

George Mason University
College of Education and Human Development
Graduate School of Education
Mathematics Education Leadership

EDIC 646 (DL3) – Mathematics Education Leadership for School Change
3 Credits, Fall 2016
Mondays, 7:20 PM-10:00 PM online (as noted in schedule)

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.

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 the Blackboard learning management system (LMS) housed in the MyMason portal. You will log in to the Blackboard course site using your Mason email name (everything before @masonlive.gmu.edu) and email password. The course site will be available on Monday, August 22, 2016.

Technical Requirements

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

- High-speed Internet access with a standard up-to-date browser, either Internet Explorer or Mozilla Firefox is required (note: Opera and Safari are not compatible with Blackboard).
- Students must maintain consistent and reliable access to their GMU email and Blackboard, as these are the official methods of communication for this course.
- To access Blackboard Courses: Log into <http://mymason.gmu.edu>, select the Courses Tab.
- To access Blackboard Collaborate: Select Tools from the Blackboard Course Menu, then select Blackboard Collaborate.
- Students will need computer speakers or headphones and a headset or built-in 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://windows.microsoft.com/en-us/windows/downloads/windows-media-player/>
 - Apple Quick Time Player: www.apple.com/quicktime/download/

Note: If you are using an employer-provided computer or corporate office for class attendance, please verify with your systems administrators that you will be able to install the necessary applications and that system or corporate firewalls do not block access to any sites or media types.

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 3 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 as 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:

- A. Develop skillful and flexible use of different instructional formats – whole group, small group, partner, and individual – in support of learning goals.
- B. Design, select, and/or adapt worthwhile mathematics tasks and sequence examples to support a particular learning goal.
- C. Construct and evaluate multiple representations of mathematical ideas or processes, establish correspondences between representations, and understand the purposes of doing so.
- D. Use questions to effectively probe mathematical understanding and make productive use of responses.

- E. Develop learners' abilities to give clear and coherent public mathematical communications in a classroom setting.
- F. 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.
- G. Analyze and evaluate student ideas and work, and design appropriate responses.
- H. 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.
- I. Use leadership skills to improve mathematics programs at the school and district levels.
- J. Read, interpret, and discuss methodologies for implementing school change in mathematics education and for coping with the emotional aspects of change.
- K. 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 A-H are quoted directly from page 6-7 of the 2010 AMTE *Standards for Elementary Mathematics Specialists: A Reference for Teaching Credentialing and Degree Programs*)

Professional Standards (Association of Mathematics Teacher Educators (AMTE))

Upon completion of this course, students will have met the following professional standards: EDCI 646 is designed to enable mathematics education leaders to use strategies to implement and evaluate school change in mathematics teaching and learning. Students need knowledge of effective instruction in mathematics as well as vehicles for change so that they can be a catalyst for school improvement in mathematics. The course was developed according to the *Standards for Elementary Mathematics Specialists* of the Association of Mathematics Teacher Educators (AMTE, 2010).

Required Texts

- Felux, C. & Snowdy, P. (2006). *The math coach field guide: Charting your course*. Sausalito, CA: Math Solutions.
- Lewis, C. & Hurd, J. (2011). *Lesson study step-by-step: How teacher learning communities improve instruction*. Portsmouth, NH: Heinemann.
- West, L. & Staub, F. C. (2003). *Content-focused coaching: Transforming mathematics lessons*. Portsmouth, NH: Heinemann.

NOTE: The *Lesson Study Step-By-Step* (Lewis & Hurd, 2011) and *Content-Focused Coaching* (West & Staub, 2003) texts both include DVDs with video clips we will be using in class. Be sure

your copy includes these materials with the book.

Course Performance Evaluation

Students are expected to submit all assignments on time in the manner outlined by the instructor (e.g., Blackboard, Tk20, hard copy).

- **Assignments and 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. Late assignments will be worth a lower grade. *Additional details and rubrics for all assignments will be posted on Blackboard. Please review these materials!*

- a. Coaching Project—(40%)

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. After discussing the clips with the small group, participants will develop a written summary of the important ideas related to mathematical pedagogy and mathematical content that surfaced during their own pre- and post-conferences. Each small group will also choose a representative clip (one pre- or post-conference clip) to discuss with the entire class. This is a Performance Based Assessment. This project will be posted to TK20 for the final evaluation.

- b. Lesson Study Project – (40%)

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 is a Performance Based Assessment. This project will be posted to TK20 for the final evaluation.

- c. Reading Discussion Questions & Participation (20%)

The quality of this 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, and sharing with the class the products of various reading/writing assignments and teacher leader experiences. As part of the reading, each student will be assigned to post discussion questions at least once during the semester connected to the reading for the week. In addition, students will need to post a comment responding to at least one of the discussion questions each week.

- **Other Requirements**

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.

Class materials will be posted for each class session on Blackboard. Students are responsible for reviewing these materials and submitting required artifacts (where appropriate) to online class discussion boards.

- **Course Performance Evaluation Weighting**

- 40% Coaching Project
- 40% Lesson Study Project
- 20% Reading Discussion Questions & Participation

- **Grading Policies**

The evaluation criteria utilizes the graduate grading scale and is as follows:

A	93%-100%	B+	87%-89%	C	70%-79%
A-	90%-92%	B	80%-86%	F	Below 70%

TK20/Performance-Based Assessment(s) Submission Requirement

Every student registered for any Mathematics Education Leadership course with a required TK20 performance-based assessment (designated as such in the syllabus) must submit these assessments (**EDCI 646: (Coaching Project and Lesson Study Project)**) to Tk20 through ‘*Assessments*’ in Blackboard. Failure to submit the assessment(s) to Tk20 (through Blackboard) will result in the course instructor reporting the course grade as Incomplete (IN). Unless this grade is changed upon completion of the required Tk20 submission, the IN will convert to an F nine weeks into the following semester.

Professional Dispositions

Students are expected to exhibit professional behaviors and dispositions at all times.

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

- Students must adhere to the guidelines of the University Honor Code (see <http://oai.gmu.edu/the-mason-honor-code/>).
- Students must follow the university policy for Responsible Use of Computing (see <http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>).
- 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.
- 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 <http://ods.gmu.edu/>).
- Students must follow the university policy stating that all sound emitting devices shall be silenced during class unless otherwise authorized by the instructor.

Campus Resources

- Support for submission of assignments to Tk20 should be directed to tk20help@gmu.edu or <https://cehd.gmu.edu/api/tk20>. Questions or concerns regarding use of Blackboard should be directed to <http://coursessupport.gmu.edu/>.
- The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing (see <http://writingcenter.gmu.edu/>).
- The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance (see <http://caps.gmu.edu/>).
- The George Mason University Office of Student Support staff helps students negotiate life situations by connecting them with appropriate campus and off-campus resources. Students in need of these services may contact the office by phone (703-993-5376). Concerned students, faculty and staff may also make a referral to express concern for the safety or well-being of a Mason student or the community by going to <http://studentsupport.gmu.edu/>, and the OSS staff will follow up with the student.

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

Class Schedule

PROPOSED CLASS SCHEDULE:

Key: *Field Guide* = Math Coach Field Guide; *Coaching* = Content-Focused Coaching; *Lesson Study* = Lesson Study Step-by-Step

	Date	Topics and Goals	Assignments Due
0	Mon 8/22	Blackboard course available; log on to access the syllabus and create a Collaborate profile	
1	Mon 8/29	Introduction to the class Principles and skills for being a math coach What is the job like? Team introductions	Create a Collaborate profile, including a picture, by the start of the first class
	Mon 9/5	No class; university closed in observance of Labor Day	
2	Mon 9/12	Interacting with teachers about students' work Dealing with conflict, PLC, Group norms	Introduction Letter Readings: (<i>Field Guide</i>) 1: Being a successful math coach 2: The math bulletin board 3: Coaching a middle school math team
3	Mon 9/19	Basic introduction to lesson study with particular focus on planning and first teaching	Lesson Study Element 1 due Readings: (<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
4	Mon 9/26	Building a PD group to conduct a research lesson, more detail about planning	Lesson Study Element 2 due Readings: (<i>Lesson Study</i>) 4: Focus the Group's Inquiry 5: Conduct and Discuss the

			Research Lesson (<i>Field Guide</i>) 8: Lesson Study
5	Mon 10/3	Walking through a research lesson. What happens in the classroom?	Lesson Study Element 3 due Readings: (<i>Lesson Study</i>) 6: What should you expect from Lesson Study? 7: Lesson Study’s Diverse Forms
	Mon 10/10	No class—Columbus Day; per university calendar, “Monday classes/labs meet Tuesday. Tuesday classes do not meet this week”	
6	Tues 10/11	Challenges and opportunities for lesson study	Lesson Study Element 4 due Readings: (<i>Lesson Study</i>) 8: Misconceptions, Challenges, Next Steps 9: Next Steps
7	Mon 10/17	Introduction to content-focused coaching Individual work with teachers	Readings: (<i>Coaching</i>) 1: What is content-focused coaching? 2: Working with teachers
8	Mon 10/24	Asynchronis work session - Online module to be completed by Monday 10/24 at 11:59pm. What are variations for content-focused coaching? What are “types” of teachers you might encounter and how do you respond?	Readings: (<i>Coaching</i>) 5: Coaching a new teacher 6: Coaching an experienced teacher 7: Coaching a teacher leader
9	Mon 10/31	Present Lesson Study Results to Class	Lesson Study Project Due (This is a Performance Based Assessment.)
10	Mon 11/7	Coaching in the context of the school and the district – support and obstacles.	Readings: (<i>Coaching</i>) 8: The principal 9: The district 10: Teacher to coach
11	Mon	Teaching with another teacher	Readings: (<i>Field Guide</i>)

	11/14	Demonstration/modeling	4: Helping reluctant teachers 5: Making sense of arithmetic 7: Coteaching
12	Mon 11/21	Observation tools Lesson design frameworks	Coaching Plan Due Readings: (Field Guide) 6: Learning to look 9: Helping teachers take ownership
13	Mon 11/28	Implementing innovations, school-wide innovation	Readings: (Field Guide) 10: Adopting a new math program
14	Mon 12/5	Asynchronis work session - Online module to be completed by 12/5/16 at 11:59pm.	Readings: (Field Guide) 11: From the trenches
15	Mon 12/12	(University Reading Day) Presentations of Coaching Project with feedback on coaching.	Coaching Project Due (This is a Performance Based Assessment.)

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

Assessment Rubric(s)

COACHING PROJECT - NCTM CAEP Standards Alignment

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.	
<i>Detailed Standard Breakdown</i>	<i>Reporting category in rubric</i>
3C.1 Plan lessons and units that incorporate a variety of strategies.	Coaching Project: reporting category b) Coaching Plan - Strategies & Misconceptions
3C.2 Plan lessons and units addressing student differences and diverse populations and how these differences influence student learning of mathematics.	Coaching Project: reporting category d) Coaching Plan - Diverse Populations
3C.3 Include mathematics-specific and instructional technologies in	Coaching Project: reporting

planned lessons and units.	category c) Coaching Plan - Technology
3C.4 Build all students' conceptual understanding and procedural proficiency in planned lessons and units.	Coaching Project: reporting category b) Coaching Plan - Strategies & Misconceptions
3C.5 Assist others in planning lessons and units that incorporate multiple strategies, differentiated instruction for diverse populations, and mathematics-specific and instructional technologies to build all students' conceptual understanding and procedural proficiency.	Coaching Project: reporting category g) Video Evidence
3C.6 Include in planned lessons and units multiple opportunities and solution avenues for students to demonstrate conceptual understanding and procedural proficiency.	Coaching Project: reporting category b) Coaching Plan - Strategies & Misconceptions

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.	
<i>Detailed Standard Breakdown</i>	<i>Reporting category in rubric</i>
3F.1 Plan, select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.	Coaching Project: reporting category d) Assessments
3F.2 Assist teachers in using formative and summative assessments addressing essential mathematical proficiencies.	Coaching Project: reporting category d) Assessments
3F.3 Use assessment results for subsequent instructional planning	Coaching Project: reporting category d) Assessments

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.	
<i>Detailed Standard Breakdown</i>	<i>Reporting category in rubric</i>
5C.1 Collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment data.	Coaching Project: reporting category d) Data Analysis
5C.2 Determine the extent to which students' mathematical proficiencies have increased as a result of their Instruction or their efforts in coaching/mentoring teachers.	Coaching Project: reporting category d) Data Analysis
5C.3 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.	Coaching Project: reporting category d) Data Analysis

Coaching Project Rubric

Levels/Criteria	4	3	2	1
	Exceeds Expectations	Meets Expectations	Developing	Does Not Meet Expectations
a) COACHING PLAN - BACKGROUND	<p>Plan includes a background of the teacher.</p> <p>Plan includes goals and challenges of coaching/assisting the teacher.</p>	<p>Plan includes a background of the teacher.</p> <p>Plan includes goals OR challenges of coaching/assisting the teacher.</p>	Plan includes a background of the teacher.	Plan does not include the background, goals, or challenges of coaching/assisting the teacher.
b) COACHING PLAN - STRATEGIES & MISCONCEPTIONS NCTM Indicator 3C.1 Plan lessons and units that incorporate a variety of strategies. 3C.4 Build all students' conceptual understanding and procedural proficiency in planned lessons and units. 3C.6 Include in planned lessons and units multiple opportunities and solution avenues for students to demonstrate conceptual understanding and procedural proficiency.	<p>Plan contains several different strategies that show multiple opportunities and solution avenues for students to demonstrate conceptual understanding and procedural proficiency.</p> <p>Plan contains several different misconceptions.</p> <p>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.</p>	<p>Plan contains different strategies that show multiple opportunities and solution avenues for students to demonstrate conceptual understanding and procedural proficiency.</p> <p>Plan contains a misconception.</p> <p>Plan describes the connections between the different strategies/misconceptions to support students' conceptual understanding and procedural proficiency.</p>	Plan contains different strategies or misconceptions that show multiple opportunities and solution avenues for students to demonstrate conceptual understanding and procedural proficiency.	Student strategies and misconceptions lack a complete listing and in-depth understanding.
c) COACHING PLAN - TECHNOLOGY NCTM Indicator 3C.3 Include mathematics-specific and instructional technologies in	<p>Your choice of technology is explained regarding how it is math-specific and supports the task.</p> <p>The tool is specific to the task (ie: the</p>	<p>Your choice of technology is explained regarding how it is math-specific and supports the task.</p> <p>The tool is specific to the task (ie: the</p>	Your choice of technology is not explained regarding how it is math-specific and supports the task or the tool is not specific.	Your choice of technology is not explained regarding how it is math-specific and does not support the task or the tool is not specific.

planned lessons and units.	geoboard on NLVM, and not simply "iPads"). Links to the web or appstore are provided and screen captures of the tool are included.	geoboard on NLVM, and not simply "iPads").		
d) COACHING PLAN - DIVERSE POPULATIONS 3C.2 Plan lessons and units addressing student differences and diverse populations and how these differences influence student learning of mathematics.	Modifications to the lesson are given for diverse populations to meet all student needs. Explanation of how student differences may influence their learning of mathematics.	Modifications are given for diverse populations but may lack clarity or completeness.	Modifications are given for diverse populations but may lack clarity and completeness.	Plan modifications are very minimal.
d) PRE-CONFERENCE SUMMARY	Includes pre-conference summary. Includes questions about the mathematics and the teaching of the lesson. Includes thoughts, concerns, challenges, and expectations of the pre-conference.	Includes pre-conference summary. Includes questions about the mathematics and the teaching of the lesson.	Includes pre-conference summary.	Does not include a pre-conference summary.
d) ASSESSMENTS NCTM Indicator 3F1 Plan, select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.	Plan a formative and summative assessment to inform instruction by reflecting on mathematical proficiencies essential for all students. Assist teachers in using formative and summative assessments addressing essential mathematical	Plan a formative and summative assessment to inform instruction by reflecting on mathematical proficiencies essential for all students. Assist teachers in using formative and summative assessments. Select, implement,	Plan a formative and summative assessment to inform instruction by reflecting on mathematical proficiencies essential for all students. Assist teachers in using formative OR summative assessments.	Plan a formative and summative assessment to inform instruction by reflecting on mathematical proficiencies essential for all students. Does not assist teachers in using formative

<p>3F.2 Assist teachers in using formative and summative assessments addressing essential mathematical proficiencies. 3F.3 Use assessment results for subsequent instructional planning.</p>	<p>proficiencies. Select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.</p>	<p>interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.</p>	<p>Select, implement, interpret, or use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.</p>	<p>or summative assessments.</p>
<p>e) POST-CONFERENCE SUMMARY</p>	<p>Includes post-conference summary. Describes the lesson the teacher taught and what mathematics was part of the lesson (intended or unintended). Describes what kinds of questions were discussed related to the teaching of the lesson Describes your thoughts and concerns about what happened during the lesson.</p>	<p>Includes post-conference summary. Describes the lesson the teacher taught and what mathematics was part of the lesson (intended or unintended). Describes what kinds of questions were discussed related to the teaching of the lesson</p>	<p>Includes post-conference summary. Describes the lesson the teacher taught and what mathematics was part of the lesson (intended or unintended).</p>	<p>Includes post-conference summary.</p>
<p>f) DATA ANALYSIS NCTM Indicator 5C.1 Collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment data. 5C.2 Determine the extent to which students' mathematical proficiencies have increased as a result of their instruction or their</p>	<p>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</p>	<p>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</p>	<p>Collect, organize, analyze, and reflect on diagnostic, formative, OR summative assessment data. Determine the extent to which students' mathematical proficiencies have increased as a result of their instruction</p>	<p>Collect, organize, analyze, and reflect on diagnostic, formative, OR summative assessment data.</p>

efforts in coaching/mentoring teachers. 5C.3 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.	designing and modifying their instruction as a means to meet group and individual needs and increase student performance.	designing and modifying their instruction as a means to meet group and individual needs and increase student performance.	or their efforts in coaching/mentoring teachers.	
g) VIDEO EVIDENCE 3C.5 Assist others in planning lessons and units that incorporate multiple strategies, differentiated instruction for diverse populations, and mathematics-specific and instructional technologies to build all students' conceptual understanding and procedural proficiency.	Assisted a teacher in developing multiple strategies to build all students' conceptual understanding and procedural proficiency. Assisted a teacher in identifying diverse populations and modifying the task to build all students' conceptual understanding and procedural proficiency. Assisted a teacher in aligning mathematics-specific and instructional technologies to build all students' conceptual understanding and procedural proficiency.	Assisted a teacher in developing multiple strategies and identifying diverse populations and modifying the task or aligning mathematics-specific and instructional technologies to build all students' conceptual understanding and procedural proficiency.	Assisted a teacher in developing a strategy or identifying diverse populations or modifying the task or aligning mathematics-specific and instructional technologies to build all students' conceptual understanding and procedural proficiency.	Does not collaborate with peers on lesson plan.

LESSON STUDY PROJECT - NCTM CAEP Standards Alignment

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.

<i>Detailed Standard Breakdown</i>	<i>Reporting category in rubric</i>
3A.1 Apply knowledge of mathematics curriculum standards for elementary within and across mathematical domains.	Lesson Study: reporting category b) Curriculum Standards
3A.2 Relate mathematics curriculum standards to student learning.	Lesson Study: reporting category b) Curriculum Standards
3A.3 Demonstrate how mathematics curriculum standards and learning progressions impact the teaching of elementary students at different developmental levels and coaching/mentoring elementary classroom teachers.	Lesson Study: reporting category f) Differentiation

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.	
<i>Detailed Standard Breakdown</i>	<i>Reporting category in rubric</i>
3E.1 Implement and promote techniques for actively engaging students in learning and doing mathematics.	Lesson Study: reporting category a) Task
3E.2 Provide instruction that incorporates high quality tasks and a range of questioning strategies.	Lesson Study: reporting category c) Questions
3E.3 Guide productive mathematical discussions in classrooms centered on key mathematical ideas.	Lesson Study: reporting category c) Questions
3E.4 Select and apply instructional techniques that assist in identifying and addressing student misconceptions.	Lesson Study: reporting category c) Questions
3E.5 Engage students and teachers in communicating about mathematics.	Lesson Study: reporting category c) Questions
3E.6 Use students' misconceptions as opportunities for learning.	Lesson Study: reporting category c) Questions

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.	
<i>Detailed Standard Breakdown</i>	<i>Reporting category in rubric</i>
3F.1 Plan, select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.	Lesson Study: reporting category i) Assessment

3F.2 Assist teachers in using formative and summative assessments addressing essential mathematical proficiencies.	Lesson Study: reporting category m) Coaching/Assisting - Assessment
3F.3 Use assessment results for subsequent instructional planning.	Lesson Study: reporting category i) Assessment

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.	
<i>Detailed Standard Breakdown</i>	<i>Reporting category in rubric</i>
4B.1 Plan and create sequential learning opportunities in which students connect new learning to prior knowledge and experiences.	Lesson Study: reporting category h) Learning Sequence
4B.2 Coach/mentor teachers in creating developmentally appropriate, sequential, and challenging learning opportunities in which students connect new learning to prior knowledge and experiences.	Lesson Study: reporting category n) Coaching/Assisting - Sequence
4B.3 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.	Lesson Study: reporting category h) Learning Sequence
4B.4 Create a developmentally appropriate and challenging sequence of instruction for all students that shows a progression of learning over time toward proficiency and understanding.	Lesson Study: reporting category h) Learning Sequence

4d) Demonstrate and encourage equitable and ethical treatment of and high expectations for all students.	
<i>Detailed Standard Breakdown</i>	<i>Reporting category in rubric</i>
4D.1 Demonstrate and encourage equitable and ethical treatment of all students.	Lesson Study: reporting category g) Equitable Teaching
4D.2 Have high expectations for all students and persist in helping each student reach his/her full potential.	Lesson Study: reporting category g) Equitable Teaching
4D.3 Demonstrate respect for and responsiveness to the cultural backgrounds and differing perspectives students bring to the classroom.	Lesson Study: reporting category g) Equitable Teaching

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,

spreadsheets, 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.	
<i>Detailed Standard Breakdown</i>	<i>Reporting category in rubric</i>
4E.1 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.	Lesson Study: reporting category d) Tools
4E.2 Coach/mentor teachers in applying mathematical content and pedagogical knowledge to select and use tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies.	Lesson Study: reporting category o) Coaching/Assisting - Tools
4E.3 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.	Lesson Study: reporting category d) Tools
4E.4 Participate in learning opportunities that address current and emerging technologies in support of mathematics learning and teaching.	Lesson Study: reporting category p) Coaching/Assisting - Technology

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.	
<i>Detailed Standard Breakdown</i>	<i>Reporting category in rubric</i>
5B.1 Engage students in developmentally appropriate mathematical activities and investigations that require active engagement in building new knowledge.	Lesson Study: reporting category k) Lesson Reflection Justification
5B.2 Coach/mentor teachers in using developmentally appropriate mathematical activities and investigations that require active student engagement in building new knowledge.	Lesson Study: reporting category q) Coaching/Assisting - Investigations
5B.3 Engage students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge.	Lesson Study: reporting category e) Developmental Technology
5B.4 Facilitate students' ability to develop future inquiries based on current analyses.	Lesson Study: reporting category l) Lesson Reflection Problem Solving

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.

<i>Detailed Standard Breakdown</i>	<i>Reporting category in rubric</i>
5C.1 Collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment data.	Lesson Study: reporting category j) Data Analysis
5C.2 Determine the extent to which students' mathematical proficiencies have increased as a result of their instruction or their efforts in coaching/mentoring teachers.	Lesson Study: reporting category j) Data Analysis
5C.3 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.	Lesson Study: reporting category j) Data Analysis

Lesson Study Rubric

Levels/Criteria	4	3	2	1
	Exceeds Expectations	Meets Expectations	Developing	Does Not Meet Expectations
Group Final Paper				
Pre-planning assignments				
Pre-planning documents: 1) Meeting Notes (Appendix A) and 2) Introductory Interview (Appendix B)	There is exemplary evidence of group collaboration and task sharing. There is ample documentation that all members of the group engaged in thoughtful discourse during decision-making processes.	There is sufficient evidence of group collaboration and task sharing. There is some documentation of academic discourse during the decision-making process.	There is some evidence of group collaboration and task sharing.	There is little to no evidence of group collaboration and task sharing.
s) GOAL SETTING Action Plan (Appendix C)	Goals include roles for group members and tasks that need to be completed. Goals include the research goals the team identified.	Goals include the research goals the team identified.	Goals are vague or not researched.	Does not include goals.
Lesson Plan (Appendix E)				

<p>a) TASK NCTM Indicator 3E.1 Implement and promote techniques for actively engaging students in learning and doing mathematics.</p>	<p>The task implements and promotes techniques for actively engaging students in learning and doing mathematics.</p> <p>Complete a second round of Lesson Study using a revised task.</p>	<p>The task has a cognitive demand of “Procedures with Connections”</p>	<p>The task has a cognitive demand of “Procedures without Connections”</p>	<p>The task has a cognitive demand of “Memorization”</p>
<p>b) CURRICULUM STANDARDS NCTM Indicator 3A.1 Apply knowledge of mathematics curriculum standards for elementary within and across mathematical domains. 3A.2 Relate mathematics curriculum standards to student learning.</p>	<p>Includes the grade level, major concept, objective/goals, VA SOL's, NCTM process standards, mathematical practice CCSS, and prerequisite knowledge.</p> <p>Assemble resources that your group can use to support the lesson. These could include books, websites, articles or other materials that could be shared with teachers or math specialists.</p>	<p>Includes the grade level, major concept, objective/goals, VA SOL's, NCTM process standards, mathematical practice CCSS, and prerequisite knowledge. Lesson is based on research and it cited correctly.</p>	<p>Includes the grade level, major concept, objective/goals, VA SOL's, NCTM process standards, mathematical practice CCSS, and prerequisite knowledge.</p>	<p>Lesson plan is not based on research. Many aspects of the plan are missing.</p>
<p>c) QUESTIONS NCTM Indicator 3E.2 Provide instruction that incorporates high quality tasks and a range of questioning strategies. 3E.3 Guide productive mathematical discussions in classrooms centered on key mathematical</p>	<p>Plan contains key questions and student expectations to aid teacher when implementing the task to maintain rigor.</p> <p>Plan contains questions and expected student expectations to</p>	<p>Plan contains key questions and student expectations to aid teacher when implementing the task to maintain rigor but lacks some clarity.</p> <p>Plan contains questions and expected student</p>	<p>Plan contains questions low in cognitive demand.</p> <p>Student expectations are also low in rigor.</p>	<p>Plan does not contain key questions.</p> <p>Student expectations are missing.</p>

<p>ideas. 3E.4 Select and apply instructional techniques that assist in identifying and addressing student misconceptions. 3E.5 Engage students and teachers in communicating about mathematics. 3E.6 Use students' misconceptions as opportunities for learning.</p>	<p>address misconceptions. Plan contains questioning strategies to guide productive mathematical discussions in classrooms centered on key mathematical ideas.</p> <p>Questions engage students and teachers in communicating about mathematics. Plan describes how student misconceptions will be used as opportunities for learning.</p> <p>(Complete a second round of Lesson Study using targeted questions that were identified through data analysis.)</p>	<p>expectations to address misconceptions.</p> <p>Questions engage students and teachers in communicating about mathematics.</p>		
<p>d) MATHEMATICAL TOOLS NCTM Indicator 4E.1 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. 4E.3 Make and nurture sound decisions about when instructional tools</p>	<p>Apply mathematical content and pedagogical knowledge to select and use 2 or more instructional tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies.</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</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</p>	<p>Does not use tools and/or does not make sound decisions about when to use the tool.</p>

<p>enhance teaching and learning and recognize both the insights to be gained and possible limitations of such tools.</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>(*Different tools can be used in additional rounds of lesson study.)</p>	<p>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>sound decisions about when instructional tools enhance teaching and learning and recognize both the insights to be gained OR possible limitations of such tools.</p>	
<p>e) Developmental TECHNOLOGY NCTM Indicator 5B.3 Engage students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge.</p>	<p>Your choice of technology is explained regarding how it will enhance learning.</p> <p>Tool engages students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge.</p> <p>Plan contains a detailed explanation of how the students will interact with the tool.</p>	<p>Your choice of technology is explained regarding how it will enhance learning.</p> <p>Tool engages students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge.</p>	<p>Your choice of technology is not explained regarding how it will enhance learning or the tool does not engage students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge.</p>	<p>Your choice of technology is not explained regarding how it will enhance learning and the tool does not engage students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge.</p>
<p>f) DIFFERENTIATION NCTM Indicator 3A.3 Demonstrate how mathematics curriculum standards and learning progressions impact the teaching of elementary students at</p>	<p>Plan identifies the grade level standard (VA SOL & CCSS) and at least two other grade levels and describes the progression and vertical alignment.</p>	<p>Plan includes how to modify the lesson to gear down and gear up to meet all student needs but is lacking clarity or completeness.</p>	<p>Plan includes how to modify the lesson to gear down and gear up to meet all student needs but is lacking clarity and completeness.</p>	<p>Plan differentiation and modifications are very minimal.</p>

<p>different developmental levels and coaching/mentoring elementary classroom teachers.</p>	<p>Modifications to the lesson are given for different developmental levels to meet all student needs.</p> <p>Collaborated with peers to coach and give feedback on the differentiation of others' task.</p>	<p>Modifications are given that are appropriate for the given level but may lack clarity or completeness.</p> <p>Collaborated with peers to coach and give feedback on the differentiation of others' task.</p>	<p>Grade modifications are given that are appropriate for the given level but may lack clarity and completeness.</p>	
<p>h) LEARNING SEQUENCE NCTM Indicator 4B.1 Plan and create sequential learning opportunities in which students connect new learning to prior knowledge and experiences. 4B.3 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. 4B.4 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>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>Plan and create sequential learning opportunities in which students connect new learning to prior knowledge and experiences.</p> <p>Describe 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>Describe the sequence of instruction for all students that shows a progression of learning over time toward proficiency and understanding.</p>	<p>Plan and create sequential learning opportunities in which students connect new learning to prior knowledge or experiences.</p> <p>Describe the sequence of instruction for all students that shows a progression of learning over time toward proficiency and understanding.</p>	<p>Plan and create sequential learning opportunities in which students connect new learning to prior knowledge or experiences.</p>

<p>i) ASSESSMENTS NCTM Indicator 3F1 Plan, select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students. 3F.3 Use assessment results for subsequent instructional planning.</p>	<p>Plan a formative and summative assessment to inform instruction by reflecting on mathematical proficiencies essential for all students.</p> <p>Select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.</p> <p>(Complete a second round of Lesson Study using assessment results for subsequent instructional planning)</p>	<p>Plan a formative and summative assessment to inform instruction by reflecting on mathematical proficiencies essential for all students.</p> <p>Select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.</p>	<p>Plan a formative and summative assessment to inform instruction by reflecting on mathematical proficiencies essential for all students.</p> <p>Select, implement, interpret, or use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.</p>	<p>Plan a formative and summative assessment to inform instruction by reflecting on mathematical proficiencies essential for all students.</p>
<p>Group Final Paper Reflections (Main text of paper)</p>				
<p>r) REFLECTION - LESSON STUDY</p>	<p>Reflection describes the role of each person, aspects of lesson study that were attempted, and the results.</p> <p>Reflection describes what the group learned and how it will transfer to a math specialist position.</p> <p>Reflection summarizes the research themes for your group and explains the rationale for those</p>	<p>Reflection describes the role of each person, aspects of lesson study that were attempted, and the results.</p> <p>Reflection describes what the group learned and how it will transfer to a math specialist position.</p> <p>Reflection summarizes the research themes for your group and explains the rationale for those</p>	<p>One or more of the following components are incomplete:</p> <p>Reflection describes the role of each person, aspects of lesson study that were attempted, and the results.</p> <p>Reflection describes what the group learned and how it will transfer to a math specialist position.</p> <p>Reflection</p>	<p>One or more of the following components are missing:</p> <p>Reflection describes the role of each person, aspects of lesson study that were attempted, and the results.</p> <p>Reflection describes what the group learned and how it will transfer to a</p>

	<p>goals.</p> <p>Reflection summarizes the lesson your group implemented and how it meets the research goals.</p> <p>In describing each of the above categories, the paper includes insightful, thoughtful reflections that indicate group learning and growth.</p>	<p>goals.</p> <p>Reflection summarizes the lesson your group implemented and how it meets the research goals.</p>	<p>summarizes the research themes for your group and explains the rationale for those goals.</p> <p>Reflection summarizes the lesson your group implemented and how it meets the research goals.</p>	<p>math specialist position.</p> <p>Reflection summarizes the research themes for your group and explains the rationale for those goals.</p> <p>Reflection summarizes the lesson your group implemented and how it meets the research goals.</p>
<p>g) EQUITABLE TEACHING NCTM Indicator 4D.1 Demonstrate and encourage equitable and ethical treatment of all students. 4D.2 Have high expectations for all students and persist in helping each student reach his/her full potential. 4D.3 Demonstrate respect for and responsiveness to the cultural backgrounds and differing perspectives students bring to the classroom.</p>	<p>The video shows evidence of equitable and ethical treatment of all students, high expectations for all students and persist in helping each student reach his/her full potential and respect for and responsiveness to the cultural backgrounds and differing perspectives students bring to the classroom.</p> <p>The lesson was modified for the second round of lesson study to address equity and high expectations of all students.</p>	<p>The video shows evidence of equitable and ethical treatment of all students, high expectations for all students and persist in helping each student reach his/her full potential and respect for and responsiveness to the cultural backgrounds and differing perspectives students bring to the classroom.</p>	<p>The candidate is developing equitable and ethical treatment of all students, high expectations for all students and persist in helping each student reach his/her full potential and respect for and responsiveness to the cultural backgrounds and differing perspectives students bring to the classroom.</p>	<p>The candidate does not show evidence that they are developing equitable and ethical treatment of all students, high expectations for all students and persist in helping each student reach his/her full potential and respect for and responsiveness to the cultural backgrounds and differing perspectives students bring to the classroom.</p>
<p>j) DATA ANALYSIS NCTM Indicator 5C.1 Collect, organize,</p>	<p>Collect, organize, analyze, and reflect on</p>	<p>Collect, organize, analyze, and reflect on</p>	<p>Collect, organize, analyze, and reflect on</p>	<p>Collect, organize, analyze, and</p>

<p>analyze, and reflect on diagnostic, formative, and summative assessment data. 5C.2 Determine the extent to which students' mathematical proficiencies have increased as a result of their instruction or their efforts in coaching/mentoring teachers. 5C.3 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>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>(Complete a second round of Lesson Study using the same lesson and data results.)</p>	<p>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>diagnostic, formative, OR 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>reflect on diagnostic, formative, OR summative assessment data.</p>
<p>k) LESSON REFLECTION - JUSTIFICATION NCTM Indicator 5B.1 Engage students in developmentally appropriate mathematical activities and investigations that require active engagement in building new knowledge.</p>	<p>Reflection shows evidence that students were engaged in developmentally appropriate mathematical activities and investigations that require active engagement in building new knowledge.</p>	<p>Reflection shows evidence that students were engaged in investigations that require active engagement in building new knowledge.</p>	<p>Reflection shows evidence that students were engaged in investigations that require active engagement.</p>	<p>Reflection of lesson implementation is missing.</p>
<p>l) LESSON REFLECTION - PROBLEM SOLVING NCTM Indicator 5B.4 Facilitate</p>	<p>Reflection shows evidence that you facilitated students' ability to develop future</p>	<p>Reflection shows evidence that you facilitated students' ability to develop inquiries</p>	<p>Reflection shows evidence that you facilitated students' ability solve the task.</p>	<p>There is no expectation of students communicating their problem</p>

students' ability to develop future inquiries based on current analyses.	inquiries based on current analyses.	about the task.		solving strategies.
Individual Reflection Paper				
Coach is a reflective practitioner	Kept a detailed journal of coaching actions with insightful reflections Clearly communicated effective evidence of coaching actions throughout individual final report	Kept a detailed journal of coaching actions Communicated evidence of coaching actions throughout individual final report	Kept a journal of individual contributions to the group but coaching actions and/or reflections were missing from the journal	Journal is incomplete or lacks focus and clarity
m) COACHING/ ASSISTING - ASSESSMENT NCTM Indicator 3F.2 Assist teachers in using formative and summative assessments addressing essential mathematical proficiencies.	Assist teachers in using formative and summative assessments addressing essential mathematical proficiencies.	Assist teachers in using formative and summative assessments.	Assist teachers in using formative OR summative assessments.	Does not assist teachers in using formative or summative assessments.
n) COACHING/ ASSISTING - SEQUENCING NCTM Indicator 4B.2 Coach/mentor teachers in creating developmentally appropriate, sequential, and challenging learning opportunities in which students connect new learning to prior knowledge and experiences.	Coach/mentor teachers in creating developmentally appropriate, sequential, and challenging learning opportunities in which students connect new learning to prior knowledge and experiences.	Coach/mentor teachers in analyzing developmentally appropriate, sequential, and challenging learning opportunities in which students connect new learning to prior knowledge and experiences.	Coach/mentor teachers in describing developmentally appropriate, sequential, and challenging learning opportunities in which students connect new learning to prior knowledge and experiences.	Does not coach/mentor teachers in developmentally appropriate, sequential, and challenging learning opportunities in which students connect new learning to prior knowledge and experiences.
o) COACHING/ ASSISTING - TOOLS NCTM Indicator	Coach/mentor teachers in applying	Coach/mentor teachers in applying	Coach/mentor teachers in applying	Does not coach/mentor teachers in

<p>4E.2 Coach/mentor teachers in applying mathematical content and pedagogical knowledge to select and use tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies.</p>	<p>mathematical content and pedagogical knowledge to select and use 3 or more tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies.</p>	<p>mathematical content and pedagogical knowledge to select and use 2 tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies.</p>	<p>mathematical content and pedagogical knowledge to select and use 1 tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies.</p>	<p>applying mathematical content and pedagogical knowledge to select and use tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies.</p>
<p>p) COACHING/ ASSISTING - TECHNOLOGY NCTM Indicator 4E.4 Participate in learning opportunities that address current and emerging technologies in support of mathematics learning and teaching.</p>	<p>The candidate participates in learning opportunities that address current and emerging technologies in support of mathematics learning and teaching and gives feedback to all of the group members.</p>	<p>The candidate participates in learning opportunities that address current and emerging technologies in support of mathematics learning and teaching and gives feedback to 2 of the group members.</p>	<p>The candidate participates in learning opportunities that address current and emerging technologies in support of mathematics learning and teaching and gives feedback to 1 of the group members.</p>	<p>The candidate does not participate in learning opportunities that address current and emerging technologies in support of mathematics learning.</p>
<p>q) COACHING/ ASSISTING - INVESTIGATIONS NCTM Indicator 5B.2 Coach/mentor teachers in using developmentally appropriate mathematical activities and investigations that require active student engagement in building new knowledge.</p>	<p>Assist peers in designing a task that uses developmentally appropriate mathematical activities and investigations that require active student engagement in building new knowledge.</p>	<p>Assist peers in designing a task that is developmentally appropriate and uses investigations.</p>	<p>Assist peers in thinking about their task.</p>	<p>Does not collaborate with peers during task creation.</p>