding of the process of science. Although we cannot look specifically at the questions related to the process of science, we have found that students who participate in research have significantly higher MFT scores than students who do not, even when controlling for entrance standardized test scores. It is reasonable to hypothesize that engaging in a project that requires students to implement the process of science will improve their scores on questions related to the process of science. Because an increasing number of biology faculty are mentoring undergraduate research projects, MFT scores may improve, especially in this area. We will continue to meet with the department to discuss the results of the MFT and will continue to think carefully about ways that we can better address the most difficult concepts in multiple courses throughout our curriculum.

Upload Rubrics/Other Files

Goal 4

Program Goals are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

Program Goal
Students will be able to navigate relevant primary literature and identify and evaluate appropriate sources for a given topic.

Pillar of Success Supported
High-Demand, Market-Driven Programs

Outcomes

Outcome 1

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention,

employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Percent of Biology graduates who scored a 2 (Proficient) or a 3 (Advanced) on the “Resources” criterion of the Student Presentation Rubric

Timeframe for this Outcome
Academic Year 2024-2025

Performance Target for "Met"
At least 70% of students scored a 2 or a 3 on the “Resources” criterion of the Student Presentation Rubric

Performance Target for "Partially Met"
At least 60% but fewer than 70% of students scored a 2 or a 3 on the “Resources” criterion of the Student Presentation Rubric

Performance Target for "Not Met"
Fewer than 60% of students scored a 2 or a 3 on the “Resources” criterion of the Student Presentation Rubric

Assessment Measure Used
BIOL 499 Student Oral Presentation Rubric

Frequency of Assessment
Every fall and spring semester to students enrolled in BIOL 499

Data Collected for this Timeframe (Results)
100%

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative
100% of the students assessed scored a 2 or 3 on the “Resources” criterion of the presentation rubric in BIOL 499. Students met expectations for this outcome again this year. In addition, this year is the 6th year in a row that students have met this expectation. The 5-year rolling average is 98% of students meeting expectations.

Over the past 7 years, students have met expectations for this outcome in every year they were assessed. We have been tracking this outcome long enough to report the 5-year rolling average from 2021-2022 (84%), 2022-2023 (87%), 2023-2024 (94%), and 2024-2025 (98%). Many changes have been implemented and fine-tuned throughout this time to better prepare students to meet this outcome (discussed in more detail in the program goal narrative below).

Resources Needed to Meet/Sustain Results
None

Explanation of How Resources Will Be Used
N/A

Outcome 2

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Percent of Biology graduates who scored a 2 (Proficient) or a 3 (Advanced) on the “Content and Organization” criterion of the Student Presentation Rubric

Timeframe for this Outcome
Academic Year 2024-2025

Performance Target for "Met"
At least 70% of students earning at least 70% on the “Content” and “Organization” criteria of the Student Presentation Rubric

Performance Target for "Partially Met"
At least 60% but fewer than 70% of students earning at least a 70% on the “Content” and “Organization” criteria of the Student Presentation Rubric

Performance Target for "Not Met"
Fewer than 60% of students earning at least 70% on the “Content” and “Organization” criteria of the Student Presentation Rubric

Assessment Measure Used
BIOL 499 Student Oral Presentation Rubric

Frequency of Assessment
Every fall and spring semester to students enrolled in BIOL 499

Data Collected for this Timeframe (Results)
91%

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative
91% of the students assessed scored at least 70% on the “Content and Organization” criterion of the presentation rubric in BIOL 499. Students met expectations for this outcome again this year. This year is the 5th year in a row where we students have fully met this goal.

Over the past 8 years, students have met expectations for this outcome in 6 of 8 years (75%), partially met expectations 1 of 8 years (12.5%) and failed to meet expectations for this outcome in 1 of 8 years (12.5%) they were assessed. We have been tracking this outcome long enough to report the 5-year rolling average from 2021-2022 (70%), 2022-2023 (72%), 2023-2024 (83%), and 2024-2025 (89%). Many changes have been implemented and fine-tuned throughout this time to better prepare students to meet this outcome (again, these are discussed in more detail in the program goal narrative below).

Resources Needed to Meet/Sustain Results
None

Explanation of How Resources Will Be Used

Goal Summary

Goal Summary/Comments
The Biology Department has made numerous changes to individual courses and the curriculum overall to increase students' ability to navigate the primary literature and create useful and informative presentations based on this literature. Beginning in their first year, students in BIOL 111 and 112 laboratories begin to learn about primary literature and are exposed to specific, relevant examples of primary research as it relates to the course topics. Students read primary literature during the BIOL 303 course required of all majors and the biology seminar series (BIOL 299,399, 499) builds on this foundation. In BIOL 299, students learn to identify and evaluate sources for their appropriateness, read primary literature, and analyze and present on these articles in the course. In BIOL 399, students begin to choose their own papers and are expected to be able to identify and evaluate peer-reviewed articles. BIOL 399 culminates with students independently presenting a summary of one primary literature article of their own selection. In BIOL 499, students independently present a synthesis of three journal articles they choose. Throughout the series, students learn to select appropriate articles, carefully read the literature, and write summaries of the papers they read. In addition, several upper-level electives in the biology major have incorporated exposure to the primary literature in various ways, such as requiring students to use primary literature as references and having students participate in or lead discussions about primary literature. Students in the biology program historically had difficulty finding, understanding, participating in, and organizing discussions about primary literature, and this deficiency was one of the main reasons the seminar courses were expanded and are required of biology majors. We feel confident that these changes are, indeed, helping our students gain the key skill set they need to be successful readers and interpreters of primary research.

Changes Made/Proposed Related to Goal
The BIOL 499 rubric was updated so that now "Content" and "Organization" are assessed separately for a maximum combined score of 18. We have modified that performance targets for outcome 2 to reflect these changes. By using 70% as our benchmark (rather than 2 out of 3) future modifications to the rubric will not necessarily result in any changes to the outcome's performance target.

The instructors teaching BIOL 299, 399, and 499 met at the end of the spring 2025 semester to ensure that the methods used to teach and assess student communication were consistent through the seminar series. We agreed that the messaging was largely consistent but clarified some confusion about what was expected for student presentations in the different courses. Overall, we will continue to monitor student success and think of additional ways to use primary literature in the courses we teach throughout the biology curriculum.

Upload Rubrics/Other Files

Goal 5

Program Goals are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

Program Goal
Students will be able to accurately and effectively communicate and collaborate within the discipline of

biology and with other disciplines.

Pillar of Success Supported
High-Demand, Market-Driven Programs

Outcomes

Outcome 1

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Percent of biology seniors who scored a 2 (Proficient) or a 3 (Advanced) on the “Effective Scientific Communication” criterion of the Student Presentation Rubric

Timeframe for this Outcome
Academic Year 2024-2025

Performance Target for "Met"
At least 70% of students scored a 2 or a 3 on the “Effective Scientific Communication” criterion of the presentation rubric

Performance Target for "Partially Met"
At least 60% but fewer than 70% of students scored a 2 or a 3 on the “Effective Scientific Communication” criterion of the presentation rubric

Performance Target for "Not Met"
Fewer than 60% of students scored a 2 or a 3 on the “Effective Scientific Communication” criterion of the Student Presentation Rubric

Assessment Measure Used
BIOL 499 Student Oral Presentation Rubric

Frequency of Assessment
Every fall and spring semester to students enrolled in BIOL 499

Data Collected for this Timeframe (Results)
78%

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative
78% of students scored a 2 or a 3 on the “Effective Scientific Communication” criterion of the presentation rubric. Students met expectations for this outcome. These results are similar to those of the last few years. We continue to see good results for this outcome and believe that this is a real trend

that is the product of our recent program changes or a combination of other factors.

Over the past 8 years, students have met expectations for this outcome in 6 of 8 years (75%), partially met expectations for this outcome in 1 of 8 years (12.5%) and failed to meet expectations for this outcome in 1 of 8 years (12.5%) they were assessed. We have been tracking this outcome long enough to report the 5-year rolling average from 2021-2022 (73%), 2022-2023 (76%), 2023-2024 (85%), and 2024-2025 (85%). We feel confident that our students generally make good progress towards improving their communication skills as they move through our program. We will continue to monitor this outcome and look for additional places in the curriculum where students can gain experience communicating science to their peers and beyond.

Resources Needed to Meet/Sustain Results

Explanation of How Resources Will Be Used

Outcome 2

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Percent of biology seniors who scored a 2 (Proficient) or a 3 (Advanced) on the “Appropriate Scientific Communication (Vocabulary)” and “Appropriate Scientific Communication (Style/Delivery)” criteria of the Student Presentation Rubric

Timeframe for this Outcome
Academic Year 2024-2025

Performance Target for "Met"
At least 70% of students scored a 2 or a 3 on the “Appropriate Scientific Communication (Vocabulary)” and “Appropriate Scientific Communication (Style/Delivery)” criteria of the Student Presentation Rubric

Performance Target for "Partially Met"
At least 60% but fewer than 70% of students scored a 2 or a 3 on the “Appropriate Scientific Communication (Vocabulary)” and “Appropriate Scientific Communication (Style/Delivery)” criteria of the Student Presentation Rubric

Performance Target for "Not Met"
Fewer than 60% of students 2.00 scored a 2 or a 3 on the “Appropriate Scientific Communication (Vocabulary)” and “Appropriate Scientific Communication (Style/Delivery)” criteria of the

Student Presentation Rubric

Assessment Measure Used
BIOL 499 Student Oral Presentation Rubric

Frequency of Assessment
Every fall and spring semester to students enrolled in BIOL 499

Data Collected for this Timeframe (Results)
65%

Score (Met=3, Partially Met=2, Not Met=1)
2

Comments/Narrative
65% of students scored a 2 or a 3 on the “Appropriate Scientific Communication” criteria of the presentation rubric. Students partially met expectations for this outcome. We think it is likely that students only partially met expectations this year because the data for is collected from relatively small samples sizes and is thus intrinsically noisy. A better measure of overall student success can be gained by looking at multiple years of data.

Over the last 8 years, students have met expectations for this outcome in 4 of 8 years (50%) of the years they were assessed, partially met expectations in 3 of 8 years (37.5%) and failed to meet expectations in 1 of 8 years (12.5%) they were assessed. We have been tracking this outcome long enough to report the 5-year rolling average from 2021-2022 (68%), 2022-2023 (72%), 2023-2024 (83%), and 2024-2025 (82%). We feel confident that our students generally make good progress towards improving their communication skills as they move through our program. We will continue to monitor this outcome and look for additional places in the curriculum that students can gain experience communicating science to their peers and beyond.

Resources Needed to Meet/Sustain Results
None

Explanation of How Resources Will Be Used

Goal Summary

Goal Summary/Comments
Students met the expectations most of the outcomes used to assess this goal. It is the hope of the faculty teaching these courses that students are gaining communication skills from repeated practice in their courses within the biology program and in their general education and elective courses. We will continue to monitor progress on this goal over the next few years to allow us to differentiate between true patterns in the data and expected year-to-year fluctuations.

Changes Made/Proposed Related to Goal
The instructors teaching BIOL 299, 399, and 499 met at the end of the spring 2025 semester to ensure that the methods used to teach and assess student communication were consistent through the seminar series. We agreed that the messaging was largely consistent but clarified some confusion about what was expected for student presentations in the different courses. Students are weakest in their appropriate scientific communication ability, but more consistent feedback in terms of how the course rubrics are used will likely improve this outcome.

Overall, members of the biology department believe that the seminar series (BIOL 299, 399, and 499) has been very successful, as evidenced by the consistent ability of students to meet expectations for the outcomes in this goal. We continue to meet as a department to discuss how skills can be scaffolded in early seminar courses so that students are prepared for later courses.

Upload Rubrics/Other Files

Goal 6

Program Goals are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

Program Goal
To comply with Program Productivity standards as defined by the South Carolina Commission on Higher Education

Pillar of Success Supported
High-Demand, Market-Driven Programs

Outcomes

Outcome 1

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Operational Outcome

Enter Outcome
Major enrollment

Timeframe for this Outcome
Academic Year 2024-2025

Performance Target for "Met"
Using a five-year rolling average, the number of students enrolled in the major (a) for Baccalaureate programs is greater than or equal to 12.5, (b) for Master’s/First Professional is greater than or equal to 6.

Performance Target for "Partially Met"
Not Applicable

Performance Target for "Not Met"
Using a five-year rolling average, the number of students enrolled in the major (a) for Baccalaureate programs is less than 12.5 (b) for Master’s/First Professional is less than 6.

Assessment Measure Used
Enrollment and Graduation data extracted from

Frequency of Assessment
Annually

Banner

Data Collected for this Timeframe (Results)
159.8

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative
This outcome was met. There have historically been a large number of biology majors in this program. However, over the past few years the headcount in the biology department has been decreasing. This may be in part because the Medical Biology program began in Fall 2022. Students who would have otherwise majored in biology may be choosing medical biology in order to have a degree more relevant to their career goals. We are not concerned with the decrease because the biology major is still one of the largest on campus and faculty would like students to be able to choose majors according to their interests. Additionally, the medical biology program may ultimately attract more students to Lander, some of whom may eventually decide to major in biology.

Resources Needed to Meet/Sustain Results
None

Explanation of How Resources Will Be Used
N/A

Outcome 2

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Operational Outcome

Enter Outcome
Completions (Degrees awarded)

Timeframe for this Outcome
Academic Year 2024-2025

Performance Target for "Met"
Using a five-year rolling average, the number of degrees awarded (a) for Baccalaureate programs is greater than or equal to 8, (b) for Master's/First Professional is greater than or equal to 3.

Performance Target for "Partially Met"
Not Applicable

Performance Target for "Not Met"
Using a five-year rolling average, the number of degrees awarded (a) for Baccalaureate programs is

less than 8 (b) for Master's/First Professional is less than 3.

Assessment Measure Used
Enrollment and Graduation data extracted from Banner

Frequency of Assessment
Annually

Data Collected for this Timeframe (Results)
25.2

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative
This outcome was met. While there have historically been many students in the biology major at any given time, the number of graduating seniors has fluctuated somewhat. With recent changes to the program and general education requirements, a high degree of flexibility has been added to the 4-year guides for our majors. Students have the opportunity to choose courses to fit their specific needs, and we think this is increasing retention and graduation of students in the biology major.

Resources Needed to Meet/Sustain Results
None

Explanation of How Resources Will Be Used
N/A

Goal Summary

Goal Summary/Comments
Overall, the biology program easily met both outcomes for the program goal again this year. Within the department, we have recently changed our curriculum to add flexibility for students with varied career plans, and we are confident that this will not only increase retention of students but also increase graduation rates. We are currently analyzing retention, success, and graduation rates in our program since 2014. We found that before the curriculum was changed, only 12% of students enrolled as freshmen in BIOL 111 graduated with a biology degree in 4 years, and only 32% of these students graduated with any degree within 4 years. However, since the change in the curriculum, 24% have graduated with a degree in biology within 4 years and 43% have graduated with any degree in that time. Although we would still like to improve retention, we are quite pleased that our curriculum change is associated with a doubling of biology graduation rates.

Changes Made/Proposed Related to Goal
Both self-efficacy (i.e., the belief that one can succeed) and a sense of belonging are closely associated with student retention in STEM majors. The department has been working to increase belonging through activities engaging students outside the classroom. Five years ago, we started an annual "Biology Bash" during the early part of the fall semester so that new students could meet and interact with returning students and faculty. Members in two student organizations TriBeta (a biology honor society) and ESSO (the environmental science student organization) are still working on plans to include more students in their events and activities. It is our hope that getting students engaged with each other outside the classroom will help to forge bonds between students and increase the sense of community and belonging to the major. Participation in undergraduate research has been documented to increase student retention, likely by increasing both self-efficacy and a sense of belonging in science. We found that students who do conduct undergraduate research have 7.3 times higher odds of graduating than students who do not. The number of faculty mentoring undergraduate research students in the department has been increasing, which may improve the graduation rate of biology majors overall.

In the past year we have also been increasing the career-focused content in the biology seminar series (i.e., BIOL 299, BIOL 399, and BIOL 499). The instructors of these courses met with representatives of

career services in Spring 2025, and as a result have planned more career-focused activities in BIOL 299 and 399. We hope that helping students plan for a career will enable them to see the relevance of biology for their goals and help them stay focused to achieve those goals.

Upload Rubrics/Other Files

Dean's Email Address
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Approved by Dean?

Signature of Dean

Comments from Dean's Review