Assessment 5: Candidate Effect on Student Learning

a. Description of the Assessment:
The Impact on Student Learning Project (ISLP) assessment is administered during the internship semester to all candidates. The primary purpose of the project is to demonstrate the candidate's ability to plan, implement, assess, and reflect on instruction as well as provide evidence that they have had a positive impact on student learning.

Each candidate is assigned to a middle school (grade 7 or 8) for half of their internship and a high school (grade 9-12) for the remainder. The candidate is placed into a classroom under the direct supervision of a highly qualified mathematics teacher. Each candidate has a content supervisor and a clinical supervisor during his or her internship. The content supervisor is a highly qualified university supervisor with secondary mathematics teaching experience.

The project requires that candidates develop, teach, and assess a complete instructional unit. The length of the unit will vary, but it should include a substantial number of consecutive instructional days, in the range of one or two weeks. The candidate will collaborate with their cooperating teacher and their content supervisor. The project should be an original work, but may include activities from cited resources or related to educational research articles.

The project requires candidates to measure students' content mastery to assess the effectiveness of instruction. Candidates will determine the extent to which the learners achieved the objectives of the project.

The content supervisor will conduct an observation during the implementation of the project. Upon the completion of the internship, the content supervisor will assess the project using the MTH Impact on Student Learning Project Rubric (Attachment A). An overall project rating is determined according to the following scale:

Rating	**Score**
Target	81 - 90
Acceptable	68 - 80
Unacceptable	0 - 67

b. Alignment of Assessment to the NCTM Standards and Elements:
This assessment is administered to secondary mathematics candidates during their internship semester prior to graduation. The successful completion of this assessment is a requirement for course credit. Please see the Scoring Guide in Part f for a more detailed alignment.

Program Standard	Elements Addressed
Standard 2: Mathematical Practices	2a, 2b, 2c
Standard 3: Content Pedagogy	3a, 3b, 3c, 3f
Standard 4: Mathematical Learning Environment	4b, 4e
Standard 5: Impact on Student Learning	5b, 5c
Standard 7: Secondary Mathematics Field Experiences and Clinical Practice	7c

c. Analysis of the data findings:

Data Table A Secondary Mathematics Impact on Student Learning Project (Internship) Undergraduate Program Completers			
	Target	**Acceptable**	**Unacceptable**
Spring 2014 (N = [redacted])	0	2	0
Fall 2014 (N = [redacted])	0	2	0

This assessment was revised in the fall of 2013 to better align to the 2012 NCTM CAEP Standards. The program did not have any candidates enrolled in internship at that time. [redacted] candidates were enrolled in the spring of 2014, and [redacted] candidates were enrolled in the fall of 2014. So the data collected represents two administrations of the assessment and demonstrates the performance of a total of [redacted] candidates.

Data table A displays the candidates' cumulative performance on their Impact on Student Learning Projects. All four candidates demonstrated their ability to effectively plan, implement, assess, and reflect on instruction aligned to the Common Core Mathematics. Data table B summarizes the candidates' performance in each rubric criteria and provides evidence supporting proficiency in each of the NCTM CAEP standard sub-elements represented. Data table C displays the mean score for each NCTM CAEP element aligned to this rubric. The minimum NCTM CAEP element mean score was 2.00 corresponding to acceptable on the 3-point rubric. The data clearly shows that the candidates each had a positive impact on student learning.

See data table B for the complete data set.

d. Interpretation of how that data provides evidence for meeting standards:

The Impact on Student Learning Project, completed during internship, provides evidence that the candidates can successfully apply their content and pedagogical skills in a secondary mathematics classroom. It also provides evidence that they are prepared to effectively assess and measure student learning, critically reflect on their own teaching, and make modifications when needed to meet the learning needs of their students.

The data reveals that the candidates ability to collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment evidence and determine the extent to which students' mathematical proficiencies has increased as a result of their instruction is an area of strength. This provides ample evidence supporting candidate proficiency in planning, implementing and assessing instruction. Data table B provides performance data for candidates in the two administrations (spring 2014, fall 2014) by displaying the mean criteria score*, score range and percentage of completers meeting the minimum expectation of acceptable or target.

e. Assessment Tool:

Impact on Student Learning Project Assignment

Overview:

Effective teachers of secondary mathematics provide evidence demonstrating that as a result of their instruction, secondary students' conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and application of major mathematics concepts in varied context have increased. These teachers support the continual development of a productive disposition toward mathematics. They show that new student mathematical knowledge has been created as a consequence of their ability to engage students in mathematical experiences that are developmentally appropriate, require active engagement, and include mathematics-specific technology in building new knowledge.

This project will demonstrate the candidate's ability to plan, implement, assess, and reflect on instruction as well as provide evidence that they have had a positive impact on student learning. The length of the project will vary depending on the topic, but it should include at least three lesson plans that would take one or two weeks to implement in the classroom. Both the supervising teacher as well as the content supervisor should approve the project's topic. The planning, activities, assessments, etc. must be original work (created by the candidate), but may include activities from textbooks or supplemental resources. All materials created should be organized in a three-ring binder and kept electronically as well. The following components should be included:

- **Title Page** – Include the title of the project, subject and grade level, the name of the school for which it was developed, your name, and the date.

- **Introduction** – Write a brief informative paragraph giving a basic understanding of the project and its relationship to the overall curriculum for the course. Explain the project's connection to past content. Clarify what students need to know in order to be successful in this project. You should also indicate how much time is needed for this particular project and provide a brief overview of each day's activities.

- **Rationale** – Narrative focuses on the educational value of the project within the context of curriculum standards for secondary mathematics and its relationship to student learning by addressing each of the following.
    - The project's connection to both prior knowledge and future learning. Narrative should span both middle level and high school mathematics.
    - What the project will enable students to do.
    - How it prepares them for real-work performance tasks.
    - How the content enhances analytical or critical thinking skills.
    - How the content prepares students to be more successful in other areas or topics in mathematics.
    - How the content enhances learning in other disciplines.

- **Outcomes/Standards/Evidence Alignment** – Information should be organized in a table as specified below.
    - List the desired student learning outcomes of the project in terms of both general and specific student behaviors. These outcomes should specifically identify what students should know and be able to do as a result of instruction. Explicitly correlate each outcome to the Common Core Standard(s). Label each student learning outcome for easy reference, for example: SLO1, SLO2, SLO3.
    - Identify all Common Core Standards that address each outcome. Label each standard using the appropriate reference, and *include the full statement of the standard*. If a given outcome corresponds to only a portion of the standard, highlight that portion or strike through the portion that does not apply.
    - How will you know if students have achieved the desired results and satisfied the outcome? What will you accept as evidence of student proficiency? What part of the assessment plan will provide the evidence? Identify what portion of the assessment plan will collect data associated to each student learning outcome.

Student Learning Outcomes: After completing the project, student will be able to…	Common Core Mathematics Standards:	Evidence: (Identify what portion of the assessment plan will collect this SLO data.)
SLO1		
SLO2		

- **Lesson Plans** – This section consists of individual lesson plans developed for the project. The project must contain at least 3 lessons. Each lesson must use the MTH Lesson Plan template and include ***all*** instructional material. Be sure that the lesson plans give evidence of higher order thinking skills with activities that require critical or creative thinking and/or problem solving skills. After each lesson is taught, you must reflect on its effectiveness.

- **Samples of students' work.** Samples should include low, middle, and high performance work with meaningful comments that illustrate that the intern respects, values, and understands the student work. Just for clarification, work samples should include meaningful feedback from candidates to students. Student names should be redacted.

- **Assessment Plan -** must include a variety of types: formal, informal, formative, summative, traditional, performance-based, individual, group projects, etc. Candidate must create and type assessments using correct mathematical notation, graphs, figures and or diagrams. Rubrics for each assessment must be included. At a minimum your assessment plan should include a pre-test, formative assessments and a posttest. All assessment items must be explicitly aligned to the project student learning outcomes (SLO1, SLO2, SLO3, …).

  The Assessment Plan must include
  - A variety of strategies focusing on understanding the ways students think about mathematics
  - Varying levels of thinking as designated by the assessment pyramid
  - Varying levels of difficulty as designated by the assessment

  The Assessment Plan must include

  - Analysis of knowledge prior to the project,
  - Analysis of knowledge during the project, and
  - Analysis of knowledge after the completion of the project.

  The Project must document

  - The use of pre-assessment results to modify the instructional plan.
  - How student progress was monitored during the project.
  - How assessment results affected instructional decisions.
  - A positive impact on student learning.

Data Analysis (Evaluation of Teacher's Impact on Student Learning) – This section contains the results of student performance within the project. The data collected must allow an ***item*** analysis for each student. In this section you will determine if the project's goals were met? The analysis must be supported with student work samples and a very thorough data analysis of the assessment results.

a) Collect and record the data/results for each assessment by item.
b) Compile the data results for each ***student-learning outcome*** (including the pre-assessment and final assessment) using both a table and a graph. Technology should be used to analyze the data. Report data for each student by student-learning outcome and then ***quantify*** the extent to which the learners achieved that objective/goal. ****There must be a direct correlation between data analysis and the*** **Outcomes/ Standards/ Evidence Alignment table.**
c) Summarize what the data tells about students' learning in this project and provide an explanation/analysis of the results. Conclusions drawn from this analysis should be provided in the "Reflection" section.
d) Provide an intervention plan for students not satisfying the objectives.

- **Reflection** – This section remains blank until after the entire project is taught. Here the strengths and weaknesses of the project should be recorded and changes should be noted. Consider the following questions as you write your project reflection:

  - What were the strengths of the project? Which lesson was most effective? Why? What were the weaknesses of the project? Which lesson was weakest? Why?
  - How did the results of the pre-test influence your teaching? What changes did you make to your plans while you were teaching the project? Why did you decide to make these changes? What steps did you take to remediate learners having difficulty? What additional changes in instruction and assessment of learners would be required to make the project more effective?
  - Do the results of your assessments provide evidence that student learning occurred? Explain. How will the results inform future instruction? Describe the steps you took to interpret and report assessment results to students and parents. Was this procedure effective? Why or why not? How did your use of technology enhance the gathering and analyzing of data?
  - How will you use this experience to improve your teaching in the future?

f. The Scoring Guide:

Appendix

A MTH Impact on Student Learning Project Rubric
B MTH Lesson Plan Template

g. Data:

Data Table B Secondary Mathematics Impact on Student Learning Project Rubric (Internship) Undergraduate Program Completers *Each indicator is rated as: target (3), acceptable (2), or unacceptable (1).						
Rubric Criteria (NCTM CAEP Sub-Element Alignment)	**Spring 2014**			**Fall 2014**		
	Mean Criteria Score* and (Range)	**Number of Completers**	**% of Completers Meeting Minimum Expectation (Acceptable or Target)**	**Mean Criteria Score* and (Range)**	**Number of Completers**	**% of Completers Meeting Minimum Expectation (Acceptable or Target)**
Mathematical Practices – Problem Solving (2a.1)	2.0 (2-2)	[redacted]	100%	3.0 (3-3)	[redacted]	100%
Mathematical Practices – Problem Solving (2a.2)	3.0 (3-3)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Mathematical Practices – Problem Solving (2a.3)	2.5 (2-3)	[redacted]	100%	3.0 (3-3)	[redacted]	100%
Mathematical Practices – Problem Solving (2a.4)	2.0 (2-2)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Mathematical Practices – Reasoning (2b.1)	2.0 (2-2)	[redacted]	100%	2.0 (2-2)	[redacted]	100%
Mathematical Practices – Reasoning (2b.2)	2.0 (2-2)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Mathematical Practices – Reasoning (2b.3)	2.5 (2-3)	[redacted]	100%	3.0 (3-3)	[redacted]	100%
Mathematical Practices – Reasoning (2b.4)	3.0 (3-3)	[redacted]	100%	2.0 (2-2)	[redacted]	100%
Mathematical Practices – Reasoning (2b.5)	3.0 (3-3)	[redacted]	100%	2.0 (2-2)	[redacted]	100%

Data Table B continued *Each indicator is rated as: target (3), acceptable (2), or unacceptable (1).						
Rubric Criteria (NCTM CAEP Sub-Element Alignment)	**Spring 2014**			**Fall 2014**		
	Mean Criteria Score* and (Range)	**Number of Completers**	**% of Completers Meeting Minimum Expectation (Acceptable or Target)**	**Mean Criteria Score* and (Range)**	**Number of Completers**	**% of Completers Meeting Minimum Expectation (Acceptable or Target)**
Mathematical Practices – Modeling (2c.1)	2.5 (2-3)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Mathematical Practices – Modeling (2c.2)	2.0 (2-2)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Content Pedagogy – Rationale (3a.1)	3.0 (3-3)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Content Pedagogy – Curriculum Standards (3a.2)	2.5 (2-3)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Content Pedagogy – Research in Planning (3b)	2.5 (2-3)	[redacted]	100%	2.0 (2-2)	[redacted]	100%
Content Pedagogy – Lesson Planning (3c.1)	3.0 (3-3)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Content Pedagogy – Lesson Planning (3c.2)	2.5 (2-3)	[redacted]	100%	2.0 (2-2)	[redacted]	100%
Content Pedagogy – Assessment Plan (3f.1)	3.0 (3-3)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Content Pedagogy – Assessment Plan (3f.2)	2.0 (2-2)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Mathematical Learning Environment – Lesson Planning (4b.1)	2.5 (2-3)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Mathematical Learning Environment – Lesson Planning (4b.2)	2.5 (2-3)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Mathematical Learning Environment – Lesson Planning (4b.3)	2.5 (2-3)	[redacted]	100%	3.0 (3-3)	[redacted]	100%

Data Table B continued *Each indicator is rated as: target (3), acceptable (2), or unacceptable (1).						
Rubric Criteria (NCTM CAEP Sub-Element Alignment)	**Spring 2014**			**Fall 2014**		
	Mean Criteria Score* and (Range)	**Number of Completers**	**% of Completers Meeting Minimum Expectation (Acceptable or Target)**	**Mean Criteria Score* and (Range)**	**Number of Completers**	**% of Completers Meeting Minimum Expectation (Acceptable or Target)**
Mathematical Learning Environment – Instructional Tools and Mathematics-Specific Technologies (4e.1)	2.0 (2-2)	[redacted]	100%	2.0 (2-2)	[redacted]	100%
Mathematical Learning Environment – Instructional Tools and Mathematics-Specific Technologies (4e.2)	2.0 (2-2)	[redacted]	100%	2.0 (2-2)	[redacted]	100%
Impact on Student Learning – Student Engagement (5b.1)	2.0 (2-2)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Impact on Student Learning – Student Engagement (5b.2)	3.0 (3-3)	[redacted]	100%	2.0 (2-2)	[redacted]	100%
Impact on Student Learning – Assessment Results (5c.1)	3.0 (3-3)	[redacted]	100%	3.0 (3-3)	[redacted]	100%
Impact on Student Learning – Assessment Results (5c.2)	3.0 (3-3)	[redacted]	100%	2.5 (2-3)	[redacted]	100%
Impact on Student Learning – Assessment Results (5c.3)	3.0 (3-3)	[redacted]	100%	3.0 (3-3)	[redacted]	100%
Secondary Mathematics Clinical Practice (7c.1)	2.0 (2-2)	[redacted]	100%	2.0 (2-2)	[redacted]	100%
Secondary Mathematics Clinical Practice (7c.2)	2.0 (2-2)	[redacted]	100%	2.0 (2-2)	[redacted]	100%

Data Table C Secondary Mathematics Impact on Student Learning Project Rubric (Internship) Undergraduate Program Completers *Each indicator is rated as: target (3), acceptable (2), or unacceptable (1).		
Rubric Criteria (NCTM CAEP Element Alignment)	**Spring 2014**	**Fall 2014**
	Mean Criteria Score*	Mean Criteria Score*
2a	2.40	2.75
2b	2.50	2.30
2c	2.25	2.50
3a	2.75	2.50
3b	2.50	2.00
3c	2.75	2.25
3f	2.50	2.50
4b	2.50	2.67
4e	2.00	2.00
5b	2.50	2.25
5c	3.00	2.83
7c	2.00	2.00

MTH Impact on Student Learning Project Rubric

(NCTM CAEP Sub-Element Alignment)	Target (3)	Acceptable (2)	Unacceptable (1)
Mathematical Practices - Problem Solving. Effective teachers solve problems. Intern can design and use a variety of stimulating curricula that provide experiences that • Use problem solving to develop conceptual understanding, • Make sense of a wide variety of problems and persevere in solving them, • Apply and adapt a variety of strategies in solving problems confronted within the field of mathematics and other contexts. • Formulate and test conjectures in order to frame generalizations.			
2a.1	Mathematical activities and investigations provide students with opportunities to use problem solving to develop conceptual understanding.	Mathematical activities and investigations use problem solving to develop conceptual understanding.	Use of problem solving to develop conceptual understanding is limited or unclear.
2a.2	Students are engaged in problem solving activities within the field of mathematics and making connections to real-world contexts.	Students participate in problem solving activities within the field of mathematics. Candidate illustrates (provides) examples of connections to real-world contexts.	Students are not engaged in problem solving activities or the activities only include context within the field of mathematics.
2a.3	Creates opportunities to showcase a variety of students' problem solving strategies and encourages students to make sense of problems and persevere in solving them.	Encourages a variety of problem solving strategies and encourages students to make sense of problems and persevere in solving them but does not showcase students' strategies.	Communication of problem solving strategies is limited or unclear. Does not encourage students to make sense of problems and persevere in solving them.
2a.4	Mathematical activities and investigations allow for students to formulate and test conjectures in order to frame generalizations.	Includes experiences that allow for student discovery but lacks the proper foundation for students to frame generalizations.	Does not design experiences that allow for students to formulate and test conjectures in order to frame generalizations.

MTH Impact on Student Learning Project Rubric

Mathematical Practices - Reasoning. Effective teachers reason abstractly. Intern can design and use a variety of stimulating curricula that provide experiences that require

- Abstract, reflective and quantitative reasoning with attention to units, constructing viable arguments and proofs and critiquing the reasoning of others;
- Representing and modeling generalizations using mathematics; recognizing structure and expressing regularity in patterns of mathematical reasoning;
- Using multiple representations to model and describe mathematics; and
- Utilizing appropriate mathematical vocabulary and symbols to communicate mathematical ideas to others.

2b.1	Reasons abstractly, reflectively and quantitatively with attention to units, constructing viable arguments and proofs.	Communicates mathematical reasoning with clarity, precision, and logical order.	Communicates mathematical reasoning using inappropriate strategies or flawed arguments that are vague or imprecise.
2b.2	Able to understand, critique, and respond coherently to the mathematical reasoning and strategies of others. Evidence: Feedback on student work samples recognizes student work that showed correct thinking and offers guidance as needed.	Attempts to understand, critique, and respond coherently to the mathematical reasoning and strategies of others. Feedback on student work samples inconsistently recognizes student work that showed correct thinking or guidance offered does not encourage student perseverance.	No evidence of understanding the mathematical reasoning and strategies of others.
2b.3	Represents and models generalizations using mathematics while providing opportunities for students to recognize patterns of mathematical reasoning.	Represents and models generalizations using mathematics while recognizing patterns of mathematical reasoning.	Neither represents nor models generalizations using mathematics.
2b.4	Communicates mathematical ideas using a variety of representations and recognizes and clarifies the connections between the representations.	Communicates mathematical ideas using more than one type of representation but with no attempt to recognize the connections between the representations.	Communicates mathematical ideas using a single representation.
2b.5	Uses appropriate vocabulary and symbols to communicate mathematical ideas to others, and clearly communicates to students that they are expected to communicate their reasoning precisely.	Uses appropriate vocabulary and symbols to communicate mathematical ideas to others.	Does not use appropriate vocabulary and symbols to communicate mathematical ideas to others.

MTH Impact on Student Learning Project Rubric

(NCTM CAEP Sub-Element Alignment)	Target (3)	Acceptable (2)	Unacceptable (1)
Mathematical Practices - Modeling. Effective teachers formulate, represent, analyze, and interpret mathematical models derived from real-world contexts or mathematical problems.			
2c.1	Designs experiences that allow students to ***formulate*** and ***represent*** mathematical models derived from variety of real-world contexts to build mathematical understanding.	Motivates or illustrates the ***formulation*** and ***representation*** of mathematical models derived from variety of real-world contexts.	Does not recognize mathematical models derived from variety of real-world contexts.
2c.2	Designs experiences that allow students to ***analyze*** and ***interpret*** mathematical models derived from variety of real-world contexts to build mathematical understanding.	Motivates and illustrates the ***analysis*** and ***interpretation*** of mathematical models derived from variety of real-world contexts.	Does not recognize mathematical models derived from variety of real-world contexts.
Rationale. Narrative focuses on the educational value of the project within the context of curriculum standards for secondary mathematics and their relationship to student learning by addressing each of the following. • The project's connection to future content. • What the project will enable students to do. • How it prepares them for real-work performance tasks. • How the content enhances analytical or critical thinking skills. • How the content prepares students to be more successful in other areas or topics in mathematics. How the content enhances learning in other disciplines.			
3a.1	Rationale thoroughly communicates the value of the project within the context of curriculum standards and across mathematical domains.	Rationale communicates the value of the project within the context of curriculum standards, but some explanations may not be thoroughly developed across mathematical domains.	Rationale does not clearly communicate the value of the project.
Content Pedagogy - Curriculum Standards. Effective teachers apply knowledge of curriculum standards for secondary mathematics and their relationship to student learning within and across mathematical domains.			
3a.2	Instruction engages students in developmentally appropriate mathematical *investigations* and clearly communicates student-learning outcomes based on common core standards.	Instruction is developmentally appropriate and clearly communicates student-learning outcomes based on common core standards.	Goals of instruction vague, unclear or not quite appropriate.

MTH Impact on Student Learning Project Rubric

(NCTM CAEP Sub-Element Alignment)	Target (3)	Acceptable (2)	Unacceptable (1)
Content Pedagogy – Research in Planning. Effective teachers analyze and consider research in planning for and leading students in rich mathematical learning experiences.			
3b	Project includes a research article reflection that identifies how the research was used and in what ways the ideas were modified to fit instructional needs.	Project includes a research article reflection identifying how the research was used but no modifications were made to fit instructional needs.	Project does not include a research article reflection or included research article reflection does not clearly relate to the project's student learning outcomes.
Content Pedagogy –Lesson Planning. Effective teachers plan lessons and units that incorporate a variety of strategies, differentiated for diverse populations, and mathematics-specific and instructional technologies in building all students' conceptual understanding and procedural proficiency.			
3c.1	Lesson plans include variety of instructional strategies differentiated for diverse populations.	Lesson plans include more than one instructional strategy that could be differentiated for diverse populations.	Lesson plans does not include a variety of instructional strategies.
3c.2	Lesson plans *appropriately* incorporate mathematics-specific technologies to effectively build ***all*** students' conceptual understanding and procedural proficiency.	Lesson plans *appropriately* incorporate mathematics-specific technology in an attempt to build students' conceptual understanding and procedural proficiency.	Lesson plans *inappropriately* incorporate mathematics-specific technology or fails to build students' conceptual understanding and procedural proficiency.
Content Pedagogy – Assessment Plan. Effective teachers plan select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies for all students. (All assessments should be intern-created and use precise language and notation.)			
3f.1	Candidate uses both formative and summative assessments to effectively measure student proficiencies associated to all student learning outcomes. Assessments include a variety of strategies focusing on understanding the ways students think about mathematics as well as varying levels of thinking and difficulty.	Candidate uses both formative and summative assessments to effectively measure student proficiencies associated to all student learning outcomes. Assessments focus on understanding the ways student think about mathematics but with limited strategies or skewed with regard to level of thinking or difficulty.	Assessments do not measure student proficiencies associated to the student learning outcomes. OR Assessments focus on student recall of facts and algorithms with no evidence of interest in understanding the ways students think about mathematics and skewed with regard to level of thinking and difficulty.
3f.2	Documentation of how assessment results were used to inform instruction includes specific examples.	Documentation of how assessment results were used to inform instruction is generic.	No documentation of how assessment results were used to inform instruction.

MTH Impact on Student Learning Project Rubric

(NCTM CAEP Sub-Element Alignment)	Target (3)	Acceptable (2)	Unacceptable (1)
Mathematical Learning Environment – Lesson Planning. Effective teachers plan and create developmentally appropriate sequential, and challenging learning opportunities grounded in mathematics education research in which students are actively engage in building new knowledge for prior knowledge experiences.			
4b.1	Lesson plans are sequenced to create challenging learning opportunities that are developmentally appropriate.	Lesson plans create learning opportunities that are developmentally appropriate but either too challenging or not challenging enough.	Lesson plans do not create challenging learning opportunities or are not developmentally appropriate.
4b.2	Instructional strategies are grounded in mathematics education research in which students are actively engaged.	Instructional strategies are grounded in mathematics education research. (5E instruction model, Marzano's Best Practices, etc.)	Lesson plans are not grounded in mathematics education research.
4b.3	Lesson plans actively engage students in building new knowledge from prior knowledge and experiences.	Lesson plans build new knowledge from prior knowledge and experiences.	Lesson plans do not build new knowledge from prior knowledge and experiences.
Mathematical Learning Environment – Instructional Tools and Mathematics-Specific Technologies. Effective teachers apply mathematical content and pedagogical knowledge to select and use instructional tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies (e.g., graphing tools, interactive geometry software, computer algebra systems, and statistical packages); and make sound decisions about when such tools enhance teaching and learning, recognizing both the insights to be gained and possible limitations of such tools.			
4e.1	Project clearly describes how the ***instructional tools*** will be used to enhance teaching and learning, recognizing both the insights to be gained and possible limitations of such tools.	Project clearly describes how the ***instructional tools*** will be used to enhance the teaching and learning.	No attempt to use ***instructional tools*** and no reasonable explanation why the limitations of the tools do not enhance learning.
4e.2	Project clearly describes how the ***mathematics-specific technologies*** will be used to enhance teaching and learning, recognizing both the insights to be gained and possible limitations of technologies.	Project clearly describes how the ***mathematics-specific technologies*** will be used to enhance teaching and learning, recognizing either the insights to be gained OR possible limitations of technologies.	No attempt to use ***mathematics-specific technologies*** and no reasonable explanation regarding the possible limitations of technologies.

MTH Impact on Student Learning Project Rubric

(NCTM CAEP Element Alignment)	Target (3)	Acceptable (2)	Unacceptable (1)
Impact on Student Learning - Student Engagement. Effective teachers show that new student knowledge has been created as a consequence of their ability to engage students in mathematical experiences that are developmentally appropriate, require active engagement, and include mathematics-specific technology.			
5b.1	Students are engaged in developmentally appropriate mathematical investigations. Documentation includes evidence that • Pacing is appropriate, • Lesson captures perplexity, by following the Three-Act Math Tasks (Dan Meyer)or similar engagement methodology, and Students are given an opportunity for reflection.	Documentation that students are engaged in developmentally appropriate mathematical investigations. Documentation includes evidence that • Pacing is mostly appropriate, • Lesson attempts to capture perplexity but missing a key component, and Students are given an opportunity for reflection.	There is no documentation addressing the engagement of students in developmentally appropriate mathematical investigations.
5b.2	Students use mathematics-specific technologies appropriate to the learning objective.	Students use mathematics-specific technologies but it does not connect to the learning objectives in a meaningful way.	Students do not use mathematics-specific technology and explanation for lack of use not based in sound pedagogy.
Impact on Student Learning - Assessment Results. Effective teachers collect, organize, analyze and reflect on diagnostic, formative, and summative assessment evidence and determine the extent to which students' mathematical proficiencies have increased as a result of their instruction.			
5c.1	Diagnostic and summative data is clearly displayed and organized by student learning outcomes.	Diagnostic and summative data is included but are not organized by student learning outcomes.	Data is not included or is included but does not relate to student learning outcomes.
5c.2	Data analysis accurately interprets assessment results, including a reflection on how the assessment evidence will inform future instruction.	Data analysis accurately interprets assessment results and includes a reflection on the assessment evidence.	Data analysis is not included, inaccurately interprets assessment results, or does not include a description of how the assessment results were reported or will inform future instruction.
5c.3	Assessment evidence demonstrates a positive impact on student learning for each student-learning outcome.	Assessment evidence demonstrates a positive impact on student learning on most of the student learning outcomes.	Assessment does not provide evidence demonstrating a positive impact on student learning on most of the student learning outcomes.

MTH Impact on Student Learning Project Rubric

(NCTM CAEP Element Alignment)	Target (3)	Acceptable (2)	Unacceptable (1)
Secondary Mathematics Field Experiences and Clinical Practice – Effective teachers develop a broad experiential base of knowledge, skills, and effective approaches to mathematics teaching and learning.			
7c.1	Project provides evidence the teacher candidate has developed the knowledge, skills and professional behaviors necessary to examine the nature of mathematics, how mathematics should be taught, and how students learn mathematics. The introduction and rationale spans both middle and high school mathematics and documents specific ways in which candidate has drawn upon research in mathematics education and professional development to inform practice.	Project provides evidence the teacher candidate has developed the knowledge, skills and professional behaviors necessary to examine the nature of mathematics, how mathematics should be taught, and how students learn mathematics. The introduction and rationale spans both middle and high school mathematics.	Project does not provide evidence the teacher candidate has developed the knowledge, skills or professional behaviors necessary to examine the nature of mathematics, how mathematics should be taught, and how students learn mathematics.
7c.2	Project introduction and reflection includes an analysis of approaches to mathematics teaching and learning, focusing on tasks, discourse, environment, and assessment. Candidate documents specific changes made to the project as a result of conversations with cooperating teacher, peers, *and* university supervisors.	Project introduction and reflection includes an analysis of approaches to mathematics teaching and learning, focusing on tasks, discourse, environment, and assessment.	Project introduction or reflection does not focus on approaches to mathematics teaching and learning, tasks, discourse, environment, or assessment. OR Analysis is limited or faulty.

MTH Lesson Plan

Intern _____ Cooperating Teacher _____

School _____ University Supervisor [redacted]

Grade _____Subject _____Date _____
(Month/Day/Year)

INSTRUCTION PLAN **Complete and submit 48 hours prior to observation.**

1. Place title of lesson here.

Student Learning Outcomes: After completing the unit, student will be able to…	Common Core Standards: Type the standard here using its appropriate reference. Cross out any portion not addressed in lesson plan.	Evidence: (Identify what part of the assessment plan will provide evidence of student proficiency.)

2. METHODS

Identify instructional strategies have you chosen for this lesson.

3. STUDENT GROUPING

How will you group students for instruction? Will student be working cooperatively in groups of 2, groups of 3, groups of 4, independently, etc.? If working in groups, ***specifically*** describe how the groups will be determined.

4. Vocabulary (Include definitions.)

5. Real World Applications that are explored during this lesson. (Capture perplexity.)

Explain what experiences allow students to formulate, represent, analyze and or interpret mathematical models derived from a variety of real-world contexts to build mathematical understanding.

6. Strategic Use of Tools/Technology

Explain how you and the students strategically use mathematics-specific tools during the lesson to enhance or extend the meaning of the mathematics. If no math-specific tools or technologies are used, explain how the limitations of such tools prohibited their use. Tools: Manipulatives, physical models, drawings, virtual manipulatives or representations, etc. Technologies: Graphing calculators, graphing software, interactive geometry software, computer algebra systems, statistical packages, etc.

7. Insert Activity Plan – use template (repeat for each activity)

Name of Activity:

8. ACCOMMODATIONS

What accommodations will be made for children with special needs (i.e. teaching, evaluation)?

9. RESOURCES

• Include a list of any resources used in the development of this lesson. This should be a proper citation of materials used to develop this lesson. Include internet resources, print material in books or journals, and community/school resources. • All resources should be modified in some way to improve them.

Activity Plan

Title of the Activity or Lesson:

Goals of the Activity or Lesson: (What mathematical content and processes do you hope students will learn from their work on this activity? Use correct common core labeling.)

Why do students need to learn this?

- This concept connects to future learning. It is important later in the study of …
- This understanding or skill will enable students to…
- This understanding or skill prepares students for real-work performance tasks of…
- The content enhances analytical or critical thinking skills by…
- The content enhances learning in other disciplines. (Include specifics.)

Setting Up the Mathematical Activity – Engage Phase

A. In what ways does the task build on students' previous knowledge? What definitions, concepts, or ideas do students need to know in order to begin work on the task?

   - Students will need a (geometrical, graphical, algebraic, numerical, …) understanding of ... Specifically, students will need to
     -
     -
     -
     -
   - Students will need to be familiar with ...
   -

B. What are all the ways the investigation can be completed? (What methods do you think your students use? What misconceptions might students have? What errors might students make?)

C. What are your expectations for students as they work on and complete this activity? (What resources will students use? How will students work – independently, small groups, pairs? How will students record and report their work?)

D. How will you introduce students to the activity so as not to reduce the demands of the task? How will you engage students?

➢ Include a narrative here that described what happens during the engage phase of the lesson.

Exploration Phase: As students are working independently or in small groups:

A. What questions will you ask to focus their thinking?

B. What will you see or hear that lets you know how students are thinking about the mathematical ideas?

C. What questions will you ask to assess students' understanding of key mathematical ideas, problem-solving strategies, or the representations? Attach all graphic organizers, exit ticket, …

D. What questions will you ask to advance students' understanding of the mathematical ideas?

E. What questions will you ask to encourage students to share their thinking with others or to assess their understanding of their peers' ideas?

- Include a narrative here that described what happens during the explore phase of the lesson.

Sharing and Discussing the Activity - Explain Phase

A. Which solution paths do you want to have shared during the class discussion in order to accomplish the goals for the lesson? Which will be shared first, second, etc? Why?

B. What will you see or hear that lets you know that students in the class understand the mathematical ideas or problem-solving strategies that are being shared?

C. How will you orchestrate the class discussion so that students:
   Make sense of the mathematical ideas being shared?
   Expand on, debate, and question the solutions being shared?
   Make connections between their solution strategy and the one shared?
   Look for patterns and form generalizations?

D. What extensions to the activity will you pose that will help students look for patterns, make connections, or form a generalization?

- Include a narrative here that described what happens during the explain phase of the lesson.

- Include a narrative here that described what happens during the elaborate phase of the lesson.

- Explain here how students will summarize their understanding.

REFLECTION AFTER THE OBSERVATION **Complete after observation, and submit with 48 hours after the observation.**
1. Did you depart from anything you planned for today? If so why?
2. If you were going to teach this class again to the same students, what would you do differently? What would you do the same? Why?
3. Based on what happened today, what do you plan to do next with this class?
4. Identify an individual or group of students who did well in today/s lesson. How do you account for this individual or group's performance? What might you try in the future to further challenge this (these) students?
5. In what specific ways did you assess the students understanding of this lesson?
6. What evidence can you provide to support your claims in the above question?
7. In what ways were the students active learners in todays lesson (as opposed to passive)?