General Education Assessment 2015-2016

FOUNDATIONAL KNOWLEDGE

Overview Information for Foundational Knowledge Assessment

- Total number of courses: 3: CHM 101 (28 sections), MAT 111 (22 sections), and HST 101 (2 sections).
- All data collected during the Fall Semester of 2015
- Types of data collected: Responses to in-class assessments, assigned correct/incorrect (and sometimes “partially correct”) scores
- Learning goal assessed: Foundational Knowledge
- University Studies components represented: Historical and Philosophical Perspectives, Mathematics and Statistics, Quantitative and Logical Reasoning, Scientific Approaches to the Natural World
- Total number of student work products included in entire Foundational Knowledge sample: 1509

Findings

Chemistry 101

The Chemistry department selected eleven questions centered on three foundational chemistry concepts to be assessed.

1. Structure/Function
2. Stochiometry
3. Energy Changes (Calorimetry)

These three concepts align with the program's student learning outcome: 1. Demonstrate an understanding of the fundamental principles and concepts associated with each of the major branches of chemistry: Organic, Analytical, Physical, Inorganic and Biochemistry. Test items were selected from the common course final. Section instructors applied a uniform scoring scale to the items: items were scored as correct or incorrect. All students taking the final were included in the sample, 678 students. The below table provides the percentage of correct scores for the 11 questions.

Percentage of correct responses by question for CHM 101

Question group	Structure/Function					Stochiometry			Energy Changes (Calorimetry)		
Total correct responses	474	508	455	438	472	526	318	373	290	365	201
N	678	678	678	678	678	678	678	678	678	678	678
Percentage correct responses	69.9%	74.9%	67.1%	64.6%	69.6%	77.6%	46.9%	55.0%	42.8%	53.8%	29.6%

There were higher percentages of correct responses across-the-board in the Structure/Function question group. Fewer correct scores were seen in the Energy Changes (Calorimetry) group.

The following table provides additional information about student understanding based on their total number of correct responses to questions within each concept.

Number of correct responses by concept for CHM 101

Number of Correct Responses	Percent of Students		
	Structure/Function	Stoichiometry	Energy Changes (Calorimetry)
5	27.2%		
4	29.3%		
3	22.2%	27.8%	12.6%
2	11.4%	38.6%	29.6%
1	7.5%	25.1%	35.3%
0	2.4%	8.4%	22.4%
Average Number of Correct Answers	3.50 (out of 5)	1.86 (out of 3)	1.32 (out of 3)

Student demographics and preparedness data were not collected for this study.

Departmental Comments

Members of the Chemistry faculty provided comments about the results. The overall impression was that the students performed at expected levels for a 100-level foundational course in the discipline. Historically, students struggle with energy changes, and this reflects the abstract and esoteric nature of the subject matter. The department commented that there is no current plan to spend additional time or resources on the material in CHM 101. It was also noted that there is another chapter in CHM 102 that deals with this material and much of the department's upper level thermodynamics course (CHM 321 and the accompanying lab) considers this material from a deeper perspective.

Math 111

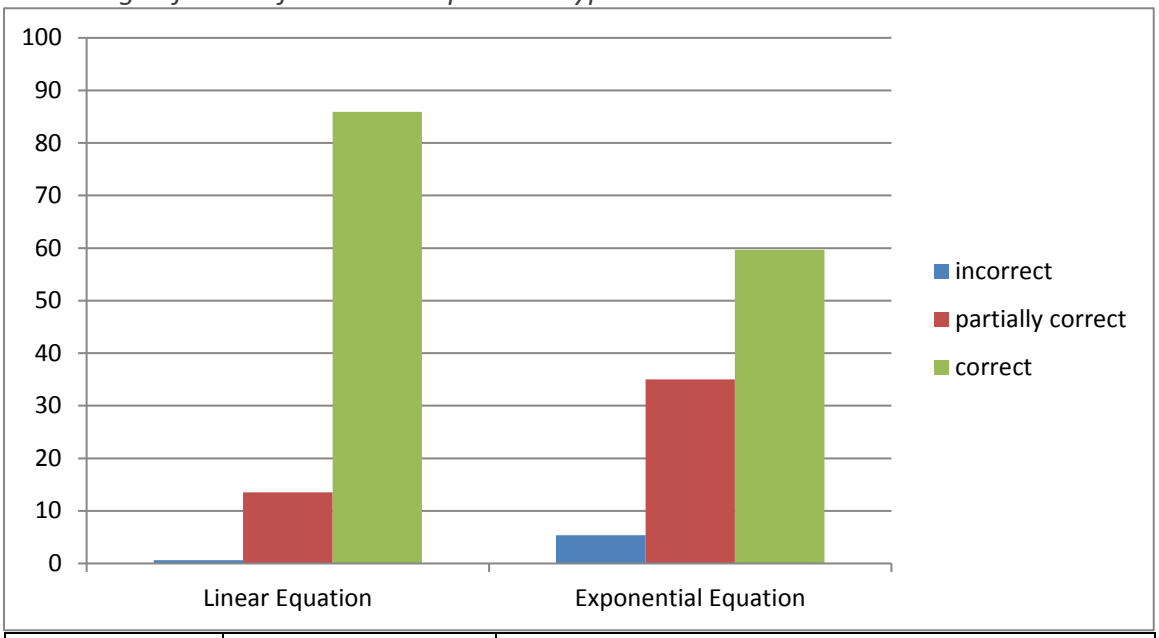
The lead faculty teaching MAT 111 College Algebra selected two concepts from the course to be assessed, based on course-level student learning outcomes.

1. Students will solve linear equations.
2. Students will solve exponential equations requiring logarithms.

These student learning outcomes are aligned with the Mathematics and Statistics student learning outcome for Foundation Knowledge 1: Students will demonstrate knowledge of basic mathematical and statistical concepts, including calculus, linear

algebra, analysis, modern algebra, probability, and statistics. One test item for each of these SLOs was selected from the common course final. Section instructors applied a uniform scoring scale to the items: items were scored as correct, partially correct, or incorrect. All students taking the final were included in the sample, 709 students. The figure below provides the results.

Percentage of scores for MAT 111 problem type



incorrect	0.6%	5.4%
partially correct	13.5%	35.0%
correct	85.9%	59.7%

Demographics and Preparedness Findings

There were no statistically significant differences between the means, medians, and score distributions of ethnicity groups or honors vs. non-honors students. For both problems, there was a difference in scores between males and females, with females scoring higher on both problems. There was a statistically significant difference between the scores of transfer vs. freshman-start students on the exponential equation problem, with freshman-start students scoring higher. There was also a statistically significant difference between the scores of Isaac Bear vs. non-Isaac Bear students for the same problem, with non-Isaac Bear students scoring higher.

To compare scores based on number of credit hours completed, two methods were used. First, students were grouped into four categories, those having completed 0-30 credit hours, 31-60 credit hours, 61-90, and over 90 credit hours. Comparison of means (using ANOVA), medians (using Independent Samples test of medians) and distributions

(using the Mann-Whitney U statistic) showed a statistically significant difference between the groups for the exponential equation problem such that freshman students scored the highest followed by juniors, then sophomores, and finally seniors. Looking at Spearman rho correlation coefficients, the number of total hours completed was significantly negatively correlated with scores on the exponential equation problem (-.084*). There were no significant correlations between scores on either problem and GPA, ACT score, SAT Verbal score, or SAT Math score.

Comparisons Between Criteria

There was no a statistical difference between the scores on the two problems for work completed in courses taught by tenure-line faculty vs. non-tenure-line faculty.

Departmental Comments

The members of the Lower Division Mathematics Interest Group provided the following comments about the results:

“The results of the General Education Assessment 2015-2016 for MAT 111 under Foundational Knowledge are similar to previous results and unsurprising. The results for the student learning outcome, "Students will solve linear equations" is satisfactory. The results for the student learning outcome, "Students will solve exponential equations requiring logarithms" are acceptable, but point to a possible area of improvement. The demographics and preparedness findings are acceptable, but we prefer to see no statistically significant differences among transfer vs. freshman-start students, males vs. females, or Isaac Bear vs. non-Isaac Bear students. The comparisons between criteria findings are satisfactory.”

The following action items were implemented during Fall 2016 and will continue during 2017 to address two areas of improvement:

1. The course calendar for MAT111 was adjusted to allow for more in-class instruction on exponential and logarithmic functions.

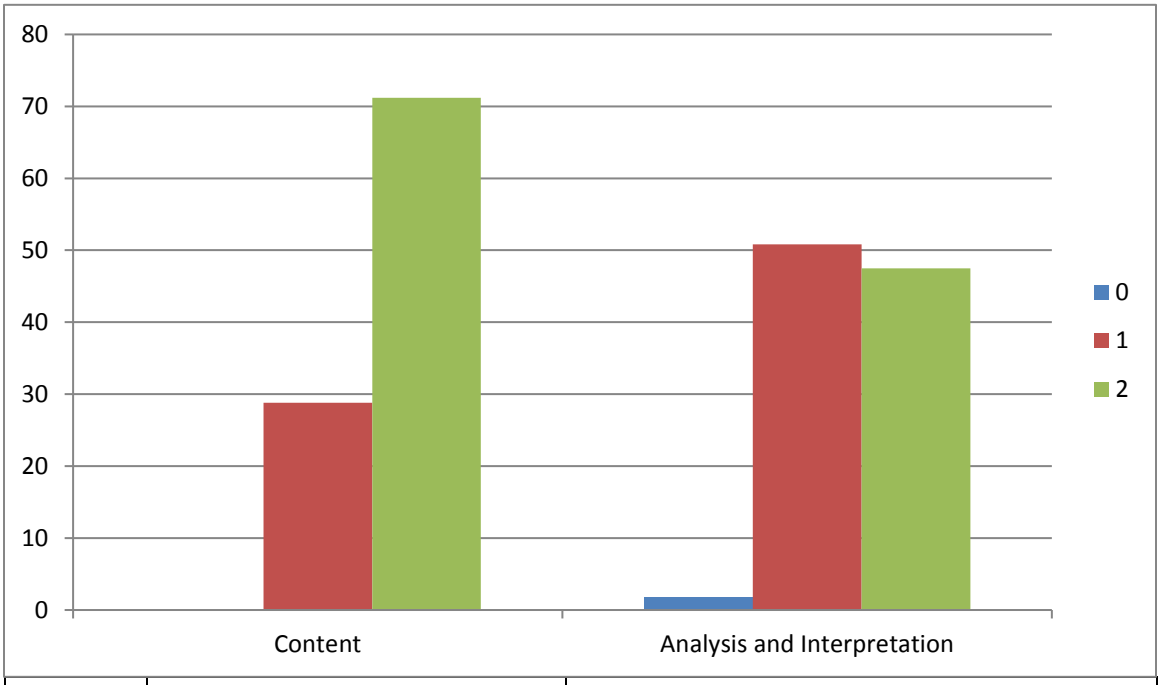
2. A free, after-school tutoring program was implemented for all Isaac Bear students taking mathematics courses at UNCW.

History 101

Student work (N=59) was sampled from a common essay question on the final exam in two sections of HST 101. The work was scored using a rubric developed with help from the History department chair and two History department faculty members, who also scored the student work using the rubric. The rubric used consists of two dimensions:

Content (the claim and supporting facts) and Analysis (the reasoning and linkage between the claim and the evidence provided), and each dimension was scored on a three-point scale (zero to two). The rubric is included at the end of this chapter. The figure below provides the results.

Distribution of scores by rubric dimension for HST 101 Foundational Knowledge



0	0%	1.7%
1	28.8%	50.8%
2	71.2%	47.5%
25th %tile	1	1
50th %tile	2	1
75th %tile	2	2
Mode	2	1
N	59	59

Scores were higher for the Content dimension than for the Analysis and Interpretation dimension, indicating that students were better at providing factual knowledge than at developing the reasoning for including that factual information in their answer. The scores on the two dimensions were significantly correlated (.544**).

Departmental Comments

The History Undergraduate Committee provided these comments about the assessment results:

“In general, the Committee found the results of the assessment as expected. Scores for the Content dimension were significantly higher than those for Analysis and Interpretation. The results were taken from two Fall 2015 courses, so we might reasonably assume that a significant number (if not a majority) of the students were in their first semester at the university. We would not expect that one class would be sufficient for all students to develop adequate analytical skills since, in our experience, students fresh out of high school have very limited familiarity with assignments that require more than the composition of a simple factual narrative.

However, please note that the History faculty is actively engaged in discussions relevant to these findings. In recent years our conversations/workshops on pedagogy have emphasized strategies that can build students’ competency in these critical areas (comparison, causation, continuity and change, contextualization, constructing evidence-based arguments, etc). These strategies are adaptable to students at all levels, offering them more opportunities to engage in those “historical thinking” processes directly. Such steps include incorporating more class discussions, primary source analysis, short analytical essay assignments (in and out of class), etc.”

History 101 Foundational Knowledge Scoring Rubric

Dimension	0	1	2
Content - Claim and Supporting Facts	-Less than three events -Event not in the time period -Event didn't affect western civilization - essay didn't provide evidence	-Contains three events -Events are in the time period -At least one may not be of great significance -May not contain sufficient evidence to support claim	-All listed events were significant -One of the supporting facts for printing press was the religious aspect -Evidence was thorough and sufficient
Analyzing/Reasoning/Linkage	-No analysis or links between claims and facts	-Linkage is there, but is vague or insufficient.	-Linkage is made, is clear, and is sufficient.

12/12/16