

Annual Assessment Report

2013-2014

School of Mathematical and Natural Sciences

This assessment report is available through the School homepage at
http://www.uamont.edu/Math_and_Sciences/annualreports.htm

July 2014

1. What are the Student Learning Outcomes (SLOs) for your unit? How do you inform the public and other stakeholders (students, potential students, the community) about your SLOs? If your unit is accredited by an outside source, please attach the letter verifying your accreditation.

A student who graduates from UAM with a major administered by the School of Mathematical and Natural Sciences should:

1. Be able to clearly express mathematical and/or scientific ideas in oral and written communication;
2. Be able to demonstrate the ability to apply scientific and/or mathematical concepts to real world situations;
3. Have a core knowledge of the major discipline;
4. Be prepared for immediate employment in a scientific, technical, medical, or educational environment;
5. Be prepared to enter graduate or professional school in the appropriate area.

The Student Learning Outcomes (SLOs) are measured through student performance on exams, quizzes, laboratory exercises, field course journals, homework assignments, research projects, reports, and/or presentations.

The Student Learning Outcomes are posted on the School of Mathematics and Natural Science website at: [http://www.uamont.edu/Math and Sciences/learningoutcomes.htm](http://www.uamont.edu/Math_and_Sciences/learningoutcomes.htm). They are also posted in the display case near the front entrance to the Science Center.

External Accreditations: None

2. Describe how your unit's Student Learning Outcomes fit into the mission of the University.

The mission the University of Arkansas at Monticello shares with all universities is the commitment to search for truth, understanding through scholastic endeavor. The University seeks to enhance and share knowledge, to preserve and promote the intellectual content of society, and to educate people for critical thought. The University provides learning experiences that enable students to synthesize knowledge, communicate effectively, use knowledge and technology with intelligence and responsibility, and act creatively within their own and other cultures.

The University strives for excellence in all its endeavors. Educational opportunities encompass the liberal arts, basic and applied sciences, selected professions, and vocational/technical preparation. These opportunities are founded in a strong program of general education and are fulfilled through contemporary disciplinary curricula, certification programs, and vocational/technical education or workforce training. The University assures opportunities in higher education for both traditional and non-traditional students and strives to provide an environment that fosters individual achievement and personal development.

Student Learning Outcomes (SLOs) 1, 2, and 3 address aspects of UAM's mission that are related to the commitment to search for truth and understanding through scholastic endeavor. These SLO's focus on teaching students to have core knowledge in their discipline, be able to apply the basic core knowledge to real world situations, and effectively communicate scientific information orally and in writing. Students in Math and Sciences learn specific information related to their discipline, and also the historical aspects of the advancements made in their field, including advancements made in their specific fields related to improved technology found in today's instrumentation.

SLOs 2 and 3 support the University's goal to enhance and share knowledge, promote the intellectual content and promote critical thinking. Students in Math and Science majors learn many basic concepts early in their college career, and as the courses become more in depth, critical thinking skills are enhanced as understanding of content, applications, and connections to more complicated systems are made through course content, papers, laboratory projects, and research.

SLO's 4 and 5 address the preparedness of Math and Science majors to enter the workplace or enter a graduate program in a related field. The general education component of the degree plans for math and science majors provides a broad background in the liberal arts and basic and applied sciences. Supportive requirements provide additional background in the sciences and mathematics, and the courses in the major provide specific content and serve as the basis for critical thinking and problem solving skills that will enable a graduate to enter the workplace, a professional program, or a graduate program in a related area.

3. Provide an analysis of the learning data from your unit. How is this data used as evidence of learning.

The School of Mathematical and Natural Sciences uses performance in the classroom and laboratory to measure student comprehension. Multiple exams are given in each course, and in many courses a comprehensive final exam is given. Homework, quizzes, lab notebooks, field journals, research papers, and oral presentations are also graded in several courses. In the School of Mathematical and Natural Sciences, grades are given almost entirely based on student performance, not attendance and other elements that are unrelated to the student's ability to successfully complete the learning objectives at the course level. In most

cases, a large percentage of the course grade is based on performance on exams. The level of difficulty of questions on exams is comparable to questions found in supplied test banks, end of chapter problems, and in chemistry the ACS Standardized Final Exams. The textbooks used in most of our courses are the industry standard text for that course. The course objectives for each course are based on common syllabi adopted by the state, comparison with courses at other universities, the specific course content required by professional and graduate programs, and for the case of chemistry, the American Chemical Society. Even though our chemistry program is not accredited by the ACS, their internationally recognized model is followed as closely as possible.

Pre-tests and Post-tests

Within the past year, several courses used pre-test and post-tests. The questions asked on the pre-test were very similar to a question asked on the final exam. The questions were chosen over a wide variety of topics. The table below shows pre/post test results for the specific courses that use this method of assessment.

Course	# Students	# Questions	Avg Correct on Pretest	Avg Correct on Final exam
Intro to Biological Science	133	15	7.8	10.6
Mammalogy	25	15	4.6	9.6
Comparative Anatomy	14	15	4.1	9.3
Evolution	32	15	4.5	10.0
Introduction to Chem	68	10	4.1	8.6
Intro. to Org. and Biochem Laboratory	3	10	3.3	8.0

One section of the Intro to Biological Science class in the Fall 2013 and one in the Spring 2014 were given a pre-test to measure background knowledge on topics that would be seen in the course. The fifteen questions were a mix of big-concept questions and some were more detailed in nature. On the last day of the semester, the students were given the same questions. The students were not aware they were being assessed in this manner at the beginning of the course.

In Mammalogy, a 15 question pre-test was given to evaluate the students' readiness to enter the course. On the first class day of the Fall 2013 semester, a pre-test was administered to the class. The questions were a mix of "big-concept" and detail ideas, and concerned facts that a student who has completed the course would be expected to know, but that wouldn't necessarily be familiar to a student who hasn't had the class. The questions were multiple choice questions with a correct answer and four distractors. On the last day of class, the students were given the same questions. Students at the beginning of the course were not made aware that they would be assessed in this manner.

Only students who completed both the pre-test and post-test are included in the results given here. Average score on the pre-test was 4.6 out of 15, or 30.7% (n = 25, range 2-8, standard deviation 1.50). Average score on the post-test was 9.6, or 64.0% (n = 25, range 3-13, standard deviation 2.57). Every student in the class except one registered an improvement on the post-test (n = 25, average increase 5.0 questions, range -1-9, standard deviation 2.20). Average percentage change in score was 123.6% (n = 25, range -25.0-300.0%, standard deviation 77.9%). One student actually did worse on the post-test than on the pre-test.

This is the first year that this type of assessment has been used in the Mammalogy class. Results seem to indicate that many of the objectives of the class are being met. The instructor will use the assessment again next year. After several years of results have been collected, the instructor will analyze results of individual questions to determine whether changes in the presentation of material need to be made to make sure that all concepts are being covered adequately.

On the first class day of Comparative Anatomy in the Fall 2013 semester, a pre-test was administered. The pre-test consisted of 15 questions designed to test the students' prior knowledge of some of the most important concepts of Comparative Anatomy. On the last day of the regular semester, the same questions were asked of class. Every student in the course registered an improvement on the post test. The average increased from 27.3% correct on the pre-test to 61.9% correct on the post test. This year's results are roughly equivalent to the 2012 results on this assessment.

For the first time, a 15 question pre-test/post-test was given in the Evolution class. Only students who completed both the pre-test and post-test are included in the results given here. Average score on the pre-test was 4.5 out of 15, or 30.0% (n = 32, range 2-9, standard deviation 1.61). Average score on the post-test was 10.0, or 66.7% (n = 32, range 6-14, standard deviation 2.10). Every student in the class except one registered an improvement on the post-test (n = 32, average increase 5.5 questions, range 0-10, standard deviation 2.59). Average percentage change in score was 154.5% (n = 32, range 0.0-500.0%, standard deviation 119.3%).

This is the first year that this type of assessment has been used in the Evolution class. Results seem to indicate that many of the objectives of the class are being met. The instructor will use the assessment again next year. After two or three years of results have been collected, the instructor will analyze results of individual questions to determine whether changes in the presentation of material need to be made to make sure that all concepts are being covered adequately.

In Introduction to Chemistry, students were given ten questions related to chemistry and five questions related to basic math skills on the second day of class. For this assessment, the math questions were not included since they did not appear on the final exam in the same format. Since some of the chemistry questions were mathematical in nature, the students were allowed to use their calculator if they remembered to bring it; however, some students did not, which may have lowered the pre-test score slightly. The final exam contained questions over the same topics as the pre-test questions. Some were identical questions, while others were slightly different, but clearly the same topic. The increase in average from 4.1 correct responses on the pre-test to 8.6 correct on the post-test indicates an overall improvement in understanding in course material. One student scored lower on the post-test than the pre-test; however, that student marked the answer "B" on all ten questions on the post-test.

The Introduction to Organic and Biochemistry Lab pre-test consisted of five questions over topics including lab safety, chemical reactions, and calculations, and 5 questions over chemical properties of organic compounds and biochemical systems. Similar questions were included on the final exam. Scores increased from a class average of 3.3 correct on the pre-test to an average of 8.0 for the class on the post-test, which indicates that the students' understanding of the material increased.

Essentially all entering freshmen students are placed into Introduction to Algebra, Intermediate Algebra, or College Algebra or higher based on their performance on the ACT exam, or equivalent placement exam. A nationally normalized post-test is given at the end of the Intermediate Algebra course. UAM has selected the ASSET exam as the end of course exam. Almost every student enrolled in Intermediate Algebra scored below

a 19 on the ACT, or equivalent on a comparable exam. A 19 is needed to enter college level math courses. A few students with higher than a 19 ACT are in Intermediate Algebra by virtue of failing or withdrawing from College Algebra three times.

In the Fall 2013 term, the ASSET test was given to all Intermediate Algebra sections as a required component of remedial math assessment. 52 of 98 (53%) students taking the exam passed at the level equivalent to a 19 ACT score. The trend continues in which several students that essentially walked away from the course came in to take the exam in hopes of scoring the passing score, and therefore qualifying to move to College Algebra or Survey of Math. As the number of students coming back to take the exam in a "hail Mary" effort increases, the pass rate continues to drop. There were 224 students originally enrolled in all sections of Intermediate Algebra. There were 45 students who passed the course with a grade of C or higher. Of these 45 that passed the course, 33 passed the ASSET exam. These students were allowed to move on to College Algebra by virtue of the course grade. Of the students that took the ASSET exam and failed the course, 19 of these students scored a 39 scaled score or higher, which will allow them to move on to College Algebra or Survey of Math. Overall, 64 of 224 (29%) were allowed to progress to college-level mathematics courses, which is somewhat lower than the 35% last year.

ASSET Exam Results (Some terms include McGehee and/or Crossett numbers when reported)

Term	# enrolled	# taking exam	# passed	% taking test that passed	passed test w/o passing course	passed course w/o passing exam
Spr 14	150	84	45	53.6	12	7
Fall 13	224	98	52	53.1	19	12
Spr 13	216	107	69	64.5	21	13
Fall 12	327	167	95	56.9	42	20
Spr 12	242	122	83	68.0	15	12
Fall 11	266	143	93	65.0	32	8

In the Spring 2014 term, 150 students took Intermediate Algebra for a grade at the main campus. 40 students scored a C or higher in the course. Of the 40 students that passed the course, 33 scored equivalent to a 19 Math ACT or higher on the ASSET exam. There were 12 students who scored a D or F in the course that passed the ASSET exam, which will allow them to move on to College Algebra or Survey of Math. Overall, 53.6% (52 out of 98) of Intermediate Algebra students that took the ASSET as the final exam passed with a score that is equivalent to a 19 ACT. The success rate in this group was slightly better than that of the Fall 2013 classes. Either by passing the course or the ASSET exam, 35% (52/150) were allowed to progress to the general education math course. As in the past, there are a large number of "walk-away F's" which are defined as students that enroll in the course and attend very little, and eventually stop coming altogether, and do not take the final exam. These students put almost no effort into the course. I am somewhat disturbed about the lower percentage of students passing the exam; however, I feel that this can easily be explained by the fact that many students are taking the final exam and hoping for a miracle to occur which will allow them to move on to college algebra or survey of math. Because of financial aid regulations, many students cannot drop a class without forfeiting financial aid in future semesters. In the past, many of these low performing students dropped before the final exam.

Using data from the ASSET exams, faculty continue to make changes to the topics covered in Introduction to Algebra, Intermediate Algebra, and College Algebra. All of the courses are using in-house written workbooks which serve as the primary textbook for the course, and all use an online homework and assessment package that is closely aligned with the workbook. The Intermediate Algebra and Intro to Algebra courses use the ALEKS (Assessment and Learning in Knowledge Spaces) software. The package evaluates students on topics in the course, and indicates level of mastery on each. The software is also used as the online homework tool which gives immediate feedback for those that aren't getting the problems correct. Data from ALEKS indicates that students who put in a minimum of 30 hours of out of class time on the program have a reasonable chance of passing the course. Students who put in more than 60 hours of time on the program typically score an A or a B in the course. There isn't a strong correlation between ALEKS data and the ASSET exam score; however, the data certainly supports that the more hours worked is related to the final course grade.

Performance on National Exams

Students completing both General Chemistry and Organic Chemistry are given nationally normed American Chemical Society (ACS) Examinations as final examinations. Scores on these exams indicate that our students are continuing to perform near the national average in General Chemistry, and above that in Organic Chemistry. On this year's General Chemistry standardized final exam, UAM students finished four questions below national average. Although it is below national average, we are fairly pleased with our results since we are being compared to ACS certified programs, and several that use the exam are prestigious private institutions. This year's Organic Chemistry class' mean and median scores were very similar to the national average, with exactly half the class scoring above the mean, and half scoring below the mean. Some in the class scored above the 80th percentile nationally. The item analysis from the final exams is reviewed periodically to identify trends on the most commonly missed questions. The individual faculty member uses this information to improve coverage in certain areas. In recent years, the laboratory exercises have been changed slightly to provide additional coverage for areas that were identified as a problem area on the ACS Final Exam.

When examining item analysis for the exams, there are no clear trends on what topics are missed most on the exam. Slightly more students miss questions on multi-step organic synthesis than the other questions, but this expected since these questions are more difficult and require far more critical thinking skills than the questions related to nomenclature or physical properties of organic compounds. Although we are proud of UAM's performance on this exam, we need to use this information appropriately since we typically have only 12-15 students completing the Organic Chem II course, even though we may start with 30-36 students at the beginning of Organic Chem I. We are looking at the best students of a very small group that have already successfully completed Gen Chem I and II and are typically good students as a whole, but this should be the case at all universities. When examining the rosters from the past, it is not uncommon to find that the students that perform well on the ACS final exams are typically those accepted into medical school, pharmacy school, or other professional or graduate programs.

In General Chemistry, the ACS final exam scores have declined over the past several years. Since 2008, the scores have been in the 40th to 45th percentile range, nationally. This year, the percentile ranking is not known since the exam was a new exam provided by the ACS; however, this year's students had fewer correct answers than in the past several years. Without standardized data for comparison, it is impossible to compare results, but the faculty have indicated that overall, they felt this group was somewhat weaker than in the past. The

decline in the test scores over the past few years is partially attributed to the decline in the number of chemistry majors in these courses. Only one traditional chemistry major has graduated in the past five years. The bulk of the students taking the General Chem I and II sequence are biology majors and agriculture majors. The chemistry faculty continue to note that students are not putting the effort into the homework. We have reviewed several on-line homework packages and have tried some of the packages on a trial basis. One of these packages was adopted as an optional purchase so that students can do homework on-line and get immediate feedback. In the past year, the Sapling Software package was used for online homework and assessment. In general, most of the students did not like the online homework. Almost every student indicated they preferred the pencil and paper versions.

Even though many of the students score at or below national average on the ACS final exam, there are several that score very well on the exam. Many of these students continue to be successful in future chemistry courses and continue onward to professional programs in medicine, pharmacy, dentistry, physical therapy, or graduate school.

Admissions Exams

Since many School of Mathematical and Natural Sciences students are seeking admission into medical, dental, or pharmacy school, we often use those nationally normalized exams as a measure of program quality.

During the past year, three students took the Medical College Admissions Test (MCAT) and self-reporting scores back to UAM. The exam has sections in biological sciences, physical sciences, and verbal. Each section is worth a possible 15 points each. In the past, there was a writing component to the examination, but this year this was dropped. The composite scores (sum of three sections) for the students are 20, 22, and 26 out of 45, which is equivalent to 23rd, 32nd, and 55th percentile, respectively. Each student scored near the 50th percentile in both life sciences and physical sciences, which is slightly lower than in the past. One student scored exceptional well in verbal reasoning (95th percentile), which is not a typical verbal score for a UAM student.

Six students took the PCAT exam in the past year and self-reported scores back to UAM. The scores range from 33 to 84 on a 100 point scale, which is slightly better than last year's group. The exam has sub-scores for verbal, biology, reading comprehension, quantitative ability, and chemistry. There is also no calculator allowed on this exam even though calculations are done in both the quantitative and chemistry sections. Typically, UAM students score highest in chemistry or biology sections of the exams. For most UAM students, the verbal and reading comprehension scores typically are lower. Students who are lifelong readers typically perform well. Students who are not lifelong readers score poorly, and very little can be done in the short term to improve this score. Over the past six years, UAM students have averaged 45th percentile on the verbal ability, 53rd percentile in biology, 48th percentile in reading comprehension, 39th percentile in quantitative ability, and 53rd percentile in chemistry. We are pleased to see an above national average performance on the biology and chemistry sections of the exams; however, we are somewhat disappointed with the poor performance on the quantitative ability section. We feel this is largely due to the fact that many of our math courses are calculator based while the exam doesn't allow a calculator.

Each year, one or more of the pre-pharmacy advisors attends the UAMS Pharmacy Advisors Meeting. The official meeting is very general in nature, but more importantly, faculty at the pharmacy school often interact with advisors one-on-one to discuss strengths and weaknesses in the students coming from the 4-year institutions. A UAMS faculty member that was one of Dr. Bramlett's former students at another university

told him that UAM's students continue to do quite well. Typically UAM students scored near the top of the class on the organic chemistry evaluation exam that is given early in the term. They also do very well on the biochemistry topics. They are very pleased with the overall science background of the UAM students. They are especially pleased with the balance of chemistry and biology knowledge they possess. This year's applicant group from UAM consisted of four students, with all four being accepted. Two students have elected to attend UAMS, one will attend Harding University. The fourth acceptance was also accepted into the Doctor of Osteopathic Medicine program at William Carey University, and will attend there. One student applied to three colleges of pharmacy, and was accepted by two. The three others applied only to one institution.

One student took the Dental Aptitude Test (DAT) in the past year and self-reported their scores. The student scored at the national average on the exam; however, was declined admission. See Appendix A for individual scores. The lack of an in-state dental school makes it very hard to be admitted into dental school since there are only a limited number of positions held for Arkansas students.

Two Math and Science scores were reported for GRE examinations in the past twelve months. GRE has adopted a new scoring system which makes it very difficult to compare current scores to those in the past. Both scores were above average in both verbal and quantitative subject areas. See Appendix A for scores.

Capstone Courses

Biology, chemistry, and mathematics all have a capstone course requirement. Respectively these courses are BIOL 4741, Biology Seminar; CHEM 4611, Chemistry Seminar, or CHEM 4691, Senior Research, or CHEM 4742, Advanced Laboratory Techniques; and MATH 4711, Mathematics Seminar. Students research a topic, utilizing information from both the library and their own class and laboratory experiences. The students must write a research paper and do an oral presentation, either locally or at a professional meeting. The Biology faculty grade all students in Biology Seminar. All chemistry faculty are involved in the grading of the papers and oral presentations in Advanced Lab Techniques.

This year, nine students participated in the Advanced Laboratory Techniques. Six of the students did an exceptional job on their papers and presentations. Two were ranked very good, and one was below average but acceptable for a grade of D. The lowest ranked student was given another opportunity to make corrections to his paper and to repeat his oral presentation; however, he elected to keep a D in the course and not try to improve his grade. The faculty felt that all students had met the learning objectives.

Seven students involved in chemistry research did presentations at professional meetings. In each case, the students' preparation of the research poster or oral presentation was very good. Two students did similar presentations at multiple meetings. All demonstrated successful accomplishment of student learning outcomes. Ryan Reyes won the award for Most Outstanding Undergraduate Biochemistry Poster at the Arkansas Academy of Sciences.

Name	Meeting	Title
Cynthia Robinson	NASA-Arkansas Space Grant Consortium Annual Symposium	Nitrate can be reduced to nitrite in celery during storage
Ryan Reyes	National Meeting of the American Chemical Society, Dallas TX Arkansas Academy of Sciences	Molecular Modeling Studies Phylogenetically Significant Carotenoids of Oxygenic Phototrophs
Esgar Jimenez	NASA-Arkansas Space Grant Consortium Annual Symposium	Photovoltaic Generation of Hydrogen
John Austin Beatty	2013 Arkansas INBRE Research Conference, Fayetteville, AR	Characterization of a Chromium Complex formed by reaction of Hexadentate Polypyridine Ligand
Taylor Snider	2013 Arkansas INBRE Research Conference, Fayetteville, AR	Method Development for the Characterization of Fatty Acid Content in Freshwater Eustigmatophyceae
Kiara Newhouse	2014 Southeast Undergraduate Research Conference, Knoxville, TN Mid-South Inorganic Chemists Association (MICA) 2013 Fall meeting, Little Rock, AR Posters at the Capitol, Little Rock, AR	Ion Chromatographic Study of Aerosol Samples Collected from Jonesboro, AR.

In Mathematics, five students took the capstone course, Mathematics Seminar in the past year. The students in the course must write a research paper and perform an oral presentation, demonstrating knowledge and understanding in a specific area of mathematics. Four of the five students did very well. The fifth student didn't do as well, but performed at the acceptable level and easily met the desired learning outcomes.

Biology Seminar is used as the capstone course for the Biology major. Thirteen students completed the course in the 2013-14 academic year. Most of the students did an excellent job finding related references, writing the paper, and presenting the information in the seminar. All students had to do minor re-writes on the paper to get the appropriate references and follow the proper format. One student required major re-writes to get their paper to the acceptable level. All of the thirteen students met the course learning objectives at well above the acceptable level.

Nine biology majors were involved with research projects that ended with the presentation of their results at

professional meetings. Some of the presentations were oral presentations made by an individual while others were poster presentations involving several students. The biology faculty felt that all students displayed very good to excellent knowledge of the topics and performed exceptionally well in preparing the poster or digital presentation. The presentations are listed below:

Name	Meeting	Title
Shana Chancellor & Hope Dunlap	NASA-Arkansas Space Grant Consortium Annual Symposium 2013 Arkansas INBRE Research Conference, Fayetteville, AR 2013 Southeast Regional IDeA Meeting, Little Rock, AR	Expression of the <i>Drosophila melanogaster</i> RpS6-Or_aca2 gene
Kiara Newhouse	National Meeting of the American Chemical Society, Dallas TX	Effects of high altitude radiation on Seed Germination and Seedling Growth
M. Collins N. Jones M. Lindsey A. Mendosa C. Roberts J. Garmon	UAM Research and Scholarship Forum, Monticello, AR, September 2013 UAM School of Education STEM Open House, Monticello, AR, September 2013	Evaluation of the DNA Sequences from the Nuclear Large Subunit Ribosomal RNA gene for Use in Delimiting Species of Algae <i>Nannochloropsis</i> (Eustigmatophyceae)

Even though our physics program has only a minor and primarily serves as support courses for mathematics, chemistry and biology, there were four students involved with undergraduate research projects. All of the students exhibited excellent knowledge of the research topics. Three of the students presented their research at regional meetings. All did an excellent job of organizing material and developing the displays for their poster presentation. Chris Gillison received the award for the Most Outstanding Physical Science Poster at the Arkansas Academy of Sciences. Those presenting were:

Name	Meeting	Title
Kody Coleman	Arkansas Academy of Sciences	Superhet converter for VLF 60KHz WWVB radio signal
Chris Gillison	Arkansas Academy of Sciences	Stable fuzzy logic control for non-linear chaotic maps
Kyra Jerry	Arkansas Academy of Sciences	Geometric validation of linear and non-linear Diophantine equations

Overall, the School of Math and Sciences had numerous research projects involving students. From these projects there have been 18 professional presentations by students, 3 publications in refereed journals, and 14 grants that had contributions from student researchers. These students are recognized for being excellent students and are highly sought after for graduate programs. Four of the biology students were accepted into graduate programs with all receiving assistantships. The biology/biochemistry double majors continue to be

exceptionally successful with four students being accepted into medical school, four students accepted into pharmacy school, and one into vet school. Three Mathematics graduates have been accepted into the post baccalaureate teaching preparation programs, and one was accepted into the graduate program at the University of Arkansas.

4. Based on your analysis of student learning data in Question 3, include an explanation of what seems to be improving student learning and what should be revised.

Over the past three years, the remedial mathematics courses have adopted UAM written text/workbooks that provide less theory and are more of a “how to” guide. Each book is coordinated with the ALEKS (Assessment and Learning in Knowledge Spaces) software which provide assessments, homework, practice problems, and pre-test assessments. The course pass rates have not increased significantly with the adoption of this approach; however, a higher percentage of students are passing the end of course exam. This is partly due to the faculty having multiple tutoring sessions with practice ASSET exams. When combining the number of students that pass the course and the number of students passing the end of course exam, the overall success rate in intermediate algebra for students being allowed to proceed to college level math is approximately 40% of those initially enrolled, which is almost identical to the previous year. Prior to the implementation of ALEKS and the workbooks, the success rate in Intermediate Algebra was approximately 25%. Although the current 40% success rate represents a small increase, we are not proud of the fact that 60% of the initial enrollees are not successful. We feel that a large part of this is due to lack of student effort. This is confirmed when reviewing the amount of time spent on the ALEKS program. The ALEKS program logs the amount of time that work is done for each student, and it is clear that the bulk of the students that are unsuccessful have put in very little or no time. On the other hand, students that have put in the recommended number of hours typically do better in the course. Faculty in both Introduction to Algebra and Intermediate Algebra have indicated a strong correlation between hours logged and overall grade in the course. The exceptions to the previous statement are typically non-traditional students that struggle in mathematics. Many of the students that receive an F in the course come to class on occasion, log very little time on ALEKS, and simply quit coming to class at some point in the semester. Several faculty are trying to develop a plan that makes students attend class or be removed early on; however, this goes against the policies of the University. Plans were in place to do a test course in which a required component of the Intro to Algebra course was a mandatory two hour lab per week. The course was dropped from the fall 2013 schedule after only one student had enrolled in the course by mid-July.

Introduction to Algebra went through similar changes with an in-house written text, and coupling with ALEKS. The package is far cheaper than the previous textbook, and like Intermediate Algebra, the students can do on-line homework and practice for exams. It’s built in assessment lets the students know which topics they have mastered. Results similar to those found in Intermediate Algebra have been found, with those putting in more time being far more successful than those that are putting less or no time. In Introduction to Algebra there isn’t a nationally normed end of course examination as there is in Intermediate Algebra; however, a team written comprehensive final examination is given. Typically about 40% of the students that complete the course (i.e. take the final) pass with a grade of C or higher. Based on number of students who start the term, the success rate is typically around 20% passing with a C or higher. This year was no different. The success rate for the Spring 2013 term was up slightly to 22.6% for the Monticello sections. The Crossett and McGehee sections faired slightly better at 33.6%. We hope that the increase in pass rate over the past year is a result of the efforts of the faculty and improvements made in the workbooks; however, we are continuing to make improvements on the text and the software. It is possible that staffing the tutoring lab with faculty for several hours per week during the spring term is partly responsible for this increase. In the fall, no faculty

were assigned time in the tutoring lab, and there was a 21.8 % pass rate for the fall term for the Monticello sections. Again, the off-campus sections had a higher pass rate at 35.7%. Discussions among the on-campus and off-campus faculty members are planned to discuss best practices.

The math faculty teaching developmental courses meet regularly, and have ongoing discussions about how things should be covered in their courses. Everyone follows a pacing guide that is agreed upon at the start of the term. This creates a need to alter some topic coverage in order to get all the topics seen by the end of course ASSET exam. This requires changes in workbooks and the ALEKS package to match the coverage.

The Survey of Math courses have been using an online homework system, My Math Lab, which provides immediate feedback. Some students, especially those that were trained on ALEKS, accepted the software rather easily. Others resisted using the online homework; however, most at least attempted their homework. A workbook was developed for the course and used during the year. During the Fall 2013 term 61.5% of the students passed the course with a D or higher, excluding early college high school sections. In the Spring 2014 term, 72.9% successfully passed the course, which is slightly higher than the previous year. Continued upgrades to workbook are currently being done.

General Chemistry is undergoing minor changes in order of topics covered in order to diminish the difficulty gap between Chem I and Chem II. At some point, we hope to move one or more topics to Chem I which would lower the pace of coverage in Chem II. It is difficult to make these changes without removing needed topics.

Organic Chemistry has moved away from online homework. The instructor felt that the students were not nearly as prepared as when doing pencil and paper homework. Many of the students applauded the move away from the online homework. It also resulted in a textbook change back to the text that was used before switching to the online homework.

Relatively few changes are made to our courses or programs based on performance on the professional exams such as the PCAT or MCAT exam. The scores on those exams are affected by many variables other than course content knowledge. Some of these factors are: reading speed and comprehension, tendency to do well on standardized exams, and the amount of review time spent on each subject before the exam. The faculty and staff at UAMS do tell us that students that complete our programs perform well in their programs. They also indicate that students that take equivalent courses at less rigorous institutions typically do not do as well in their programs. We are looking at the calculus content on the PCAT exam since our students have not done well on the quantitative portion of the PCAT over the past several years.

In the capstone courses there are changes made periodically. Typically, the instructor of record for the course has the final say on changes being made; however, this course is team taught by all faculty in chemistry, and informal discussions are held every fall to determine what is going to be done in the spring offered course. While some changes are made to suit the instructor for that particular term, other changes have been assessment driven. For instance, the year after Advanced Laboratory Techniques was implemented, the Chemistry faculty felt that not enough emphasis was placed on the research paper, and too much emphasis was placed on the specialty techniques being taught. We changed the emphasis to be much higher on the written paper and seminar, and since that time, there has been a major improvement on the performance in those areas. Last year, the student output was very good for the most part. This year, the students continue to improve on the writing portion. The students are still exposed to specialty lab techniques and instrumentation that they are likely to see in graduate school or in the workplace; however, we are not covering that material at the same

depth as before. This year's topic (pesticides and herbicides) was chosen to heighten the interest in the agricultural chemistry industry and to learn of the health hazards associated with the dangerous chemicals used in the past.

Students are very much encouraged to present their research findings at regional and national meetings. Students who take part in scholarly activities other than normal course work have a much deeper understanding of the topics covered in the classroom. We have made more funding available for student travel so that more students can participate in professional meetings. Five years ago, we rarely had students presenting at meetings. The previous two years we have had approximately 15 students involved with one or more presentations. This year, 18 students did presentations at meetings. The Research Program for Minority Students (RPMS) was grant funded originally; however, it is now funded totally by UAM and external grants. The program has been hugely successful at getting students into summer research programs and graduate programs.

5. Other than course level/grades, describe/analyze other data and other sources of data whose results assist your unit to improve student learning.

The School of Mathematical and Natural Sciences uses a variety of other measures to assess the quality of our programs. These measures include job/graduate school initial placement, senior exit surveys, alumni surveys, and student evaluations. We rarely get information back from employers; however, we attend annual meetings with schools that host professional programs. Their faculty and administrators verbally provide very general information about trends they see among the students coming from our institution. This information is intentionally very general in order to not violate FERPA laws.

When reviewing the Math and Science graduates over the last several years, many of the students have been very successful in their initial placement. Several students have attended graduate school or a professional school, others have found positions in industry, while others, especially in mathematics, have chosen to enter the field of education. With 4 out of 4 accepted into medical school this year, UAM continues its string of 100% acceptance to 11 years. In 2013-14, 4 out of 4 students were accepted into pharmacy programs. The pharmacy acceptance rate has improved to near 90% during that same period of time; however, we feel that every applicant that has truly deserved to be admitted has been. Applicants to dental school programs have been slightly less successful, at 50%, mainly due to the fact that our students must apply to out of state programs. One student was accepted into vet school, and another was accepted into law school. See Appendix B for initial placement information of Math and Science graduates from the current year.

Most graduating seniors take part in exit interviews with the Dean of Math and Sciences. During the interview, the students were asked about the School of Math and Science strong points and weaknesses. Specific questions about curriculum were asked as well. Most students had little or nothing to say specifically about the curriculum. One biology/biochemistry double major specifically requested more cell and molecular type biology courses, instead of as many field courses. One student felt strongly that we should add an Engineering program. Lack of funding, no space, and low enrollments would all be difficult to overcome with the addition of a program of this type; however, it is a program that I wish had been added in the 1960's when money was available to start programs of this type. Most students praised the education they have received in the sciences. Students openly praise the faculty for their knowledge and level of commitment to helping students, but many students feel that we are behind other universities that they have visited in terms of equipment and facilities. See Appendix C for student responses.

Alumni surveys were once sent out with newsletters mailings, but the newsletter has not been sent out in several years due to time required to put it all together and mailing costs. Often, when students reconnect with the School of Math and Sciences, an Alumni Survey is sent out via email. This year, no graduate surveys were returned, even though a few were sent to students that sent us updated information.

Even though it is more informal, we do listen to current student comments. We do a lot of individualized advising in Math and Sciences because so many of our students are applying to specific programs out-of-state and therefore have slightly different prerequisites. Often students come to us with problems caused by poor advising from another unit where a student was wrongly assigned, or started as a general studies student. While most of these problems were created based on information that the students provided on an application, we could still do a better job by catching those mistakes early. The most common mistakes that we see are students that are planning on attending medical school, pharmacy school, or an allied health program being put into the wrong biology, wrong chemistry, or not put into these classes at all. This essentially puts the student a year behind. Since students can apply to these programs from any major, it is important that they be listed in WeevilNet as pre-med and as their major. This year, some improvements were made in this area. Because of financial aid restrictions, pre-med students are automatically registered as biology majors. This can be changed, but it does make students aware that they need a specific major. Pre-pharmacy students are also registered as chemistry majors, pre-engineering are co-registered as math majors, and allied health students are co-registered as natural science (life science option) students. While some change their major, many work toward those degrees.

We try to monitor the progress of our graduates by staying in contact directly with the students, and also by contact with faculty in their professional programs. The Pre-Med Advisors Meeting held at UAMS every spring gives us general information about the performance of our students, but information about individual students is kept confidential. This year, they mentioned that the UAM students were performing quite well, with one student being the number one student in the class. The UAMS and Harding University Colleges of Pharmacy each provide similar information about our students. Harding reported that all of our students had a good year with some of them appearing on the dean's list. UAMS representatives said that all the UAM students were doing very well in their coursework.

At professional meetings, our faculty members often meet faculty from graduate programs that have accepted our students. Again, we cannot get specific information about a student, but we do get generalized information about what we can do to improve our programs. A specific recommendation that was recently expressed by a faculty member from the chemistry program at University of Arkansas was that we implement more assignments in which our chemistry majors use chemical literature. In response to that recommendation we have put more emphasis on the research paper portion of Advanced Lab Techniques. We are also encouraging all majors to take part in undergraduate research projects, which will involve more contact with the chemical literature and also scientific writing. In the Master of Arts in Teaching (MAT) program, they want the students more exposed to educational settings, and possibly introduce some pedagogy into their curriculum. In response to that request, the School of Math and Sciences recommended the development of the minor in Teaching and Learning. We are encouraging this minor for all majors that are considering a career in education. Although we have had no Math and Science majors choose this as a minor, we have had several students take courses from the this minor as electives. Several of the students have indicated that they feel this better prepares them for the MAT program.

In the ten year program review in Mathematics, a recommendation was made to add a course in Advanced Calculus or Real Analysis (similar course, different name). This fall, an Advanced Calculus course is being offered as a special topics course. The course will be proposed to Curriculum and Standards for approval as a

permanent course, and will become a required course for the mathematics degree. Another recommendation was to do something that would give the students more programming experience. This fall, a proposal to make Programming Logic and Design, and another course in a computer programming language supportive requirements for the math degree is being sent forth to Curriculum and Standards.

6. As a result of the review of your student learning data in previous questions, explain what efforts your unit will make to improve student learning over the next assessment period. Be specific indicating when, how often, and by whom these improvements will take place.

Two years ago, a new text that was chosen for organic chemistry that provides more detail in structure and properties; however, after using that text for one year, a decision was made to go back to the previous textbook. It was a better fit of our most common audience, Biochemistry and Biology majors. The instructor is quite pleased with the return to the book that was previously used in the course. Last year, he didn't offer quizzes on a regular basis, and it was apparent at the end of the semester that the students had not performed as well in the course, or on the final exam. This year, the quizzes are being reimplemented.

Many of the advisors, especially in the pre-professional and allied health programs, are planning group advising sessions. We started this in 2012-13. We did even more last year, but plan for even more in the upcoming year. Currently, they are planned for the Tuesday or Thursday activity hour (12:30-1:30). The idea is to provide better information on what is needed to be accepted into the professional programs. Hopefully, it will help students make an earlier decision on their career choice, and provide an avenue for early intervention for students that are struggling. Admissions representatives from the UAM Master of Arts in Teaching program, UAMS College of Medicine, William Carey College of Osteopathic Medicine, UAMS College of Pharmacy, and Harding University College of Pharmacy will provide a program for our students. The Sigma Zeta Math and Science Honor Society students are also planning a student advising session to help students plan their path to professional school or a graduate program. In the past Spring, this event was quite successful.

During faculty development week meetings, assessment will be discussed in each discipline's meeting. With the implementation of the new student evaluation system through Blackboard, we hope to develop some assessment driven questions that will be added to the specific course evaluations. Implementation of other assessment tools, such as pre-test/post-test, will be considered.

7. What new tactics to improve student learning has your unit considered, experimented with, researched, reviewed or put into practice over the past year.

Each year, upgrades to the Introduction to Algebra workbook/text, the Intermediate Algebra workbook/text, and ALEKS software are currently being done. Dr. Hassan Sayyar continues to make improvements to the College Algebra workbook. Calculus I, and Calculus II tried the WebAssign online homework system on a free trial basis. That system has been adopted for use in those courses. A new workbook has been developed for Survey of Math, and they now use My Math Lab as an online supplement. Some students enjoyed the immediate feedback the software provides. Other students were less receptive to online homework. The faculty have met with the University of Central Arkansas mathematics faculty to discuss the possibility of contributing to statewide written textbooks which would be far cheaper than the current textbooks used in those courses.

Some courses in mathematics would like to use the computer lab during class on occasion to give hands-on practice on the online homework and assessment packages. Previously, with only ten computers, the facility was too small to be able to do this effectively. This year 5 additional computers were added, which will make it possible for an entire class of students to work in the lab when working as pairs or small groups.

In chemistry, work continues on developing electronic lectures that the students can watch on their own time, which would allow class time to be used more for problem solving and critical thinking activities. At this time, the technology that will be used is probably going to be voice-over Powerpoint (VOP). A few VOPs were done in chemistry labs in the past year, and were fairly well received by the students. Lynn Fox used VOPs extensively to provide additional study opportunities for her students in mathematics. She used a “pen” that could be used to write digital information to the computer screen and record her voice as she explained the material being covered. This was very useful in making lecture content available outside of class. Pharmacology course lectures were recorded for an entire semester and made available to students to watch on their own time. Comments from students praised this effort; however, a small number of complaints were received about the clarity what was written on the board during class.

The building was equipped with wireless technology in the past year, but the quality is poor and occasionally not strong enough in extreme corners of the building where labs are held. We hope to equip the labs with wireless projectors at some point; however, that is being put on hold at this time.

At the urging of the Provost, we added an online Survey of Mathematics course. Even though most of the faculty in Math and Sciences feel that online classes are much lower in quality than face to face courses, some are considering the possibility of hybrid courses. By being a hybrid, we feel that we can maintain standards and provide the all important hands on component. College Algebra and Introduction to Biological Sciences and lab courses were added to the online offering by hiring of adjunct faculty.

Several faculty in Math and Sciences are using the first day of class each semester as a chance to talk with students about careers and what courses they need to be in. So far, this has been a positive event in which several students have changed courses in order to be in the proper course for their major. Much time is spent on the level of effort required to be successful in our courses. A lot of effort is being spent on topics that pertain to retention of students.

8. How do you ensure shared responsibility for student learning and assessment among students, faculty, and other stakeholders?

Students are continually given feedback on their progress throughout each course by posting of grades on exams, quizzes, homework, lab assignments and other assignments. Students meet with advisors at least once per term, and more realistically, several times per term. The students provide feedback to the unit in the form of student evaluations. The online student evaluations provide data comparison and student comments to the dean and faculty member. Many students meet with Dean Bramlett to discuss classes, progress toward a degree, committee references for those applying to professional school, and often just informally chat. All graduating seniors are given an invitation to meet with Dr. Bramlett for an exit interview to discuss their experience within the School of Math and Sciences. See Appendix C.

Faculty are encouraged to maintain good communication with their students and properly post up to date

grades. At the encouragement of the dean, several faculty now pass out mid-term grade sheets to students in the lower level classes. This has been a huge success within the School. The faculty are also involved with collection of data and reporting to the appropriate representative on the Math and Science Assessment Committee. This information consists of grades and other feedback related to student performance in the classroom, scores from standardized national exams in general and organic chemistry, scores from ASSET end of course examinations in Intermediate Algebra, and data collected relative to capstone courses in each major.

9. Describe and provide evidence of efforts your unit is making to recruit/retain/graduate students in your unit at the University.

We have certainly become more active in recruiting students over the past few years. Dr. Bramlett continues to be active with the Arkansas Advanced Placement programs. He provided instruction at several Advanced Placement test preparation workshops. Three were held for the Pulaski County School District schools, one was hosted in El Dorado in January 2014, and one in Arkadelphia. At each site, 5 hours of instruction were provided over 2-4 different topics. At the December workshop, the topics covered were stoichiometry, electrolytic cells, galvanic cells, and net ionic equations. The topics at the January session were kinetics and thermodynamics. At Arkadelphia buffer solutions, nuclear chemistry, and atomic structure were covered. At each event, a few minutes were taken to recruit students into programs at UAM.

In the past, guest teaching appearances have seemed to work well in attracting students into the Math and Science majors. Several students from Hamburg attended UAM from the AP Chemistry class that Dr. Bramlett worked with in 2009-10. In the following years, it was effective in recruiting students from Star City, Crossett, and Rison. This year, Star City, Monticello, Dumas, and Hamburg have already requested guest teaching and teacher help sessions from Dr. Bramlett.

We hosted the Regional Mathematics Contest and the Regional Science Fair. Science Fair information can be found at http://www.uamont.edu/math_and_sciences/RSF/. At these events, faculty and representatives from Admissions were given the opportunity to meet with students and discuss the potential to attend college at UAM.

Dr. Bramlett, along with Dr. Andrew Williams and Tracie Jones of the Education Renewal Zone, is forming a southeast Arkansas chemistry teachers group that will meet monthly. The goal is to provide resources for teachers so that the students will be better prepared when they college. Recruitment of students to UAM will also be an underlying effort.

To retain students, the faculty in Math and Sciences continue to give freshmen special attention during academic advising and also in the first day of freshmen level classes. They are given very specific information on expectations in each course, and also for each major or pre-professional curriculum, such as curriculum guides. These are available on the UAM website at:
http://www.uamont.edu/Math_and_Sciences/academics.htm. Curriculum guides for the specific majors can be found in the UAM Catalog.

The School of Math and Sciences puts a great emphasis on getting students involved with research programs. As early as the freshmen year, faculty in Math and Sciences identify students that would benefit from being involved in research programs. The students can earn extra money, but it also provides an opportunity to forge

excellent relationship with a faculty mentor. Last year, about 25 students were involved with research projects. Eighteen of those students presented their research findings at state, regional, or national meetings.

Scholarships are also provided by the School of Mathematical and Natural Sciences. In the upcoming year, \$11,561.04 will be awarded to approximately 40 students. These awards greatly reduce the financial burden on those that are attending college, thus improving retention. They also provide recognition for the top students in our unit.

The scholarships that will be awarded by Math and Sciences beginning in the Fall 2014 term will be:

ENDOWED SCHOLARSHIPS

Account	Name	2014/2015 Amt \$ Per Semester
31-004940	Dr. Van C. Binns Scholarship - Pre-Medicine	1979.20
31-009708	***Anthony T. and Faye Chandler Scholarship	278.24
31-004903	James Gordon Culpepper Scholarship	1125.71
31-004852	Gregory Alan Devine Memorial Scholarship	1499.01
31-004904	Dr. Albert L. Etheridge Scholarship	1165.70
31-004899	William and Anna Hill Scholarship	3568.08
31-004937	Wilburn C. Hobgood Scholarship	1045.61
31-004865	Mr. Jim Huey Scholarship	703.06
31-011159	Dr. C. Lewis & Wanda W. Hyatt Endowed Scholarship	833.55
31-004906	Victoria Ku Scholarship	1003.75
31-009626	Mathematics Scholarship	633.06
31-004872	Mathematics & Physics Scholarship	782.33
31-009695	Miller Sisters' Scholarship - Science	1799.93
31-011792	Robert H. Moss Endowed Scholarship	666.94
31-012020	Earl K. Phillips Math & Science Endowed Scholarship	1120.38
31-004938	Herman C. Steelman Scholarship	817.64
31-004889	Jack H. Tharp Scholarship	1498.76
31-010396	Carolyn Hibbs Thompson Chemistry Scholarship	1930.85
31-007114	Dr. Paul Allen Wallick, Sr. Scholarship	670.28
		\$ 11561.04

The School of Mathematical and Natural Sciences also uses both institutional and federal work study funds to employ as many of our students as possible. They are employed as general office help, math tutors, lab teaching assistants, graders, museum and herbarium help, and research assistants. It is a strong belief that the more the student works on campus, the stronger the connection the student will have with the University, and the more likely the student will be to graduate.

We also use the Biology Club, the Medical Science Club, and the Math and Physics Club as social hooks for students. Getting involved in these clubs gives them more of a purpose to be here other than just attending classes. It also gives them a glimpse of the future that a degree in the Math and Sciences areas can provide. These clubs bring in speakers from other universities and from industry. They do community service projects, such as highway clean-up, Saline River stream team clean-up events, and Relay for Life. They have social events such as football tailgating and cookouts.

The overall goal of the School of Mathematical and Natural Sciences is to produce successful students, which in most cases implies graduating with a degree; however, it is ironic that the most successful students often gain admission to a professional school prior to completing their degree. We do allow courses to transfer back for degree completion purposes within the guidelines set by the University (see page 60, 2013-15 UAM Catalog); however, especially in allied health programs, those students do not have enough hours to qualify. Those students are encouraged to complete the associates degree, but many do not choose to take the specific remaining courses to do so.

In most of the Math and Science majors, there are a fairly large number of students who change their major, often to majors in other units, after their first semester or first year. The rigors of chemistry, biology, math and physics often are greater than the student expected. Many people enter UAM with an interest in pharmacy or medicine, but after one or two courses decide that their skill level isn't adequate for those pursuits. Those students are often encouraged to change their major to something else. When these students change majors, this is not necessarily a retention problem since they are likely to graduate in another major; however, since we do not attempt to track these students, our numbers of graduates relative to the numbers of majors does not look good. For numbers of majors and numbers of graduates over the past several years, see Appendices D & E. After the freshmen year fall-off, a fairly large percentage of the students do graduate and are successful in industry, a graduate program, or in the field of education. For a list of initial placement of our graduates from the current year, see Appendix B.

Letters and emails have been sent to several students that have completed a significant portion of their degree and then dropped out. Options are reviewed to see if prior biology and chemistry majors are closer to a Natural Science or the Bachelor of General Studies degree. In the past year, several students have been contacted about the possibility of completing their degree through the Bachelor of General Studies major, or using the professional school courses to complete their degree. One student qualified for the Bachelor of General Studies degree without even taking an additional course. Another student changed his major to General Studies for his last term and completed his degree. He is now attending medical school.

**Appendices for the
Annual Assessment Report
2013-2014**

School of Mathematical and Natural Sciences

- Appendix A Nationally Scored Exam Results
PCAT, MCAT, and DAT Scores
- Appendix B Initial Placement Information
- Appendix C Exit Surveys
- Appendix D Number of Graduates
- Appendix E Number of Majors

Appendix A

Nationally Scored Exam Results

PCAT Scores

MCAT Scores

DAT Scores

GRE Scores

PCAT Exam Scores

Student A Test Date November 2013 The Psychological Corporation

Multiple Choice Scores	Scaled Score	Percentile Rank
Verbal Ability	385	22
Biology	411	63
Reading Comprehension	389	30
Quantitative Ability	396	39
Chemistry	412	68
Composite	399	43

Student A Test Date June 2014 The Psychological Corporation

Multiple Choice Scores	Scaled Score	Percentile Rank
Verbal Ability	409	63
Biology	435	92
Reading Comprehension	395	41
Quantitative Ability	393	33
Chemistry	426	85
Composite	412	72

Writing Scores	Your Score	Avg Score
Conventional Language	3.0	2.76
Problem Solving	3.5	2.76

This student is applying for 2015 admission into pharmacy school

Student B Test Date June 2014 The Psychological Corporation

Multiple Choice Scores	Scaled Score	Percentile Rank
Verbal Ability	451	98
Biology	411	63
Reading Comprehension	419	84
Quantitative Ability	396	39
Chemistry	418	76
Composite	419	84

This student is applying for 2015 admission into pharmacy school

Student C Test Date June 2014 The Psychological Corporation

Multiple Choice Scores	Scaled Score	Percentile Rank
Verbal Ability	403	52
Biology	435	92
Reading Comprehension	402	54
Quantitative Ability	404	55
Chemistry	415	72
Composite	412	76

This student is applying for 2015 admission into pharmacy school

Student D Test Date June 2014 The Psychological Corporation

Multiple Choice Scores	Scaled Score	Percentile Rank
Verbal Ability	412	68
Biology	430	89
Reading Comprehension	388	29
Quantitative Ability	416	77
Chemistry	422	81
Composite	414	76

This student is applying for 2015 admission into pharmacy school

Student E Test Date January 2014 The Psychological Corporation

Multiple Choice Scores	Scaled Score	Percentile Rank
Verbal Ability	379	15
Biology	396	35
Reading Comprehension	377	15
Quantitative Ability	396	39
Chemistry	405	56
Composite	395	33

This student was accepted to Harding University College of Pharmacy.

Student F

Test Date September 2013

The Psychological Corporation

Multiple Choice Scores	Scaled Score	Percentile Rank
Verbal Ability	423	82
Biology	393	29
Reading Comprehension	406	62
Quantitative Ability	393	33
Chemistry	415	72
Composite	406	59

This student was accepted to UAMS and Harding University Colleges of Pharmacy.

MCAT Test Scores

Student A

Test Date	July 2014	Score	Percentile
	Verbal Reasoning		
	Physical Sciences		
	Biological Sciences		
	Total Score	20	23

This student is applying for admission in 2015. Subject subscores were not provided by the student.

Student B

Test Date	July 2014	Score	Percentile
	Verbal Reasoning	6	26.1
	Physical Sciences	8	54.7
	Biological Sciences	8	41.1
	Total Score	22	32

This student is applying for admission in 2015.

Student C

Test Date	July 2014	Score	Percentile
	Verbal Reasoning	11	95.3
	Physical Sciences	7	40.2
	Biological Sciences	8	41.1
	Total Score	26	23

This student is applying for admission in 2015.

DAT Test Scores

Note: Standard Scores used in the testing program range from 1 to 30. Only standard scores are reported to dental schools.

Academic Average is the average of the five scores rounded to the nearest whole number, QR, RC, B, GC, OC

Total Science score is a standard score based on all 100 questions in Biology, General Chemistry, and Organic Chemistry
It is not the average of the three science standard cores.

Student A

August 2013 Test Date	Score	Percentile
Perceptual Ability		
Quant. Reasoning		
Reading Comp.		
Biology		
Gen Chemistry		
Org Chemistry		
Total Science		
Academic Avg	17	48-52

This student is applying for 2015 entering class. The student did not provide subscores.

GRE Scores

Student A July 2013

	Raw Score	Percentile
Verbal	156	70
Quantitative	155	61

This student has been accepted into Ph.D. program in biology, with assistantship

Student B March 2013

	Raw Score	Percentile
Verbal	154	62
Quantitative	154	57

This student was accepted into Ph.D. program in biology, with assistantship

Appendix B

Current Year Placement of Graduates

2013 -2014 Graduates and Placement

Graduate	Hon	Conferral Date	Major 1	Major 2	Minor	Initial Placement
Student 1		5/9/2014	BGS-Math, Chem, Interdis			Business owner
Student 2		8/5/2013	BGS-Biol, Chem, Interdis			Med School (Int. Amer. University)
Student 3		5/9/2014	Biology (BS)		Chemistry	
Student 4		12/18/2013	Biology (BS)			Pharm. School (UAMS)
Student 5	M	5/9/2014	Biology (BS)	Chemistry (BS) Biochem		Med School (UAMS)
Student 6		5/9/2014	Biology (BS) Organismal			Grad School (Rennes Univ. France)
Student 7		5/9/2014	Biology (BS) Organismal			Ark Game and Fish Internship
Student 8		5/9/2014	Biology (BS)	Chemistry (BS) Biochem		Med School (William Carey)
Student 9	S	5/9/2014	Biology (BS)	Chemistry (BS) Biochem		Dental School (UT-Mem)
Student 10	M	5/9/2014	Biology (BS)	Chemistry (BS) Biochem	History	Grad School (UAMS)
Student 11	C	5/9/2014	Biology (BS)	Chemistry (BS) Biochem		Med School (William Carey)
Student 12	C	5/9/2014	Biology (BS)	Chemistry (BS) Biochem		Vet School (LSU)
Student 13		5/9/2014	Biology (BS)		Nat Sci	
Student 14	M	5/9/2014	Biology (BS)		Nat Science	Lab instructor UAM
Student 15	M	5/9/2014	Biology (BS)	Chemistry (BS) Biochem		Yale Research Internship
Student 16		5/9/2014	Biology (BS) Organismal			Construction business (flooring)
Student 17		5/9/2014	Biology (BS)			Funeral Dir in Maine
Student 18		5/9/2014	Biology (BS)	Chemistry (BS) Biochem		ASTA Internship applicant
Student 19		5/9/2014	Chemistry (BS) Biochem			Pharm. School (UT-MEM)
Student 20		5/9/2014	Chemistry (BS) Biochem			Pharm. School (HU)
Student 21	C	5/9/2014	Mathematics (BS)	Chemistry (BS) Biochem	Physics	
Student 22		5/9/2014	Mathematics (BS)	Chemistry (BS) Biochem	Physics	Engineer in defense industry, Camden, AR
Student 23		12/18/2013	Mathematics (BS)		Physics	Math Teacher in TX
Student 24		12/18/2013	Mathematics (BS)		Coaching	Math Teacher MAT
Student 25		5/9/2014	Natural Science (BS) Life Sci			Cashier Walgreens
Student 26		12/18/2013	Natural Science (BS) Life Sci			
Student 27		5/9/2014	Natural Science (BS) Life Sci			Law School
Student 28		12/18/2013	Natural Science (BS) Life Sci		Crim. Justice	Store manager

For honors: C= Cum Laude, M = Magna Cum Laude, S = Summa Cum Laude

Appendix C

Graduating Senior Exit Interviews

Mathematical and Natural Sciences Graduate Survey

Your response is very important to the internal assessment of our programs. Please complete the following. Feel free to give specific examples related to your job, your continued education, or about UAM courses that you have taken. Feel free to attach additional pages if needed. This page is also available on the Math/Science homepage and may be submitted by email as an attachment

What are you doing after graduation?

After graduation, I'm going to medical school at UAMS.

Do you feel that UAM prepared you for your professional life?

I do feel that UAM prepared me for professional life. Classes at the science center are very difficult and forced me to develop good studying habits at the beginning of my college career. I'm very sure the rigorous course work helped prepare me for entry into medical school.

What did you like most about the School of Math and Sciences? (Strengths)

The major strength of the Math and Science Department is its staff and faculty. Many of our professors are deeply knowledgeable about their fields of study and this is good, but this isn't what makes us different or great. The thing that sets us apart is that we have faculty that are exceptional teachers. They are people who are experts in their fields, yet able to present information in a way that's understandable to someone that's just beginning. It's a true rarity to find a professor that is passionate about the work, knowledgeable about the subject, and also a great teacher. Our department is filled with such individuals.

What did you like least about the School of Math and Sciences? (Weaknesses)

One of the school's weaknesses is that we aren't allotted much money to spend on upgrades. That's upgrades for the normal lab equipment and research equipment and infrastructure and a whole host of other things. Upgrades even include hiring extra staff to handle the new flood of students wanting to be a part of our science center.

On a different note, it's my personal opinion that some the staff's abilities are being undervalued. There are some excellent teachers, and I mean teachers, who should have a greater amount of involvement.

What changes do you recommend?

I would recommend that Dr. Serna be the only one to teach Physics I and II. He is an excellent teacher, and very passionate about his students and his work. Physics itself can be a difficult subject to relate to, but Dr. Serna does a great job. We need his experience and skill in this particular class because, for whatever reason, it is on the MCAT and other professional school tests.

Is there anything else you would like to add?

I think we're good.

The following information is optional but highly recommended:

Name: John Austin Beatty

Major(s): Biology/Biochemistry

Minor(s): natural science

E-mail address Austin.beatty@yahoo.com

facebook user name? _____

Postal Address 1785 Selma Collins Road

Telephone number _____

Dermott, Arkansas 71638

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What are your plans after graduation? (or what have you done)

I will be obtaining my masters degree in animal behavior from Rennes University in France

Do you feel that UAM prepared you for your professional life?

Hard to say since I don't know what the future holds, but yes, I think I learned a lot.

What did you like most about the School of Math and Sciences? (Strengths)

Biology teachers are very good. They are very passionate about their jobs.

What did you like least about the School of Math and Sciences? (Weaknesses)

Physics. I didn't think it was very organized

What changes do you recommend?

There were a couple teachers I couldn't hear very well. They need to be coached on speaking louder or wearing a microphone.

Is there anything else you would like to add?

Loved the field work that we did

The following information is optional but highly recommended:

Name: Morgane Brachet

Major(s): Organismal Biology

Minor(s): _____

E-mail address malkovichliv_mo@hotmail.fr facebook user name? _____

Postal Address 570B Rue De BasPeze, 41250 Mont-Pres-Chambord, FRANCE Telephone number _____

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School of Math and Sciences
P.O. Box 3480
Monticello, AR 71656-3480

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What are your plans after graduation? (or what have you done)

I will be attending the UAMS College of Pharmacy

Do you feel that UAM prepared you for your professional life?

Definitely! My prereqs prepared me very well for the PCAT exam.

What did you like most about the School of Math and Sciences? (Strengths)

The teachers really care in Math and Sciences. The teachers in other departments didn't give a crap about me or even the subject they were teaching. It was not uncommon for courses to be cancelled in English and other departments. I had one Science Center class cancelled in my three years I was here. The teachers in the Science Center love their course content, and it made it more interesting to me.

What did you like least about the School of Math and Sciences? (Weaknesses)

I took early college high school college algebra and that was a big mistake. I should have taken it here.

What changes do you recommend?

So many of the gen ed courses are a waste. Music app. was worthless. It was a joke.

Is there anything else you would like to add?

The following information is optional but highly recommended:

Name: Jake Cash
Major(s): Biology/Biochem
Minor(s): _____
E-mail address jake.cash14@gmail.com **facebook user name?** _____
Postal Address 2520 Cash Road **Telephone number** _____
Rison, AR 71665

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What are you doing after graduation? I will be going to UAMS Ph.D. biomedical program

Do you feel that UAM prepared you for your professional life? Yes, I feel more prepared for chem than biology. Need more cell related courses

What did you like most about the School of Math and Sciences? (Strengths) Really loved the organic and biochemistry courses. Dr. Taylor is an awesome teacher. Overall, everyone in chemistry is very good. Dr. Huang has been very helpful. Dr. Taylor has been an excellent advisor.

What did you like least about the School of Math and Sciences? (Weaknesses)

I took math so early in my career that I didn't remember it when I needed it. Advising could fix this
Need more upper level cell-based biology courses

What changes do you recommend?

Labs really need updating. I feel that safety could even be an issue in some.

Is there anything else you would like to add?

College experience was great for me here, but would have been better if there were more upper level biology courses

The following information is optional but highly recommended:

Name: Shana Chancellor

Major(s): Biology / Biochemistry

Minor(s): History

E-mail address shana.chancellor@gmail.com facebook user name? _____

Postal Address 507 Winding Creek Trail Telephone number _____

Red Oak, TX 75154

Feel free to drop in for a visit. There's usually coffee available. Students and faculty have tailgating at football games, etc... You are always welcome to join in. Keep in touch!

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What are your plans after graduation? (or what have you done)

William Carey College of Osteopathic Medicine in Hattiesburg, MS

Do you feel that UAM prepared you for your professional life?

Definitely. UAM has prepared me with a great education as well as general skills on how to deal with stress and school and life.

What did you like most about the School of Math and Sciences? (Strengths)

I liked how much the teachers and advisors cared. Not only did they excel at teaching, but they also were truly concerned with keeping up with the students' progress. They were always there to lend a helping hand when times got tough and were willing to do anything they could do in their power to help students reach their highest potential.

What did you like least about the School of Math and Sciences? (Weaknesses)

I think the building should be refurbished just like other buildings have been on campus.

What changes do you recommend?

None

Is there anything else you would like to add?

No

The following information is optional but highly recommended:

Name: Tessa Cucurullo

Major(s): Biology and Chemistry

Minor(s): none

E-mail address xtessamarieo@yahoo.com facebook user name? Tessa Cucurullo

Postal Address 4050 Union Church Road
Magnolia, MS 39652 Telephone number 8707239668

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What are your plans after graduation? (or what have you done)

I will be attending LSU School of Veterinary Medicine

Do you feel that UAM prepared you for your professional life?

Yes. LSU was impressed with the fact that I had both a biochem and biology degree. During the interview, they asked a few questions about my biochem and they seemed very pleased.

What did you like most about the School of Math and Sciences? (Strengths)

Biology classes are awesome! Teachers are passionate. They teach you to think for yourself. They are very helpful and will do anything they can to help you be successful.

What did you like least about the School of Math and Sciences? (Weaknesses)

Honestly the building is the only thing that I can make a negative comment about. The heating and air is terrible, and there is mold everywhere. Students also need access to a printer.

What changes do you recommend?

Figure out a way to charge students per page to do printing, and make that available. More options on scheduling would be nice, but not really practical in a department this size.

Is there anything else you would like to add?

I love UAM!
Harris Hall staff people are often rude and hateful.

The following information is optional but highly recommended:

Name: Hope Voerster Dunlap

Major(s): Biology/Biochem

Minor(s):

E-mail address hope_vd90@live.com facebook user name?

Postal Address 120 Shady Grove Road Telephone number

New Edinburg, AR 71660

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What are your plans after graduation? (or what have you done)

I will be attending pharmacy school at UAMS

Do you feel that UAM prepared you for your professional life?

Absolutely. I wasn't a great science student when I started, but I built from the ground up with great teaching and advising. I'm confident I can handle anything biology or chemistry related that I will see in pharmacy school. While talking with other applicants at my interview, it was clear that my biochemistry was far superior to that from other campuses. I was surprised at how low the expectations were in some of the biochem courses the other applicants had taken.

What did you like most about the School of Math and Sciences? (Strengths)

Small size, and the ability to build a relationship with the teachers. I felt like my coursework was personally laid out just for me, based on my skills and my goals.

What did you like least about the School of Math and Sciences? (Weaknesses)

The building is terrible. I froze in the some of the rooms, burned up in others.

What changes do you recommend?

I personally feel the Early College High School courses really put me behind a little. I wish I had waited until I was on campus to take those courses. I think that whole idea needs to be rethought.

Is there anything else you would like to add?

The students here are a tight group. I learned a lot, and I learned to work as a team member. I highly recommend UAM to someone that is looking for the smaller college environment. The education you get here is excellent, especially in my field.

The following information is optional but highly recommended:

Name: Courtney Emberton

Major(s): Biochem and Biology

Minor(s): None

E-mail address EMBERTONCL@gmail.com **facebook user name?** _____

Postal Address HWY 110 Box 6068 **Telephone number** _____

Clinton, AR 72031

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What are your plans after graduation? (or what have you done)

Finish writing lab manuals for Ms. Chappell, then explore my options. Will take Praxis exams and GRE in preparation for graduate school or MAT program. Haven't decided which yet.

Do you feel that UAM prepared you for your professional life?

Most definitely

What did you like most about the School of Math and Sciences? (Strengths)

The biggest thing is the personal relationships I had with my instructors. They helped me push myself farther, and made me realize I had potential that I didn't realize that I had. Courses like biochem made me think. I love how much I developed because of that course.

What did you like least about the School of Math and Sciences? (Weaknesses)

The heating and air in this building is ridiculous. You never know how to dress.

What changes do you recommend?

The two physicists need to coordinate better. Both are good, but it is hard taking one of them for part one, and the other for part two. There needs to be more upper level biology options that are related to cell and molecular instead of field biology

Is there anything else you would like to add?

For such a small school, this department provides an enormous amount of opportunities above and beyond the classroom. I've been a TA, I've written lab manuals, and I've prepped labs. I consider those things to be my real education. I also like the fact that there is healthy competition among the students in this department. It makes testing fun.

The following information is optional but highly recommended:

Name: Lauren McClain Morgan

Major(s): Biology / Biochem

Minor(s): _____

E-mail address laurenmcclain@hotmail.com facebook user name? _____

Postal Address 910 Harmony Church Road Telephone number _____

Warren, AR 71671

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What are your plans after graduation? (or what have you done)

I am attending pharmacy school at Harding University

Do you feel that UAM prepared you for your professional life?

Yes, and then some. I feel that since I stayed for the double major and graduated before going to pharmacy school, I'm very well prepared.

What did you like most about the School of Math and Sciences? (Strengths) Amount of one on one time you can get with a teacher outside the classroom. I've never felt this way about teachers in other departments. You really have to hunt them down to find them. In the afternoon, they are never around. I love the amount of detail that each subject goes into. When I talk with people at other universities, it is clear we had more detail in our courses.

What did you like least about the School of Math and Sciences? (Weaknesses) Every year I felt like I was playing catch up because I couldn't ever get my courses worked out right. My path, coming in with a GED, is certainly different than someone coming out of high school. I got my courses out of sync from the beginning, and it was tough to get them all in without course conflicts. At a bigger university there would have been more course offerings to pick from.

What changes do you recommend? I would like to see more practice exams, like for the ACS finals, etc... For pre-med, pre-pharm, etc... I would like to have prep courses offered here instead of having to drive to Little Rock or Jonesboro.

Is there anything else you would like to add? I like the extensive amount of lab work that I got in my two majors. I feel confident with anything hands on in chemistry and biology.

The following information is optional but highly recommended:

Name: Shannon Raney

Major(s): Biology and Biochemistry

Minor(s): _____

E-mail address jaredssunshine@hotmail.com sraney@harding.edu

Postal Address 90 Highway 189 N, Kingsland, AR 71652

Telephone number 870-656-9278

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What are you doing after graduation? I am waiting to hear from several schools. I have applied to graduate research programs. I I have already been accepted to Yale research prep program. There are several others that will let me know in May. I'm getting married to Summer Huddleston in 3 months.

Do you feel that UAM prepared you for your professional life? Definitely. I'm very pleased with what I have learned at UAM. Not only did I get top notch instruction in my classes, but have been given the opportunity to do research. I'm confident that students from UAM get a better problem solving background than any larger university.

What did you like most about the School of Math and Sciences? (Strengths) The people. Everyone here is very positive, and encouraging. I have been pushed and encouraged to do things that are far ahead of what I once believed I could do. My former college certainly never did anything like what this department does. Jeff Taylor, the Fawley's, and John Hunt have had an incredible impact on my future. I don't think I would be looking at an M.D./Ph.D. program if I had stayed at my former college.

I think working as a tutor helped me greatly too. It gave me more practice with course content, but more importantly practice dealing with people that are not necessarily at their best.

What did you like least about the School of Math and Sciences? (Weaknesses)

Facilities are pretty bad. Equipment is greatly needed.

What changes do you recommend? New building would be the first thing if money is available. In terms of programs, I would say put even more emphasis on research.

Is there anything else you would like to add?

No

The following information is optional but highly recommended:

Name: Ryan Reyes

Major(s): Biochemistry/Biology

Minor(s): _____

E-mail address ryan.m.reyes7@gmail.com _____ facebook user name? _____

Postal Address _____ Telephone number _____

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Appendix D

Graduation Numbers by major per year

Graduates Per Year Per Major

									Page	10 yr	3 yr
	07-08	08-09	09-10	10-11	11-12	12-13	13-14		Total	Mean	Mean
Biology	15	12	10	7	19	12	16		193	12.2	15.7
Chemistry	2	4	4	6	5	6	11		70	4.3	7.3
Mathematics	6	2	4	0	8	2	3		74	4.4	4.3
Natural Science*	7	2	8	4	12	2	4		51	4.7	6.0
Bach of Gen St**							2		2	0.2	.7
Total	30	20	26	17	44	22	36		390	25.8	34.0

	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07
Biology	11	13	6	6	9	4	12	10	12	9
Chemistry	3	3	5	4	2	2	4	2	2	1
Mathematics	5	1	4	5	5	5	3	9	5	5
Natural Science*	-	-	-	-	0	0	4	1	4	3
Total	19	17	15	15	16	11	23	22	23	18

										96-97
Biology										10
Chemistry										4
Mathematics										2
Natural Science*										-
Total										16

Appendix E

Math and Science Majors by Class per Year

Majors By Class For Fall Terms-continued

Major	Level	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Pre-Medicine	Freshman	28	19	30	20	16	14	28	20	23	22
	Sophomore	5	5	7	5	7	4	2	7	6	6
	Junior	7	5	2	3	5	4	2	3	7	1
	Senior	3	2	0	0	1	0	1	2	4	5
	Pre-Freshman	0	5	21	21	20	19				
	Special*	0	0	0	0	0	0				
	Post Bach	2	0	0	0	0	0		1	1	1
	Total	45	36	60	49	49	41	33	33	41	35
Pre-Pharmacy	Freshman	13	14	14	16	15	8	14	15	18	15
	Sophomore	6	9	8	3	9	7	3	8	5	8
	Junior	2	4	6	3	3	4	6	3	5	3
	Senior	3	1	4	0	1	0		3	4	
	Pre-Freshman	0	1	7	7	12	5				
	Special*	0	0	0	0	0	0				
	Post Bach	0	2	0	0	1	0				
	Total	24	31	39	29	41	24	23	29	32	26
Pre-Engineering	Freshman	4	7	11	7	5	10	6	9	10	8
	Sophomore	1	2	3	3	2	2	2	1	2	2
	Junior	0	0	0	1	1	2				1
	Senior	0	0	0	0	0	0				
	Pre-Freshman	0	0	1	3	2	0				
	Special*	0	0	0	0	0	0				
	Post Bach	0	0	0	0	0	0		1		
	Total	5	9	15	14	10	14	8	11	12	11
Allied Health	Freshman	27	16	13	28	23	16	25	29	30	16
	Sophomore	5	8	8	8	8	11	6	12	11	9
	Junior	2	4	3	4	3	4	4	5	6	3
	Senior	0	3	0	0	2	1		1	2	1
	Pre-Freshman	0	0	9	8	5	9				
	Special*	0	0	0	0	0	0				
	Post Bach	0	1	0	0	0	0				
	Total	34	32	33	48	41	41	35	47	49	29
Math and Science	Totals	198	195	237	235	217	211	180	210	228	198

