Assessment Data is from what semester?  Fall
Faculty Name(s):  Andy Bloom

1. Course Name and Number:
Math 190, Basic Mathematics

2. List all Course SLOs from the Course Outline of Record:
   1. Solve numerous problems in order to gain mastery of the arithmetic skills needed for everyday situations.
   2. Demonstrate a systematic and logical approach to solving arithmetic problems.
   3. Demonstrate the knowledge and skills required to select the correct introductory formulas and apply the correct procedures to solve word problems related to practical situations.

3. Specific Course SLO(s) assessed as part of this project:
   SLO 3 – solving word problems

4. Is this course on GE Plan A?  ____ Yes  X  No  (See Catalog pages 49-51 & page 55)
   If Yes, identify what area. (All GE course assessments count as GE assessments.)
   ____ Area I Natural Sciences
   ____ Area II Social and Behavioral Sciences
   ____ Area III Fine Arts/Humanities
   ____ Area IV Language and Rationality
   ____ Area V Physical Education/Wellness
   ____ Area VI Intercultural/International Studies
   ____ Area VII Information Competency

5. How did you assess the SLO(s)? (Attach any related documents at end of form.)
   Assessment was completed using 4 word problems on the final exam. The questions were:
   1. A bridge is built across a 20 foot span. The bridge is built out of wood slats that are each 2/3 feet wide. How many slats are needed to cover the bridge?
   2. Solve the proportion: 2/21 = N/105
   3. A sweater is listed as selling for $80. For Black Friday the store has everything marked down 25%. What is the sales price of the sweater?
   4. You need to put up a fence around a small garden in your yard. The garden has four sides and its sides are 22.5 feet, 18 1/5 feet, 25 feet, and 14.3 feet. The fence costs $8 per foot. How much will it cost you to fence in the yard?

6. Results and analysis of the data. (Attach any related documents at end of form.)
Student responses were graded using one of five marks –

0 – Question skipped
1 – Improper method attempted
2 – Proper method with significant math error
3 – Proper method with minor math error
4 – Proper method applied correctly

Question 1: 7 students answered the question correctly, 2 students employed the correct method but made significant math errors, 21 students attempted the incorrect method of solution, and 2 students left it blank.

Question 2: 22 students answered the question correctly, 7 students made minor math errors, and 3 students attempted the correct method but made significant math errors. No students left this question blank.

Question 3: 14 students answered the question correctly, 7 students made minor math errors, 9 students made significant errors, 1 student attempted an incorrect solution method, and 1 student left the question blank.

Question 4: 9 students answered the question correctly, 11 students made minor math errors, 8 students made significant math errors, 1 student attempted an incorrect solution method, and 3 students left the question blank

It is important to note that the material for question 3 and 4 were from a test that was given the second week of November. It was the material that was freshest in the minds of students and the results reflect this. While question 1 and 4 had far less students who answered the question correctly, there were very few who left the question blank. This is a significant improvement from the first test. Additionally, question 4 had a majority of students get the question correct or make a small error in their calculations.

As a class that is 4 levels below transfer, math 190 has its own challenges. I committed myself this semester to teaching students what is necessary to be successful in college. On our first assignment and test, a significant number of students left questions blank rather than attempting to solve them. The first question on this assessment came from our second chapter test. On that test, almost one third of the class left the question blank. Steady effort was made all semester long to get students to attempt problems rather than quitting before they tried. In particular, word problems were left blank early in the semester. Students were afraid to try. This conscious effort to get students to realize that it is better to be wrong than to never try led to students becoming more determined and persisting when problems were confusing. I constantly reiterated strategies for solving confusing problems and we did a lot of word problems both in and out of class. While I wish the results from the SLO were more positive, I am very proud that there were only 6 questions left blank on the final exam. On the first test each question had more than 6 students that left it blank. This is a significant improvement. Students will need to work over the next few semesters to continue to improve.

I believe there are several significant conclusions that can be drawn from this assessment:

1. Students need to do more word problems and need strategies for how to solve them when they are confusing.
2. Students need to be taught how to assess the reasonability of their answer and they need to understand the significance of this check.
3. Students need to be taught how to effectively study and prepare for exams.

A major component of the developmental math classes is solving word problems. Students cannot avoid them and they need to become more comfortable with them. On this test, students had answers that were completely unreasonable. They need to be able to recognize these nonsensical solutions and fix their errors. On the bridge question, students routinely answered that it would
take 14 slats and one student answered that one slat was necessary. Students need to realize that, if each slat is less than one foot wide, and the gap is 30 feet wide, it will be necessary to use more than 30 slats. On question 3, students answered that the sweater would cost $20, which was the amount of the discount. Correct application of the concepts is not useful unless the questions can be answered correctly and students can identify incorrect solutions when they arise. Finally, the performance on the second and third questions was significantly better than the first and fourth questions. The material on those questions was tested later in the semester and was fresher in student’s minds. Based on the performance on other problems from the final, it is safe to assume that students did not study for the final exam, or did not give the final the time and energy it required. I don’t know if this is a result of the lack of effort they were able to employ in high school classes but it will not lead to success as they get closer to college transfer level classes. This is a habit that needs to be broken and proper study habits must be taught and encouraged for these students to be successful in the future.

7. What are you going to do based on the results of the data? (Any planned revisions?)

I would like to address all three of these issues in the future.

1) The culmination of every unit in this course is a section dealing with word problems. To try to make students more comfortable, I have assigned an additional section of word problems to be completed as a part of the journal they create in the class. In class, we work on word problems in groups and then discuss the strategies that students use. In future semesters, I will try to give more time to word problem days and try to provide students with additional tools for solving problems. I will try to emphasize group work and the importance of talking through solution strategies. I think it can be most helpful for students to hear how their classmates approach problems.

2) This is a problem that plagues students in all levels of classes. I have had calculus students who say that houses cost an average of $250 instead of $250,000 because they don’t appreciate the significance of units and the solutions they present. Every student should look at their answer and determine if the answer makes sense. I believe one of the problems is that in elementary and high school, answers were just answers and had no meaning or intention of being reasonable. At a workshop I attended, the speaker called these “cantaloupe problems” because she had presented a problem in one of her classes where the solution was that “Jane would eat 60 cantaloupes.” When a student questioned her about who could eat 60 cantaloupes, she realized the importance of creating solutions that are reasonable and realistic. She was only surprised that in ten years of using the problem, no one had ever questioned it before. I attempt to point out the unrealistic answers that I get on questions and try very hard to get students to see why these answers are unrealistic. Despite my best efforts, students leave the test early despite having answers like, 2 miles = 24 inches on their paper. Every student could realize that these could not possibly be equal but students have never been held accountable to the reasonability of their solutions. This makes it more difficult for students to look at harder problems. They should all take a few seconds before solving the problem to get a sense of what would be a reasonable solution. Then, if their solution is unreasonable, they could go back and make changes. I will continue to enforce the need to come up with a framework for the reasonability of solutions and will continue to provide problems, in all classes, that reflect the real world. One of my best math 190 students commented this year that he appreciated the realism of the word problems and the fact that he could look at the answer and determine if it made sense. I felt that, for at least one student, I am making strides in getting students to question their answers before they just move on to the next problem.

3) In past years, I have begun the first day of class with math problems and an introduction of the content of the course. I think this leads to a few problems. Students in math 190, 191, and 151 are retaking classes they have taken before in high school. It takes a long time to convince them that they do not completely understand the content even though they remember the terminology. By the time they realize that they do not understand well
enough to successfully answer questions, they have done poorly on the first test and have developed poor habits. Another problem with beginning the semester by looking at the math content is that there is a limit to the time that can be spent addressing good study skills.

In the future, I will need to develop a new first day of class. I am considering two options. Option one will be to pretest the class on the first chapter. Hopefully this will convince them that they do not understand the material and make them more responsive to learning. A potential problem is that students will be discouraged and a poor pretest could continue their belief that they just aren’t good at math. A second option would be to spend the first full day of class discussing good study skills. The problem with this is that students do not always pay attention or feel that the day’s material is meant for them. Unfortunately, it is really difficult to rework bad habits and make them good. This year, I had several students in math 181 who got Cs and Ds on the first test and came back through hard work to earn As and Bs in the class. In math 190, a student failed the first two tests and was able to earn a C in the class. A poor start does not mean that a student will not do well, but it takes a special student to get the help needed to learn how to be more successful. Even more difficult, is for a student to be willing to put in the hours of work necessary to be successful, particularly if they are not used to working hard.

There are a lot of things that can be done to improve students’ ability to successfully solve word problems. I will work in the future to emphasize the importance of treating problems as a complicated example of real world applications of the math we are learning. I will continue to encourage students to attempt problems and will continue trying to get students to ask themselves if their solutions are reasonable and make sense.

Please save your finished document in the following format. (Date should be for the semester in which data was collected; same date should be listed at top of this form.)

 yyyysemester-sloa-courseid.doc
Example: 2014spring-sloa-engl101c.doc