

COURSE SLO ASSESSMENT REPORT, SCCDepartment: Chemistry Course: Chem 259Year: 2013 Semester: Fall

1) Outcome to be assessed	A- Apply major concepts of chemical reactivity of organic compounds to solve problems																																																																																																																														
2) Means of assessment and criteria of success	SLO A will be assessed using a standardized year-long Organic Chemistry exam. We will compare our average to the national average. Success in achieving the SLO means 70% of the students are having the national average or above. For the given version, the year-long organic chemistry exam 2008, the average was 39.48																																																																																																																														
3) Summary of data collected	<p>The data was collected for 18 students Class average was 50.1. That average exceeds the national average so in general the class achieved the national average and as a class the SLO was achieved. Four students (22%) got less than 40 correct answers on the ACS exam.</p> <table border="1"><thead><tr><th>Question</th><th>incorrect</th><th>% incorrect</th><th>Question</th><th>incorrect</th><th>% incorrect</th></tr></thead><tbody><tr><td>1</td><td>2</td><td>11.11</td><td>36</td><td>1</td><td>5.56</td></tr><tr><td>2</td><td>6</td><td>33.33</td><td>37</td><td>0</td><td>0.00</td></tr><tr><td>3</td><td>3</td><td>16.67</td><td>38</td><td>2</td><td>11.11</td></tr><tr><td>4</td><td>6</td><td>33.33</td><td>39</td><td>11</td><td>61.11</td></tr><tr><td>5</td><td>0</td><td>0.00</td><td>40</td><td>6</td><td>33.33</td></tr><tr><td>6</td><td>6</td><td>33.33</td><td>41</td><td>8</td><td>44.44</td></tr><tr><td>7</td><td>4</td><td>22.22</td><td>42</td><td>3</td><td>16.67</td></tr><tr><td>8</td><td>11</td><td>61.11</td><td>43</td><td>2</td><td>11.11</td></tr><tr><td>9</td><td>6</td><td>33.33</td><td>44</td><td>4</td><td>22.22</td></tr><tr><td>10</td><td>1</td><td>5.56</td><td>45</td><td>5</td><td>27.78</td></tr><tr><td>11</td><td>9</td><td>50.00</td><td>46</td><td>4</td><td>22.22</td></tr><tr><td>12</td><td>7</td><td>38.89</td><td>47</td><td>1</td><td>5.56</td></tr><tr><td>13</td><td>1</td><td>5.56</td><td>48</td><td>5</td><td>27.78</td></tr><tr><td>14</td><td>5</td><td>27.78</td><td>49</td><td>11</td><td>61.11</td></tr><tr><td>15</td><td>13</td><td>72.22</td><td>50</td><td>7</td><td>38.89</td></tr><tr><td>16</td><td>6</td><td>33.33</td><td>51</td><td>9</td><td>50.00</td></tr><tr><td>17</td><td>5</td><td>27.78</td><td>52</td><td>6</td><td>33.33</td></tr><tr><td>18</td><td>10</td><td>55.56</td><td>53</td><td>5</td><td>27.78</td></tr><tr><td>19</td><td>9</td><td>50.00</td><td>54</td><td>3</td><td>16.67</td></tr><tr><td>20</td><td>8</td><td>44.44</td><td>55</td><td>5</td><td>27.78</td></tr></tbody></table>	Question	incorrect	% incorrect	Question	incorrect	% incorrect	1	2	11.11	36	1	5.56	2	6	33.33	37	0	0.00	3	3	16.67	38	2	11.11	4	6	33.33	39	11	61.11	5	0	0.00	40	6	33.33	6	6	33.33	41	8	44.44	7	4	22.22	42	3	16.67	8	11	61.11	43	2	11.11	9	6	33.33	44	4	22.22	10	1	5.56	45	5	27.78	11	9	50.00	46	4	22.22	12	7	38.89	47	1	5.56	13	1	5.56	48	5	27.78	14	5	27.78	49	11	61.11	15	13	72.22	50	7	38.89	16	6	33.33	51	9	50.00	17	5	27.78	52	6	33.33	18	10	55.56	53	5	27.78	19	9	50.00	54	3	16.67	20	8	44.44	55	5	27.78
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	23	1	5.56	58	9	50.00
	24	13	72.22	59	8	44.44
	25	8	44.44	60	2	11.11
	26	0	0.00	61	4	22.22
	27	1	5.56	62	10	55.56
	28	6	33.33	63	4	22.22
	29	6	33.33	64	2	11.11
	30	6	33.33	65	5	27.78
	31	4	22.22	66	2	11.11
	32	7	38.89	67	10	55.56
	33	2	11.11	68	10	55.56
	34	0	0.00	69	1	5.56
	35	2	11.11	70	1	5.56
4) Analysis of data	<p>Some of these questions more than 50% students missed:</p> <p>Question # 11(New) Boiling point</p> <p>Question # 15 (Acidic hydrogens)</p> <p>Question # 18 (Number of chiral centers)</p> <p>Question # 19 (New) E alkene</p> <p>Question # 24 (SN1 vs SN2)</p> <p>Question # 39 (New) addition of Grignard to a cyano group</p> <p>Question # 49 (New) Decarboxylation of a beta keto acid</p> <p>Question # 51 (New) cis hydroxylation of cyclohexene</p> <p>Question # 62 (New) Grignard workup</p> <p>Question # 67 (New) Mass spectrometry</p> <p>Question # 68 (Polymer)</p> <p>This group of students did an average job and 11 questions had more than 50% incorrect answers. Last group assessment results showed 6 questions with more than 50% incorrect answers.</p>					
5) Plan of action/what to do next	<p>This group had 78 % of the students meeting the SLO with getting above the average score on the national ACS exam.</p> <p>The students met SLO A for this class.</p> <p>There is no plan of action as 78% of the students met SLO A of the course.</p>					

COURSE SLO ASSESSMENT REPORT, SCC

Department: Chemistry _____ Course: _____ Chem 259 _____

Year: 2013 _____ Semester: Fall _____

1) Outcome to be assessed	B- Write in scientific terms and interpret patterns of reactivity on the basis of mechanistic reasoning				
2) Means of assessment and criteria of success	SLO B will be assessed using a mechanism on the final exam. Success in achieving the SLO means having 70% of the students obtaining competent or above on writing a mechanism. A rubric was used to evaluate how they can draw a mechanism based on reactivity. The mechanism used was a Friedel-Crafts alkylation of an aromatic ring with a rearrangement of the carbocation. Achieving the SLO means that 70% of the students achieved competent or above on the rubric (10 pts out of 15)				
3) Summary of data collected	One section was assessed with 18 students. A rubric was used to evaluate how they can draw a mechanism based on reactivity. Students were expected to identify the first step in a mechanism, draw arrows correctly and show each step with the correct electron flow and charges and reach the final product. Rearrangement of the carbocation was supposed to be the second step in the mechanism.				
		Inaccurate (0 pt)	Developing (1 pt)	Competent (2 pts)	Accomplished (3 pts)
	Identifies the first step in the mechanism (cation)	5 (28%)		3 (16%)	10 (56%)
	Draws the product of each step in the mechanism in a logical way				
	a. Correct flow of electrons	6 (33%)		5 (28%)	7 (39%)
	b. Proton transfer steps (rearrangement)	8(45%)			10 (55%)
	c. Use of correct charge in acid or base (Charge)	6 (33%)			12 (67%)
	Final product (rearomatize)	14 (78%)			4 (22%)

4) Analysis of data	<p>From analyzing the rubric by which the mechanism was graded, the students were not able to achieve that SLO. Seventy two percent recognized the type of mechanism as EAS and used the correct arrows to draw the first step. Fifty five percent of the students were able to draw the carbocation rearrangement in its right place in the mechanism and sixty seven percent of the students were able to use the correct charges. This is due to the fact that the later parts of the mechanism students either get inaccurate (0 points) or accomplished (3 points).</p>
5) Plan of action/what to do next	<p>Data shows that only 50% of the students (9 out of 18) achieving overall competent or above in writing the mechanism (with 10 pts or more on the rubric). This means that the students did not meet SLO B for the course.</p> <p>The sample used for assessment is a very small sample. We will need to accumulate few more sections (over a couple of years) to obtain statistically valid data. Writing a mechanism is always a challenge for the students. Practicing writing mechanisms and also devoting more practice time for drawing mechanism might help the students. It is clear that this group of students underperformed the previous group in the total percentage of students completing the mechanism but overall, the percentage of students who can use arrows and charges in their correct positions more than doubled. This is attributed to the change in the text book that helps the students with arrow pushing technique early on in the first semester.</p>

COURSE SLO ASSESSMENT REPORT, SCC

Department: Chemistry _____ Course: _____ Chem 259 _____

Year: 2013 _____ Semester: Fall _____

1) Outcome to be assessed	C- Perform experiments with published protocols, use standard laboratory procedure and instruments and analyze data to determine the identity of an unknown organic compound																																																																																																																																																																																																																																																														
2) Means of assessment and criteria of success	SLO C will be assessed using a laboratory unknown lab report. The report will be graded using a rubric. Success in achieving the SLO means 70% of the students achieved competent or above on their unknown report (20 pts or above).																																																																																																																																																																																																																																																														
3) Summary of data collected	<p>One section was assessed with 18 students.</p> <p>A rubric was used to evaluate how they can determine some physical data (boiling point, solubility), halide test, nitro group presence, unsaturation in the unknown, functional group determination, IR interpretation, followed by correct identification of the unknown.</p> <table border="1" data-bbox="394 722 2011 1406"> <thead> <tr> <th>#</th> <th>Unknown</th> <th>Bp</th> <th>sol</th> <th>halide</th> <th>Nitro</th> <th>FG</th> <th>unsat</th> <th>IR</th> <th>FG test</th> <th>List</th> <th>Identity</th> <th>Total</th> <th>Deriv</th> <th>Problem</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Ethanol</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>30</td> <td>No deriv.</td> <td>NO</td> </tr> <tr> <td>2</td> <td>2-Butanol</td> <td>2</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>29</td> <td>No deriv.</td> <td>NO</td> </tr> <tr> <td>3</td> <td>Acetone</td> <td>0</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>27</td> <td>Deriv ok</td> <td>NO</td> </tr> <tr> <td>4</td> <td>Acetone</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>2</td> <td>3</td> <td>29</td> <td>No deriv.</td> <td>NO</td> </tr> <tr> <td>5</td> <td>N,N-dimethylaniline</td> <td>0</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>0</td> <td>24</td> <td>No deriv.</td> <td>Yes</td> </tr> <tr> <td>6</td> <td>Ethanol</td> <td>3</td> <td>2</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>29</td> <td>No deriv.</td> <td>NO</td> </tr> <tr> <td>7</td> <td>Aniline</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>0</td> <td>3</td> <td>1</td> <td>3</td> <td>3</td> <td>25</td> <td>No deriv.</td> <td>NO</td> </tr> <tr> <td>8</td> <td>N,N-dimethylaniline</td> <td>0</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>0</td> <td>24</td> <td>No deriv.</td> <td>Yes</td> </tr> <tr> <td>9</td> <td>Aniline</td> <td>0</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>0</td> <td>24</td> <td>Deriv ok</td> <td>Yes</td> </tr> <tr> <td>10</td> <td>Acetone</td> <td>0</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>1</td> <td>3</td> <td>25</td> <td>Deriv ok</td> <td>NO</td> </tr> <tr> <td>11</td> <td>1-Butanol</td> <td>1</td> <td>3</td> <td>0</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>0</td> <td>22</td> <td>No deriv.</td> <td>yes</td> </tr> <tr> <td>12</td> <td>1-Octanol</td> <td>2</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>2</td> <td>3</td> <td>3</td> <td>28</td> <td>No deriv.</td> <td>NO</td> </tr> <tr> <td>13</td> <td>1-Butanol</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>30</td> <td>No deriv.</td> <td>NO</td> </tr> <tr> <td>14</td> <td>Acetophenone</td> <td>0</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>27</td> <td>Deriv ok</td> <td>NO</td> </tr> <tr> <td>15</td> <td>Acetophenone</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>30</td> <td>Deriv ok</td> <td>NO</td> </tr> </tbody> </table>															#	Unknown	Bp	sol	halide	Nitro	FG	unsat	IR	FG test	List	Identity	Total	Deriv	Problem	1	Ethanol	3	3	3	3	3	3	3	3	3	3	30	No deriv.	NO	2	2-Butanol	2	3	3	3	3	3	3	3	3	3	29	No deriv.	NO	3	Acetone	0	3	3	3	3	3	3	3	3	3	27	Deriv ok	NO	4	Acetone	3	3	3	3	3	3	3	3	2	3	29	No deriv.	NO	5	N,N-dimethylaniline	0	3	3	3	3	3	3	3	3	0	24	No deriv.	Yes	6	Ethanol	3	2	3	3	3	3	3	3	3	3	29	No deriv.	NO	7	Aniline	3	3	3	3	3	0	3	1	3	3	25	No deriv.	NO	8	N,N-dimethylaniline	0	3	3	3	3	3	3	3	3	0	24	No deriv.	Yes	9	Aniline	0	3	3	3	3	3	3	3	3	0	24	Deriv ok	Yes	10	Acetone	0	3	3	3	3	3	3	3	1	3	25	Deriv ok	NO	11	1-Butanol	1	3	0	3	3	3	3	3	3	0	22	No deriv.	yes	12	1-Octanol	2	3	3	3	3	3	3	2	3	3	28	No deriv.	NO	13	1-Butanol	3	3	3	3	3	3	3	3	3	3	30	No deriv.	NO	14	Acetophenone	0	3	3	3	3	3	3	3	3	3	27	Deriv ok	NO	15	Acetophenone	3	3	3	3	3	3	3	3	3	3	30	Deriv ok	NO
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	16	Benzaldehyde	3	3	3	3	3	3	3	3	3	3	30	No deriv.	NO
	17	Aniline	0	3	3	3	3	3	3	3	3	3	27	Deriv ok	NO
	18	1-Octanol	1	3	3	3	3	3	3	3	2	0	24	Deriv ok	Yes
		Average	1.50	2.94	2.83	3.00	3.00	2.83	3.00	2.83	2.78	2.17	26.89		
4) Analysis of data	<p>From the given data, 72% of the students (13/18) were able to correctly determine the name and the structure of the unknown liquid compound but only 50% had the correct B.P. The majority of students were not able to determine the boiling point correctly. Students did not have any difficulty with solubility, halide test, nitro group test, unsaturation test or IR interpretation. The difficulty was sometimes in determining the functional group and the correct tests that goes with that functional group. Overall, 100% of the students achieved the laboratory SLO.</p>														
5) Plan of action/what to do next	<p>Grading the unknown identification using a rubric showed that 100% of the students achieved overall competent or accomplished on the SLO (which means 20 pts or above). Students met SLO C for the course.</p> <p>There is no plan of action as 100% of the students met SLO C for the course.</p>														