Approved General Education Core Courses
Biological/Physical Science

There are five General Education Assessment Tests that were developed in 2012 and accepted for courses on the Approved General Education Core Courses for the Science Disciplines. They are coded accordingly (2012-BIO, 2012-BTC, etc). Some of the tests were piloted in Spring 2012. The number of students participating in the pilot is shown below. Courses without a test listed are taught by adjunct faculty or have not been taught for at least 2 years. These tests will be developed in time for administration at the end of Fall 2012.

Course Number	Course Title	Gen Ed Assessment Test Code	Pilot Data	Comments
BIO 101/102	Gen Bio I/II	2012-BIO	N=142	
BIO 103/104	Human A&P I/II	2012-BIO		
BIO 106	Unity/Diversity of Life	2012-BIO		
BIO 110	Human Biology	A FT Faculty will be assigned this assessment		
BIO 111	Contemporary Issues	A FT Faculty will be assigned this assessment		
BIO 112	Biology of Disease	A FT Faculty will be assigned this assessment		
BIO 113/114	Principles of Bio I/II	2012-BIO	N=37	
BIO 205	Microbiology	2012-Micro		
BTC 101	Intro to Biotech	2012-BTC	N=14	
CHM 101	Intro to College Chem	2012-CHM	N=95	
CHM 103/104	Gen Chem I/II	2012-CHM	N=21	
PHS 105	Descriptive Astronomy		Adjuncts will be advised that these assessments need to be developed for Fall 2012	
PHS 107/108	Intro Physical Geology			
PHS 109	Meteorology			
PHY 112	Applied Physics	2012-PHY	Probably need a different test	
PHY 201/202	General Physics I/II	2012-PHY		
PHY 203/204	Principles of Physics I/II	2012-PHY		

Summary of Gen Ed Assessment projects:

BIO-101/102 and BIO 113/114 Gen Ed Assessment

A set of 5 critical thinking questions from the Common Final Exam given to all BIO 101 and BIO 113 classes was designated as the Gen Ed BIO assessment and will be administered to all BIO students in lab courses starting in Fall 2012. Any BIO course without a separate specific gen ed assessment (Ex. BIO 205) will use this assessment. The assessment was administered, graded, and summarized in a pilot study for the Spring 2012 semester. The same assessment will be used for BIO 103/104 and BIO 106 in Fall 2012.

A summary of the data from the 2012-BIO assessment pilot follows in table 1 and the actual assessment questions are attached.

Table 1.

semester	Course section	number of students	mean exam score	mean score for gen. ed. questions
spring 2012	Bio101-	35	64.52	74.29
spring 2012	Bio101-	33	64.68	71.52
spring 2012	Bio101-	17	69.1	73.81
fall 2011	Bio101- M01/02			
fall 2011	Bio101- M03/04	36	67.79	73.24
fall 2011	Bio101-	21	69.37	73.29
fall 2011	Bio113-01	19	71.79	75.83
summer 2011	Bio113-01	18	71.18	69.47

BTC 101 Gen Ed Assessment

A Gen Ed Assessment of the Science Area Gen Ed Learning Outcomes was included in the Common Final Exam for BTC 101, the only BTC course on the Gen Ed list. The assessment was piloted with the Spring 2012 BTC 101 class (n=14) and results were:

Question #	51	52	53	54	55
No. correct answers	13	8	0	14	12
% correct answers	93	57	0	100	86

The actual questions on the BTC Gen Ed assessment are attached in the Appendix.

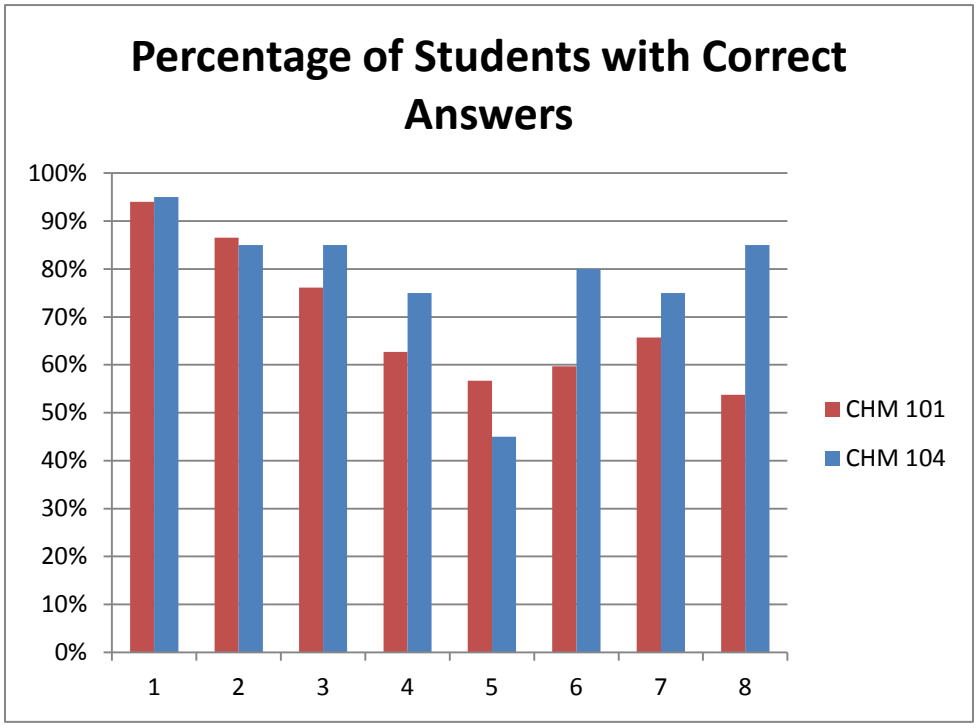
BIO 205 Gen Ed Assessment

The Gen Ed Assessment of Learning Outcomes for BIO 205 (Microbiology) was developed in Spring 2012. The assessment will be piloted with three classes during the Summer 2012 semester. Thereafter, the assessment will be added to the common final exam for BIO 205, starting in Fall 2012.

The actual 2012-Micro assessment is attached in the Appendix.

CHM Gen Ed Assessment.

The assessment questions were developed during Spring 2012 and piloted with CHM 101 and CHM 104 students. The results of the pilot assessment are shown in the graph below and the assessment document is attached in the Appendix.



Discussion:

General Education Outcome used in Biological and Physical Sciences:

The ability to access, process, analyze and synthesize scientific information

The CHM SLOA Assessment was used in Spring 2012 semester to assess the above outcome. The results of the CHM SLOA Assessment were graphed for each question.

The students access the data from the reading how the experiment was performed and using the data table provided (see Appendix)

Students process the given data to obtain information about the mass of the original sample (1), total mass lost by the sample (3), and the mass of the residue in the crucible (4).
Students analyze the processed information to obtain the percent water in the sample (6), the theoretical percent water in the sample (7), and the percent error in the experiment (8).
Questions (2) and (5) assess more of the basic core of scientific principles.
This pilot quiz could be revised to include a graph for students to interpret and draw conclusions from experimental data.

Other Science Area General Education outcomes

- Relate a basic core of scientific principles to an open-ended framework
- Demonstrate observational and analytical skills in a structured situation
- Formulate conclusions based on observations and information
- Use technology to access scientific information, generate and analyze empirical data, and solve problems.

Possible assessments for the other general education outcomes in CHM 101:

A common experimental scenario quiz was piloted for CHM 101. This scenario experiment has some questions which assess the first and second outcome.

- Relate a basic core of scientific principles to an open-ended framework
- Demonstrate observational and analytical skills in a structured situation

The lab reports given during the semester would assess the following outcome.

- Formulate conclusions based on observations and information

To address this outcome, a couple of questions throughout the semester from several labs could be collected and graded using a rubric.

The graphing lab or spectroscopy lab could be used to use access the following outcome.

- Use technology to access scientific information, generate and analyze empirical data, and solve problems.

The spectroscopy lab would be good, because the students have to collect the data, graph it and then using this data, they must answer a couple of conceptual questions about light emission and absorption. This lab is also done near the end of the semester, which give time for the students to develop the problem solving skills required for this outcome.

Possible assessments for the other general education outcomes in CHM 104:

A common experimental scenario quiz was piloted for CHM 104. This scenario experiment has some questions which assess the first and second outcome.

- Relate a basic core of scientific principles to an open-ended framework
- Demonstrate observational and analytical skills in a structured situation

The lab reports given during the semester would assess the following outcome.

- Formulate conclusions based on observations and information

To address this outcome, a couple of questions throughout the semester from several labs could be collected and graded using a rubric.

Many of the laboratory experiments in CHM 104 require graphing obtained data as part of the data analysis. Experiments requiring graphing and interpretation of the graph are kinetics, thermodynamics, equilibrium, titrations, and galvanic cells. One of these labs could be used to use access the following outcome.

- Use technology to access scientific information, generate and analyze empirical data, and solve problem

The Following bar graph shows the percentage of students who answered question 1 through 8 correctly on the general education assessment quiz.

CHM 101 is the Foundation of Chemistry course which taken by students who have not taken chemistry before. Many allied health students and students who took chemistry many years ago will take this course. CHM 104 is the second semester of General Chemistry. Majority of these students are biology, biotech and engineering students.
Questions 1, 3, 4, 6, 7 and 8 have students think about the data given and use problem solving skills to answer the questions. Whereas questions 2 and 5 are more basic chemistry knowledge questions; naming reactions and experimental criterion, which are taught in CHM 101 and CHM 103, first semester General Chemistry.
CHM 104 students perform better on the problem solving questions, whereas the CHM 101 students did better answering the basic specific knowledge questions.
CHM 104 students have had two semesters to hone their problem solving skills relative to the CHM 101 students. So CHM 104 students are expected to have a higher percentage correct than the CHM 101 students.

PHY 201/202 and PHY 203/204 Physics Gen Ed Assessment

A Physics Gen Ed assessment was developed and will be administered for the first time in Fall 2012 to all PHY 201 and 203 students. The assessment document with an answer key is attached in the Appendix.

Approved General Education Core Courses

Mathematics

There are eight mathematics courses listed by number on the Approved Gen Ed Core courses for math. However, students may also use any MAT course with a MAT 101 prerequisite for their gen ed math course. Therefore, the Spring 2012 pilot administration of the Gen Ed Math assessment was given to students in every math class (n=441). The assessment was developed using released questions from the nationally normed PRAXIS I exam administered in 2008 which allowed the HCC assessments to be compared to students in a national pool (n=2,520). Specific data for HCC students in every class is included in the Spring 2012 summary for Mathematics assessment. In general, HCC students scored above the national benchmark for all eight questions except for students in MAT 114 (Applied Algebra, a new course for Career Program students), and MAT 109/119 (Statistics) who scored less than the benchmark on some of the questions rated "difficult".

(15 minutes - no calculator)

Question Number	***Content Category***	***National Pool %Correct***	***HCC Students Spring 2012***
1	Geometry and Measurement	65%	65%
2	Number and Operation	82%	92%
3	Data Analysis and Probability	54%	65%
4	Algebra	50%	73%
5	Number and Operation	41%	51%
6	Data Analysis and Probability	67%	77%
7	Algebra	87%	91%
8	Geometry and Measurement	76%	87%
Total/Ave		**65%**	**69%**

The assessment used for the pilot (Forms A and Forms B) are attached in the Appendix.

A PDF of the data and data analysis for every course in Spring 2012 is also attached.