Academic Program Assessment Plan
Biological Sciences

Academic Program Name	Biological Sciences
Program Leader	Kendra Greenlee
Academic Unit	Biological Sciences
Unit Leader	Kendra Greenlee
College	College of Science and Mathematics
College Dean	Kimberly Wallin

1. Mission statement

The Department of Biological Sciences integrates exceptional biological research and diverse learning opportunities to provide everyone with the knowledge and skills to succeed in a changing world.

2. Program learning outcomes (PLOs)

Our outcomes are organized into 4 themes:

Theme 1: Understanding and application of scientific reasoning and process

A Department of Biological Sciences graduate:

(1) Makes connections between biology, the physical sciences and math
(2) Identifies scientific issues and uses the scientific method, including experimental design, data collection, analysis, and interpretation.
(3) Understands the philosophical underpinnings of scientific reasoning

Theme 2: Effective use of technology to obtain and evaluate information and data

A Department of Biological Sciences graduate:

(4) Demonstrates the ability to use sources of information in biology, including published literature and scientific databases, and to evaluate the quality of information sources
(5) Demonstrates the ability to acquire and analyze experimental data and to use quantitative analysis to interpret biological data
(6) Demonstrates the ability to develop numerical and graphical models and to simulate biological mechanisms
(7) Demonstrates the ability to use scientific techniques necessary for data gathering and analysis

Theme 3: Communication and conduct within a scientific context

A Department of Biological Sciences graduate:

(8) Communicates effectively in writing, speech, and visual presentations within a variety of contexts
(9) Understands the roles of teamwork and individual effort in scientific endeavors; discusses issues constructively and appreciates different ideas and viewpoints

Theme 4: Is prepared for effective citizenship and life after college

A graduate of the Department of Biological Sciences:

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(10) Understands professional standards in science and its applications, including the responsible use of information

3. Curriculum map

We aligned each of our courses to the outcomes identified in section 2 (Table1). We articulate where students are introduced to each outcome, where that outcome is reinforced (developing), and where it is mastered.

Table 1. Curriculum map of Biological Sciences (I=Introducing; D=Developing; M=Mastering)

Course	1	2	3	4	5	6	7	8	9	10
BIOL 150	I				I				I	
BIOL 150L	I	I	I		I	I	I	I	I	
BIOL 151	I					I		I	I	
BIOL 151L		I	I		I	I	I	I	I	
BIOL 189								I	I	
BIOL 270	D	D		I	D		D	D	D	I
BIOL 271	D	D		I	D		D	D	D	I
BIOL 272	D	D		I	D		D	D	D	I
BIOL 273	D	D		I	D		D	D	D	I
BIOL 274	D	D		I	D		D	D	D	I
BIOL 275	D	D		I	D		D	D	D	I
BIOL 359		D	D	D		D			D	
BIOL 364	D		D				D	D	D	
BIOL 370	D				D	D		D		D
BIOL 410		M							M	M
BIOL 414	M		M	M	M		M	M	M	
BIOL 444	M			M	M	M	M	M	M	M
BIOL 450	M	M		M	M		M	M	M	
BIOL 452	M			M	M	M	M	M	M	M
BIOL 454	M	M		M	M		M	M	M	
BIOL 456	M		M	M		M		M	M	M
BIOL 458	M	M		M	M		M	M	M	M
BIOL 460	M		M		M	M		M	M	M
BIOL 461	M	M		M		M		M	M	
BIOL 462	M	M	M	M		M		M	M	
BIOL 463			M	M	M		M	M	M	

BIOL 464*										
BIOL 465		M	M	M		M		M	M	
BIOL 470	M	M		M	M	M	M	M		
BIOL 472		M	M	M				M		
BIOL 475	M		M	M		M		M	M	M
BIOL 476	M			M		M		M	M	
BIOL 477		M		M	M	M	M	M	M	
BIOL 479	M		M	M			M	M	M	M
BIOL 480	M		M	M		M	M	M	M	M
BIOL 481	M		M	M			M	M	M	M
BIOL 482		M	M	M				M	M	M
BIOL 483		M	M					M	M	M

*Still working to align this course

4. Assessment cycle

We intend to assess our 10 outcomes over a four year cycle as follows:

- Year 1: Outcomes 2, 5, and 7
- Year 2: Outcomes 4, 8, and 10
- Year 3: Outcomes 1 and 3
- Year 4: Outcomes 6 and 9

In the coming academic year (2021-22), we will assess our Year 1 Outcomes.

5. Assessment methods and measures

We plan to assess each outcome at three distinct stages in our curriculum: introductory courses (Biol 150/L, Biol 151/L), CUREs (course-based undergraduate research experiences, 200-level courses), and in selected 400-level courses (each year, we will identify 2-4 courses where the focal outcomes are assessed). We will use VALUE rubrics, developed by the AAC&U (https://www.aacu.org/value-rubrics), to review course artifacts and determine students' proficiency for each outcome.

In year 1 of our four-year assessment cycle, we will evaluate Outcomes 2, 5, and 7 using course artifacts gathered from a suite of courses (Table 2). We identified four potential courses at the Master level (400-level), but anticipate using a selection of these courses based on enrollment and data availability. We will adopt and adapt several VALUE rubrics to evaluate artifacts, including Quantitative Literacy, Inquiry & Analysis, and Problem Solving.

In our analyses, we will explore:
(1) The extent to which students are meeting each programmatic outcome;
(2) How our curriculum is impacting students who identify as BIPOC, first generation college students, Pell eligible students, and women.

This analysis will also help support curriculum changes to balance the courses offered in our two curriculum tracks to better meet student learning needs.

Table 2. Potential artifacts for Year 1 assessment
(list artifacts under outcome; if possible, include link to the actual assignment)

Level	Course	Outcome 2	Outcome 5	Outcome 7
Intro	Biol 150L	1. Experimental Design Worksheet 2. Data Analysis Assignment	Interpretation of Results	Scientific Techniques: Wet Lab Measuring Rate of Drug Delivery from Hydrogel Scientific Techniques: Extracting data from large databases
	Biol 151L	Results/interpretation worksheets	Results/interpretation worksheets	Results/interpretation worksheets
Developing	CUREs	Proposal, Final poster Proposal Directions	Proposal, Final poster Scientific Paper Discussion Section Directions	Proposal, Final poster Lab Notebook Elements
Mastery	Biol 454	*Given the dynamic nature of course development, we will work with faculty during the academic year to identify potential evidence sources.*		
	Biol 458			
	Biol 475			
	Biol 477			

6. Assessment oversight

We will use an assessment committee to oversee our annual assessment process. These individuals will be charged with:

(1) Working with appropriate faculty to gather evidence in both fall and spring semesters
(2) Querying the registrar for demographic information, in particular gender, race and ethnicity, first generation college student status, and Pell eligibility
(3) Adapting the VALUE rubrics to meet our assessment needs
(4) Applying the VALUE rubrics to analyze student artifacts
(5) Evaluating the results to make recommendations to the department (an improvement plan)
(6) Generating an annual assessment report for the Office of Assessment

Members of this committee will include the Associate Chair of the Department and two faculty members, ideally one Professor of Practice and one tenured faculty member. The Associate Chair, once named, will be responsible for recruiting faculty and for managing the assessment process.