

EXAMPLE

Winthrop University Academic Program Continuous Improvement Report 2018-19

College or Unit: College of Arts and Sciences

Department: Biology, BS

Academic Year: 2018-19

Dean or Unit Head: XX

Program Coordinator: XX

Unit Assessment Coordinator: XX

Stakeholders

Program Name and Degree

Primary Purpose

Program Mission Statement: The mission of the Bachelor of Science program in the Department of Biology is to prepare undergraduate students for entry-level careers in a biology-related field or to pursue studies in an advanced degree program. By providing instruction that explores the science of life, in all its complexity and diversity, and the opportunity to work on research or participate in practical biological experiences, the program strives to create students who are knowledgeable across various biological fields and are able to think critically. This mission aligns with the institutional and college missions of educating students to meet the needs and challenges of the contemporary world.

Department Mission Statement: XX

Primary Activities

Mission Alignment

Unit Mission Statement: XX

University Mission Statement: Winthrop University provides personalized and challenging undergraduate, graduate, and continuing professional education programs of national caliber within a context dedicated to public service to the State of South Carolina...The values of service, excellence, diversity, community, and leadership provide the foundation of Winthrop's continuing development and shape Winthrop's continuing success...Winthrop students acquire and develop knowledge, skills, capabilities, and values that enrich their lives and prepare them to meet the needs and challenges of the contemporary world, including the ability to communicate effectively, appreciate diversity, work collaboratively, synthesize knowledge, solve complex problem, and adapt to change. [Full mission statement: <https://www.winthrop.edu/president/default.aspx?id=1620>]

<p>Student Learning Outcome #1: Students will demonstrate knowledge of the broad fundamental concepts of biology.</p>	<p>The outcome is narrowly defined, specific, measurable, includes an action verb, and appropriate for a biology program.</p>
<p>Alignment of outcome with the Winthrop Plan, if applicable: Goal 2 – Enhance quality of the student experience</p>	
<p>Alignment of outcome with the College's Strategic Plan, if applicable:</p>	
<p>Alignment of outcome with the University Learning Competencies (ULCs), if applicable:</p>	<p>These alignments indicate the relationship between the program, the college, and university.</p>
<p>Drop down box:</p>	

Connection to last year's data.

Summarizes change made in 2018-19 for this outcome.

ULC 1 – Graduates think critically and solve problems.

Summary Statement of Assessment-based Accomplishments and Improvements: (summary statement based on prior year's Continuous Improvement Action Plan)

Summarizes impact of change.

Based on last year's analysis of the Major Field Test (MFT) 2018 data, specifically the Diversity of Organisms indicator, the program added three diversity readings to the curriculum in BIO 115. Due to the time delay between the treatment (BIO 115 in freshman year) and the assessment (MFT in junior or senior year) the Diversity of Organisms score remained at 43% for 2019, the same as for 2018.

Activities:

Provides a detailed account of the activities undertaken in 2018-19 for this outcome. Referencing back to the 2017-18 Report, these activities align with the Action Plan described for 2018-19.

Dr. James, the instructor of record for BIO 115, added three diversity readings to the curriculum. The reading, "Diversity of Organisms," was included in the fourth week of the curriculum during the evolution unit. The reading, "Concerns with Near Extinct Amazon Rainforest Flora," was included in the seventh week of the curriculum during the Plant kingdom unit. The reading, "Impact of Pollution on Organisms," was included in the eleventh week of the curriculum during the environmental impact unit. Readings were assigned as part of the students' preparation for specific classes. Content from the readings was included in the course activities – reading 1 was addressed in the lecture content of the course, reading 2 was included as a collection of readings for a small group discussion, and reading 3 was used in preparation for a laboratory activity. (1 – "Diversity of Organisms" reading; 2 – "Concerns with Near Extinct Amazon Rainforest Flora" reading; 3 – "Impact of Pollution on Organisms" reading)

Direct measure of assessment.

Includes reference to documentation.

Assessment Method #1:

All students are required to take the Major Field Test (MFT) in Biology prior to graduation. The MFT is a good assessment method for this outcome since it assesses student knowledge across a wide spectrum of biological concepts. (4 – ETS Major Field Test for Biology Test Description and Sample Test Questions)

Clear identification of tool and discussion of how the tool supports the outcome.

Most student complete the MFT in the spring semester of their senior year, however, a few will take it in the spring semester of their junior year if they plan to graduate the following December. Students take the MFT in a nearby institution of higher education that is a certified ETS Testing Center. (Note: The department has a process and funding to support students who are not able to afford the testing fee.) (5 – Roster of spring 2019 student test participants by academic year)

Includes reference to documentation.

Data collection process is clearly described – who, what, where, when.

Test results are provided directly to students by ETS. Institutional MFT data are available for download via a web interface. Staff within the Office of the Provost download and share the data with the Biology department chair. He then shares it with program faculty and a meeting to discuss the data is held.

Clearly states the desired results.

Target:

55% of test questions within each of the nine indicators are to be answered correctly by the students as a collective group. This has been and remains the program's target based on historical data (see 5-year data results) and the benchmark set by several of the institution's peer institutions. (6 – Summary of discussions with peer institutions regarding student expectations for MFT Biology performance)

Provides sound reasoning for the established target and documents its discussion with peer institutions.

Assessment Results:

A narrative describing the data accompanies the data table. Note the use of data from previous years and a discussion of these data in relation to current year data.

Discussion of which indicators met the target. Data table supports this claim.

The overall MFT results serve as a good indicator for this outcome, since it assesses student knowledge across a broad range of fundamental biology concepts. The 5-year data trends for most of the nine indicators show consistent performance with a slight increase over the past few years. These indicators include (1) Biochemistry and Cell Energetics, (2) Cellular Structure, Organization, Function, (3) Molecular Biology and Genetics, (4) Organismal – Animals, (5) Organismal – Plants, (6) Population Genetics and Evolution, (7) Ecology, and (8) Analytical Skills. Additionally, these eight indicators met the target of 55% of questions answered correctly by our students, as a collective, for the spring 2019 MFT administration. (7 – ETS Major Field Test for Biology Departmental Summary: Assessment Indicators 2019)

Includes reference to documentation.

The data table provides a clear visual display of results.

Table 1: Mean percent of test questions per indicator answered correctly by students collectively

Indicator	2015	2016	2017	2018	2019
Biochemistry and Cell Energetics	56%	53%	57%	57%	58%
Cellular Structure, Organization, Function	58%	58%	61%	63%	64%
Molecular Biology and Genetics	45%	45%	50%	55%	55%
Diversity of Organisms*	36%	43%	43%	43%	43%
Organismal – Animals	58%	60%	64%	65%	68%
Organismal – Plants	52%	55%	53%	55%	57%
Population Genetics and Evolution	60%	64%	66%	66%	68%
Ecology	62%	61%	63%	63%	65%
Analytical Skills	59%	62%	62%	63%	64%

Note the use of a title and headers on columns.

*Diversity of Organisms included 14 of the 150 test questions (9%).

2015: n=40 students

2016: n=38 students

2017: n=42 students

2018: n=39 students

2019: n=41 students

Note the inclusion of number of students completing the MFT for each year of data presented.

Further narrative on data and target.

As the data indicate, over the course of the past five years, two indicators – Biochemistry and Cell Energetics and Organismal-Plants – have been close to the 55% target, but have been on an upward swing for 2018 and 2019. Molecular Biology and Genetics and Diversity of Organisms continue to be concerns for the program. The faculty decided to address Diversity of Organisms, since the 5-year trend indicates no movement and is consistently below our target. We will monitor the Molecular Biology and Genetics scores closely, however, the last two years have shown a positive upward trend and have met our target of 55%.

Discussion addresses the MFT data presented above.

Discussion of Assessment Results:

Using the MFT Item Information Report, we are provided with the following information regarding the 14 questions from the Diversity of Organisms Indicator. (8 – ETS Major Field Test for Biology Item Information Report 2019)

Includes reference to documentation.

Discussion addresses the data and puts it into a context for the program.

- Our students, as a collective, had a higher percent of answering with a correct response than the national population on 7 of the 14 questions. All of these questions focused on diversity within the Animal kingdom.
- On the remaining 7 questions (50%), the national population scored more correct responses than our collective students. All of these questions focused on the Plant and Fungi kingdoms.

As described in the Activities section, the program took its first step in addressing this issue in 2018-19 through the inclusion of three additional readings related to diversity of organisms in BIO 115, the introductory course for our majors. We realize that this is not going to have an immediate impact on our 2019 MFT scores, since the majority of students in BIO 115 are freshmen and the MFT is primarily taken by juniors and seniors. We feel, however, that we needed to begin to address this concern with our students from their very first course. We did not conduct any assessment in BIO 115 during 2018-19, as we did not feel the readings lent themselves to an actual assessment. The intent of the readings was to expand the students' exposure to diversity within the Plant and Fungi kingdoms and to enrich this exposure within the lecture, small group discussion, and laboratory exercise supported by these readings. As described in our Continuous Improvement Plan, we need to address this concern throughout the curriculum and will continue to use the MFT as our overall assessment method.

Data are shared and discussed with faculty.

MFT data are shared with all program faculty and an assessment meeting is held to discuss the data, its impact, and follow-up actions. This meeting usually takes place in the week following graduation. This 3-hour meeting was held on May 7, 2019. (9 – Biology Program Faculty meeting minutes – May 7, 2019)

Includes reference to documentation.

Clear identification of tool and alignment of tool with the outcome.

Multiple methods of assessment are used (MFT and Senior Survey).

Assessment Method #2:

All senior students enroll in BIO 499 during the spring semester, so it is an ideal environment for students to reflect over their four-years in the biology program. Students within the course are asked to complete a Senior Survey that focuses on the biology curriculum, their research experience, and their level of confidence in their knowledge of basic fundamental biological concepts. The survey, although written by program faculty, does incorporate selected questions from David Lopatto's Survey of Undergraduate Research Experiences (S.U.R.E.). (10 – David Lopatto's Survey of Undergraduate Research Experiences; 11 – Biology Program Senior Survey)

Indirect measure of assessment.

Includes reference to documentation.

The online survey is completed by students during the first part of class using their own laptops, tablets, or phones. The instructor leaves the room and a GA not associated with BIO 499 monitors the survey administration. Data are extracted from the system by the biology program's administrative assistant and shared with faculty after final grades are due. Program faculty review and discuss the data during an assessment meeting held the week after spring graduation. (9 – Biology Program Faculty meeting minutes – May 7, 2019)

Clearly stated expectation.

Target:

The program expects 85% of seniors to be "confident" or "very confident" in their knowledge of the broad fundamental concepts of biology. Since the majority of our graduates go to professional school (pre-med, pre-dent) or graduate school, the faculty feel strongly that they need to feel confident in their knowledge of fundamental concepts to assure success in the next chapter of their professional lives. Additionally, historical data trends (see 5-year data results) support the feasibility of this target.

The data collection process is clearly described.

Justification for target.

Assessment Results:

Data align with the method. These are actually Senior Survey data.

Narrative explanation of the data to follow in the table.

The set of Senior Survey questions that is most appropriate for this outcome, knowledge of the broad fundamental concepts of biology, asks students to rate their level of confidence in their knowledge of various biological concepts, including anatomy, biochemistry, bioethics, botany, cell biology, ecology, genetics, microbiology, physiology, and zoology. Students responded using a 5-point rating scale with 5=very confident, 4=confident, 3=slightly confident, 2=not confident, and 1=undecided. (12 – Biology Department Senior Survey Data Table – Spring 2019)

Includes reference to documentation.

Table 2: Percent of students responding with a rating of “Very Confident” or “Confident” on Senior Survey

Clear visual presentation of current and past data.

Concept	2015 n=39		2016 n=38		2017 n=41		2018 n=39		2019 n=41	
	%	n	%	n	%	n	%	n	%	n
Anatomy	100%	39	95%	36	98%	40	100%	39	98%	40
Biochemistry	67%	26	71%	27	68%	28	69%	27	68%	28
Bioethics	95%	37	92%	35	98%	40	95%	37	93%	38
Botany	72%	28	71%	27	68%	28	69%	27	68%	28
Cell Biology	82%	32	84%	32	83%	34	79%	31	85%	35
Ecology	90%	35	89%	34	85%	35	90%	35	90%	37
Genetics	72%	28	74%	28	76%	31	72%	28	73%	30
Microbiology	69%	27	74%	28	73%	30	72%	28	73%	30
Physiology	87%	34	84%	32	90%	37	85%	33	85%	35
Zoology	92%	36	92%	35	88%	36	92%	36	90%	37

Note the inclusion of number of students.

Note the inclusion of % and # of students.

Previous data are provided and discussed in relation to current data.

5-year trend data indicate that the program has exceeded its target of 85% of seniors “confident” or “very confident” in their knowledge on 6 of 10 broad biological concepts, including anatomy, bioethics, cell biology, ecology, physiology, and zoology. These six concepts also met the 85% target for 2019. Biochemistry and botany are averaging around 69% confidence, with genetics and microbiology averaging 72-73% confidence. None of these four concepts met the 85% target for 2019.

Discussion of target attainment.

Discussion of Assessment Results:

The program recognizes that this is an indirect method of assessing student knowledge. Students’ levels of confidence in knowledge are recorded here as their perceptions of knowledge.

Discusses both data sources and their support for curricular actions.

Bearing in mind that these are student perceptions, the program does note, however, the similarity between student perception and student performance of knowledge. Students answered the lowest percentage of items correct on the MFT indicators of genetics and diversity of organisms (specifically questions relating to the Fungus and Plant kingdoms), similar to the two areas in which they perceive less confidence (botany and genetics). The triangulation of these two data sources supports the curricular actions that the program is taking in regard to diversity of organisms.

Data are shared and discussed with faculty.

The Senior Survey data are shared with all program faculty and an assessment meeting is held to discuss the data, its impact, and follow-up actions. This meeting usually takes place in the week

The Action Plan addresses Diversity of Organisms, the topic identified by the data.

following graduation. This 3-hour meeting was held on May 7, 2019. (9 – Biology Program Faculty meeting minutes – May 7, 2019)

Continuous Improvement Action Plan for next year:

In 2019-20, the program will continue to address the Diversity of Organisms within the curriculum.

The program identifies three distinct actions to take in 2019-20, all reflective of what was learned from the data.

A clear description of the plans for BIO 332, including activity, timeline, and responsible individual.

1. The current curriculum inclusion of diversity readings in BIO 115 will continue.
2. BIO 332 is a course taken primarily by juniors, usually their third or fourth course in the program. BIO 332 will add a laboratory exercise focusing on the Fungi and Plant kingdoms. The fungi are an often overlooked, but ecologically important group of organisms. The lab will also address in detail the spore-bearing (non-seed-bearing) plants (mosses and ferns). Dr. Kim, the instructor of record, will replace the current lab, which focuses almost exclusively on seed-bearing plants, with this laboratory exercise and incorporate the topics covered in the current seed-bearing plant lab into a general ecology lab that occurs later in the semester. All laboratory reports in BIO 332 are assessed with a common lab report rubric, which will be applied to this new lab as well. The rubric assesses the dimensions of hypothesis, conduction of experiment, data collection, data analysis and interpretation, and conclusion for all lab reports. The department would like to see how rubric results for this lab compare to rubric ratings for the other BIO 332 labs.
3. The program faculty have decided to conduct MFT review sessions. Healthy discussion occurred within the program to address the philosophical concerns of teaching to a test voiced by some faculty. We have agreed as a program to review the major topics that we have already taught within our curriculum, noting that students are exposed to some of the MFT topics in their freshman and sophomore years and take the test in the spring of their junior or senior year. Review sessions will be organized by topic and students can select which ones they desire to attend, with attendance at all being recommended. These sessions will occur early in the spring 2020 semester, facilitated by faculty members with the appropriate expertise. We are continuing to discuss appropriate times for these sessions and will discuss this with our students early in the fall semester. Possibilities include Saturday mornings, Sunday evenings, common hours, and a week night evening. The consideration of stacking several one-hour reviews into a longer time block is being considered. The program will have the timing determined within two weeks of the beginning of the fall semester. Communication to students will occur via email, program/department website, bulletin boards, social media outlets, and classroom announcements.

A clear description of the review session plan, including activity, timeline, and responsible individuals.

The program is also keeping a close eye on the MFT Genetics score, although it has trended upward ten percent points in the last five years to reach the target of 55%. This is an area we may need to address in our 2019-20 Report and possibility include actions in our continuous improvement plan for 2020-21.

Supporting Documentation

1. "Diversity of Organisms" reading
2. "Concerns with Near Extinct Amazon Rainforest Flora" reading
3. "Impact of Pollution on Organisms" reading

Supporting documentation is numbered and listed in the order in which it is presented in the report.

4. ETS Major Field Test for Biology Test Description and Sample Test Questions
5. Roster of spring 2019 student test participants by academic year
6. Summary of discussions with peer institutions regarding student expectations for MFT Biology performance
7. ETS Major Field Test for Biology Departmental Summary: Assessment Indicators 2019
8. ETS Major Field Test for Biology Item Information Report 2019
9. Biology Program Faculty meeting minutes – May 7, 2019
10. David Lopatto's Survey of Undergraduate Research Experiences
11. Biology Program Senior Survey
12. Biology Program Senior Survey Data Table – Spring 2019