Discipline Outcome

Chemistry Competency: Students will demonstrate mastery of concepts from the CHE112 competency based syllabus by performing on a standardized national exam.

Assessment Author(s)

Kim Stasiewicz

Measure 1 Type:

Direct

Scores and pass rates on a standardized test

Measure 1 Description:

Students will demonstrate mastery of concepts from the CHE112 competency based syllabus by performing on a standardized national exam.

Measure 1 Sample Size:

41

1) Describe the benchmark for this measure.
Students will score at or above the national average (41 out of 70) on the ACS General Chemistry Exam.

2) What is the rationale for choosing this benchmark?

The ACS exam is a nationally accepted measure of student proficiency in chemistry. Students are required to understand concepts and solve quantitative problems in order to succeed on this exam. If students can perform well on the ACS exam, they are prepared for future chemistry courses as they transfer to four year universities.

This discipline outcome was Surpassed benchmark

Measure 1 Results:

Students scored an average of 45 out of 70 on this standardized exam. The national average (and the benchmark) is 41 out of 70.

1) How did unit/department performance compare to the benchmark?

This year’s score (45) was slightly higher than last year’s (41). The following graph shows the department’s performance on this nationally accepted standardized exam over the last several years.

1) Based on the findings, how does the unit/department rate performance in regards to this outcome (strong exceeds benchmark, neutral meets benchmark, or weak misses benchmark)?

Surpassed benchmark

2) How does this assessment affect plans for this coming year in terms of strategic planning, budget planning,
administrative and educational support unit planning, and assessment planning?

The department will continue to assess this outcome in order to ensure that we are adequately preparing students for future science courses, and for transfer to a four-year institution. We will also track results across sections of CHE112 to promote consistency within the department.

3) How will your assessment results enable you to improve institutional processes or academic instruction in order to support, facilitate and/or stimulate student learning?

We will use the results of this assessment to improve instruction in CHE112. In addition to reporting the average score on the ACS exam, the department also provides each instructor with a detailed item analysis form so he/she can see which questions and concepts were mastered by students, and which were not. This will show each instructor which area(s) he/she might need to improve in the future.

Further Action:

Further Action Unnecessary

Discipline Outcome

Laboratory Technique: Students will demonstrate the ability to use typical laboratory equipment properly and safely to perform an acid/base titration.

Assessment Author(s)

Kim Stasiewicz

Measure 1 Type:

Direct

Performance comparison

Measure 1 Description:
This assessment is a practical demonstration of students' lab abilities, given at approximately the midpoint of the first semester of general chemistry. Students first standardize a solution of sodium hydroxide by titrating it with a KHP (potassium hydrogen phthalate) solution which they prepare. Then, they use the standardized sodium hydroxide solution to determine the concentration of an unknown acid solution, using acid-base titration techniques.

**Measure 1 Sample Size:**

141

1) Describe the benchmark for this measure.

At least 50% of CHE111 students will determine their unknown acid concentration to within 1% of the true value. At least 75% of CHE111 students will determine their unknown acid concentration to within 2%.

2) What is the rationale for choosing this benchmark?

Based on past experience with this assessment, the benchmarks have been found to be reasonable expectations (although challenging ones) for students who have had half a semester of laboratory instruction. Students should have mastered sufficient laboratory technique and sufficient quantitative reasoning/calculation skills to reach these benchmarks.

This discipline outcome was

Surpassed benchmark

**Measure 1 Results:**

Out of 141 students, 53.9% were able to find the percent of acid in their unknown sample to within 1% of the true value. 77.3% came within 2% of the true value.

1) How did unit/department performance compare to the benchmark?

The department surpassed both benchmarks. 53.9% of students came within 1% of the correct value (the benchmark is 50%). 77.3% of students came within 2% of the true value (the benchmark is 75%). See the chart below for a more detailed analysis.
2) How does the data compare to the previous year, if applicable?

This year's students performed slightly better than last year's students, particularly on the second part of the benchmark. Last year's students only had 50% come within 1% of the correct value, and only 61.9% came within 2%. See the chart below for a comparison of this year's results with those of previous years.

1) Based on the findings, how does the unit/department rate performance in regards to this outcome (strong exceeds benchmark, neutral meets benchmark, or weak misses benchmark)?

Surpassed benchmark

2) How does this assessment affect plans for this coming year in terms of strategic planning, budget planning, administrative and educational support unit planning, and assessment planning?

The department will continue to assess this outcome. It is important that we ensure that our students have sound laboratory skills as well as general content knowledge as they proceed to their next lab classes. The department has shared results of previous assessments with instructors, highlighting students' lack of calculation skills, which seemed to be a problem in years when the benchmarks were missed. This seems to have helped, as performance has improved from the last year. We will continue to monitor students' lab abilities in this way.

3) How will your assessment results enable you to improve institutional processes or academic instruction in order to support, facilitate and/or stimulate student learning?

We will use these results to improve chemistry instruction by sharing results with instructors as mentioned above, and changing our methods accordingly.

Further Action:
Discipline Outcome

Student Success and Persistence: The department measures student persistence through first semester college chemistry.

Assessment Author(s)
Kim Stasiewicz

Measure 1 Type:
Indirect

Data tracking

Measure 1 Description:
This assessment is a measure of student persistence through first semester general college chemistry.

Measure 1 Sample Size:
132

1) Describe the benchmark for this measure.
At least 75% of students completing CHE111 will earn a "C" or better.

2) What is the rationale for choosing this benchmark?
The department tracks this information in order to see trends in student persistence and retention from year to year and from section to section. We are aware of any severe drops in student retention or persistence, and we can then analyze the cause(s). This is an effort to support the college's mission to promote success for students, and to move more students toward transfer or graduation, without sacrificing academic rigor.

This discipline outcome was Surpassed benchmark
Measure 1 Results:

90.8% of students who completed CHE111 succeeded by earning a "C" or better.

1) How did unit/department performance compare to the benchmark?

The department exceeded the benchmark; 90.8% of completing students earned a "C" or better in CHE111. The benchmark is 75%. See the flow chart below for a breakdown of how students performed in the class compared to their initial diagnostic scores, which indicate preparedness for the course.

CHE111 Student Persistence and Retention
2016-2017

2) How does the data compare to the previous year, if applicable?

This year's results surpassed last year's by a significant amount. Last year, 85.2% of students were successful in CHE111, whereas this year, 90.8% succeeded.

1) Based on the findings, how does the unit/department rate performance in regards to this outcome (strong exceeds benchmark, neutral meets benchmark, or weak misses benchmark)?

Surpassed benchmark

2) How does this assessment affect plans for this coming year in terms of strategic planning, budget planning, administrative and educational support unit planning, and assessment planning?

The department has monitored the persistence/retention of chemistry students through CHE111 for many years, and we will continue to do so. Chemistry is a challenging class for many students, and we want to
ensure that it does not prevent students from moving forward in a science or engineering program. At the same time, we strive to maintain academic rigor, as seen in our other assessment measures.

3) How will your assessment results enable you to improve institutional processes or academic instruction in order to support, facilitate and/or stimulate student learning?

We will continue to look across sections for any cases of surprisingly high or low rates of persistence in chemistry classes. We can then address potential issues with instructors who might need to strengthen academic rigor in their classes.

Further Action:
Further Action Unnecessary

Learning Outcome

Information Management: Students will demonstrate the ability to apply the scientific method to solve a problem in their everyday lives.

Assessment Author(s)
Kim Stasiewicz

Measure 1 Type:
Direct

Rubric-graded report

Measure 1 Description:
Students will apply the scientific method to an everyday problem. They will clearly state the problem, form and test a hypothesis, collect data, analyze results, and draw a conclusion.

Measure 1 Sample Size:
1) Describe the benchmark for this measure.

Students will score an average of 75% or higher on this rubric-graded report.

2) What is the rationale for choosing this benchmark?

This assignment is given after a chapter detailing the scientific method, which is the basis for attaining knowledge in science. Students should be able to apply this method to a real-world problem at this point. To succeed, students must collect, organize, and analyze data using critical thinking skills. These are skills that we want students to gain during any chemistry course at ACC.

This learning outcome was

Surpassed benchmark

Measure 1 Results:

Students scored an average of 84% on this rubric-graded report, surpassing the benchmark of 75%.

1) How did unit/department performance compare to the benchmark?

Students scored 84% on this assessment; the benchmark was 75%. The benchmark was surpassed by 9%.

2) How does the data compare to the previous year, if applicable?

This year's score was identical to last year's.

1) Based on the findings, how does the unit/department rate performance in regards to this outcome (strong exceeds benchmark, neutral meets benchmark, or weak misses benchmark)?

Surpassed benchmark

2) How does this assessment affect plans for this coming year in terms of strategic planning, budget planning, administrative and educational support unit planning, and assessment planning?
We plan to continue to assess this outcome. Results have been fairly steady for this assessment. The department will continue to ensure that students are mastering the crucial critical thinking and information management skills required for this rubric-graded report. We will also budget funds for instructors to score this assessment.

3) How will your assessment results enable you to improve institutional processes or academic instruction in order to support, facilitate and/or stimulate student learning?

We will use these results to improve student instruction. As stated above, the skills needed for this report are crucial for science students. Instructors can use the results of this project to correct students' misconceptions about how science works and how data should be collected and analyzed.

Further Action:
Further Action Unnecessary

Learning Outcome
Quantitative Reasoning: Students will demonstrate the ability to use critical thinking and quantitative reasoning to solve several problems related to chemistry concepts (density, molarity, etc.).

Assessment Author(s)
Kim Stasiewicz

Measure 1 Type:
Direct

Pre-Post tests

Measure 1 Description:
Students will demonstrate the ability to use critical thinking and quantitative reasoning to solve fourteen word problems related to chemistry concepts (density, molarity, etc.)
Measure 1 Sample Size:

160

1) Describe the benchmark for this measure.

Students will show at least a 30% improvement on these word problems from the beginning of the semester to the end of the semester.

2) What is the rationale for choosing this benchmark?

The word problems used in this assessment are typical of what a general college chemistry student should be able to do after one semester. They involve reading and analyzing the questions, and they require critical thinking and quantitative reasoning skills. These problems are indicative of the skills students will need in order to move on to the next level of chemistry, or to continue on in STEM fields in general. A 30% improvement shows that the department is succeeding in its mission to educate students who wish to pursue further educational or career opportunities related to chemistry.

This learning outcome was

Surpassed benchmark

Measure 1 Results:

Student scores overall showed an increase of 33.9% form the beginning of the semester to the end of the semester.

1) How did unit/department performance compare to the benchmark?

The department surpassed the benchmark by 3.9%.

2) How does the data compare to the previous year, if applicable?

This year, scores increased by 33.9% during the semester. Last year, scores increased by 34.8%. This year's results are 0.9% lower than last year's--virtually identical.

1) Based on the findings, how does the unit/department rate performance in regards to this outcome (strong exceeds benchmark, neutral meets benchmark, or weak misses benchmark)?

Surpassed benchmark
2) How does this assessment affect plans for this coming year in terms of strategic planning, budget planning, administrative and educational support unit planning, and assessment planning?

The department will continue to assess this outcome to ensure that students taking CHE111 are prepared for future chemistry courses. We will also compare results from year to year, and from section to section, to ensure consistency within the department.

3) How will your assessment results enable you to improve institutional processes or academic instruction in order to support, facilitate and/or stimulate student learning?

The results will be used to maintain and improve solid chemistry instruction at ACC. We share the results of each section's pre-test and post-test with that section's instructor. From the pre-test, the instructor can see those areas in which students already have some base knowledge, and which topics might be completely unknown to students. From the post-test results, instructors can see what topics still have not been mastered, so they can modify instruction in the next semester.

Further Action:

Further Action Unnecessary