General Education Outcomes

Communication Assessment

Pasadena City College
2012-13

Communication: Use creative expression to communicate acquired knowledge or skills effectively.

Competencies:
1.1 - **Reading:** Read and comprehend written material critically and effectively at the appropriate program level.
1.2 - **Writing:** Write in a clear, coherent, and organized manner, at the appropriate academic level, to explain ideas, to express feelings, and to support conclusions, claims, or theses.
1.3 - **Listening:** Listen actively, respectfully, and critically.
1.4 - **Creative Communication:** Create or communicate through speech,music, art, and/or performance.

Program Review

General Education

Created on: 01/02/2013 10:34:00 AM PDT
Last Modified: 03/13/2013 06:49:58 PM PDT

Table of Contents

Standing Requirements

Mission Statement

PASADENA CITY COLLEGE

PHILOSOPHY OF GENERAL EDUCATION

General education requirements guide the student toward an intelligent understanding of the whole self and of the physical and social world. These requirements encourage the student to explore different areas of human inquiry not only to gain a basic understanding of these areas, but also to comprehend and use the principles, methods, values and thought processes of these disciplines. These explorations include an examination of the physical universe, its life forms and natural phenomena, human behavior and artistic and creative accomplishments. Basic to these studies and to the student’s effectiveness in society is the capacity to think clearly, logically and analytically; to communicate clearly both orally and in writing; to perform quantitative functions; to find information; and to examine and evaluate that information using critical thinking skills.

After completing the general education requirements, the graduate should have the skills, knowledge, and insights to evaluate and appreciate the physical environment, culture, and society. To promote these skills and knowledge, Pasadena City College has developed Institutional Learning Outcomes and Competencies.

Program Outcomes (Program Level)

General Education Outcomes

Outcome

Outcome	Mapping
Communication: Use creative expression to communicate acquired knowledge or skills effectively.	No Mapping
Cognition: Use critical thinking skills to observe, analyze, synthesize, and evaluate ideas and information.	No Mapping
Information Competency: Use research and technical skills effectively and ethically to achieve an objective.	No Mapping
Social Responsibility: Demonstrate sensitivity to and respect for others.	No Mapping
Personal Development: Demonstrate an understanding of practices that promote physical, psychological, and emotional well-being. Competencies	No Mapping

2012-2013 Program Review

Components, Outcomes & Measures

Introduction/Background

No text specified

Components/Outcomes and Measures

Category I. Student Success and Achievement

Component A. Student Success and Retention

General Education Outcomes are assessed and the results are used for improvement

Measure: Biology 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): We assessed students enrolled in Biology 11, General Biology for non-majors. Full-time faculty members were asked to randomly select five Crime Scene lab assignments from each of their sections. Faculty met to discuss and create a rubric to assess the students' demonstrated ability to communicate through an in-class, graded writing assignment.

Acceptable Target and Rationale: An acceptable result of the assessment is that two-thirds of the students earn scores of "competence."

Ideal Target and Rationale: An ideal target is that 80% of the students meet the acceptable score.

What steps were taken to analyze the data?: Susan Bower and Lisa Ciletti assessed the assignments from seven lab sections.

Key/Responsible Personnel (WHO analyzed the data?): Susan Bower, Janet Chen and Lisa Ciletti participated in the discussion. The other faculty to be included in future assessments: Joe Conner and Deb Folsom.

Measure: Chemistry 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): The assessment was performed in our Chemistry 1A program. Chem 1A is the first semester of general college chemistry for science and engineering majors and is a GE course at PCC. Students in Chem 1A write one formal laboratory write-up each semester (due mid-semester) which includes organization and presentation of data, graphical analysis of results, and a lengthy written analysis and discussion of the data and results in the Conclusion section of the report. The Conclusion section of the formal laboratory write-up was assessed using the AACU Written Communication Value Rubric for 31 students in 3 separate Chemistry 1A courses enrolled for the Spring 2012 semester.

Acceptable Target and Rationale: An acceptable target for our Chem 1A students is that at least two-thirds of our students earn “competent” scores. If our Chem 1A students met this goal they are demonstrating a proficiency in scientific writing necessary for them to progress to more advanced chemistry courses where formal laboratory write-ups are required for each experiment performed.

Ideal Target and Rationale: An ideal goal would be for 80% of Chem 1A students to meet the acceptable score. This goal is in keeping with the target passing rate set for PCC campus.

What steps were taken to analyze the data?: In June 2012, Debra Wood (Assistant Professor of Chemistry) analyzed the Conclusion section of all 31 laboratory reports using the AACU Written Communication Value Rubric. The reports were scored for each of the 5 fundamental criteria listed on the Rubric using a 0 to 4 scale. The scores were marked on scantron forms which were give to Matthew Jordan for tabulation and summary.

Key/Responsible Personnel (WHO analyzed the data?): Debra Wood (Assistant Professor of Chemistry) assessed all of the laboratory reports and submitted scores for each report marked on scantron forms. Matthew Jordan oversaw the tabulation and compilation of the data on the scantron forms.

Measure: English 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): The class that we agreed as a Division to assess was English 1A, our core composition course. Faculty teaching 1A were asked to randomly select five argumentative essays from the second half of the course. A small committee of experienced graders met and created a rubric to score the ability of students to formulate and defend a thesis. We then scored model essays on that rubric. A larger group of faculty double scored all the seventy essays we received on that rubric. Any discrepancies were resolved by one of the original committee. As a member of that committee, I believe the data is valid and reliable.

Acceptable Target and Rationale: An acceptable result of the assessment would be that two thirds of the students scored at the level of “acceptable” thesis formation. The essays were collected near the end of the term, so one would expect that a supermajority of them would be able to formulate an adequate thesis by that point of the term, assuming that they would need to do so to pass the course. Unfortunately, we did not meet this result in this initial assessment.

Ideal Target and Rationale: An ideal target would be 80% of students meeting the acceptable score. This ideal would mean that the Division is exceeding our target passing rate set in the campus Educational Master Plan for 2015.

What steps were taken to analyze the data?: In May, I, Dustin Hanvey, collected the results and turned them in to the IPRO office. In October, Crystal Kollross aggregated the data and created a chart that we could then analyze as a Division. The initial assessment was made by the norming committee. The results were also discussed with our Dean.

Key/Responsible Personnel (WHO analyzed the data?): The assessment was analyzed on two occasions, once at a Division retreat attended by about 30-40 Division members and second at a Composition Committee meeting. Both meetings included our Dean, Amy Ulmer.

Measure: Foreign Languages 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): The Foreign Language Department formed a committee to create a common assessment tool to be administered to at least one section of each level one course taught by the full-time professors. Thus the committee consisted of full-time professors from Chinese, French, German, Italian, Japanese and Spanish. The majority, but not all, of the professors taught the level one, introductory course that semester.

The assessment consisted of a reading selection in the target language followed by ten true or false questions written in English to assess reading comprehension. The selection was composed in English and translated into the target language by the committee members. The committee members exchanged email to determine what topics could be covered in the selection and met various times to compose the selection. The committee members also created a rubric. Norming was quick and easy because the correct answers to the True and False questions in English were evident to all of us, no matter what language we taught.

Acceptable Target and Rationale: An acceptable result of the assessment would be that 70% of our students score at 1 (60%) or above. If equated with grade point averages, we would like the vast majority of our students to receive a minimum grade of D (barely passing) or better.

Ideal Target and Rationale: An ideal result would be that 70% of our students score a 2 or better. If though of in terms of letter grades, a supermajority of our students would be able to continue on to level two of the language with a grade of C (70%) and above.

What steps were taken to analyze the data?: The assessment was administered during the week of May 14 – 18 and the committee met the next week to score the tool. At that time we entered the scores onto ScanTron sheets provided by Matt Jordan, and the next semester we were given data sheets with the results from each language.

Key/Responsible Personnel (WHO analyzed the data?): An interdisciplinary group of faculty from each of the Foreign Languages that participated in the assessment.

Measure: Geology 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): Faculty assessed written explanation of Theory of Plate Tectonics as an essay question incorporated into a midterm examination given near the end of the semester. The question is as follows: "Describe plate tectonics to someone who has a high school education but has never studied the process. You should include a few basic definitions and descriptions. You need not discuss fracture zones nor hot spots, but otherwise be thorough. Do not include diagrams. Use the back of this page as well as the front if necessary (20 points)."
Students were assessed by the AACU Written Communication Rubric. Only one faculty member (the author) participated in the assessment, as of those full-time faculty that teach Geol 1, one was away on sabbatical, and another was teaching a full complement of Geol 3 courses.

Acceptable Target and Rationale: For an “acceptable” result students were to name and explain the dynamics of the three major types of plate boundaries, using appropriate scientific vocabulary and defining key terms. Achieving an acceptable result with the prompt is somewhat challenging in that asking for these concepts to be included in the answer answers the question for the students and eliminates the challenge. In this regard, classroom discussions, lectures, and reading clarified the mechanics of plate tectonics in the days prior to the exam, and prepared students to answer this question despite the generalized prompt. That is to say a simple reading of the prompt would likely not lead to these expectations unless one took the class. Admittedly this is an area for improvement in the writing of the prompt. Also, the rubric was not tailored to score for this particular result, in which case the rubric needs to be altered for use in geology courses.

Ideal Target and Rationale: “Ideal” results included the above in addition to a discussion of mantle convection, layering of the Earth and dynamics of these layers, and how friction between the lithosphere and asthenosphere serves to cause plate motion. Again, asking for this in the prompt readily provides the answer, and the question was designed to allow students to communicate what they understand of the process. After giving the assessment, it appears as if the prompt and rubric need to be rewritten in a manner that allows well-prepared students to earn “ideal” results that are assessed accordingly without being vague in any way. Because of conflicting schedules, I was the only full time professor available for giving this assessment during the spring 2012 semester, but I have since shared the question with my geosciences colleagues, and we are currently revising the question and the syllabus accordingly.

What steps were taken to analyze the data?: : Students in two classes (64 total) were given the assessment as part of a midterm exam at the end of the semester. All students were graded according to the AACU Written Communication Rubric, as were my colleagues across the Natural Sciences Division. Student scores were entered into eLumen and graphs of the data were delivered to me, and are included below. The greatest shortcoming in data collection and analysis is that there was no possibility of a normalizing session as I was the only available geosciences instructor for the assessment. Despite that it appears geosciences students achieve similar results to the rest of the Natural Sciences students. The results "look" different at a glance, but the y-axis is calibrated differently on the graphs of Geosciences students and Natural Sciences students (included below).

Key/Responsible Personnel (WHO analyzed the data?): I (Bryan Wilbur) am the key and sole participant in the Geosciences as sabbatical schedules during the spring of 2012 shifted class assignments to the point that I was the only full time geology professor teaching physical geology.

Measure: Learning Assessment Committee Summary and Assessment of 2012-13 GEO Assessment

Description of Measure (WHAT data were used to measure the outcome?): The Learning Assessment Committee (LAC) met multiple times at the beginning of the 2013 Spring Term to discuss and evaluate the 2012-13 GEO Assessment. A Committee member prepared a PowerPoint summary of the 2012-13 GEO Assessment and the LAC made recommendations to improve the assessment process that were later incorporated in to the PowerPoint.

Acceptable Target and Rationale: Improvements are made to the GEO Assessment process.

Ideal Target and Rationale: Improvements are made to the GEO Assessment process and a plan and timeline is formulated to assess all GEOs.

What steps were taken to analyze the data?: The Learning Assessment Committee evaluated the 2012-13 GEO Assessment and produced recommendations to improve the process.

Key/Responsible Personnel (WHO analyzed the data?): The Learning Assessment Committee which consists of members of faculty from each Instructional Division at the College, Classified staff, Management, and a student.

Measure: Math 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): A committee including several math instructors, the department coordinator and the division dean, with assistance from the assessment coordinator and an English instructor put the assessment together. It consists of a level-appropriate word problem and six questions designed to determine students' level of understanding of the components of the word problem and their ability to express their overall understanding of the situation. It was administered to a total of seventeen sections at the Beginning Algebra, Intermediate Algebra, Precalculus and Calculus levels. A three-person committee met regularly to construct a rubric and calibrate grading. We each scored responses from three classes and met several times to ensure we agreed on scoring. We then scored the seventeen courses individually, randomly pulling ten assessments from each section. The data resulting from this process should be reliable.

Acceptable Target and Rationale: 60% of students receiving a score of 3 or 4 would be acceptable. This number is based on responses I got when writing the Annual Assessment Report for the math department. My colleagues considered this to be an acceptable result for course-level SLOs.

Ideal Target and Rationale: 70% of students achieving a 3 or 4 would be ideal. The better they can understand and analyze word problems, the better their understanding of contextualization of math in general will be. This roughly corresponds to the college's goal of a ~70% success rate for our courses.

What steps were taken to analyze the data?: The data was entered into a spreadsheet in which the percentage of students receiving each possible score (0, 1, 2, 3, 4) was recorded for each section, for each course and the overall total of students who were scored. Mean scores were also computed for each section, for each course and for the total.

Key/Responsible Personnel (WHO analyzed the data?): Matt Henes, Mathematics instructor. The data and results were also presented and discussed during a division meeting.

Measure: Social Sciences 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): The assessment was performed across disciplines within social sciences. A single short writing assignment from each of the disciplines involved provided data for the assessment. A rubric from the Association of American Colleges and Universities was used for the assessment. This rubric broke communication down into 5 criteria, of which 3 were selected at the most measurable and appropriate for the variety of artifacts being assessed. The 3 criteria chosen were “content development,” “sources and evidence” and “syntax and mechanics.”

Acceptable Target and Rationale: An acceptable target for Social Science students is that approximately 60% of the students samples earn “capstone” (a score of 4) or the upper “milestone” (a score of 3) scores across the criteria for communication. If Social Science students met this goal they are demonstrating a proficiency in analytical writing necessary to perform well in Social Sciences courses generally and be relatively ready for transfer to a four year institution.

Ideal Target and Rationale: 70% achieving “competent” or “mastery” would be better. The committee felt that 100% would be ideal, but ultimately unattainable, so a more realistic goal of 70% was selected.

What steps were taken to analyze the data?: In the Fall of 2013, representatives of every program (department) within Social Sciences were recruited and then met as a group. The nature of the assessment activity was explained at that time with help from Matthew Jordan the Assessment Coordinator and help from Dustin Hanvey, who had previously conducted the GEO in the English department. Issues were raised regarding the difficulty of interdisciplinary assessment. The representative from the Philosophy department felt members of her department would feel that assessment by an individual untrained in that discipline would be unreliable. An argument was made that for a general assessment, it should be possible for those outside the discipline to accurately assess a GEO (which are, in any case, measured across disciplines and part of a students’ general education). The representatives of the various departments were satisfied with this argument and were asked to locate a suitable assignment from either their own class or the class of a colleague. The main criteria for a suitable assignment were that 1) it was written (the group elected to restrict the evaluation of communication to written communication) and that 2) the assignment was relatively short in length (no specific length was indicated but 2-4 pages was suggested). Student anonymity was maintained (names were removed). Unfortunately there was confusion about the ideal number of papers for the activity and the number of artifacts assessed for each subject varied widely (see recommendations for improvement below).

In early January 2013, the participating faculty met and data collected the previous semester were analyzed. The data analysis was divided into two parts. First a “norming session” was conducted. For this activity, each of the professors who had contributed artifacts explained the nature of the assignment with attention to the particular type of writing that was expected for the assignment (to compensate for any cross-disciplinary variation). Then, the professor who provided an assessment led a norming activity where the committee members each assessed an artifact and then the group discussed it. The norming activity resulted in a productive discussion of how both assessment and grading of student assignments was done by the various professors present. Without going into unnecessary detail there was a great deal of diversity in how individual professors said they graded (and what they considered important), but the norming activity was very successful quite quickly as the group as a whole was able to produce consistent scores for multiple artifacts for two different disciplines. At that point the papers were divided up between the professors, with no preference as to how the different disciplines artifacts were distributed, though there was a preference to give individual professors as many examples as possible of the same assignment (thus they would be evaluate multiple artifacts from the same programs’ assessment). This was a concern due to the small sample size for some of the programs.

Key/Responsible Personnel (WHO analyzed the data?): Derek Milne (Assistant Professor of Anthropology and History) oversaw the assessment activity. Individual faculty from Economics, Philosophy, Political Science, History, Child Development, Psychology joined Milne (who represented Anthropology). The representative from one discipline within Social Sciences (Sociology) was unable to participate in the assessment activity due to scheduling conflicts. Several of those who were able to participate (Economics and Child Development) did not provide an artifact for assessment but nevertheless participated in the assessment activity. While managing a large group of faculty for the assessment was difficult, we did feel that the division’s methods ultimately led a significant number of faculty to be involved in the process, with at least one representative from all programs involved in some or all parts of the process (in some other divisions a smaller number or even a single individual was responsible for conducting the assessment). We believe that having individuals within each program participate will make the assessment process easier in the future. The faculty participants submitted scores for each report marked on scantron forms. Matthew Jordan oversaw the tabulation and compilation of the data on the scantron forms. This data was then returned to Derek Milne who, with some assistance from the Assessment Committee, analyzed the data as it is presented here. Additional information is provided in the “steps to analyze the data section” above.

Measure: Speech 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): A formal, full sentence, research-based outline is required to accompany the Informative Speech in our Speech 1 courses. This outline becomes the basis for the oral presentation. 30 outlines were assessed to examine organization, language, supporting material and central message.

For FALL 2012, PCC offered 43 sections of Speech 1. 10 section numbers were randomly selected and the instructors for these sections, which included both full-time and part-time instructors, were given the following directions:
“Make a copy of the outline for the informative speech prepared by every 4th student on your roster. Please mark out the name of the student.”
53 outlines were collected and 30 outlines were randomly selected from this group. 4 full-time faculty members participated in a norming session and scored each of the 30 outlines with a common rubric. The data collected is considered valid and reliable.

Acceptable Target and Rationale: An acceptable result would be for the average score of each section to be 2.5. This would indicate that the skill sets shown in the outline meet expectations and are moving beyond an “adequate” score and illustrate progression to a higher skill set.

Ideal Target and Rationale: An ideal result would be for the average score of each section to be 3.0 or higher. This score clearly meets expectations and would illustrate a higher skill set, understanding of each component, and an acceptable level of rigor in all classrooms while considering that this assignment occurs within the first third of the semester.

What steps were taken to analyze the data?: Four faculty members scored each outline independently and then met to discuss the results. Norming occurred during the process to ensure that each person scoring was looking at the GEO ad rubric in similar ways.
Was the assessment analyzed by an individual or a group? Who was involved?

The assessment was analyzed by a group. The creation of the assessment was discussed at a department meeting. The following were present for that meeting:

Cindy Phu, Rita Gonzales, AC Panella, Stephanie Fleming, Mark Whitworth, Joshua Fleming, Dolores Avila and James Arnwine.

The scoring was performed by Rita Gonzales, Stephanie Fleming, Cindy Phu and AC Panella.

Key/Responsible Personnel (WHO analyzed the data?): Initial analysis of the results was performed by Rita Gonzales, Stephanie Fleming, Joshua Fleming, Cindy Phu and AC Panella.

Further discussion is planned for a March 19 department meeting.

Review Findings and Recommendations

Finding per Measure

Category I. Student Success and Achievement

Component A. Student Success and Retention

General Education Outcomes are assessed and the results are used

Measure: Biology 2012-13 GEO #1: Communication Assessment Documentation

for improvement

Description of Measure (WHAT data were used to measure the outcome?): We assessed students enrolled in Biology 11, General Biology for non-majors. Full-time faculty members were asked to randomly select five Crime Scene lab assignments from each of their sections. Faculty met to discuss and create a rubric to assess the students' demonstrated ability to communicate through an in-class, graded writing assignment.

Acceptable Target and Rationale: An acceptable result of the assessment is that two-thirds of the students earn scores of "competence."

Ideal Target and Rationale: An ideal target is that 80% of the students meet the acceptable score.

What steps were taken to analyze the data?: Susan Bower and Lisa Ciletti assessed the assignments from seven lab sections.

Key/Responsible Personnel (WHO analyzed the data?): Susan Bower, Janet Chen and Lisa Ciletti participated in the discussion. The other faculty to be included in future assessments: Joe Conner and Deb Folsom.

Findings for Biology 2012-13 GEO #1: Communication Assessment Documentation

Summary of Findings: By comparison to the average of the BIOL/CHEM/GEOL lab report averages, the BIOL 11 assessments fell slightly below the others for 1.3 Genre Disciplinary Conventions and 1.5 Control of Syntax and Mechanics. For the other three assessments, the BIOL 11 scores were at or above those for the rest of college, as well as for the rest of the Natural Sciences Division. From the processed data, it is not clear as to the percentage of students who scored values of above 2 (Competence).

By comparison to the average of the BIOL/CHEM/GEOL lab report averages, the BIOL 11 assessments fell slightly below the others for 1.3 Genre Disciplinary Conventions and 1.5 Control of Syntax and Mechanics. BIOL 11 enrolls many students who self-identify as ESL learners. Many of these students earn outstanding scores on multiple choice exams, but struggle to pass quizzes that require the students to read a question and compose a written response. Some of these students have expressed a concern about possessing limited English writing skills.

Recommendations for Improvement: We plan to improve our students' performance through a modification of our current pedagogy. We will continue to balance our assessment of BIOL 11 students using multiple choice exams, as well as short answer and essay exams, quizzes or assignments. We will make an effort to emphasize the importance of written communication by continuing to provide lab assignments which require an in-class written response. We currently assign only one formal lab report (which is prepared by students outside of class time). As a means of improving students' Genre and Disciplinary Conventions and Control of Syntax and Mechanics skills and awareness of those skills, we plan to make use of peer editing for this lab assignment. Each student will be asked to submit three copies of her/his lab report; one will be reviewed by the lab instructor; the other two will be provided anonymously (identified only by an ID number) by the lab instructor to two classmates. These two students will be instructed to comment on each paper they are provided (for content, syntax, mechanics, etc.). After the lab reports are evaluated, the comments on the papers will be returned to the authors for examination, and the lab report can then be edited for a second grade. The intension is to provide students an opportunity to improve their written communication through input from their classmates. If this approach appears to improve the quality of the written product that our students are generating, we have discussed adding another formal written assignment to our curriculum. That addition is slated for introduction for Fall 2013 in the Biology 11 classes.

Reflections/Notes : The process was smooth, but we would like to modify our approach to assessment this semester. We will try to randomly sample students in more Biology 11 sections, assessing fewer students for each section. The writing assignment that we used appears to be appropriate. The assessment is manageable and appears to be reproducible. The data are easy to process. This semester we will evaluate the percentage of students who have earned the "competence" rubric level or higher. We may also assess the writing assignments prior to conducting the peer evaluations, as well as afterward so that we have a tool for comparison.

Substantiating Evidence:

- AAC&U Written Communication Value Rubric (Microsoft Word) (See appendix)
- BIOL11 2012-13 GEO #1: Communication Assessment Data (JPEG (Image)) (See appendix)

Natural Science Averages 2012-13 GEO #1: Communication Assessment Data (JPEG (Image)) (See appendix)

Measure: Chemistry 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): The assessment was performed in our Chemistry 1A program. Chem 1A is the first semester of general college chemistry for science and engineering majors and is a GE course at PCC. Students in Chem 1A write one formal laboratory write-up each semester (due mid-semester) which includes organization and presentation of data, graphical analysis of results, and a lengthy written analysis and discussion of the data and results in the Conclusion section of the report. The Conclusion section of the formal laboratory write-up was assessed using the AACU Written Communication Value Rubric for 31 students in 3 separate Chemistry 1A courses enrolled for the Spring 2012 semester.

Acceptable Target and Rationale: An acceptable target for our Chem 1A students is that at least two-thirds of our students earn “competent” scores. If our Chem 1A students met this goal they are demonstrating a proficiency in scientific writing necessary for them to progress to more advanced chemistry courses where formal laboratory write-ups are required for each experiment performed.

Ideal Target and Rationale: An ideal goal would be for 80% of Chem 1A students to meet the acceptable score. This goal is in keeping with the target passing rate set for PCC campus.

What steps were taken to analyze the data?: In June 2012, Debra Wood (Assistant Professor of Chemistry) analyzed the Conclusion section of all 31 laboratory reports using the AACU Written Communication Value Rubric. The reports were scored for each of the 5 fundamental criteria listed on the Rubric using a 0 to 4 scale. The scores were marked on scantron forms which were give to Matthew Jordan for tabulation and summary.

Key/Responsible Personnel (WHO analyzed the data?): Debra Wood (Assistant Professor of Chemistry) assessed all of the laboratory reports and submitted scores for each report marked on scantron forms. Matthew Jordan oversaw the tabulation and compilation of the data on the scantron forms.

Findings for Chemistry 2012-13 GEO #1: Communication Assessment Documentation

Summary of Findings: The following is a summary of the average score (out of a possible 4) for each of the 5 fundamental criteria listed on the AACU Written Communication Value Rubric:

Context & Purpose: 2.58
Content Development: 1.97
Disciplinary Conventions: 2.23
Sources & Evidence: 1.94
Syntax & Mechanics: 2.23

The summary data indicates that the “Acceptable Target “ is closest to being reached is in the area of Context and Purpose. The average scores hover slightly above and slightly below a score of 2 for the remaining 4 criteria, indicating that our students are just on the cusp of basic competency in writing and not at the level of proficiency we hope for in writing scientific reports, especially in their ability to explore and develop major ideas and to use data and observations to support scientific arguments and conclusions.

It should also be noted that chemistry students posted the lowest scores in the Natural Sciences Division on the GEO communication assessment relative to biology and geology students. This result is not a surprise. Many of our Chem 1A students are ESL students who chose to enroll in Chem 1A before their language skills are adequate for the course. They are often successful in the course because of their strong math/science skills, although there are clear, observable weaknesses in their ability to communicate scientific concepts in both written and verbal form.

Although more data is required to fully justify the statement of “Approaching”, it must always be our goal to make forward progress toward our goals until we have realized them. The information listed in the “Recommendations” section below explains the new strategies being implemented by PCC Chemistry faculty to improve the writing abilities of our students.

Results: Acceptable Target Achievement: Not Met; Ideal Target Achievement : Approaching

Recommendations for Improvement: Performing the GEO Communication assessment in the chemistry department has led to several important improvements in our instructional program. First, the chemistry faculty discovered (to our surprise) that although communication of scientific information is a critical skill our students need to learn, we did not have a course SLO that specifically stated this objective. We do now. The chemistry faculty unanimously approved and added “Demonstrate competency in scientific writing” as an SLO to all our courses and is now on our syllabi.

Secondly, chemistry faculty have implement several different strategies to improve the writing abilities of our students. The thrust of all these strategies is simply put: We need to require our students to do more writing in our courses if we want to grow them into better scientific writers. This is a new and recent expansion upon the traditional course emphasis of mathematical problem-solving using dimensional analysis and a fill-in-the blank/short answer approach to laboratory write-ups that rarely give students an opportunity to practice developing a chemical concept at length in written form.

A group of faculty is experimenting with “Inquiry-Based Learning” and is piloting several new Chemistry 1A lab experiments that require students to develop their own laboratory procedure to answer a scientific question (with guideline support) and write a report presenting their procedure, observations, data, and conclusions. Other faculty are taking the traditional formal write-up experiment performed in Chemistry 1A and developing a new set of guidelines and instructions to better instruct students on how to present data, create graphs, and discuss and defend scientific arguments and conclusions.

Recognizing that good writing requires mastering the “art of re-writing” several faculty have implemented projects that require students to submit revisions of the work they have done. One faculty member is requiring multiple re-writes of a laboratory experiment. Another faculty member is requiring students to write a letter to an elected official on the issue of Global Warming. Students are in peer edit groups (composed of 3 students) where they will read each other’s letters and make editorial corrections that are incorporated along with the instructor’s comments into the final rewritten letter that will be mailed to the official.

Another faculty member is providing his introductory chemistry students (Chemistry 22) the opportunity to practice their writing skills through TED talks. TED (Technology, Entertainment Design) talks are short presentations by individuals on the cutting edge of their respective fields. The website www.TED.com has a large selection of presentations for the students to choose from. Student are assigned 7 TED talks to watch and are asked to write a 1-2 page summary of the presentation, highlighting the main points, including a paragraph or two discussing how they personally benefited from listening to the presentation. The instructor is able to observe how well a student’s writing ability is progressing as he assesses the TED reports turned in by the student through the semester.

Reflections/Notes : Assessment techniques, like writing skills, improve with practice. The Chemistry Communication GEO assessment that this report summarizes could have benefited from a larger sampling of students from more of our Chem 1A courses. It also would be advisable to have more than one faculty member doing the evaluation and scoring of the reports.

The benefits of the assessment process are observable in the Chemistry department. Faculty are strategically acting to improve student’s writing skills in new and exciting ways. We are learning what works, and what does not work, and sharing those ideas with each other.

Substantiating Evidence:

- AAC&U Written Communication Value Rubric (Microsoft Word) (See appendix)
- CHEM1A 2012-13 GEO #1: Communication Assessment Data (JPEG (Image)) (See appendix)
- Improvement Example: Letter to Representative with Instructor and Peer Review (Adobe Acrobat Document) (See appendix)
- Improvement Example: Modified Assessment to Include More Writing (Adobe Acrobat Document) (See appendix)
- Improvement Example: New "TED Talk Write Up" To Increase Writing (Adobe Acrobat Document) (See appendix)
- Improvement Example: Revised Assignment Prompt (Adobe Acrobat Document) (See appendix)

Improvement Example: Revision Process of Lab Reports (Adobe Acrobat Document) (See appendix)
Natural Science Averages 2012-13 GEO #1: Communication Assessment Data (JPEG (Image)) (See appendix)

Measure: English 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): The class that we agreed as a Division to assess was English 1A, our core composition course. Faculty teaching 1A were asked to randomly select five argumentative essays from the second half of the course. A small committee of experienced graders met and created a rubric to score the ability of students to formulate and defend a thesis. We then scored model essays on that rubric. A larger group of faculty double scored all the seventy essays we received on that rubric. Any discrepancies were resolved by one of the original committee. As a member of that committee, I believe the data is valid and reliable.

Acceptable Target and Rationale: An acceptable result of the assessment would be that two thirds of the students scored at the level of “acceptable” thesis formation. The essays were collected near the end of the term, so one would expect that a supermajority of them would be able to formulate an adequate thesis by that point of the term, assuming that they would need to do so to pass the course. Unfortunately, we did not meet this result in this initial assessment.

Ideal Target and Rationale: An ideal target would be 80% of students meeting the acceptable score. This ideal would mean that the Division is exceeding our target passing rate set in the campus Educational Master Plan for 2015.

What steps were taken to analyze the data?: In May, I, Dustin Hanvey, collected the results and turned them in to the IPRO office. In October, Crystal Kollross aggregated the data and created a chart that we could then analyze as a Division. The initial assessment was made by the norming committee. The results were also discussed with our Dean.

Key/Responsible Personnel (WHO analyzed the data?): The assessment was analyzed on two occasions, once at a Division retreat attended by about 30-40 Division members and second at a Composition Committee meeting. Both meetings included our Dean, Amy Ulmer.

Findings for English 2012-13 GEO #1: Communication Assessment Documentation

Summary of Findings: The result, in which just about half of our students met the “acceptable” score were disappointing to all of us. Some questioned the method of the assessment—could we really accurately grade assignments of various types? Did we need a common assessment? We discussed the possibility that the results show we need to rethink the teaching of thesis formation in English 1A. We discussed as well the ways in which we can make the course more rigorous to help more students meet the standard. We all agreed that we need to repeat the assessment to see if we can see a trend, year to year, perhaps with more items being tested, including grammar, use of examples, and MLA.

Recommendations for Improvement: Based on the results of the study of our students' ability to create and support a thesis, the English Division has decided to form a committee that will study the possibility of creating Stretch Composition for our Division. This program, led by professors Elsie Rivas-Gomez and Kirsten Ogden, will hold "boot camps" during the Summer of 2013, during which faculty will discuss this new program, study models of Cal States that have already instituted Stretch like CSUN and CSUSB, and train faculty to pilot this program at PCC. At least ten sections will be piloted in Fall 2013 for possible expansion in the following year. The goal of the program is to embed basic skills into college level composition, allow students directed self-placement, and create cohorts in which students and faculty support each other in achieving college level skills during the first year enrolled on campus. The ulitmate hope is to increase the amount of successful completion of our program, especially for traditionally disadvantaged students of color.

Reflections/Notes :

Substantiating Evidence:

AAC&U Written Communication Value Rubric (Microsoft Word) (See appendix)
ENGL1A 2012-13 GEO #1: Communication Assessment Data (JPEG (Image)) (See appendix)

Information about the English Stretch Program (Web Link)
http://pccstretch.wordpress.com/

Measure: Foreign Languages 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): The Foreign Language Department formed a committee to create a common assessment tool to be administered to at least one section of each level one course taught by the full-time professors. Thus the committee consisted of full-time professors from Chinese, French, German, Italian, Japanese and Spanish. The majority, but not all, of the professors taught the level one, introductory course that semester.

The assessment consisted of a reading selection in the target language followed by ten true or false questions written in English to assess reading comprehension. The selection was composed in English and translated into the target language by the committee members. The committee members exchanged email to determine what topics could be covered in the selection and met various times to compose the selection. The committee members also created a rubric. Norming was quick and easy because the correct answers to the True and False questions in English were evident to all of us, no matter what language we taught.

Acceptable Target and Rationale: An acceptable result of the assessment would be that 70% of our students score at 1 (60%) or above. If equated with grade point averages, we would like the vast majority of our students to receive a minimum grade of D (barely passing) or better.

Ideal Target and Rationale: An ideal result would be that 70% of our students score a 2 or better. If though of in terms of letter grades, a supermajority of our students would be able to continue on to level two of the language with a grade of C (70%) and above.

What steps were taken to analyze the data?: The assessment was administered during the week of May 14 – 18 and the committee met the next week to score the tool. At that time we entered the scores onto ScanTron sheets provided by Matt Jordan, and the next semester we were given data sheets with the results from each language.

Key/Responsible Personnel (WHO analyzed the data?): An interdisciplinary group of faculty from each of the Foreign Languages that participated in the assessment.

Findings for Foreign Languages 2012-13 GEO #1: Communication Assessment Documentation

Summary of Findings: Over 250 students participated in the assessment. The average scores provided to us on a 4 point scale were as follows:

Chinese 3.62
French 3.64
German 3.83
Italian 3.52
Japanese 3.56
Spanish 3.94

Results: Acceptable Target Achievement: Exceeded; Ideal Target Achievement : Exceeded

Recommendations for Improvement: Student performance on the assessment for reading comprehension was outstanding. At this time we are not recommending any changes to curriculum, pedagogy or student and faculty support based on this assessment.

Reflections/Notes : One of the goals of the assessment process was for the professors to collaborate and communicate across the different languages. That goal was fully met for all the professors worked seriously, conscientiously and extremely well together. We came unanimously to the conclusion, however, that because of the inherent differences in the languages we teach it would be better for each language to assess reading comprehension on its own. That way we could tailor the reading selection to the grammar and vocabulary points covered in each language, rather than compose a common assessment tool that, in some cases was too general.

Substantiating Evidence:

Foreign Languages 2012-13 GEO #1: Communication Assessment Data (JPEG (Image)) (See appendix)

Measure: Geology 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): Faculty assessed written explanation of Theory of Plate Tectonics as an essay question incorporated into a midterm examination given near the end of the semester. The question is as follows: "Describe plate tectonics to someone who has a high school education but has never studied the process. You should include a few basic definitions and descriptions. You need not discuss fracture zones nor hot spots, but otherwise be thorough. Do not include diagrams. Use the back of this page as well as the front if necessary (20 points)."
Students were assessed by the AACU Written Communication Rubric. Only one faculty member (the author) participated in the assessment, as of those full-time faculty that teach Geol 1, one was away on sabbatical, and another was teaching a full complement of Geol 3 courses.

Acceptable Target and Rationale: For an “acceptable” result students were to name and explain the dynamics of the three major types of plate boundaries, using appropriate scientific vocabulary and defining key terms. Achieving an acceptable result with the prompt is somewhat challenging in that asking for these concepts to be included in the answer answers the question for the students and eliminates the challenge. In this regard, classroom discussions, lectures, and reading clarified the mechanics of plate tectonics in the days prior to the exam, and prepared students to answer this question despite the generalized prompt. That is to say a simple reading of the prompt would likely not lead to these expectations unless one took the class. Admittedly this is an area for improvement in the writing of the prompt. Also, the rubric was not tailored to score for this particular result, in which case the rubric needs to be altered for use in geology courses.

Ideal Target and Rationale: “Ideal” results included the above in addition to a discussion of mantle convection, layering of the Earth and dynamics of these layers, and how friction between the lithosphere and asthenosphere serves to cause plate motion. Again, asking for this in the prompt readily provides the answer, and the question was designed to allow students to communicate what they understand of the process. After giving the assessment, it appears as if the prompt and rubric need to be rewritten in a manner that allows well-prepared students to earn “ideal” results that are assessed accordingly without being vague in any way. Because of conflicting schedules, I was the only full time professor available for giving this assessment during the spring 2012 semester, but I have since shared the question with my geosciences colleagues, and we are currently revising the question and the syllabus accordingly.

What steps were taken to analyze the data?: : Students in two classes (64 total) were given the assessment as part of a midterm exam at the end of the semester. All students were graded according to the AACU Written Communication Rubric, as were my colleagues across the Natural Sciences Division. Student scores were entered into eLumen and graphs of the data were delivered to me, and are included below. The greatest shortcoming in data collection and analysis is that there was no possibility of a normalizing session as I was the only available geosciences instructor for the assessment. Despite that it appears geosciences students achieve similar results to the rest of the Natural Sciences students. The results “look” different at a glance, but the y-axis is calibrated differently on the graphs of Geosciences students and Natural Sciences students (included below).

Key/Responsible Personnel (WHO analyzed the data?): I (Bryan Wilbur) am the key and sole participant in the Geosciences as sabbatical schedules during the spring of 2012 shifted class assignments to the point that I was the only full time geology professor teaching physical geology.

Findings for Geology 2012-13 GEO #1: Communication Assessment Documentation

Summary of Findings: 33.8% of students scored better than 80% on the rubric scores, and 75.0% of students scored better than 60% on rubric scores. Of the 25% of students that scored below 60%, one did not participate (left the exam question blank). These scores translate to between an overall 2.5 and 3.0 in all categories of assessment, placing the class overall in the mid to low-mid “benchmark” categorization. Students scored lowest in syntax and mechanics, which might be understandable in that this is a science class and students may have thus ignored some typical writing conventions stressed as part of the curriculum in other courses that stress writing skills. This may also be a by-product of what may be an overly vague prompt.

Recommendations for Improvement: The rubric for grading this assessment needs to

be tailored a bit more to the parameters of this particular assignment, or I need to write an assessment that more accurately reflects the communications skills rubric used for this assignment. The lowest scores were in “Syntax and mechanics” which is consistent with other natural sciences courses.
It was suggested by Natural Sciences faculty that across the Natural Sciences faculty should incorporate a written component to the Student Learning Objectives for each course, considering these are part of the SLOs for the AA degree. We are currently revising the Geology 1 SLO number three to "Evaluate the logic, validity and relevance of information in assessing evidence in plate tectonic theory and the evolution of Earth" with the addition of a writing component. Furthermore, additional assessments must be carried out by multiple faculty members. The essay remains the most expansive method for evaluation competence regarding tectonics, as it allows students to explain and draw connections between different plate boundaries. This can be assessed via lab exercises, but is best assessed via essay, thus the opportunity to incorporate the writing/communication requirement.

SLOs for Geology 1 are currently under revision to:
1. Comprehend, interpret and analyze written, oral and graphical information in applying the scientific method to problems in natural science.
2. Differentiate among the major rock forming minerals through recognition of major physical properties.
3. Identify the three main rock types (igneous, metamorphic and sedimentary rocks) and place the processes of their formation in the context of the rock cycle and the plate tectonics model.
4. Draw appropriate conclusions from the application of scientific principles to evaluate likelihood of future geological hazards based upon current and historical analytical data/observations.
5. Evaluate the logic, validity and relevance of information in assessing evidence in plate tectonic theory and the evolution of Earth

Reflections/Notes :

Substantiating Evidence:

- AAC&U Written Communication Value Rubric (Microsoft Word) (See appendix)
- Geology 2012-13 GEO #1: Communication Assessment Data (JPEG (Image)) (See appendix)
- Natural Science Averages 2012-13 GEO #1: Communication Assessment Data (JPEG (Image)) (See appendix)

Measure: Learning Assessment Committee Summary and Assessment of 2012-13 GEO Assessment

Description of Measure (WHAT data were used to measure the outcome?): The Learning Assessment Committee (LAC) met multiple times at the beginning of the 2013 Spring Term to discuss and evaluate the 2012-13 GEO Assessment. A Committee member prepared a PowerPoint summary of the 2012-13 GEO Assessment and the LAC made recommendations to improve the assessment process that were later incorporated in to the PowerPoint.

Acceptable Target and Rationale: Improvements are made to the GEO Assessment process.

Ideal Target and Rationale: Improvements are made to the GEO Assessment process and a plan and timeline is formulated to assess all GEOs.

What steps were taken to analyze the data?: The Learning Assessment Committee evaluated the 2012-13 GEO Assessment and produced recommendations to improve the process.

Key/Responsible Personnel (WHO analyzed the data?): The Learning Assessment Committee which consists of members of faculty from each Instructional Division at the College, Classified staff, Management, and a student.

Findings for Learning Assessment Committee Summary and Assessment of 2012-13 GEO Assessment

Summary of Findings: The Learning Assessment Committee agreed that the initial General Education Outcomes Assessment that looked at student performance on GEO #1: Communication was a significant step forward for the College. Departments that taught high impact General Education courses developed and administered assessments and are in process of using the results for improvement.

Results: Acceptable Target Achievement: Met; Ideal Target Achievement : Approaching

Recommendations for Improvement: 1. Use online resources to conduct a more thorough sample.
2. Consider evaluating improvement (value added).
3. Isolate variables for more rich data (language level of student, time of day class meets, etc.).
4. Agree about when to administer assessments (before or after "W" data, Midterm or later, etc.).
5. Assess multiple rubric criteria for each competency.
6. Increase efforts to ensure a valid sample.
7. Align all course level SLOs to the GEOs (where appropriate), so that this data can be harnessed through eLumen and be used for triangulation with the stand-along GEO assessments conducted here.
8. Create a cycle for continuing GEO Assessment that includes (for each GEO): one semester for developing assessment tools, one semester for administering the assessments, and one semester for analyzing the data and making recommendations.
9. Involve more courses, faculty, and departments in the GEO Assessments.

Reflections/Notes : Developing and administering PCC's first General Education Outcomes Assessment focusing on Communication was a learning experience for the many who were involved in the process. We identified many opportunities for improvement in the process that are listed in our recommendations for improvement. Overall, the process was very productive as faculty from across disciplines came together to examine data on student performance in communication. Some of the departments identified high levels of student success, while other identified areas for improvement and are the process of implementing the improvements.

Substantiating Evidence:

- GEO 2012-13 Assessment Protocol (Microsoft Word) (See appendix)
- GEOs and Philosophy of General Education (Word Document (Open XML)) (See appendix)
- Summary of 2012-13 GEO #1: Communication Assessment with LAC Recommendations for Improvements to the Process (PowerPoint Presentation (Open XML)) (See appendix)

Measure: Math 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): A committee including several math instructors, the department coordinator and the division dean, with assistance from the assessment coordinator and an English instructor put the assessment together. It consists of a level-appropriate word problem and six questions designed to determine students' level of understanding of the components of the word problem and their ability to express their overall understanding of the situation. It was administered to a total of seventeen sections at the Beginning Algebra, Intermediate Algebra, Precalculus and Calculus levels. A three-person committee met regularly to construct a rubric and calibrate grading. We each scored responses from three classes and met several times to ensure we agreed on scoring. We then scored the seventeen courses individually, randomly pulling ten assessments from each section. The data resulting from this process should be reliable.

Acceptable Target and Rationale: 60% of students receiving a score of 3 or 4 would be acceptable. This number is based on responses I got when writing the Annual Assessment Report for the math department. My colleagues considered this to be an acceptable result for course-level SLOs.

Ideal Target and Rationale: 70% of students achieving a 3 or 4 would be ideal. The better they can understand and analyze word problems, the better their understanding of contextualization of math in general will be. This roughly corresponds to the college's goal of a ~70% success rate for our courses.

What steps were taken to analyze the data?: The data was entered into a spreadsheet in which the percentage of students receiving each possible score (0, 1, 2, 3, 4) was recorded for each section, for each course and the overall total of students who were scored. Mean scores were also computed for each section, for each course and for the total.

Key/Responsible Personnel (WHO analyzed the data?): Matt Henes, Mathematics instructor. The data and results were also presented and discussed during a division meeting.

Findings for Math 2012-13 GEO #1: Communication Assessment Documentation

Summary of Findings: In the case of Math 125 and 131, the results are consistent with expected skill levels. The same word problem was used for both classes, and overall, Math 131 students scored higher than Math 125 students, with 65% and 53%, respectively, scoring at least 3, and mean scores of 2.85 and 2.48, respectively. 55% of Math 7A students and 50% of Math 5A students scored at least 3, with mean scores of 2.70 and 2.40, respectively. (Different word problems were used for the 7A and 5A assessments.) In most of the assessed sections, fewer than 20% of students scored 1.

Math 125: Section=4, Mean=2.48, % scoring 3 or 4=53%
Math 131: Section=4, Mean=2.85, % scoring 3 or 4=65%
Math 7A: Section=4, Mean=2.70, % scoring 3 or 4=55%
Math 5A: Section=5, Mean=2.40, % scoring 3 or 4=50%

Recommendations for Improvement: An Action Research Project will be conducted to determine whether asking students to identify relevant information from word problems improves their performance. Based on the tool we have developed, I have changed how I teach word problems in my Math 125 and 131 classes; so have Jorge Encinas and Jens Kristen, the two other faculty members that scored students' work. A Faculty Inquiry group consisting of Math 125 and Math 131 instructors who assessed the GEO met, and their recommendations are to inform part-and full-time faculty that this GEO will be assessed, distribute to them sample word problems and the rubric that will be used to assess the GEO in future terms, conduct workshops for students on solving word problems, and include in the Instructor Information Packet that we give to instructors examples of questions we use in our own classes to determine students' reading comprehension ability. We hope that we can compare our techniques and determine which seem to yield higher success in solving word problems overall. Similar inquiry groups will be formed to discuss the results from the Math 7A and Math 5A courses.

Reflections/Notes : In my opinion, the scoring process, the norming process and the assessment tool itself were all good. One way this could be improved, though, would be to select different word problems for the 7A and 5A levels. They just weren't well-suited for the information that was asked. The data and results were presented and discussed during a division meeting; plans for how to use the results are still being considered.

Substantiating Evidence:

- Math 2012-13 GEO Assessment Rubric (Word Document (Open XML)) (See appendix)
- Math 2012-13 GEO Assessment Student Samples (Word Document (Open XML)) (See appendix)

Measure: Social Sciences 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): The assessment was performed across disciplines within social sciences. A single short writing assignment from each of the disciplines involved provided data for the assessment. A rubric from the Association of American Colleges and Universities was used for the assessment. This rubric broke communication down into 5 criteria, of which 3 were selected at the most measurable and appropriate for the variety of artifacts being assessed. The 3 criteria chosen were "content development," "sources and evidence" and "syntax and mechanics."

Acceptable Target and Rationale: An acceptable target for Social Science students is that approximately 60% of the students samples earn "capstone" (a score of 4) or the upper "milestone" (a score of 3) scores across the criteria for communication. If Social Science students met this goal they are demonstrating a proficiency in analytical writing necessary to perform well in Social Sciences courses generally and be relatively ready for transfer to a four year institution.

Ideal Target and Rationale: 70% achieving "competent" or "mastery" would be better. The committee felt that 100% would be ideal, but ultimately unattainable, so a more realistic goal of 70% was selected.

What steps were taken to analyze the data?: In the Fall of 2013, representatives of every program (department) within Social Sciences were recruited and then met as a group. The nature of the assessment activity was explained at that time with help from Matthew Jordan the Assessment Coordinator and help from Dustin Hanvey, who had previously conducted the GEO in the English department. Issues were raised regarding the difficulty of interdisciplinary assessment. The representative from the Philosophy department felt members of her department would feel that assessment by an individual untrained in that discipline would be unreliable. An argument was made that for a general assessment, it should be possible for those outside the discipline to accurately assess a GEO (which are, in any case, measured across disciplines and part of a students' general education). The representatives of the various departments were satisfied with this argument and were asked to locate a suitable assignment from either their own class or the class of a colleague. The main criteria for a suitable assignment were that 1) it was written (the group elected to restrict the evaluation of communication to written communication) and that 2) the assignment was relatively short in length (no specific length was indicated but 2-4 pages was suggested). Student anonymity was maintained (names were removed). Unfortunately there was confusion about the ideal number of papers for the activity and the number of artifacts assessed for each subject varied widely (see recommendations for improvement below).

In early January 2013, the participating faculty met and data collected the previous semester were analyzed. The data analysis was divided into two parts. First a "norming session" was conducted. For this activity, each of the professors who had contributed artifacts explained the nature of the assignment with attention to the particular type of writing that was expected for the assignment (to compensate for any cross-disciplinary variation). Then, the professor who provided an assessment led a norming activity where the committee members each assessed an artifact and then the group discussed it. The norming activity resulted in a productive discussion of how both assessment and grading of student assignments was done by the various professors present. Without going into unnecessary detail there was a great deal of diversity in how individual professors said they graded (and what they considered important), but the norming activity was very successful quite quickly as the group as a whole was able to produce consistent scores for multiple artifacts for two different disciplines. At that point the papers were divided up between the professors, with no preference as to how the different disciplines artifacts were distributed, though there was a preference to give individual professors as many examples as possible of the same assignment (thus they would be evaluate multiple artifacts from the same programs' assessment). This was a concern due to the small sample size for some of the programs.

Key/Responsible Personnel (WHO analyzed the data?): Derek Milne (Assistant Professor of Anthropology and History) oversaw the assessment activity. Individual faculty from Economics, Philosophy, Political Science, History, Child Development, Psychology joined Milne (who represented Anthropology). The representative from one discipline within Social Sciences (Sociology) was unable to participate in the assessment activity due to scheduling conflicts. Several of those who were able to participate (Economics and Child Development) did not provide an artifact for assessment but nevertheless participated in the assessment activity. While managing a large group of faculty for the assessment was difficult, we did feel that the division's methods ultimately led a significant number of faculty to be involved in the process, with at least one representative from all programs involved in some or all parts of the process (in some other divisions a smaller number or even a single individual was responsible for conducting the assessment). We believe that having individuals within each program participate will make the assessment process easier in the future. The faculty participants submitted scores for each report marked on scantron forms. Matthew Jordan oversaw the tabulation and compilation of the data on the scantron forms. This data was then returned to Derek Milne who, with some assistance from the Assessment Committee, analyzed the data as it is presented here. Additional information is provided in the "steps to analyze the data section" above.

Findings for Social Sciences 2012-13 GEO #1: Communication Assessment Documentation

Summary of Findings: The following is a summary of the average score (out of a possible 4) for each of the 3 fundamental criteria listed on the AACU Written Communication Value Rubric for Social Sciences as a whole.

Anthro 1
Content development: 3.18
Sources and evidence: 2.88
Syntax and mechanics: 2.82
Average for all three: 2.96
Number of students: 17

Hist 7a
Content development: 3.10
Sources and evidence: 3.10
Syntax and mechanics: 2.80
Average for all three: 3.00

Number of students: 10

Philo 25
Content development: 3.35
Sources and evidence: 3.45
Syntax and mechanics: 3.04
Average for all three: 3.28
Number of students: 23

PolSci 6 2.75 2.88 2.13 2.59 8
Content development: 2.75
Sources and evidence: 2.88
Syntax and mechanics: 2.13
Average for all three: 2.59
Number of students: 8

Psych1
Content development: 2.73
Sources and evidence: 2.45
Syntax and mechanics: 2.27
Average for all three: 2.48
Number of students: 11

SOC SCI AVG 3.02 2.95 2.61 2.86 69
Content development: 3.02
Sources and evidence: 2.95
Syntax and mechanics: 2.61
Average for all three: 2.86
Number of students: 69

Acceptable Target Achievement: The data across the various disciplines follows a general pattern where “content development” and “sources and evidence” were both generally stronger than “syntax and mechanics.” Several of the professors involved in the assessment believed that this was due to a lack of an English or even advanced ESL requirement for students to enroll in Social Science classes. While several professors were clear that they did not emphasize grammar (“syntax and mechanics” as it was called in the rubric) in their grading of a students’ communication, the majority of the committee felt this was important. Those against such emphasis argued that there was no time to adequately grade and correct student errors or more importantly, fundamentally improve student competence in this area.

The summary data indicates that the “Acceptable Target “ is closest to being reached is in the area of “content development,” though “sources and evidence is comparable in virtually all departments. The average scores for these variables ranges from 2.45 to 3.45, indicating some interdisciplinary variation but an overall strength in these areas. Discussions with participating faculty suggested the variance across subjects might reflect the relative importance of the assignment in the curriculum of each course. It was clear that some of the assignment artifacts were more casual writing assignments while some were the culmination of greater instruction, focus and value vis-à-vis student grades. The diversity of courses across programs in a discipline like Social Sciences might very well have made controlling for this in the assessment activity itself more difficult.

Acceptable Target Achievement: The data across the various disciplines follows a general pattern where “content development” and “sources and evidence” were both generally stronger than “syntax and mechanics.” Several of the professors involved in the assessment believed that this was due to a lack of an English or even advanced ESL requirement for students to enroll in Social Science classes. While several professors were clear that they did not emphasize grammar (“syntax and mechanics” as it was called in the rubric) in their grading of a students’ communication, the majority of the committee felt this was important. Those against such emphasis argued that there was no time to adequately grade and correct student errors or more importantly, fundamentally improve student competence in this area.

The summary data indicates that the “Acceptable Target “ is closest to being reached is in the area of “content development,” though “sources and evidence is comparable in virtually all departments. The average scores for these variables ranges from 2.45 to 3.45, indicating some interdisciplinary variation but an overall strength in these areas. Discussions with participating faculty suggested the variance across subjects might reflect the relative importance of the assignment in the curriculum of each course. It was clear that some of the assignment artifacts were more casual writing assignments while some were the culmination of greater instruction, focus and value vis-à-vis student grades. The

diversity of courses across programs in a discipline like Social Sciences might very well have made controlling for this in the assessment activity itself more difficult.

Recommendations for Improvement: Many possible improvements in the assessment process occurred to the faculty both during and after the assessment activity. Optimally, a full sample of all Social Sciences programs (departments) should be included as part of the sample. This was difficult due to both scheduling and the fact that this was the first time such an assessment was attempted. One problem was that getting providing a proper orientation or training to professors who volunteered to participate. In one case, a professor who was oriented could not attend the assessment and this meant a discipline (Sociology) was not represented. A second and related problem concerns the collection of artifacts. Though this should improve over time with the conduct of additional assessments, both the sample and the diversity of assignment artifacts is in need of improvement. All of the professors involved provided their own assignments and while this is more convenient, ultimately the assessment must reach beyond those professors involved in the activity and to more diverse faculty across the division. In sum, the main way to improvement this assessment are found in the structure of the assessment and more specifically, the recruitment process.

Reflections/Notes : The assessment was our first attempt to evaluate a GEO in the Social Science Division. The process produced some useful data—especially the suggestion that an English 1A prerequisite may be useful for Social Science classes. Further evaluation of the communication SLO (as well as others, such as critical thinking) should yield additional data on this question. The feasibility of requiring English 1A for Social Sciences courses would have to be thoroughly investigated, however—it is unclear that English department could handle such a burden. It is also unclear whether such a requirement would be equally desirable for all Social Science courses. With the likelihood of a shift in administrative organization toward a department/program emphasis, the ease of programs' considering this question for themselves may be made easier. The diversity of Social Sciences (including the issues related to this that were raised in the assessment process) may make a departmentally-based assessment more effective at including not only all of the programs within Social Sciences but a involving broader cross section of faculty in the GEO assessment process.

Substantiating Evidence:

- AAC&U Written Communication Value Rubric (Microsoft Word) (See appendix)
- GEO Communication Assessment 2012-13: Social Sciences Averages (JPEG (Image)) (See appendix)
- GEO Communication Assessment 2012-13: Social Sciences Averages-Content Development (JPEG (Image)) (See appendix)
- GEO Communication Assessment 2012-13: Social Sciences Averages-Sources (JPEG (Image)) (See appendix)
- GEO Communication Assessment 2012-13: Social Sciences Averages-Syntax & Mechanics (JPEG (Image)) (See appendix)

Measure: Speech 2012-13 GEO #1: Communication Assessment Documentation

Description of Measure (WHAT data were used to measure the outcome?): A formal, full sentence, research-based outline is required to accompany the Informative Speech in our Speech 1 courses. This outline becomes the basis for the oral presentation. 30 outlines were assessed to examine organization, language, supporting material and central message.

For FALL 2012, PCC offered 43 sections of Speech 1. 10 section numbers were randomly selected and the instructors for these sections, which included both full-time and part-time instructors, were given the following directions:
"Make a copy of the outline for the informative speech prepared by every 4th student on your roster. Please mark out the name of the student."
53 outlines were collected and 30 outlines were randomly selected from this group. 4 full-time faculty members participated in a norming session and scored each of the 30 outlines with a common rubric. The data collected is considered valid and reliable.

Acceptable Target and Rationale: An acceptable result would be for the average score of each section to be 2.5. This would indicate that the skill sets shown in the outline meet expectations and are moving beyond an "adequate" score and illustrate progression to a higher skill set.

Ideal Target and Rationale: An ideal result would be for the average score of each section to be 3.0 or higher. This score clearly meets expectations and would illustrate a higher skill set, understanding of each component, and an acceptable level of rigor in all classrooms while considering that this assignment occurs within the first third of the semester.

What steps were taken to analyze the data?: Four faculty members scored each outline independently and then met to discuss the results. Norming occurred during the process to ensure that each person scoring was looking at the GEO ad rubric in similar ways.
Was the assessment analyzed by an individual or a group? Who was involved?

The assessment was analyzed by a group. The creation of the assessment was discussed at a department meeting. The following were present for that meeting:

Cindy Phu, Rita Gonzales, AC Panella, Stephanie Fleming, Mark Whitworth, Joshua Fleming, Dolores Avila and James Arnwine.

The scoring was performed by Rita Gonzales, Stephanie Fleming, Cindy Phu and AC Panella.

Key/Responsible Personnel (WHO analyzed the data?): Initial analysis of the results was performed by Rita Gonzales, Stephanie Fleming, Joshua Fleming, Cindy Phu and AC Panella.

Further discussion is planned for a March 19 department meeting.

Findings for Speech 2012-13 GEO #1: Communication Assessment Documentation

Summary of Findings: While the assessment reveals that student performance is satisfactory, the process itself revealed significant diversity in the format, composition and quality of outlines gathered. While the overall score “met expectations,” some individual outlines were missing key components. Discussion revealed that these instructors may be choosing to teach these components later in the semester but this assertion is difficult to verify.

Results: Acceptable Target Achievement: Exceeded; Ideal Target Achievement : Exceeded

Recommendations for Improvement: While the overall score indicates that student performance is satisfactory, the department should take the following steps:
a. Curriculum: Review the course outline to examine if requirements are clearly indicated. This updated course outline should be distributed to all Speech 1 instructors.
b. Curriculum: Provide a department-developed sample for required outlines to all instructors.
c. Curriculum: Consider using a department-developed, standardized grading sheet for major assignments required in the course outline.
d. Student support: Provide the Speech Communication department tutor with sample outline and rubric.

Reflections/Notes : The department should consider a larger sample size and ensure that as many instructors as possible can participate. While the sections were randomly chosen, multiple sections from the same instructors were chosen. A larger sample might yield more meaningful results.

While the outline is the basis for the oral presentation, it may be helpful to score both the outline and the presentation using the same rubric. This would help to assess a student’s ability to make the progression from writing to delivering a speech.

We may want to consider using the persuasive speech rather than the informative speech. The persuasive speech typically serves as the capstone assignment for most instructors and would enable us to assess the culmination of skills rather than adjusting our findings for a speech that occurs very early in the course.

Substantiating Evidence:

- AAC&U Oral Communication Value Rubric (Adobe Acrobat Document) (See appendix)
- Speech GEO #1: Communication (Oral) Assessment Data (JPEG (Image)) (See appendix)
- Speech GEO #1: Communication Assessment Directions (Microsoft Word) (See appendix)

Overall Recommendations for Improvement

No text specified

Program Responsiveness

No text specified

Data Sets and Reference Materials

Appendix

A. AAC&U Written Communication Value Rubric (Microsoft Word)
B. AAC&U Written Communication Value Rubric (Microsoft Word)
C. AAC&U Written Communication Value Rubric (Microsoft Word)
D. AAC&U Written Communication Value Rubric (Microsoft Word)
E. Natural Science Averages 2012-13 GEO #1: Communication Assessment Data (JPEG (Image))
F. Natural Science Averages 2012-13 GEO #1: Communication Assessment Data (JPEG (Image))
G. Natural Science Averages 2012-13 GEO #1: Communication Assessment Data (JPEG (Image))
H. Speech GEO #1: Communication (Oral) Assessment Data (JPEG (Image))
I. Speech GEO #1: Communication Assessment Directions (Microsoft Word)
J. Summary of 2012-13 GEO #1: Communication Assessment with LAC Recommendations for Improvements to the Process (PowerPoint Presentation (Open XML))
K. AAC&U Oral Communication Value Rubric (Adobe Acrobat Document)
L. AAC&U Written Communication Value Rubric (Microsoft Word)
M. BIOL11 2012-13 GEO #1: Communication Assessment Data (JPEG (Image))
N. CHEM1A 2012-13 GEO #1: Communication Assessment Data (JPEG (Image))
O. ENGL1A 2012-13 GEO #1: Communication Assessment Data (JPEG (Image))
P. Foreign Languages 2012-13 GEO #1: Communication Assessment Data (JPEG (Image))
Q. GEO 2012-13 Assessment Protocol (Microsoft Word)
R. GEO Communication Assessment 2012-13: Social Sciences Averages (JPEG (Image))
S. GEO Communication Assessment 2012-13: Social Sciences Averages-Content Development (JPEG (Image))
T. GEO Communication Assessment 2012-13: Social Sciences Averages-Sources (JPEG (Image))
U. GEO Communication Assessment 2012-13: Social Sciences Averages-Syntax & Mechanics (JPEG (Image))
V. Geology 2012-13 GEO #1: Communication Assessment Data (JPEG (Image))
W. GEOs and Philosophy of General Education (Word Document (Open XML))
X. Improvement Example: Letter to Representative with Instructor and Peer Review (Adobe Acrobat Document)
Y. Improvement Example: Modified Assessment to Include More

Writing (Adobe Acrobat Document)

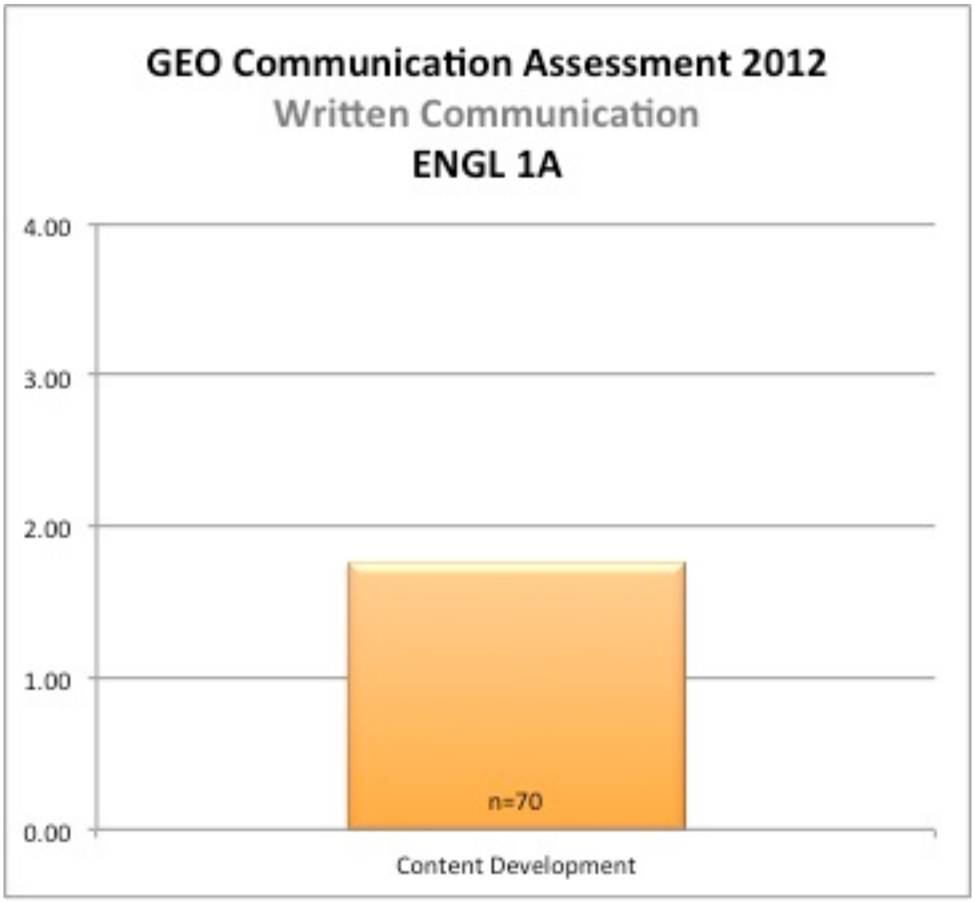
Z. Improvement Example: New "TED Talk Write Up" To Increase Writing (Adobe Acrobat Document)

AA. Improvement Example: Revised Assignment Prompt (Adobe Acrobat Document)

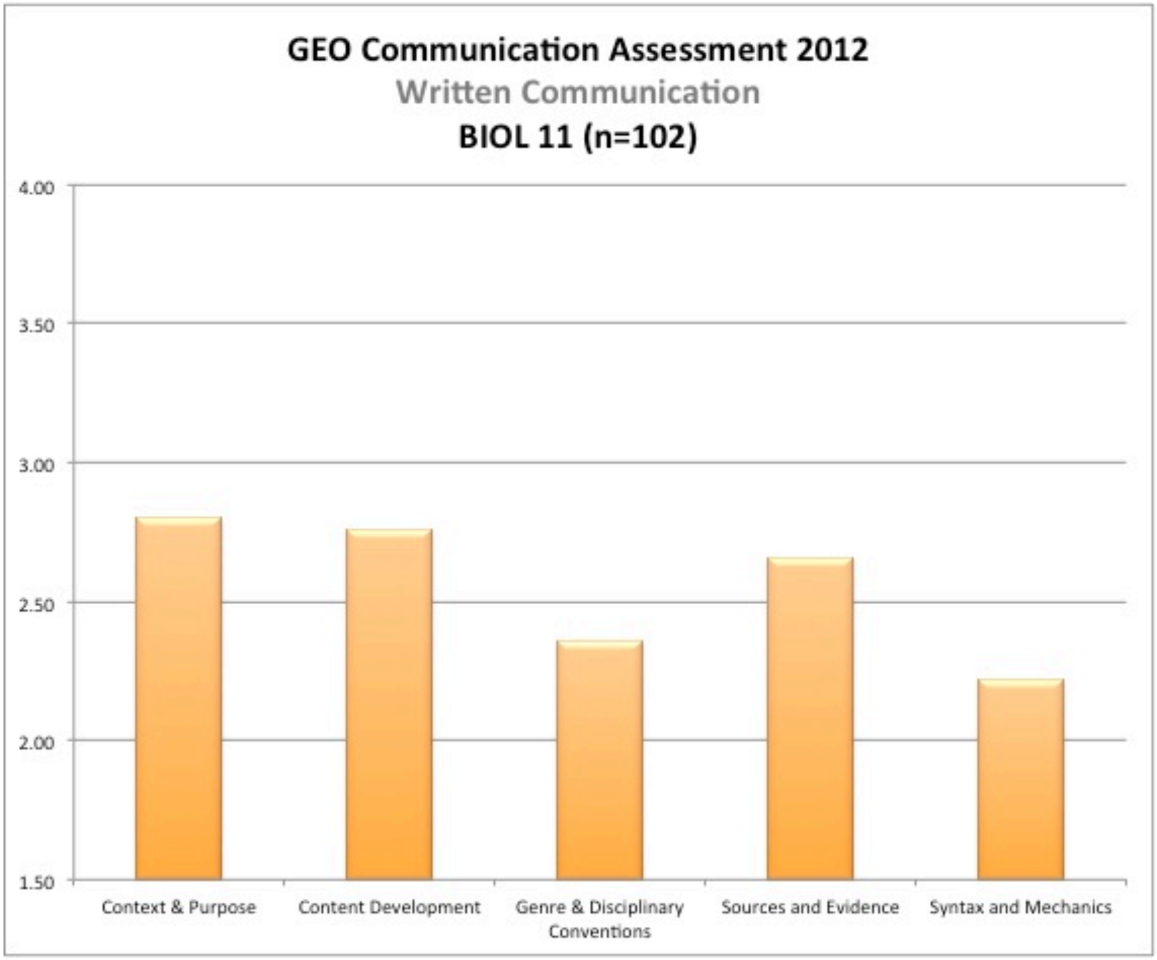
AB. Improvement Example: Revision Process of Lab Reports (Adobe Acrobat Document)

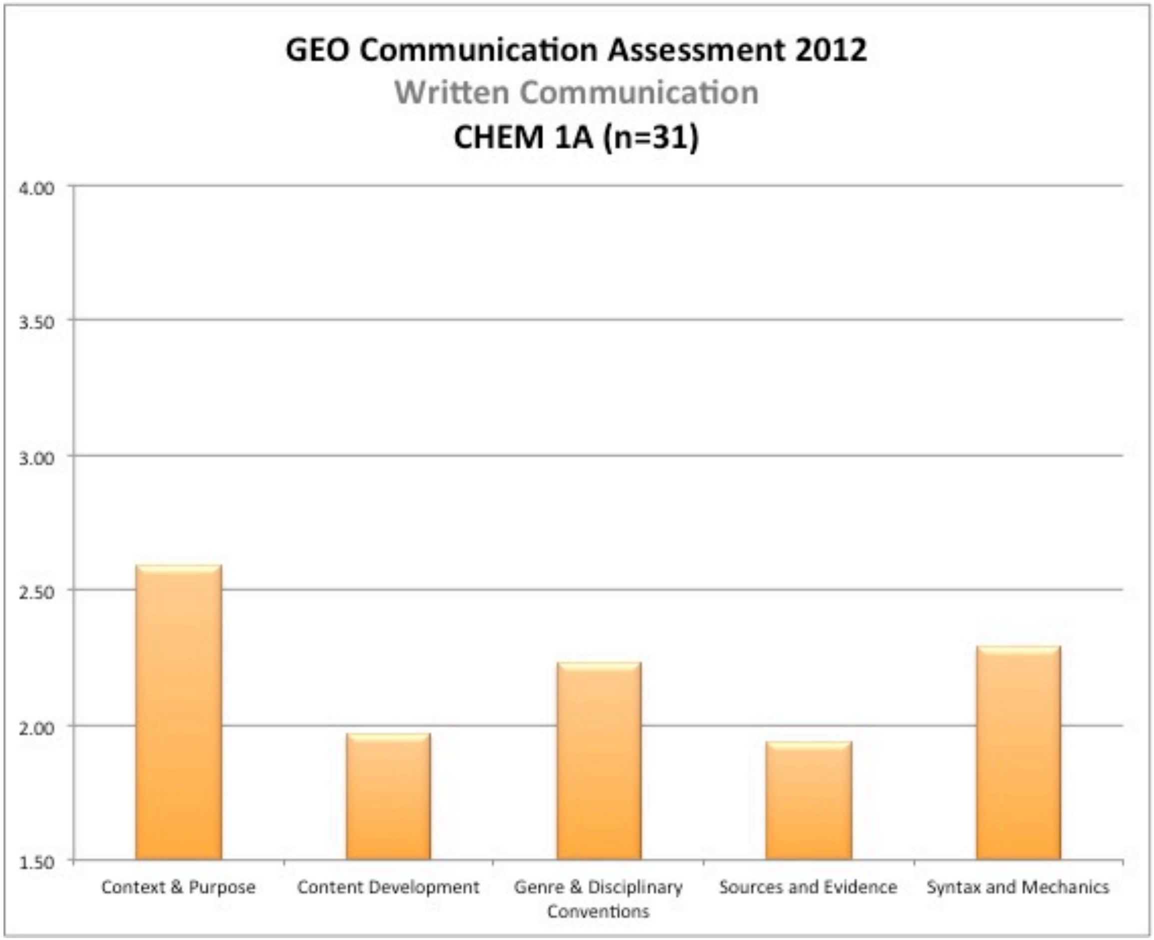
AC. Math 2012-13 GEO Assessment Rubric (Word Document (Open XML))

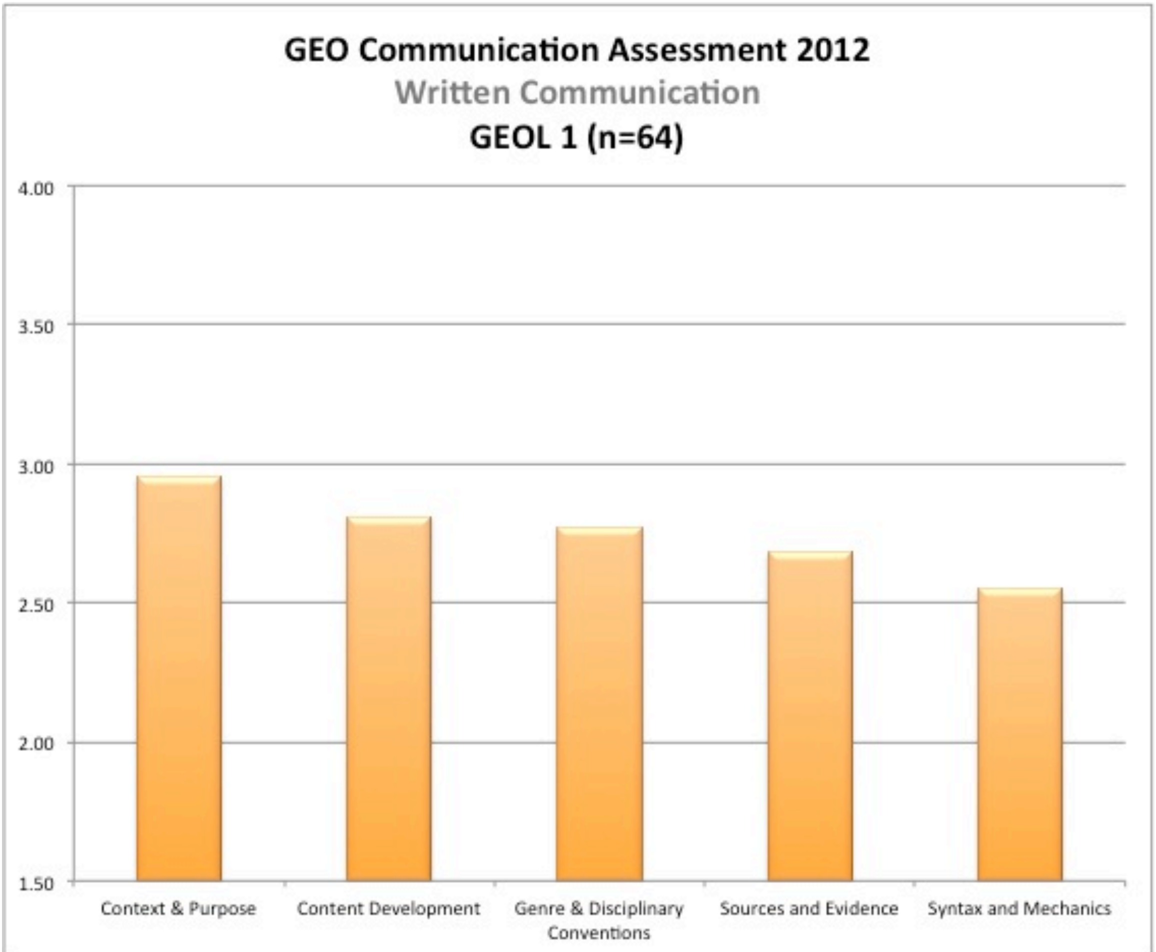
AD. Math 2012-13 GEO Assessment Student Samples (Word Document (Open XML))

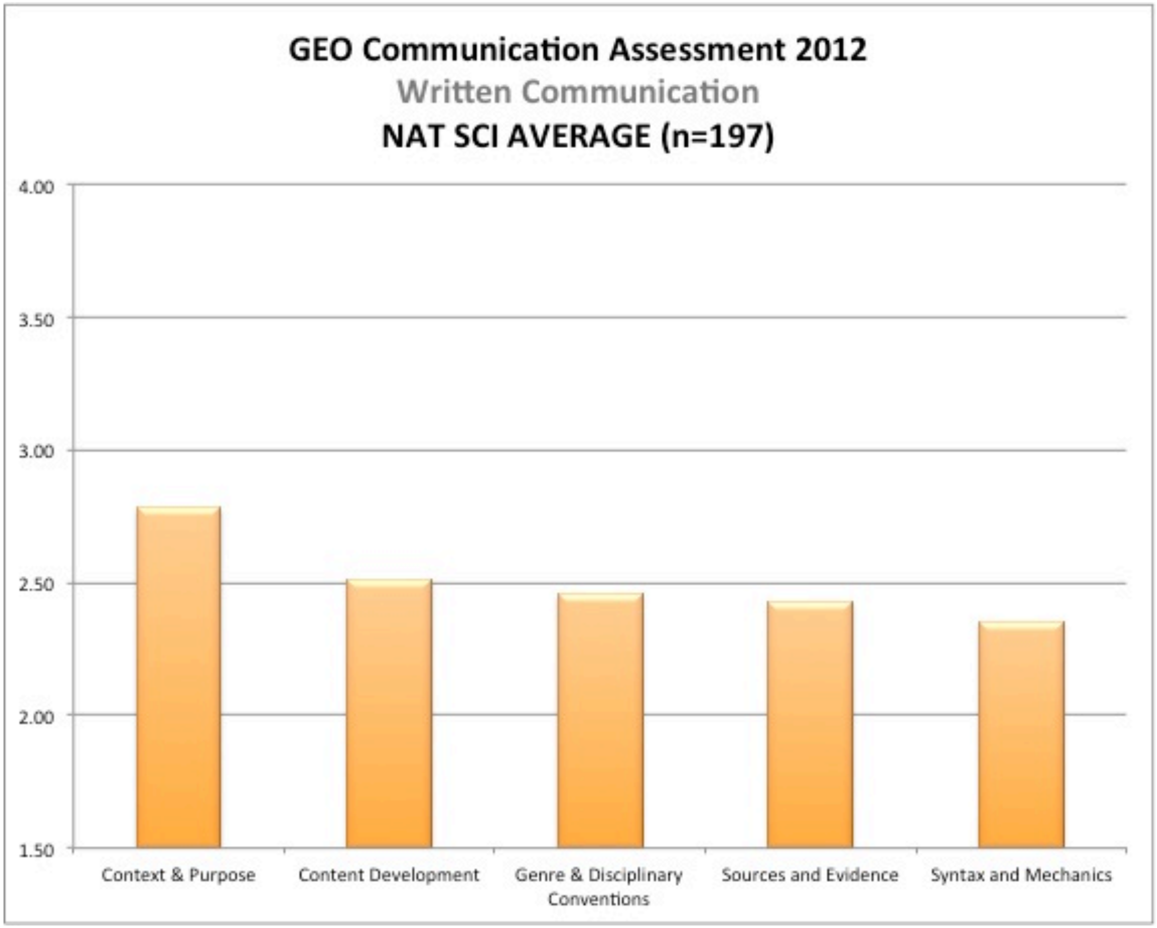

GEO Communication Assessment 2012
Written Communication
ENGL 1A
4.00
3.00
2.00
1.00
0.00
n=70
Content Development

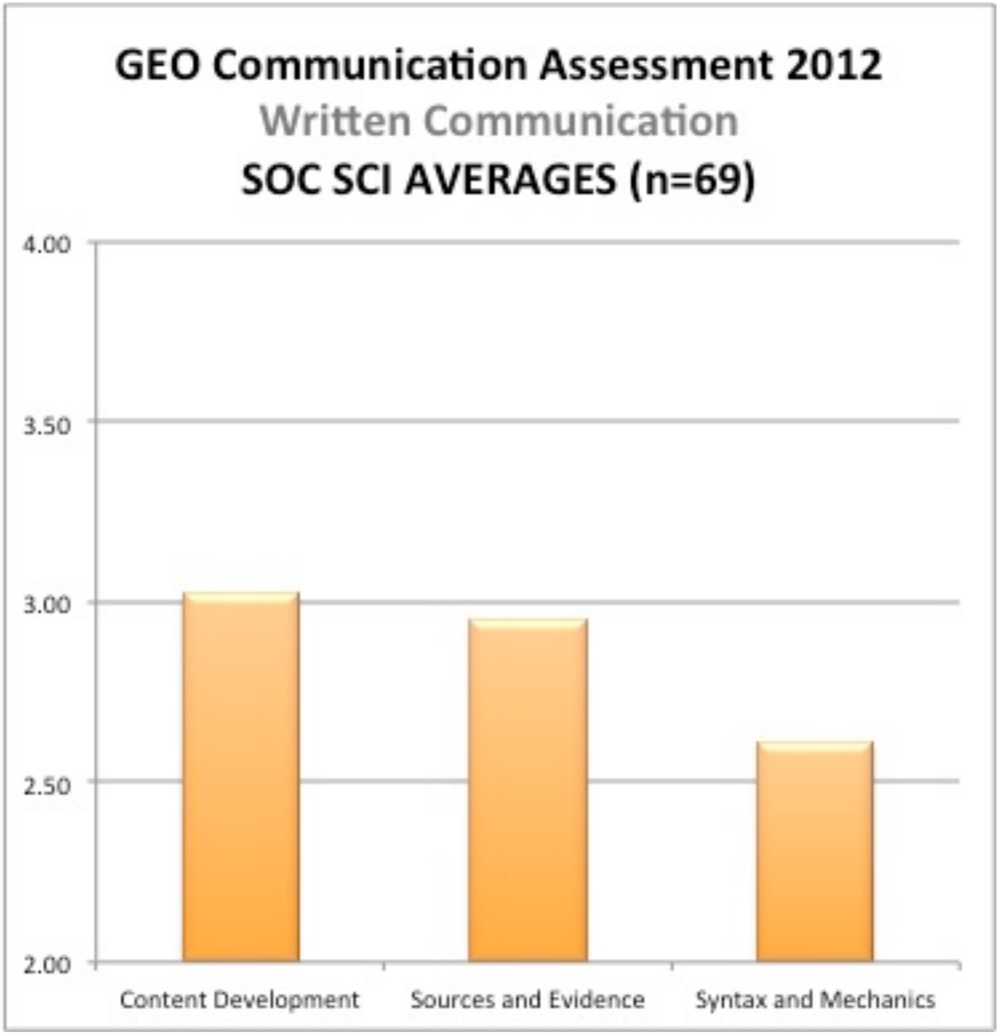

GEO Communication Assessment 2012
Reading Comprehension
Foreign Languages
4.00
3.50
3.00
2.50
2.00
n=47
n=58
n=47
n=40
n=20
n=41
CHNSE 1
FRNCH 1
GRMAN 1
ITALN 1
JPNSE 1
SPAN 1

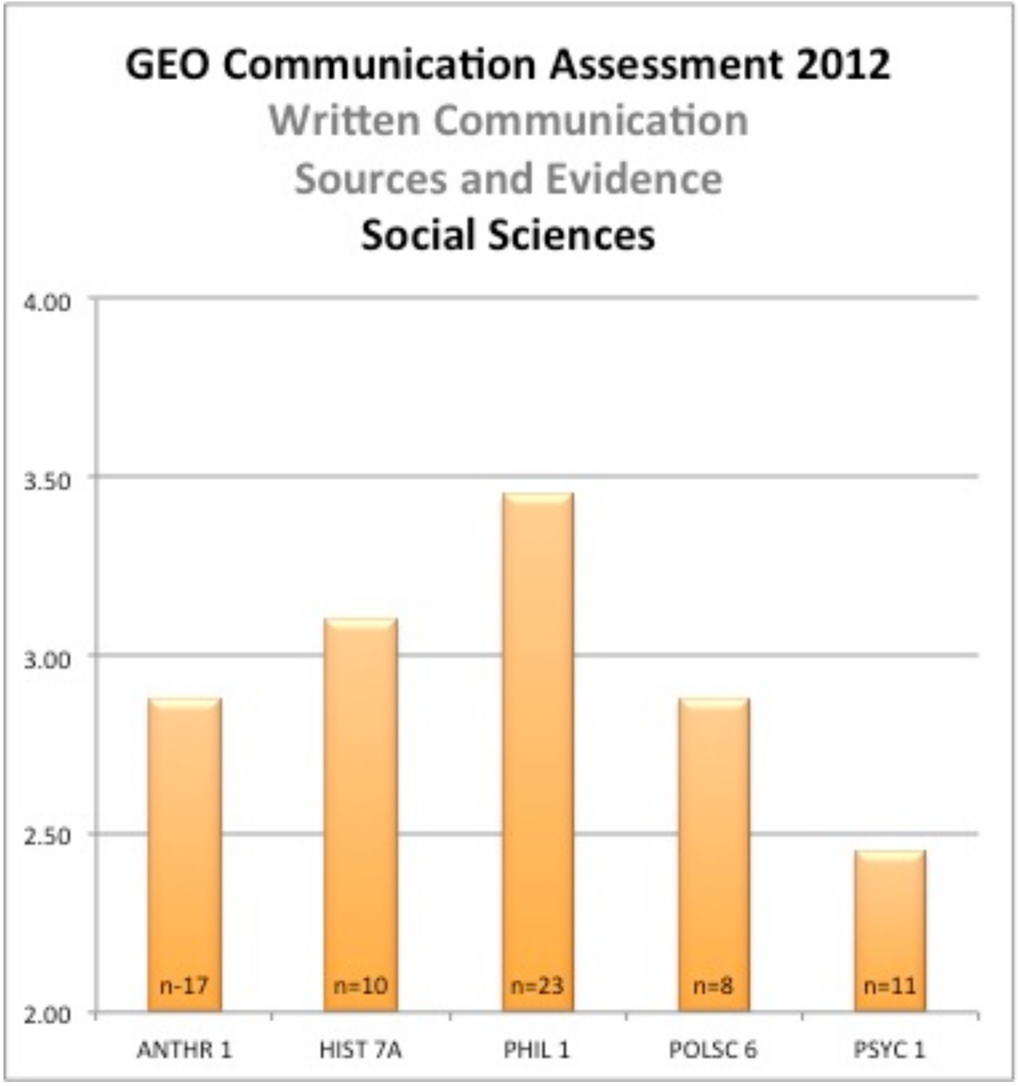

GEO Communication Assessment 2012
Written Communication
BIOL 11 (n=102)
4.00
3.50
3.00
2.50
2.00
1.50
Context & Purpose
Content Development
Genre & Disciplinary Conventions
Sources and Evidence
Syntax and Mechanics

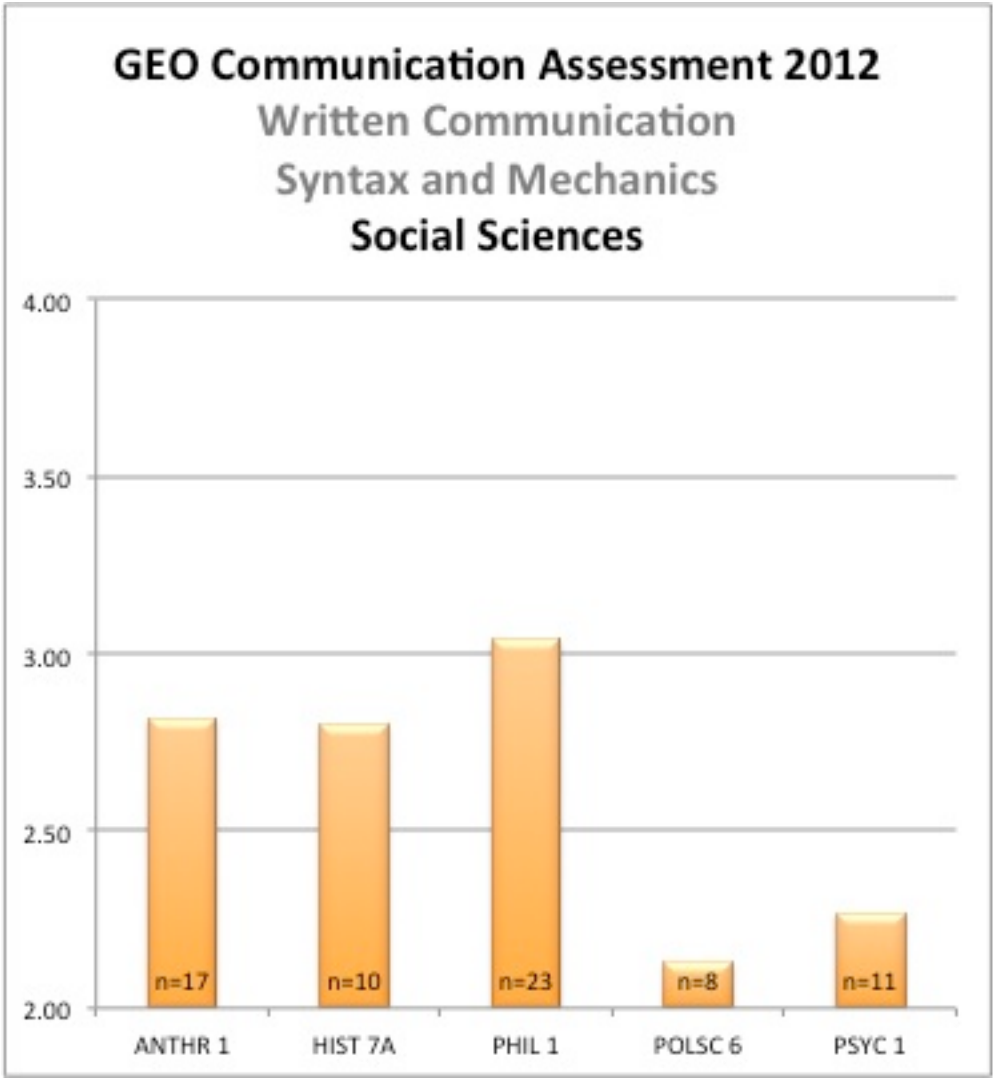

GEO Communication Assessment 2012
Written Communication
CHEM 1A (n=31)
4.00
3.50
3.00
2.50
2.00
1.50
Context & Purpose
Content Development
Genre & Disciplinary Conventions
Sources and Evidence
Syntax and Mechanics

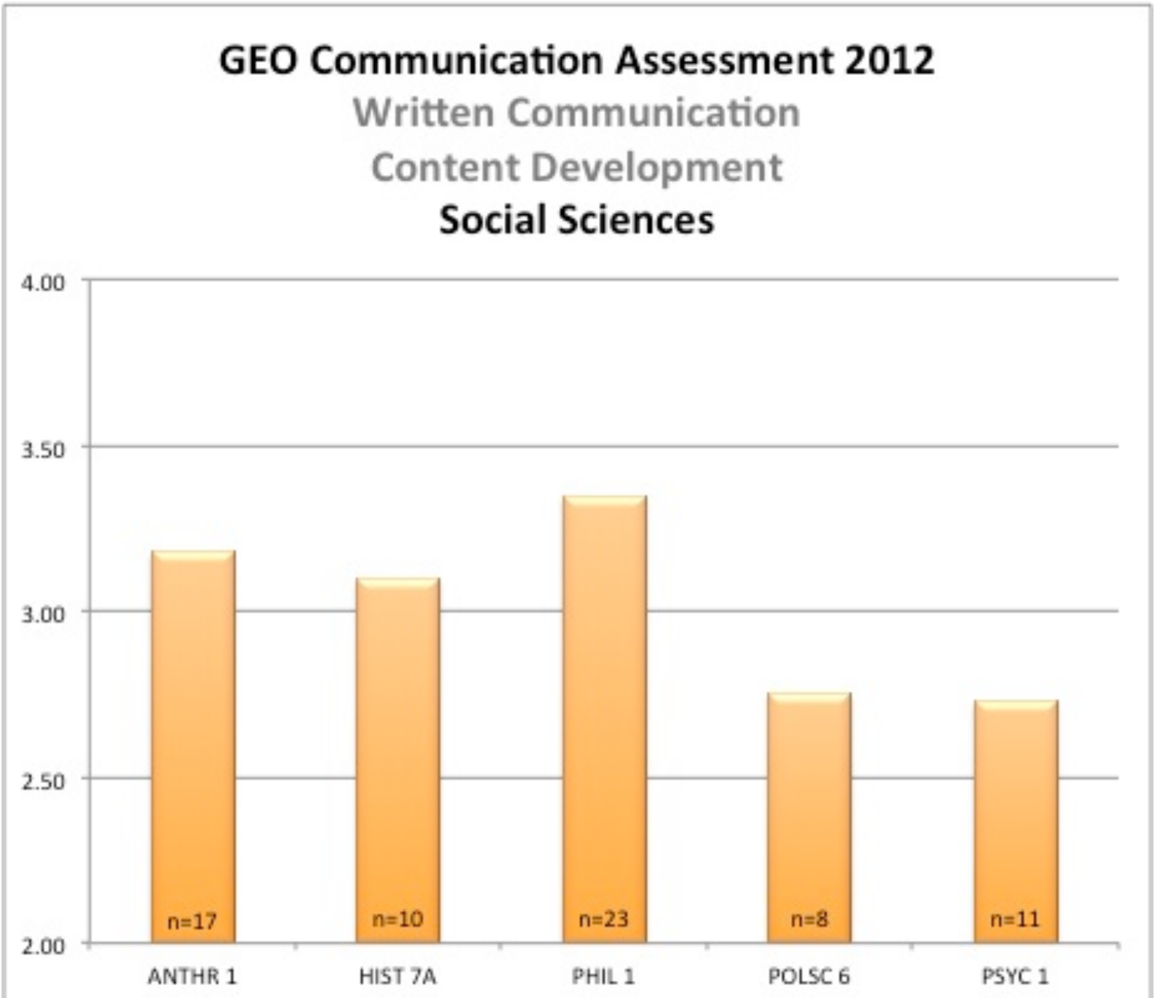

GEO Communication Assessment 2012
Written Communication
GEOL 1 (n=64)
4.00
3.50
3.00
2.50
2.00
1.50
Context & Purpose
Content Development
Genre & Disciplinary Conventions
Sources and Evidence
Syntax and Mechanics

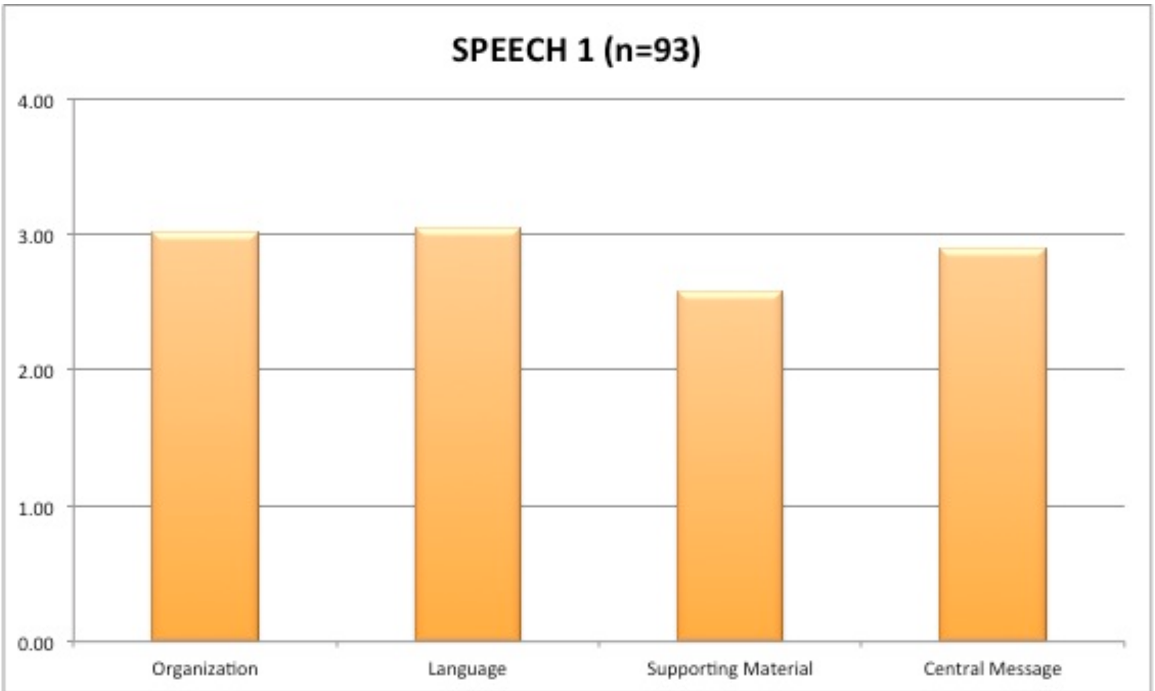

GEO Communication Assessment 2012
Written Communication
NAT SCI AVERAGE (n=197)
4.00
3.50
3.00
2.50
2.00
1.50
Context & Purpose
Content Development
Genre & Disciplinary Conventions
Sources and Evidence
Syntax and Mechanics


GEO Communication Assessment 2012
Written Communication
SOC SCI AVERAGES (n=69)
4.00
3.50
3.00
2.50
2.00
Content Development
Sources and Evidence
Syntax and Mechanics


GEO Communication Assessment 2012
Written Communication
Sources and Evidence
Social Sciences
4.00
3.50
3.00
2.50
2.00
n-17
n=10
n=23
n=8
n=11
ANTHR 1
HIST 7A
PHIL 1
POLSC 6
PSYC 1


GEO Communication Assessment 2012
Written Communication
Syntax and Mechanics
Social Sciences
4.00
3.50
3.00
2.50
2.00
n=17
n=10
n=23
n=8
n=11
ANTHR 1
HIST 7A
PHIL 1
POLSC 6
PSYC 1


GEO Communication Assessment 2012
Written Communication
Content Development
Social Sciences
4.00
3.50
3.00
2.50
2.00
n=17
n=10
n=23
n=8
n=11
ANTHR 1
HIST 7A
PHIL 1
POLSC 6
PSYC 1


SPEECH 1 (n=93)
4.00
3.00
2.00
1.00
0.00
Organization
Language
Supporting Material
Central Message

Math 125 Communication GEO Assessment

Name

Read the application problem and answer the related questions. Do not solve the problem.

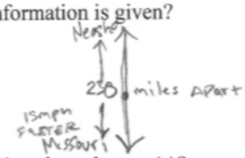
The Kansas City Southern Railway operates in 10 states and Mexico. Suppose two trains leave Neosho, Missouri at the same time. One travels north and the other travels south at a speed that is 15 miles per hour faster. In 2 hours, the trains are 230 miles apart. Find the speed of each train.

1. Restate the problem in your own words.

   Two trains from Kansas City Railway travel in two seperate ways at the same time.

   Train One - North - Train two - South - 15t - 2

2. What information is given?



3. What is/are the unknown(s)?

   The actual speed of Two Trains

4. Write down a phrase that states a numerical relationship.

5. What is/are the unit(s) of the unknown(s)?

6. What does the problem ask you to find?

   How long did Two Trains Took to be 230 miles Apart.

2

Math 131 Communication GEO Assessment

Name

Read the application problem and answer the related questions. Do not solve the problem.

The Kansas City Southern Railway operates in 10 states and Mexico. Suppose two trains leave Neosho, Missouri at the same time. One travels north and the other travels south at a speed that is 15 miles per hour faster. In 2 hours, the trains are 230 miles apart. Find the speed of each train.

1. Restate the problem in your own words.

   Railway operates in 10 States along with mexico. two trains leave missouri at the Same time. travels different directions at a rate of 15 mph faster than one another. 2hours later they are 230 miles apart

2. What information is given?

   One travles north other South.
   15 miles an hour difference.
   2hrs later trains are 230 miles apart

3. What is/are the unknown(s)?

   r = rate

4. Write down a phrase that states a numerical relationship.

   $X + Y = 230$

5. What is/are the unit(s) of the unknown(s)?

   rate

6. What does the problem ask you to find?

   Speed of each train

D r t

230

230

$x + y = 230$

x

3

Math 131 Communication GEO Assessment

Name

Read the application problem and answer the related questions. Do not solve the problem.

The Kansas City Southern Railway operates in 10 states and Mexico. Suppose two trains leave Neosho, Missouri at the same time. One travels north and the other travels south at a speed that is 15 miles per hour faster. In 2 hours, the trains are 230 miles apart. Find the speed of each train.

1. Restate the problem in your own words.
Two trains leave from the same station at the same time, in different directions. One of them is 15 mph faster than the other. After 2 hrs. the trains are 230 miles apart. What is the speed of each.

2. What information is given?
The distance
and time

3. What is/are the unknown(s)?
The Rate or speed of the trains

4. Write down a phrase that states a numerical relationship.
$R = \frac{D}{T}$?

5. What is/are the unit(s) of the unknown(s)?
mph.

6. What does the problem ask you to find?
The speed of both the trains

4

Math 125 Communication GEO Assessment

Name

Read the application problem and answer the related questions. Do not solve the problem.

The Kansas City Southern Railway operates in 10 states and Mexico. Suppose two trains leave Neosho, Missouri at the same time. One travels north and the other travels south at a speed that is 15 miles per hour faster. In 2 hours, the trains are 230 miles apart. Find the speed of each train.

1. Restate the problem in your own words.
   Two trains leave Neosho, MI at the same time. One goes ~~North~~ the other South at 15mph+. In 2hrs the trains are 230 miles apart. What is the speed of each train.

2. What information is given?
   ~~one~~train travels north, the other South @ 15mph faster than the north moving train. In 2 hrs. they are 230 miles apart

3. What is/are the unknown(s)?
   How fast each train is moving

4. Write down a phrase that states a numerical relationship.
   The north train is moving 15 mph slower than the South moving train

5. What is/are the unit(s) of the unknown(s)?
   mph

6. What does the problem ask you to find?
   Find the speed of each train.

General Education Outcome 1 – Communication: Use creative expression to communicate acquired knowledge or skills effectively
Competency 1.1 – Reading: Read and comprehend written material critically and effectively at the appropriate program level

	4	3	2	1
Comprehension	Correctly and completely rewrites the problem; identifies relevant givens and unknowns, including numerical information; and correctly identifies what's being asked for	The restatement of the problem indicates the situation is understood but some relevant information or the actual question or directive is missing; correctly identifies givens and unknowns but omits numerical information; correctly identifies what's being asked for	Attempts to rewrite the problem but leaves out relevant information or numbers and the actual question or directive is missing; misidentifies or gives incomplete givens or unknowns; does not correctly identify what's being asked for	Attempts to rewrite the problem, but leaves out relevant information and numbers; or misstates the problem. Gives incorrect givens and unknowns. Does not correctly identify what is being asked for. OR answers contradict themselves
Units	Gives correct units throughout	Most units are correctly given	Some units are correctly given	Makes an attempt but no correct units are given
Identifies relationships	Correctly identifies a numerical relationship that is necessary to solve the problem	Correct and relevant relationships are given, but number(s) are missing	Relationships may be correct but irrelevant—they don't lead to the solution of the problem	Makes an attempt, but all relationships are incorrect

ORAL COMMUNICATION VALUE RUBRIC

for more information, please contact value@aacu.org

Association of American Colleges and Universities

The VALUE rubrics were developed by teams of faculty experts representing colleges and universities across the United States through a process that examined many existing campus rubrics and related documents for each learning outcome and incorporated additional feedback from faculty. The rubrics articulate fundamental criteria for each learning outcome, with performance descriptors demonstrating progressively more sophisticated levels of attainment. The rubrics are intended for institutional-level use in evaluating and discussing student learning, not for grading. The core expectations articulated in all 15 of the VALUE rubrics can and should be translated into the language of individual campuses, disciplines, and even courses. The utility of the VALUE rubrics is to position learning at all undergraduate levels within a basic framework of expectations such that evidence of learning can by shared nationally through a common dialog and understanding of student success.

The type of oral communication most likely to be included in a collection of student work is an oral presentation and therefore is the focus for the application of this rubric.

Definition

Oral communication is a prepared, purposeful presentation designed to increase knowledge, to foster understanding, or to promote change in the listeners' attitudes, values, beliefs, or behaviors.

Framing Language

Oral communication takes many forms. This rubric is specifically designed to evaluate oral presentations of a single speaker at a time and is best applied to live or video-recorded presentations. For panel presentations or group presentations, it is recommended that each speaker be evaluated separately. This rubric best applies to presentations of sufficient length such that a central message is conveyed, supported by one or more forms of supporting materials and includes a purposeful organization. An oral answer to a single question not designed to be structured into a presentation does not readily apply to this rubric.

Glossary

The definitions that follow were developed to clarify terms and concepts used in this rubric only.

- Central message: The main point/thesis/"bottom line"/"take-away" of a presentation. A clear central message is easy to identify; a compelling central message is also vivid and memorable.
- Delivery techniques: Posture, gestures, eye contact, and use of the voice. Delivery techniques enhance the effectiveness of the presentation when the speaker stands and moves with authority, looks more often at the audience than at his/her speaking materials/notes, uses the voice expressively, and uses few vocal fillers ("um," "uh," "like," "you know," etc.).
- Language: Vocabulary, terminology, and sentence structure. Language that supports the effectiveness of a presentation is appropriate to the topic and audience, grammatical, clear, and free from bias. Language that enhances the effectiveness of a presentation is also vivid, imaginative, and expressive.
- Organization: The grouping and sequencing of ideas and supporting material in a presentation. An organizational pattern that supports the effectiveness of a presentation typically includes an introduction, one or more identifiable sections in the body of the speech, and a conclusion. An organizational pattern that enhances the effectiveness of the presentation reflects a purposeful choice among possible alternatives, such as a chronological pattern, a problem-solution pattern, an analysis-of-parts pattern, etc., that makes the content of the presentation easier to follow and more likely to accomplish its purpose.
- Supporting material: Explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities, and other kinds of information or analysis that supports the principal ideas of the presentation. Supporting material is generally credible when it is relevant and derived from reliable and appropriate sources. Supporting material is highly credible when it is also vivid and varied across the types listed above (e.g., a mix of examples, statistics, and references to authorities). Supporting material may also serve the purpose of establishing the speakers credibility. For example, in presenting a creative work such as a dramatic reading of Shakespeare, supporting evidence may not advance the ideas of Shakespeare, but rather serve to establish the speaker as a credible Shakespearean actor.

ORAL COMMUNICATION VALUE RUBRIC

for more information, please contact value@aacu.org

Association of American Colleges and Universities

Definition

Oral communication is a prepared, purposeful presentation designed to increase knowledge, to foster understanding, or to promote change in the listeners' attitudes, values, beliefs, or behaviors.

Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet benchmark (cell one) level performance.

	Capstone 4	**Milestones** 3	2	**Benchmark** 1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced, but is not explicitly stated in the presentation.

WRITTEN COMMUNICATION VALUE RUBRIC

for more information, please contact value@aacu.org

Association of American Colleges and Universities

The VALUE rubrics were developed by teams of faculty experts representing colleges and universities across the United States through a process that examined many existing campus rubrics and related documents for each learning outcome and incorporated additional feedback from faculty. The rubrics articulate fundamental criteria for each learning outcome, with performance descriptors demonstrating progressively more sophisticated levels of attainment. The rubrics are intended for institutional-level use in evaluating and discussing student learning, not for grading. The core expectations articulated in all 15 of the VALUE rubrics can and should be translated into the language of individual campuses, disciplines, and even courses. The utility of the VALUE rubrics is to position learning at all undergraduate levels within a basic framework of expectations such that evidence of learning can by shared nationally through a common dialog and understanding of student success.

Definition

Written communication is the development and expression of ideas in writing. Written communication involves learning to work in many genres and styles. It can involve working with many different writing technologies, and mixing texts, data, and images. Written communication abilities develop through iterative experiences across the curriculum.

Framing Language

This writing rubric is designed for use in a wide variety of educational institutions. The most clear finding to emerge from decades of research on writing assessment is that the best writing assessments are locally determined and sensitive to local context and mission. Users of this rubric should, in the end, consider making adaptations and additions that clearly link the language of the rubric to individual campus contexts.

This rubric focuses assessment on how specific written work samples or collectios of work respond to specific contexts. The central question guiding the rubric is "How well does writing respond to the needs of audience(s) for the work?" In focusing on this question the rubric does not attend to other aspects of writing that are equally important: issues of writing process, writing strategies, writers' fluency with different modes of textual production or publication, or writer's growing engagement with writing and disciplinarity through the process of writing.

Evaluators using this rubric must have information about the assignments or purposes for writing guiding writers' work. Also recommended is including reflective work samples of collections of work that address such questions as: What decisions did the writer make about audience, purpose, and genre as s/he compiled the work in the portfolio? How are those choices evident in the writing -- in the content, organization and structure, reasoning, evidence, mechanical and surface conventions, and citational systems used in the writing? This will enable evaluators to have a clear sense of how writers understand the assignments and take it into consideration as they evaluate

The first section of this rubric addresses the context and purpose for writing. A work sample or collections of work can convey the context and purpose for the writing tasks it showcases by including the writing assignments associated with work samples. But writers may also convey the context and purpose for their writing within the texts. It is important for faculty and institutions to include directions for students about how they should represent their writing contexts and purposes.

Faculty interested in the research on writing assessment that has guided our work here can consult the National Council of Teachers of English/Council of Writing Program Administrators' White Paper on Writing Assessment (2008; www.wpacouncil.org/whitepaper) and the Conference on College Composition and Communication's Writing Assessment: A Position Statement (2008; www.ncte.org/cccc/resources/positions/123784.htm)

Glossary

The definitions that follow were developed to clarify terms and concepts used in this rubric only.

- Content Development: The ways in which the text explores and represents its topic in relation to its audience and purpose.
- Context of and purpose for writing: The context of writing is the situation surrounding a text: who is reading it? who is writing it? Under what circumstances will the text be shared or circulated? What social or political factors might affect how the text is composed or interpreted? The purpose for writing is the writer's intended effect on an audience. Writers might want to persuade or inform; they might want to report or summarize information; they might want to work through complexity or confusion; they might want to argue with other writers, or connect with other writers; they might want to convey urgency or amuse; they might write for themselves or for an assignment or to remember.
- Disciplinary conventions: Formal and informal rules that constitute what is seen generally as appropriate within different academic fields, e.g. introductory strategies, use of passive voice or first person point of view, expectations for thesis or hypothesis, expectations for kinds of evidence and support that are appropriate to the task at hand, use of primary and secondary sources to provide evidence and support arguments and to document critical perspectives on the topic. Writers will incorporate sources according to disciplinary and genre conventions, according to the writer's purpose for the text. Through increasingly sophisticated use of sources, writers develop an ability to differentiate between their own ideas and the ideas of others, credit and build upon work already accomplished in the field or issue they are addressing, and provide meaningful examples to readers.
- Evidence: Source material that is used to extend, in purposeful ways, writers' ideas in a text.
- Genre conventions: Formal and informal rules for particular kinds of texts and/or media that guide formatting, organization, and stylistic choices, e.g. lab reports, academic papers, poetry, webpages, or personal essays.
- Sources: Texts (written, oral, behavioral, visual, or other) that writers draw on as they work for a variety of purposes -- to extend, argue with, develop, define, or shape their ideas, for example.

WRITTEN COMMUNICATION VALUE RUBRIC

for more information, please contact value@aacu.org

Association of American Colleges and Universities

Definition

Written communication is the development and expression of ideas in writing. Written communication involves learning to work in many genres and styles. It can involve working with many different writing technologies, and mixing texts, data, and images. Written communication abilities develop through iterative experiences across the curriculum.

Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet benchmark (cell one) level performance.

	Capstone 4	**Milestones** 3	 2	**Benchmark** 1
Context of and Purpose for Writing *Includes considerations of audience, purpose, and the circumstances surrounding the writing task(s).*	Demonstrates a thorough understanding of context, audience, and purpose that is responsive to the assigned task(s) and focuses all elements of the work.	Demonstrates adequate consideration of context, audience, and purpose and a clear focus on the assigned task(s) (e.g., the task aligns with audience, purpose, and context).	Demonstrates awareness of context, audience, purpose, and to the assigned tasks(s) (e.g., begins to show awareness of audience's perceptions and assumptions).	Demonstrates minimal attention to context, audience, purpose, and to the assigned tasks(s) (e.g., expectation of instructor or self as audience).
Content Development	Uses appropriate, relevant, and compelling content to illustrate mastery of the subject, conveying the writer's understanding, and shaping the whole work.	Uses appropriate, relevant, and compelling content to explore ideas within the context of the discipline and shape the whole work.	Uses appropriate and relevant content to develop and explore ideas through most of the work.	Uses appropriate and relevant content to develop simple ideas in some parts of the work.
Genre and Disciplinary Conventions *Formal and informal rules inherent in the expectations for writing in particular forms and/or academic fields (please see glossary).*	Demonstrates detailed attention to and successful execution of a wide range of conventions particular to a specific discipline and/or writing task (s) including organization, content, presentation, formatting, and stylistic choices	Demonstrates consistent use of important conventions particular to a specific discipline and/or writing task(s), including organization, content, presentation, and stylistic choices	Follows expectations appropriate to a specific discipline and/or writing task(s) for basic organization, content, and presentation	Attempts to use a consistent system for basic organization and presentation.
Sources and Evidence	Demonstrates skillful use of high-quality, credible, relevant sources to develop ideas that are appropriate for the discipline and genre of the writing	Demonstrates consistent use of credible, relevant sources to support ideas that are situated within the discipline and genre of the writing.	Demonstrates an attempt to use credible and/or relevant sources to support ideas that are appropriate for the discipline and genre of the writing.	Demonstrates an attempt to use sources to support ideas in the writing.
Control of Syntax and Mechanics	Uses graceful language that skillfully communicates meaning to readers with clarity and fluency, and is virtually error-free.	Uses straightforward language that generally conveys meaning to readers. The language in the portfolio has few errors.	Uses language that generally conveys meaning to readers with clarity, although writing may include some errors.	Uses language that sometimes impedes meaning because of errors in usage.

As a result of the GEO #1: Communication Assessment, a Chemistry Instructor added an assignment in which students write short responses to TED talks that they watch online to give students more practice and feedback with their writing. Attached are two samples of student work.

[redacted]

Chem 22 M/W

Ted Talk #2 Print Your own Medicine

Organic chemists are now finding ways to print molecules out in 3D as well as 'APP'ing chemistry to make universal chemistry sets. APPing chemistry making chemistry sets universal for everyone to use. It's pretty neat.

With chemists constantly working with different tool sets or chemistry sets, making a universal chemistry set for many people to use. This allowed the ability to create a 3D chemistry set by using a 3D printer. What they did was print half chemistry set, and half molecules they were working with. This printer is able to print molecules. That's pretty awesome. Instead of printing products and objects with the 3D printer, they started to print molecules with it. This lead up to the idea of being able to being able to diagnose illness or sickness inside of you, using your own cells, and printing your own medicine to heal whatever it is that is wrong with you. According to your own body. By printing what illness is in your body, and what molecule or chemical can heal it. The cool thing is there is also the ability to use your own stem cells to heal or diagnose yourself. This is done by searching and downloading the blueprint for the molecule you need, and it's printed by using a universal set of chemical inks, special hardware, software, and a diagnosis. This allows many people to fight viruses that may be new, super harmful, and gives many people access to medicine, that would other wise take forever to get, allowing people to fight disease quickly.

I think this is one of the coolest things that could be done, ever. Using a 3D printer to print molecules and medicines for diseases? There's not a lot that's cooler than that. It allows people that need specific medicines or molecules to fight off super diseases to get them, instead of getting medicines that are usually used for general purposes. It allows people to use medicine that is specifically tailored to their human bodies. This will allow for better, safer medicine, which will benefit people a great deal more than most medicines out there. This is a really fantastic idea in my opinion. And I really hope that they'll find a way to get this out as fast as possible and not keep it as just research or a prototype. People out in the world desperately need something like this. The ability to create specific molecules to cater to peoples needs and illnesses seems like such a leap for humanity in the world of healing and medicine. It will help a lot of people that couldn't be helped before. I just really hope it gets out to the world soon.

[redacted]

TED Talk #2

The second TED talk that I decided to watch was titled, "Re-engineering mosquitoes to fight disease" by Hadyn Perry, who is the CEO of Oxitec, a biotech company that strives to find better ways of insect control. Mr. Perry opened his presentation by stating that the mosquito has killed more humans than any other animal, disaster, and war. He went on to talk about a particular disease that has been spreading rapidly within the last 50 years; the Dengue fever. He began to explain that the reason why Dengue fever was so lethal to people was because there are 4 different strains of the disease. If a person were to get it for the first time, their bodies would be mildly affected because antibodies would be made to counter it. But if the same person were to contract the disease a second time, they would suffer much greater symptoms because the previously formed antibodies would not be able to fight the new strain of Dengue. A particular species of mosquitoes were known to spread the Dengue, the Aedes Aegypti mosquito. During his research, Mr. Perry tried to find an effective method to lower the population of Aegypti. He mentioned that he wanted to find a solution that could only harm this particular species of mosquito because other species of mosquitoes were actually beneficial to the environment. A cool fact about mosquitoes is that only the females were the ones that bit because they needed the blood to make eggs. The males don't have the capability to bite and only focus on finding mates. Knowing this piece of information, Mr. Perry and Oxitec made a factory to make their own sterile male mosquitoes. After many tests, Mr. Perry and his team found out that the population of the Aegypti mosquitoes went down drastically because the sterile mosquitoes prevented the females from producing fertile eggs. Because of his research, Mr. Perry was able to find a efficient solution to control the population of a particular species of insect. With further funding in the future, Mr. Perry hopes to take on the challenge of preventing the spread of malaria in the world. I chose to watch this TED Talk because I know from previous experiences how mosquitoes have spread diseases throughout the world particularly in areas without adequate medical care. After watching Hadyn Perry's presentation, I think it's pretty interesting how we can genetically engineer living things to suit our needs. Perhaps in the future, we could start to find new things to engineer to further benefit the world.

As a result of the GEO #1: Communication Assessment, a Chemistry Instructor further developed his assignment prompt for lab reports with more specific information on how to organize and prepare it.

CHEMISTRY 1A
How to Organize a Laboratory Report

All lab reports **MUST BE TYPED** or done in **Ink**. Processors are available for student use in the natural sciences computer lab.

LAB REPORTS WILL INCLUDE:

1. COVER PAGE:
   a. Title of experiment
   b. Name
   c. Partner's name (Clearly labeled as the partner)
   d. Instructor's name
   e. Date

2. A TABLE OF CONTENT (Showing an outline of the report)

3. INTRODUCTION (purpose, background, hypothesis)
Introduction must be written in complete sentences.
Write your lab report in terms of third person singular. For example instead of stating "My hypothesis is that ….." state "One could hypothesis that …"
Some experiments are analytical (for example you are trying to find the percentage of water in an unknown) and therefore no hypothesis is needed. However, you need to give some background on the chemistry that you are using to figure out the composition of your unknown.

4. MATERIALS & METHODS
   Simply refer to the proper pages in the lab manual. You don't have to type the procedure. However, if any changes were made form the lab manual (example: "vacuum filtration was used instead of gravity filtration as in instruction line________page________") it must be included here.

5. DATA & GRAPHS
   Observation and data tables (neatly tabulated). INCLUDE THE UNKNOWN NUMBER IN YOUR DATA TABLE.
   Each data table must have a title and a number.
   Each graph must have a title and a number.
   Each axis in your graphs must be labeled and should have a unit.

6. SAMPLE CALCULATIONS

For each calculation:

Label the calculation (for example: Density of water)
Write the formula for the calculation (example: m/v =d)
Plug in the numbers from your data (example: 10.0234g/10.00ml=1.002g/ml)

UNITS AND SIGNIFICANT FIGURES COUNT!!!!!

Show only one sample calculation for each type of calculations. For example if more than one trial was run (as is usually the case), list only the results of the other calculations (in the appropriate data tables).

An example is:

Density of water m/v = d   10.0234g/10.00ml = 1.002g/ml

6. CONCLUSION:

This is where you tell what the final result is. You need to discuss you data with respect to the points that you raised in your introduction. You need to be very specific. You need to state your results. State where you got them from (which table # or graph #) and what your results indicate (you need to discuss your data with respect to the points you raised in your introduction). Your conclusion also must be written in terms of third person singular.

EXAMPLE:

My data shows that the unknown # 6 is 25% by mass water.

According to the data in table 3 unknown # 6 is 25% by mass water.

8. ANALYSIS OF SOURCES OF ERROR:

All experimental procedures have some sources of error. Indicate at least 1 possible source of error for each part of the experiment (these could be errors that you possibly committed during the experiment, or that one could commit during the experiment). For each source, tell what effect the error would have on the results

9. The original data (raw data) must be clearly labeled and included at the end of the experiment.
10. The check list for the written report from your lab manual must be included here.

As a result of the GEO #1: Communication Assessment, a Chemistry Instructor now requests that his students take a formal lab report on salt water analysis through multiple revisions, incorporating his feedback. Attached are multiple versions with a final draft.

Draft 1

[redacted]

Chem 1A

11/11/2012

Abstract: To find the salinity of seawater through the methods of conductivity and evaporation. Find calcium and chloride concentration through the method of titration. biological factor?

Introduction: Seawater from different areas contains different amount of salinity and other ions such as calcium and chloride. These factors will affect the ability of the area to sustain life and the chemical composition effects they have on the animals that are living there. Seawater from 3 different areas has been collected for the experiment. Testing the seawater from each area will show the relationship of salinity of seawater to the abundance of crabs and the relationship of the amount of calcium ions to the size of crab shells and mussels.

In this experiment, the experimental methods of conductivity and evaporation will be used to measure the salinity of water. Conductivity meter is used to measure the salinity of seawater. Conductivity is measuring the amount of current that is allowed to pass through the solution. A solution that has high salinity has a higher resistance of the electric current that passes through it. Therefore, the higher the salinity of seawater, the higher the reading on the conductivity meter will be. why?

Another method of measuring salinity will be evaporation. Evaporation is the process by which liquid is converted from its liquid form to its vapor form. In this experiment, seawater is boiled to remove the water and sodium chloride will be left behind as residue. After all the water has evaporated, the mass of the residue will be measured. Therefore, the higher the salinity of the seawater, the heavier the mass of the residue will be.

The experiment will also measure calcium and chloride concentration through the method of titration. Titration is the measure of a solution of unknown concentration is added to a known volume of a second solution until the reaction between them is just complete; the concentration of the unknown solution (the titer) can then be calculated. Fill 50 ml of silver nitrate solution into the burette and then titrate it with the seawater mixed with potassium chromate solution. Continue titrating the solution until it reaches the end point where the solution will turn a light orange color and then read the reading on the burette to check how much silver nitrate solution was used. The color change is due to the fact that the seawater mixed with potassium chromate has reached an end point. There is a reaction between the silver in the silver nitrate solution and the chloride ion in the seawater. Therefore, the higher the amount of calcium and chloride concentration, the more the amount of silver nitrate used.

titration reaction, explain better.

Hence, the experiment will test whether a higher salinity of seawater will result in more crabs living in the area and also whether the higher the concentration of calcium in seawater will affect the size of crab shells and mussels.

Experiments Methods:

- Titration For Chloride

Materials:

- Filter Paper
- Erlenmeyer Flask (500ml)
- Funnel

paragraph form

- Buret and stand
- 10ml graduated cylinder
- Silver nitrate solution 0.1M ($AgNO_3$)
- Potassium Chromate ($KCr0_4$)– Color indicator

method, paragraph form

Steps:

1. Filter the seawater from all 3 areas.
2. Measure 1ml of seawater from Area 1 using the 10ml-graduated cylinder,
3. Fill up the 10ml-graduated cylinder by putting 9ml of distilled water to make a 10% seawater solution.
4. Transfer the 10% seawater solution into a 500ml erlenmeyer flask.
5. Set up the buret and stand and fill the buret with $AgNO_3$.
6. Measure where the buret is filled up to.
7. Put 3 drops of potassium chromate into the seawater solution from Area 1.
8. Titrate the solution with the 0.1M $AgNO_3$ until the color changed into a light orange.
9. Repeat the steps for the other Areas.

Reactions:

$AgNO_{3\,(aq)} \rightarrow Ag^{+}_{(aq)} + NO3^{-}_{(aq)}$

$Ag^{+}_{(aq)} + Cl^{-}_{(aq)} \rightarrow AgCl_{(s)}$

Data:

	Start Point (ml)	End Point (ml)	Amount Used (ml)
Sample 1	20.5	23.9	3.40
Sample 2	23.9	27.3	3.40

Sample 3	27.3	31.0	3.70

Calculations: (Not taught yet)

- Titration For Calcium: (Not yet done)
- Conductivity

  Materials:

  - Seawater of the 3 Areas
  - Conductivity Meter

Steps:

1. Make salt water solution:
   a. Put 2 grams of salt into 100 mL water, which makes 2% solution.
   b. Dilute the solution into two separate 1% salt solutions by putting 50 mL of 2% solution with 50 mL of water.
   c. Dilute the solution further into 4 separate 0.5% salt solutions.
   d. From one of the 0.5% solution, take 30 mL and dilute it into 70 mL of water to get 0.3% solution.
   e. From the same 0.5% solution, take 20 mL of solution and dilute it into 80 mL of water to get 0.2% solution.
   f. Get another 0.5% solution, take 40 mL of the solution and dilute it into 60 mL of water to get 0.4% solution.
   g. From the same 0.5% solution, there is 10 mL 5% solution left, dilute it into 90 mL of water to get 0.1% solution.

2. Make a standard curve:

   a) Measure the conductivity of the salt-water solution by putting the conductivity meter into the salt-water.

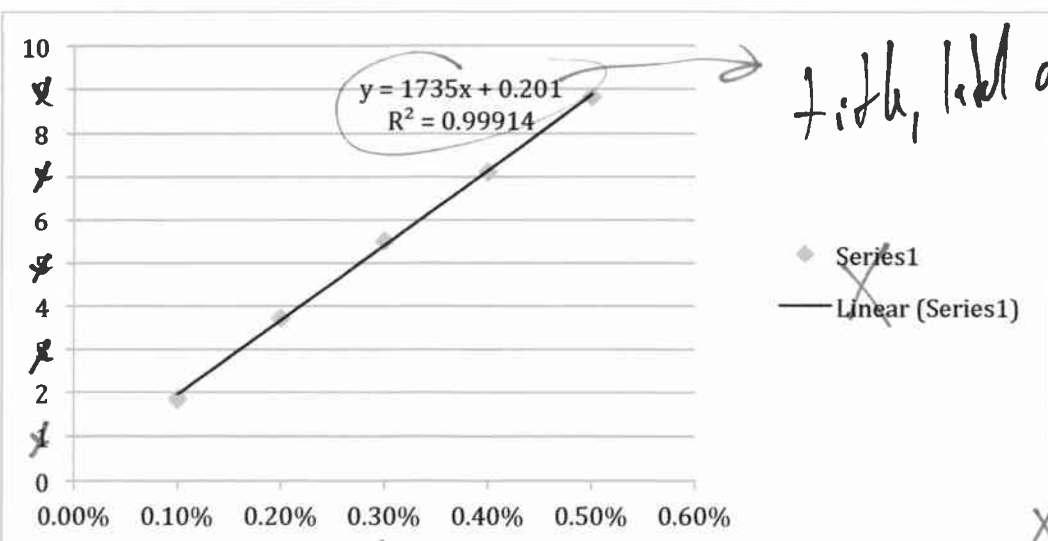
   b) Measure the conductivity of the seawater from the different areas.

   c) Use the standard curve to measure the percent salinity of the seawater from the different areas.

Data:

0.1%	1.85mS
0.2%	3.72mS
0.3%	5.52mS
0.4%	7.11mS
0.5%	8.83mS

label



title, label axis.

label

Area	Conductance	% Salinity
1	5.40mS	0.30
2	4.34mS	0.24
3	5.26mS	0.29

Evaporation: (Not done yet)

Draft 2

[redacted]

Chem 1A

11/11/2012

[redacted]

Lab Report

Abstract: ~~To find~~ The salinity of seawater was determined using ~~through the methods~~ of conductivity and evaporation. ~~Find~~ Calcium ion and chloride concentration was determined with ~~through the method of~~ titration. These values were compared ~~To also find out the connection between calcium and chloride connection~~ to the size of the crab shells.

Introduction: Seawater from different areas contains different amount of salinity and other ions such as calcium and chloride. These factors will affect the ability of the area to sustain life and the chemical composition effects they have on the animals that are living there. Seawater from 3 different areas has been collected for the experiment. more specific on area. Testing the seawater from each area will show the relationship of salinity, calcium and chloride ~~of seawater~~ to the abundance of crabs and the relationship of the amount of calcium ions to the size of crab shells and mussels. what about chloride?

~~In this experiment, the experimental methods of~~ Conductivity and evaporation was ~~will be~~ used to measure the salinity of water. ~~Conductivity meter is used to measure the salinity of seawater~~. Conductivity is measuring the amount of current that is allowed to pass through the solution. A solution that has high salinity has a higher resistance of the electric current that passes through it. This is due to the fact that there are more sodium and chloride ions that produced a higher resistance for the current to pass through.

This statement is not correct. Salinity = ↑ ion concentration, ↑ ion concentration is not going to equal higher resistance.

Eriochrome black T

not if resistance is higher.

Therefore, the higher the salinity of seawater, the higher the reading on the conductivity meter will be.

Another method of measuring salinity will be evaporation. Evaporation is the process by which liquid is converted from its liquid form to its vapor form. In this experiment, seawater is boiled to remove the water and sodium chloride will be left behind as residue. After all the water has evaporated, the mass of the residue will be measured. Therefore, the higher the salinity of the seawater, the heavier the mass of the residue will be.

just sodium chloride?

The experiment will also measure calcium ion and chloride concentration through the method of titration. Titration is the measure of a solution of unknown concentration ~~is~~ by add~~ed~~ing ~~to~~ a known volume of a second solution w/ a known concentration until the reaction between them is just complete; the concentration of the unknown solution (the titer) can then be calculated. Fill 50 ml of silver nitrate solution into the burette and then titrate it with the seawater mixed with potassium chromate solution. Continue titrating the solution until it reaches the end point where the solution will turn a light orange color and then read the reading on the burette to check how much silver nitrate solution was used. The color change is due to the fact that the seawater mixed with potassium chromate has reached an end point. The reactions are: What do you mean by "end point"

never heard of this word?

method

seem to be a method. Restate to just talk about titration theory.

explain in intro.

there only reactions? What about indicator → what does it do?

$$AgNO_{3\,(s)} \rightarrow Ag^{+}_{(aq)} + NO^{-}_{3\,(aq)}$$

$$Ag^{+}_{(aq)} + Cl^{-}_{(aq)} \rightarrow AgCl_{(s)}$$

What has happened at end point?

Therefore, the higher the amount of calcium and chloride concentration, the more the amount of silver nitrate used.

has nothing to do w/ $AgNO_3$.

Hence, the experiment will test whether a higher salinity of seawater will result in more crabs living in the area and also whether the higher the concentration of calcium ion in seawater will affect the size of crab shells and mussels. How did you determine Ca^{+2}?

Chloride Titration:

The materials needed are filter paper, Erlenmeyer flask (500ml), funnel, buret and stand, 10ml graduated cylinder, silver nitrate solution 0.1M and potassium chromate (color indicator). do not need this.

Seawater was filtered ~~To start of the experiment, filter the seawater~~ from all 3 areas. Then measure 1ml of seawater from Area 1 using the 10ml graduated cylinder. Then fill up the 10ml graduated cylinder by putting 9ml of distilled water to make a 10% seawater solution. rotate, make 1 sentence. Transfer the 10% seawater solution into a 500ml Erlenmeyer flas. Then set up the buret and fill it with $AgNO_3$ ~~Measure where the buret is filled up~~ to. Concentration? After that, put 3 drops of potassium chromate solution into the seawater solution from Area 1. How did you make it? Titrate the solution with the 0.1M $AgNO_3$ until the color changed into a light orange. Then repeat the steps for the other areas.

Why is this added?

Reactions:

$AgNO_{3\,(aq)} \rightarrow Ag^{+}_{(aq)} + NO3^{-}_{(aq)}$

$Ag^{+}_{(aq)} + Cl^{-}_{(aq)} \rightarrow AgCl_{(s)}$

Data:

	Start Point (ml)	End Point (ml)	Amount Used (ml)
Sample 1	20.5	23.9	3.40
Sample 2	23.9	27.3	3.40
Sample 3	27.3	31.0	3.70

Calculations:

For Area 1:

$$\frac{0.100molAgNO_3}{1L}\times 3.4ml\times\frac{1L}{10^3ml}\times\frac{1molAg^+}{1molAgNO_3}=3.4\times10^{-4}molAg^+$$

$$3.4\times10^{-4}molAg^+\times\frac{1molCl^-}{1molAg^+}\times\frac{34.5gCl^-}{1molCl}=\frac{0.01173gCl^-}{1ml}\times100\%\ \times10$$

just 1 example, then table for all chloride concentration.

For Area 2:

$$\frac{0.100molAgNO_3}{1L}\times 3.4ml\times\frac{1L}{10^3ml}\times\frac{1molAg^+}{1molAgNO_3}=3.4\times10^{-4}molAg^+$$

$$3.4\times10^{-4}molAg^+\times\frac{1molCl^-}{1molAg^+}\times\frac{34.5gCl^-}{1molCl}=0.01173gCl^-$$

concentration?

For Area 3:

$$\frac{0.100molAgNO_3}{1L}\times 3.7ml\times\frac{1L}{10^3ml}\times\frac{1molAg^+}{1molAgNO_3}=3.7\times10^{-4}molAg^+$$

$$3.7\times10^{-4}molAg^+\times\frac{1molCl^-}{1molAg^+}\times\frac{34.5gCl^-}{1molCl}=0.01277gCl^-$$

- Titration For Calcium:

The materials needed are, Erlenmeyer flask (500ml), funnel, buret and stand, 50ml graduated cylinder, EDTA solution and sodium hydroxide solution and color indicator.

Intro for Ca^{+2}?

~~To start the experiment~~, mMeasure 10ml of seawater from Area 1 using the 50ml graduated cylinder and transfer it into the Erlenmeyer flask. Then measure 50ml of distilled water using the 50ml graduated cylinder and transfer the distilled water into the Erlenmeyer flask. Then put 30 drops of NaOH solution into the seawater solution. Put 3 drops of color indicator in the solution, the solution will turn light red color. Then fill up the buret with EDTA solution and measure where the buret is filled up to. Titrate the seawater solution and stop until the color changed into blue color. Then repeat the experiment for the other areas.

Data:

	Start Point (ml)	End Point (ml)	Amount Used (ml)
Area 1	33.3	39.3	6.0
Area 2	19	24	5.0
Area 3	39.3	46.7	7.4

Calculations:

For Area 1:

$$6ml \times \frac{0.01molEDTA}{L} \times \frac{10^{-3}L}{1ml} = 6\times10^{-5}moles$$

$$6\times10^{-5} \times \frac{1molCa^{2+}}{1molEDTA} \times \frac{1}{10ml} \times \frac{10^{3}}{L} = 6\times10^{-3}molesofCa^{2+}$$

Show one calculation, then put all data in table form.

For Area 2:

$$5ml \times \frac{0.01molEDTA}{L} \times \frac{10^{-3}L}{1ml} = 5\times10^{-5}moles$$

$$5\times10^{-5} \times \frac{1molCa^{2+}}{1molEDTA} \times \frac{1}{10ml} \times \frac{10^{3}}{L} = 5\times10^{-3}molesofCa^{2+}$$

For Area 3:

$$7.4ml \times \frac{0.01molEDTA}{L} \times \frac{10^{-3}L}{1ml} = 7.4\times10^{-5}moles$$

$$7.4\times10^{-5} \times \frac{1molCa^{2+}}{1molEDTA} \times \frac{1}{10ml} \times \frac{10^{3}}{L} = 7.4\times10^{-3}molesofCa^{2+}$$

Measuring salinity through conductivity meter:

Materials needed ~~are~~ solutions of 1%, 2%, 3%, 4% ~~and~~ 5% salt-water concentrations, seawaters ~~from the~~ 3 areas ~~and~~ conductivity ~~meter~~. what salt, what assumptions making in intro?

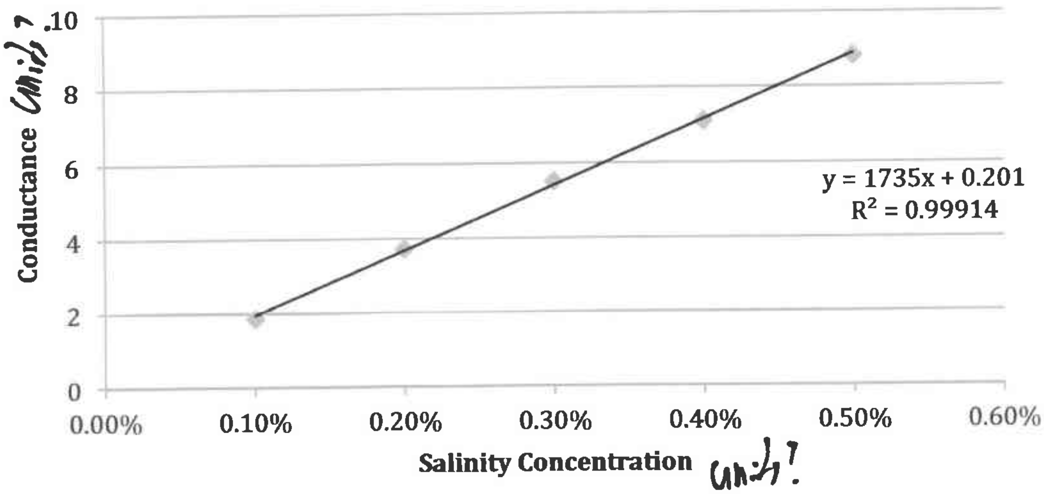
~~First~~ M ~~m~~ake salt-water solution by putting 2 grams of salt into 100ml water, which makes a 2% solution. Dilute the solution into two separate 1% salt solutions by putting 50ml of 2% solution with 50ml of distilled water. Dilute the solution futher into 4 separate 0.5% salt solutions. From on of the 0.5% solution, take 30ml and dilute it into 70ml of water to get 0.3% solution. From the same 0.5% solution, take 20ml of solution and dilute it into 80ml of water to get 0.2% solution. From another 0.5% solution, take 40ml of the solution and dilute it into 60ml of water to get 0.4% solution. Dilute 10ml of 0.5% solution with 90ml of water to get 0.1% solution. ~~Put the 0.1%, 0.2%, 0.3%, 0.4%, and 0.5% solution into 5 different bottles.~~ Mark ~~the bottle~~. std. curve info in intro?

~~Make a~~ A standard curve ~~for the experiment~~ We prepared plotting....? ← what two variables are plotted together? measuring the conductivity of salt-water solution by putting the conductivity into the salt-water. Then measure the confuctivity of the salt-water solution by putting the conductivity meter into the saltwater. Use the standard curve to measure the percent salinity of the seawater from the different areas.

Data: put table on same page. ?

0.1%	1.85mS
0.2%	3.72mS

0.3%	5.52mS
0.4%	7.11mS
0.5%	8.83mS



Area	Conductance	% Salinity
1	5.40mS	0.30
2	4.34mS	0.24
3	5.26mS	0.29

Biological Data:

	Area 1	Area 2	Area 3
Average Crab Abundance	16.5	9.50	3.33
Average Mussels Abundance	86.0	56.6	0.00
Average Crab Size (cm)	0.88	0.65	2.50
Average Mussels Size (cm)	5.46	4.08	0.00

Conclusion:

chemical composition

Comparing the ~~experiment~~ data and the biological data, show that the higher the salinity of the water, the higher the abundance of crab and mussels. Area 1 having the highest salinity of 0.30% has an average of 16.5 amount of crab and 86.0 amount of mussels. While area 2 having a smaller salinity of 0.24% has an average of 9.50 amount of crabs and 56.6 amount of mussels. However, area 3 has a higher salinity than area two but the amount of crab and mussels are lower that the amount in area 2.

From the experiment data and biological data, it showed that the higher the calcium concentration, the bigger the size of the crabs and mussels. Area 3 has the

not a concentration!

highest calcium concentration of 7.4×10^{-3} moles of calcium, has the largest size of crab of 2.50cm. Area 1 has a calcium concentration of 6×10^{-3} moles of calcium while area 2 has a calcium concentration of 5×10^{-3} moles of calcium. In area 1 the crabs have an average size of 0.88cm and area 2 has an average size of 0.65cm. Also in area 1, the mussels have an average size of 5.46cm and 4.08 in area 2. The data showed that the higher the concentration of calcium, the larger the size of the crabs and mussels.

Is this data accurate/precise. Should talk about how well the data correlates to known facts. Did this data correspond to what has been done before?

references?

180/200

[redacted]

Chem 1A

12/05/2012

[redacted]

Final Draft

Seawater Analysis

Abstract: The salinity of seawater was determined using conductivity and chlorine titration. Calcium ion concentration was determined with titration. The values were compared to the size of the crab shells and mussels.

Introduction: Seawater from different areas contains different amount of salinity and other ions such as calcium and chloride. These factors will affect the ability of the area to sustain life and the chemical composition effects they have on the animals that are living there. Seawater from 3 different areas from long beach, which were 20 feet apart from each other, has been collected for the experiment. Testing the seawater from each area will show the relationship of salinity of seawater to the abundance of crabs and the relationship of the amount of calcium ions to the size of crab shells and mussels. Measuring the amount of chloride concentration will also determine the salinity of the seawater and show the relationship of the abundance of crabs and mussels to the concentration of salinity.

Conductivity was used to measure the salinity of water. Conductivity is measuring the amount of electric current in a solution. A solution that has high salinity has a higher reading on the conductivity meter due to the amount of ions in the solution. The higher the amount of ions in the solution will result in a higher reading on the conductivity. As the ions in seawater are mostly sodium and chloride, and the value on the conductivity depends on the ions that contribute to the reading, therefore using conductivity will be a good method to test for salinity in seawater. Therefore, the higher the salinity of seawater, the higher the reading on the conductivity meter will be.

The experiment will also measure chloride concentration through the method of titration. Titration is the measure of a solution of unknown concentration by adding to a known volume of a second solution with a known concentration until the reaction between them is just complete; the concentration of the unknown solution can then be calculated. In titration, the silver nitrate solution will be displaced by the chlorine ion to form silver chloride. A potassium chromate solution will act as a color indicator to indicate when the concentration of the silver ion has become excess in the solution of seawater and silver chloride. This means that the titration has reached an end point. The solution will turn to a light orange color, which shows that the titration is done. The reactions are:

$$AgNO_{3\,(s)} \rightarrow Ag^{+}_{(aq)} + NO_{3}^{-}{}_{(aq)}$$

$$Ag^{+}_{(aq)} + Cl^{-}{}_{(aq)} \rightarrow AgCl_{(s)}$$

$$2Ag^{+}_{(aq)} + CrO_{4}^{2-}{}_{(aq)} \rightarrow Ag_{2}CrO_{4\,(aq)}$$

Therefore, the higher the amount of chloride concentration, the more the amount of silver nitrate used.

Another type of titration is used to measure calcium concentration. The solutions needed were EDTA solution (H_2Y^{2-}), sodium hydroxide solution and color indicator of Hydroxynaphthol blue ($MgIn^-$). In this titration, the sodium hydroxide solution will be displaced by the Magnesium ion in the color indicator to form magnesium hydroxide. This is to allow the calcium ions in the seawater to react with the EDTA solution. A hydroxynaphthol blue solution will act as a color indicator to indicate when the concentration of the EDTA solution has displaced the entire magnesium ion from the color indicator. This means that the titration has reached an end point. The solution will turn from red to a light blue color, which shows that the titration is done. The reactions are:

Main Reaction: $H_2Y^{2-}{}_{(aq)} + Ca^{2+}{}_{(aq)} \rightarrow CaY^{2-}{}_{(aq)} + 2H^+{}_{(aq)}$

$H_2Y^{2-}{}_{(aq)} + Mg^{2+}{}_{(aq)} \rightarrow MgY_{(aq)} + 2H^+{}_{(aq)}$

At End Point: $H_2Y^{2-}{}_{(aq)} + MgIn^-{}_{(aq)}$ (red) $\rightarrow MgY^{2-}{}_{(aq)} + HIn^{2-}{}_{(aq)}$ (light blue) + $H^+{}_{(aq)}$

Hence, the experiment will test whether a higher salinity of seawater will result in more crabs living in the area and also whether the higher the concentration of calcium in seawater will affect the size of crab shells and mussels.

Chloride Titration:

Seawater was filtered from all 3 areas. Then measure 1ml of seawater from Area 1 using the 10ml graduated cylinde and then fill up the 10ml graduated cylinder by putting 9ml of distilled water to make a 10% seawater solution. Transfer the 10% seawater solution into a 500ml Erlenmeyer flask. Then set up the buret and fill it with 0.1M AgNO3. After that, put 3 drops of potassium chromate solution into the seawater solution from Area 1. The potassium chromate solution is used as a color indicator to show when the solution reach the end point. Titrate the solution with the 0.1M $AgNO_3$ until the color changed into a light orange. Then repeat the steps for the other areas.

Reactions:

$AgNO_{3\,(aq)} \rightarrow Ag^{+}_{(aq)} + NO3^{-}_{(aq)}$

$Ag^{+}_{(aq)} + Cl^{-}_{(aq)} \rightarrow AgCl_{(s)}$

$2Ag^{+}_{(aq)} + CrO_4^{2-}{}_{(aq)} \rightarrow Ag_2CrO_{4\,(aq)}$

Silver nitrate solution:

1. Weigh 4.5g of solid silver nitrate on an analytical balance.
2. Dispense the solid silver nitrate into a 250ml conical flask and fill up to the line with distilled water, stopping frequently to swirl the flas and mix the solution evenly
3. Decant the solution into a brown bottle. Label it as 0.1M $AgNO_3$.

Potassium Chromate Indicator Solution:

1. Use a 50ml graduated cylinder to measure 20 ml of distilled water and decant into a 50ml beaker.
2. Weight 1 g of potassium chromate on an analytical balance and add it to the beaker. Stir the solution thoroughly.
3. Decant into a brown bottle. Label it as 0.25M K_2CrO_4 me2l, -5

Data:

	Start Point (ml)	End Point (ml)	Amount Used (ml)
Sample 1	20.5	23.9	3.40
Sample 2	23.9	27.3	3.40

Sample 3	27.3	31.0	3.70

Calculations:

For Area 1:

$$\frac{0.100molAgNO_3}{1L} \times 3.4ml \times \frac{1L}{10^3 ml} \times \frac{1molAg^+}{1molAgNO_3} = 3.4 \times 10^{-4} molAg^+$$

$$3.4 \times 10^{-4} molAg^+ \times \frac{1molCl^-}{1molAg^+} \times \frac{34.5gCl^-}{1molCl} = 0.01173gCl^-$$

$$\%Cl\_in\_10\%seawater = \frac{0.01173gCl}{10} \times 100\% = 0.1173\%$$

$$\%Cl\_in\_100\%seawater = 0.1173 \times 10 = 1.173\%$$

Areas	Percentage of Chloride (%)
Area 1	1.173 or (11.73ppt)
Area 2	1.173 or (11.73ppt)
Area 3	1.277 or (12.77ppt)

- Titration For Calcium:

Measure 10ml of seawater from Area 1 using the 50ml graduated cylinder and transfer it into the Erlenmeyer flask. Then measure 50ml of distilled water using the 50ml graduated cylinder and transfer the distilled water into the Erlenmeyer flask. Then put 30 drops of NaOH solution into the seawater solution. Put 3 drops of color indicator in the solution, the solution will turn light red color. Then fill up the buret with EDTA solution and measure where the buret is filled up to. Titrate the seawater solution and stop until the color changed into blue color. Then repeat the experiment for the other areas.

Reactions:

Main Reaction: $H_2Y^{2-}{}_{(aq)} + Ca^{2+}{}_{(aq)} \rightarrow CaY^{2-}{}_{(aq)} + 2H^+{}_{(aq)}$

$H_2Y^{2-}{}_{(aq)} + Mg^{2+}{}_{(aq)} \rightarrow MgY{}_{(aq)} + 2H^+{}_{(aq)}$

At End Point: $H_2Y^{2-}{}_{(aq)} + MgIn^-{}_{(aq)}$ (red) $\rightarrow MgY^{2-}{}_{(aq)} + HIn^{2-}{}_{(aq)}$ (light blue) + $H^+{}_{(aq)}$

Data:

	Start Point (ml)	End Point (ml)	Amount Used (ml)
Area 1	33.3	39.3	6.0
Area 2	19	24	5.0
Area 3	39.3	46.7	7.4

Calculations:

For Area 1:

$$6ml \times \frac{0.01molEDTA}{L} \times \frac{10^{-3}L}{1ml} = 6\times10^{-5}moles$$

$$6\times10^{-5} \times \frac{1molCa^{2+}}{1molEDTA} \times \frac{1}{10ml} \times \frac{10^3}{L} = 6\times10^{-3}molesofCa^{2+}$$

$$6\times10^{-3}molesofCa^{2+} \times 40 = 0.24g\_of\_Ca^{2+}$$

$$Calcium\_concentration = 0.24\times0.1\times10 = 0.24\%$$

$$\frac{6\times10^{-3}}{100} = 6\times10^{-5}M$$

Areas	Calcium Concentration (M)
Area 1	6.0×10^{-5}

Area 2	5.0×10^{-5}
Area 3	7.4×10^{-5}

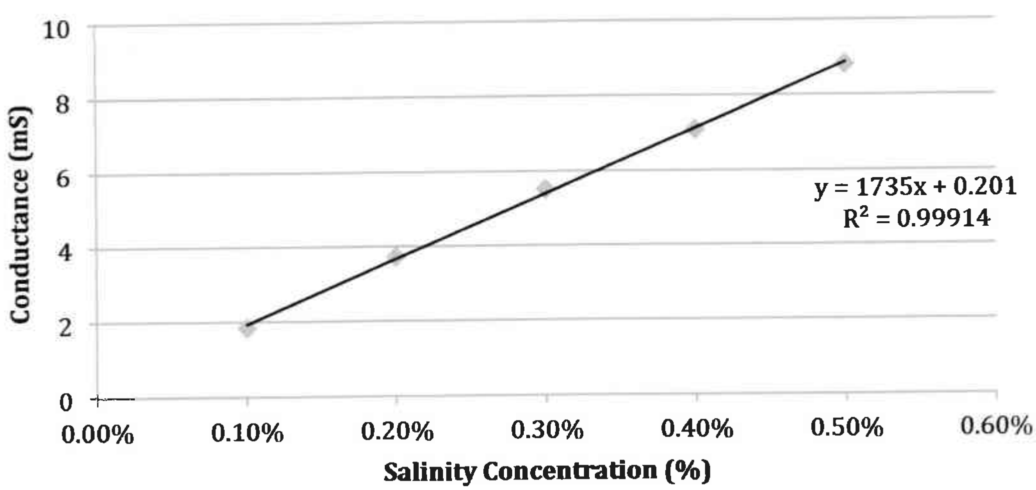
Measuring salinity through conductivity meter:

First make salt-water solution by putting 2 grams of sodium chloride into 100ml water, which makes a 2% solution. Dilute the solution into two separate 1% salt solutions by putting 50ml of 2% solution with 50ml of distilled water. Dilute the solution futher into 4 separate 0.5% salt solutions. From on of the 0.5% solution, take 30ml and dilute it into 70ml of water to get 0.3% solution. From the same 0.5% solution, take 20ml of solution and dilute it into 80ml of water to get 0.2% solution. From another 0.5% solution, take 40ml of the solution and dilute it into 60ml of water to get 0.4% solution. Dilute 10ml of 0.5% solution with 90ml of water to get 0.1% solution.

A standard curve was prepared by plotting the conductivity of salt-water solution by putting the conductivity meter into the salt-water. Then measure the conductivity of the salt-water solution by putting the conductivity meter into the saltwater. The conductance is plotted on the Y-axis and the salinity concentration on the X-axis. Use the standard curve to measure the percent salinity of the seawater from the different areas.

Data:

Salinity Concentration (%)	Conductance [mS(micro siemens)]
0.1	1.85
0.2	3.72
0.3	5.52
0.4	7.11
0.5	8.83



Area	Conductance	% Salinity
1	5.40mS	0.30
2	4.34mS	0.24
3	5.26mS	0.29

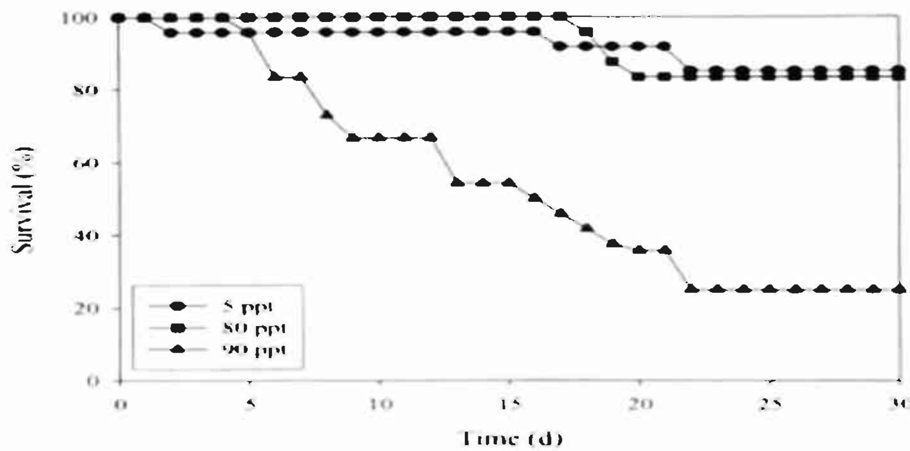
Biological Data:

	Area 1	Area 2	Area 3
Average Crab Abundance	16.5	9.50	3.33
Average Mussels Abundance	86.0	56.6	0.00
Average Crab Size (cm)	0.88	0.65	2.50
Average Mussels Size (cm)	5.46	4.08	0.00

math -5

Conclusion:

The data of the titration experiment showed that Area 1 and 2 have a chloride concentration of 11.73ppt and area 3 has a concentration of 12.77ppt. According to the experiment done by Florida Institute of Technology, Department of Biological Sciences, crabs inhabit in area of salt concentration from 5-34 ppt. The research showed that the higher the salinity of the seawater, the higher the chances of survival for the crabs. However, if the salinity is too large (90ppt or more), their survival chances decreases.

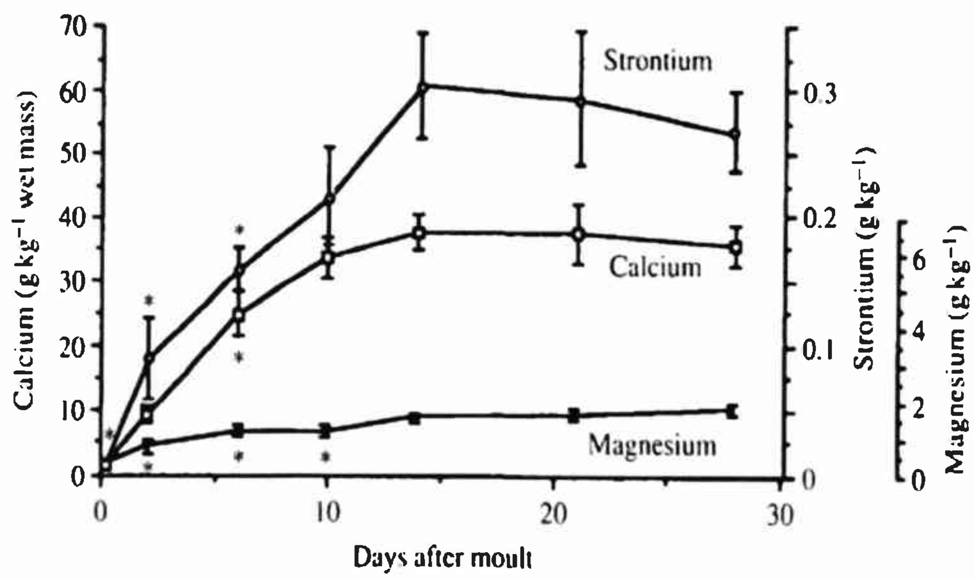


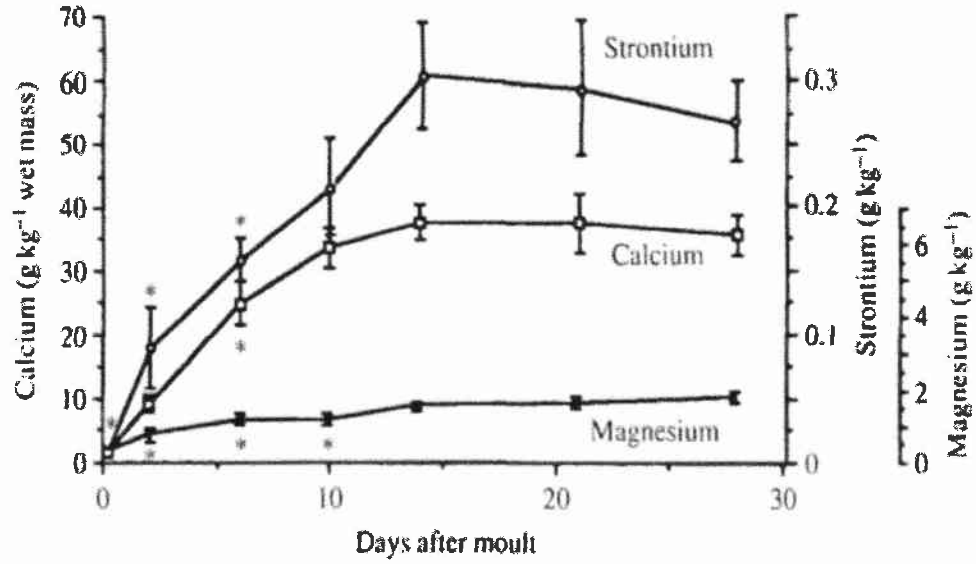
The graph showed the chances of survival for the crabs in different salinity. This showed that crabs prefer to live in a higher salinity of water. The higher the salinity of water, the higher the survival rates therefore a higher abundance. However, from the data of the chloride titration, the higher the salinity, result in a lower abundance of crabs. Area 1 and 2 has a chloride concentration of 11.73 ppt while area 3 has a chloride concentration of 12.77ppt. But Area 1 has the highest abundance of crabs but has a lower salinity compared to Area 3, which has a highest salinity. Therefore, the experiment done by the Florida Institute of Technology, Department of Biological Sciences, disagrees with the claim that a higher salinity in seawater will result in the higher abundance of crabs.

However, comparing the data of the conductivity meter and the biological data, show that the higher the salinity of the water, the higher the abundance of crab and mussels. Area 1 having the highest salinity of 0.30% has an average of 16.5 amount of crab and 86.0 amount of mussels. While area 2 having a smaller salinity of 0.24% has an average of 9.50 amount of crabs and 56.6 amount of mussels. However, area 3 has a higher salinity than area two but the amount of crab and mussels are lower that the amount in area 2. Thus, the data collected by Florida Institute of Technology, Department of Biological Sciences proved the claim that the higher the salinity of seawater, the higher the abundance of crabs and mussels.

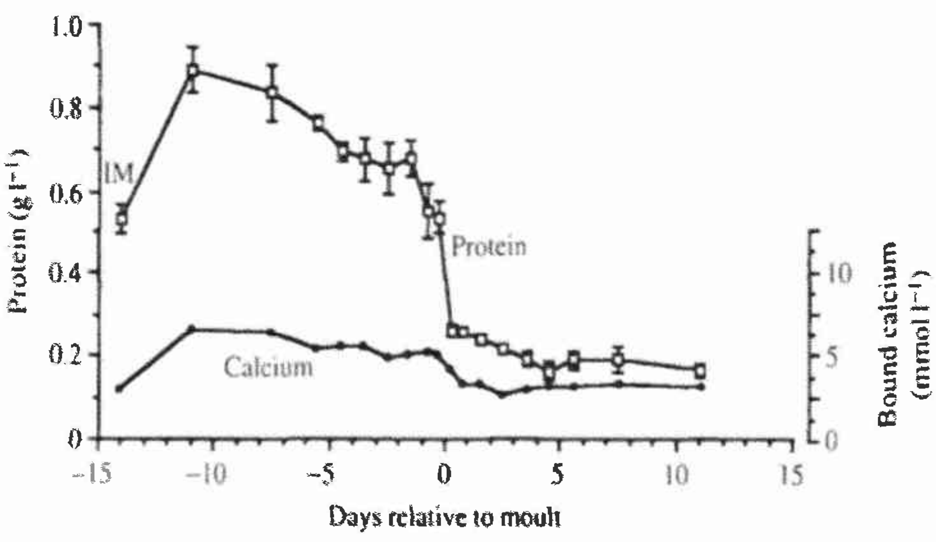
The difference between the chloride titration data and the conductivity meter data is because salinity does not depend solely on chloride titration. There are other ions that affect the salinity of seawater. It showed that there are lesser chloride ions in Area 1 and 2 than Area 3, but because using the conductivity meter showed that the total salinity of Area 1 is bigger than Area 2 and the salinity of Area 2 is bigger than Area 3. Therefore, it could be said that there are other factors affecting salinity concentration, not just due to chloride ions.

According to an experiment done by University of Texas at Austin, Marine Science Institute, as the crabs undergo moulting, their size also increase. According to the experiment, calcium contents of crabs immediately after moult were 1.63±0.16gkg^{-1}. Their result proved the increase of concentration of calcium ion during moulting.





The graph showed the increase in calcium intake after moulting and this resulted in the increase of crab size.



This graph showed the calcium intake before moulting and proved that as the crabs are undergoing moulting, there was a great increase in calcium uptake. Therefore, Texas at Austin, Marine Science Institute proved that the claim that the higher the concentration of calcium, the larger the size of the crabs and mussels.

Conclusion -10

Works Cited

Ehlinger, Gretchen S., and Richard A. Tankersley. "Survival and Development of Horseshoe Crab (Limulus Polyphemus) Embryos and Larvae in Hypersaline Conditions." *National Center for Biotechnology Information*. U.S. National Library of Medicine, n.d. Web. 05 Dec. 2012.

Neufeld, Douglas S., and James N. Cameron. "Postmoult Uptake of Calcium by the Blue Crab (Callinectes Sapidus) in Water of Low Salinity." *Postmoult Uptake of Calcium by the Blue Crab (Callinectes Sapidus) in Water of Low Salinity*. N.p., n.d. Web. 05 Dec. 2012.

As a result of the GEO #1: Communication Assessment, a Chemistry Instructor replaced her assessment from the first experiment in the course from fill-in-the-blank and short answer to a formal lab report to give students more practice and feedback with their writing.

9.5/10

[redacted]
Group #6
Chem 1A

Experiment 1, Part A: Precision and Accuracy of Lab Glassware

Introduction

Every chemical glassware serves a specific purpose. Glassware with a "TC" symbol is used to contain chemical solutions and can be found on volumetric flasks and most graduated cylinders. The markings on these types of glassware give an accurate measure of the volume of the solution contained. Glassware with a "TD" notation can be found mainly on burets, pipets, and some graduated cylinders. These types of laboratory equipment are calibrated to accurately deliver chemical solutions at their stated volume. In this lab, we will determine the precision and accuracy of a beaker, buret, graduated cylinder and a volumetric flask when they are used as both a TC and a TD by calculating the density and standard deviation of deionized water that these four glassware types store and transfer, using the measurement markings on these 4 different types of glassware.

Try not to use such long sentences. Break it up.

Procedure

list the materials used in the expt.

1. Obtain a clean 50 ml volumetric flask, a 50 ml buret, a 150 ml beaker and a 50 ml graduated cylinder.

2. Weigh each of the glassware, except for the buret, with an analytical balance. Since the buret cannot be weighed by the analytical balance, weigh another 150 ml beaker to determine the volume of the DI water that will be delivered by the buret. Record the mass of each in Table 1-A.

Mention that Buret is used as TD & other glassware used as TC

3. Obtain a clean wash bottle and fill it with DI water. Record the temperature of the DI water.

   Temperature of the DI water is: 22.80°C
   which corresponds to a water density of: 0.9975g/cm³

4. Using the wash bottle, fill one of the glassware with 50 mL of deionized water and place it onto the analytical balance. For the buret, transfer DI water into the burrette first and then use the measurement markings on the buret to deliver 50 ml of DI water into the 150 ml Beaker. Record the mass in Table 1-A.

5. Pour the DI water from the glassware back into the wash bottle and wipe the water droplets off of the glassware with a paper towel.

6. Repeat step 4 to determine the masses of the remaining glassware with the added 50 ml of DI water for a total of 3 trials per glassware. Be sure to wipe the drops of water off of each glassware after every trial. Record the results in Table 1-A.

Table 1-A: Mass of Each Type of Glassware with 50 ml DI water for 3 Trials

Type of Glassware	Mass of Glassware (g)	Mass of Glassware + 50 ml DI water in g (Trial 1)	Mass of Glassware + 50 ml DI water in g (Trial 2)	Mass of Glassware + 50 ml DI water in g (Trial 3)
Volumetric Flask (50 ml) TC	33.2670	83.0886	83.0303	83.1312
Beaker (150 ml) TC	81.7660	130.3865	130.7780	129.3810
Graduated Cylinder (50 ml) TC	72.1950	121.0810	121.1420	121.0120
Buret (Using a 150 ml Beaker for mass) TD	79.2210	128.9161	128.9427	128.9256

Procedure for determining the accuracy and precision of using a 50 ml Graduated Cylinder and a 150 ml Beaker as a TD

7. Obtain a clean beaker and place it onto the analytical balance. Record the mass in table 1-B.

8. Transfer DI water into a wash bottle and record the temperature.

   Temperature of the DI water: 20.00°C
   which corresponds to a water density of: $0.9982 g/cm^3$

9. Transfer the DI water into a 50 ml graduated cylinder until it reaches the 50 ml mark. Then transfer the DI water from the graduated cylinder into the clean beaker.

10. Record the mass of the beaker with the added DI water in table 1-B.

11. Transfer the DI water back into the wash bottle and wipe off any water drops on both the graduated cylinder and the beaker with a paper towel. Repeat steps 9 and 10 again for trial 2.

12. Transfer DI water into a 150 ml Beaker until it reaches the 50 ml mark. Then transfer the DI water into the same beaker that was used when transferring DI water from the graduated cylinder. Make sure the beaker is clean and dry.

13. Record the mass of the beaker with the added DI water in table 1-B.

14. Clean and dry both beakers. Repeat steps 12 and 13 again for trial 2.

Table 1-B: Mass of the Beaker with 50 ml DI water delivered by the Graduated Cylinder and Beaker

Type of Glassware used as a TD	**Mass of Empty Beaker (g)**	**Mass of Beaker + 50 ml DI water in g (Trial 1)**	**Mass of Beaker + 50 ml DI water in g (Trial 2)**
Graduated Cylinder (50 ml)	92.8299	141.4253	142.2651
Beaker (150 ml)	92.8299	133.4151	133.6381

Calluations:

% Error for Density of water in the 50 ml volumetric flask:

Trial 1:

Water Density = (mass of glassware containing 50 ml DI water) – (mass of glassware) / volume of water = (83.0886-33.2670) g /50 ml= 0.9964 g/ml; 0.9964g/ml x 1000 ml/1L x 1L/1000 cm^3= **0.9964 g/cm^3**

% Error = |Actual Value – Experimental Value|/Actual Value x 100%

= |0.9975g/cm^3- 0.9964g/cm^3|/ 0.9975g/cm^3 x 100% = **0.1103%**

Trial 2:

Water Density = (83.0303-33.2670) g /50 ml= **0.9953 g/cm^3**

% Error = |0.9975g/cm^3- 0.9953g/cm^3|/ 0.9975g/cm^3 x 100% = **0.2206%**

Trial 3:

Water Density = (83.1312-33.2670) g /50 ml= **0.9973 g/cm^3**

% Error = |0.9975g/cm^3- 0.9973g/cm^3|/ 0.9975g/cm^3 x 100% = **0.0201%**

Overall % Error: (0.1103+0.2206+0.0201)%/3 x = **0.1170%**

% Error for Density of water in the 150 ml beaker:

Trial 1:

Water Density = (130.3865-81.7660) g /50 ml= **0.9724 g/cm^3**

% Error = |0.9975g/cm^3- 0.9724g/cm^3|/ 0.9975g/cm^3 x 100% = **2.516%**

Trial 2:

Water Density = (130.7780-81.7660) g /50 ml= **0.9802 g/cm³**

% Error = |0.9975g/cm³- 0.9802g/cm³|/ 0.9975g/cm³ x 100% = **1.734%**

Trial 3

Water Density = (129.3810-81.7660) g /50 ml= **0.9523 g/cm³**

% Error = |0.9975g/cm³- 0.9523g/cm³|/ 0.9975g/cm³ x 100% = **4.531%**

Overall % Error: **2.927%**

<u>% Error for Density of water in the 50 ml Graduated Cylinder</u>:

Trial 1:

Water Density = (121.0810-72.1950) g /50 ml= **0.9777 g/cm³**

% Error = |0.9975g/cm³- 0.9777g/cm³|/ 0.9975g/cm³ x 100% = **1.985%**

Trial 2:

Water Density = (121.1420-72.1950) g /50 ml= **0.9789 g/cm³**

% Error = |0.9975g/cm³- 0.9789g/cm³|/ 0.9975g/cm³ x 100% = **1.865%**

Trial 3:

Water Density = (121.0120-72.1950) g /50 ml= **0.9763 g/cm³**

% Error = |0.9975g/cm³- 0.9763g/cm³|/ 0.9975g/cm³ x 100% = **2.125%**

Overall % Error: **1.992%**

<u>% Error for Density of water in the buret</u>:

Trial 1:

Water Density = (128.9161-79.2210) g /50.00 ml= **0.9939 g/cm³**

% Error = |0.9975g/cm³- 0.9939g/cm³|/ 0.9975g/cm³ x 100% = **0.3609%**

Trial 2:

Water Density = (128.9427-79.2210) g /50.00 ml= **0.9944 g/cm³**

% Error = |0.9975g/cm³- 0.9944g/cm³|/ 0.9975g/cm³ x 100% = **0.3108%**

Trial 3:

Water Density = (128.9256-79.2210) g /50.00 ml= **0.9941 g/cm³**

% Error= |0.9975g/cm³- 0.9941g/cm³|/ 0.9975g/cm³ x 100% = **0.3409%**

Overall % Error: **0.3375%**

Standard Deviation for Mass of Water and 50 ml Volumetric Flask:

Average of the three trials: (83.0886 + 83.0303 + 83.1312) g /3 = 83.0834 g

S= $\sqrt{}(83.0886\text{-}83.0834)^2 + (83.0303\text{-}83.0834)^2 + (83.1312\text{-}83.0834)^2$ /3-1

=0.0507 g

Standard Deviation for Mass of Water and 150 ml Beaker:

Average of the three trials: (130.3865 + 130.7780 + 129.3810) g /3 = 130.1818 g

S= $\sqrt{}(130.3865\text{-}130.1818)^2 + (130.7780\text{-}130.1818)^2 + (129.3810\text{-}130.1818)^2$ /3-1

=0.721g

Standard Deviation for Mass of Water and 50 ml Graduated Cylinder:

Average of the three trials: (121.0810 + 121.1420 + 121.0120) g /3 = 121.0783 g

S= $\sqrt{}(121.0810\text{-}121.0783)^2 + (121.1420\text{-}121.0783)^2 + (121.0120\text{-}121.0783)^2$ /3-1

=0.0650g

Standard Deviation for Mass of Water and 150 ml Beaker delivered by Buret:

Average of the three trials: (128.9161 + 128.9427 + 128.9256) g /3 = 128.9281 g

S= $\sqrt{}(128.9161\text{-}128.9281)^2 + (128.9427\text{-}128.9281)^2 + (128.9256\text{-}128.9281)^2$ /3-1

=0.0135g

% Error of Graduated cylinder when used as a TD:

Trial 1:

Water Density = (141.4253-92.8299) g /50.00 ml= **0.9719 g/cm^3**

% Error = |0.9982g/cm^3-0.9719g/cm^3|/ 0.9982g/cm^3 x 100% = **2.63%**

Trial 2:

Water Density = (142.2651-92.8299) g /50.00 ml= **0.9887 g/cm^3**

% Error = |0.9982g/cm^3-0.9887g/cm^3|/ 0.9982g/cm^3 x 100% = **0.952%**

Overall % Error: **1.79%**

Standard Deviation for Mass of Water and Beaker delivered by the Graduated Cylinder:

Standard deviation of 141.4253g and 142.2651g (using the same formula as above) = **0.5938g**

% Error of 150 ml Beaker when used as a TD:

Trial 1:

Water Density = (133.4151-92.8299) g /50.00 ml= **0.8117 g/cm^3**

% Error = |0.9982g/cm^3-0.8117g/cm^3|/ 0.9982g/cm^3 x 100% = **18.68%**

Trial 2:

Water Density = (133.6381-92.8299) g /50.00 ml= **0.8162 g/cm^3**

% Error = |0.9982g/cm^3-0.8162g/cm^3|/ 0.9982g/cm^3 x 100% = **18.23%**

Overall % Error: **18.46%**

Standard Deviation for Mass of Water and Beaker delivered by the 150 ml beaker:

Standard deviation of 133.4151g and 133.6381g (using the same formula as above) = **0.1577g**

Table 1-C: Summary of Precision and Accuracy for the 4 Glassware Types

Type of Glassware	% Error (Accuracy)	Standard Deviation (g) (Precision)
Volumetric Flask (50ml)	0.1170%	0.0507
Beaker (150ml)	2.927%	0.721
Graduated Cylinder (50ml)	1.992%	0.0650
Buret (50ml)	0.3375%	0.0135

Table 1-D: Precision and Accuracy of the 150ml Beaker and 50 ml Graduated Cylinder when both are used as a TD.

Type of Glassware used as a TD	% Error (Accuracy)	Standard Deviation (g) Precision
Graduated Cylinder (50 ml)	1.79%	0.5938
Beaker (150 ml)	18.46%	0.1577

Conclusion

Amongst the glassware types when they are used as a TC, the results show that the glassware with the greatest degree of accuracy in containing solutions is the 50 ml volumetric flask because it has the lowest % error. Of all the calculated densities from the four types of glassware, the densities from the 50 ml volumetric flask are closest to the true density value of the DI water that was used, which was 0.9975g/cm^3 followed closely by the buret. It is the buret, however, that is supposed to be the most accurate because of its many measurement marks. The sole purpose of the buret is to allow users to precisely and accurately deliver the desired volumes of chemical solutions. A possible explanation of why the results indicate that the volumetric flask is more accurate than the buret when used as a TC can be due to the technician's technique in carefully transferring water into the volumetric flask, up to the 50 ml mark, and ensuring that there are no water droplets on the neck of the flask before weighing it in each of the three trials. Most importantly, since the volumetric flask is designed solely for storing chemical

3 the graduation does not increase the accuracy; the vol. flask also has a line & vol. fill to the line is very accurate

solutions, it is possible to get a percent error that is lower than the buret when used as a TC. However, due to the many measurement marks on the buret, the buret shou~~ld be the~~ most accurate glassware even when used ~~as a~~ TC.

buret cannot be used as TC; can only be used as TD.

Amongst the glassware types when they are used as a TD, the glassware with the highest precision is the buret because it has the lowest standard deviation, meaning that the volumes varied very little when it was used to deliver 50 ml of DI water from one trial to the next. Since the buret has the highest degree of precision along with the second highest degree of accuracy according to the results, it is preferred over other glassware types in experiments involving the need to accurately and precisely transfer chemical solutions.

In conclusion, the buret is designed to precisely and accurately deliver different volumes of chemical solutions. Because the buret has a lot of measurement markings, it also makes it a very accurate glassware for storing chemical solutions as well whereas the volumetric flask is solely designed to ~~carry~~ contain solutions with a great degree of accuracy so ~~it is poss~~ible to obtain results that show the volumetric flask having a higher accuracy than the buret.

Based on the calculations of accuracy for preparation of solutions, volumetric flask would be the best choice. and for delivery of solutions, buret would be the best choice.

Experiment 1, Part B: Preparation and Density Measurements of Sodium Chloride Solutions

Introduction

Sodium chloride solution ($NaCl_{(aq)}$) is used in all types of health care settings and serves many medical purposes such as delivering injectable medicines and flushing IV lines. In this lab, different concentrations of sodium chloride solutions,defined as the mass percent, will be prepared and the density of each of those solutions will be measured. Then the density for each of the sodium chloride solution at its prepared mass percent will be plotted on excel to generate a standard curve. From the standard curve, the mass percent of an unknown saline solution will be determined by measuring its density and the percent error will be calculated to evaluate how accurate the standard curve is at determining the mass% of the unknown saline solution.

Procedure

1. Prepare 25 ml of 1.00%, 1.50%, 2.00% and 2.50% NaCl solutions. Then create an unknown solution ranging from 1.00%-3.00% and calculate its exact mass %. (See Calculations section for the preparation of these NaCl solutions at their specific concentrations)

   Temperature of the DI Water: ______20.00°C______
   which corresponds to a density of: ______0.9982g/cm^3______

   Mass % of created unknown: __3.0008% (See Calculations section for the calculation)__

2. Give the unknown to the instructor and obtain another unknown.

3. Measure the density of each NaCl solution using two burets and 4 Erlenmeyer Flasks (See Table 1-E below).

4. On Excel, plot the mass % vs. density for the known sodium chloride solutions to generate a standard curve.

5. Using the standard curve, determine the mass% of the unknown saline solution (See Calculations section).

6. Obtain the true value of the unknown mass % from the instructor and calculate the % error (See Calculations section).

Table 1-E: Densities of the NaCl Solutions at Different Concentrations or Mass %.

Concentration of NaCl Solution (Mass %)	Mass of Erlenmeyer Flask with Stopper (g)	Mass of NaCl Solution + Mass of Erlenmeyer Flask with Stopper (g)	Mass of NaCl Solution (g)	Volume of NaCl Solution Delivered by the Buret (ml)	Density of NaCl Solution (g/cm^3)
1.00%	144.2078	159.0090	14.8012	15.00	0.9867
1.50%	123.0640	138.7196	15.6556	15.00	1.044
2.00%	130.9099	146.6077	15.6978	15.00	1.047
2.50%	137.8912	153.6712	15.7800	15.00	1.052
Unknown (from Group 8)	139.3365	164.2305	24.8940	25.00	0.9958

Calculations

Formulas Required:

Mass % = Mass of solute/Mass of solution x 100%, where mass of solution= mass of solute + mass of solvent.

Density of NaCl solution = (Mass of NaCl solution and Mass of Erlenmeyer Flask w/stopper - Mass of Erlenmeyer Flask w/stopper)/Volume of NaCl delivered by the Buret

For preparation of the 1.00% NaCl solution:

Mass of $NaCl_{(s)}$ required: 1.00% of 25g= 0.25g

Mass of Actual $NaCl_{(s)}$: **0.2524g**

Volume of DI water required: 25.00g-0.2524g = 24.75g DI Water; V=24.75g/0.9982g/cm^3
Volume of DI water required=24.79 cm^3 or **24.79 ml**

Actual Mass%: 0.2524g/25.00g x 100% = **1.0096%**

For preparation of the 1.50% NaCl solution:

Mass of $NaCl_{(s)}$ required: 1.50% of 25g= 0.375g

Mass of Actual $NaCl_{(s)}$: **0.3745g**

Volume of DI water required: 25.00g-0.3745g = 24.63g DI Water; V=24.63g/0.9982g/cm^3
Volume of DI water required=24.67 cm^3 or **24.67 ml**

Actual Mass%: 0.3745g/25.00g x 100% = **1.498%**

For preparation of the 2.00% NaCl solution:

Mass of $NaCl_{(s)}$ required: 2.00% of 25g= 0.5g

Mass of Actual $NaCl_{(s)}$: **0.5035g**

Volume of DI water required: 25.00g-0.5035g = 24.50g DI Water; V=24.50g/0.9982g/cm^3
Volume of DI water required=24.54 cm^3 or **24.54 ml**

Actual Mass%: 0.5035g/25.00g x 100% = **2.014%**

For preparation of the 2.50% NaCl solution:

Mass of $NaCl_{(s)}$ required: 2.50% of 25g= 0.625g

Mass of Actual $NaCl_{(s)}$: **0.6263g**

Volume of DI water required: 25.00g-0.6263g = 24.37g DI Water; V=24.37g/0.9982g/cm^3
Volume of DI water required=24.42 cm^3 or **24.42 ml**

Actual Mass%: 0.6263g/25.00g x 100% = **2.505%**

For preparation of the unknown NaCl Solution (3.00%):

Mass of $NaCl_{(s)}$ required: 3.00% of 25g= 0.75g

Mass of Actual $NaCl_{(s)}$: **0.7502g**

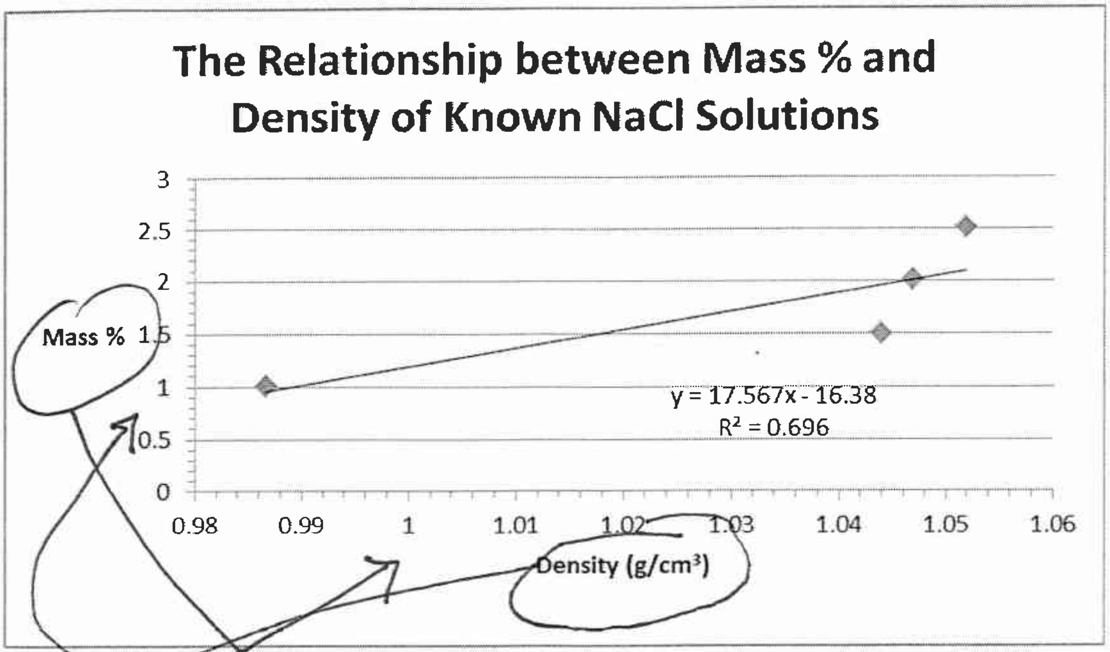
Volume of DI water required: 25.00g-0.7502g = 24.25g DI Water; V=24.25g/0.9982g/cm^3
Volume of DI water required= 24.29 cm^3 or 24.29 **ml**

Actual Mass%: 0.7502g /25.00g x 100% = **3.0008%**

For determining the mass % of the unknown (from Group 8)

Density of unknown NaCl solution= (164.2305-139.3365)g/25ml = **0.9958g/cm^3**

Using the Standard Curve generated by Excel of our known NaCl Solutions, the Mass% of the unknown can be determined by using the line equation, where x values correspond to the density of the unknown and y values correspond to the mass %.



Independent variable should be x-axis & dependent variable → y axis

Mass % of Unknown (from Group 8) can be determined by using the line equation and substituting the density of the unknown into "x" to solve for y, the mass %

$y = 17.567\ (0.9958) - 16.38 = \mathbf{1.1132\%}$

True mass% of the unknown: **1.2744%**

% Error: $|1.2744\% - 1.1132\%| / 1.2744\% \times 100\% = \mathbf{12.65\%}$

Conclusion:

Using the standard curve of the known concentrations of NaCl solutions and its densities, the mass percent of our unknown NaCl solution with a density of 0.9968 is found to be 1.1132%. Given that the concentration of the unknown NaCl solution has a range between 1.00-3.00%, it makes determining the true mass % of the unknown very difficult since its true value is close to the mass% of the known NaCl solutions. One would have to be extremely precise when preparing the 1.00%-2.50% NaCl solutions in order to accurately determine the mass % of an unknown NaCl solution that is within such a narrow range. Since the experiment was not conducted with extreme accuracy where we used the exact masses of $NaCl_{(s)}$ required for the preparation of the different concentrations of the NaCl solutions, the mass% of the unknown determined by our standard curve yielded a 12.65% error, with the true mass % being 1.2744%.

To better improve the accuracy of the standard curve, one should determine the densities of NaCl solutions with concentrations that cover a broader range such as preparing NaCl solutions that have a 5.00%, 10.00%, 15.00% and 20.00% concentration and then plotting a Density vs. Mass% standard curve. Such a standard curve would allow one to determine the mass% of an unknown concentration of NaCl solution with better accuracy, resulting in a lower percent error. good

As a result of the GEO #1: Communication Assessment, a Chemistry Instructor developed a new assignment. Students are asked to write a letter to a government representative on the issue of global warming. Students must do a rewrite of the letter that addresses teacher comments and suggestions from two peer reviews that are conducted by classmates.

The following are included:

1. Assignment prompt
2. Final draft of letter
3. First draft with instructor comments
4. First draft with peer comments
5. First draft with a second peer's comments

Assignment Prompt

Letter to Government Leaders Regarding Global Warming **Name** [redacted]

Global Warming is one of the most urgent, as well as a controversial, topics we face as a global society. Your knowledge and understanding of this issue is crucial to your ability to participate in the discussion and influence the direction we move in addressing this issue.

In order to facilitate this process you are being asked to write a one-page letter to an elected government official addressing the topic of Global Warming. In the letter you must include the following:

a) a brief introductory explanation of the science of global warming (1-2 sentences maximum) **(3 points)** ______

b) a discussion of the potential impact (or disavowal of impact) of global warming in an area of personal interest to you (ex: melting of polar ice caps, increasing acidity of oceans, rising sea levels, increasing surface land temperatures, changing weather patterns, interference with crop production, alteration of wildlife habitat, destabilization of societies, etc). **(5 points)** ______

c) a statement of your own personal position on global warming. Do you believe this process is occurring? What are your concerns about this issue? Why is it important (or not important) to you? **(5 points)** ______

d) a recommendation for a specific action (or opposition to proposed action) ex: recommendation to implement a carbon tax, increase mandatory fuel efficiency for cars/trucks, invest in renewable energy sources, ban exploration and drilling of new oil deposits, vote on a piece of legislation, etc.) **(5 points)** ______

e) an awareness of the mechanics of writing a letter to an elected official: **(7 points)**
1) Length of Letter: 1700 characters to 2000 characters ______
2) Composed of complete sentences utilizing good grammar, spelling, and punctuation
3) * At least 2 versions of the letter must be submitted: the original composition and at least one edited version. You are required to solicit peer review and edits from at least 2 of your classmates. Comments can be made on original letter using different color ink for the 2 different peer editors. (Peer editors must identify themselves by printing his/her name at the bottom right-hand corner of the letter using colored ink)
4) Ask for a reply from the official. Be sure to include your address beneath your name.

Total Points ______

Remember the following as you write your letter: Write the letter in **your own words**, Keep it **concise** (get to the point quickly), Make it **interesting** (include an attention-getting example or illustration), Make it **personal** (why does this issue matter to you?), Be **confident** (you may know more than the elected official about the topic), Be **polite** and take a **firm position.**

[redacted]

February 27, 2013

Final draft of letter

Dear Senator Boxer,

I am writing to you today about a concern that is affecting our planet and is affecting our lives. Global warming is the problem. Global warming is caused by the sun, which gives off rays of heat and reaches the Earth. This heat is suppose to go back to space, but there are gases in the atmosphere that stop the heat from escaping back into place. Therefore this causes what is called the greenhouse effect because of the amount of CO_2 gas is produced by energy like, use of gas for our cars or simply turning on a light we are burning fossil fuels and creating large amounts of CO_2 to be released to the atmosphere. So, this creates the cloud of CO_2 to increase and not letting the heat from the sun escape therefore our temperature increases on Earth.

Sadly to say the consequences of the ongoing global warming has been impacting the Earth's temperature. According to research done by scientists, current levels of the CO_2 in the atmosphere are at 380 ppm since the 1950s and will continue to rise rapidly if we don't do something to reduce this rapid increase. The fossil fuels we are burning, which creates CO_2 are being trapped into the atmosphere because of the greenhouse effect and are causing the temperature to increase, so this temperature is causing the glaciers and ice caps to melt. Sea levels increase with this extra water that is being melted. Once this happens, there is a greater chance for islands to become flooded and people dying from starvation. There is also a higher chance to having severe storms and droughts, because of the climate changes that have been occurring and will keep occurring more drastically as the planet gets warmer.

I do believe global warming is happening as we speak because of the facts, data, and temperature changes that we have already observed. We, the people, create most of the CO_2 on this planet by driving cars, manufacture businesses, and etc. Basically we are to be blame for the increasing temperature here on Earth and all the harmful impacts that we have and are creating. It is important to me because of how it will effect the next generation. I wouldn't want my children to suffer because of what my generation has caused to increase global warming. For example, the next generation will suffer from the key sources of life, which would be a shortage of water and food.

Some ways to improve this problem could be how efficiently people use energy on Earth. There should be a way we can influence the people to use less energy and encourage them to use items that can lessen the negative impact on the planet. For instance, we can use solar panels to create our energy, people can start carpooling with a friend, or we can start by using less water and light in our homes. This will take time to influence everyone, but it will benefit the next generation. I would like to hear what ideas you already have to direct this matter of global warming and what certain change you will by making that will help our planet.

Thank you for your time and considering my request.

Sincerely,

[redacted]

First draft with Instructor comments

February 19, 2013

Dear Senator Boxer,

Sentence structure is poor. Needs rewording

We know for a fact that CO_2 levels are increasing because of the activities are doing without realizing it. Scientifically global warming is impacted by the concentration of atmospheric CO_2 where the solar energy is hitting the Earth's surface and is suppose to bounce back into space, but there is some gases that are trapped inside from the fossil fuel which effects the Earth's temperature.

This is not a correct synopsis of Global Warming

Data to support this

Sadly to say the consequences of global warming is giving harmful impacts. For example, the Earth's temperature is increasing from the amount of CO_2 being created, where it make the glaciers and ice caps to melt. This causes the sea level to increase and could affect the sea animals from reproducing or staying alive. When the sea level increases and the possibility of having warmer weather, there is a higher chance of having severe storms and droughts that will happen more often.

I believe there is global warming happening as we speak because of the impacts it has caused the Earth. ~~Some~~ One of the issues I am concern ed ~~with from the~~ about regarding climate change is the fact that the human beings on Earth ~~is~~ cause the problem. We use ~~many of the~~ energy on this planet ~~such~~ to driv ~~ing~~ e cars, manufacture businesses, trashes ~~being~~ burned, and etc. Basically we are the cause ~~d~~ of the earth having a warm ing ~~temperature~~ trend and all the harmful ~~impacts~~ results. It is important because of how it will effect the next generation. I wouldn't want my children to suffer because of what my generation has ~~caused~~ done to increase global warming.

Some ways to improve this problem could be how efficiently people use ~~the~~ energy on Earth. There should be a way we can influence the people to use less energy and encourage them to use items that can lessen the negative impact on the planet. For instance, we can use solar panels or carpooling with a friend or even using less water and light in the house. Basically decreasing the amount of energy and heat that we use as a planet. This will take time to influence the people as a whole, but it can benefit the next generation and not blaming us for what we did to this planet.

not a complete ~~Sentence~~ sentence

Sincerely,

[redacted]

- ask for a reply
- incorporate more data/facts to support Global Warming argument.
- letter seems a little short.

First draft with peer comments

February 19, 2013

Dear Senator Boxer,

Direct more of the problem you are concerned about (why you are writing the letter ???)

We know for a fact that CO_2 levels are increasing because of the activities we are doing without realizing it. Scientifically global warming is impacted by the concentration (the amount ???) of atmospheric CO_2 where the solar energy is hitting the Earth's surface and is suppose to bounce back into space, but there ~~is~~ are some gases that are trapped inside from the fossil fuel that we burn which effects the Earth's temperature, mainly the gas CO_2 is what we need to be concerned about.

what is this called? explain greenhouse effect

Sadly to say the consequences of the ongoing global warming that has and is still occuring, has been impacting the ~~is giving harmful impacts. For example, the~~ Earth's temperature is increasing from the amount of CO_2 being created, where it make the glaciers and ice caps to melt. ~~This causes the sea level to increase and could affect the sea animals from reproducing or staying alive.~~ When the sea level increases and the possibility of having warmer weather, there is a higher chance of having severe storms and droughts that will happen more often.

how does it affect the animals

Is lands get flooded

no food, people dying starvation

How does it affect you personally. (your next generation)

I believe there is global warming happening as we speak because of the impacts it has caused the Earth. Some of the issues I am concern with from the climate change is the fact that the human beings on Earth is the problem. We ~~use many of the energy~~ create most of the CO_2 on this planet by ~~such~~ driving cars, manufacture businesses, trashes being burned, and etc. Basically we are to blame for the temperatures rising here on earth ~~the caused of the earth having warm temperature~~ and all the harmful impacts. It is important because of how it will effect the next generation, I wouldn't want my children to suffer because of what my generation has caused to increase global warming. (How will they suffer??)

reword sentence we humans are causing the problem and this is how we are creating stated it above

make sure you state the impacts you believe somewhere in paragraph 2 (state the impacts there)

Some ways to improve this problem could be how people use the energy on Earth, like explain a bit more of what to do in first sentence. There should be a way we can influence the people to use less energy and encourage them to use items that can lessen the negative impact on the planet. For instance, we can use solar panels or carpooling with a friend or even ~~using~~ use less water and light in the house. (make a law better for people to do this) Basically decreasing the amount of energy and heat that we use as a planet. This will take time to influence the people as a whole, but it can benefit the ~~next~~ future generations ~~and not blaming us for what we did to this planet.~~ I would like to hear what ideas you already have to direct this matter of global warming and to make a certain change that will help our planet.

Sincerely,

[redacted]

First draft with peer comments

February 19, 2013

Add her address

Dear Senator Boxer,

Maybe have an intro?

We know for a fact that CO_2 levels are increasing because of the activities are doing without realizing it. Scientifically global warming is impacted by the concentration of atmospheric CO_2, ~~where~~ the solar energy is ~~hitting~~ hits the Earth's surface and is supposed to bounce back into space, however ~~but~~ there are ~~is some~~ gases that are trapped ~~inside~~ within the atmosphere from ~~the~~ fossil fuels which effects the Earth's temperature. regularly/usually?

Unfortunately ~~Sadly to say~~ the consequences of global warming impact the earth negatively ~~is giving harmful impacts~~. For example, the Earth's temperature is increasing from the amount of CO_2 being created, thus ~~whereas it make~~ the glaciers ~~and~~ ice caps ~~to~~ melt. Due to this, ~~This causes~~ the sea level ~~to~~ increases and ~~could~~ affect making ~~the~~ sea animals from reproducing quicker ~~or staying alive. When the sea level increases~~ and endangers the ecosystem ~~and the possibility of having warmer weather, there is a higher chance of having severe storms and droughts that will happen more often~~. Maybe talk more about the ecosystem & how it is affected by global warming

Awkward sentence structure

specify

I believe there is global warming happening as we speak because of the impacts it has caused the Earth. Some of the issues I am concerned with ~~from the~~ climate change is the fact that the human beings on Earth is the problem. ? ~~We use many of the energy on this planet such~~ as a result of driving cars, manufacturing businesses, trash ~~es~~ being burned, ~~and etc.~~ Basically, we are the cause~~d~~ of the earth having warm temperature and all the harmful impacts are just some of the problems we encounter. ~~It is important because of how it will effect the next generation, I wouldn't want my children to suffer because of what my generation has caused to increase global warming.~~ If we do not solve this problem soon the future generations . . . . .

Maybe how we use energy

~~Some~~ ways to fight ~~improve~~ this problem could be ~~how~~ to reevaluate ~~people use~~ the energy we use in our daily activities ~~on Earth.~~ ~~There should be a way we can~~ influencing ~~the~~ people to use less energy and encouraging them to use items that can reduce ~~lessen~~ the negative impact on the planet. For example, ~~instance, we can~~ the use of solar panels ~~or~~, carpooling with a friend, or even reducing ~~using less~~ water and light consumption ~~in the house~~ is used homes. Basically point towards decreasing the amount of energy ~~and heat~~ that we use as a planet managing how. This will take time to influence the people as a whole, but it can benefit the next generation and promote responsible energy use ~~not blaming us for what we did to this planet.~~

What items?

All of the points

Sincerely,

[redacted]

Procedure for Assessing Communication GEO

Focus on Written Communication
– prepared by Debbie Wood, Chemistry

1. Faculty should review the general "Written Communication Value Rubric", (a nationally vetted rubric created by the *Association of American Colleges and Universities*) as preparation for determining what written assignment will be an appropriate tool to assess a student's ability to write (see attached rubric). It is not necessary that all the faculty in a discipline use the same assignment for the assessment process, but all assignments in a discipline should be evaluated using the same rubric. It is not necessary to have a specific "Communication SLO" on a course syllabus in order to do the communication assessment, but this is preferred. Note: Faculty assessing communication competencies other than written communication (e.g. oral communication, creative communication through art, music, or performance) should contact Matthew Jordan (Assessment Coordinator, Ext 7631) for discussion of the appropriate rubric to use in the assessment process.

2. The assessment tool (essay, lab report, etc) should be administered at an appropriate time frame in the course to reflect the value the course itself has added to the improve the ability of the student to write. (Faculty may choose to administer a pre-assessment assignment to better determine student's baseline writing skills upon entering the class.) No minimum word length is required for the assignment, but the assignment should be of sufficient depth and rigor as to be evaluated by the communication rubric.

3. After the assessment tool has been administered, a random sampling of the assignments turned should be selected for grading. 5 assignments selected per 30 assignments turned in is a statistically appropriate sample size. The assignments must be randomly selected and cannot be reviewed prior to selection for completeness and quality of work. (The faculty member can perform the random selection of assignments for their class, but for increased assessment rigor, it is suggested that another individual not connected with the class select the 5 assignments that are to be graded.)

4. The randomly selected assignments should be photocopied with the instructor and the student author names omitted. The assignments should be turned into the lead faculty member for the department that is coordinating the assignment process.

5. A group of volunteer faculty from the department will grade the assignments using the "Written Communication Value Rubric". A norming session will be conducted prior to the grading to make sure that all the faculty are assessing the assignments in a consistent manner.

6. Data results from the assessment will be submitted to the lead faculty member for compilation. The results will be processed and presented to faculty for discussion during the Fall 2012 Faculty Professional Development Day. Faculty will discuss the data and use this information to suggest strategies for improving student's ability to communicate.

Thank you for participating in the Speech assessment of the General Education Outcomes!!!

Directions:

For the following sections, make a copy of the outline for the informative speech prepared by every 4th student on your roster for the following sections:

AVILA	2293
GONZALES	2288, 2276, 2310
HALEY	2783
KARLSEN	2317
PANELLA	2210, 0880
PHU	0818
RODRIGUEZ	2324
WHITWORTH	2284

Please mark out the name of the student, make copies of each outline and place them in my box as soon as possible. I know that it may be a couple of weeks before you reach this assignment in your classes, so just give me the copies as soon as you are possible but keep in mind that the department is presenting on this data November 9.

That's it. Just make copies. Thanks again for your participation!