Clovis Community College
Core Competencies Assessment 2013—Area III: Laboratory Science

Class: Chemistry 113 – Chemistry for General Education (Online) Fall 2013 **Faculty: Lana Powell, Larry Powell**

Common Core No.: NMCCN CHEM 1114

Competencies (Learning Outcomes Being Measured)	**Assessment Procedures** (Process/Instrument named or described – rubric attached)	**Assessment Results**	**How Results Will Be Used To Make Improvements**	**(Optional)** Recommendations/Goals/ Priorities
1. Students will describe the process of scientific inquiry. Students should: a. Understand that scientists rely on evidence obtained from observations rather than authority, tradition, doctrine, or intuition. b. Students should value science as a way to develop reliable knowledge about the world.	Students will work through problems using the Scientific Method, specific historical examples will also be investigated that correlate to important concepts in Chemistry (ex.: atomic models, stoichiometry, metrics) – practice exercises, quizzes, lecture exams, and labs are used to evaluate student understanding and progress. A post-test was given to 72 online students in the fall of 2013 and was used to determine the percentages provided in this report.	Chemistry 113 classes did meet the 70% minimum success rate we want our students to reach. On the exit assessment test, student results were as follows: Comp. 1 = 72% correct	We used a minimum of 70% correct for each competency as the standard that we aspired to reach. All competencies did reach that mark. To address the two lowest results (competency 1 and 5), we will stress scientific inquiry and scientific thinking more in Chem. 113 next semester. Additionally, we will continue to devote significant time to the mathematical aspects of chemistry throughout the semester – although the results were good in those competencies, they are always areas of concern.	We will reemphasize the importance of the process of scientific inquiry (competency 1) and scientific thinking (5) in our Chem. 113 classes next semester. Our overall scores for competencies 2, 3, and 4, showed strong results and we will continue our successful teaching methods in those areas – especially stressing the mathematical areas of chemistry.

Competencies (Learning Outcomes Being Measured)	**Assessment Procedures** (Process/Instrument named or described – rubric attached)	**Assessment Results**	**How Results Will Be Used To Make Improvements**	**(Optional)** Recommendations/Goals/ Priorities
2. Students will solve problems scientifically. Students should: a. Be able to construct and test hypotheses using modern lab equipment (such as microscopes, scales, computer technology) and appropriate quantitative methods. b. Be able to evaluate isolated observations about the physical universe and relate them to hierarchically organized explanatory frameworks (theories).	The Scientific Method will be used to solve problems and problems will be solved in the following areas: density, metrics, formula mass, per cent composition, balancing equations, stoichiometry – Lab reports, problem sets, quizzes, lecture exams	Comp. 2 = 96%		
3. Students will communicate scientific information. Students should: Communicate effectively about science (e.g., write lab reports in standard format and explain basic scientific concepts, procedures, and results using written, oral, and graphic presentation techniques.)	Students will submit lab reports derived from their at-home labs and have threaded discussion dealing with current topics in Chemistry	Comp. 3 = 95%		

Competencies (Learning Outcomes Being Measured)	**Assessment Procedures** (Process/Instrument named or described – rubric attached)	**Assessment Results**	**How Results Will Be Used To Make Improvements**	**(Optional)** Recommendations/Goals/ Priorities
4. Students will apply quantitative analysis to scientific problems. Students should: a. Select and perform appropriate quantitative analyses of scientific observations. b. Show familiarity with the metric system, use a calculator to perform appropriate mathematical operations, and present results in tables and graphs.	Students will perform calculations throughout the course in areas listed above – Lab reports, problem sets, lecture exams	Comp. 4 = 94%		
5. Students will apply scientific thinking to real world problems. Students should: a. Critically evaluate scientific reports or accounts presented in the popular media. b. Understand the basic scientific facts related to important contemporary issues (e.g., global warming, stem cell research, cosmology), and ask informed questions about those issues. End – Laboratory Science	Threaded discussions A final assessment quiz that has questions that correlate to each of the five competencies is given at the end of the semester	Comp. 5 = 88%		

Faculty Members Completing Assessment: **Lana Powell, Larry Powell** **12/3/2013**
Name ***Date***

Clovis Community College
Core Competencies Assessment 2014—Area III: Laboratory Science

Class: Chemistry 113 – Chemistry for General Education (Online) **Faculty: Lana Powell, Larry Powell**

Common Core No.: NMCCN CHEM 1114

Competencies (Learning Outcomes Being Measured)	**Assessment Procedures** (Process/Instrument named or described – rubric attached)	**Assessment Results**	**How Results Will Be Used To Make Improvements**	**(Optional)** Recommendations/Goals/ Priorities
1. Students will describe the process of scientific inquiry. Students should: a. Understand that scientists rely on evidence obtained from observations rather than authority, tradition, doctrine, or intuition. b. Students should value science as a way to develop reliable knowledge about the world.	Students will work through problems using the Scientific Method, specific historical examples will also be investigated that correlate to important concepts in Chemistry (ex.: atomic models, stoichiometry, metrics) – practice exercises, quizzes, lecture exams, and labs are used to evaluate student understanding and progress. A post-test was given to 72 online students in the fall of 2013 and was used to determine the percentages provided in this report.	Chemistry 113 classes did meet the 70% minimum success rate we want our students to reach. On the exit assessment test, student results were as follows: Comp. 1 = 83% correct – up from 72% correct in 2013	We used a minimum of 70% correct for each competency as the standard that we aspired to reach. All competencies did reach that mark. We addressed the two lowest results from 2013 (competency 1 and 5) and we and stressed scientific inquiry and scientific thinking more in online Chemistry 113 this semester. This assessment shows an increase in both of those competencies. There was also an increase in competency 4. With this assessment, we saw a very small drop in competency 2 (from 96% to 95%) and a decrease in competency 3 (from 95% to 89%). In response to those results, we will continue to devote significant time to the mathematical aspects of	We will reemphasize the importance of the processes of scientific problem solving and communication (competencies 2 and 3). Scientific inquiry (competency 1) and scientific thinking (5) were stressed in our Chemistry 113 classes this semester and showed increases with this assessment. Our overall score for competency 4, showed a strong result and we will continue our successful teaching methods in that area.

Competencies (Learning Outcomes Being Measured)	**Assessment Procedures** (Process/Instrument named or described – rubric attached)	**Assessment Results**	**How Results Will Be Used To Make Improvements**	**(Optional)** Recommendations/Goals/ Priorities
			chemistry throughout the semester. Although the results were good in that competency, it is always an area of concern. Additionally, student communication of scientific information will be a focus.	
2. Students will solve problems scientifically. Students should: a. Be able to construct and test hypotheses using modern lab equipment (such as microscopes, scales, computer technology) and appropriate quantitative methods. b. Be able to evaluate isolated observations about the physical universe and relate them to hierarchically organized explanatory frameworks (theories).	The Scientific Method will be used to solve problems and problems will be solved in the following areas: density, metrics, formula mass, per cent composition, balancing equations, stoichiometry – Lab reports, problem sets, quizzes, lecture exams	Comp. 2 = 95% correct – down from 96% correct in 2013		
3. Students will communicate scientific information. Students should: Communicate effectively about science (e.g., write lab reports in standard format and explain basic scientific concepts, procedures, and results using	Students will submit lab reports derived from their at-home labs and have threaded discussion dealing with current topics in Chemistry	Comp. 3 = 89% correct – down from 95% in 2013		

Competencies (Learning Outcomes Being Measured)	**Assessment Procedures** (Process/Instrument named or described – rubric attached)	**Assessment Results**	**How Results Will Be Used To Make Improvements**	**(Optional)** Recommendations/Goals/ Priorities
written, oral, and graphic presentation techniques.)				
4. Students will apply quantitative analysis to scientific problems. Students should: a. Select and perform appropriate quantitative analyses of scientific observations. b. Show familiarity with the metric system, use a calculator to perform appropriate mathematical operations, and present results in tables and graphs.	Students will perform calculations throughout the course in areas listed above – Lab reports, problem sets, lecture exams	Comp. 4 = 96% correct – up from 94% in 2013		

5. Students will apply scientific thinking to real world problems. Students should: a. Critically evaluate scientific reports or accounts presented in the popular media. b. Understand the basic scientific facts related to important contemporary issues (e.g., global warming, stem cell research, cosmology), and ask informed questions about those issues. End – Laboratory Science	Threaded discussions A final assessment quiz that has questions that correlate to each of the five competencies is given at the end of the semester	Comp. 5 = 90% correct – up from 88% correct in 2013		

Faculty Members Completing Assessment: **Lana Powell, Larry Powell** **12/3/2013**
Name ***Date***

Clovis Community College
Core Competencies Assessment 2013-2014—Area III: Laboratory Science

Class: Chemistry 151 and 152 **Faculty: Apryl Nenortas**

Common Core No.: NMCCN CHEM 1214 and NMCCN CHEM 1224

Competencies (Learning Outcomes Being Measured)	**Assessment Procedures** (Process/Instrument named or described – rubric attached)	**Assessment Results**	**How Results Will Be Used To Make Improvements**	**(Optional)** Recommendations/Goals/ Priorities
1. Students will describe the process of scientific inquiry. Students should: a. Understand that scientists rely on evidence obtained from observations rather than authority, tradition, doctrine, or intuition. b. Students should value science as a way to develop reliable knowledge about the world.	Students will work through problems using the scientific method, specific historical examples will also be investigated that correlate to important concepts in Chemistry (ex.: precision and accuracy, units of measurement, atomic theory, periodicity of elements, compounds, equations, limiting reactions, gas laws, oxidation/reduction, solutions, acids and bases, titrations, organic an biochemistry); Exercises, quizzes, lecture exams, labs	The minimum standard was set at 70% (or more) correct for each competency. Comp. 1 = 83% This competency exceeds the minimum standard by 13%.	The online format is new for this course sequence. Continuous improvements will be made in format and content to help further support students. Best practices and QM standards are used for the design of the course and the instructor maintains a level of expertise in this modality. Instructor will continue to expand her knowledge, training and skill level with regard to e-learning and androgogy. Metacognition exercises will be used to help students reflect on areas that drive their motivation for an online format.	Both Chemistry 151 and 152 were offered online only this year. The courses were asynchronous and included lecture, lab, discussion, and assessment components. Final exams were proctored. Students were required to engage in a higher level of independence and self- mgt as compared to on-campus courses because there was no set meeting time. To help balance this out, students were contacted frequently and offered one-on-one assistance. Group study was encouraged via the online conferencing option. None of the students used the group study option. All competencies except for one exceeded our desired minimum score of 70%.

Competencies (Learning Outcomes Being Measured)	**Assessment Procedures** (Process/Instrument named or described – rubric attached)	**Assessment Results**	**How Results Will Be Used To Make Improvements**	**(Optional)** Recommendations/Goals/ Priorities
2. Students will solve problems scientifically. Students should: a. Be able to construct and test hypotheses using modern lab equipment (such as microscopes, scales, computer technology) and appropriate quantitative methods. b. Be able to evaluate isolated observations about the physical universe and relate them to hierarchically organized explanatory frameworks (theories).	The Scientific Method will be used to solve problems and problems will be solved in the areas used as examples above – Lab reports, problem sets, quizzes, lecture exams. Emphasis will be put on how students collect and analyze data. Some data will be given on exams for evaluation and analysis. Other data will be collected the student, himself.	Comp. 2 = 69% This competency missed the minimum standard by 1%.	A common misconception among the students was how to deal with negative or "failed" experimental data. Students reported anxiety when data did not support the hypothesis. Some students reported changing the data so the exercise "worked." Discussion and feedback was offered in this area, however, the misconception remained. A new lab exercise will be introduced that is designed to fail and the student will be asked to analyze the failure with suggestions for improvement. The goal is to decrease student anxiety with regard to unexpected data results.	Goal: Use reinforcement and discussion to alleviate the anxiety students experience when their data doesn't support their hypothesis. Scientific thinking requires the ability to consider and possibly accept unexpected results. Group analysis may be used in future courses to assist with peer-peer reinforcement. Future courses will also engage home lab kits to expose distance students to basic lab equipment.
3. Students will communicate scientific information. Students should: Communicate effectively about science (e.g., write lab reports in standard format and explain basic scientific concepts, procedures, and results using written, oral, and graphic presentation techniques.)	Students will submit lab reports and discuss current topics in Chemistry – Lab reports, current events in Chemistry reports and presentations. Students will conduct literature reviews of current issues in peer reviewed journals and popular media.	Comp. 3 = 84% This competency exceeds the minimum standard by 14%.	The high level of communication skill is likely due to the use of structured lab reports and peer-reviewed journal articles. These activities will remain a part of the class curriculum and will be adjusted to reflect current scientific issues in society.	Goal: Continue using structured lab reports and current literature to expose students to the world of scientific literature. Students were asked to share a scientific story from popular media. The stories were then discussed and analyzed. This seemed to engage the students' interest a great deal.

All class assessment forms are due to your division chair by July 1.

Competencies (Learning Outcomes Being Measured)	**Assessment Procedures** (Process/Instrument named or described – rubric attached)	**Assessment Results**	**How Results Will Be Used To Make Improvements**	**(Optional)** Recommendations/Goals/ Priorities
4. Students will apply quantitative analysis to scientific problems. Students should: a. Select and perform appropriate quantitative analyses of scientific observations. b. Show familiarity with the metric system, use a calculator to perform appropriate mathematical operations, and present results in tables and graphs.	Students will perform calculations throughout the course in areas used as examples above – Lab reports, problem sets, lecture exams	Comp. 4 = 83% This competency exceeds the minimum standard by 13%.	One common challenge for students is developing a working knowledge of the metric system. This was noted in several terms, so during 2011-2012, a scenario formats was introduced to the questions and in-class discussions. Questions were placed in real-world scenarios to make the problem realistic. For example, "*A patient needs 500 mg of medicine. But the pharmacy only makes that pill in 25 g size. What do you do?*" Also, graphs and tables from professional journals were presented to bring scientific concepts into the classroom in a meaningful way. The result of these types of presentations was an improvement in skills over the period of the course	Goal: Continue developing problems / analysis in a real-world scenario format so students connect the classroom skill with professional world application

All class assessment forms are due to your division chair by July 1.

5. Students will apply scientific thinking to real world problems. Students should: a. Critically evaluate scientific reports or accounts presented in the popular media. b. Understand the basic scientific facts related to important contemporary issues (e.g., global warming, stem cell research, cosmology), and ask informed questions about those issues. End – Laboratory Science	Current events in Chemistry reports and presentations A final assessment quiz that has questions correlating to each of the five competencies was given during the final exam testing period.	Comp. 5 = 85% This competency exceeds the minimum standard by 15%.	Applying the scientific method and thinking to a problem is an area that many students find difficult. The introduction of the literature review component and discussion of various types of research in class has improved students' skills in this area. Interestingly, in spite of this level of success, students struggled a great deal with how to process negative data.	Goal: Maintain the exercises updating items as new discoveries are made (keep the material current and relevant). Use exercises that engage real world applications of material instead of single skill demonstrations.

Faculty Member Completing Assessment: **Apryl Nenortas** **6/30/2014**
Name ***Date***

All class assessment forms are due to your division chair by July 1.