Student Learning Assessment Report (SLAR)

Instructions: This template is a running document of each annual Academic Program Assessment Report due to the department chairs and Provost the last Friday in October. The final report in the document should be the official report of the year of the full Program Review. All reports below use the same report template. If the report is the Program Review year, please indicate it next to "Program Review Year" and also submit the Academic Program Review (APR).

Department: Natural And Applied Sciences

Academic Program Evaluated: Mathematics Education (9-12) **Program Review Year: 2019-2020**

	Year 1 **Academic Year: 2016-2017**	Year 2 **Academic Year: 2017-2018**	Year 3 **Academic Year: 2018-2019**	Year 4 **Academic Year: 2019-2020**
Faculty members involved in this assessment process: (List all faculty members who participated: program coordinator, reviewers, committee members, etc.)	1. Don Tosh, Professor of Mathematics Artifact Assessor 2. Dianne Twigger, Assistant Professor of Mathematics Artifact Assessor		1. Don Tosh, Professor of Mathematics Artifact Assessor 2. Dianne Twigger, Assistant Professor of Mathematics Artifact Assessor 3. Michelle Parker, Adjunct Professor of Mathematics Artifact Assessor	
Number of students in	Freshmen: 1	Freshmen:	Freshmen: 4	Freshmen:

sample: (If known, supply the number of students in each class/year who were used in the assessment report.)	Sophomores: 0 Juniors: 3 Seniors: 6 Graduate: 0	Sophomores: Juniors: Seniors: Graduate:	Sophomores: 3 Juniors: 0 Seniors: 0 Graduate: 0	Sophomores: Juniors: Seniors: Graduate:
Instrument(s) used in assessment: (List the exams, standardized tests, portfolios, etc. that were used in the assessment process.)	1. Exam; Differential Equations 2. Quiz; Calculus III 3. Exam; Calculus II 4. Exam; Discrete Mathematics 5. Homework; Linear Algebra 6. Take Home Midterm; Algebraic Structures 7. Take Home Final; Advanced Calculus 8. Presentation; Senior Seminar 9. Homework; Calculus II 10. Quiz; Calculus III 11. Exam 3; Linear Algebra 12. Homework; Differential Equations		1. Hypothesis test homework assignment Math 210 (Elementary Statistics) 2. Curve Sketching Assignment Math 231 (Calculus 1) 3. Integration Techniques Quiz Math 232 (Calculus 2) 4. Second order ODE exam Math 431 (Differential Equations) 5. Second Order ODE homework assignment Math 431 (Differential Equations) 6. Subspace/Vector Space proof Quiz Math 331 (Linear Algebra) 7. Ring and Isomorphism Exam Math 343 (Algebraic Structures)	

			8. Topology Presentation Math 496 (Mathematics Seminar) 9. SPSS assignment Math 210 (Elementary Statistics) 10. Bisection Programming Math 432 (Numerical Analysis) 11. Summary Statistics Quiz Math 210 (Elementary Statistics) 12. Regression Assignment Math 210 (Elementary Statistics) 13. Optimization Assignment Math 231 (Calculus 1) 14. Mass and Volumes of Revolution Quiz Math 233 (Calculus 3) 15. First order ODE applications assignment Math 431 (Differential Equations)	
Additional Data: (List any additional information/data				

that informed this report.)				
Methodology: **(Explain the method of data collection and the data analysis process.)**	Outcomes were assessed using a variety of different instruments, in a variety of different classes. Mastery was set at three on a four point scale. For overall outcome results when a student had been assessed on multiple outcomes, the students highest score was recorded (this explains the reduction in sample size when discussing overall results).		Using 4-point scale rubrics, assessors scored student work on instruments above in Cours Commons. A score of 3 or high indicates mastery, and if a student is assessed in multiple ways, the highest score prevai	
Results of Assessment: **(List the findings in summary format as narrative.)**	Students are achieving mastery in three of the four outcomes. Currently we have not collected data for outcome 4 (Improve Technological Skills). Education courses are assessed in the Education Department according to their accreditation guidelines. These outcomes are not included in this report.		Students are achieving mastery in each of the four program level outcomes. Data collection in the major is becoming more common and is evidenced by the increased sample sizes. Education courses are assessed in the Education Department according to their accreditation guidelines. These outcomes are not included in this report.	

Data: **(Provide the graphs, charts, etc. that were used to show data results. Do not include the actual data.)**	**Results of Assessment (mean scores on a scale of 0-4; 3+ considered proficient)** Students are assessed on four themes (Program Level Outcomes) 1. Developing Problem Solving Skills (mean 3.25, n=32) 2. Improve Proof Techniques (mean 3.3, n=30) 3. Model Real Life Phenomena (mean 3.53, n=38) 4. Improve technological skills (no data)		**Results of Assessment (mean scores on a scale of 0-4; 3+ considered proficient)** Students are assessed on four themes (Program Level Outcome 1. Develop Problem Solving Skills (mean 3.29, n=52) 2. Model Real Life Phenome (mean 3.13, n=100) 3. Improve Proof Technique (mean 3.59, n=13) 4. Improve Technological Skills (mean 3.44 n=62)	
Strengths: **(From the findings, list the areas of strengths that currently exist in the academic program.)**	Three of the four outcomes are currently assessed in multiple courses, using multiple instruments. This ensures that students have multiple exposures to important concepts in mathematics. Average student scores were all near or above mastery level set in the outcome assessment plan. Also, data shows that student scores improve as they progress through the program.		Student sample size has increased dramatically from first assessments. All four program level outcomes yield results at or above the mastery level. Students have been scoring well on Missouri Content Assessments that are required prior to teacher certification. This is another indicator that students are achieving all outcomes in their field.	

Areas in need of improvement: **(From the findings, list the areas of weakness(s) that currently exist in the academic program.)**	Currently the only courses that assesses the outcome "Improve Technological Skills" is Math 432 Numerical Analysis which is taught only every other years. We are considering other courses in which we can add a technological component to be assessed. Potential courses include Differential Equations and Linear Algebra. This would provide use with multiple assessment opportunities to address this outcome.		Students have difficulty in developing problem solving skills and modeling real life phenomena in Math 210 and Math 232. This is somewhat expected as these are gateway courses for their program and topics used in assessment provide data on one of the student's first experiences with higher level thinking. Math 210 and 232 are also taken by students who are not in the mathematics program and their values could be skewing the results.	

Year 1:

Plans for improvement: **(Provide the improvement plan, when it will be implemented, and person who will administer the improvement plan.)**
*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Plan for Improvement	Timeline	Responsible Person
Include technological components to assess in various courses.	SP17 – Differential Equations FA 18 – Linear Algebra	Twigger and Tosh
Incorporate modeling component into other courses	FA 18 – Probability and Statistical Inference	Tosh
Compile assessment report at the end of each academic year	SP18	Twigger and Tosh

Year 1:

Improvements made: **(List completed improvement plans and dates of actual implementation.)**
If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Improvement Plan	Implementation Date
A proof component was added to weekly quizzes in Advanced Calculus as well as Algebraic Structures. This contributed to a significant increase in outcome assessment scores.	2016-2017
An introduction to proofs unit was added to Math 212 discrete mathematics. This has given students a stronger base in proof writing techniques.	2016

Year 2:

Plans for improvement: **(Provide the improvement plan, when it will be implemented, and person who will administer the improvement plan.)**
*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Plan for Improvement	Timeline	Responsible Person

Year 2:

Improvements made: **(List completed improvement plans and dates of actual implementation.)**
*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Improvement Plan	Implementation Date

Year 3:

Plans for improvement: **(Provide the improvement plan, when it will be implemented, and person who will administer the improvement plan.)**
*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Plan for Improvement	Timeline	Responsible Person
All sections of course will incorporate outcomes and provide artifacts for specific topics.	Immediately	All instructors and professors of courses listed in curriculum map
Further coverage on courses involving proof techniques to increase data	Fall 2019	Professors Tosh and Twigger

Year 3:

Improvements made: **(List completed improvement plans and dates of actual implementation.)**
*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Improvement Plan	Implementation Date

New technology components were added to Math 431 (Differential Equations) and Math 231 (Calculus 1)	2018-2019
Course Level Outcomes were standardized for each program course so that they can be assessed using rubrics in canvas starting in fall 2019. Utilizing rubrics on canvas will allow us to evaluate data from all instructors in a course.	2019

Year 4:

Plans for improvement: **(Provide the improvement plan, when it will be implemented, and person who will administer the improvement plan.)**
*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Plan for Improvement	Timeline	Responsible Person

Year 4:

Improvements made: **(List completed improvement plans and dates of actual implementation.)**
*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Improvement Plan	Implementation Date
