Learning Outcomes Assessment - Critical Thinking

Assessment: ID: 196

Assessment Type: General Learning Outcome
Year/Term: 2010 / 2
Name: Kelley, Ron
Email: rkelley@eou.edu
Program: Chemistry
Prefix / Course Number: CHEM / 204

High Impact Practice (HIP):

- ☐ First Year Experience
- ☐ Leadership Training
- ☐ University Writing Requirement
- ☐ Undergraduate Research
- ☐ Service Learning / Community-Based Learning
- ☐ Performance
- ☐ Capstone Project
- ☐ Learning Community
- ☐ Co-Curriculum
- ☐ Collaborative Assignments and Projects
- ☐ Diversity / Global Learning
- ☐ Internship / Practicum / Field Work
- ☐ Portfolio

Learning Outcome: Critical Thinking
Assessment Method/Tool: Rubric
Measurement Scale: 1 - 3
Sample Size: 90

	Developing (# of students)		Adequate (# of students)		Proficient (# of students)	
	#	%	#	%	#	%
1. Identifies and explains issues	4	4.4%	5	5.6%	81	90.0%
2. Recognizes contexts and assumptions	7	7.8%	19	21.1%	64	71.1%
3. Acknowledges multiple perspectives	0	0.0%	0	0.0%	90	100.0%
4. Evaluates evidence to reach conclusions	7	7.8%	13	14.4%	70	77.8%
Averages: (based on 90 student sample size)	4.5	5.0%	9.3	10.3%	76.3	84.7%

Benchmark: 85% Institutional benchmark goal for percent of students to meet "Adequate" or "Proficient" levels

(This institutional benchmark does not take into account the level of the course and the preparedness of the students in the sample. Results will help the institution understand the learning needs of participating students.)

Percent Achieving Benchmark 95.0% Actual percent of students meeting "Adequate" or "Proficient" levels

Learning Outcomes Assessment - Critical Thinking

Assessment: ID: 196

Question / Prompt / Assignment: (used for the assessment)

This chemical nomenclature and chemical equation based assignment is distributed on the first day of the course and is handed in at the end of the second week of the term. The intent of this assignment is to provide feedback both to the student and the instructor about the preparedness and appropriateness of this course for the student. If the student is unable to perform at adequate or proficient levels on this assignment, then the student should strongly consider stepping down from the CHEM 200 level course series, and attend instead the CHEM 100 level series. The student may then attend the CHEM 200 series the following school year. The student audience is usually about 60% freshmen, and 95% prospective science majors. Completion of the CHEM 200 course series is required for all BS science degrees.

Commentary / Explanation: (provide context within the course/activity for the question/prompt/assignment)

The trait interpretation for the rubric is as follows;
Trait 1, identifies issues: applies to the correct set up, format, and interpretation for chemical species based on carefully reading the written description of the chemical reaction;
Trait 2, recognizes contexts and assumptions: applies to the level of attention to details in the presented chemical equation, such as the correct use of implied charge states, normal elemental bond number, numerical coefficients, subscripts, and parentheses as well as addressing species' states of matter;
Trait 3, acknowledges multiple perspectives or approaches: not viewed as applicable to this rubric;
Trait 4, evaluates evidence to reach conclusions: assuming the previous traits have successful been accomplished, balancing the chemical reaction equation is the last step in the process so that the same number of each element occurs on each side of the reaction arrow.

Data Analysis: What do these results mean? (what do the results indicate regarding student proficiency in the outcome assessed)

Trait 1: With almost 96% of the class in the adequate and proficient categories and 90% in the proficient category, students are clearly demonstrating their appropriate college level of reading proficiency.
Trait 2: Math preparation is considered to be more important than chemistry subject preparation to the success of the students in the CHEM 204 course. Successful students in math and sciences must be attentive to detail issues. This is a developing skill for most freshmen as demonstrated by the much larger percentage of the students in the adequate category, 21%, and smaller percentage in the proficient category, 71%. Combined however, these values still exceed the 85% threshold mark.
Trait 3: Not applicable, no comment.
Trait 4: The conclusive balancing part of the assignment also had 92% adequate and proficient student performance. However, unlike Trait 2 there were a smaller percentage in the adequate performance level, 14%. For this assignment, this is perhaps the clearest indicator of a student's critical thinking ability, but it is predicated upon successful treatment of the concepts embodied by Traits 1 and 2.

Closing the Loop:

How will you use the results to improve student learning?

How do these results relate to University, Program, and General Education Learning Outcomes?)

As a screening tool to assess student preparedness for the CHEM 200 course series, the assignment does a good job. Quite often students realize early on in the term that they are not prepared for the series based solely on their performance on this assignment.
This year's group of students performed better than most years.
What this assignment does not address is the retention of these concepts for the rest of the CHEM 204 course.

Student Samples (optional): (web links to posted, online files)

NOTE: Student names cannot be used on the samples.

Developing Example (web address)

Adequate Example (web address)

Proficient Example (web address)

Learning Outcomes Assessment - Critical Thinking

Assessment: ID: 196

Assessment Type: General Learning Outcome
Year/Term: 2010 / 2
Name: Kelley, Ron
Email: rkelley@eou.edu
Program: Chemistry
Prefix / Course Number: CHEM / 204

High Impact Practice (HIP):

- ☐ First Year Experience
- ☐ Leadership Training
- ☐ University Writing Requirement
- ☐ Undergraduate Research
- ☐ Service Learning / Community-Based Learning
- ☐ Performance
- ☐ Capstone Project
- ☐ Learning Community
- ☐ Co-Curriculum
- ☐ Collaborative Assignments and Projects
- ☐ Diversity / Global Learning
- ☐ Internship / Practicum / Field Work
- ☐ Portfolio

Learning Outcome: Critical Thinking
Assessment Method/Tool: Rubric
Measurement Scale: 1 - 3
Sample Size: 90

	Developing (# of students)		Adequate (# of students)		Proficient (# of students)	
	#	%	#	%	#	%
1. Identifies and explains issues	4	4.4%	5	5.6%	81	90.0%
2. Recognizes contexts and assumptions	7	7.8%	19	21.1%	64	71.1%
3. Acknowledges multiple perspectives	0	0.0%	0	0.0%	90	100.0%
4. Evaluates evidence to reach conclusions	7	7.8%	13	14.4%	70	77.8%
Averages: (based on 90 student sample size)	4.5	5.0%	9.3	10.3%	76.3	84.7%

Benchmark: 85% Institutional benchmark goal for percent of students to meet "Adequate" or "Proficient" levels

(This institutional benchmark does not take into account the level of the course and the preparedness of the students in the sample. Results will help the institution understand the learning needs of participating students.)

Percent Achieving Benchmark 95.0% Actual percent of students meeting "Adequate" or "Proficient" levels

Learning Outcomes Assessment - Critical Thinking

Assessment: ID: 196

Question / Prompt / Assignment: (used for the assessment)

This chemical nomenclature and chemical equation based assignment is distributed on the first day of the course and is handed in at the end of the second week of the term. The intent of this assignment is to provide feedback both to the student and the instructor about the preparedness and appropriateness of this course for the student. If the student is unable to perform at adequate or proficient levels on this assignment, then the student should strongly consider stepping down from the CHEM 200 level course series, and attend instead the CHEM 100 level series. The student may then attend the CHEM 200 series the following school year. The student audience is usually about 60% freshmen, and 95% prospective science majors. Completion of the CHEM 200 course series is required for all BS science degrees.

Commentary / Explanation: (provide context within the course/activity for the question/prompt/assignment)

The trait interpretation for the rubric is as follows;
Trait 1, identifies issues: applies to the correct set up, format, and interpretation for chemical species based on carefully reading the written description of the chemical reaction;
Trait 2, recognizes contexts and assumptions: applies to the level of attention to details in the presented chemical equation, such as the correct use of implied charge states, normal elemental bond number, numerical coefficients, subscripts, and parentheses as well as addressing species' states of matter;
Trait 3, acknowledges multiple perspectives or approaches: not viewed as applicable to this rubric;
Trait 4, evaluates evidence to reach conclusions: assuming the previous traits have successful been accomplished, balancing the chemical reaction equation is the last step in the process so that the same number of each element occurs on each side of the reaction arrow.

Data Analysis: What do these results mean? (what do the results indicate regarding student proficiency in the outcome assessed)

Trait 1: With almost 96% of the class in the adequate and proficient categories and 90% in the proficient category, students are clearly demonstrating their appropriate college level of reading proficiency.
Trait 2: Math preparation is considered to be more important than chemistry subject preparation to the success of the students in the CHEM 204 course. Successful students in math and sciences must be attentive to detail issues. This is a developing skill for most freshmen as demonstrated by the much larger percentage of the students in the adequate category, 21%, and smaller percentage in the proficient category, 71%. Combined however, these values still exceed the 85% threshold mark.
Trait 3: Not applicable, no comment.
Trait 4: The conclusive balancing part of the assignment also had 92% adequate and proficient student performance. However, unlike Trait 2 there were a smaller percentage in the adequate performance level, 14%. For this assignment, this is perhaps the clearest indicator of a student's critical thinking ability, but it is predicated upon successful treatment of the concepts embodied by Traits 1 and 2.

Closing the Loop:

How will you use the results to improve student learning?

How do these results relate to University, Program, and General Education Learning Outcomes?)

As a screening tool to assess student preparedness for the CHEM 200 course series, the assignment does a good job. Quite often students realize early on in the term that they are not prepared for the series based solely on their performance on this assignment.
This year's group of students performed better than most years.
What this assignment does not address is the retention of these concepts for the rest of the CHEM 204 course.

Student Samples (optional): (web links to posted, online files)

NOTE: Student names cannot be used on the samples.

Developing Example (web address)

Adequate Example (web address)

Proficient Example (web address)