De Anza College **SLO ARCHIVE**

Student Learning Outcomes for CHEM 1A

General Chemistry

Team Members:

Team Leader:
Ram Subramaniam (8517) in CHEM

Other members:

1. Cinzia Muzzi (x5790) CHEM
2. Ram Subramaniam (x8517) CHEM

Additional team members/notes about team:

Ram Subramaniam, Cinzia Muzzi,
Gary Fisher,

Additional Notes:

Outcomes:

Outcome 1 Phase I: Statement

Identify and explain trends in the periodic table.

Outcome 1 Phase II: Assessment Strategy Used:

Assessment Quarter: Summer 2010
Assessors: Ram Subramaniam
Assessment Tools: *No tools assigned*.

Outcome 1 Phase III: Reflect & Enhance

Number of people involved in Phase III: 3

Changes:

Methods:
The following questions from the final examination were used to assess this outcome:(a) Which has a greater affinity for electrons (a more negative value of electron affinity) and why?Sodium or Magnesium(b) Which has a greater ionization energy and why?Nitrogen or oxygen

Findings and Conclusions:
The following statistical data was obtained:Average: 2.5/5Standard Deviation: 2/5Median: 3/5

Enhancement (Planned Actions)
Part I:

Part II:

Outcome 2 Phase I: Statement

Construct balanced reaction equations and illustrate principles of stoichiometry.

Outcome 2 Phase II: Assessment Strategy Used:

Assessment Quarter: Summer 2010
Assessors: Ram Subramaniam
Assessment Tools: *No tools assigned*.

Outcome 2 Phase III: Reflect & Enhance

Number of people involved in Phase III: 3

Changes:

Methods:
The following question from the final exam was used to assess this outcome:How many grams of phosphine (PH3) can form when 37.5 g of phosphorous and 83.0 L of hydrogen has react at STP?P4(s) + H2(g) ïƒ¨ PH3(g) [unbalanced]

Findings and Conclusions:
The following statistical data was collected:Average: 8.1/10Standard Deviation: 2.6/10Median: 10/10

Enhancement (Planned Actions)
Part I:

Part II:

Outcome 3 Phase I: Statement

Apply the first law of thermodynamics to chemical reactions.

Outcome 3 Phase II: Assessment Strategy Used:

Assessment Quarter: Summer 2010

Assessors: Ram Subramaniam
Assessment Tools: *No tools assigned*.

Outcome 3 Phase III: Reflect & Enhance

Number of people involved in Phase III: 3

Changes:

Methods:
The following question from the final exam was used to assess this outcome:High purity benzoic aicd (C6H5COOH; DHrxn for combustion = -3227 kJ/mol) is used as a standard for calibrating bomb calorimeters. A 1.221-gram sample of benzoic acid is burned in a bomb calorimeter whose heat capacity is 1365 J/C. What is the observed temperature change?

Findings and Conclusions:
The data obtained from the assessment is as follows:Average: 8.4/10Standard Deviation: 2.7/10Median: 10/10

Enhancement (Planned Actions)
Part I:
The national success rate in chemistry (based on data from nsf.gov and acs.org) is between 65-70%. The assessment data of the outcomes for this chemistry class indicates that the performance of De Anza College chemistry students is above the national average.However, this data is from a relatively small sample size (one group of 25 students during the summer quarter). In order to have a more comprehensive assessment of the learning outcomes, we plan to evaluate the outcomes in more sections. Also, the current assessment only evaluated the lecture component of the class. This class has a laboratory component, which is weighted, at 25% -30% of the studentâ€™s total performance in the class. In a future term, we plan to evaluate and assess the outcomes in the laboratory as well.

Part II:
From this limited sample, we were still able to arrive at some interesting conclusions. Outcome statement one, for instance, stems from a conceptual learning objective and studentâ€™s data here indicated a lower success rate than in outcome statement three which involved numerical problem solving skills. Even more interesting, the objectives related to SLO-1 are not directly dealt with in any of the laboratory experiments. Whereas the objectives related to SLO-3 are discussed via a laboratory experiment besides in lecture.This data supports our theory that laboratory experiences that closely parallel material discussed in the lecture is essential for students to be successful in chemistry. Ideally, it would be beneficial to the students if we were to modify the laboratory program to incorporate experiments perfectly aligned with the lecture. The limiting factor in having a highly challenging and exceptional laboratory program is primarily due to limitations in resources. Specifically, the staffing situation in our laboratories is sub-par; we have one staff member undertaking the responsibilities of three entirely different positions (stockroom manager, hazardous waste manager, laboratory coordinator). Changes to our laboratory curriculum involve great deal of planning: developing new laboratory experiments, ordering required chemicals and other supplies, writing a new laboratory manual, creating waste

labels, organizing different necessary equipment, training student workers in appropriate laboratory preparations, just to name a few. All of these tasks require large investments of time from both the faculty and the single stockroom personnel. While the faculty may be able to develop new and interesting laboratory experiments, it is impossible to implement these without complete synergy with the (lone) stockroom personnel. Students will greatly benefit from a richer laboratory experience, and this is likely to lead to a much improved accomplishment and success of the learning outcomes. However, due to limitations in resources such projects are currently purely theoretical concepts.

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