

Annual Key Assessment Findings and Curricular Improvements
Department of Biology
Undergraduate B.A./B.S. Program in Biology

Key Assessment Findings

There were 62 students who took the undergraduate comprehensive examination over the 5-year period beginning AY09-10 (Table 1). All but one of those students passed this key assessment milestone for their B.S. or B.A. degree in Biology.

Table 1. Undergraduate Comprehensive Examination Data from AY2009-14

THE CATHOLIC UNIVERSITY OF AMERICA
 Financial Planning, Institutional Research and Assessment

UNDERGRADUATE COMPREHENSIVE EXAMINATION RESULTS
SCHOOL OF ARTS AND SCIENCES
DEPARTMENT OF BIOLOGY
AY2009-2010 to AY2013-2014

	Fail		Pass		High Pass		Pass w/Honors		TOTAL
	#	%	#	%	#	%	#	%	
AY2009-2010	1	12.50%	7	87.50%	0	0.00%		0.00%	8
AY2010-2011	0	0.00%	12	100.00%	0	0.00%		0.00%	12
AY2011-2012	0	0.00%	5	62.50%	3	37.50%		0.00%	8
AY2012-2013	0	0.00%	13	92.86%	1	7.14%		0.00%	14
AY2013-2014	0	0.00%	16	0.00%	4	0.00%		0.00%	20
TOTAL	1	1.61%	53	85.48%	8	12.90%	0	0.00%	62

Note:

- 1) Milestone outcomes were included in the categories High Pass and Pass with Honors if these designations were explicitly indicated in the students' milestone record.
- 2) Category "High Pass" includes both "High Pass" and "Pass with distinction".
- 3) The count in this table is based on the exam outcomes of all attempts in an academic year.

In the past 5 years, only one student did not meet expectations and pass the comprehensive examination (Table 1). Beginning in AY11-12, we have seen an increase in the number of students who have exceeded expectations and have received a high pass. Applying our rubrics to the comprehensive examinations, we find that greater than 98% of students (Tables 2 and 3) meet or exceed our expectations for content, writing, and use of peer-reviewed literature in the scholarly paper that they produce for this capstone project.

Table 2. Student Learning Assessment Rubric of Senior Comprehensive Exams from AY2013-14

Student Learning Assessment Rubric
Department of Biology
B.S. and B.A. in Biology
Rubric for Senior Comprehensive Exam-AY13-14

Trait	Level						Mean	SD	Total N
	Exceeding Expectations (3pts)		Meeting Expectations (2pts)		Below Expectations (1pt)				
	N	%	N	%	N	%			
1) Proficiency in curricular content and biological concepts	5	25%	15	75%	0	0%	2.25	0.44	20
2) Written presentation of scientific topics	6	30%	14	70%	0	0%	2.30	0.47	20
3) Effective use of peer-reviewed scientific literature	6	30%	14	70%	0	0%	2.30	0.47	20

Table 3. Student Learning Assessment Rubric of Senior Comprehensive Exams from AY2009-14

Trait	Level						Mean	SD	Total N
	Exceeding Expectations (3pts)		Meeting Expectations (2pts)		Below Expectations (1pt)				
	N	%	N	%	N	%			
1) Proficiency in curricular content and biological concepts	15	24%	45	73%	2	3%	2.21	0.48	62
2) Written presentation of scientific topics	14	23%	46	74%	2	3%	2.19	0.47	62
3) Effective use of peer-reviewed scientific literature	15	24%	46	74%	1	2%	2.23	0.46	62

Note (For Tables 1 and 2):

- 1) The "N" represents the number of students at each level of performance for each trait.
- 2) The "%" represents the percentage of the number of students falling at the level performance for each trait against the total number of students.
- 3) The mean is the average of all scores across the levels within the trait.
- 4) The standard deviation (SD) is the measure of the variability of the data set, indicating how "spread out" these data are from the mean value.

Curricular Improvements

Beginning in AY11-12, we have introduced a sophomore laboratory sequence that includes Biol 217--Molecular Genetics and Protein Engineering (3 credits) and Biol 317--Investigations in Molecular Cell Biology (4 credits). This course sequence builds upon the basic skills that our majors are learning in our freshman laboratories. These laboratory courses progressively teach students to become independent researchers with the capacity to engage in their own projects by proposing specific experiments, defending their ideas, performing modern molecular experiments, and communicating their results. The innovation with these courses is multi-fold. The content emphasizes quantitative aspects of biology. The experiments are progressively more sophisticated across the academic year and include cutting-edge biology where the students have some freedom to decide what to investigate and how to design the experiments. We place significant emphasis on developing problem-solving, writing, and oral presentation skills, and we teach the students how to critically interpret the primary scientific literature. All of these skills are assessed in our Biology senior comprehensive examinations. The students who took their comprehensive examinations in AY13-14 were one of the first cohorts exposed to this new curriculum, and these students had the highest performance (largest number of High Pass designations) on their comprehensive examinations. We will continue to monitor whether there is an increase in student performance in future years that could be supported by this aspect of our curriculum. In addition, we are planning to shift our sequence of required biology courses so that students can spend a maximum amount of time on our sophomore laboratories (*e.g.* we plan to move our Genetics course from sophomore year to junior year beginning with AY15-16).