

Weber State University  
Annual Assessment of Evidence of Learning

Cover Page

Department/Program: MICROBIOLOGY  
Academic Year of Report: 2015/16  
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**A. Brief Introductory Statement:**

Please review the Introductory Statement and contact information for your department displayed on the assessment site:

<http://www.weber.edu/portfolio/departments.html> - if this information is current, please place an 'X' below. No further information is needed. We will indicate "Last Reviewed: [current date]" on the page.

**Information is current; no changes required.**

**Information is not current; updates below.**

Update:

## **B. Mission Statement**

Please review the Mission Statement for your department displayed on the assessment site: <http://www.weber.edu/portfolio/departments.html> - if it is current, please indicate as much; we will mark the web page as “Last Reviewed [current date]”. No further information is needed. If the information is not current, please provide an update:

**Information is current; no changes required.**

**Information is not current; updates below.**

### **Department of Microbiology Mission Statement**

The department of Microbiology seeks to provide a quality undergraduate education to students of Weber State University in both general education and discipline-specific courses. We strive to provide our graduates with a solid academic foundation for further educational opportunities, and the knowledge and skills for career opportunities upon graduation. We seek to integrate into student's program of study the development of skills including critical thinking, problem solving, teamwork, written and oral communication, and laboratory research techniques. The department provides opportunities for research and other scholarly activities for both faculty and students, and serves as a resource for the campus and the state of Utah in the area of microbiology. We attempt to inspire life-long learning and teach students the broad range of disciplines in microbiology. We also believe that a more knowledgeable public will be able to make more informed decisions with regard to scientific issues that impact their lives.

### **C. Student Learning Outcomes**

Please review the Student Learning Outcomes for your department displayed on the assessment site:

<http://www.weber.edu/portfolio/departments.html> - if they are current, please indicate as much; we will mark the web page as “Last Reviewed [current date]”. No further information is needed.

If they are not current, please provide an update:

**Information is current; no changes required.**

**Information is not current; updates below.**

However, our strategic plan lays out goals for a review of curriculum objectives in 2016-17. Efforts have been hampered by other departmental priorities (hiring a new lab manager, faculty, and office assistant, building & move issues, etc.). We plan to resume these efforts in the spring.

## D. Curriculum

Please review the Curriculum Grid for your department displayed on the assessment site: <http://www.weber.edu/portfolio/departments.html> - if it is current, please indicate as much; we will mark the web page as “Last Reviewed: [current data]”. No further information is needed. If the curriculum grid is not current, please provide an update:

**Information is current; no changes required.**

**Information is not current; updates below.**

### Curriculum Map

	Core Concepts					Fundamental Skills							
	CC1	CC2	CC3	CC4	CC5	FS1	FS2	FS3	FS4	FS5	FS6	FS7	FS8
	Model systems for Basic Biology	Integral role in Disease and Human Health	Ubiquitous in nature	Vital Role – Integration of Science and	Indispensable role in Environment and Ecology	Nature of Science	Laboratory Skills	Critical thinking	Data Analysis	Problem Solving	Communication	Cooperation	Values
<b>Required Courses</b>													
2054, Principles of Microbiology	1, A	2	2, A	1	2, A	1	3, A	1	1	1	1	2	1
3053, Microbiological Procedures	2, A					3, A	3, A	3	3	3	3	3	
3154, Microbial Ecology	2, A	2	3, A	2	3, A	3, A	3, A	3, A			2, A	2, A	2
4054, Microbial Physiology	3, A	2	3, A	2	3, A		3, A		3, A			3, A	3
4154, Microbial Genetics	3, A		1	2	3, A	2	3, A	2, A	2, A	2	3, A	3, A	2
<b>Elective Courses</b>													
3012, Microbiology and Global Public Health		2, A		3, A					2, A			2	3
3254, Immunology		3, A		3, A			3, A		2, A		3, A		3, A
3305, Medical Microbiology		3, A		3, A		3, A	3, A	3, A	3, A	3, A	3, A	3, A	2
3403, Tropical Diseases		3, A		3, A		3, A	3, A	3, A		3, A	3, A	3, A	3, A
3484, Environmental Microbiology	3, A	3, A		3, A	3, A	3, A	3, A	3, A		3, A	3, A	3, A	
3502, Environmental Health		2	3		3			2		2			3
3753, Geomicrobiology	2		3, A		3, A	2	3, A	3, A		2, A	2	2	
3853, Food Microbiology	1, A	2, A	1	3, A	1			3, A	3, A	3, A			
4252, Cell Culture	3, A	2	2	2	2	2	3, A	2	3, A	3	2	3, A	
4354, Industrial Microbiology				3, A		3, A	3, A	3, A	3, A				
4554, Virology	3, A	3, A	3, A	3, A	3, A	3	3, A	3	3, A	3	3	3, A	

	Core Concepts					Fundamental Skills							
	CC1	CC2	CC3	CC4	CC5	FS1	FS2	FS3	FS4	FS5	FS6	FS7	FS8
	Model systems for Basic Biology	Integral role in Disease and Human Health	Ubiquitous in nature	Vital Role - Integration of Science and	Indispensable role in Environment and Ecology	Nature of Science	Laboratory Skills	Critical thinking	Data Analysis	Problem Solving	Communication	Cooperation	Values
<b>High Impact Courses</b>													
4800, Directed Research	3	3	3			3	3				3, A		
4830, Directed Readings	3	3	3								3, A		
4991, Microbiology Seminar											3, A		

*Note<sup>a</sup>*: Define words, letters or symbols used and their interpretation; 1= introduced, 2 = emphasized, 3 = mastered, A = Assessed Comprehensively;

## **E. Assessment Plan**

Please review the Assessment Plan for your department displayed on the assessment site: <http://www.weber.edu/portfolio/departments.html> - if the plan current, please indicate as much; we will mark the web page as “Last Reviewed [current date]”. No further information is needed.

The site should contain an up-to-date assessment plan with planning going out a minimum of three years beyond the current year. Please review the plan displayed for your department at the above site. The plan should include a list of courses from which data will be gathered and the schedule, as well as an overview of the assessment strategy the department is using (for example, portfolios, or a combination of Chi assessment data and student survey information, or industry certification exams, etc.).

*Please be sure to include your planned assessment of any general education courses taught within your department.* This information will be used to update the General Education Improvement and Assessment Committee’s planning documentation.

Assessment plan:

Departmental assessment for 2016-2017 focused on renewing the Microbiology General Education courses. Assessment of the planned major’s level courses, MICR 3484 Environmental Microbiology, 3853 Food Microbiology, will be assessed in 2016-17; and 4154 Microbial Genetics and 4354 Industrial Microbiology will be assessed in 2017-2018.

An updated plan for 2017-2023 will be developed within the next year. General education courses will be reviewed annually.

**F. Report of assessment results for the most previous academic year:**

A. Evidence of Learning: Courses within the Major – NA for 2015-2016

B. Evidence of Learning: High Impact or Service Learning

Learning Objectives: Nature of Science (FS#1), Laboratory Skills (FS#2), Communication (FS#6)  
In 2014-2015 (from Annual Report):

- 48 Directed Research students worked on mentored projects.
  - Two undergraduate research students attended, and presented posters at, the American Society for Microbiology General Meeting in New Orleans. May 2015. And the American Dairy Science Association General Meeting, Orlando, FL, July 2015.
  - Several students presented work at local or regional meetings, including the Intermountain Branch American Society for Microbiology, Utah Academy of Sciences, Arts, and Letters, Utah Conference on Undergraduate Research, the National Conference of Undergraduate Research, and The Weber State Symposium
- 23 students earned credit for Physician or Dentist Shadowing, or Coop-Work experiences
- 35 Students completed directed readings credit

Assessment of High Impact Learning:

Directed Research: Faculty assess mentored research projects independently. This may include evaluation of notebooks, written summaries, and publication or presentation of work in scientific publications or conferences.

Titles of student publications and presentations can be found in the departmental annual report.

Directed readings: Faculty assess mentored readings projects independently. This may include thesis papers, book or paper summaries.

Physician and Dental Shadowing and Co-Op Work experiences: Assessment is through student logs and journals and supervisor evaluation letters.



### c. Evidence of Learning: General Education Courses

The Microbiology General Education Courses were approved for Renewal in Fall 2016

#### MICR 2054: Principles of Microbiology 2015

Outcome	Content	Assessment	Measure	Results
SS1: Nature of Science	Current research in microbiology, Historical Microbiology, Classical Experiments in Microbiology, Laboratory Exercises.	Exam questions on Chitester selected from 6 exams in MICR 2054	70% of students will have 70% or better 15 question	77% of students met the criteria.
	Students will be able to identify hypotheses in current scientific literature Students will be able to distinguish scientific evidence from non-evidence Students will make an argument using scientific evidence.	Graded discussion posts: Students read articles (or view/listen to multimedia) about current microbiological science and answer questions.	Formative assessment only, An example is given in below. Six discussion activities were used in 2014. Discussions were graded on complete/incomplete basis.	In 2016 rubrics will be added for summative assessment of SS1.
SS2: Integration of Science	Role of other disciplines in microbiology, physics, chemistry, biochemistry, and the impact of microbiology on other sciences, ecology, zoology, botany, agriculture, etc.	Exam questions on Chitester selected from 6 exams in MICR 2054	70% of students will have 70% or better 17 questions	75% of students scored 70% or better on these questions
SS3: Science and Society	The impact of microorganisms on the health and well-being of humans, especially their ability to cause disease. Vaccines, antibiotics.	Exam questions on Chitester selected from 6 exams in MICR 2054	70% of students will have 70% or better 45 questions	90% of students scored 70% or better on these questions
SS4: Problem Solving	Microbiological laboratory techniques that require data collection and analysis, e.g. determining the number of cells per milliliter in a food or water sample.	1. Exam questions on Chitester selected from 6 exams in MICR 2054	70% of students will have 70% or better 45 questions	62% of students scored 70% or better on these questions
		2. Lab Exam 3, student use data to calculate the outcomes of microbiological dilutions. They must plan and execute a dilution scheme to quantify bacteria in a sample culture.	70% of students will earn 70% or better on Lab exam 3.	91% of class met the threshold.
		3. Dilution Quiz: 10 questions, take home quiz. Students solve dilution problems	90% of students will earn 80% or better. Canvas Quiz	In 2014, >90% of students met this threshold
LS1: Levels of Organization	Cell structure and function. Three domains of life. Basics of evolution.	Multiple choice and short answer questions on macromolecules, and cell structure and functions.	70% of Students will answer 70% of the questions correctly Measured with ChiTester 127 questions	82% of students scored 70% or better on these questions
LS2: Metabolism and homeostasis	Central metabolic pathways, including anabolism and catabolism, aerobic and anaerobic respiration, and fermentations.	Multiple choice and short answer questions on Glycolysis, Citric Acid Cycle, Electron Transport and related topics	70% of Students will answer 70% of the questions correctly. Measured with ChiTester 257 questions	81% of students scored 70% or better on these questions
LS3: Genetics and Evolution	Central Dogma of biology, DNA replication, transcription, translation, mutations, genetic exchange, and the relationship between genetic change and microbial diversity and evolution. Antibiotic resistance.	Multiple choice and short answer questions on DNA replication and protein synthesis, mutations, and genetic exchange	70% of Students will answer 70% of the questions correctly. Measured with ChiTester 178 questions	83% of students scored 70% or better on these questions
LS4: Ecological Interactions	Impact of microbial activity on their environment. Including human-microbe interactions, Metabolic diversity, nitrogen fixation, waste water treatment.	Multiple choice and short answer questions on the interactions between microorganisms and between microorganisms and the human immune system	70% of Students will answer 70% of the questions correctly. Measured with ChiTester 20 questions	62% of students scored 70% or better on these questions

\*At least one measure per objective must be a direct measure; indirect measures may be used to supplement direct measure(s).

**Action Plan:**

- Develop a common set of questions for each instructor to use for assessment of each outcome through Chi-tester
- Develop more and better assessment of the Natural Science Learning Outcomes, especially Nature of Science and Problem Solving
- Increase the use of rubric-graded assignments that evaluate higher-order thinking skills
- Participate in campus-level discussions on Evidenced Based Teaching Practices (e.g. flipped classrooms, group-learning)
- Use tools such as the CWSEI Teaching Practices Inventory for faculty self-evaluation of teaching practice
- Refine the alignment between course outcomes and those stated within the AAAS Vision and Change Report on Undergraduate Biology Education and by The American Society for Microbiology

## 1113 Introduction to Microbiology

### Course Description:

An introduction to microorganisms, their biology, and their relationships to health, technology, and the environment, with practical applications. Three lecture/demonstrations per week.

### MICR 1113 Life Science Outcomes Measured in Chi-tester Exams

Fall 2015-Summer 2016

Outcome	Content	Assessment	Measure	Percent of students meeting criteria
Nature of Science	Current research in microbiology, Historical Microbiology, Classical Experiments in Microbiology,	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	49%
		2. Selected Exam Questions (Spring 2016) 15 questions		88%
Integration of Science	Role of other disciplines in microbiology, physics, chemistry, biochemistry, and the impact of microbiology on other sciences, ecology, zoology, botany, agriculture, etc.	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	36%
Science and Society	The impact of microorganisms on the health and well-being of humans, especially their ability to cause disease. Vaccines, antibiotics	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	53%
		2. Selected Exam Questions (Spring 2016) 52 questions		74%
Problem Solving	DNA transcription and translation	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	59%
		2. Selected Exam Questions (Spring 2016) 9 questions		83%
Levels of Organization	Cell structure and function. Three domains of life. Basics of evolution	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	61%
		2. Selected Exam Questions (Spring 2016) 35 questions		74%
Metabolism and homeostasis	Central metabolic pathways, including anabolism and catabolism, aerobic and anaerobic respiration, and fermentations.	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	63%
		2. Selected Exam Questions (Spring 2016) 55 questions		71%
Genetics and Evolution	Central Dogma of biology, DNA replication, transcription, translation, mutations, genetic exchange, and the relationship between genetic change and microbial diversity and evolution. Antibiotic resistance	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	63%
		2. Selected Exam Questions (Spring 2016) 54 questions		72%
Ecological Interactions	Impact of microbial activity on their environment. Including human-microbe interactions, Metabolic diversity, nitrogen fixation, waste water treatment, other examples	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	64%
		2. Selected Exam Questions (Spring 2016) 25 questions		74%

Results from outcome-linked Chitester questions, by semester.

Percentage of Students Meeting 70% or Better for Each Learning Outcome by semester

Outcome	Spring		Summer		Spring		Summer	
	Fall 2014	2015	2015	Fall 2015	2016	2016	2016	2016
LS1	80%	71%	64%	60%	65%	33%		
LS2	57%	69%	69%	63%	65%	37%		
LS3	65%	62%	53%	71%	60%	NA		
LS4	71%	70%	NA	NA	64%	NA		
S1	55%	55%	47%	45%	53%	37%		
S2	57%	46%	39%	46%	34%	18%		
S3	40%	37%	52%	37%	59%	50%		
S4	62%	60%	26%	62%	58%	NA		

### Action Plan:

Direct Measures:

Because we have several instructors that teach this course in different formats (including online, face-to-face, and IVC), and because instructors use different summative and formative assessment techniques, developing standard assessment tools has been a challenge.

- Students are currently assessed using traditional multiple-choice questions on four to seven, unit exams (depending on instructor). Each exam addresses one or more of the natural science or life sciences learning objectives for the life sciences.
- We are working to develop a standardized assessment tool or tools that can be used to measure the LS learning outcomes for MICR 1113 across sections, instructors, and formats.
- We need to increase the use of rubric-graded assignments that evaluate higher-order thinking skills.
- Participate in campus-level discussions on Evidenced Based Teaching Practices (e.g. flipped classrooms, group-learning).
- Use tools such as the CWSEI Teaching Practices Inventory for faculty self-evaluation of teaching practice.
- Refine the alignment between course outcomes and those stated within the AAAS Vision and Change Report on Undergraduate Biology Education and by The American Society for Microbiology.

## Microbiology 1153: Elementary Public Health

### Course Description:

Principles and practices of public health, emphasizing prevention and control of communicable and degenerative diseases, and environmental health problems. Three lectures/ demonstrations/ week.

Su 2015-Sp 2016

Outcome	Content	Assessment	Threshold	Results
Nature of Science	Historical Microbiology, Classical Experiments in Microbiology,	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty.	1. 70% of students will have 70% or better on these questions	1. 76% of students earned 70% or better.
Integration of Science	Sciences of Public Health: Biomedical Science, Social and Behavioral Science, Health Policy, Epidemiology, Statistics, Environmental Health	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty.	1. 70 % of students will have 70% or better on these questions	1. 64% of students earned 70% or better
Science and Society	The impact of microorganisms on the health and well-being of humans, especially their ability to cause disease. Vaccines, antibiotics. Socioeconomic impact of health and disease.	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty.	1. 70 % of students will have 70% or better on these questions 2. Rubric evaluated canvas assignments *	78% of students earned 70% or better
Problem Solving	Epidemiology, identifying types of epidemiologic studies, calculating incidence rates and relative risks, Interpreting and evaluating health claims (e.g. vaccine side effects)	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty.	1. 70 % of students will have 70% or better on these questions	30% of students earned 70% or better
Levels of Organization	Cell structure and function, microbial diversity, three domains of life	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty. Measure 2: Open note quiz on Canvas	1. 70 % of students will have 70% or better on these questions* 2. 80% of students will have 70% or better on assignment	1 19% of students earned 70% or better 2. 80% had better than 70% on assignment
Metabolism and homeostasis	Metabolic diversity in prokaryotic organisms. Organisms used in food production.	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty.	1. 70 % of students will have 70% or better on these questions	56% of students earned 70% or better
Genetics and Evolution	Central Dogma of Biology, DNA replication, transcription, translation, mutations, genetic exchange, and the relationship between genetic change and microbial diversity and evolution. Antibiotic resistance, sickle cell anemia	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty. Measure 2: Open note quiz on Canvas	1. 70 % of students will have 70% or better on these questions 2. 80% of students will have 70% or better on assignment	1. 71% of students earned 70% or better 2. 83 % had 70% or better on assignment
Ecological Interactions	Impact of environmental quality on health and disease. Examples: role of climate change in changing disease patterns, impact of drought on plant pathogens, relationships between UV exposure and skin cancer, air pollution, importance of water and sewage treatment.	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty.	1. 70% of students will have 70% or better on these questions*	30% of students earned 70% or better

- \*This number is usually around 65-70%, why it is so low this year is not clear. We will look into the questions used for the to make sure they are appropriately assessing the objective. There could be a disconnect. Also, we will look more specifically at how different sections are addressing this outcome.

- Canvas Rubrics were changed and an assessment report could not be generated for 15-16. The rubrics have been reformatted and should be available in the future.

#### Direct Measures:

Because we have several instructors that teach this course in different formats (including online and face-to-face) and using different assessment techniques developing standard assessment tools has been a challenge.

1. Students are assessed using traditional multiple-choice questions on four to seven, unit exams (depending on instructor). Each exam addresses one or more of the natural science or life sciences learning objectives for the life sciences.
2. More faculty are now aligning questions through Chi-tester.
3. Scores for S4, Problem solving, and LS1, Levels of Organization, were especially low. Right now, it is difficult to determine if this is because of the selection of questions or if there was something else that happened this year.
4. Assessments, sample questions, and rubrics are available upon request.

1153 Chitester: Data includes all instructors assessing with Chitester-linked outcomes.

	Included Questions	N Students (All Tests)	% Above 70% (All Tests)
LS1	87	149	19%
LS2	71	62	56%
LS3	133	147	65%
LS4	93	67	71%
S1	59	63	76%
S2	90	146	64%
S3	195	146	78%
S4	100	147	30%

#### Action Plan

- Create a common course assessment for the LS/NS objectives that can be used in all sections of MICR 1153
- Explore new assessment techniques, including rubric-graded assignments and projects
- Evaluate online and face-to-face sections separately to determine if there are significant differences between sections
- Develop more content that explicitly addresses objectives that have not met the threshold levels, especially, S4 problem solving and LS1 levels of organization

## G. Summary of Artifact Collection Procedure

Artifact	Learning Outcome Measured	When/How Collected?	Where Stored?
Chitester linked outcomes	All	End of the semester	Chitester database, Reports generated as needed
Lab Exams	Lab Skills	3 times per semester	Exams are stored for a year with the instructor. Scores are collected in an Excel spreadsheet (without identifying information) with the Department Chair.
Chitester rubrics	LS and NS outcomes	End of the semester	Canvas assignments are now accessible to the instructor after the semester. Assignment grades are kept in Canvas and with the instructor.
Exit Interview Data		Summarized in the Department Annual Report	Chair's office

Summary Information (as needed)

## Appendix A

Most departments or programs receive a number of recommendations from their Five-Year Program Review processes. This page provides a means of updating progress towards the recommendations the department/program is acting upon.

Date of Program Review: 2013	Recommendation	Progress Description
Strategic Plan	The department needs to develop a strategic plan “consistent with the strategic plan of the College and University”	A Strategic Plan was developed and is available upon request.
Curriculum, Advising, and Course offerings	Review course offerings, eliminate excess overlap in lab courses, evaluate advising, investigate a core curriculum, or course, with other departments	Developing a lab skills matrix to determine which skills are taught in each course and make sure students have the prerequisite skills for their upper division courses.
		Curriculum review is a goal of new strategic plan. Department is considering adopting AAAS Vision and Change Core Concepts and Skills.
		Department has developed two Graduation MAPs, one for pre-professional students and one for general microbiology students. Depending on Math placement the major can be completed in 4 years, but advising is critical.
Workload	Upper division lab courses are overfull creating a safety hazard and diminishing the laboratory experience	New facility as proper safety equipment. Room sizes accommodate courses
		Exploring ways to involve students as TAs
New Building	Develop a specific plan for using new resources in the science building...document how the new space will fix identified problems	Continued discussions of equipment inventory and needs.
Safety	Address safety concerns that are not integral to the infrastructure of the building	Done

## Appendix B



Please provide the following information about the full-time and adjunct faculty contracted by your department during the last academic year (summer through spring). Gathering this information each year will help with the headcount reporting that must be done for the final Five Year Program Review document that is shared with the State Board of Regents.

Faculty	
Headcount	10
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)	
Full-time Tenured	7
Full-time Non-Tenured (includes tenure-track)	
Part-time	
With Master's Degrees	
Full-time Tenured	
Full-time Non-Tenured	
Part-time	3
With Bachelor's Degrees	
Full-time Tenured	
Full-time Non-tenured	
Part-time	
Other	
Full-time Tenured	
Full-time Non-tenured	
Part-time	
Total Headcount Faculty	10
Full-time Tenured	7
Full-time Non-tenured	0
Part-time	3

**Please respond to the following questions.**

- 1) Based on your program's assessment findings, what subsequent action will your program take?

We believe that our general education courses are meeting the learning outcomes for the Natural Science and Life Science learning outcomes, although the Chi-tester aligned questions do not demonstrate this for all outcomes. During the next year, we will evaluate questions used for assessment to ensure they are meeting the learning outcomes. We will also work toward meeting the goals for each course's "Action plan."

Our department continues to graduate excellent students, who achieve success in graduate and professional school and who are hired in the field following graduation. We are trying to monitor students' post-graduation, but this has been difficult. We have worked with the Office of Institutional Effectiveness to include the Department's exit interview questions with the University's Graduation Survey. The goal was to increase participation in the survey and to have the data in a format that is easier to analyze. Participation with the exit survey was better this past year, and the data is available as an appendix to the Department's 2015-16 annual report.

The Department will continue to work toward the goals outlined in our Strategic Plan. The Plan is available upon request.

- 2) Are there assessment strategies within your department or program that you feel are particularly effective and/or innovative? If so, what are those strategies and what do you learn about your students by using them?

Several faculty are experimenting with new assessment techniques, especially formative, in-class, assessments such as classroom response systems. Evaluation of laboratory skills through practical examinations, laboratory notebook evaluations, and laboratory reports, are a vital component of several of our courses.