2. SLO(s) being assessed: Student will..

SLO 10: Students will understand and appreciate methods and issues of science and technology.

3. AGSC Content Area of Alignment:

Area III: Science and Math

4. Assessment Method(s):

[Explain how assessment for the measures associated with this SLO - not grading for the course as a whole - was conducted. You may cut/paste rubrics for inclusion here, identify faculty reviewing committees, or identify specific kinds of test questions important to your method. Is this the method you initially planned to use? Provide a separate paragraph for each method].

An exam comprising of 20 multiple questions was given to students who took this class (Spring 2013 semester). The exam was written such that 5 questions addressed a subsection of SLO 10 (SLO10-1, SLO 10-2, SLO 10-3 and SLO 10-5). The social impact portion (SLO 10-4) of assessment was not included.

5. Findings: What assessment data did each assessment method produce?

On average, CHEM 1020 students were assessed as having little/no ability when all 4 sub sections are combined. The data was further broken down to show the percentage of students' ability on each individual subsection i.e. each subsection of SLO 10 will have a percentage of students who emerged as having advanced ability, intermediate ability, basic ability and little/no ability).

Attachment name: Freshman Chemistry CORE SLO Assessment Devise 2

6. Based on the comprehensive rubric for the appropriate SLO(s), indicate the extent of competency of the average student who has completed this core course in each learning outcome assigned to it:

<table>
<thead>
<tr>
<th>SLO</th>
<th>Level of Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLO 10</td>
<td>little or no</td>
</tr>
</tbody>
</table>

7. How did you (or will you) use the findings for improvement?

[What questions/issues/concerns did your data raise for the faculty teaching the course? What discussion did the faculty have about the findings? What future actions to improve student attainment of this outcome will the department/program take as a result of this analysis?]

The Undergraduate Program Committee will meet to discuss how the learning objectives can be improved in these courses so that appropriate recommendations can be made to the faculty. One possibility is direct coupling of the lecture with the lab so that concepts learned in the lecture class can be stressed more when students perform experimental exercises in the laboratory classes. This will be particularly helpful in improving scores for SLO 10-3 (Data interpretation) when students can correlate theoretical concepts learned in lectures to data obtained when performing experimental exercises.

8. Additional Comments:

[What else would you like the Committee to know about your assessment of this course or plans for the future?]
<table>
<thead>
<tr>
<th>Course Name / number</th>
<th>CHEM1010/1011, CHEM1020/1021</th>
</tr>
</thead>
</table>

9. Committee Comments:
Please answer the questions on the provided scantron form. There are 20 questions.

**CHEM 1020**

**SLO 10-1 Historic Perspective**

1.1) Choose the correct association
    Brönsted - Lowrey
    a) DNA base pairing
    b) Acid/Base theory
    c) Addition to CC double bonds
    d) Metabolism
    e) Designation of 3-D structures

1.2) Choose the correct association
    Watson –Crick
    a) DNA base pairing
    b) Acid/Base theory
    c) Addition to CC double bonds
    d) Metabolism
    e) Designation of 3-D structures

1.3) Choose the correct association
    Krebs cycle
    a) DNA base pairing
    b) Acid/Base theory
    c) Addition to CC double bonds
    d) Metabolism
    e) Designation of 3-D structures

1.4) Choose the correct association
    Markovnikov
    a) DNA base pairing
    b) Acid/Base theory
    c) Addition to CC double bonds
    d) Metabolism
    e) Designation of 3-D structures

1.5) Choose the correct association
    Fischer
    a) DNA base pairing
    b) Acid/Base theory
    c) Addition to CC double bonds
    d) Metabolism
    e) Designation of 3-D structures
SLO 10-2 Scientific Method

2.1) Please provide the correct answer:
   a) Collecting data, forming a hypothesis, designing a test and forming a theory
   b) Collecting data, forming a theory, designing a test and forming a hypothesis
   c) Collecting data, forming a theory, designing a test and establishing a law
   d) Forming a theory, collecting data to support theory and establishing a law
   e) Forming a theory, collecting data to support theory and forming a hypothesis

2.2) Choose the correct association
Law
   a) Tentative explanation of an observation
   b) Tested hypothesis
   c) Belief
   d) Relationship that hold true in all experiments

2.3) Choose the correct association
Theory
   a) Tentative explanation of an observation
   b) Tested hypothesis
   c) Belief
   d) Relationship that hold true in all experiments

2.4) Choose the correct association
Hypothesis
   a) Tentative explanation of an observation
   b) Tested hypothesis
   c) Belief
   d) Relationship that hold true in all experiments

2.5) Argon dating of rock shows an age of 4 million years. If bone is bedded in the rock, this shows the bone is also 4 million years old.
   a) True
   b) False
SLO 10-3 Data Interpretation

3.1 If the correct answer is 3.0, but the experimental values are 3.51, 3.47 and 3.53, the experimental results are:
a) accurate  
b) precise  
c) accurate and precise  
d) neither accurate nor precise  
e) precise but not accurate

3.2 – 3.3) The following questions refer to the plot below of the mass of precipitate (Ag₂CO₃) found as a function of the initial concentrations of both AgNO₃ and Li₂CO₃.

3.2 Identify the species that are soluble
a) Li₂CO₃, AgNO₃, LiNO₃, Ag₂CO₃  
b) Li₂CO₃, AgNO₃, LiNO₂  
c) Li₂CO₃, AgNO₃  
d) Ag₂CO₃  
e) LiNO₂

3.3. The dashed line indicates the amount of precipitate when
a) Li₂CO₃ is the limiting reagent  
b) AgNO₃ is the limiting reagent  
c) Ag₂CO₃ is the limiting reagent  
d) LiNO₂ is the limiting reagent
3.4 When doing an experiment, it is better to:

a) use all data collected whether valid or not  
b) use only some of the data  
c) use all data except when there is a clear experimental error  
d) keep repeating experiment until expected results is obtained and use that value.  
e) Copy the results from another student

3.5 When determining the moles of Ag₂CO₃ from the reaction, one should:

a) weigh the solution  
b) filter the precipitate, dry and weigh it  
c) pour off the liquid and weigh the wet precipitate  
d) measure the volume of solution  
e) copy results from another student
SLO 10-5 Demonstrating understanding of Science

5.1) What is the formula for sodium sulfate?
   a) NaS
   b) NaSO₃
   c) Na₂SO₄
   d) NaSO₄
   e) NaSO

5.2) What is the correct stoichiometry for the reaction
   \[ aC₂H₄ + bO₂ \rightarrow cCO₂ + dH₂O \]
   a) \(abcd = 1111\)
   b) \(abcd = 2222\)
   c) \(abcd = 1212\)
   d) \(abcd = 1322\)
   e) \(abcd = 2121\)

5.3) What is the unit for 10³ meters?
   a) kilometer
   b) millimeter
   c) centimeter
   d) megameter
   e) decimeter

5.4) How many moles of water are in 36.0 g of H₂O? \(\text{At wt. } H=1.0 \text{ amu; } O=16 \text{ amu}\)
   a) 1.0 moles
   b) 2.0 moles
   c) 0.5 moles
   d) 4.0 moles
   e) 10.0 moles

5.5) How many protons and neutrons are in the isotope \(^{14}\_6\text{C}\)?
   a) 14p, 6n
   b) 6p, 14n
   c) 14p, 20n
   d) 6p, 8n
   e) 8p, 6n