

Assessment Plan for the Biological and Chemical Sciences major

2017-2018

1. Mission Statement of the Biological and Chemical Sciences major

The major in biological and chemical sciences provides students the opportunity and the guidance to build a foundation for further learning in the fundamental areas of biology, the study of life, and chemistry, the study of matter. Students engage in active learning as they apply the scientific method towards understanding the natural world. Students think critically when evaluating their learning, and are prepared to share their education with others. Students learn to write and to speak effectively about science and scientific issues. Students are prepared for a variety of careers, including education and general science careers.

2. 3. 4. Program goals, learning objectives and outcomes

1. Students learn the fundamental basics of biology and chemistry, and appreciate the interconnections between them.
 - a. Learn important concepts and principles that underpin biology and chemistry
 - i. Gain knowledge in biology and chemistry
 - ii. Apply concepts in different scenarios in lecture and lab
 - b. Demonstrate the interrelationships of chemistry and biology
 - i. Understand basic biochemical pathways such as photosynthesis and respiration
 - ii. Describe the bonding mechanisms found in major classes of biological molecules
2. Students investigate scientific questions using the scientific method and proper research techniques, and learn to evaluate data and communicate their results both orally and in writing, using proper technology.
 - a. Learn the scientific method and how to properly conduct a scientific study
 - i. Design a lab or field study using the scientific method
 - ii. Present results in a lab report and in oral presentation formats
 - b. Evaluate data using statistical methods such as graphs and basic summary measurements
 - i. Students can make and evaluate graphs
 - ii. Students can use excel to conduct simple statistical analyses
 - c. Evaluate the value of sources of information found on the internet and in print
 - i. Learn how to find primary research sources
 - ii. Use primary literature sources to support a thesis
3. Students critically evaluate issues relating to science in society.
 - a. Investigate how science is important to society
 - i. Learn the importance of science to our everyday lives
 - ii. Discuss current scientific discoveries
4. Students learn the value of science in the liberal arts and for lifelong learning.

- a. Understand the value of diverse perspectives in scientific study
 - i. Group work where students interact with their peers
 - ii. Learn to be creative in scientific investigations

5. Means of Assessment of Outcomes

Goal	Objective	Outcome	How Outcome is Measured	Measurement Tool	Success Criteria	Data Location
#1	Students learn the fundamental basics of biology and chemistry, and appreciate the interconnections between them.					
	a. Learn important concepts and principles that underpin biology and chemistry	i. Gain knowledge in biology and chemistry	Exams and homework questions	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files
		ii. Apply concepts in different scenarios in lecture and lab	Discussion questions and lab reports/handouts	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files

Goal	Objective	Outcome	How Outcome is Measured	Measurement Tool	Success Criteria	Data Location
	b. Demonstrate the interrelationships of chemistry and biology	i. Understand basic biochemical pathways such as photosynthesis and respiration	Class activities in Biol 130, specifically the diagrams of photosynthesis and respiration, Chem 213 - lab activity, and Chem 214, final exam question	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files
		ii. Describe the bonding mechanisms found in major classes of biological molecules	Exams and lab activities	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files
#2	Students investigate scientific questions using the scientific method and proper research techniques, and learn to evaluate data and communicate their results both orally and in writing, using proper technology.					

	a. Learn the scientific method and how to properly conduct a scientific study	i. Design a lab or field study using the scientific method	Lab projects	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files
		ii. results in lab report & presentation	Lab projects	“	“	“
	b. Evaluate data using statistical methods such as graphs and basic summary measurements	i. Students can make and evaluate graphs	Exams and lab activities	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files
		ii. Students can use excel to conduct simple statistical analyses	Lab activities	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files

	c. Evaluate the value of sources of information found on the internet and in print	i. Learn how to find primary research sources	Lab and lecture activities	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files
		ii. Use primary literature sources to support a thesis	Lab and lecture activities	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files
#3	Students critically evaluate issues relating to science in society and learn proper research techniques.					
	a. Investigate how science is important to society	i. Learn the importance of science to our everyday lives	Class discussions and projects	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files
		ii. Discuss current scientific discoveries	Class discussions and projects	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files

					level	
4.	Students learn the value of science in the liberal arts and for lifelong learning.					
	a. Understand the value of diverse perspectives in scientific study.	i. Group work where students interact with their peers	Lab and lecture projects	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files
		ii. Learn to be creative in scientific investigations	Lab and lecture projects	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files

6. How assessment data will be utilized

This is the first year that we will be doing an assessment of the Biological and Chemical Sciences major. We will focus on Program Goal 1, objective b, and outcome i. To do this we will analyze assignments from the introductory biology and chemistry courses and see where the interrelationships between the fields are apparent. For example, in Biol 130 there are several class assignments dealing with the transfer of electrons in photosynthesis and respiration – we will see if our means of assessing the outcomes fit our success criteria and make changes if necessary.

