

2020-2021 Assessment Reporting Template for Graduate and Undergraduate Programs

There are four sections to the Annual Assessment Reporting Template: Program Summary Information, Student Learning Outcomes (Table 1), Program Outcomes (Table 2), and General Questions. Please follow the directions at the beginning of each report section and provide the information requested.

Reports are due June 30, 2021. If you need assistance, please do not hesitate to contact Bethany Bodo, Director, Institutional Effectiveness, Office of Analytics and Institutional Effectiveness, at bbodo@vt.edu.

Program Summary Information

Directions: Please provide the name and academic level of the degree program, the department chair, the assessment point of contact, and the program mission statement.

Degree Program: Biology, BS

Department Chair: John Doe

Point of Contact Regarding Assessment (if different than Chair): Jane Smith

Program Mission Statement:

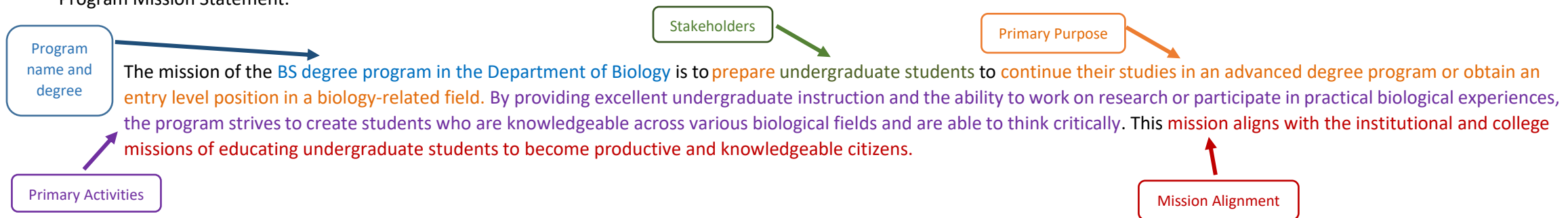


Table 1: Student Learning Outcomes (SLOs)

SLO Process Column Directions (all sections should be completed for all of the program's SLOs):

- Each program should have a total of 5 to 8 SLOs, unless a discipline-specific accrediting body requires more.
- Programs should provide all of their SLOs with corresponding measures and targets, even if specific outcomes were not measured during the current cycle.
- Every SLO should have at least one direct measure. Direct measures are those in which faculty members or other reviewers directly evaluate student work that demonstrates the specific knowledge, skill, ability, or competency described in a student learning outcome. These should not be overall project grades or test scores. Rather, if a project is used, students' ability on only that specific student learning outcome of interest should be evaluated. In contrast, indirect measures of student learning outcomes typically ask students to reflect on their learning or abilities but do not provide direct evidence of the learning.
- Programs should be measuring 2 to 3 of their student learning outcomes every year.
- In the "2020-2021 AY Findings" column, programs should:
 - For all SLOs, indicate when this SLO was last assessed and when it will be assessed next.
 - For measured SLOs, also include findings and whether or not the target was met.

SLO Use of Results Column Directions (all sections should be completed for SLOs measured by the program during the current year):

- Comments on Findings: Please reflect on the findings. What do these mean to your program and student learning in this area? Does the program plan to change its assessment strategy for this SLO?
**Please note: Action plans for improving student learning in this area should be presented in the next column.
- Action Planning: The primary goal of assessment is for programs to continuously make improvements to enhance student learning. Therefore:
 - Programs should provide an action plan for every unmet SLO: What changes is the program planning to make to improve student learning in this area?
 - If all SLOs were met: The program should determine if there are any SLOs that would benefit from increased attention and indicate what the program plans to do to further support student learning in this area.
- Comments on Action Planning: The program should provide comments on previously implemented action plans to enhance student learning for this specific SLO.
- Programs should assess each of their outcomes at least twice during a five-year period.

SLO Process Complete all columns in this section for each of the program's SLOs.				SLO Use of Results Complete columns for SLOs measured during the current cycle.		
Student Learning Outcomes	Assessment Measures	Targets	2020-2021 AY Findings	Comments on Findings	Action Planning	Comments on Action Planning
Include all SLOs.	Provide a measure for each SLO.	Based on the measure, include a target for each SLO.	For all outcomes include: When was this SLO last assessed and when will it be assessed next? For measured outcomes include: Specific findings and whether or not the target was met.	Include comments on findings for each SLO measured. What do these findings mean to your program and student learning in this area? Does the program plan to change its assessment strategy for this SLO?	An action plan should be included for all SLOs with unmet targets OR <u>at least one SLO</u> each year, even if all targets were met.	What action plans have been implemented for this outcome in the past? How have those changes affected student learning and/or program quality?
SLO #1: Explain the core biological concepts related to evolution and principles of genetics.	Direct measure, capstone paper: In BIOL 4030, students are required to complete a capstone paper. This paper contains a section for students to explain the core biological concepts related to evolution and principles of genetics. A rubric will be used to evaluate student performance on this aspect of the capstone paper (Scale: 1 = significantly below expectations, 2 = somewhat below expectations, 3 = meets expectations, 4 = slightly exceeds expectations, and 5 = significantly exceeds expectations).	80% of the students will meet or exceed expectations on the rubric items pertaining evolution and principles of genetics.	65% of the seniors taking the BIOL 4030 course were rated as meeting or exceeding expectations. Target: Not Met	Although there was a slight increase in student performance from the previous year, we still are not meeting our target. Students may need a refresher in this area since most content in this area is covered during their sophomore year in the program.	The program will work to implement refresher sessions on core evolution and genetics concepts during the 2021-2022 academic year. The outcome will then be re-measured during the 2022-2023 academic year.	Last year the program decided to review with students what was expected of them in the capstone paper. There was a 10% increase in the percentage of students meeting the target. (2018-2019: 55%)

	<p>Indirect measure, graduating student exit survey:</p> <p>Two questions pertaining to the importance and achievement of evolution and genetics. All questions are on a 4-point Likert scale (Importance scale: 1 = not important, 2 = somewhat important, 3 = important, 4 = very important and Achievement scale: 1 = beginning, 2 = developing, 3 = accomplished, and 4 = exemplary).</p>	<p>80% of students will say that these areas of biology are "important" or "very important" to a biology major and 90% of students will say that regarding achievement they were "accomplished" or "exemplary."</p>	<p>40 students completed the graduating student exit survey.</p> <p>70% (28 students) of students rated the importance of the evolution area as either "important" or "very important." This is below our target.</p> <p>83% (33 students) of the students rated the importance of the genetics area as either "important" or "very important," meeting the target.</p> <p>93% (37 students) of students rated their achievement in the evolution area as "accomplished" or "exemplary," meeting our target for this area.</p> <p>90% (36 students) of students rated their achievement in genetics as "accomplished" or "exemplary," meeting the target.</p>	<p>Students feel that they are achieving these areas in the undergraduate program in Biology. However, they don't feel as if the evolution component is as important as the program would like.</p>	<p>The program will ask its Advisory Board about the concept of evolution to ensure this is still a critical area for undergraduate Biology majors. And, if so, the program will continue to emphasize this area and reinforce the importance of these topics to students during the course of their program.</p>	<p>No previous action plans were implemented for this area. The survey was created and piloted during the 2018-2019 academic year, and this is only the second time it has been implemented.</p>
<p>SLO #2: Effectively communicate scientific information in both written and oral formats.</p>	<p>Direct measure, capstone paper:</p> <p>In BIOL 4030, students are required to complete a capstone paper. This paper will be rated with a rubric designed to evaluate the student's ability to communicate effectively in writing. (Scale: 1 = significantly below expectations, 2 =</p>	<p>Written communication targets: 80% of the students will meet or exceed expectations on the rubric items pertaining to written communication. Rating of a "3" or above.</p>	<p>Only the indirect survey measure was implemented this year. The direct measure will be collected during 2021-2022 for this student learning outcome.</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>

	somewhat below expectations, 3 = meets expectations, 4 = slightly exceeds expectations, and 5 = significantly exceeds expectations.)	And 40% of the students will either slightly exceed or significantly exceed expectations (rating of "4" or "5").				
	<p>Direct measure, capstone presentation:</p> <p>Students are also required to do a presentation in this course for their capstone project. A rubric designed to measure oral communication skills will be used to rate student performance on the presentation.</p> <p>(Scale: 1 = significantly below expectations, 2 = somewhat below expectations, 3 = meets expectations, 4 = slightly exceeds expectations, and 5 = significantly exceeds expectations.)</p>	<p>Oral communication targets: 70% of the students will meet or exceed expectations on the rubric items pertaining to oral communication. Rating of a "3" or above.</p> <p>And 30% of the students will either slightly exceed or significantly exceed expectations (rating of "4" or "5").</p>	Only the indirect survey measure was implemented this year. The direct measure will be collected during 2021-2022 for this student learning outcome.	N/A	N/A	N/A
	<p>Indirect measure, graduating student exit survey:</p> <p>Two questions pertaining to the importance and achievement of effective written and oral communication. All questions are on a 4-point Likert scale. (Importance scale: 1 = not important, 2 = somewhat important, 3 = important, 4 = very important and Achievement scale: 1 = beginning, 2 = developing, 3 = accomplished, and 4 = exemplary).</p>	80% of students will say that written and oral communication are "important" or "very important" for a biology major and 90% of students will say that regarding achievement they were "accomplished" or "exemplary."	<p>40 students completed the graduating student exit survey. 98% (39 students) of students rated the importance of written communication as either "important" or "very important," and 88% (35 students) of students rated the importance of oral communication as "important" or "very important," meeting the target for these areas.</p> <p>93% (37 students) of students rated their achievement in written communication as "accomplished" or "exemplary" and 90% (36</p>	Students feel that they are achieving both oral and written communication skills in the program.	The program will examine these findings as compared to the direct assessments that will be implemented during the 2021-2022 academic year.	N/A

			students) of students rated their achievement in genetics as “accomplished” or “exemplary,” meeting the target for these areas.			
SLO #3: Demonstrate ethical standards when conducting biological research.	Direct measure, final lab: In BIOL 3942, students are required to conduct several labs during the course of the semester. The final lab is designed so that students are challenged with several ethical issues. Students will be rated with a rubric on how they overcome these ethical issues. (Scale: 1 = significantly below expectations, 2 = somewhat below expectations, 3 = meets expectations, 4 = slightly exceeds expectations, and 5 = significantly exceeds expectations.)	Since the appropriate handling of ethical issues is very important in biological research and to the program, we are setting very high standards. Therefore, the program wants 95% of the students to meet or exceed expectations and 75% of students to either slightly exceed or significantly exceed expectations.	Not collected in 2020-2021. Will collect data during 2022-2023.	N/A	N/A	N/A
SLO #4: Explain how the study of biological sciences impacts the real-world.	Direct measure, research paper: In BIOL 4090, students are required to write a research paper on a current finding in biology and how it is impacting the real world. Student responses to this paper will be rated using a rubric. One section of this rubric pertains specifically to how well they explain how the current finding is impacting the real world. (Scale: 1 = significantly below expectations, 2 = somewhat below expectations, 3 = meets expectations, 4 = slightly exceeds expectations, and 5 = significantly exceeds expectations.)	80% of students will meet or exceed expectations when it comes to explaining the real-world impacts of biology (rating of “3” or above), and 30% of students will either slightly exceed or significantly exceed expectations (rating of “4” or “5”).	Did we meet our targets? Yes, and no. 45 students took the BIOL 4090 course. 80% (36 students) of our students were rated as “meeting” or “exceeding” expectations in this area. However, only 7% (3 students) of the students scored in the highest category.	The program feels that this concept is very important for undergraduate students. Therefore, we would like to see more students rated in the “slightly exceeding” or “significantly exceeding” categories.	This past year the program developed and implemented a new “Current Topics in Biology” course. The program will start requiring this course of all students beginning in the 2021-2022 academic year. We will be tracking the results as the students move through the new curriculum.	This is a new assessment methodology so no previous action plans were implemented.
	Indirect measure, graduating student exit survey: Two questions pertaining to the importance and achievement of this area by students. Both questions are on a 4-	80% of students will say that this area of biology is “important” or “very important” to a biology major and 90% of students will indicate that they are	40 students completed the graduating student exit survey. 95% (38 students) of students rated the importance of this area as either “important” or “very	Students feel that this is a very important area in the field of biology but do not feel they are achieving this to the degree the program would like.	The program is hoping that the addition of the required “Current Topics in Biology” course will further expose students to the real-world impacts	No previous action plans were implemented for this area. The survey was created and piloted during the 2018-2019 academic year and this is only the

	point Likert scale. (Importance scale: 1 = not important, 2 = somewhat important, 3 = important, 4 = very important and Achievement scale: 1 = beginning, 2 = developing, 3 = accomplished, and 4 = exemplary).	“accomplished” or “exemplary” regarding achievement.	important,” meeting the target. 73% (29 students) of students rated their achievement in this area as “accomplished” or “exemplary,” not meeting the target for this area.		of the field. We will be tracking these percentages as the students move through the new curriculum.	second time it has been implemented.
SLO #5: Effectively execute basic lab and technology skills required for biology professionals.	Direct measure, lab experiment: Students in the BIOL 2860 course are required to conduct a laboratory experiment which demonstrates their lab skills and their ability to use the technology of the field. Students are rated with the use of a rubric developed by the department. (Scale: 1 = significantly below expectations, 2 = somewhat below expectations, 3 = meets expectations, 4 = slightly exceeds expectations, and 5 = significantly exceeds expectations.)	Since this is a lower-level course, the initial target is that 70% of the students will meet or exceed expectations.	85 students took BIOL 2860. We met our target for this outcome. 79% (67 students) of the students taking BIOL 2860 met or exceeded expectations.	We are glad to see student performance increase on this outcome. We will continue to monitor this outcome and measure again in 2022-2023.	No action plan needed at this time. We are meeting our target for this outcome.	This outcome was measured during the 2018-2019 academic year and we were not meeting our target. At that time, we implemented a lab report review day in the class to go over basic lab procedures and demonstrate to students the appropriate way to use the current technology. This was designed to help students recall what they learned in the first lab course in the BIOL 2850-2860 series.
	Direct measure, lab experiment: Senior level students are required to take the BIOL 4880 lab course. Students in this course are rated with the use of the same department-developed rubric used in the BIOL 2860 course. (Scale: 1 = significantly below expectations, 2 = somewhat below expectations, 3 = meets expectations, 4 = slightly exceeds expectations, and 5 = significantly exceeds expectations.)	Since this course is taken immediately prior to graduation, students are expected to be highly skilled in these areas. Therefore, 95% of the students will be rated as meeting or exceeding expectations with 70% of the students exceeding expectations.	45 students took the BIOL 4880 lab course. We met the target of 96% (43 students) of the students being rated as meeting or exceeding expectations. However, only 51% (23 students) of our seniors were meeting the second target of exceeding expectations.	We are very disappointed that only 51% of our seniors were able to exceed expectations. We will need to monitor this outcome closely moving forward.	The faculty member teaching this course has decided to implement two new labs for the seniors that will require them to walk through the use of each piece of equipment and conduct basic lab procedures.	This is a new assessment being conducted by the department and no previous action plans have been implemented.
	Indirect measure, graduating student exit survey:	80% of students will say that basic lab and technology skills are	40 students completed the graduating student exit survey. 95% (38 students) of	The program is meeting the targets for this outcome in terms of both	N/A	No previous action plans were implemented for this area. The survey was

	Two questions pertaining to the importance and achievement of basic lab and technology skills. All questions are on a 4-point Likert scale. (Importance scale: 1 = not important, 2 = somewhat important, 3 = important, 4 = very important and Achievement scale: 1 = beginning, 2 = developing, 3 = accomplished, and 4 = exemplary).	“important” or “very important” to a biology major and 90% of students will say that they are “accomplished” or “exemplary” in regard to achievement.	students rated the importance of basic lab skills as either “important” or “very important” and 85% (34 students) of the students rated technology skills as either “important” or “very important,” meeting the targets. 93% (37 students) of students rated their achievement of basic lab skills as “accomplished” or “exemplary” and 95% (38 students) rated their achievement of technology skills as “accomplished” or “exemplary,” meeting the targets.	importance and achievement.		created and piloted during the 2018-2019 academic year and this is only the second time it has been implemented.
SLO #6: Critically analyze scientific research and findings.	Direct measure, lab project: In BIOL 3942, students are required to critically analyze several research studies prior to conducting each of the labs. For the last critical review, students are rated with a rubric measuring their ability to analyze the research and findings presented. (Scale: 1 = significantly below expectations, 2 = somewhat below expectations, 3 = meets expectations, 4 = slightly exceeds expectations, and 5 = significantly exceeds expectations.)	70% of the students will meet or exceed expectations.	Not collected in 2020-2021. Will collect data during 2022-2023.	N/A	N/A	N/A
SLO #7: Concentration, Cell Biology: Explain the use of cells and biological materials in	Direct measure, short-answer questions: Students choosing the concentration of cell biology are required to take BIOL 3250. On the final, students are required to answer short-answer questions explaining the use of cells and biological	75% of students will score an average of 4.0 or higher on the items related to the use of biological materials in biotechnology.	Not collected in 2020-2021. Will collect data during 2021-2022.	N/A	N/A	N/A

biotechnology.	materials in biotechnology. Answers will be scored from 1 to 5 then averaged for each student.					
SLO #8: Concentration, Enviro. Biology: Explain the role different biological components play in the development of biofuels.	Direct measure, short-answer questions: Students choosing the concentration of Enviro. Biology are required to take BIOL 3650 Biofuels. On the final, students are required to answer short-answer questions explaining how the different biological components play a role in the development of biofuels. Answers are scored from 1 to 5, then averaged for each student.	75% of students will score an average of 4.0 or higher on the biofuels items.	22 students took BIOL 3650 Biofuels. 86% (19 students) of the students scored an average of 4.0 or higher on the biofuels items, meeting the target.	N/A – Students met the target since the restructuring of the course.	N/A	The last time this assessment was conducted only 50% of the students scored an average of 4.0 or higher on the 4 short-answer items. Faculty in the concentration changed the structure of the course and how they taught the Biofuels area. This has resulted in a significant increase in student performance in this area.
	Direct measure, paper: Students choosing the Environmental Biology concentration are also required to take a capstone course in the concentration (BIOL 4410). In this course, students are required to write a paper on biofuels. Students are rated on a rubric designed by the concentration faculty. (Scale: 1= significantly below expectations, 2= somewhat below expectations, 3=meets expectations, 4 = slightly exceeds expectations, and 5 significantly exceeds expectations.)	85% of the students will meet or exceed expectations in their ability to explain the role biological components play in the development of biofuels.	19 students took BIOL 4410. 95% (18 students) of students were rated as “meeting” or “exceeding” expectations, meeting the target.	The concentration faculty are pleased with the students’ performance on this learning outcome.	N/A	This was the second time this assessment was conducted and both times the achievement target was met.

- The program has developed an appropriate number of student learning outcomes, all of which are measurable and have action verbs.
- The outcomes are narrowly defined, specific, and seem appropriate for the program.
- The outcomes align with the mission statement.

- Each SLO has a direct measure that is a good indicator of the outcome.
- The program uses multiple measures and a combination of direct and indirect measures for many of its SLOs.
- Measures are specific to the outcomes and will produce data specific enough to make improvements.

- The program has defined achievement targets that are specific to each of the outcome-measure pairs.
- Targets are achievable but rigorous.

The findings presented are:

- Related to the outcome-measure pair.
- On the same scale as the target.
- Specific enough to examine all aspects of the stated outcome.
- Identified as meeting or not meeting their targets.

- The program has provided information on how findings have been interpreted and what that means for the program moving forward.

Action plans are:

- Provided for all outcomes where targets were not met.
- Related to the outcome.
- Sustainable and realistic for the program.

- The program has reviewed any previous action plans and has provided commentary on the results.

Table 2: Program Outcomes (POs)

PO Process Column Directions (all sections should be completed for all of the program’s POs):

- Each program should have a total of 2 to 3 POs.
- Programs should provide all of their POs with corresponding measures and targets, even if not measured during the current cycle.
- Programs should be measuring 1 to 2 of their POs every year.
- In the “2020-2021 AY Findings” column, programs should:
 - For all POs, indicate when this PO was last assessed and when it will be assessed next.
 - For measured POs, also include findings and whether or not the target was met.

PO Use of Results Column Directions (all sections should be completed for POs measured by the program during the current year):

- Comments on Findings: Please reflect on the findings. What do these findings mean to your program? Does the program plan to change its assessment strategy for this PO?
** Please note: Action plans related to the area should be presented in the next column.
- Action Planning: Programs should provide an action plan for every unmet PO. Is the program planning any changes or other improvements based on these findings?
- Comments on Action Planning: The program should provide comments on previously implemented action plans to enhance the student experience or improve program quality.
- Programs should assess each of their POs at least twice during a five-year period.

PO Process Complete all columns in this section for each of the program’s POs.				PO Use of Results Complete columns for POs measured during the current cycle.		
Program Outcomes (POs)	Assessment Measures	Targets	2020-2021 AY Findings	Comments on Findings	Action Planning	Comments on Action Planning
Include all POs.	Provide a measure for each PO.	Based on the measure, include a target for each PO.	For all outcomes include: When was this PO last assessed and when will it be assessed next? For measured outcomes include: Specific findings and whether or not the target was met.	Include comments on findings for each PO measured. What do these findings mean to your program? Does the program plan to change its assessment strategy for this PO?	An action plan should be included for all POs with unmet targets. Is the program planning any changes or other improvements based on these findings?	What action plans have been implemented for this outcome in the past? How have those changes affected the student experience and/or program quality?
PO #1: Students enrolled in the BS Biology program at the end of their sophomore year will complete the program.	Tracking of students enrolled in the program.	80% of students enrolled at the end of their sophomore year will complete the program.	85% of students who were enrolled in the program at the end of their sophomore year graduated. Target: Met	We were very pleased with these findings, which indicate a significant improvement over the last several years.	N/A	The program did not meet the established target for this program outcome in 2016-2017 (65% in 2016-2017) and decided to require students to complete an additional course prior to moving into the upper division courses. It took the program a few years to implement this action plan but we feel that it has made a tremendous difference in the number of students completing the program.
PO #2: Students enrolled in the BS	Alumni tracking	75% of students completing the BS	During the previous academic year, 46 students completed the Biology BS	We are disappointed that only 65% of our graduates have	We decided that we need to have some workshops and seminars for	This is a new program outcome, so no action plans have been previously implemented.

Biology program will continue on to an advanced degree program or obtain employment in a related field within 1 year of graduation.	survey of students who completed the program during the previous academic year.	program in Biology will report continuing in an advanced degree program or obtaining employment in a related field.	program. 65% (30 students) of those students reported continuing on to an advanced degree program or obtaining employment in a related field. Target: Not Met	found related employment or admission into graduate school within 1 year of graduation. We need to continue to monitor this outcome.	students on applying to graduate school and jobs. We hope that this will help students moving forward.	
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- The program has developed two programs outcomes for the upcoming year.
- Each of these outcomes is focused on either a specific student achievement area or an activity of the program.
- The outcomes are feasible for the program, and the program could develop action plans to address any deficiencies.
- The program outcomes are reflective of the developed mission statement.

- Each program outcome has a direct measure that is a good indicator of the outcome.
- Measures are specific to the outcomes and will produce data specific enough to make improvements.

- The program has defined achievement targets that are specific to each of the outcome-measure pairs.
- Targets are achievable but rigorous.

- The findings presented are:
- Related to the outcome-measure pair.
 - On the same scale as the target.
 - Specific enough to examine all aspects of the stated outcome.
 - Identified as meeting or not meeting their targets.

- The program has provided information on how findings have been interpreted and what that means for the program moving forward.

- Action plans are:
- Provided for all outcomes where targets were not met.
 - Related to the outcome.
 - Sustainable and realistic for the program.

- The program has reviewed any previous action plans and has provided commentary on the results.

General Questions

Directions: Please answer at least one of the following questions.

- Is there any additional information not included in your assessment plan that you would like to share that describes efforts you have made to improve student learning, program quality, and/or the student experience?
- What have you learned about your program or your students as a result of engaging in the assessment process?
- What external factors are driving or informing your assessment practices?