University of Arkansas at Monticello
Academic Unit Annual Report

Unit: School of Mathematical and Natural Sciences

Academic Year: 2022 - 2023

What is the Unit Vision, Mission and Strategic Plan including goals, actions and key performance indicators (KPI)? Please identify new goals from continuing goals. (insert strategic plan, goals and KPIs below)

Unit Vision: The School of Mathematical and Natural Sciences comprises the disciplines of biology, chemistry, computer science, earth science, mathematics, mathematics education, physical science, physics, and science education. The School has majors in Biology, Chemistry, Mathematics, and Natural Sciences.

Unit Mission: The mission of the School of Mathematical and Natural Sciences is to offer specialization in biology, chemistry, mathematics, and natural science and to provide opportunities for all students to enhance their understanding of science and mathematics. Curricula offered in the School prepare graduates for careers in industry and teaching, for graduate studies, and for admission to professional programs including allied health, dentistry, medicine, optometry, pharmacy, and veterinary medicine. This mission is fulfilled through the following goals:

1. To provide academic programs which promote the development of professional scientists and mathematicians and provide opportunities for all students to enhance their understanding of the natural sciences and mathematics.
2. To prepare individuals for successful careers in industry and teaching and for graduate studies in science and mathematics.
3. To provide curricula for pre-professional studies in dentistry, medicine, optometry, pharmacy, and allied health (physical therapy, radiological technology, respiratory therapy, medical technology, occupational therapy, and dental hygiene).
4. To provide technical and analytical courses to support studies in agriculture, forestry, nursing, physical education, psychology, and wildlife management.
5. To serve the general education program through courses in biology, chemistry, earth science, mathematics, physics, and physical science that provide a basic background for a baccalaureate degree.

In Table 1, provide assessment of progress toward meeting KPIs during the past academic year and what changes, if any, might be considered to better meet goals.

Table 1: Assessment of Key Performance Indicators

KPI	Assessment of Progress	Implications for Future Planning/Change
Assign new courses for assessment so that lower level courses can be included as well.	For Critical Thinking, the Critical Thinking course, Quantitative Literacy, General Botany Lab, Calculus II, Biostatistics, and Organic Chemistry II were chosen as assessment courses. For Communication, the Critical Thinking course, Organic Chemistry II Lab, Number Systems, Plants in Our World, and Biochemistry Lab were chosen as assessment courses. For Teamwork, General Chemistry I Lab, General Ecology, and Biochemistry Lab were chosen as assessment courses. For Global Learning, Earth and Atmosphere and Climate Change were chosen as assessment courses.	No changes are planned at the moment. If in the future, data is consistently nonexistent for an assessment course, a new course will replace it.
Get at least 2 Math and Science faculty up to speed with the new assessment process.	As this year, only Critical Thinking and Communication will be assessed, two faculty members and myself attended the Assessment Rubric training sessions to get a better understanding of what is being requested with the rubrics. Also, for the faculty teaching the courses that were newly added to the Critical Thinking and Communication assessments, examples were given to demonstrate what is expected.	Assessment rubrics will be completed for 100% of the courses used for Teamwork and Global Learning in the next academic year.
Make sure our courses match up to the Arkansas Course Transfer system (ACTS) syllabi in terms of content.	This year, the math courses that did not have an ACTS number assigned were reviewed to see if they could be matched to the ACTS courses based on the syllabi. All but Intro to Statistics were mapped to an ACTS course.	Discussions will take place to see if the Intro to Statistics course could be aligned with the ACTS syllabus.
Increase math enrollment in gateway courses to 75% co-requisite.	This year, the prerequisites for the gateway and remedial math courses were adjusted and Multiple Measures was implemented to decrease the number of students in remedial math courses. The goal was to reach 75% of freshmen who required remediation to be instead placed in the co-requisite model. We reached 86.6%.	After this first full school year of implementing these changes, a comparison of the number of students failing math courses will be compared to the number of students that were failing before the changes to see if the new

KPI	Assessment of Progress	Implications for Future Planning/Change
		model is hurting or helping or our students progress.
Increase online course offerings by 2 courses.	To try to meet student demand and to reach students outside of our general service area, 4 more online courses were offered this year. Introductory Chemistry and Lab and General Chemistry I and Lab were added to the online course offerings.	On the schedule for Fall 2023, 3 more previously face-to-face courses have been added to the list of online options: Trigonometry, Calculus I, and College Physics I. After the first semester, we will meet to discuss the pros and cons to improve the online offerings.

List, in Table 2, the Academic Unit Student Learning Outcomes (SLO) and the alignment with UAM and Unit Vision, Mission, and Strategic PlansTable 2: Unit Student Learning Outcomes

University Student Learning Outcome	Unit Student Learning Outcome (may have more than one-unit SLOs related to each University SLO; List each one)	Alignment with UAM/University Vision, Mission and Strategic Plan	Alignment with Unit Vision, Mission, and Strategic Plan
Communication: Students will communicate effectively in social, academic, and professional contexts using a variety of means, including written, oral, quantitative, and/or visual modes as appropriate to topic, audience, and discipline.	Be able to clearly express mathematical and/or scientific ideas in oral and written communication.	These skills are necessary for our graduates to contribute to the economic and quality of life indicators in the community, state, and region.	The curricula in Math and Sciences are the foundations for the content knowledge needed for the SLO. The upgrading of the major program requirements is important in keeping the programs up to date and relevant.

University Student Learning Outcome	Unit Student Learning Outcome (may have more than one-unit SLOs related to each University SLO; List each one)	Alignment with UAM/University Vision, Mission and Strategic Plan	Alignment with Unit Vision, Mission, and Strategic Plan
Critical Thinking: Students will demonstrate critical thinking in evaluating all forms of persuasion and/or ideas, in formulating innovative strategies, and in solving problems.	Have a core knowledge of the major discipline. Be able to demonstrate the ability to apply scientific and/or mathematical concepts to real world situations.	This is the basis for our graduates to succeed in a global environment, be successful in entrepreneurial endeavors, and be a productive member of the community.	Our mission states that we wish to provide opportunities for our students to improve their understanding of math and science concepts and provide proper training in these concepts in our support courses to other academic units.
Global Learning: Students will demonstrate sensitivity to and understanding of diversity issues pertaining to race, ethnicity, and gender and will be capable of anticipating how their actions affect campus, local, and global communities.	Be prepared for immediate employment in a scientific, technical, medical, or educational environment. Be prepared to enter graduate or professional school in the appropriate area.	This is the basis for our graduates to succeed in a global environment, be successful in entrepreneurial endeavors, and be a productive member of the community.	Math and Sciences wants to educate students to better understand the role of science in events around the world and locally.
Teamwork: Students will work collaboratively to reach a common goal and will demonstrate the characteristics of productive citizens.	Be prepared to work with others to accomplish a common goal. Learn how science is conducted between two members of the same faculty. Learn how science is conducted between two or more members of differing universities.	This is the basis for our graduates to succeed in a global environment, be successful in entrepreneurial endeavors, and be a productive member of the community.	Our goal is to prepare students for their future professions and to ensure that knowledge of proper procedure for collaboration is obtained to further the advancement of the math and science fields.

Describe how Student Learning Outcomes are assessed in the unit and how the results/data are used for course/program/unit improvements?

The Student Learning Outcomes (SLOs) are measured in our courses through student performance on exams, quizzes, laboratory exercises, field course journals, homework assignments, research projects, reports, and presentations. Further assessment is done using performance on nationally normed examinations such as the American Chemical Society (ACS) standardized final examinations and pre-professional placement exams such as the GRE, PCAT, MCAT, OAT, and DAT and post graduate placement into graduate programs, professional programs, and employment. Recently, some professional programs removed the requirement of the standardized test score, such as the PCAT for pharmacy. So far for the year, we have one student accepted into medical school, 4 students accepted into pharmacy school, 1 student accepted into dental school, 3 students accepted into graduate (masters or doctorate) programs, and many others accepted into various Allied Health programs such as occupational therapy, dental hygiene, and imaging.

This year the courses identified for assessment were changed, and each course instructor included in assessment selected an assignment or group of assignments that would be used to assess the student learning outcome chosen. Using the appropriate rubric, information would be provided on students in those courses. The courses and SLO selected are shown in the following table:

Course	SLO	Status
Critical Thinking	Critical Thinking	Completed
Critical Thinking	Communication	Completed
Quantitative Literacy	Critical Thinking	No response
General Chemistry I Lab	Teamwork	Not assessed this year
Earth and Atmosphere	Global Learning	Not assessed this year
General Botany Lab	Critical Thinking	Completed
Calculus II	Critical Thinking	
Biological Statistics	Critical Thinking	Completed
General Ecology	Teamwork	Not assessed this year
Organic Chemistry II	Critical Thinking	Completed
Organic Chemistry II Lab	Communication	Completed
Number Systems	Communication	Completed
Climate Change	Global Learning	Course not offered in 2022-2023
Plants in Our World	Communication	Completed
Biochemistry Lab	Communication	Completed
Biochemistry Lab	Teamwork	Not assessed this year

UNIVERSITY ASSESSMENT: AACU RUBRIC DATA

Written Communication

UAM class number and name: Chem 3414 Organic Chemistry II_____

Semester: Spring 2023_____

If dimension not assessed, leave blank.

Dimension	# of students scoring 4	# of students scoring 3	# of students scoring 2	# of students scoring 1	# of students scoring 0	Average	Total # of students
Context and Purpose for Writing	5	3	2	2	1	2.69	13
Content Development	4	5	3	0	1	2.85	13
Genre and Disciplinary Conventions	5	2	3	2	1	2.62	13
Sources and Evidence	4	4	4	0	1	2.77	13
Control of Syntax and Mechanics	3	5	4	0	1	2.69	13

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

Strengths
- Most students followed the format very well
- Well organized sections of notebooks and reports
- Did a good job of conveying the purpose of the writing

Weaknesses
- Some of the references selected were not appropriately checked for accuracy (Wikipedia)
- Many students reports started off great, but by the end of the report the quality was lacking

Opportunities for Growth
- Review more written articles related to laboratory work

- Practice writing specific sections of reports prior to doing full reports

<u>Threats to Effectiveness</u>
- Students often put less effort into lab than lecture
- Chegg and other sources will provide lab reports to students

<u>Other Notes:</u>   In general, scientific writing has not been a problem in courses like Organic Chemistry. Some students don't particularly like writing lab reports, but they are done appropriately. Many students do work together on these reports.

Written Communication

UAM class number and name: <u>Chem 4731 Biochemistry Lab   </u>
Semester: <u>Spring 2023   </u>

If dimension not assessed, leave blank.

Dimension	# of students scoring 4	# of students scoring 3	# of students scoring 2	# of students scoring 1	# of students scoring 0	Average	Total # of students
Context and Purpose for Writing	3	2	1	0	0	3.34	6
Content Development	4	1	1	0	0	3.5	6
Genre and Disciplinary Conventions	6	0	0	0	0	4	6
Sources and Evidence	4	1	1	0	0	3.5	6
Control of Syntax and Mechanics	3	3	0	0	0	3.5	6

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

<u>Strengths</u>
- Throughout the course, students wrote six written lab reports, allowing them to develop a strong understanding of the common mistakes made in scientific lab reports.
- Most of the class closely adhered to the syntax typically expected in a scientific setting.

<u>Weaknesses</u>
- Some students failed to adhere to proper formatting and referencing guidelines, resulting in errors in their lab reports.
- Students continued to struggle with conducting thorough literature searches and accurately referencing their sources.

<u>Opportunities for Growth</u>
- Creating a comprehensive video guide that covers each section of a scientific paper and provides clear instructions on what should be included.
- Offering students more opportunities to submit drafts earlier in the process, enabling them to receive feedback and make necessary corrections before final submission.

<u>Threats to Effectiveness</u>
- Students procrastinating and writing reports at the last minute, without proper time for revision and improvement.
- Students lacking a solid understanding of the importance of effective scientific writing and the impact it can have on their academic and professional careers.

<u>Other Notes</u>: The biochemistry lab reports are a specific type of scientific writing. It is crucial for students in science to learn how to read and write scientific literature. However, it takes a long time to craft a relevant, well-sourced scientific piece of writing. Students often struggle and complain about the length of these reports. However, by the end of the class, they all show significant improvement in their writing. The obstacles for these writing assignments mostly stem from the students' limited time. Students who take their time to write beforehand, ask for feedback, and engage in several rounds of editing end up with a good scientific lab report.

Written Communication

UAM class number and name: <u>BIOL 3013 Plants in Our World</u>
Semester: <u>Fall 2022</u>

If dimension not assessed, leave blank.

Dimension	# of students scoring 4	# of students scoring 3	# of students scoring 2	# of students scoring 1	# of students scoring 0	Average	Total # of students
Context and Purpose for Writing (Exams)	3	0	1	0	0	3.5	4
Content Development	3	0	0	1	0	3.25	4
Genre and Disciplinary Conventions	3	0	0	1	0	3.25	4
Sources and Evidence							
Control of Syntax and Mechanics	3	0	0	1	0	3.25	4

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

<u>Strengths</u>
- This is a great class for students who like to learn.
- For students who choose to embrace feedback, this course offers a chance to improve writing skills, as well as casual discourse skills.
- Context & Purpose for Writing was assessed using the midterm & final exams. They are both take-home exams designed to assess student ability to track down information (from the book & readings & notes). Course content is rather encyclopedic in scope, so forcing rote memorization would not really have anything to do with learning (just memorizing). So students demonstrate their understanding of context & purpose, focusing on all elements of the course.
- The other scored categories are assessed based on 15 weekly write-ups. Not surprisingly, write-up grades generally correspond to overall course grades. Most students quickly learn how to meet expectations with their writing. Poor grades generally reflect missing or late work.

Weaknesses
- There are many kinds of writing. Our 15 weekly write-ups do, at times, feel like unnecessary overkill -- doing the same thing every week. Attempts to find other assessments have thus far been unsatisfactory (resulting in students not reading the material). The subject matter is different every week, so I can't afford to allow students to learn they can skip the readings.

Opportunities for Growth
- I tell students what to read, so apart from research related to their in-class presentation (which does involve students tracking down their own sources & evidence), there is little room for having students explore sources. I do have them track down articles related to plants in our world the first couple weeks, so in a minor way we do address this already, but nowhere near as well as most students could use, e.g., I've had several students tell me that they've never been in the library in their 3-4 years at UAM. How sad.
- I have considered developing other methods for assessing student engagement, but I have found that students will not do the weekly reading if i don't require a weekly write-up and in-class discussion (& then call them on any corner-cutting). What other kind of assessment could I use to ensure weekly engagement, something that would challenge the students to learn or expand in some new way (that doesn't involve too much additional hassle for me)?

Threats to Effectiveness
- Attempting to do too much more, e.g., it would be nice to encourage additional research (besides what is tied to their presentation) or to have them explore additional writing techniques, but other courses should focus on such things, and I wouldn't want to water this course down doing things that aren't directly related topically. Plus, studies have shown that even good students will eventually quit engaging material if too much is assigned, and from student feedback it seems that what we do already (with weekly engagement) taxes some students beyond reason (in their minds).

Improvement Actions/Revisions?

I love this class. How would I improve it? With a few longer dedicated lab sessions that engaged specific topics, like paper-making, soap and/or candle-making, etc. Such labs would require a significant investment of funds, though, so time alone is not the solution. And I would love to recruit top students from other departments, motivated students excited about learning. This course does not build on any science prereqs (even though some have been required historically). I plan to rewrite the course description in the catalog, in the hope of extra-departmental recruitment.

Oral Communication

UAM class number and name: <u>BIOL 3013 Plants in Our World</u>
Semester: <u>Fall 2022</u>

If dimension not assessed, leave blank.

Dimension	# of students scoring 4	# of students scoring 3	# of students scoring 2	# of students scoring 1	# of students scoring 0	Average	Total # of students
Organization	2	0	2	0	0	3	4
Language	2	2	0	0	0	3.5	4
Delivery	2	2	0	0	0	3.5	4
Supporting Material	2	1	1	0	0	3.5	4
Central Message	3	1	0	0	0	3.75	4

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

<u>Strengths & Weaknesses</u>
- The assessment here is based on an in-class presentation, for which students were given a rubric based on this Oral Communication Rubric. This course also involves weekly discussions, tied to weekly write-ups. Thus, students are given feedback every week on their written & oral communication skills, and it is very rare for a student not to adjust to meet expectations with the work they do. Students who underperform in this class typically do so because they don't complete the work or submit it late. I am, literally, critiquing every comma & typo from day one, as well as any dispassionate lack of engagement. By the time students give their in-class presentation, they have already learned to pay attention to rubric details. The rare student who starts out with poor unacceptable communication skills learns quickly how to meet standards. What I find is that some students give up at some point, realizing that they'll receive a passing grade overall without having to continue to apply themselves (so they quit coming to class or turning work in on time). In a "D = degree" world, some students are content to do the bare minimum. Thus, I don't think using performance on the presentation is an accurate representation of overall communication skills, as all I'm demonstrating is that when you have an upper level course (taken only by upper level students who have already proven themselves as students), if you provide clear details on what you want the students to do, most of them will do it. Looking at the weekly discussions is probably still also an over-inflation of true ability, but it is also likely a truer grade-based indicator of communication skills in the class, only the weekly discussion grades are basically pass/fail, i.e., show up & engage for the 2-3 points, without touching on all the rubric categories. Guidance for in-class discussion primarily focuses on showing up, engaging the material, using the details from their write-ups & response to others as focal points.

- This course provides a very broad overview of many fascinating details about life around the world. Students who actively participate improve their casual discourse skills (& writing skills). This course is truly a capstone course, tying together virtually every other course, from chemistry to psychology to economics to geography to Spanish. Students who engage the course leave it as better citizens, people better equipped to deal with the vagaries of life.

Opportunities for Growth
- Very few students take this class, and they tend to already be upper level. Given UAM's high dropout rate, the students in Math & Science who make it to this class tend to be decent students. As above, some students do skip, some don't submit work on time (or at all), but when I've talked with those students, they have always been aware of the consequences of their action and willing to live with the grade. Overall, this is typically a great class with excellent student engagement. So, what is there to grow? Perhaps I could attempt to create a rubric to better tease apart weakly discussions and then somehow track improvement over the semester, but I'm not sure how that would actually help the students.

Threats to Effectiveness
- Going online removes the interactive, dynamic aspects of the course. Students who aren't really interested in learning tend to dislike the constant pressure to perform & engage, and they tend to be the 'bad apple' that brings the whole class down. This is an easy class for good students (willing to apply themselves weekly). I would hate for this reputation as 'easy' to result in higher enrollment of apathetic students (who are not willing to apply themselves weekly). And now I worry that attempts to 'improve' for the sake of this rubric might force me to start doing things that could undermine the course dynamic.

Oral Communication

UAM class number and name: MAED 3553 Number Systems
Semester: Summer II 2022_____

If dimension not assessed, leave blank.

Dimension	# of students scoring 4	# of students scoring 3	# of students scoring 2	# of students scoring 1	# of students scoring 0	Average	Total # of students
Context and Purpose for Writing	0	0	1	3	0	1.00	4
Content Development	0	0	1	2	1	0.75	4

Genre and Disciplinary Conventions	0	0	1	3	0	1.25	4
Sources and Evidence	0	0	2	2	0	1.50	4
Control of Syntax and Mechanics	0	0	1	3	0	1.25	4

Strengths
- The students seemed eager to do this assignment, as it was often the first opportunity they had to teach a mathematics lesson. The assignment required them to plan a lesson to an age-appropriate group, create a lesson plan, find materials to support their teach, and to execute the lesson in the time allotted. Most of the students admitted that this assignment combined several components of a real classroom lesson and they were surprised at how much preparation the presentation required.

Weaknesses
- The MAED classes are designed to be methods classes, where students learn various methods of teaching mathematics to elementary through middle school aged classrooms. Unfortunately, most of the students are lacking in some necessary areas of mathematics and a lengthy review of basic mathematical skills must be done before methods of teaching those skills can be employed. Most of the students in Number Systems hope to never teach mathematics and do the minimal work required to pass.

Opportunities for Growth
- Each semester, great strides are taken to assess students' mathematical knowledge at the beginning of the semester. Once deficits are identified, a plan is put in place to bring students up to par. Using more manipulatives and a wider variety of alternative ways of teaching basic concepts may help model the kind of techniques that are expected of them in their assigned lesson.

Threats
- As the number of certified mathematics teachers in our area declines, the number of students lacking a sound mathematical background rises. In a class where methods of teaching mathematics should be explored from the first day, far too much time is spent teaching elementary mathematical concepts.

Other notes: In an attempt to assess the oral and written communication skills of our future teachers, an assignment in MAED 3553 was graded using the suggested rubrics. The course is entitled Number Systems and the audience consists of students majoring in any of the Bachelor's degrees in the School of Education. The assignment is given on the first day of class and the

components are outlined in the syllabus. Students must plan and execute a standards-based mathematics lesson to their classmates. The level of the mathematics lesson should be appropriate to the level they wish to teach. The lesson should be approximately 20 minutes in length and students are encouraged to use the techniques they learned for disseminating content (manipulatives, videos, group discovery, etc.). The results of the assignment are given above and were quite eye-opening. After assessing each presentation, a SWOT analysis was done on the assignment, as a whole.

Oral Communication

UAM class number and name: BIOL 198V Special Topics: Critical Thinking
Semester: Spring 2023_____

If dimension not assessed, leave blank.

Dimension	# of students scoring 4	# of students scoring 3	# of students scoring 2	# of students scoring 1	# of students scoring 0	Average	Total # of students
Organization	2	2	0	0	0	3.5	4
Language	4	0	0	0	0	4	4
Delivery	2	2	0	0	0	3.5	4
Supporting Material	3	1	0	0	0	3.75	4
Central Message	3	1	0	0	0	3.75	4

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

Strengths
- In their presentations, students demonstrated familiarity with their research proposals and provided ample content and supporting material
- The presentations were clear in terms of language usage and central message

Weaknesses
- A few students lacked experience in giving presentations, leading to difficulties in delivery and presentation skills
- Students faced challenges in properly organizing materials, as well as managing time effectively

Opportunities for Growth
- Offering opportunities for students to practice their presentations and receive feedback before the actual presentation.
- Providing students with more examples of successful presentations and best practices.

Threats to Effectiveness
- Students' fear of public speaking may hinder their ability to deliver presentations effectively.
- Students' lack of preparation may negatively impact the quality of their presentations

Other Notes: The Introduction to Research and Critical Thinking class is designed for freshman students and most of them lack experience in public speaking. Throughout the course, the students had to make a total of five presentations and received feedback after each one. Initially, they struggled with delivery, time management, and content, but they showed improvement in their final speaking assignment. Since most presentations were about the students' research interests, content was not a significant issue. The primary challenge in this class was the students' fear of public speaking and their lack of experience in this area.

Critical Thinking

UAM class number and name: BIOL 198V Special Topics: Critical Thinking_
Semester: Spring 2023_____

If dimension not assessed, leave blank.

Dimension	# of students scoring 4	# of students scoring 3	# of students scoring 2	# of students scoring 1	# of students scoring 0	Average	Total # of students
Organization	3	1	0	0	0	3.75	4
Language	4	0	0	0	0	4	4
Delivery	1	3	0	0	0	3.25	4
Supporting Material	2	2	0	0	0	3.5	4
Central Message	2	2	0	0	0	3.5	4

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

Strengths
- This class is about critical thinking and this assignment was about pseudoscience and biases. The students did a great job at understanding the basics of applying critical thinking methods to investigate a claim
- The students were skilled in providing and evaluating evidence to support claims

Weaknesses
- Some students still struggled to form coherent connections between claims, evidence, conclusions and outcomes
- Assumptions and biases were still present in the students' arguments

Opportunities for Growth
- Offering additional reading materials and videos that further enhance understanding of critical thinking
- Introducing more critical thinking exercises, particularly those relevant to the research field

Threats to Effectiveness
- The limited time and credit allocation for this class poses challenges in fully exploring critical thinking concepts and skills

Other Notes: Critical thinking is a fundamental skill that all students should master. This class is specifically designed to cultivate critical thinking abilities, with the first half focusing on exploring various aspects of effective critical thinking methods and practices. In the second half, these methods are applied to scientific research. While students gain valuable insights into critical thinking through this assignment and class, it is crucial to acknowledge that they are still in the early stages of their scientific journey. As freshmen, this assignment marks the beginning of their exploration of critical thinking and scientific research.

Critical Thinking

UAM class number and name: Chem 3414 Organic Chem II_____

Semester:___2232 (Spring 2023)_

If dimension not assessed, leave blank.

Dimension	# of students scoring 4	# of students scoring 3	# of students scoring 2	# of students scoring 1	# of students scoring 0	Average	Total # of students
Explanation of Issues	2	4	3	3	1	2.23	13
Evidence	2	4	4	2	1	2.31	13
Influence of Context and Assumptions	1	5	3	3	1	2.15	13
Student's Position (Perspective, Thesis/Hypothesis)	2	4	3	3	1	2.23	13
Conclusion and Related Outcomes (Implications and Consequences}	2	4	3	3	1	2.23	13

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

Strengths
- The Evidence category had the highest overall average. Students had the ability to look at spectral data and determine the significance of each peak, and determine the substructure related to that particular signal. Their strongest areas were Mass Spectroscopy and Infrared Spectroscopy

Weaknesses
- Influence of context and assumptions was the weakest category. Students tended to be able to identify their own assumptions fairly well; however, when working with other students' assumptions, they tended to get confused and misread the data in the spectra.
- Students were much weaker in NMR than other spectroscopic methods, largely due to the complication due to splitting of signals.

Opportunities for Growth
- Additional time spent on proton NMR as well as C-13 NMR.
- More labs using this type of data for structure determination
- Better experiments to utilize equipment

Threats to Effectiveness
- Declining enrollment in the major
- Cost of specialized equipment and supplies

Other Notes:
Two students ranked at level 4 (Capstone) in all categories except Influence and context and assumptions, in which only one student ranked at that level. Those two students scored were two of the top performers in the class throughout the semester. One of the students is pre-med, and the other is pre-pharmacy and will be starting pharmacy school this fall after completing only two years at UAM. One student, who ended the term with the second highest grade received assessments of 3 in each category. This assessment started early in the semester, and she struggled a little initially, but was progressing nicely by the end of the course. She was the class' highest score on the ACS standardized final exam.

Critical Thinking

UAM class number and name: BIOL 3223 Bio Stats_____

Semester: Spring 2023_____

If dimension not assessed, leave blank.

Dimension	# of students scoring 4	# of students scoring 3	# of students scoring 2	# of students scoring 1	# of students scoring 0	Average	Total # of students
Explanation of Issues	4	3	0	0	0	3.5	7
Evidence	4	1	2	0	0	3.29	7
Influence of Context and Assumptions	3	2	1	1	0	3	7
Student's Position (Perspective, Thesis/Hypothesis)	3	2	0	2	0	2.86	7
Conclusion and Related Outcomes (Implications and Consequences}	3	3	1	0	0	3.29	7

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

Strengths
- The explanation of issues category had the highest overall average. Students had the ability to analyze a research article and successfully determine the issues in question.

Weaknesses
- Student's Position category had the lowest overall average. Students had a difficult time writing the objectives.

Opportunities for Growth
- Better utilize statistical software
- Provide more articles for students to analyze

Threats to Effectiveness
- Inability to add the excel add-on for statistics for students

Critical Thinking

UAM class number and name: <u>BIOL 2171 Botany Lab, tied to BIOL 2143 Botany Lecture</u>

Semester: <u>Spring 2023</u>

If dimension not assessed, leave blank.

Dimension	# of students scoring 4	# of students scoring 3	# of students scoring 2	# of students scoring 1	# of students scoring 0	Average	Total # of students
Explanation of Issues (overall)	5	9	12	6	3	2.26	27
Evidence (final)	13	6	3	3	2	2.93	27
Influence of Context and Assumptions (iNat)	8	4	3	3	9	1.96	27
Student's Position (midterm)	3	2	3	8	11	1.19	27
Conclusion and Related Outcomes (overall}	5	9	4	6	3	2.26	27

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

<u>Strengths</u>
- The Evidence category reflects performance in the last week of class (final lab practical), i.e., after a semester of practice & feedback, and I am content that most students do eventually learn to think critically & interpret what is in front of them based on what was covered. Explanation of Issues and Conclusion & Related Outcomes both reflect overall performance in the course. Most students start out struggling but do improve with feedback.

<u>Weaknesses</u>
- Student's Position reflects performance on the midterm practical, when most students have yet to take the course seriously. Despite many quizzes & in-class activities prior to the midterm, it generally seems to take underperformance on a major assignment before students truly begin to critically assess what is asked. Influence of Context & Assumptions is assessed based on an iNaturalist assignment, for which students are given a detailed rubric, trained via an in-class session, and shown how to access the work of dozens of previous students. It is an exercise that requires self-motivation and is only worth 10 points (compared to 50-100 on an exam). Because of the clear rubric, motivated students generally do well, but it

is also the assignment that typically has the highest number of failing grades, because many students simply do not take it seriously.

Opportunities for Growth
- More points earlier in the semester might encourage some students to improve more quickly, but I've already seen that such an approach does result in overall poorer grades, as students are unable to recover (don't pull their grades up). Still, I do wonder if there might be a more effective means of reaching the students earlier in the semester. Overall, I find that by the end, most students have finally stepped up and are thinking critically.

Threats to Effectiveness
- My approach with this course is hands-on, applied, active learning, mostly outdoors. It makes what the students are learning directly applicable to the world around them, providing a reality to content that is often lacking in courses. Administration's insistence that my living teaching collection be removed directly undermines my ability to teach this course (& others like Regional Flora).

Improvement Actions/Revisions?

There is generally a bimodal grade distribution in this course. I weight assignments in the seond half of the semester more heavily, i.e., I minimize point values with earlier assignments. I find that this helps the students improve -- if they see a chance to pull their grade up, then by the end many of them are trying harder, whereas if their grade is already too low to pull up much, they just give up. None of that is directly related to critical thinking, but since I am using graded assignments as proxies for the assessment categories, I find that by semester's end most students have greatly improved. Ultimately, some students can't be coerced into making even minimal efforts. The success I see is partially related to how I assess grades throughout the semester, but I am unwilling to strive for improved performance if it means my standards have lowered. The improvement I see in this course is because the students step up, and I honestly think that student performance is unlikely to improve much more, as long as UAM is an open enrollment school and as long as there is general disdain for education, e.g., many students act as if they are buying a degree and many administrators seem to have priorities other than what constitutes effective learning. Change those mindsets and performance might improve.

Summarize all of your unit changes predicated on assessment data.
In the laboratory courses, a greater variety was introduced in the types of lab experiments performed, and more examples and practice were given in the upper level laboratory courses to assist in the ability to record lab books and write scientific articles. In the upper level math course assessed, more time was allotted for problem solving during class time so that the students are more familiar with the content. The upper level math classes incorporated more opportunities for individual presentations so that assessing the individuals will be easier.

Public/Stakeholder/Student Notification of SLOs

List all locations/methods used to meet the HLC requirement to notify the public, students and other stakeholders of the unit SLO an. (Examples: unit website, course syllabi, unit publications, unit/accreditation reports, etc.)

☐

- Posted in the glass case at the main entrance to the Science Center
- Posted on the School of Math and Sciences website at http://uam-web2.uamont.edu/pdfs/mnsciences/mns%20student%20learning%20outcomes.pdf
- Annual assessment reports located on the Math and Sciences webpage uamont.edu
- Course syllabi

Enrollment

Table 3: Number of Undergraduate and Graduate Program Majors (Data Source: Institutional Research)

UNDERGRADUATE PROGRAM MAJOR: Biology

Classification	Fall 2020	Fall 2021	Fall 2022	3-Year Total & Average	10-Year Total & Average
Freshman	30	27	22	79/26.3	273/27.3
Sophomore	15	18	15	48/16	144/14.4
Junior	13	16	13	42/14	135/13.5
Senior	15	7	15	37/12.3	166/16.6
Post Bach	0	0	0	0/0	0/0
Total	73	68	65	206/68.7	718/71.8

UNDERGRADUATE PROGRAM MAJOR: Chemistry

Classification	Fall 2020	Fall 2021	Fall 2022	3-Year Total & Average	10-Year Total & Average
Freshman	13	8	10	31/10.3	105/10.5
Sophomore	7	7	9	23/7.7	71/7.1
Junior	10	6	4	20/6.7	79/7.9
Senior	8	6	6	20/6.7	74/7.4
Post Bach	0	0	0	0/0	0/0
Total	38	27	29	94/31.3	329/32.9

UNDERGRADUATE PROGRAM MAJOR: Mathematics

Classification	Fall 2020	Fall 2021	Fall 2022	3-Year Total & Average	10-Year Total & Average
Freshman	4	1	6	11/3.7	60/6.0
Sophomore	3	3	0	6/2	29/2.9
Junior	1	5	4	10/3.3	34/3.4
Senior	2	1	2	5/1.7	27/2.7
Post Bach	0	0	0	0/0	0/0
Total	10	10	12	32/10.7	150/15.0

UNDERGRADUATE PROGRAM MAJOR: Natural Science

Classification	Fall 2020	Fall 2021	Fall 2022	3-Year Total & Average	10-Year Total & Average
Freshman	9	5	3	17/5.7	100/10.0
Sophomore	9	4	4	17/5.7	56/5.6
Junior	4	3	3	10/3.3	45/4.5
Senior	7	4	7	18/6.0	52/5.2
Post Bach	0	0	0	0/0	0/0
Total	29	16	17	62/20.7	253/25.3

UNDERGRADUATE PROGRAM MAJOR: Pre-Engineering

Classification	Fall 2020	Fall 2021	Fall 2022	3-Year Total & Average	10-Year Total & Average
Freshman	7	5	4	16/5.3	73/7.3
Sophomore	4	1	1	6/2.0	19/1.9
Junior	0	4	1	5/1.7	8/0.8
Senior	2	1	0	3/1.0	5/0.5
Post Bach	0	0	0	0/0	0/0
Total	13	11	6	30/10.0	105/10.5

UNDERGRADUATE PROGRAM MAJOR: Pre-Medicine

Classification	Fall 2020	Fall 2021	Fall 2022	3-Year Total & Average	10-Year Total & Average
Freshman	16	10	9	35/11.7	164/16.4
Sophomore	8	11	7	26/8.7	82/8.2
Junior	8	7	8	23/7.7	63/6.3
Senior	6	3	6	15/5.0	53/5.3
Post Bach	0	0	0	0/0	0/0
Total	38	31	30	99/33	362/36.2

UNDERGRADUATE PROGRAM MAJOR: Pre-Pharmacy

Classification	Fall 2020	Fall 2021	Fall 2022	3-Year Total & Average	10-Year Total & Average
Freshman	9	6	1	16/5.3	79/7.9
Sophomore	4	2	2	8/2.7	44/4.4
Junior	2	1	0	3/1.0	38/3.8
Senior	4	1	1	6/2.0	18/1.8
Post Bach	0	0	0	0/0	0/0
Total	19	10	4	33/11	179/17.9

UNDERGRADUATE PROGRAM MAJOR: Allied Health

Classification	Fall 2020	Fall 2021	Fall 2022	3-Year Total & Average	10-Year Total & Average
Freshman	11	7	5	23/7.7	89/8.9
Sophomore	8	5	6	19/6.3	48/4.8
Junior	3	4	4	11/3.7	23/2.3
Senior	5	3	2	10/3.3	18/1.8
Post Bach	0	0	0	0/0	0/0
Total	27	19	17	63/21	178/17.8

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

Strengths
- The number of Biology majors has remained steady over the past 3 years, only differing by 3 to 5 students. It appears that if we can get students to make it through their Freshmen year, we are more likely to retain them in the Biology program.
- The Biology program is still the bread and butter of the Math and Sciences department. The Chemistry program is still viable because of the Biology/Biochemistry double major and the pre-professional programs such as Pre-Pharmacy.

Weaknesses
- The Mathematics program is still bouncing between having 2 or 3 graduates per year which keeps it on the nonviable programs list.
- Pre-Pharmacy is experiencing a decrease in enrollment. This is not just a UAM event as pharmacy school enrollment has decreased nationwide. This is due to the saturation of the job market. It is becoming increasingly difficult to find employment after graduating, especially if the student wishes to remain in this part of the state. Pharmacists experience a great salary and as the work is not physically taxing, people stay in this position well past retirement which halts the younger generations from obtaining employment.

Opportunities for Growth
- The introduction of 2 new Associate degrees in Mathematics (Engineering Mathematics and Data Science) will allow the pre-engineering students to complete a degree before leaving, allowing them to be included in the Math program completers. We get a lot of Pre-Engineering students but they either get their courses and leave without a degree or they leave when they find out that UAM cannot offer them the degree they seek. These 2 degree programs have received campus approval and are now awaiting board approval.
- Getting the news of student successes out to the public could result in more students enrolling. We have started the UAM Math and Science Facebook page where we showcase all of our student achievements (awards, inductions, acceptances, etc.)

Threats to Effectiveness
- Attracting qualified faculty is always difficult as most scholars who have taken the past 8-10 years in earning the necessary degree for tenure do not want to accept a job where the salary is as low as it is here at UAM.
- The number one threat is the declining enrollment at UAM as a whole which is attributed to the following factors:
  - Monticello is not an exciting city to live in, especially if a student is used to places such as Little Rock or areas in the central to northern part of the state.
  - The UAM general service region's student population is declining.
  - The outside and inside appearances of most UAM facilities (except for Babin Business Center and the Student Success Center) are all old and very dated. It does not aid in attracting visiting students deciding

where to go. The Science Center is the academic building that the average student will take most of their general education requirements- one math (or more if remediated), two science courses, and two laboratory courses. Yet, it is one of the most neglected-looking buildings on campus.

Progression/Retention Data
Table 4: Retention/Progression and Completion Rates by Major (Data Source: Institutional Research)

Major: Biology	Number	Percentage
Number of majors classified as juniors (60-89 hours) in fall 2020	12	100
Number and percentage graduated in that major during 20-21 academic year	5	42
Number and percentage graduated in that major during 21-22 academic year	3	25
Number and percentage that graduated in that major during 22-23 academic year	1	8

Major: Pre-Medicine	Number	Percentage
Number of majors classified as juniors (60-89 hours) in fall 2020	7	100
Number and percentage graduated in that major during 20-21 academic year	4	57
Number and percentage graduated in that major during 21-22 academic year	3	43
Number and percentage that graduated in that major during 22-23 academic year	0	0

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

Strengths
- Many of our biology majors double major in chemistry, giving them strong backgrounds in both disciplines.
- It also demonstrates that the majority (67%) of our biology majors that make it to their junior year finish their degrees on time.

- All of the students on the Pre-Medicine track completed their degrees on time.

Weaknesses
- Two of the three students who are yet to complete their degree are still in the program.
- One is no longer in the program.
- Most Biology majors are double listed as Pre-Medicine majors.

Opportunities for Growth
- Stronger academic advising of our juniors during their junior and senior years.
- Stronger academic advising of our freshmen and sophomores including steering towards other, more achievable degrees such as the Natural Science degree when it is obvious they won't make it as Biology majors.

Threats to Effectiveness
- Students wait until their junior year and decide to move to another major such as the Natural Science major as it is not as strenuous as the Biology major.
- Some students choose to stay an extra year to lessen their semester class load.

Major: Chemistry	Number	Percentage
Number of majors classified as juniors (60-89 hours) in fall 2020	11	100
Number and percentage graduated in that major during 20-21 academic year	4	36
Number and percentage graduated in that major during 21-22 academic year	3	27
Number and percentage that graduated in that major during 22-23 academic year	0	0

Major: Pre-Pharmacy	Number	Percentage
Number of majors classified as juniors (60-89 hours) in fall 2020	2	100
Number and percentage graduated in that major during 20-21 academic year	0	0
Number and percentage graduated in that major during 21-22 academic year	1	50
Number and percentage that graduated in that major during 22-23 academic year	0	0

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

Strengths
- The vast majority of our chemistry are also simultaneously seeking Biology degrees, making them strong in both disciplines.
- Almost two-thirds (64%) of our chemistry majors graduate on time.

Weaknesses
- Many of our Chemistry majors leave before their senior year as most are Pre-Pharmacy students acquiring the pre-requisite courses needed for their pharmacy degree at another school.
- Many of the BBDM juniors decide to drop the Chemistry major to lessen the difficulty of their major.

Opportunities for Growth
- Make sure that the Pre-Professional students are aware that they can have hours transferred back to UAM from their professional schools so that they could essentially earn their Bachelor degree and their professional degree from two different schools simultaneously.
- More encouragement of our double majors to keep their Chemistry degree as it will make them stand out in their professional programs or graduate programs.

Threats to Effectiveness
- The rising cost of tuition is forcing many students to take on jobs which takes them away from their studies. As the Chemistry major is a rigorous one, students choose to drop their major or take fewer hours to manage their job resulting in them graduating late or not at all.
- Students dropping their Chemistry majors to ease their academic load causes the number of majors to decrease.

Major: Mathematics and Pre-Engineering	Number	Percentage
Number of majors classified as juniors (60-89 hours) in fall 2020	0	100
Number and percentage graduated in that major during 20-21 academic year	0	0
Number and percentage graduated in that major during 21-22 academic year	0	0
Number and percentage that graduated in that major during 22-23 academic year	0	0

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

<u>Strengths</u>
- The Math faculty are very flexible in course offerings.
- Math courses are available in person and online.

<u>Weaknesses</u>
- As math is at the top of most people's "Worst Subject" list, it is difficult to recruit for math. Also, most people who are math majors knew they were going to major in math in high school. It is very uncommon, if not nonexistent, for a student to change their major to math unless they were already in a similar degree such as Computer Information Systems (CIS).

<u>Opportunities for Growth</u>
- As more emphasis on Data Science in the media, we hope that we will start to see more Math majors.
- The new Secondary Mathematics program is just in its first year and hasn't had time to make an impact.
- A new Associate in Engineering Mathematics and an Associate in Data Science have had both campus and board approval and are awaiting final approvals. As we do receive many students as Pre-Engineering majors and many prospective student visits from people interested in Engineering, we hope that having an actual credential to offer will not increase the number of students in our Math program and the number of completers. However, those students will only make it into this chart if they decide to continue with us and earn a Bachelor as our new students wanting the Associate degrees should graduate before their junior year.
- Convincing more CIS students to double major in CIS and Data Science is a great idea.
- The Math degree and all of its options are now attainable completely online. Hopefully this will allow our department to reach more students and not just the ones in our typical service area.
- We do actually have Math majors, they just were not juniors in 2020.

<u>Threats to Effectiveness</u>
- Most people are not aware of all of the career options available for a person with a Bachelors in Mathematics. They believe that you either planning to teach math or you want to be an engineer.

Major: Natural Science	Number	Percentage
Number of majors classified as juniors (60-89 hours) in fall 2020	3	100
Number and percentage graduated in that major during 20-21 academic year	2	67
Number and percentage graduated in that major during 21-22 academic year	1	33
Number and percentage that graduated in that major during 22-23 academic year	0	0

Major: Allied Health	Number	Percentage
Number of majors classified as juniors (60-89 hours) in fall 2020	3	100
Number and percentage graduated in that major during 20-21 academic year	1	33
Number and percentage graduated in that major during 21-22 academic year	1	33
Number and percentage that graduated in that major during 22-23 academic year	0	0

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

Strengths
- This degree gives our students who chose to major in Biology or Chemistry but realized they couldn't quite cut it a simpler option so that we can retain the student rather than them officially withdrawing.
- The data shows that all of the students who were juniors in this major during this time graduated with their degrees on time.
- This academic plan has the flexibility needed for Allied Health students with different paths can fit into it.

Weaknesses
- Most of the students in this degree are in this degree for financial aid purposes only and have no intentions of completing a degree at UAM.
- Most students will leave the program to go to their professional programs before the reach their junior years.

Opportunities for Growth
- Make sure that all students who leave to go to their professional programs are aware that they can and should transfer their hours back to UAM so that they earn a Bachelor degree simultaneously with the degree they earn at their institutions.

Threats to Effectiveness
- Rising costs are making college life difficult for our students as many have to work jobs to be able to afford their education.

Gateway Course Success (Applies only to units teaching Gateway Courses: Arts/Humanities, Math/Sciences, Social Behavioral) (Data Source: Institutional Research)

Table 5: Gateway Course Success*

Course	Remediation	2020-2021 *Passed		2020-2021 Failed		2021-2022 *Passed		2021-2022 Failed		2022-2023 Passed		2022-2023 Failed		3-Year Trend *Passed		3-Year Trend Failed	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Course MATH 1003 Quantitative Literacy	**No Remediation**	109	64	62	36	100	59	70	41	96	68	45	32	305	63	177	37
Course MATH 1103 Quantitative Literacy with Review	**16-18 MATH ACT or MATH 143 Intro Algebra**	83	44	106	56	79	35	145	65	76	33	153	67	238	37	404	63
Course MATH 1033 Trigonometry	**No Remediation**	24	55	20	45	34	60	23	40	42	72	16	28	100	63	59	37
Course MATH 1043 College Algebra	**No Remediation**	109	57	81	43	79	59	54	41	72	61	47	39	260	59	182	41
Course MATH 1143 College Algebra with Review	**19-21 MATH ACT or MATH 183 Intermediate Algebra**	44	70	19	30	53	83	11	17	74	90	8	10	171	82	38	18
Course MATH 2255 Calculus I	**No Remediation**	30	73	11	27	12	57	9	43	17	55	14	45	59	63	34	37

*Passed = A, B, or C; Failed = D, F, or W

What do the data indicate in regard to strengths, weaknesses, opportunities for growth and threats to effectiveness?

Strengths
- MATH 1003 Quantitative Literacy experienced the highest pass rate in the last academic year than it has in the past 3 years.
- The pass rate for MATH 1143 has remained high over the past three years.
- The pass rate for MATH 1033 has increased each year of the past three years.

- The pass rate for MATH 1043 has also increased each year of the past three years.

Weaknesses
- The pass rate for MATH 1103 Quantitative Literacy with Review has remained low and has decreased each year of the past three years. Less than a third of the students passed this year.
- Other than the COVID year, the pass rate for MATH 2255 Calculus I has decreased. However, the decrease was not significant.

Opportunities for Growth
- Curriculum changes to incorporate more remediation topics may help to improve student understanding.

Threats to Effectiveness
- With the new ACT cutoffs for gateway courses and the elimination of Intro to Algebra to meet the state's co-requisite model, students with low ACT scores will be in their gateway courses. Also the wider ACT range for College Algebra with Review will allow students with a 16 to be the same section as a student with a 21, making the course more difficult to instruct. This could lead to an decrease in the pass rate for math courses in the near future.
- Low enrollment numbers and the instructing of students to take their math course their first semester makes it difficult for math instructors to make load in the Spring as the number of course offerings decreases.

Completion (Graduation/Program Viability)

Table 6: Number of Degrees/Credentials Awarded by Program/Major (Data Source: Institutional Research)

Number of Degrees Awarded:

Undergraduate Program/Major	2020-2021	2021-2022	2022-2023	Three-Year Total	Three-Year Average
Biology	18	11	12	41	13.7
Chemistry	15	7	6	28	9.3
Mathematics	3	3	2	8	2.7
Natural Science	8	5	2	15	5
Total	44	26	22	92	30.7

Provide an analysis and summary of the data related to Progression/Retention/Program Viability including future plans to promote/maintain program viability.

The number of graduates in Biology ticked upwards slightly since last year. Hopefully this is an indicator that future numbers will also increase. The number of Chemistry graduates decreased slightly. More Biology/Biochemistry Double Majors are choosing to drop their Biochemistry major resulting in the number of graduates being half of the number of Biology majors. We are still informing students of the value of the double major for their professional programs as many graduates are only strong in one area and weak in the other. Being a double major gives them an advantage. The number of Mathematics majors decreased as well. There were at least 4 Data science students that could have graduated but decided to do one more semester or year either because of a desire to play college sports for one more year or the desire to take a new Machine Learning course that is advantageous for Data Science majors that is currently on the Fall 2023 schedule. As UAM does receive many applications and entering Freshmen that are interested in Engineering, we have proposed a new Associates degree in Engineering Mathematics so that these students can become completers and receive a degree in Math from UAM. An Associates degree has also been proposed in Data Science so that students can have the option of getting a credential and then joining the entry level workforce or getting their Associates and deciding to continue their education and earn their Bachelor degree in Data Science. Both are awaiting board approval, and we are hopeful that this will increase the number of Math graduates. The number of Natural Science majors also decreased. Most of these students get accepted into an Allied Health program before earning a degree from UAM.

We have also started a Facebook page to advertise the successes in our department. Getting the word out to show students and parents That they can become whatever they desire with a degree from the School of Math and Sciences here at UAM can potentially spark More interest in our programs. We have also used paid Facebook ads to advertise our newly approved Secondary Mathematics Bachelor program and the Data Science program. These ads reached a total of 6,942 accounts and resulted in 142 link clicks to the UAM Math and Science webpage.

<u>Tracking graduates</u>
Summarize how you track the career progression of your unit's graduates.
As we are very involved in our students' educations while they are students, we develop a bond with them. Many keep in touch to let us know of program acceptances and degrees earned via phone calls, emails, or visits back to campus. Others communicate through social media such as Facebook to inform of career changes or progressions.

Record the number of recent graduates entering jobs related or unrelated to their major or pursing further credentials related or unrelated to their major.

	Related to major	Unrelated to major	Comments
Number of recent graduates entering workforce	3		One student is working as a dental assistant. One is working for Arkansas Game and Fish. One has a job at an Agricultural company.
Salary range	-	-	Unsure of the salaries these students are making.
Number of recent graduates pursing a graduate degree	10		Some of our graduates are continuing on to Math graduate programs or Masters programs in different science fields. Many have also been accepted into PharmD programs, one has been accepted into medical school so far, and one has been accepted into dental school.
Number of recent graduates pursing a certificate, associate, or baccalaureate degree	4		These students have been accepted into occupational therapy programs, dental hygiene programs, imaging programs, and physical therapy programs.

Faculty
Table 7: Faculty Profile, Teaching Load, and Other Assignments (Data Source: Institutional Research) load hr/contact hr

<div align="center">Teaching Load</div>

Faculty Name	Status/ Rank	Highest Degree	Area(s) of Responsibility	Summer II	Fall	Spring	Summer I	Other Assignments
Abbott, Richard	Asst. Prof.	Ph.D.	Biology	0/0	15/18	12/15	0/0	Director of the UAM Herbarium
Bacon, Edmond	Instructor/ Prof Emeritus	Ph.D.	Biology		13/15	19/24	0/0	Director of the Turner Neal Museum
Barton, Laura	Instructor	M.S.	Mathematics	0/0	15/15	15/15	5/5	Director of the ACTM Math Contest
Blount, Keith	Assoc. Prof.	Ph.D.	Biology	0/0	13/15	0/0	0/0	
Bramlett, J. Morris	Professor	Ph.D.	Chemistry	5/6	11/13	11/12	5/6	Director of the Pomeroy Planetarium

Faculty Name	Status/Rank	Highest Degree	Area(s) of Responsibility	Summer II	Fall	Spring	Summer I	Other Assignments
Burrows, Ross	Assoc. Prof	Ph.D.	Physics	0/0	13.33/17	12/15	0/0	Director of the SE Arkansas Regional Science Fair
Chappell, Jessie	Lab Instructor (adjunct)	M.S.	Biology	0/0	0/0	2/5	0/0	
Cooper, Lura	Instructor	MAT	Mathematics	6/6	15/15	11/11	6/6	
Ferrer, Arturo Q	Asst. Prof.	Ph.D	Biology	0/0	11.66/13	12/12	0/0	Assistant Director of Research Programs for Minority Students (RPMS)
Fox, Victoria Lynn	Assoc. Prof.	Ph.D.	Mathematics	6/6	14/14	9/9	0/0	Assistant Dean of Mathematics
Gavin, Jared	Assoc. Prof.	Ph.D.	Mathematics and Physics	6/6	11/11	11.66/13	0/0	
Goodding, Alan	Instructor	MAT	Mathematics	0/0	15/15	12/12	0/0	
Grilliot, Matthew	Adjunct Instructor	Ph.D.	Biology	0/0	4.33/5	4.33/5	0/0	
Hatfield, Susan	Lab Instructor	M.S.	Chemistry	0/0	9/13	11.66/14	4.33/5	Stockroom manager for Intro and General Chemistry
Huang, Jinming	Professor	Ph.D.	Chemistry	0/0	11/12	11/12	5/6	
Hunt, John	Professor	Ph.D.	Biology	6/6	11/12	9/9	0/0	Director of Pre-Medicine Studies
Martin, E. Carole	Assoc. Prof.	Ed.D.	Mathematics	0/0	14/14	8/8	0/0	
Massah, Courtney	Adjunct instructor	M.S.	Biology	0/0	0/0	0/0	3/3	
Morgan, Lauren	Lab Instructor	B.S.	Biology	3.33/5	11.33/17	11.33/17	2/3	Stockroom manager for Biology
Muhoza, Djamali	Asst. Prof.	Ph.D.	Chemistry	5/6	12/12	10/12	0/0	Director of Research Programs for Minority Students (RPMS)
Nall, Morgan	Lab instructor (adjunct)	M.S.	Biology	0/0	0/0	0/0	2/3	
Roser, Andrew	Asst. Prof.	Ph.D.	Biology	0/0	17/21	14/15	0/0	
Sayyar, Hassan	Assoc. Prof.	Ph.D.	Mathematics	0/0	12/12	9/9	3/3	
Sayyar, Kelley	Instructor	M.S.	Earth Science		14.33/19	14.33/17	0/0	
Sims, Christopher	Professor	Ph.D.	Biology	0/0	11/12	13/15	3/3	Asst. Dean for the Sciences

Faculty Name	Status/ Rank	Highest Degree	Area(s) of Responsibility	Summer II	Fall	Spring	Summer I	Other Assignments
Slater, Shuneize	Asst. Prof.	Ph.D.	Chemistry	0/0	4.33/5	3/3	0/0	Dean of Math and Sciences
Walker, Randall (McGehee)	Instructor	M.S.	Biology	5/6	13/15	0/0	0/0	
Early College High School								
Bridgforth, Cherie	Adjunct instructor	MAT	Math – White Hall H.S.	0/0	6/6	6/6	0/0	
Cupples, James	Adjunct instructor	M.S.	Math – Parkers Chapel H.S.	0/0	6/6	0/0	0/0	
Ross, Shelvia	Adjunct instructor	MAT	Math – Hamburg H.S.	0/0	14/14	9/9	0/0	

What significant change, if any, has occurred in faculty during the past academic year?

- Dr. Keith Blount resigned from his position as Associate Professor of Biology in December 2022. His position has not been filled.
- After retiring in May 2022, Ms. Jessie Chappell returned to the classroom as an adjunct biology lab instructor to teach an Anatomy and Physiology lab in Spring 2023. She is scheduled to remain in this position in the Fall 2023.
- Dr. Djamali Muhoza first replaced Dr. Andrew Williams in his position as Assistant Director of the RPMS program. However, after Dr. Keith Blount's resignation, Dr. Muhoza became the Director of the RPMS.
- Dr. Randall Walker, Biology instructor on the McGehee campus, passed away unexpectedly in December 2022. Dr. Andrew Roser taught his Anatomy and Physiology courses, and Dr. Arturo Ferrer taught his Intro to Biology course but as an online course.
- Dr. Courtney Massah was hired as an adjunct to begin teaching Anatomy and Physiology as online offerings starting Summer I 2023. This is to fill the void left in McGehee by Dr. Walker's passing. The course is also available to Crossett students, Coaching students, and students that are completely online.
- Mrs. Morgan Nall was hired as an adjunct lab instructor to teach the labs for Anatomy and Physiology in McGehee. This appointment is only scheduled for Summer I and Summer II.
- Dr. Arturo Quintero-Ferrer became the Assistant Director for the RPMS program once Dr. Muhoza became Director.
- Ms. Lura Cooper became the Advisor for the Sigma Zeta Honor Society once the role was vacated by Dr. Andrew Williams.
- Dr. Morris Bramlett stepped down as Dean of Math and Science and returned to the classroom full-time.
- Dr. Shuneize Slater assumed the role of Dean of Math and Science.

Table 8: Total Unit SSCH Production by Academic Year (ten year) (Data Source: Institutional Research)

Academic Year	Total SSCH Production	Percentage Change	Comment
2013-14	13546	-5.88%	Not including 1070 concurrent enrollment
2014-15	15550	+14.8%	Not including 1403 concurrent enrollment
2015-16	14696	-5.42%	Not including 1430 concurrent enrollment
2016-17	13841	-5.82%	Not including 1729 concurrent enrollment
2017-18	14421	+4.19%	Not including 1296 concurrent enrollment
2018-19	11915	-17.4%	Not including 554 concurrent enrollment
2019-20	10402	-13.7%	Not including 381 concurrent enrollment
2020-21	9393	-9.7%	Not including 369 concurrent enrollment
2021-22	8575	-8.7%	Not including 384 concurrent enrollment
2022-23	8346	-2.7%	Not including 425 concurrent enrollment

What significant change, if any, has occurred in unit SSCH during the past academic year and what might have impacted any change?

This is the fifth year in a row that the School of Math and Sciences has experienced a decrease in SSCH. However, the rate of decline has steadily decreased each year for the past four years, and this year experienced the smallest decline of only 229 SSCHs. The decline is illustrative of the decline in enrollment that UAM has been experiencing as a whole. The decline in the student population of our general service area and lack of modern facilities on campus/town attractions makes recruiting to UAM outside of our service area difficult.

Unit Agreements, MOUs, MOAs, Partnerships
Table 9: Unit Agreements-MOUs, MOAs, Partnerships, Etc.

Unit	Partner/Type	Purpose	Date	Length of Agreement	Date Renewed
Math and Sciences	Arkansas Dept of Health	Zoonotic Tick Disease Research	May 1, 2023	3 months	May 1, 2023

List/briefly describe notable faculty recognition, achievements/awards, service activities and/or scholarly activity during the past academic year.

Faculty Scholarly Activity

Publications

- Pastore, J.F.B., A. Martinez, **J.R. Abbott**, & K.M. Neubig. Towards new generic delimitations in Polygalaceae II: *Senega* Spach. Annals of the Missouri Botanical Garden 108: 126–249

- McCartha, Grace L., Caitlyn M. Sims, Brendan J. Kosnik, **J. Richard Abbott**, Mathew L. Jones, Ben E. Benton, Scott A. Mangan, and Travis D. Marsico. 2023. Flora of six lower Mississippi River Islands (U.S.A.). JBRIT in press.

- Uncontrol: Minions of Oligarchy, A Novel by **Hurant Burrows**. Published June 12, 2022. https://www.amazon.com/Uncontrol-Minions-Oligarchy-Hurant-Burrows-ebook/dp/B0B3ZHYNGC

- Massey, C., Gray, R., Baldwin, D., **Fox V**., and Longing, J. (2022) Undergraduate professional preparation and attitudes toward coaching related curriculum of Arkansas varsity high school head coaches. *Applied Research in Coaching and Athletics Annual*.

- Massey, C., Gray, R., Baldwin, D., **Fox V**., Longing, J., and Salloukh, M. preprint (2023). Selected demographic characteristics and attitudes toward coaching certification of Arkansas varsity high school head coaches. *Applied Research in Coaching and Athletics Annual*.

- **Hunt, J. L., M. E. Grilliot**, T. L. Best, C. M. Wilkerson, and A. F. Huitt. *In Review*. Energy content of grasshoppers (Orthoptera: Acrididae) in the diet of scaled quail (*Callipepla squamata*) in southeastern New Mexico. *Journal of the Arkansas Academy of Science.*

- **Hunt, J. L.**, and T. L. Best. 2023. Seven-year study of foods of mourning doves (*Zenaida macroura*) in southeastern New Mexico. *The Southwestern Naturalist* 67:72-77.

- **Hunt, J. L., M. E. Grilliot**, T. L. Best, F. A. Johnson, T. L. Kilgore, and C. M. Wilkerson. 2022. Energy content of seeds of switchgrass (*Panicum virgatum*) in the diet of mourning doves (*Zenaida macroura*) in southeastern New Mexico. *Journal of the Arkansas Academy of Science* 76:38-41.

- **Hunt, J. L.** 2023. Birds and us: a 12,000-year history from cave art to conservation, by Tim Birkhead (review). *Choice* 60-2893.

- **Hunt, J. L.** 2023. Rereading Darwin's Origin of Species: the hesitations of an evolutionist, by Richard G. Delisle and James Tierney (review). *Choice* 60:1689.

- **Hunt, J. L.** 2022. Understanding development, by Alessandro Minelli (review). *Choice* 59:2568.

- **Muhoza D**, Adams PD . New Clinical Trials Targeting K-Ras Mutations Show Promise Towards Ending Ras's "Undruggable" Era. Preprint available from the Protein & Peptide Letters Journal

- **Muhoza D**, Moradi M, Adams PD . Biochemical Analysis of a Small Molecule Inhibitor on Cdc42 and its Effector Interactions. In preparation

- **Muhoza D**, Adams PD . One Step Purification of an Active PAK1 Derived Peptide. In preparation

- **Muhoza, D**., A Simple Purification Method for Heat-Stable Recombinant Low Molecular Weight Proteins and Peptides Via GST-Fusion Products -https://pubmed.ncbi.nlm.nih.gov/37093474/

- **Roser, Andrew**, "Study on Germination of Bacillus anthracis Spores: The Role of SporeAssociated Inosine Hydrolysis and the Persistence of Heat-Activated State" (2022). Dissertation. # https://digitalcommons.latech.edu/dissertations/#

Presentations

- Tate, B., **J.R. Abbott**, & K.M. Neubig. 2022. Determining species delimitation of *Sisyrinchium* (Iridaceae) in Arkansas using genomic and phylogenetic approaches. Arkansas Academy of Science, Arkadelphia, AR, 1–2 April. Poster.

- McCartha, G.L., C.M. Sims, B.J. Kosnik, **J.R. Abbott**, M.L. Jones, B.E. Benton, & T.D. Marsico. 2022. Plant community composition of six Lower Mississippi River islands. International Biogeography Society, Vancouver, January. Poster.

- Arkansas Native Plant Society 2022 Basics of Botany Series with **Dr. Richard Abbott** (Saturdays, 6 pm). Part 1: Plant Identification Terminology, 2 Apr; Part 2: Plant Reproductive Terminology, 21 May; Part 3: The Basics Behind a Name, 18 Jun. https://www.youtube.com/watch?v=GFnDQx05K0Y https://www.youtube.com/watch?v=nSDfJR9fTfw https://www.youtube.com/watch?v=c2k76TXz9lU

- **J. Richard Abbott**. Artificial Plant ID Motifs: Simple and Useful Patterns for Field Identification of Plants. Central Arkansas Master Naturalists Advanced Training Speaker. 17 Feb 2022. https://arkansasmasternaturalists.org/content.aspx?page_id=22&club_id=250502&module_id=512286 or https://us02web.zoom.us/rec/share/8PnKb8Q3xWfTP_NIkbF8kyRYYok3KhS97NDZFHSnF_BjdDzhmF9RNF0fvq_8p1XU.qqnW_2U23KF1bh2I [Access Passcode: N56*Hjd3]

- **J. Richard Abbott**. I Curso virtual para el reconocimiento de caracteres en la identificación de plantas del Neotrópico (por Zoom).
  Sesión 1 Caracteres vegetativos básicos para la identificación de plantas, 19 Abr
  Sesión 2 Caracteres reproductivos básicos para la identificación de plantas, 20 Abr
  Sesión 3 Sistema de patrones básicos para simplificar la identificación de plantas, 21 Abr

- **Arturo Ferrer**. 54th Annual Idaho potato conference Pocatello Idaho. Spanish session. Preservacion de Germoplasma Comercial y Silvestre de Papa.

- **Arturo Ferrer**. Guest Speaker at the Universidad Autonoma de Guadalajara, UAG. A Brief History of Sequencing.

- **Arutro Ferrer**. Guest Speaker at the Semana del conocimiento Jalisco 2022 Ciencia, tecnologia e inovacion para la salud. Epigenetica mas alla del Genoma.

- **Arturo Ferrer**. Arkansas Philological Association Conference 27-29 October UAM Monticello Arkansas presenting in panel along with Dr. Craig Olsen Teaching with comics as an active learning tool.

- **Hunt, J. L., M. E. Grilliot**, T. L. Best, C. M. Wilkerson, and A. F. Huitt. Energy content of grasshoppers (Orthoptera: Acrididae) in the diet of scaled quail (*Callipepla squamata*) in southeastern New Mexico. Arkansas Academy of Science, Pine Bluff, Arkansas, March 30-April 1, 2023. Poster Presentation.

- **Hunt, J. L.** Mammals of the Hot Springs Region. Diamond Lakes Arkansas Master Naturalists, Hot Springs, Arkansas, August 20, 2022.

Notable Faculty or Faculty/Service Projects

- Dr. J. Richard Abbott is the UAM Herbarium director. He has created a living teaching area to give his students hands-on experience in identify plants and plant motifs. He has received adjunct faculty status at Arkansas State University and serves on graduate committees there. He goes into the field with many graduate students from there. He also works with the Arkansas Natural Heritage Commission within the state.

- Dr. Ed Bacon is the director of the Turner Neal Museum and is the president and coordinator for the local Arkansas Game and Fish Stream Team. He is the UAM coordinator for the USM Gulf Coast Research Lab and director of the Ouachita River Basin Research Laboratory. He is also fundraising to build a greenhouse on campus. His attempt has resulted in more than $20000 being either received or pledged.

- Ms. Laura Barton is the coordinator for the Regional ACTM Mathematics Contest.

- Dr. Morris Bramlett is the director of the Pomeroy Planetarium and gives planetarium shows to hundreds of students each year. He is also the campus representative to the NASA Arkansas Space Grant Consortium.

- Dr. Ross Burrows is the director of the Southeast Arkansas Regional Science Fair (SEARSF).

- Ms. Lura Cooper is a consultant for the dumas School District. She is the advisor for the Sigma Zeta National Honor Society and is a national grader for the AP Calculus exam.

- Dr. Lynn Fox is the Assistant Dean of Mathematics.

- Dr. John Hunt is the chair of the Pre-Professional Committee, and he is also the campus representative for the Goldwater Scholarship Program. He is also a member of the Ouachita Mountain Biological Station Board of Governors.

- Dr. Djamali Muhoza is the director for the Research Programs for Minority Students (RPMS).

- Dr. Arturo Ferrer is the assistant director for the Research Programs for Minority Students (RPMS).

- Dr. Andrew Roser is the UAM representative for the Arkansas Tick-Borne Disease Research Consortium.

- Dr. Christopher Sims is the Assistant Dean of Science.

- Dr. Shuneize Slater is the Dean of Mathematical and Natural Sciences.

Faculty Grant Awards

- Dr. J. Richard Abbott, $1500 UAM Faculty Research Award, Botanical DNA lab work

- Dr. J. Richard Abbott, $1000 UAM Faculty Research Award, Botanical DNA lab work

- Dr. J. Richard Abbott, $17,000 Arkansas Natural Heritage Commission, Addressing species limits

- Dr. Ross Burrows, $11,000. NASA Arkansas Space Consortium, Purchase a new instrument

- Dr. Arturo Quintero Ferrer, $1500 UAM Faculty Research Award, Plant genetics lab creation

- Ms. Susan Hatfield and Dr. Shuneize Slater, $7232 Centennial Grant, purchase new chemistry lab stools

- Dr. Djamali Muhoza, $6286 INBRE Summer Manuscript Support

- Dr. Andrew Roser, $1500 UAM Faculty Research Award

- Dr. Andrew Roser, $10,000 Centennial Grant, purchase molecular biology equipment

- Dr. Shuneize Slater, $4200 Centennial Grant, create 2 student areas in Science Center

Describe any significant changes in the unit, in programs/degrees, during the past academic year.

- The new math option Secondary Mathematics was approved and became active as of January 2023.
- Two new options for Math were proposed. An AS in Engineering Mathematics and an AS in Data Science have received approval from Dean's Council, Curriculum and Standards, the UAM Assembly, and the UA Board of Trustees. It now awaits approval from the AHECB. If approved, the programs will go live in January 2024.

List program/curricular changes made in the past academic year and briefly describe the reasons for the change.
- BIOL 3023 Climate Change was approved and added as an elective course.

- Name changes were made for many math courses:
  - MATH 183 Intermediate Algebra was changed to MATH 183 Foundations of College Algebra to better reflect the content taught in the course.
  - MATH 2333 Introduction to Mathematical Reasoning was changed to MATH 2333 Introduction to Proofs to remove the confusion since Mathematical Reasoning is another name for Quantitative Literacy and to more accurately reflect the content taught in the course.
  - ENGR 1014 Introduction to Robotics and Basic Engineering was changed to ENGR 1014 Introduction to Robotics as there is already a Basic Engineering course.

- A pilot run of pre-requisite changes for some of the gateway math courses was implemented:
  - MATH 143 Introductory Algebra was removed from the schedule
  - The pre-requisites for MATH 183 Foundations of College Algebra were changed to allow STEM students who would formerly be placed in Introductory Algebra into the course. Curriculum changes were also made to accommodate the lower

scoring students.
- o The pre-requisites for MATH 1103 and MATH 102 Quantitative Literacy with Review were changed to allow non-STEM students who would formerly be placed in Introductory Algebra into the course. Curriculum changes were also made to accommodate the lower scoring students.
- o The pre-requisites for MATH 1143 College Algebra with Review were changed to allow students who would formerly be placed in Intermediate Algebra into the course. Curriculum changes were also made to accommodate the lower scoring students.
- o The pre-requisites for MATH 1003 Quantitative Literacy were changed to allow students who would formerly be placed in Quantitative Literacy with Review into the course. Curriculum changes were also made to accommodate the lower scoring students.
- o A new math lab, currently MATH 096V but will be MATH 1x2, was created to aid the students placed into MATH 1003 but would have been placed in MATH 1103 prior to the pre-requisite changes.

- The Math degree, and all of its options, was made into an online, in-person, or hybrid degree. This is to allow more flexibility and to attract non-traditional students and students outside of our traditional service area.
- New courses were proposed:
  - o MATH 3xx3 Introduction to Machine Learning was added as Data Science need a machine learning course before graduation.
  - o ENGR 2xx3 Engineering Statics and ENGR 2xx3 were added as courses to be requirements in the new AS Engineering Mathematics degree plan. These are two courses that entry level engineers are expected to have passed.

Describe unit initiatives/action steps taken in the past academic year to enhance teaching/learning and student engagement.

- The outside of the Science Center has been painted and new storm windows have been installed to improve the appearance and attractiveness of the building.
- Two new outdoor student study areas have been created to give students an inviting space to study or relax between classes.

- More faculty are working on writing their own textbooks to lower costs to students.

- More online course offerings are on the schedule which has resulted in more lectures being recorded for ease of student access outside the classroom. This allows students to view a lecture that they have already attended/viewed as many times as necessary for their understanding.

- The Genetics lab is being transformed into a plant tissue culture lab and a DNA sequencer has been purchased to aid in this

endeavor.

- New human models and equipment were purchased for Anatomy and Physiology labs and Microbiology lab using funds from Windgate.

- Modern EKG probes with Bluetooth capabilities were purchased for Anatomy and Physiology lab so that students will be able to view the software on their personal smart devices.

- Modern gas pressure sensors, temperature probes, and spectrophotometers with Bluetooth capabilities were purchased for General Chemistry labs so that students will be able to view the software on their personal smart devices.

- The Math Tutoring lab was fitted with its own UAM email, its own Zoom account, and a webcam so that tutoring can be available to people who do not come to campus and to students who may come to campus but realize they have questions once they have left.

Other Unit Student Success Data
Include any additional information pertinent to this report. Please avoid using student information that is prohibited by FERPA.

Student	Degree Conferred Date	Academic Plan #1	Academic Plan #2	Initial Placement
1	May 2023	Biology		Master of Science- UAMS
2	December 2022	Mathematics		Graduate school -Univ. of North Alabama
3	May 2023	Biology	Biochemistry	Master of Science- ACHE
4	May 2023	Biology	Biochemistry	Dental School- Kansas City University
5	May 2023	Biology	Biochemistry	Pharmacy School- Harding University
6	May 2023	Natural Science		Physical Therapy School- ACHE
7	May 2023	Biology	Biochemistry	Pharmacy School- UAMS
8	May 2023	Biology	Biochemistry	Medical School- UAMS
9	May 2021	Biology	Biochemistry	Physical Therapy School- Arkansas State University
10	May 2021	Biology	Biochemistry	Medical School- Arkansas State Univ
11	December 2021	Biology	Biochemistry	Pharmacy School- Harding University
12		Natural Science		Nuclear imaging- UAMS
13		Chemistry		Pharmacy School- Harding University
14		Biology		Dental Hygiene- UAMS

15	May 2023	Biology		Master of Science- Arizona State University
16		Chemistry	Biology	Pharmacy School- UAMS
17		Natural Science		Dental hygiene- Mississippi Delta
18	May 2022	Biology	Biochemistry	Medical School- UAMS
19		Mathematics		Selected as participant in Arkansas Summer Research Institute

Pomeroy Planetarium Annual Report July 1, 2022 – June 30, 2022
Planetarium shows provided by Morris Bramlett. Museum tours provided by Ed Bacon

Date	Group Name	#	Other
July 16	Family from Dumas	13	
Aug 5	Dr. Slater and Son	2	
Oct 5	White Hall area Girl Scouts -	40	split into two shows
Nov 4	McGehee Elementary	44	split into two groups
Nov 15	Arkansas Connections Acad.	55	split into two shows
Dec 2	Walk ins – non students	4	
Jan 22	Walk ins – UAM students and other	6	
Feb 8	Walk ins – UAM students and friends	5	
Mar 14	Group of UAM alumni and families		Cancelled just prior to the show -14 planned
Mar 28	El Dorado Home School Group	5	25 planned but terrible weather
Mar 31	Cornerstone Christian Academy	12	
Apr 4	Hamburg H.S. Astronomy Class	7	Not normal show. Highly specialized topics
Apr 28	UAM Student group	11	
May 2	Walk ins – non-student	4	
May 5	Virtual Arkansas	33	split into two shows
May 15	Monticello Intermed. Gifted & Talented	15	
Total		**256**	

The numbers were somewhat low this year. There were fewer large groups than we typically have; however, we had more walk ins this year than in most years. There were two groups that wanted to do a show on Thursday afternoons, but could not because of a conflict with Dr. Bramlett's teaching schedule. Both groups plan to reschedule for some time in the future. One was the Boy Scouts Group and the members' families from Ashley County area, and the other was a Drew Central class. Both groups would have been fairly large. The Drew Central Group was going to be split over two days with 4 shows, but they wanted it on a specific date which we were unable to do. Some work was done on the Planetarium during the year. In the summer 2022, Keith Blount and Morris Bramlett removed the archaic projection equipment from the shelves of the planetarium. Also in summer 2022, Ed Bacon and Morris Bramlett removed an enormous ant hill from the base of the cabinet which holds the computer and projector equipment. The ants had accumulated so much sawdust and dirt under the cabinet that it broke the electrical connection.

The planetarium still has major problems with heating and cooling. In the winter, it is fine; however, it is almost impossible to do shows in warm weather because the system contains poorly installed ductwork which does nothing to cool the room. When work was done a few years back, the installers did a terrible job installing the new duct work. There are kinks in the lines, and there may even be breaks in the duct work. The heat produced from the very large projector and computer, along with the body heat from the attendees makes it unbearable if the temperature is above 70 degrees Fahrenheit.

The lighting needs to be addressed. It would be fantastic if LED lighting was installed around the room to make it better for those entering and leaving the planetarium. There is a plan to contact the electricians to provide an estimate to make this happen.

With the biology research group taking over the room that normally stores telescopes and planetarium supplies, there is an issue with storage. Some of the telescopes need some maintenance and repair. There are plans for one telescope to be taken apart and see if it might be possible to 3D print near gears needed for the focusing mechanism to work properly.

Planetarium shows are available from external vendors; however, they typically are not for sale. They are rented or leased, and the price is extremely high, often in the thousands of dollars. Pre-COVID, there were occasional conferences and workshops that taught the skills needed to record planetarium shows that could be shown in domed planetariums, like the Pomeroy Planetarium. This would allow specialized shows to be done occasionally without having to spend hours preparing for the content. This would also allow others to host planetarium shows at times Dr. Bramlett is unavailable. Dr. Bramlett was scheduled to attend one of these conferences and workshops in 2020, but it was cancelled due to the pandemic. Future conferences will be reviewed to see if the content is appropriate.

Assessment Report for Introduction to Biological Sciences, Fall 2022-Spring 2023, University of Arkansas at Monticello, John L. Hunt, Instructor.

On the first class day of the Fall 2022 semester and the Spring 2023, a pre-test was administered to the students in the Introduction to Biological Sciences classes taught by John Hunt at the University of Arkansas at Monticello. The pre-test consisted of 15 questions designed to test the students' prior knowledge of some of the most important concepts of Biology. 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. (A copy of the questions is included at

the end of this report.) On the last day of each 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.

Normally, the results of the Fall and Spring classes are combined and reported together. However, in Spring 2023, several changes were made to the way the class was presented. A chapter on Critical Thinking was added at the beginning of the course. Numerous homework assignments intended to increase student engagement were given during the semester, and quizzes, which had previously been based on lecture material from the previous class day, were changed so that they covered homework assignments, and were given immediately after homework was turned in. Because of these changes, assessment results below are reported separately for Fall and Spring, and then results of the two are compared.

Fall 2022—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 7.1 out of 15, or 47.1% ($n = 27$, range 2-12, standard deviation 2.42). Average score on the post-test was 9.3, or 62.2% ($n = 27$, range 4-14, standard deviation 2.62). Of those who took both pre-test and post-test, 20 registered an improvement on the post-test ($n = 27$, average increase 2.3 questions, range -2-8, standard deviation 2.55). Average percentage change in score was 44.8% ($n = 27$, range -33.3-200.0%, standard deviation 59.3%). Four students actually did worse on the post-test than on the pre-test, and three registered no change.

Spring 2023—Again, 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 7.6 out of 15, or 50.7% ($n = 26$, range 4-13, standard deviation 2.10). Average score on the post-test was 10.3, or 68.7% ($n = 26$, range 5-15, standard deviation 2.73). Of those who took both pre-test and post-test, 20 registered an improvement on the post-test ($n = 26$, average increase 2.7 questions, range -1-10, standard deviation 2.71). Average percentage change in score was 43.1% ($n = 26$, range -17.0-200.0%, standard deviation 48.7%). Two students actually did worse on the post-test than on the pre-test, and four registered no change.

Students in Spring scored a full question better on the post-test than did those in Fall; however, Spring students also scored a half-question better on the pre-test. In other words, part of the increase in post-test scoring may be due to the fact that the Spring students were better at biology to begin with. Exam scores for the two semesters were also compared. Each exam covered approximately the same subjects both semesters, but again, there were slight differences in the amount of material covered. For all four exams, the Spring students had a higher average score than the Fall students:

	Exam 1 (*n*)	Exam 2 (*n*)	Exam 3 (*n*)	Exam 4 (*n*)
Fall	73.0	62.1	62.6	62.7
Spring	80.5	67.3	63.3	68.3

The DFW rate for the Spring class (34.2) was appreciably lower than that for the Fall class (56.4). Some of this can be attributed to the fact that the homework assignments, which made up about 18% of the total grade, were purposely made easy. Again, the purpose was to increase engagement, not provide grade inflation, but some grade inflation certainly occurred. However, when asked, students said that the homework assignments did have the effect of increasing engagement. Increases in average test scores seem to indicate that the extra engagement had the desired effect. These attempts to increase engagement will be continued and expanded in future sessions.

This is the ninth year that this type of assessment has been used in the Introduction to Biological Science class. Results seem to indicate that many of the objectives of the class are being met. Questions used for both the pre-test and post-test are included below.

1. Which of the following is NOT one of the basic types of organic molecules found in living things?
   a. Carbohydrates
   b. Proteins
   c. Salts
   d. Nucleic acids
   e. Lipids

2. The primary difference between prokaryotic and eukaryotic cells is that prokaryotic cells DO NOT contain membrane-bound structures called:
   a. Cilia
   b. Chromosomes
   c. Organelles
   d. Ribosomes
   e. Sutures

3. Which of the following is the BEST definition of the word "gene?"
   a. Physical trait exhibited by an organism.
   b. Section of DNA molecule that contains instructions for building a protein.
   c. Part of the cell membrane that causes specific behavior.
   d. Sperm cell or egg cell; a gamete.
   e. All of the chromosomes found in a given individual.

4. The aerobic process of breaking down organic molecules such as glucose to build ATP is called:
   a. Photosynthesis
   b. Translation
   c. Methylation
   d. Digestion
   e. Cellular respiration

5. Which of the following is the best definition of a scientific theory?
   a. A law which can be stated mathematically
   b. An explanation for observations which has a good deal of evidence to support it
   c. An educated guess
   d. An observation of natural phenomena
   e. A statement of things that are unknown

6. Proteins are complex molecules made of subunits called:
   a. Hydrocarbons
   b. Amino acids
   c. Sugars
   d. Nucleotides
   e. Fatty acids

7. Spontaneous movement of molecules from an area of higher concentration to an area of lower concentration is called:
   a. Crenation
   b. Brownian motion
   c. Reduction
   d. Diffusion
   e. Concentration dispersal

8. All of the living organisms interacting within a specific area make up a:
   a. Population
   b. Community
   c. Ecosystem
   d. Species
   e. Biome

9. "A change in allele frequencies between generations" is a simple definition of:
   a. Mutation
   b. Speciation
   c. Evolution
   d. Fitness
   e. Stabilizing selection

10. Which of these terms **best** describes the overall structure of DNA?
    a. phospholipid bilayer
    b. helix
    c. double helix
    d. triple helix
    e. modified polypeptide chain

11. Where do plants get carbon that they make into organic molecules?
    a. From groundwater absorbed by roots
    b. Symbiotic fungi
    c. The sun
    d. Carbon dioxide from the atmosphere
    e. Other organisms

12. In animals, meiosis occurs to produce:
    a. Somatic cells
    b. Clones
    c. Diploid cells
    d. Red blood cells
    e. Gametes

13. Which of the following is a byproduct of photosynthesis?
    a. Carbon dioxide
    b. Glucose
    c. Riboflavin
    d. Oxygen
    e. Nitrogen gas

14. Why does your body need oxygen?
    a. DNA molecules don't break down properly without oxygen
    b. Kidneys use oxygen to construct molecules of urine
    c. Oxygen is necessary to get rid of carbon dioxide
    d. Oxygen allows cells to get more usable energy from organic molecules
    e. Lack of oxygen allows anti-oxidants to trigger apoptosis (cell death).

15. A true-breeding plant that produces red flowers is crossed with a true-breeding plant that produces white flowers. All of the flowers of all of the offspring are red. The best explanation for this is:
    a. the red allele is recessive to the white allele
    b. all of the offspring are homozygous red
    c. the red allele is dominant to the white allele
    d. the alleles are codominant
    e. red is an easier color to produce

Assessment Report for Evolution, Spring 2023, University of Arkansas at Monticello, John L. Hunt, Instructor.

On the first class day of the Spring 2023 semester, a pre-test was administered to the students in the Evolution class at the University of Arkansas at Monticello. The pre-test consisted of 15 questions designed to test the students' prior knowledge of some of the most important concepts of Evolution. The questions were a mix of "big-concept" and detailed 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.   (A copy of the questions is included at the end of this report.) 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 5.4 out of 15, or 36.0% ($n = 8$, range 2-8, standard deviation 1.92). Average score on the post-test was 9.4 out of 15, or 62.6% ($n = 8$, range 6-13, standard deviation 2.62). All of the students registered an improvement on the post-test ($n = 8$, average increase 4.0 questions, range 2-6, standard deviation 1.51). Average percentage change in score was 87.1% ($n = 8$, range 33.0-200.0%, standard deviation 55.0%).

This is the ninth year that this type of assessment has been used in the Evolution class. (No assessment was conducted in 2020 due to the Covid-19 pandemic). Results seem to indicate that many of the objectives of the class are being met. This year's results were roughly the same as in 2022, but the differences are small, and probably not statistically significant, especially considering this year's small class size. Questions used for both the pre-test and post-test are included below.

1. Which of the following is the best definition of "evolution?"
    a. Adaptation to environmental change.
    b. Selection of the best traits.
    c. Change in gene frequency between generations.
    d. Change over time.
    e. Mutation of genes into new alleles.

2. The most critical factor in the evolution of new species is:
   a. Large amounts of inbreeding
   b. High heterozygosity
   c. Sexual dimorphism
   d. Reproductive isolation
   e. Low genetic diversity.

3. Which of the following is *most* compatible with the idea of evolution through natural selection?
   a. Chain of Being
   b. Fixity of species
   c. Mutability of species
   d. Special creation
   e. Theory of Acquired Characteristics

4. Which of the following concepts is crucial to building phylogenies?
   a. Analogous structures
   b. Sympatry
   c. Allopatry
   d. Convergent evolution
   e. Parsimony

5. "Any non-random force which causes differential reproductive success of organisms with different genetic traits" is a good definition of:
   a. Evolution
   b. Adaptation
   c. Selection
   d. Fitness
   e. Mutation

6. Which of the following is the best description of the function of HOX genes:
   a. Providing variation for the immune system.
   b. Allowing an increase in hair coloration.
   c. Control of morphogenesis.
   d. Increasing fecundity.
   e. Reduction of mutations.

7. The Hardy-Weinberg Law describes:
    a. Sexual selection possibilities.
    b. How recessive mutations are maintained in a population.
    c. The speed with which new species are formed.
    d. Equilibrium of allele frequencies in a population.
    e. Formation of biogeographical regions.

8. The Hamilton-Zuk hypothesis relates sexual selection to:
    a. Number of body segments.
    b. Size of genitalia.
    c. Number of offspring.
    d. Parasite load.
    e. Feather color.

9. At what level does natural selection act most strongly?
    a. Gene
    b. Cell
    c. Species
    d. Family
    e. Genus

10. Which of the following taxonomic groups contains organisms that are probably most similar to the first organisms to arise on earth?
    a. Archaea
    b. Eubacteria
    c. Protista
    d. Eucarya
    e. Fungi

11. What is another word that means exactly the same thing as "type specimen?"
    a. Paratype
    b. Holotype
    c. Topotype
    d. Allotype
    e. Neotype

12. Which of the following is NOT a real proposed hypothesis that attempts to explain the disappearance of the dinosaurs?
    a. Terminal Constipation Hypothesis
    b. Arctic Spillover Hypothesis
    c. Death Star Hypothesis
    d. Genetic Collapse Hypothesis
    e. Extraterrestrial Impact Hypothesis

13. Cuckoos which lay their eggs in the nest of other birds color their eggs to match those of the host bird. This is a form of:
    a. Mullerian mimicry
    b. Batesian mimicry
    c. Photomimicry
    d. Aggressive mimicry
    e. Mertensian mimicry

14. Of the following species concepts, which one is most commonly used when discussing sexually reproducing animals?
    a. Ecological
    b. Phenetic
    c. Recognition
    d. Biological
    e. Morphological

15. For natural selection to operate:
    a. members of a population must lack variation
    b. all offspring in a population must survive
    c. advantageous traits must be genetic in nature
    d. there must be an excess of available resources
    e. there must be no competition between individuals.

Assessment Report for Comparative Anatomy, Fall 2022, University of Arkansas at Monticello, John L. Hunt, Instructor.

On the first class day of the Fall 2022 semester, a pre-test was administered to the students in the Comparative Anatomy class at the University of Arkansas at Monticello. The pre-test consisted of 15 questions designed to test the students' prior knowledge of some of the most important concepts of Comparative Anatomy. 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. (A copy of the questions is included at the end of this report.) 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 5.3 out of 15, or 35.3% (n = 13, range 3-9, standard deviation 1.49). Average score on the post-test was 9.4, or 62.5% (n = 13, range 7-13, standard deviation 2.14). All students in the class registered an improvement on the post-test (n = 13, average increase 4.1 questions, range 1-9, standard deviation 2.50). Average percentage change in score was 89.7% (n = 13, range 11.0-300.0%, standard deviation 75.7%).

This is the eighth year that this type of assessment has been used in the Comparative Anatomy class, although classes in 2019 and 2020 were not assessed due to the pandemic. Results in 2022 were roughly equivalent to those obtained in the preceding years, and were nearly identical to those achieved in 2021. Results seem to indicate that many of the objectives of the class are being met. The instructor will use the assessment again next year.

Questions used for both the pre-test and post-test are included below.

1. Which of the terms below describes similarities due to convergent evolution?
    a. Homoplasy
    b. Homology
    c. Analogy
    d. Pleiotropy
    e. Anamorphy

2. Which of the following terms refers to a group that you don't belong to?
    a. Tetrapoda
    b. Chordata
    c. Eutheria
    d. Archosauria
    e. Amniota

3. The process of induction is an important part of which of the following?
    a. Evolution
    b. Development
    c. Respiration
    d. Digestion
    e. Muscle function

4. Vertebrate jaws originally evolved from:
    a. Dermal bones
    b. Cervical vertebrae
    c. Cranial bones
    d. Gill arches
    e. Fin rays

5. Zygapophyses are projections found on:
    a. Inner wall of the digestive tract
    b. Jawbones
    c. Fins
    d. Vertebrae
    e. Tongue

6. Which one of the following structures is the evolutionary ancestor of the human forearm:
    a. Lobed fin
    b. Ray fin
    c. Procoracoid
    d. Gill arch
    e. Interclavicle

7. Hypobranchial and branchiomeric musculature is associated with:
    a. Lungs
    b. Limbs
    c. Veterbral column
    d. Eyeballs
    e. Jaws

8. From an evolutionary standpoint, most fishes and tetrapods started out with a specific number of aortic arches. That number is:
    a. Four
    b. Five
    c. Six
    d. Eight
    e. Twelve

9. One of the following organs does not develop embryologically from the digestive system. Which is it?
   a. Lung
   b. Liver
   c. Intestine
   d. Stomach
   e. Kidney

10. Pronephric, mesonephric, and metanephric are different types of:
    a. Kidney
    b. Lung
    c. Liver
    d. Brain
    e. Vertebrae

11. In which type of animal is the male reproductive system most closely related to the excretory system?
    a. Kangaroo
    b. Red-winged blackbird
    c. Perch
    d. King snake
    e. African elephant

12. Another name for the telencephalon is:
    a. Olfactory nerve
    b. Cerebrum
    c. Pancreas
    d. Cranium
    e. Mandible

13. The sclera, ciliary body, and suspensory ligament are structures associated with:
    a. Esophagus
    b. Pancreas
    c. Brain stem
    d. Spinal cord
    e. Eye

14. Mammals have a four-chambered heart with two atria and two ventricles. Which of the following animals also has such a heart?
    a. Lungfish
    b. Bull shark
    c. Musk turtle
    d. American alligator
    e. Iguana

15. The part of the skull which originates with structures associated with the gills of early vertebrates is called:
    a. Splanchnocranium
    b. Dermatocranium
    c. Neurocranium
    d. Chondrocranium
    e. Glossocranium

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Addendums

Addendum 1: UAM Vision, Mission, and Strategic Plan

VISION

The University of Arkansas at Monticello will be recognized as a model, open access regional institution with retention and graduation rates that meet or exceed its peer institutions.

Through these efforts, UAM will develop key relationships and partnerships that contribute to the economic and quality of life indicators in the community, region, state, and beyond.

MISSION

The University of Arkansas at Monticello is a society of learners committed to individual achievement by:

- Fostering a quality, comprehensive, and seamless education for diverse learners to succeed in a global environment;
- Serving the communities of Arkansas and beyond to improve the quality of life as well as generate, enrich, and sustain economic development;
- Promoting innovative leadership, scholarship, and research which will provide for entrepreneurial endeavors and service learning opportunities;
- Creating a synergistic culture of safety, collegiality, and productivity which engages a diverse community of learners.

CORE VALUES:
- *Ethic of Care*: We care for those in our UAM community from a holistic perspective by supporting them in times of need and engaging them in ways that inspire and mentor.
- *Professionalism*: We promote personal integrity, a culture of servant leadership responsive to individuals' needs as well as responsible stewardship of resources.
- *Collaboration*: We foster a collegial culture that encourages open communication, cooperation, leadership, and teamwork, as well as shared responsibility.
- *Evidence-based Decision Making*: We improve practices and foster innovation through assessment, research, and evaluation for continuous improvement.
- *Diversity*: We embrace difference by cultivating inclusiveness and respect of both people and points of view and by promoting not only tolerance and acceptance, but also support and advocacy.

UAM STUDENT LEARNING OUTCOMES:
- *Communication:* Students will communicate effectively in social, academic, and professional contexts using a variety of means, including written, oral, quantitative, and/or visual modes as appropriate to topic, audience, and discipline.

- *Critical Thinking:* Students will demonstrate critical thinking in evaluating all forms of persuasion and/or ideas, in formulating innovative strategies, and in solving problems.
- *Global Learning:* Students will demonstrate sensitivity to and understanding of diversity issues pertaining to race, ethnicity, and gender and will be capable of anticipating how their actions affect campus, local, and global communities.
- *Teamwork:* Students will work collaboratively to reach a common goal and will demonstrate the characteristics of productive citizens.
-

STRATEGIC PLAN

1. STUDENT SUCCESS—fulfilling academic and co-curricular needs

- Develop, deliver, and maintain quality academic programs.
  - Enhance and increase scholarly activity for undergraduate and graduate faculty/student research opportunities as well as creative endeavors.
  - Revitalize general education curriculum.
  - Expand academic and degree offerings (technical, associate, bachelor, graduate) to meet regional, state, and national demands.

- Encourage and support engagement in academics, student life, and athletics for well-rounded experience.
  - Develop an emerging student leadership program under direction of Chancellor's Office.
  - Enhance and increase real world engagement opportunities in coordination with ACT Work Ready Community initiatives.
  - Prepare a Student Affairs Master Plan that will create an active and vibrant student culture and include the Colleges of Technology at both Crossett and McGehee.

- Retain and recruit high achieving faculty and staff.
  - Invest in quality technology and library resources and services.
  - Provide opportunities for faculty and staff professional development.
  - Invest in quality classroom and research space.
  - Develop a model Leadership Program (using such programs as American Council on Education, ACE and/or Association of American Schools, Colleges, and Universities, AASCU) under the direction of the Chancellor's Office to grow our own higher education leaders for successive leadership planning.
  - Create an Institute for Teaching and Learning Effectiveness.

- Expand accessibility to academic programs.
  - Engage in institutional partnerships, satellite programs, alternative course delivery, and online partnerships with eVersity.
  - Create a summer academic enrichment plan to ensure growth and sustainability.
  - Develop a model program for college readiness.

- o Revitalize general education.
- o Coordinate with community leaders in southeast Arkansas to provide student internships, service learning, and multi-cultural opportunities.

2. ENROLLMENT and RETENTION GAINS

- Engage in concurrent enrollment partnerships with public schools, especially in the areas of math transition courses.

- Provide assistance and appropriate outreach initiatives with students (working adults, international, transfers, and diversity) for successful transition.
- Coordinate and promote marketing efforts that will highlight alumni, recognize outstanding faculty and staff, and spotlight student success.
- Develop systematic structures for first year and at-risk students. Identify and enhance pipeline for recruiting.

3. INFRASTRUCTURE REVITALIZATION and COLLABORATIONS

- Improve Institutional Effectiveness and Resources through participation in a strategic budget process aligned with unit plans and goals for resource allocations.

- Conduct and prepare Economic Impact Studies to support UAM efforts and align program and partnerships accordingly.

- Prepare and update University Master Plan.

- Partner with system and state legislators to maximize funding.

- Increase external funding opportunities that will create a philanthropic culture among incoming students, graduates, and community.
- o Increased efforts to earn research and grant funds.
- o Creation of philanthropic culture among incoming students, graduates and community.
  - Collaborating with Athletics Fundraising to maximize synergies.
  - Create a Growing our Alumni Base Campaign.
- o Encourage entrepreneurial opportunities where appropriate.
- o Participation in articulation agreements to capitalize on academic and economic resources.
- o Partner with communities to address the socio economic, educational, and health and wellness (safety needs) of all citizens.

Addendum 2: Higher Learning Commission Sample Assessment Questions

1. How are your stated student learning outcomes appropriate to your mission, programs, degrees, students, and other stakeholders? How explicitly do major institutional statements (mission, vision, goals) address student learning?

- How well do the student learning outcomes of programs and majors align with the institutional mission?

- How well do the student learning outcomes of general education and co-curricular activities align with the institutional mission?
- How well do course-based student learning outcomes align with institutional mission and program outcomes?
- How well integrated are assessment practices in courses, services, and co-curricular activities?
- How are the measures of the achievement of student learning outcomes established? How well are they understood?

2. What evidence do you have that students achieve your stated learning outcomes?

- Who actually measures the achievement of student learning outcomes?
- At what points in the curriculum or co-curricular activities are essential institutional (including general education), major, or program outcomes assessed?
- How is evidence of student learning collected?
- How extensive is the collection of evidence?

3. In what ways do you analyze and use evidence of student learning?

- Who analyzes the evidence?
- What is your evidence telling you about student learning?
- What systems are in place to ensure that conclusions are drawn and actions taken on the basis of the analysis of evidence?
- How is evidence of the achievement of student learning outcomes incorporated into institutional planning and budgeting?

4. How do you ensure shared responsibility for student learning and assessment of student learning?

- How well integrated are assessment practices in courses, services, and co-curricular activities?
- Who is responsible for the collection of evidence?
- How cross-functional (i.e., involving instructional faculty, Student Affairs, Institutional
- Research, and/or relevant administrators) are the processes for gathering, analyzing, and using evidence of student learning?
- How are the results of the assessment process communicated to stakeholders inside and outside the institution?

5. How do you evaluate and improve the effectiveness of your efforts to assess and improve student learning?

- What is the quality of the information you have collected telling you about your assessment processes as well as the quality of the evidence?
- How do you know how well your assessment plan is working?

6. In what ways do you inform the public about what students learn—and how well they learn it?
- To what internal stakeholders do you provide information about student learning?
- What is the nature of that information?
- To what external stakeholders do you provide information about student learning?
- What is the nature of that information?

Addendum 3: Arkansas Productivity Funding Metrics
- The productivity funding formula consists of four categories: Effectiveness (80% of formula), Affordability (20% of formula), Adjustments, and Efficiency (+/-2% of formula).

Effectiveness	Affordability	Adjustment	Efficiency
• Credentials • Progression • Transfer Success • Gateway Course Success	• Time to Degree • Credits at Completion	• Research (4-year only)	• Core Expense Ratio • Faculty to Administrator Salary