

**George Mason University**  
**College of Education and Human Development**  
**Mathematics Education Leadership**

EDCI 646.6M2 & 6M3– Mathematics Education Leadership for School Change  
3 Credits, Fall 2022  
THURSDAYS, 7:20PM-10:00PM, Synchronous Online

**Faculty**

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**Prerequisites/Corequisites**

Admission to the Mathematics Education Leadership Master's Degree program or instructor permission.

**University Catalog Course Description**

Surveys current literature and large-scale studies in mathematics education. Engages students in research, study, and discussion of factors that affect teaching and learning of mathematics in school settings. Offered by the School of Education. May not be repeated for credit.

**Course Overview**

This course is designed for master's level students in the Mathematics Education Leadership program.

**Course Delivery Method**

This course will be delivered online (76% or more) using a synchronous format via Blackboard Learning Management system (LMS) housed in the MyMason portal. You will log in to the Blackboard (Bb) course site using your Mason email name (everything before @masonlive.gmu.edu) and email password. The course site will be available on Friday, August 19, 2022.

**Under no circumstances, may candidates/students participate in online class sessions (either by phone or Internet) while operating motor vehicles. Further, as expected in a face-to-face**

**class meeting, such online participation requires undivided attention to course content and communication.**

### *Technical Requirements*

To participate in this course, students will need to satisfy the following technical requirements:

- High-speed Internet access with standard up-to-date browsers. To get a list of Blackboard's supported browsers see:  
[https://help.blackboard.com/Learn/Student/Getting\\_Started/Browser\\_Support#supported-browsers](https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#supported-browsers)

To get a list of supported operation systems on different devices see:

[https://help.blackboard.com/Learn/Student/Getting\\_Started/Browser\\_Support#tested-devices-and-operating-systems](https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#tested-devices-and-operating-systems)

- Students must maintain consistent and reliable access to their GMU email and Blackboard, as these are the official methods of communication for this course.
- Students will need a headset microphone for use with the Blackboard Collaborate web conferencing tool.
- Students may be asked to create logins and passwords on supplemental websites and/or to download trial software to their computer or tablet as part of course requirements.
- The following software plug-ins for PCs and Macs, respectively, are available for free download:
  - Adobe Acrobat Reader: <https://get.adobe.com/reader/>
  - Windows Media Player:  
<https://support.microsoft.com/en-us/help/14209/get-windows-media-player>
  - Apple Quick Time Player: [www.apple.com/quicktime/download/](http://www.apple.com/quicktime/download/)

### *Expectations*

- Course Week: Our course week will begin on the day that our synchronous meetings take place as indicated on the Schedule of Classes.
- Log-in Frequency: Students must actively check the course Blackboard site and their GMU email for communications from the instructor, class discussions, and/or access to course materials at least 2 times per week. In addition, students must log-in for all scheduled online synchronous meetings.
- Participation: Students are expected to actively engage in all course activities throughout the semester, which includes viewing all course materials, completing course activities and assignments, and participating in course discussions and group interactions.
- Technical Competence: Students are expected to demonstrate competence in the use of all course technology. Students who are struggling with technical components of the course are expected to seek assistance from the instructor and/or College or University technical services.
- Technical Issues:

Students should anticipate some technical difficulties during the semester and should, therefore, budget their time accordingly. Late work will not be accepted based on individual technical issues.

- Workload:

Please be aware that this course is **not** self-paced. Students are expected to meet *specific deadlines* and *due dates* listed in the **Class Schedule** section of this syllabus. It is the student's responsibility to keep track of the weekly course schedule of topics, readings, activities and assignments due.

- Instructor Support:

Students may schedule a one-on-one meeting to discuss course requirements, content or other course-related issues. Those unable to come to a Mason campus can meet with the instructor via telephone or web conference. Students should email the instructor to schedule a one-on-one session, including their preferred meeting method and suggested dates/times.

- Netiquette:

The course environment is a collaborative space. Experience shows that even an innocent remark typed in the online environment can be misconstrued. Students must always re-read their responses carefully before posting them, so others do not consider them as personal offenses. *Be positive in your approach with others and diplomatic in selecting your words.* Remember that you are not competing with classmates, but sharing information and learning from others. All faculty are similarly expected to be respectful in all communications.

- Accommodations:

Online learners who require effective accommodations to insure accessibility must be registered with George Mason University Disability Services.

## Learner Outcomes or Objectives

This course is designed to enable students to do the following:

1. Develop skillful and flexible use of different instructional formats – whole group, small group, partner, and individual – in support of learning goals.
2. Design, select, and/or adapt worthwhile mathematics tasks and sequence examples to support a particular learning goal.
3. Construct and evaluate multiple representations of mathematical ideas or processes, establish correspondences between representations, and understand the purposes of doing so.
4. Use questions to effectively probe mathematical understanding and make productive use of responses.
5. Develop learners' abilities to give clear and coherent public mathematical communications in a classroom setting.
6. Manage diversities of the classroom and school –cultural, disability, linguistic, gender socio-economic, developmental – and use appropriate strategies to support the mathematical learning of all students.
7. Analyze and evaluate student ideas and work, and design appropriate responses.
8. Use professional resources such as professional organization networks, journals, and discussion groups to be informed about critical issues related to mathematics teaching and learning, e.g., policy initiatives and curriculum trends.
9. Use leadership skills to improve mathematics programs at the school and district levels.

10. Read, interpret, and discuss methodologies for implementing school change in mathematics education and for coping with the emotional aspects of change.
11. Explore and discuss the various aspects of the work of a mathematics leader including: working with different populations (i.e., new and experienced teachers, administrators, parents, and school cultures); managing discussions; identifying and implementing structures for professional development (i.e., Lesson Study, Content-Focused Coaching, Professional Learning Communities); and transitioning into the role of a mathematics specialist.

(\*\*\*Outcomes 1-8 are quoted directly from page 6-7 of the AMTE's *Standards for Elementary Mathematics Specialists: A Reference for Teaching Credentialing and Degree Programs* (2013))

**Professional Standards** (National Council of Teachers of Mathematics (NCTM) NCATE Mathematics Content for Elementary Mathematics Specialist (NCATE) *Addendum to the NCTM NCATE Standards 2012*)

Upon completion of this course, students will have met the following professional standards:

#### Standard 3: Content Pedagogy

- 3a) Apply knowledge of curriculum standards for elementary mathematics and their relationship to student learning within and across mathematical domains in teaching elementary students and coaching/mentoring elementary classroom teachers.
- 3c) Plan and assist others in planning lessons and units that incorporate a variety of strategies, differentiated instruction for diverse populations, and mathematics-specific and instructional technologies in building all students' conceptual understanding and procedural proficiency.
- 3e) Implement and promote techniques related to student engagement and communication including selecting high quality tasks, guiding mathematical discussions, identifying key mathematical ideas, identifying and addressing student misconceptions, and employing a range of questioning strategies.
- 3f) Plan, select, implement, interpret, and assist teachers in using formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.

#### Standard 4: Mathematical Learning Environment

- 4b) Plan, create, and coach/mentor teachers in creating developmentally appropriate, sequential, and challenging learning opportunities grounded in mathematics education research in which students are actively engaged in building new knowledge from prior knowledge and experiences.
- 4d) Demonstrate and encourage equitable and ethical treatment of and high expectations for all students.
- 4e) Apply mathematical content and pedagogical knowledge in the selection, use, and promotion of instructional tools such as manipulatives and physical models, drawings, virtual environments, presentation tools, and mathematics-specific technologies (e.g., graphing tools and interactive geometry software); and make and nurture sound decisions about when such tools enhance teaching and learning, recognizing both the insights to be gained and possible limitations of such tools.

## Standard 5: Impact on Student Learning

- 5b) Engage students and coach/mentor teachers in using developmentally appropriate mathematical activities and investigations that require active engagement and include mathematics-specific technology in building new knowledge.
- 5c) 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 or their efforts in coaching/mentoring teachers.

### Required Texts

- Aguilar, E. (2016). *The art of coaching teams: Building resilient communities that transform schools*. Jossey-Bass.
- Lewis, C. & Hurd, J. (2011). *Lesson study step-by-step: How teacher learning communities improve instruction*. Heinemann.
- West, L. & Cameron, A. (2013). *Agents of change*. Heinemann.

### Recommended Texts:

- American Psychological Association (2020). *Publication Manual of the American Psychological Association* (7<sup>th</sup> edition). American Psychological Association.
- National Council of Teachers of Mathematics. (2014). *Principles to actions: Ensuring mathematical success for all*. NCTM.
- National Council of Teachers of Mathematics. (2020). *Catalyzing Change in Early Childhood and Elementary: Initiating Critical Conversation*. NCTM.
- National Council of Teachers of Mathematics. (2020). *Catalyzing Change in Middle School Mathematics: Initiating Critical Conversation*. NCTM.

### Course Performance Evaluation

Students are expected to submit all assignments on time in the manner outlined by the instructor (e.g., Blackboard, VIA, hard copy).

### Assignments and/or Examinations

The assignments across the semesters are intended to develop skills in implementing, leading, and evaluating school change in mathematics teaching and learning. All assignments are to be completed on time so that class members might benefit from the expertise and contributions of their colleagues. ***Additional details and rubrics for all assignments will be posted on Blackboard. Please review these materials.***

### Coaching Project (40%)

(NCTM NCATE 3c, 3f, 5c)

This is a Performance-Based Assessment (PBA). For this assignment, participants will plan and **videotape or audiotape** a coaching cycle (one pre-conference and one post-conference) with a classroom teacher. Participants should **not** videotape the actual lesson that is taught by the classroom teacher. In addition to writing a summary report, participants will choose

one uninterrupted clip from each conference and present these clips to a small group of their classmates. This Performance-Based Assessment will be posted to VIA for the final evaluation. Additional details for this assignment (project description & rubric) are provided at the end of the syllabus and in Blackboard/Assignments.

**Lesson Study Project (40%)**

(NCTM NCATE 3a, 3e, 3f, 4b, 4d, 4e, 5b, 5c)

This is a Performance-Based Assessment (PBA). Students will work with a small group to conduct a lesson study. This will include selecting research goals for the lesson, planning the lesson, teaching the lesson (by at least one person in the team), and reviewing artifacts from the lesson. This Performance-Based Assessment will be posted to VIA for the final evaluation. Additional details for this assignment (project description & rubric) are provided at the end of the syllabus and in Blackboard/Assignments.

**Reading, Participation, Collaboration & Attendance (20%)**

Attendance: It is your responsibility to attend all class sessions. Please report your reasons for any absences to the instructor in writing.

Tardiness: It is your responsibility to be on time for each class session. Please report your reasons for any tardiness to the instructor in writing.

- a) A commitment to participation in class discussions and course depends heavily and primarily on the regular attendance and participation of all involved. Participation will include taking part in discussions informed by critical reading and thinking, leading discussions about selected mathematics problems, and sharing with the class the products of various writing, reflection, lesson planning, and field experience assignments. The expectations, demands, and workload of this course are professional and high.
- b) A commitment to reading reflectively and critically the assigned readings. The readings will be used to provide a framework and coherent theme to the course content. They have been selected to introduce themes in curricular development as well as research and critical commentary on mathematics curriculum.

ELEMENT	LEVEL OF PERFORMANCE			
	<i>Distinguished</i> (10 points)	<i>Proficient</i> (7 - 9 points)	<i>Basic</i> (5 - 6 points)	<i>Unsatisfactory</i> (0 - 4 points)
<b>Attendance &amp; Participation</b>	The student attends all classes, is on time, is prepared and follows outlined procedures in case of absence.  The student actively participates and	The student attends most classes, is on time, is prepared and follows outlined procedures in case of absence.  The student makes active contributions	The student is absent for multiple classes and follows outlined procedures in case of absence. At times the student is not prepared for class.	The student is frequently late for class or absences are not documented by following the outlined procedures.

	continually supports the members of the learning group and the members of the class.  Presentations demonstrate a deep knowledge of content as well as implications for teaching.	to the learning group and class.  Presentations demonstrate sufficient knowledge of content as well as implications for teaching.	Presentations demonstrate minimal knowledge of content and/or implications for teaching.	The student is frequently not prepared for class and does not actively participate in discussions.  Presentations are lacking knowledge of content and connections to teaching.
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## Other Requirements

### All assignments require APA formatting:

American Psychological Association (2020). *Publication manual of the American psychological association*. Washington, DC.

Specifically, the following aspects of APA formatting should be addressed in any submission:

- a. 12 point, Times New Roman font
- b. Double spaced
- c. Page headers/Running head
- d. Cover page with title, author's name and professional affiliation
- e. References
- f. Headings
- g. Citations
- h. Clearly organized, grammatically correct, coherent and complete
- i. Professional language (i.e. no jargon)

## Grading

All assignments are to be turned in to your instructor on time. Late work will not be accepted for full credit. Assignments turned in late will receive a 10% deduction from the grade per late day or any fraction thereof (including weekends and holidays).

Coaching Project (40%)

Lesson Study Project (40%)

Reading, Participation, Collaboration & Attendance (20%)

## GRADING POLICY (Graduate Grading Scale)

A 93%-100%

B+ 87%-89%

C 70%-79%

A- 90%-92%

B 80%-86%

F Below 70%

**For Master's Degrees:**

Candidates must have a minimum GPA of 3.00 in coursework presented on the degree application, which may include no more than 6 credits of C. (Grades of C+, C-, or D do not apply to graduate courses. The GPA calculation excludes all transfer courses and Mason non-degree studies credits not formally approved for the degree).

**For Endorsement Requirements**

Candidates must have a grade of B or higher for all licensure coursework (endorsement coursework).

**Professional Dispositions**

Students are expected to exhibit professional behaviors and dispositions at all times. Education professionals are held to high standards, both inside and outside of the classroom. Educators are evaluated on their behaviors and interactions with students, parents, other professionals, and the community at large. At the College of Education and Human Development, dispositions may play a part in the discussions and assignments of any/all courses in a student's program (and thus, as part or all of the grade for those assignments). For additional information visit:

See <https://cehd.gmu.edu/students/policies-procedures/>

This course will require students to audiotape, videotape, or use the audio/video conferencing feature. Students should dress professionally, speak professionally, and be aware of their recording surroundings and backgrounds. Background noise (such as television, music, conversations, etc.) and inappropriate background video are distracting, unprofessional, and not allowed in this course.

## Class Schedule

### Reading Key

*Lesson Study = Lewis & Hurd (2011)*

*A of C = West & Cameron (2013)*

*Coaching Teams = Aguilar (2016)*

<b>Date</b>	<b>Topic(s)</b>	<b>Readings</b>	<b>Due</b>
<b>Week 1</b> 08/25  <b>Format</b> Synchronous	Course/Technology Overview  Syllabus Overview  How do you promote school change?  Principles and skills for being a math coach	<u>Key</u> <i>Lesson Study = Lewis &amp; Hurd (2011)</i>  <i>A of C = West &amp; Cameron (2013)</i>  <i>Coaching Teams = Aguilar (2016)</i>	Profile picture posted in Collaborate Ultra.
<b>Week 2</b> 9/01  <b>Format</b> Synchronous	Introduction to lesson study  Lesson Study Assignment Overview  Lesson Study Component 1 explained  Lesson Study Group Formation	<i>Lesson Study</i> 1: Why Lesson Study? 2: Lesson Study in Action (Part 1), Clips 1 and 2 3: Build a Lesson Study Group	<b>Introduction Assignment</b> (Assignments)
<b>Week 3</b> 09/08	<b>No Class; University closed in observance of Labor Day</b>		
<b>Week 4</b> 09/15  <b>Format</b> Synchronous	Conducting a research lesson Lesson Study Component 2 explained Lesson study work time	<i>Lesson Study</i>  4: Focus the Group's Inquiry  5: Conduct and Discuss the Research Lesson	<b>Lesson Study Component 1: Group Introductory Interview</b> (Assignments)
<b>Week 5</b> 09/22  <b>Format</b> Synchronous	Building a PD group to conduct a research lesson, more detail about planning Lesson Study Components 3 & 4 explained  Lesson study work time	<i>Lesson Study</i>  6: What should you expect from Lesson Study?  7: Lesson Study's Diverse Forms	<b>Lesson Study Component 2: Group Action Plan</b> (Assignments)

<p><b>Week 6</b> 09/29</p> <p><b>Format</b> Synchronous</p>	<p>Walking through a research lesson. What happens in the classroom?</p> <p>Discuss Lesson Study Presentations</p> <p>Discuss Lesson Study Individual Papers</p>	<p><i>Lesson Study</i> 8: Misconceptions, Challenges, Next Steps 9: Next Steps</p>	<p><b>Lesson Study Component 3: Individual Journal Check</b> (Assignments)</p> <p><b>Lesson Study Component 4: Group Lesson Plan</b> (Assignments)</p>
<p><b>Week 7</b> 10/06</p> <p><b>Format</b> Asynchronous</p>	<p>Challenges and opportunities for lesson study</p>	<p>OFFICE HOURS</p>	<p>(Action: Teach lesson then meet with group to reflect, debrief, and revise)</p>
<p><b>Week 8</b> 10/13</p> <p><b>Format</b> Asynchronous</p> <p><b>Fall Break</b></p>	<p><b>Per University calendar: Monday classes meet on Tuesday</b></p> <p><b>We will not meet synchronously on 10/13. All work will be asynchronous this week.</b></p>	<p>OFFICE HOURS</p>	<p>(Action: Teach lesson then meet with group to reflect, debrief, and revise)</p>
<p><b>Week 9</b> 10/20</p> <p><b>Format</b> Synchronous</p>	<p>Present Lesson Study Results to Class</p> <p>Coaching Cycle Project Overview</p>	<p><i>A of C</i> 1: What is Content Coaching? 2: Designing and Refining Coaching Initiatives 3: Roles in a Coaching Initiative</p>	<p><b>Lesson Study Component 5: Group Final Paper</b> (Assignments)</p> <p><b>Lesson Study Component 6: Individual Revised Lesson Plan</b> (Assignments)</p>
<p><b>Week 10</b> 10/27</p> <p><b>Format</b> Asynchronous</p>	<p>Introduction to content coaching</p> <p>Coaching Initiatives</p>	<p><i>A of C</i> 4: Know Thyself 5: Communication is Key 6: Assessing Teacher Development: The Starting Place for Coaching Teachers</p>	<p>(Action 1— Lesson Study: Teach revised research lesson in individual context)</p> <p>(Action 2—Coaching Cycle: Interview teacher to prep coaching plan)</p>
<p><b>Week 11</b> 11/03</p> <p><b>Format</b> Synchronous</p>	<p>Coaching Protocol: DMPMC</p> <p>How do you decide what to coach?</p>	<p><i>A of C</i> 7: The Preconference 8: Co-Teaching the Lesson 9: The Postconference</p>	<p><b>Lesson Study Component 7: Individual Reflection Paper</b> (Assignments)</p> <p>(Action: Interview teacher to prep coaching plan)</p>

<p><b>Week 12</b> 11/10</p> <p><b>Format</b> Synchronous</p>	<p>Preconference rehearsals Post conference rehearsals</p>	<p><i>Coaching Teams</i> 1: Refining A Vision 2: Knowing Ourselves as Leaders 3: Creating a Culture of Trust</p>	<p><b>Coaching Plan</b> (Assignments)</p>
<p><b>Week 13</b> 11/17</p> <p><b>Format</b> Synchronous</p>	<p>Trust &amp; Coaching Relationships Coaching Heavy VS Coaching Light</p>	<p><i>Coaching Teams</i> 4: Defining Purpose, Process, &amp; Product 5: Laying a Foundation for Trust 6: Developing the Emotional Intelligence of a Team</p>	<p><b>Entire Lesson Study Project</b> (Assessments: VIA)</p> <p>(Action: Implement Coaching Cycle: Pre-Conference, Co-Teach, Post-Conference)</p>
<p><b>Week 14</b> 11/24</p> <p><b>Format</b> Synchronous</p>	<p>Adult Learners Non-evaluative Observations</p>	<p><i>Coaching Teams</i> 7: Cultivating Healthy Communication 8: Making Good Decisions 9: Supporting Adult Learners</p>	<p>(Action: Implement Coaching Cycle: Pre-Conference, Co-Teach, Post-Conference)</p>
<p><b>Week 15</b> 12/01</p> <p><b>Format</b> Synchronous</p>	<p>Group Presentations of Video-Clips</p>	<p><i>Coaching Teams</i> 10: Orchestrating Meaningful Meetings 11: Setting the Stage for Artful Meetings</p>	<p>(Action: Implement Coaching Cycle: Pre-Conference, Co-Teach, Post-Conference)</p>
<p><b>Week 16</b> 12/08</p> <p><b>Format</b> Synchronous</p>	<p>Implementing innovations, school-wide innovation</p> <p>Agency</p>	<p><i>Coaching Teams</i> 12: Navigating Conflict 13: Assessing Organizational Conditions</p>	<p><b>Coaching Project</b> (Assessments: VIA)</p>

Note: Faculty reserves the right to alter the schedule as necessary, with notification to students.

### Core Values Commitment

The College of Education and Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles: <http://cehd.gmu.edu/values/>.

### GMU Policies and Resources for Students

#### *Policies*

- a. Students must adhere to the guidelines of the Mason Honor Code (see <https://catalog.gmu.edu/policies/honor-code-system/> ).
  - b. Students must follow the university policy for Responsible Use of Computing (see <https://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>).
  - c. Students are responsible for the content of university communications sent to their Mason email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students **solely** through their Mason email account.
  - d. Students with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (see <https://ds.gmu.edu/>).
- a. Students must silence all sound emitting devices during class unless otherwise authorized by the instructor.

### *Campus Resources*

- Support for submission of assignments to VIA should be directed to [viahelp@gmu.edu](mailto:viahelp@gmu.edu) or <https://cehd.gmu.edu/aero/assessments>. Questions or concerns regarding use of Blackboard should be directed to <https://its.gmu.edu/knowledge-base/blackboard-instructional-technology-support-for-students/>.
- For information on student support resources on campus, see <https://ctfe.gmu.edu/teaching/student-support-resources-on-campus>

### **Notice of mandatory reporting of sexual assault, interpersonal violence, and stalking:**

As a faculty member, I am designated as a “Responsible Employee,” and must report all disclosures of sexual assault, interpersonal violence, and stalking to Mason’s Title IX Coordinator per University Policy 1202. If you wish to speak with someone confidentially, please contact one of Mason’s confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-380-1434 or Counseling and Psychological Services (CAPS) at 703-993-2380. You may also seek assistance from Mason’s Title IX Coordinator by calling 703-993-8730, or emailing [titleix@gmu.edu](mailto:titleix@gmu.edu).

**For additional information on the College of Education and Human Development, please visit our website <https://cehd.gmu.edu/students/> .**

## Coaching Project Rubric

### Course Performance Based Assessment

Level/Criteria	4	3	2	1
	Exceeds Expectations	Meets Expectations	Developing	Does Not Meet Expectations
<b>COACHING PLAN</b>				
<b>BACKGROUND</b>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Plan includes a background of the teacher.</li> <li>● The background information is detailed enough to provide the reader with insight into the coaching context</li> <li>● Plan includes goals for supporting the teacher with future instruction.</li> <li>● Plan includes anticipated challenges that may emerge in coaching/assisting the teacher.</li> </ul>	<p>Three of the following elements is met:</p> <ul style="list-style-type: none"> <li>● Plan includes a background of the teacher.</li> <li>● The background information is detailed enough to provide the reader with insight into the coaching context</li> <li>● Plan includes goals for supporting the teacher with future instruction.</li> <li>● Plan includes anticipated challenges that may emerge in coaching/assisting the teacher.</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Plan includes a background of the teacher.</li> <li>● The background information is detailed enough to provide the reader with insight into the coaching context</li> <li>● Plan includes goals for supporting the teacher with future instruction.</li> <li>● Plan includes anticipated challenges that may emerge in coaching/assisting the teacher.</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>● Plan includes a background of the teacher.</li> <li>● The background information is detailed enough to provide the reader with insight into the coaching context</li> <li>● Plan includes goals for supporting the teacher with future instruction.</li> <li>● Plan includes anticipated challenges that may emerge in coaching/assisting the teacher.</li> </ul>
<p><b>STRATEGIES &amp; MISCONCEPTIONS</b></p> <p><b>NCTM Element 3c</b></p> <p>Plan lessons and units that incorporate a variety of strategies.</p> <p>Build all students' conceptual understanding and procedural proficiency in planned lessons and units.</p> <p>Include in planned lessons and units multiple opportunities and solution avenues for students to demonstrate conceptual understanding and procedural proficiency.</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Plan contains several different strategies that show multiple opportunities and solution avenues for students to demonstrate conceptual understanding and procedural proficiency.</li> <li>● Plan contains several different misconceptions.</li> <li>● Plan describes the connections between the different strategies/misconceptions using descriptions such as similarities, differences, efficiency, visual clarity, mathematical accuracy and/or precision to support students' conceptual understanding and procedural proficiency</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Plan contains several different strategies that show multiple opportunities and solution avenues for students to demonstrate conceptual understanding and procedural proficiency.</li> <li>● Plan contains several different misconceptions.</li> <li>● Plan describes the connections between the different strategies/misconceptions using descriptions such as similarities, differences, efficiency, visual clarity, mathematical accuracy and/or precision to support students' conceptual understanding and procedural proficiency</li> </ul>	<p>One of the following elements is met:</p> <ul style="list-style-type: none"> <li>● Plan contains several different strategies that show multiple opportunities and solution avenues for students to demonstrate conceptual understanding and procedural proficiency.</li> <li>● Plan contains several different misconceptions.</li> <li>● Plan describes the connections between the different strategies/misconceptions using descriptions such as similarities, differences, efficiency, visual clarity, mathematical accuracy and/or precision to support students' conceptual understanding and procedural proficiency</li> </ul>	<p>The following elements are missing or lacking in development:</p> <ul style="list-style-type: none"> <li>● Plan contains several different strategies that show multiple opportunities and solution avenues for students to demonstrate conceptual understanding and procedural proficiency.</li> <li>● Plan contains several different misconceptions.</li> <li>● Plan describes the connections between the different strategies/misconceptions using descriptions such as similarities, differences, efficiency, visual clarity, mathematical accuracy and/or precision to support students' conceptual understanding and procedural proficiency</li> </ul>

<p><b>TECHNOLOGY</b> <b>NCTM Element 3C</b></p> <p>Include mathematics-specific and instructional technologies in planned lessons and units.</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>Your choice of technology is explained regarding how it is math-specific and supports the task.</li> <li>The tool is specific to the task (ie: the geoboard on NLVM, and not simply "iPads").</li> <li>Links to the web or appstore are provided and screen captures of the tool are included.</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>Your choice of technology is explained regarding how it is math-specific and supports the task.</li> <li>The tool is specific to the task (ie: the geoboard on NLVM, and not simply "iPads").</li> <li>Links to the web or appstore are provided and screen captures of the tool are included.</li> </ul>	<p>One of the following elements is met:</p> <ul style="list-style-type: none"> <li>Your choice of technology is explained regarding how it is math-specific and supports the task.</li> <li>The tool is specific to the task (ie: the geoboard on NLVM, and not simply "iPads").</li> <li>Links to the web or appstore are provided and screen captures of the tool are included.</li> </ul>	<p>The following elements are missing or lacking in development:</p> <ul style="list-style-type: none"> <li>Your choice of technology is explained regarding how it is math-specific and supports the task.</li> <li>The tool is specific to the task (ie: the geoboard on NLVM, and not simply "iPads").</li> <li>Links to the web or appstore are provided and screen captures of the tool are included.</li> </ul>
<p><b>DIVERSE POPULATIONS</b> <b>NCTM Element 3C</b></p> <p>Plan lessons and units addressing student differences and diverse populations and how these differences influence student learning of mathematics.</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>Modifications to the lesson are provided</li> <li>Each modification is described in detail</li> <li>Modifications meet a variety of student needs.</li> <li>Explanation of each modification influences/assists the learning of mathematics.</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>Modifications to the lesson are provided</li> <li>Each modification is described in detail</li> <li>Modifications meet a variety of student needs.</li> <li>Explanation of each modification influences/assists the learning of mathematics.</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>Modifications to the lesson are provided</li> <li>Each modification is described in detail</li> <li>Modifications meet a variety of student needs.</li> <li>Explanation of each modification influences/assists the learning of mathematics.</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>Modifications to the lesson are provided</li> <li>Each modification is described in detail</li> <li>Modifications meet a variety of student needs.</li> <li>Explanation of each modification influences/assists the learning of mathematics.</li> </ul>
<b>FINAL PAPER: PRE-CONFERENCE COMPONENTS</b>				
<p><b>PRE-CONFERENCE SUMMARY</b></p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>Includes pre-conference summary.</li> <li>Includes questions about the mathematics and the teaching of the lesson.</li> <li>Includes thoughts, concerns, challenges, and expectations of the pre-conference.</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>Includes pre-conference summary.</li> <li>Includes questions about the mathematics and the teaching of the lesson.</li> <li>Includes thoughts, concerns, challenges, and expectations of the pre-conference.</li> </ul>	<p>One of the following elements is met:</p> <ul style="list-style-type: none"> <li>Includes pre-conference summary.</li> <li>Includes questions about the mathematics and the teaching of the lesson.</li> <li>Includes thoughts, concerns, challenges, and expectations of the pre-conference.</li> </ul>	<p>The following elements are missing or lacking in development:</p> <ul style="list-style-type: none"> <li>Includes pre-conference summary.</li> <li>Includes questions about the mathematics and the teaching of the lesson.</li> <li>Includes thoughts, concerns, challenges, and expectations of the pre-conference.</li> </ul>
<p><b>ASSESSMENTS</b> <b>NCTM Element 3F</b></p> <p>Plan, select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.</p> <p>Assist teachers in using formative and summative</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>Plan a formative assessment to inform instructional next steps during the post-conference.</li> <li>Connect the formative assessment to the mathematical learning goal for students.</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>Plan a formative assessment to inform instructional next steps during the post-conference.</li> <li>Connect the formative assessment to the mathematical learning goal for students.</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>Plan a formative assessment to inform instructional next steps during the post-conference.</li> <li>Connect the formative assessment to the mathematical learning goal for students.</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>Plan a formative assessment to inform instructional next steps during the post-conference.</li> <li>Connect the formative assessment to the mathematical learning goal for students.</li> </ul>

assessments addressing essential mathematical proficiencies.  Use assessment results for subsequent instructional planning.	<ul style="list-style-type: none"> <li>Describe how the formative assessment will be implemented during the lesson. Include actions from the teacher and yourself/the coach.</li> <li>Anticipate student responses from the formative assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Describe how the formative assessment will be implemented during the lesson. Include actions from the teacher and yourself/the coach.</li> <li>Anticipate student responses from the formative assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Describe how the formative assessment will be implemented during the lesson. Include actions from the teacher and yourself/the coach.</li> <li>Anticipate student responses from the formative assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Describe how the formative assessment will be implemented during the lesson. Include actions from the teacher and yourself/the coach.</li> <li>Anticipate student responses from the formative assessment.</li> </ul>
<b>FINAL PAPER: POST-CONFERENCE COMPONENTS</b>				
<b>POST-CONFERENCE SUMMARY</b>	All of the following elements are met: <ul style="list-style-type: none"> <li>Includes post-conference summary.</li> <li>Describes the lesson the teacher taught and what mathematics was part of the lesson (intended or unintended).</li> <li>Describes what kinds of questions were discussed related to the teaching of the lesson</li> <li>Describes your thoughts and concerns about what happened during the lesson.</li> </ul>	Three of the following elements are met: <ul style="list-style-type: none"> <li>Includes post-conference summary.</li> <li>Describes the lesson the teacher taught and what mathematics was part of the lesson (intended or unintended).</li> <li>Describes what kinds of questions were discussed related to the teaching of the lesson</li> <li>Describes your thoughts and concerns about what happened during the lesson.</li> </ul>	Two of the following elements are met: <ul style="list-style-type: none"> <li>Includes post-conference summary.</li> <li>Describes the lesson the teacher taught and what mathematics was part of the lesson (intended or unintended).</li> <li>Describes what kinds of questions were discussed related to the teaching of the lesson</li> <li>Describes your thoughts and concerns about what happened during the lesson.</li> </ul>	One or fewer of the following elements is met: <ul style="list-style-type: none"> <li>Includes post-conference summary.</li> <li>Describes the lesson the teacher taught and what mathematics was part of the lesson (intended or unintended).</li> <li>Describes what kinds of questions were discussed related to the teaching of the lesson</li> <li>Describes your thoughts and concerns about what happened during the lesson.</li> </ul>
<b>DATA ANALYSIS</b> <b>NCTM Element 5C</b>  Collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment data.  Determine the extent to which students' mathematical proficiencies have increased as a result of their instruction or their efforts in coaching/mentoring teachers.  Use assessment results as a basis for designing and modifying their instruction as a means to meet group and individual needs and increase student performance.	All of the following elements are met: <ul style="list-style-type: none"> <li>Collect and organize formative assessment data from the lesson.</li> <li>Analyze and reflect on formative assessment data.</li> <li>Determine the extent to which the formative assessment results connect to the mathematical learning goal for students.</li> <li>Determine instructional next steps based on the formative assessment results</li> </ul>	Three of the following elements are met: <ul style="list-style-type: none"> <li>Collect and organize formative assessment data from the lesson.</li> <li>Analyze and reflect on formative assessment data.</li> <li>Determine the extent to which the formative assessment results connect to the mathematical learning goal for students.</li> <li>Determine instructional next steps based on the formative assessment results</li> </ul>	Two of the following elements are met: <ul style="list-style-type: none"> <li>Collect and organize formative assessment data from the lesson.</li> <li>Analyze and reflect on formative assessment data.</li> <li>Determine the extent to which the formative assessment results connect to the mathematical learning goal for students.</li> <li>Determine instructional next steps based on the formative assessment results</li> </ul>	One or fewer of the following elements is met: <ul style="list-style-type: none"> <li>Collect and organize formative assessment data from the lesson.</li> <li>Analyze and reflect on formative assessment data.</li> <li>Determine the extent to which the formative assessment results connect to the mathematical learning goal for students.</li> <li>Determine instructional next steps based on the formative assessment results</li> </ul>
<b>VIDEO EVIDENCE</b>	All of the following elements are met: <ul style="list-style-type: none"> <li>A 3-5 minute video clip of the pre-conference is included</li> </ul>	Four of the following elements are met:	Two to three of the following elements are met:	One or fewer of the following elements is met:

	<ul style="list-style-type: none"> <li>● A 3-5 minute video clip of the post-conference is included</li> <li>● Discussion of why the chosen pre-conference video is included</li> <li>● Discussion of why the chosen post-conference video is included</li> <li>● Discussion of the feedback from group peers about the video clips is included</li> </ul>	<ul style="list-style-type: none"> <li>● A 3-5 minute video clip of the pre-conference is included</li> <li>● A 3-5 minute video clip of the post-conference is included</li> <li>● Discussion of why the chosen pre-conference video is included</li> <li>● Discussion of why the chosen post-conference video is included</li> <li>● Discussion of the feedback from group peers about the video clips is included</li> </ul>	<ul style="list-style-type: none"> <li>● A 3-5 minute video clip of the pre-conference is included</li> <li>● A 3-5 minute video clip of the post-conference is included</li> <li>● Discussion of why the chosen pre-conference video is included</li> <li>● Discussion of why the chosen post-conference video is included</li> <li>● Discussion of the feedback from group peers about the video clips is included</li> </ul>	<ul style="list-style-type: none"> <li>● A 3-5 minute video clip of the pre-conference is included</li> <li>● A 3-5 minute video clip of the post-conference is included</li> <li>● Discussion of why the chosen pre-conference video is included</li> <li>● Discussion of why the chosen post-conference video is included</li> <li>● Discussion of the feedback from group peers about the video clips is included</li> </ul>
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**FINAL PAPER: APA FORMATTING**

<b>PAPER ORGANIZATION</b>	<p>The paper organization includes all of the following:</p> <ul style="list-style-type: none"> <li>● A cover page with title, author's name, and professional affiliation</li> <li>● The paper is well-organized, grammatically correct, coherent, and complete.</li> <li>● The paper has distinctive focus and voice.</li> <li>● The paper uses professional language (i.e., no jargon).</li> <li>● The paper is presented in an accessible style.</li> <li>● The paper meets APA formatting guidelines.</li> </ul>	<p>The paper organization includes five of the following:</p> <ul style="list-style-type: none"> <li>● A cover page with title, author's name, and professional affiliation</li> <li>● The paper is well-organized, grammatically correct, coherent, and complete.</li> <li>● The paper has distinctive focus and voice.</li> <li>● The paper uses professional language (i.e., no jargon).</li> <li>● The paper is presented in an accessible style.</li> <li>● The paper meets APA formatting guidelines.</li> </ul>	<p>The paper organization includes four of the following:</p> <ul style="list-style-type: none"> <li>● A cover page with title, author's name, and professional affiliation</li> <li>● The paper is well-organized, grammatically correct, coherent, and complete.</li> <li>● The paper has distinctive focus and voice.</li> <li>● The paper uses professional language (i.e., no jargon).</li> <li>● The paper is presented in an accessible style.</li> <li>● The paper meets APA formatting guidelines.</li> </ul>	<p>The paper organization includes three or fewer of the following:</p> <ul style="list-style-type: none"> <li>● A cover page with title, author's name, and professional affiliation</li> <li>● The paper is well-organized, grammatically correct, coherent, and complete.</li> <li>● The paper has distinctive focus and voice.</li> <li>● The paper uses professional language (i.e., no jargon).</li> <li>● The paper is presented in an accessible style.</li> <li>● The paper meets APA formatting guidelines.</li> </ul>
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## Lesson Study Project Rubric

### Course Performance Based Assessment

Level/Criteria	4	3	2	1
	Exceeds Expectations	Meets Expectations	Developing	Does Not Meet Expectations
<b>GROUP FINAL PAPER</b>				
<b>Pre-planning Components (Appendices A, B, &amp; C)</b>				
<b>PRE-PLANNING DOCUMENTS</b>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Meeting notes are included (Appendix A).</li> <li>● Introductory Interview is included (Appendix B).</li> <li>● Evidence of group collaboration and task sharing</li> <li>● Documentation that all members of the group engaged in thoughtful discourse during decision-making processes.</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Meeting notes are included (Appendix A).</li> <li>● Introductory Interview is included (Appendix B).</li> <li>● Evidence of group collaboration and task sharing</li> <li>● Documentation that all members of the group engaged in thoughtful discourse during decision-making processes.</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Meeting notes are included (Appendix A).</li> <li>● Introductory Interview is included (Appendix B).</li> <li>● Evidence of group collaboration and task sharing</li> <li>● Documentation that all members of the group engaged in thoughtful discourse during decision-making processes.</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>● Meeting notes are included (Appendix A).</li> <li>● Introductory Interview is included (Appendix B).</li> <li>● Evidence of group collaboration and task sharing</li> <li>● Documentation that all members of the group engaged in thoughtful discourse during decision-making processes.</li> </ul>
<b>GOAL SETTING</b>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Action Plan is included (Appendix C).</li> <li>● Goals in the action plan include specific roles for all group members</li> <li>● Goals in the action plan include tasks that need to be completed by all group members</li> <li>● A mathematical concept goal is described</li> <li>● Pedagogical techniques and/or mathematical tasks are suggested/brainstormed to achieve mathematical concept goal</li> <li>● Resources such as websites, manipulatives, books, and/or articles are suggested/brainstormed to support achieving mathematical concept goal</li> </ul>	<p>Five of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Action Plan is included (Appendix C).</li> <li>● Goals in the action plan include specific roles for all group members</li> <li>● Goals in the action plan include tasks that need to be completed by all group members</li> <li>● A mathematical concept goal is described</li> <li>● Pedagogical techniques and/or mathematical tasks are suggested/brainstormed to achieve mathematical concept goal</li> <li>● Resources such as websites, manipulatives, books, and/or articles are suggested/brainstormed to support achieving mathematical concept goal</li> </ul>	<p>Three to four of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Action Plan is included (Appendix C).</li> <li>● Goals in the action plan include specific roles for all group members</li> <li>● Goals in the action plan include tasks that need to be completed by all group members</li> <li>● A mathematical concept goal is described</li> <li>● Pedagogical techniques and/or mathematical tasks are suggested/brainstormed to achieve mathematical concept goal</li> <li>● Resources such as websites, manipulatives, books, and/or articles are suggested/brainstormed to support achieving mathematical concept goal</li> </ul>	<p>Two or fewer of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Action Plan is included (Appendix C).</li> <li>● Goals in the action plan include specific roles for all group members</li> <li>● Goals in the action plan include tasks that need to be completed by all group members</li> <li>● A mathematical concept goal is described</li> <li>● Pedagogical techniques and/or mathematical tasks are suggested/brainstormed to achieve mathematical concept goal</li> <li>● Resources such as websites, manipulatives, books, and/or articles are suggested/brainstormed to support achieving mathematical concept goal</li> </ul>
<b>Lesson Plan (Appendix D)</b>				

<p><b>CURRICULUM STANDARDS</b></p> <p><b>NCTM Element 3A</b></p> <p>Apply knowledge of mathematics curriculum standards for elementary within and across mathematical domains.</p> <p>Relate mathematics curriculum standards to student learning.</p>	<p>All of the following elements are met:</p> <p>The lesson includes:</p> <ul style="list-style-type: none"> <li>● grade level</li> <li>● major concept</li> <li>● objective/goals</li> <li>● VA SOL's</li> <li>● NCTM process standards</li> <li>● CCSS</li> <li>● prerequisite knowledge</li> <li>● Resources to support the lesson (books, websites, articles or other materials)</li> </ul>	<p>Seven of the following elements are met:</p> <p>The lesson includes:</p> <ul style="list-style-type: none"> <li>● grade level</li> <li>● major concept</li> <li>● objective/goals</li> <li>● VA SOL's</li> <li>● NCTM process standards</li> <li>● CCSS</li> <li>● prerequisite knowledge</li> <li>● Resources to support the lesson (books, websites, articles or other materials)</li> </ul>	<p>Five to six of the following elements are met:</p> <p>The lesson includes:</p> <ul style="list-style-type: none"> <li>● grade level</li> <li>● major concept</li> <li>● objective/goals</li> <li>● VA SOL's</li> <li>● NCTM process standards</li> <li>● CCSS</li> <li>● prerequisite knowledge</li> <li>● Resources to support the lesson (books, websites, articles or other materials)</li> </ul>	<p>Four or fewer of the following elements are met:</p> <p>The lesson includes:</p> <ul style="list-style-type: none"> <li>● grade level</li> <li>● major concept</li> <li>● objective/goals</li> <li>● VA SOL's</li> <li>● NCTM process standards</li> <li>● CCSS</li> <li>● prerequisite knowledge</li> <li>● Resources to support the lesson (books, websites, articles or other materials)</li> </ul>
<p><b>PROGRESSIONS &amp; DIFFERENTIATION</b></p> <p><b>NCTM Element 3A</b></p> <p>Demonstrate how mathematics curriculum standards and learning progressions impact the teaching of elementary students at different developmental levels and coaching/mentoring elementary classroom teachers.</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Plan identifies the grade level standard (VA SOL &amp; CCSS)</li> <li>● Plan identifies at least two other grade level standards (VA SOL &amp; CCSS), such as one grade above, one grade below.</li> <li>● Plan describes the progression and vertical alignment of the standards.</li> <li>● Plan describes how students at different developmental levels could enter/access this lesson within the progressions and vertical alignment of these standards.</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Plan identifies the grade level standard (VA SOL &amp; CCSS)</li> <li>● Plan identifies at least two other grade level standards (VA SOL &amp; CCSS), such as one grade above, one grade below.</li> <li>● Plan describes the progression and vertical alignment of the standards.</li> <li>● Plan describes how students at different developmental levels could enter/access this lesson within the progressions and vertical alignment of these standards.</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Plan identifies the grade level standard (VA SOL &amp; CCSS)</li> <li>● Plan identifies at least two other grade level standards (VA SOL &amp; CCSS), such as one grade above, one grade below.</li> <li>● Plan describes the progression and vertical alignment of the standards.</li> <li>● Plan describes how students at different developmental levels could enter/access this lesson within the progressions and vertical alignment of these standards.</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>● Plan identifies the grade level standard (VA SOL &amp; CCSS)</li> <li>● Plan identifies at least two other grade level standards (VA SOL &amp; CCSS), such as one grade above, one grade below.</li> <li>● Plan describes the progression and vertical alignment of the standards.</li> <li>● Plan describes how students at different developmental levels could enter/access this lesson within the progressions and vertical alignment of these standards.</li> </ul>
<p><b>LEARNING SEQUENCE</b></p> <p><b>NCTM Element 4B</b></p> <p>Plan and create sequential learning opportunities in which students connect new learning to prior knowledge and experiences.</p> <p>Create a sequence of developmentally appropriate and challenging learning opportunities grounded in mathematics education research in which students are actively engaged in building new knowledge.</p> <p>Create a developmentally appropriate and challenging sequence of</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Learning sequence of mathematical concepts is outlined.</li> <li>● The outline highlights how the lesson connects to prior knowledge and experiences.</li> <li>● The outline highlights how the lesson connects to future instructional knowledge and experiences.</li> <li>● The lesson's contribution within the learning sequence is explained</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Learning sequence of mathematical concepts is outlined.</li> <li>● The outline highlights how the lesson connects to prior knowledge and experiences.</li> <li>● The outline highlights how the lesson connects to future instructional knowledge and experiences.</li> <li>● The lesson's contribution within the learning sequence is explained</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Learning sequence of mathematical concepts is outlined.</li> <li>● The outline highlights how the lesson connects to prior knowledge and experiences.</li> <li>● The outline highlights how the lesson connects to future instructional knowledge and experiences.</li> <li>● The lesson's contribution within the learning sequence is explained</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>● Learning sequence of mathematical concepts is outlined.</li> <li>● The outline highlights how the lesson connects to prior knowledge and experiences.</li> <li>● The outline highlights how the lesson connects to future instructional knowledge and experiences.</li> <li>● The lesson's contribution within the learning sequence is explained</li> </ul>

instruction for all students that shows a progression of learning over time toward proficiency and understanding.				
<p><b>TASK</b></p> <p><b>NCTM Element 3E</b></p> <p>Implement and promote techniques for actively engaging students in learning and doing mathematics.</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>• The task implements and promotes techniques for actively engaging students.</li> <li>• The task implements and promotes techniques centered on the learning and doing of mathematics.</li> <li>• The task has an intended high-level of cognitive demand.</li> <li>• The intended cognitive demand is explained.</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>• The task implements and promotes techniques for actively engaging students.</li> <li>• The task implements and promotes techniques centered on the learning and doing of mathematics.</li> <li>• The task has an intended high-level of cognitive demand.</li> <li>• The intended cognitive demand is explained.</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>• The task implements and promotes techniques for actively engaging students.</li> <li>• The task implements and promotes techniques centered on the learning and doing of mathematics.</li> <li>• The task has an intended high-level of cognitive demand.</li> <li>• The intended cognitive demand is explained.</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>• The task implements and promotes techniques for actively engaging students.</li> <li>• The task implements and promotes techniques centered on the learning and doing of mathematics.</li> <li>• The task has an intended high-level of cognitive demand.</li> <li>• The intended cognitive demand is explained.</li> </ul>
<p><b>QUESTIONS</b></p> <p><b>NCTM Element 3E</b></p> <p>Provide instruction that incorporates high quality tasks and a range of questioning strategies.</p> <p>Guide productive mathematical discussions in classrooms centered on key mathematical ideas.</p> <p>Select and apply instructional techniques that assist in identifying and addressing student misconceptions.</p> <p>Engage students and teachers in communicating about mathematics.</p> <p>Use students' misconceptions as opportunities for learning.</p>	<p>All of the following elements are met:</p> <p>Plan contains:</p> <ul style="list-style-type: none"> <li>• Key questions to maintain rigor</li> <li>• Anticipated student responses to questions that maintain rigor</li> <li>• Key questions that address misconceptions</li> <li>• Anticipated student responses to questions that address misconceptions</li> <li>• Description of how misconceptions might be used for learning opportunities</li> </ul> <p>The questions:</p> <ul style="list-style-type: none"> <li>• Guide productive mathematical discussions centered on key mathematical ideas</li> <li>• Engage students in communicating about mathematics.</li> </ul>	<p>Six of the following elements are met:</p> <p>Plan contains:</p> <ul style="list-style-type: none"> <li>• Key questions to maintain rigor</li> <li>• Anticipated student responses to questions that maintain rigor</li> <li>• Key questions that address misconceptions</li> <li>• Anticipated student responses to questions that address misconceptions</li> <li>• Description of how misconceptions might be used for learning opportunities</li> </ul> <p>The questions:</p> <ul style="list-style-type: none"> <li>• Guide productive mathematical discussions centered on key mathematical ideas</li> <li>• Engage students in communicating about mathematics.</li> </ul>	<p>Four to five of the following elements are met:</p> <p>Plan contains:</p> <ul style="list-style-type: none"> <li>• Key questions to maintain rigor</li> <li>• Anticipated student responses to questions that maintain rigor</li> <li>• Key questions that address misconceptions</li> <li>• Anticipated student responses to questions that address misconceptions</li> <li>• Description of how misconceptions might be used for learning opportunities</li> </ul> <p>The questions:</p> <ul style="list-style-type: none"> <li>• Guide productive mathematical discussions centered on key mathematical ideas</li> <li>• Engage students in communicating about mathematics.</li> </ul>	<p>Three or fewer of the following elements are met:</p> <p>Plan contains:</p> <ul style="list-style-type: none"> <li>• Key questions to maintain rigor</li> <li>• Anticipated student responses to questions that maintain rigor</li> <li>• Key questions that address misconceptions</li> <li>• Anticipated student responses to questions that address misconceptions</li> <li>• Description of how misconceptions might be used for learning opportunities</li> </ul> <p>The questions:</p> <ul style="list-style-type: none"> <li>• Guide productive mathematical discussions centered on key mathematical ideas</li> <li>• Engage students in communicating about mathematics.</li> </ul>
<p><b>MATHEMATICAL TOOLS</b></p> <p><b>NCTM Element 4E</b></p> <p>Apply mathematical content and pedagogical knowledge to select and use instructional tools such as manipulatives</p>	<p>All of the following elements are met:</p> <p>The plan:</p> <ul style="list-style-type: none"> <li>• Uses manipulatives, physical models, drawings, virtual environments, spreadsheets, presentation tools, and/or</li> </ul>	<p>Two of the following elements are met:</p> <p>The plan:</p> <ul style="list-style-type: none"> <li>• Uses manipulatives, physical models, drawings, virtual environments, spreadsheets, presentation tools, and/or</li> </ul>	<p>One of the following elements is met:</p> <p>The plan:</p> <ul style="list-style-type: none"> <li>• Uses manipulatives, physical models, drawings, virtual environments, spreadsheets, presentation</li> </ul>	<p>The following elements are missing or lacking in development:</p> <p>The plan:</p> <ul style="list-style-type: none"> <li>• Uses manipulatives, physical models, drawings, virtual environments,</li> </ul>

<p>and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies.</p> <p>Make and nurture sound decisions about when instructional tools enhance teaching and learning and recognize both the insights to be gained and possible limitations of such tools.</p>	<p>mathematics-specific technologies)</p> <ul style="list-style-type: none"> <li>• Describes how each instructional tool enhances the learning</li> <li>• Describes possible limitations of each tool</li> </ul>	<p>mathematics-specific technologies)</p> <ul style="list-style-type: none"> <li>• Describes how each instructional tool enhances the learning</li> <li>• Describes possible limitations of each tool</li> </ul>	<p>tools, and/or mathematics-specific technologies)</p> <ul style="list-style-type: none"> <li>• Describes how each instructional tool enhances the learning</li> <li>• Describes possible limitations of each tool</li> </ul>	<p>spreadsheets, presentation tools, and/or mathematics-specific technologies)</p> <ul style="list-style-type: none"> <li>• Describes how each instructional tool enhances the learning</li> <li>• Describes possible limitations of each tool</li> </ul>
<p><b>TECHNOLOGY</b> <b>NCTM Element 5B</b></p> <p>Engage students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge.</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>• A technology tool is identified.</li> <li>• The technology tool is described.</li> <li>• The description of the technology tool includes how students will interact with it.</li> <li>• The technology tool is further explained regarding how it will enhance student learning</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>• A technology tool is identified.</li> <li>• The technology tool is described.</li> <li>• The description of the technology tool includes how students will interact with it.</li> <li>• The technology tool is further explained regarding how it will enhance student learning</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>• A technology tool is identified.</li> <li>• The technology tool is described.</li> <li>• The description of the technology tool includes how students will interact with it.</li> <li>• The technology tool is further explained regarding how it will enhance student learning</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>• A technology tool is identified.</li> <li>• The technology tool is described.</li> <li>• The description of the technology tool includes how students will interact with it.</li> <li>• The technology tool is further explained regarding how it will enhance student learning</li> </ul>
<p><b>ASSESSMENTS</b> <b>NCTM Element 3F</b></p> <p>Plan, select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.</p> <p>Use assessment results for subsequent instructional planning.</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>• Plan includes a formative assessment to inform instructional next steps.</li> <li>• The plan connects the formative assessment to the mathematical learning goal for students.</li> <li>• The plan describes how the formative assessment will be implemented during the lesson.</li> <li>• The plan anticipates student responses from the formative assessment.</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>• Plan includes a formative assessment to inform instructional next steps.</li> <li>• The plan connects the formative assessment to the mathematical learning goal for students.</li> <li>• The plan describes how the formative assessment will be implemented during the lesson.</li> <li>• The plan anticipates student responses from the formative assessment.</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>• Plan includes a formative assessment to inform instructional next steps.</li> <li>• The plan connects the formative assessment to the mathematical learning goal for students.</li> <li>• The plan describes how the formative assessment will be implemented during the lesson.</li> <li>• The plan anticipates student responses from the formative assessment.</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>• Plan includes a formative assessment to inform instructional next steps.</li> <li>• The plan connects the formative assessment to the mathematical learning goal for students.</li> <li>• The plan describes how the formative assessment will be implemented during the lesson.</li> <li>• The plan anticipates student responses from the formative assessment.</li> </ul>
<p><b>EQUITABLE TEACHING</b> <b>NCTM Element 4D</b></p> <p>Demonstrate and encourage equitable and ethical treatment of all students.</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>• Modifications to the lesson are provided.</li> <li>• Each modification is described in detail.</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>• Modifications to the lesson are provided.</li> <li>• Each modification is described in detail.</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>• Modifications to the lesson are provided.</li> <li>• Each modification is described in detail.</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>• Modifications to the lesson are provided.</li> <li>• Each modification is described in detail.</li> </ul>

<p>Have high expectations for all students and persist in helping each student reach his/her full potential.</p> <p>Demonstrate respect for and responsiveness to the cultural backgrounds and differing perspectives students bring to the classroom.</p>	<ul style="list-style-type: none"> <li>● Modifications meet a variety of student needs.</li> <li>● Explanation of each modification influences/assists the learning of mathematics.</li> </ul>	<ul style="list-style-type: none"> <li>● Modifications meet a variety of student needs.</li> <li>● Explanation of each modification influences/assists the learning of mathematics.</li> </ul>	<ul style="list-style-type: none"> <li>● Modifications meet a variety of student needs.</li> <li>● Explanation of each modification influences/assists the learning of mathematics.</li> </ul>	<ul style="list-style-type: none"> <li>● Modifications meet a variety of student needs.</li> <li>● Explanation of each modification influences/assists the learning of mathematics.</li> </ul>
<b>Group Final Paper Reflections (Main text of paper)</b>				
<p><b>LESSON STUDY ROLES AND GOALS</b></p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Describes the role of each person within the lesson study group</li> <li>● Summarizes the research themes for your group</li> <li>● Explains the rationale for the research goals</li> <li>● Summarizes the lesson your group implemented</li> <li>● Summarizes how the lesson meets the research goals.</li> </ul>	<p>Four of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Describes the role of each person within the lesson study group</li> <li>● Summarizes the research themes for your group</li> <li>● Explains the rationale for the research goals</li> <li>● Summarizes the lesson your group implemented</li> <li>● Summarizes how the lesson meets the research goals.</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Describes the role of each person within the lesson study group</li> <li>● Summarizes the research themes for your group</li> <li>● Explains the rationale for the research goals</li> <li>● Summarizes the lesson your group implemented</li> <li>● Summarizes how the lesson meets the research goals.</li> </ul>	<p>Two or fewer of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Describes the role of each person within the lesson study group</li> <li>● Summarizes the research themes for your group</li> <li>● Explains the rationale for the research goals</li> <li>● Summarizes the lesson your group implemented</li> <li>● Summarizes how the lesson meets the research goals.</li> </ul>
<p><b>DATA ANALYSIS NCTM Element 5C</b></p> <p>Collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment data.</p> <p>Determine the extent to which students' mathematical proficiencies have increased as a result of their instruction or their efforts in coaching/mentoring teachers.</p> <p>Use assessment results as a basis for designing and modifying their instruction as a means to meet group and individual needs and increase student performance.</p>	<p>All of the following elements are met:</p> <p>Reflection includes:</p> <ul style="list-style-type: none"> <li>● 2-3 Student work samples</li> <li>● Analysis of student work samples</li> <li>● Description of how the student work samples connect to the mathematical learning goals of the lesson</li> <li>● Discussion of modifications to the lesson based on student needs as determined by the lesson's assessment results</li> <li>● Discussion of instructional next steps informed by the student work samples</li> </ul>	<p>Four of the following elements are met:</p> <p>Reflection includes:</p> <ul style="list-style-type: none"> <li>● 2-3 Student work samples</li> <li>● Analysis of student work samples</li> <li>● Description of how the student work samples connect to the mathematical learning goals of the lesson</li> <li>● Discussion of modifications to the lesson based on student needs as determined by the lesson's assessment results</li> <li>● Discussion of instructional next steps informed by the student work samples</li> </ul>	<p>Three of the following elements are met:</p> <p>Reflection includes:</p> <ul style="list-style-type: none"> <li>● 2-3 Student work samples</li> <li>● Analysis of student work samples</li> <li>● Description of how the student work samples connect to the mathematical learning goals of the lesson</li> <li>● Discussion of modifications to the lesson based on student needs as determined by the lesson's assessment results</li> <li>● Discussion of instructional next steps informed by the student work samples</li> </ul>	<p>Two or fewer of the following elements are met:</p> <p>Reflection includes:</p> <ul style="list-style-type: none"> <li>● 2-3 Student work samples</li> <li>● Analysis of student work samples</li> <li>● Description of how the student work samples connect to the mathematical learning goals of the lesson</li> <li>● Discussion of modifications to the lesson based on student needs as determined by the lesson's assessment results</li> <li>● Discussion of instructional next steps informed by the student work samples</li> </ul>
<p><b>LESSON REFLECTION - PROBLEM SOLVING NCTM Element 5B</b></p> <p>Facilitate students' ability to develop future</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Evidence that students were expected to communicate their problem-solving strategies</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Evidence that students were expected to communicate their problem-solving strategies</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Evidence that students were expected to communicate their problem-solving strategies</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>● Evidence that students were expected to communicate their problem-solving strategies</li> </ul>

inquiries based on current analyses.	<ul style="list-style-type: none"> <li>• Discussion about instructional choices that facilitated students' ability to solve the task</li> <li>• Evidence that students were engaged in inquiry</li> <li>• Discussion of how learning activities could be improved to further promote students' inquiry</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion about instructional choices that facilitated students' ability to solve the task</li> <li>• Evidence that students were engaged in inquiry</li> <li>• Discussion of how learning activities could be improved to further promote students' inquiry</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion about instructional choices that facilitated students' ability to solve the task</li> <li>• Evidence that students were engaged in inquiry</li> <li>• Discussion of how learning activities could be improved to further promote students' inquiry</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion about instructional choices that facilitated students' ability to solve the task</li> <li>• Evidence that students were engaged in inquiry</li> <li>• Discussion of how learning activities could be improved to further promote students' inquiry</li> </ul>
<b>LESSON REFLECTION - JUSTIFICATION</b>  <b>NCTM Element 5B</b>  Engage students in developmentally appropriate mathematical activities and investigations that require active engagement in building new knowledge.	All of the following elements are met: <ul style="list-style-type: none"> <li>• Discussion of how the students were engaged in developmentally appropriate mathematical activities</li> <li>• Discussion of how the learning activities could be improved to further promote student engagement in developmentally appropriate mathematical activities</li> <li>• Discussion of which mathematical activities within the lesson promoted active engagement in building new knowledge</li> <li>• Discussion of how the learning activities could be improved to further promote active engagement in building new knowledge</li> </ul>	Three of the following elements are met: <ul style="list-style-type: none"> <li>• Discussion of how the students were engaged in developmentally appropriate mathematical activities</li> <li>• Discussion of how the learning activities could be improved to further promote student engagement in developmentally appropriate mathematical activities</li> <li>• Discussion of which mathematical activities within the lesson promoted active engagement in building new knowledge</li> <li>• Discussion of how the learning activities could be improved to further promote active engagement in building new knowledge</li> </ul>	Two of the following elements are met: <ul style="list-style-type: none"> <li>• Discussion of how the students were engaged in developmentally appropriate mathematical activities</li> <li>• Discussion of how the learning activities could be improved to further promote student engagement in developmentally appropriate mathematical activities</li> <li>• Discussion of which mathematical activities within the lesson promoted active engagement in building new knowledge</li> <li>• Discussion of how the learning activities could be improved to further promote active engagement in building new knowledge</li> </ul>	One or fewer of the following elements is met: <ul style="list-style-type: none"> <li>• Discussion of how the students were engaged in developmentally appropriate mathematical activities</li> <li>• Discussion of how the learning activities could be improved to further promote student engagement in developmentally appropriate mathematical activities</li> <li>• Discussion of which mathematical activities within the lesson promoted active engagement in building new knowledge</li> <li>• Discussion of how the learning activities could be improved to further promote active engagement in building new knowledge</li> </ul>
<b>GROUP REFLECTION</b>	All of the following elements are met: <ul style="list-style-type: none"> <li>• Reflection about what the lesson study group members learned as a whole</li> <li>• Summary of lesson revisions (focused on mathematical task, inquiry, representations, discourse, etc. rather than specific context revisions)</li> <li>• Discussion of insights and/or questions about the lesson study process</li> <li>• Description of how this experience may transfer to math specialist positions</li> </ul>	Three of the following elements are met: <ul style="list-style-type: none"> <li>• Reflection about what the lesson study group members learned as a whole</li> <li>• Summary of lesson revisions (focused on mathematical task, inquiry, representations, discourse, etc. rather than specific context revisions)</li> <li>• Discussion of insights and/or questions about the lesson study process</li> <li>• Description of how this experience may transfer to math specialist positions</li> </ul>	Two of the following elements are met: <ul style="list-style-type: none"> <li>• Reflection about what the lesson study group members learned as a whole</li> <li>• Summary of lesson revisions (focused on mathematical task, inquiry, representations, discourse, etc. rather than specific context revisions)</li> <li>• Discussion of insights and/or questions about the lesson study process</li> <li>• Description of how this experience may transfer to math specialist positions</li> </ul>	One or fewer of the following elements is met: <ul style="list-style-type: none"> <li>• Reflection about what the lesson study group members learned as a whole</li> <li>• Summary of lesson revisions (focused on mathematical task, inquiry, representations, discourse, etc. rather than specific context revisions)</li> <li>• Discussion of insights and/or questions about the lesson study process</li> <li>• Description of how this experience may transfer to math specialist positions</li> </ul>
<b>PAPER ORGANIZATION</b>	The paper organization includes all of the following:	The paper organization includes five of the following:	The paper organization includes four of the following:	The paper organization includes three or fewer of the following:

	<ul style="list-style-type: none"> <li>• A cover page with title, author’s name, and professional affiliation</li> <li>• The paper is well-organized, grammatically correct, coherent, and complete.</li> <li>• The paper has distinctive focus and voice.</li> <li>• The paper uses professional language (i.e., no jargon).</li> <li>• The paper is presented in an accessible style.</li> <li>• The paper meets APA formatting guidelines.</li> </ul>	<ul style="list-style-type: none"> <li>• A cover page with title, author’s name, and professional affiliation</li> <li>• The paper is well-organized, grammatically correct, coherent, and complete.</li> <li>• The paper has distinctive focus and voice.</li> <li>• The paper uses professional language (i.e., no jargon).</li> <li>• The paper is presented in an accessible style.</li> <li>• The paper meets APA formatting guidelines.</li> </ul>	<ul style="list-style-type: none"> <li>• A cover page with title, author’s name, and professional affiliation</li> <li>• The paper is well-organized, grammatically correct, coherent, and complete.</li> <li>• The paper has distinctive focus and voice.</li> <li>• The paper uses professional language (i.e., no jargon).</li> <li>• The paper is presented in an accessible style.</li> <li>• The paper meets APA formatting guidelines.</li> </ul>	<ul style="list-style-type: none"> <li>• A cover page with title, author’s name, and professional affiliation</li> <li>• The paper is well-organized, grammatically correct, coherent, and complete.</li> <li>• The paper has distinctive focus and voice.</li> <li>• The paper uses professional language (i.e., no jargon).</li> <li>• The paper is presented in an accessible style.</li> <li>• The paper meets APA formatting guidelines.</li> </ul>
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**Individual Reflection Paper**

<b>REVISED RESEARCH LESSON: OVERVIEW &amp; IMPLEMENTATION</b>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>• Identification of the research goal(s) for the lesson</li> <li>• Summary of the initial (group) implementation</li> </ul> <p>Discussion of:</p> <ul style="list-style-type: none"> <li>• Student engagement in mathematical inquiry, task, discourse, and/or problem-solving</li> <li>• Connection between student engagement and research goals</li> <li>• Differences between the first (group) lesson implementation and the revised lesson’s implementation</li> </ul>	<p>Four of the following elements are met:</p> <ul style="list-style-type: none"> <li>• Description of the research lesson’s goals</li> <li>• Explains the rationale for the research goals</li> <li>• Summarizes how the lesson meets the research goals</li> <li>• Discussion of similarities and differences between the first lesson’s goals and the revised lesson’s goal</li> </ul>	<p>Three to two of the following elements are met:</p> <ul style="list-style-type: none"> <li>• Description of the research lesson’s goals</li> <li>• Explains the rationale for the research goals</li> <li>• Summarizes how the lesson meets the research goals</li> <li>• Discussion of similarities and differences between the first lesson’s goals and the revised lesson’s goal</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>• Description of the research lesson’s goals</li> <li>• Explains the rationale for the research goals</li> <li>• Summarizes how the lesson meets the research goals</li> <li>• Discussion of similarities and differences between the first lesson’s goals and the revised lesson’s goal</li> </ul>
<b>REVISED RESEARCH LESSON: REFLECTION &amp; NEXT STEPS</b>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>• Discussion about what you learned through implementing this specific revised research lesson</li> <li>• Discussion of next steps for instruction based on this lesson’s implementation</li> <li>• Discussion about what you learned in implementing the entire lesson study cycle</li> <li>• Description of how this experience may transfer to math specialist positions</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>• Discussion about what you learned through implementing this specific revised research lesson</li> <li>• Discussion of next steps for instruction based on this lesson’s implementation</li> <li>• Discussion about what you learned in implementing the entire lesson study cycle</li> <li>• Description of how this experience may transfer to math specialist positions</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>• Discussion about what you learned through implementing this specific revised research lesson</li> <li>• Discussion of next steps for instruction based on this lesson’s implementation</li> <li>• Discussion about what you learned in implementing the entire lesson study cycle</li> <li>• Description of how this experience may transfer to math specialist positions</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>• Discussion about what you learned through implementing this specific revised research lesson</li> <li>• Discussion of next steps for instruction based on this lesson’s implementation</li> <li>• Discussion about what you learned in implementing the entire lesson study cycle</li> <li>• Description of how this experience may transfer to math specialist positions</li> </ul>

<p><b>COACHING REFLECTION</b></p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>Kept a detailed journal of coaching actions (Appendix B)</li> <li>Journal (Appendix B) includes discussion of assessment, sequencing, tools, technology, and/or investigation</li> <li>Reflection highlights specific moves or contributions to coaching peers in assessment, sequencing, tools, technology, and/or investigation</li> <li>Reflection discusses missed coaching opportunities and/or desired future coaching follow-up</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>Kept a detailed journal of coaching actions (Appendix B)</li> <li>Journal (Appendix B) includes discussion of assessment, sequencing, tools, technology, and/or investigation</li> <li>Reflection highlights specific moves or contributions to coaching peers in assessment, sequencing, tools, technology, and/or investigation</li> <li>Reflection discusses missed coaching opportunities and/or desired future coaching follow-up</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>Kept a detailed journal of coaching actions (Appendix B)</li> <li>Journal (Appendix B) includes discussion of assessment, sequencing, tools, technology, and/or investigation</li> <li>Reflection highlights specific moves or contributions to coaching peers in assessment, sequencing, tools, technology, and/or investigation</li> <li>Reflection discusses missed coaching opportunities and/or desired future coaching follow-up</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>Kept a detailed journal of coaching actions (Appendix B)</li> <li>Journal (Appendix B) includes discussion of assessment, sequencing, tools, technology, and/or investigation</li> <li>Reflection highlights specific moves or contributions to coaching peers in assessment, sequencing, tools, technology, and/or investigation</li> <li>Reflection discusses missed coaching opportunities and/or desired future coaching follow-up</li> </ul>
<p><b>PAPER ORGANIZATION</b></p>	<p>The paper organization includes all of the following:</p> <ul style="list-style-type: none"> <li>A cover page with title, author's name, and professional affiliation</li> <li>The paper is well-organized, grammatically correct, coherent, and complete.</li> <li>The paper has distinctive focus and voice.</li> <li>The paper uses professional language (i.e., no jargon).</li> <li>The paper is presented in an accessible style.</li> <li>The paper meets APA formatting guidelines.</li> </ul>	<p>The paper organization includes five of the following:</p> <ul style="list-style-type: none"> <li>A cover page with title, author's name, and professional affiliation</li> <li>The paper is well-organized, grammatically correct, coherent, and complete.</li> <li>The paper has distinctive focus and voice.</li> <li>The paper uses professional language (i.e., no jargon).</li> <li>The paper is presented in an accessible style.</li> <li>The paper meets APA formatting guidelines.</li> </ul>	<p>The paper organization includes four of the following:</p> <ul style="list-style-type: none"> <li>A cover page with title, author's name, and professional affiliation</li> <li>The paper is well-organized, grammatically correct, coherent, and complete.</li> <li>The paper has distinctive focus and voice.</li> <li>The paper uses professional language (i.e., no jargon).</li> <li>The paper is presented in an accessible style.</li> <li>The paper meets APA formatting guidelines.</li> </ul>	<p>The paper organization includes three or fewer of the following:</p> <ul style="list-style-type: none"> <li>A cover page with title, author's name, and professional affiliation</li> <li>The paper is well-organized, grammatically correct, coherent, and complete.</li> <li>The paper has distinctive focus and voice.</li> <li>The paper uses professional language (i.e., no jargon).</li> <li>The paper is presented in an accessible style.</li> <li>The paper meets APA formatting guidelines.</li> </ul>
<p><b>Revised Lesson Plan (Appendix A)</b></p>				
<p><b>CURRICULUM STANDARDS</b></p> <p><b>NCTM Element 3A</b></p> <p>Apply knowledge of mathematics curriculum standards for elementary within and across mathematical domains.</p> <p>Relate mathematics curriculum standards to student learning.</p>	<p>All of the following elements are met:</p> <p>The lesson includes:</p> <ul style="list-style-type: none"> <li>grade level</li> <li>major concept</li> <li>objective/goals</li> <li>VA SOL's</li> <li>NCTM process standards</li> <li>CCSS</li> <li>prerequisite knowledge</li> </ul>	<p>Seven of the following elements are met:</p> <p>The lesson includes:</p> <ul style="list-style-type: none"> <li>grade level</li> <li>major concept</li> <li>objective/goals</li> <li>VA SOL's</li> <li>NCTM process standards</li> <li>CCSS</li> <li>prerequisite knowledge</li> </ul>	<p>Five to six of the following elements are met:</p> <p>The lesson includes:</p> <ul style="list-style-type: none"> <li>grade level</li> <li>major concept</li> <li>objective/goals</li> <li>VA SOL's</li> <li>NCTM process standards</li> <li>CCSS</li> <li>prerequisite knowledge</li> </ul>	<p>Four or fewer of the following elements are met:</p> <p>The lesson includes:</p> <ul style="list-style-type: none"> <li>grade level</li> <li>major concept</li> <li>objective/goals</li> <li>VA SOL's</li> <li>NCTM process standards</li> <li>CCSS</li> <li>prerequisite knowledge</li> </ul>

	● Resources to support the lesson (books, websites, articles or other materials)	● Resources to support the lesson (books, websites, articles or other materials)	● Resources to support the lesson (books, websites, articles or other materials)	● Resources to support the lesson (books, websites, articles or other materials)
<p><b>PROGRESSIONS &amp; DIFFERENTIATION</b></p> <p><b>NCTM Element 3A</b></p> <p>Demonstrate how mathematics curriculum standards and learning progressions impact the teaching of elementary students at different developmental levels and coaching/mentoring elementary classroom teachers.</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Plan identifies the grade level standard (VA SOL &amp; CCSS)</li> <li>● Plan identifies at least two other grade level standards (VA SOL &amp; CCSS), such as one grade above, one grade below.</li> <li>● Plan describes the progression and vertical alignment of the standards.</li> <li>● Plan describes how students at different developmental levels could enter/access this lesson within the progressions and vertical alignment of these standards.</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Plan identifies the grade level standard (VA SOL &amp; CCSS)</li> <li>● Plan identifies at least two other grade level standards (VA SOL &amp; CCSS), such as one grade above, one grade below.</li> <li>● Plan describes the progression and vertical alignment of the standards.</li> <li>● Plan describes how students at different developmental levels could enter/access this lesson within the progressions and vertical alignment of these standards.</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Plan identifies the grade level standard (VA SOL &amp; CCSS)</li> <li>● Plan identifies at least two other grade level standards (VA SOL &amp; CCSS), such as one grade above, one grade below.</li> <li>● Plan describes the progression and vertical alignment of the standards.</li> <li>● Plan describes how students at different developmental levels could enter/access this lesson within the progressions and vertical alignment of these standards.</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>● Plan identifies the grade level standard (VA SOL &amp; CCSS)</li> <li>● Plan identifies at least two other grade level standards (VA SOL &amp; CCSS), such as one grade above, one grade below.</li> <li>● Plan describes the progression and vertical alignment of the standards.</li> <li>● Plan describes how students at different developmental levels could enter/access this lesson within the progressions and vertical alignment of these standards.</li> </ul>
<p><b>LEARNING SEQUENCE</b></p> <p><b>NCTM Element 4B</b></p> <p>Plan and create sequential learning opportunities in which students connect new learning to prior knowledge and experiences.</p> <p>Create a sequence of developmentally appropriate and challenging learning opportunities grounded in mathematics education research in which students are actively engaged in building new knowledge.</p> <p>Create a developmentally appropriate and challenging sequence of instruction for all students that shows a progression of learning over time toward proficiency and understanding.</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Learning sequence of mathematical concepts is outlined.</li> <li>● The outline highlights how the lesson connects to prior knowledge and experiences.</li> <li>● The outline highlights how the lesson connects to future instructional knowledge and experiences.</li> <li>● The lesson's contribution within the learning sequence is explained</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Learning sequence of mathematical concepts is outlined.</li> <li>● The outline highlights how the lesson connects to prior knowledge and experiences.</li> <li>● The outline highlights how the lesson connects to future instructional knowledge and experiences.</li> <li>● The lesson's contribution within the learning sequence is explained</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Learning sequence of mathematical concepts is outlined.</li> <li>● The outline highlights how the lesson connects to prior knowledge and experiences.</li> <li>● The outline highlights how the lesson connects to future instructional knowledge and experiences.</li> <li>● The lesson's contribution within the learning sequence is explained</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>● Learning sequence of mathematical concepts is outlined.</li> <li>● The outline highlights how the lesson connects to prior knowledge and experiences.</li> <li>● The outline highlights how the lesson connects to future instructional knowledge and experiences.</li> <li>● The lesson's contribution within the learning sequence is explained</li> </ul>
<p><b>TASK</b></p> <p><b>NCTM Element 3E</b></p>	<p>All of the following elements are met:</p>	<p>Three of the following elements are met:</p>	<p>Two of the following elements are met:</p>	<p>One or fewer of the following elements is met:</p>

<p>Implement and promote techniques for actively engaging students in learning and doing mathematics.</p>	<ul style="list-style-type: none"> <li>• The task implements and promotes techniques for actively engaging students.</li> <li>• The task implements and promotes techniques centered on the learning and doing of mathematics.</li> <li>• The task has an intended high-level of cognitive demand.</li> <li>• The intended cognitive demand is explained.</li> </ul>	<ul style="list-style-type: none"> <li>• The task implements and promotes techniques for actively engaging students.</li> <li>• The task implements and promotes techniques centered on the learning and doing of mathematics.</li> <li>• The task has an intended high-level of cognitive demand.</li> <li>• The intended cognitive demand is explained.</li> </ul>	<ul style="list-style-type: none"> <li>• The task implements and promotes techniques for actively engaging students.</li> <li>• The task implements and promotes techniques centered on the learning and doing of mathematics.</li> <li>• The task has an intended high-level of cognitive demand.</li> <li>• The intended cognitive demand is explained.</li> </ul>	<ul style="list-style-type: none"> <li>• The task implements and promotes techniques for actively engaging students.</li> <li>• The task implements and promotes techniques centered on the learning and doing of mathematics.</li> <li>• The task has an intended high-level of cognitive demand.</li> <li>• The intended cognitive demand is explained.</li> </ul>
<p><b>QUESTIONS</b></p> <p><b>NCTM Element 3E</b></p> <p>Provide instruction that incorporates high quality tasks and a range of questioning strategies.</p> <p>Guide productive mathematical discussions in classrooms centered on key mathematical ideas.</p> <p>Select and apply instructional techniques that assist in identifying and addressing student misconceptions.</p> <p>Engage students and teachers in communicating about mathematics.</p> <p>Use students' misconceptions as opportunities for learning.</p>	<p>All of the following elements are met:</p> <p>Plan contains:</p> <ul style="list-style-type: none"> <li>• Key questions to maintain rigor</li> <li>• Anticipated student responses to questions that maintain rigor</li> <li>• Key questions that address misconceptions</li> <li>• Anticipated student responses to questions that address misconceptions</li> <li>• Description of how misconceptions might be used for learning opportunities</li> </ul> <p>The questions:</p> <ul style="list-style-type: none"> <li>• Guide productive mathematical discussions centered on key mathematical ideas</li> <li>• Engage students in communicating about mathematics.</li> </ul>	<p>Six of the following elements are met:</p> <p>Plan contains:</p> <ul style="list-style-type: none"> <li>• Key questions to maintain rigor</li> <li>• Anticipated student responses to questions that maintain rigor</li> <li>• Key questions that address misconceptions</li> <li>• Anticipated student responses to questions that address misconceptions</li> <li>• Description of how misconceptions might be used for learning opportunities</li> </ul> <p>The questions:</p> <ul style="list-style-type: none"> <li>• Guide productive mathematical discussions centered on key mathematical ideas</li> <li>• Engage students in communicating about mathematics.</li> </ul>	<p>Four to five of the following elements are met:</p> <p>Plan contains:</p> <ul style="list-style-type: none"> <li>• Key questions to maintain rigor</li> <li>• Anticipated student responses to questions that maintain rigor</li> <li>• Key questions that address misconceptions</li> <li>• Anticipated student responses to questions that address misconceptions</li> <li>• Description of how misconceptions might be used for learning opportunities</li> </ul> <p>The questions:</p> <ul style="list-style-type: none"> <li>• Guide productive mathematical discussions centered on key mathematical ideas</li> <li>• Engage students in communicating about mathematics.</li> </ul>	<p>Three or fewer of the following elements are met:</p> <p>Plan contains:</p> <ul style="list-style-type: none"> <li>• Key questions to maintain rigor</li> <li>• Anticipated student responses to questions that maintain rigor</li> <li>• Key questions that address misconceptions</li> <li>• Anticipated student responses to questions that address misconceptions</li> <li>• Description of how misconceptions might be used for learning opportunities</li> </ul> <p>The questions:</p> <ul style="list-style-type: none"> <li>• Guide productive mathematical discussions centered on key mathematical ideas</li> <li>• Engage students in communicating about mathematics.</li> </ul>
<p><b>MATHEMATICAL TOOLS</b></p> <p><b>NCTM Element 4E</b></p> <p>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.</p> <p>Make and nurture sound decisions about when instructional tools</p>	<p>All of the following elements are met:</p> <p>The plan:</p> <ul style="list-style-type: none"> <li>• Uses manipulatives, physical models, drawings, virtual environments, spreadsheets, presentation tools, and/or mathematics-specific technologies)</li> <li>• Describes how each instructional tool enhances the learning</li> <li>• Describes possible limitations of each tool</li> </ul>	<p>Two of the following elements are met:</p> <p>The plan:</p> <ul style="list-style-type: none"> <li>• Uses manipulatives, physical models, drawings, virtual environments, spreadsheets, presentation tools, and/or mathematics-specific technologies)</li> <li>• Describes how each instructional tool enhances the learning</li> <li>• Describes possible limitations of each tool</li> </ul>	<p>One of the following elements is met:</p> <p>The plan:</p> <ul style="list-style-type: none"> <li>• Uses manipulatives, physical models, drawings, virtual environments, spreadsheets, presentation tools, and/or mathematics-specific technologies)</li> <li>• Describes how each instructional tool enhances the learning</li> <li>• Describes possible limitations of each tool</li> </ul>	<p>The following elements are missing or lacking in development:</p> <p>The plan:</p> <ul style="list-style-type: none"> <li>• Uses manipulatives, physical models, drawings, virtual environments, spreadsheets, presentation tools, and/or mathematics-specific technologies)</li> <li>• Describes how each instructional tool enhances the learning</li> <li>• Describes possible limitations of each tool</li> </ul>

enhance teaching and learning and recognize both the insights to be gained and possible limitations of such tools.				
<p><b>TECHNOLOGY</b></p> <p><b>NCTM Element 5B</b></p> <p>Engage students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge.</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● A technology tool is identified.</li> <li>● The technology tool is described.</li> <li>● The description of the technology tool includes how students will interact with it.</li> <li>● The technology tool is further explained regarding how it will enhance student learning</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>● A technology tool is identified.</li> <li>● The technology tool is described.</li> <li>● The description of the technology tool includes how students will interact with it.</li> <li>● The technology tool is further explained regarding how it will enhance student learning</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>● A technology tool is identified.</li> <li>● The technology tool is described.</li> <li>● The description of the technology tool includes how students will interact with it.</li> <li>● The technology tool is further explained regarding how it will enhance student learning</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>● A technology tool is identified.</li> <li>● The technology tool is described.</li> <li>● The description of the technology tool includes how students will interact with it.</li> <li>● The technology tool is further explained regarding how it will enhance student learning</li> </ul>
<p><b>ASSESSMENTS</b></p> <p><b>NCTM Element 3F</b></p> <p>Plan, select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.</p> <p>Use assessment results for subsequent instructional planning.</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Plan includes a formative assessment to inform instructional next steps.</li> <li>● The plan connects the formative assessment to the mathematical learning goal for students.</li> <li>● The plan describes how the formative assessment will be implemented during the lesson.</li> <li>● The plan anticipates student responses from the formative assessment.</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Plan includes a formative assessment to inform instructional next steps.</li> <li>● The plan connects the formative assessment to the mathematical learning goal for students.</li> <li>● The plan describes how the formative assessment will be implemented during the lesson.</li> <li>● The plan anticipates student responses from the formative assessment.</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Plan includes a formative assessment to inform instructional next steps.</li> <li>● The plan connects the formative assessment to the mathematical learning goal for students.</li> <li>● The plan describes how the formative assessment will be implemented during the lesson.</li> <li>● The plan anticipates student responses from the formative assessment.</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>● Plan includes a formative assessment to inform instructional next steps.</li> <li>● The plan connects the formative assessment to the mathematical learning goal for students.</li> <li>● The plan describes how the formative assessment will be implemented during the lesson.</li> <li>● The plan anticipates student responses from the formative assessment.</li> </ul>
<p><b>EQUITABLE TEACHING</b></p> <p><b>NCTM Element 4D</b></p> <p>Demonstrate and encourage equitable and ethical treatment of all students.</p> <p>Have high expectations for all students and persist in helping each student reach his/her full potential.</p> <p>Demonstrate respect for and responsiveness to the cultural backgrounds and differing perspectives</p>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Modifications to the lesson are provided.</li> <li>● Each modification is described in detail.</li> <li>● Modifications meet a variety of student needs.</li> <li>● Explanation of each modification influences/assists the learning of mathematics.</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Modifications to the lesson are provided.</li> <li>● Each modification is described in detail.</li> <li>● Modifications meet a variety of student needs.</li> <li>● Explanation of each modification influences/assists the learning of mathematics.</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Modifications to the lesson are provided.</li> <li>● Each modification is described in detail.</li> <li>● Modifications meet a variety of student needs.</li> <li>● Explanation of each modification influences/assists the learning of mathematics.</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>● Modifications to the lesson are provided.</li> <li>● Each modification is described in detail.</li> <li>● Modifications meet a variety of student needs.</li> <li>● Explanation of each modification influences/assists the learning of mathematics.</li> </ul>

students bring to the classroom.				
<b>REVISIONS AND MODIFICATIONS</b>	<p>All of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Revisions were made to the lesson that enhance the mathematical learning and understanding of students.</li> <li>● Revisions were based on Lesson Study Round 1's implementation to enhance the mathematical learning and understanding of students.</li> <li>● Revisions were made to the lesson to address specific context needs</li> <li>● Modifications were adjusted in the lesson to meet specific students' needs</li> </ul>	<p>Three of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Revisions were made to the lesson that enhance the mathematical learning and understanding of students.</li> <li>● Revisions were based on Lesson Study Round 1's implementation to enhance the mathematical learning and understanding of students.</li> <li>● Revisions were made to the lesson to address specific context needs</li> <li>● Modifications were adjusted in the lesson to meet specific students' needs</li> </ul>	<p>Two of the following elements are met:</p> <ul style="list-style-type: none"> <li>● Revisions were made to the lesson that enhance the mathematical learning and understanding of students.</li> <li>● Revisions were based on Lesson Study Round 1's implementation to enhance the mathematical learning and understanding of students.</li> <li>● Revisions were made to the lesson to address specific context needs</li> <li>● Modifications were adjusted in the lesson to meet specific students' needs</li> </ul>	<p>One or fewer of the following elements is met:</p> <ul style="list-style-type: none"> <li>● Revisions were made to the lesson that enhance the mathematical learning and understanding of students.</li> <li>● Revisions were based on Lesson Study Round 1's implementation to enhance the mathematical learning and understanding of students.</li> <li>● Revisions were made to the lesson to address specific context needs</li> <li>● Modifications were adjusted in the lesson to meet specific students' needs</li> </ul>