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

EDIC 646 (DL1) – Mathematics Education Leadership for School Change
3 Credits, Fall 2016
Mondays, 4:30 PM-7:10 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 29, 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 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 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	**Readings:** (*Field Guide)* 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:** *(Lesson Study)* 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:** *(Lesson Study)* 4: Focus the Group's Inquiry 5: Conduct and Discuss the Research Lesson (*Field Guide)* 8: Lesson Study
5	Mon 10/3	Walking through a research lesson. What happens in the classroom?	**Lesson Study Element 3 due.** **Readings:** *(Lesson Study)* 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:** *(Lesson Study)* 8: Misconceptions, Challenges, Next Steps 9: Next Steps
7	Mon 10/17	Introduction to content-focused coaching Individual work with teachers	**Readings:** *(Coaching)* 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:** *(Coaching)* 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**
10	Mon 11/7	Coaching in the context of the school and the district – support and obstacles.	**Readings:** *(Coaching)* 8: The principal 9: The district 10: Teacher to coach
11	Mon 11/14	Teaching with another teacher Demonstration/modeling	**Readings:** (*Field Guide)* 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**

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.	
Detailed Standard Breakdown	*Reporting category in rubric*
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 planned lessons and units.	Coaching Project: reporting 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.	
Detailed Standard Breakdown	*Reporting category in rubric*
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.	
Detailed Standard Breakdown	*Reporting category in rubric*
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	Plan includes a background of the teacher. Plan includes goals and challenges of coaching/assisting the teacher.	Plan includes a background of the teacher. Plan includes goals OR challenges of coaching/assisting the teacher.	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.	Plan contains several different strategies that show multiple opportunities and solution avenues for students to demonstrate conceptual understanding and procedural proficiency. Plan contains several different misconceptions. 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.	Plan contains different strategies that show multiple opportunities and solution avenues for students to demonstrate conceptual understanding and procedural proficiency. Plan contains a misconception. Plan describes the connections between the different strategies/misconceptions to support students' conceptual understanding and procedural proficiency.	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 planned lessons and units.	Your choice of technology is explained regarding how it is math-specific and supports the task. The tool is specific to the task (ie: the geoboard on NLVM, and not simply "iPads"). Links to the web or appstore are provided and screen captures of the tool are included.	Your choice of technology is explained regarding how it is math-specific and supports the task. The tool is specific to the task (ie: the geoboard on NLVM, and not simply "iPads").	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.
d) COACHING PLAN -	Modifications to the lesson are given for diverse populations to	Modifications are given for diverse populations but may	Modifications are given for diverse	Plan modifications

DIVERSE POPULATIONS 3C.2 Plan lessons and units addressing student differences and diverse populations and how these differences influence student learning of mathematics.	meet all student needs. Explanation of how student differences may influence their learning of mathematics.	lack clarity or completeness.	populations but may lack clarity and completeness.	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. 3F.2 Assist teachers in using formative and summative assessments addressing essential mathematical proficiencies.	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 proficiencies. Select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on 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, 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 OR summative assessments. Select, implement, interpret, or use formative and summative assessments to inform instruction by	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 or summative assessments.

3F.3 Use assessment results for subsequent instructional planning.	proficiencies essential for all students.		reflecting on mathematical proficiencies essential for all students.	
e) POST-CONFERENCE SUMMARY	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.	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	Includes post-conference summary. Describes the lesson the teacher taught and what mathematics was part of the lesson (intended or unintended).	Includes post-conference summary.
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 efforts in coaching/mentoring teachers. 5C.3 Use assessment results as a basis for designing and	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.	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.	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 or their efforts in coaching/mentoring teachers.	Collect, organize, analyze, and reflect on diagnostic, formative, OR summative assessment data.

modifying their instruction as a means to meet group and individual needs and increase student performance.				
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

In order to provide experience in lesson study, students will work in small groups and complete the lesson study process. Time will be given in class for small groups to meet, to establish their goal, and review their progress toward their goal.

Groups will provide evidence or documentation that supports their progress as artifacts of 1) lesson development, 2) implementation, and 3) reflection. Each group will have a space within Blackboard for discussion boards, file sharing and other tools that only the group and the instructor will be able to access.

Group Components:

Planning documentation/Lesson development:

1. Agenda and meeting notes **Due**: Ongoing
    a. Post your group's agenda and meeting notes on your group's discussion board in Blackboard each time your group meets. Rotate who is responsible for this task so everyone completes it at least once. *Anytime* your group meets (during synchronous class AND outside of class time) meeting notes should be taken and posted. This document should read as sort of a field journal so that the reader can follow a progression of the ideas discussed and actions implemented.

    Note: These notes will appear as Appendix A of your final group paper.
2. Introductory Interview (**Lesson Study Component 1**) **Due**: **9/19**
    a. Discuss the following topics to get to know your group members: what are your goals for teaching/coaching? What are things you wonder about student learning?
    b. Identify 3 or 4 mathematical content topics in which the group may be interested in developing a lesson.
    c. For each of the math topics in step b, 1) identify a grade-level focus, 2) List the corresponding curriculum standards, 3) brainstorm possible pedagogical techniques or mathematical tasks

    Note: This assignment will appear as Appendix B of your final group paper.
3. Action Plan (**Lesson Study Component 2**) **Due: 9/26**
    a. Identify Goals for your Lesson Study:
        i. Goals include roles for group members and tasks that need to be completed; identify projected dates that tasks will be completed
        ii. Goals include the research goals the team identified
    b. Identify the mathematical topic of your lesson
        i. Identify a grade-level focus
        ii. List the corresponding curriculum standards
        iii. Provide a brief overview of pedagogical techniques or mathematical tasks that will be utilized in your lesson
    c. 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.

    Note: This assignment will appear as Appendix C of your final group paper.
4. Lesson Plan (**Lesson Study Component 4**) **Due: 10/11**
    a. A draft of your lesson plan (before you teach and revise it) is due on 10/11. This draft will not be graded but reviewed and feedback provided. This draft will appear as Appendix D of your final group paper.
    b. A polished lesson plan is due on 10/31, subsumed in your final group paper as Appendix E. There should be noticeable difference between your draft and polished lesson. (Description and reflection of such changes and edits will be a component in your group final paper.)
    c. Both lesson plans (the draft and polished version) should clearly include the following components:
        i. **Task:** The task implements and promotes techniques for actively engaging students in learning and doing mathematics.
        ii. **Curriculum Standards**: Includes the grade level, major concept, objective/goals, VA SOL's, NCTM process standards, mathematical

practice CCSS, and prerequisite knowledge.

iii. **Resources**: (Taken from your action plan) 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.

iv. **Questions**: Plan contains key questions and student expectations to aid teacher when implementing the task to maintain rigor; Plan contains questions and expected student expectations to address misconceptions; Plan contains questioning strategies to guide productive mathematical discussions in classrooms centered on key mathematical ideas; Questions engage students and teachers in communicating about mathematics; Plan describes how student misconceptions will be used as opportunities for learning.

v. **Tools:** 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; 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.

vi. **Technology**: Your choice of technology is explained regarding how it will enhance learning; Tool engages students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge; Plan contains a detailed explanation of how the students will interact with the tool.

vii. **Differentiation**: Plan identifies the grade level standard (VA SOL & CCSS) and at least two other grade levels and describes the progression and vertical alignment; Modifications to the lesson are given for different developmental levels to meet all student needs; Collaborated with peers to coach and give feedback on the differentiation of others' task.

viii. **Learning Sequence:** Plan and create sequential learning opportunities in which students connect new learning to prior knowledge and experiences; 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; Create a developmentally appropriate and challenging sequence of instruction for all students that shows a progression of learning over time toward proficiency and understanding.

ix. **Assessment**: Plan a formative and summative assessment to inform instruction by reflecting on mathematical proficiencies essential for all students; Select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.

Group Final Paper **Due 10/31**

Write a 5-10 page (before including appendices) report including each of the following components:

1. Reflection about Lesson Study as a whole
    a. Introduction that briefly overviews the Lesson Study process (so that an outside reader would understand what you just completed.)
    b. Describe the role of each person, aspects of lesson study that were attempted, and the results.
    c. Summarize the research themes for your group and explain the rationale for those goals
    d. Summarizes the lesson your group implemented and how it meets the research goals.
    e. Describe what the group learned and how it will transfer to a math specialist position.
2. Description and reflection about of the instruction during the lesson
    a. Equitable teaching
        i. Describe how the video/lesson 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.
    b. Data Analysis
        i. Discuss, include, and reflect upon diagnostic, formative, and summative assessment data from the lesson
        ii. Determine the extent to which students' mathematical proficiencies have increased as a result of their instruction or their efforts in coaching/mentoring teachers.
        iii. Discuss how use of assessment results were utilized as a basis for designing and modifying their instruction as a means to meet group and individual needs and increase student performance.
    c. Justification
        i. Describe and evidence that students were engaged in developmentally appropriate mathematical activities and investigations that require active engagement in building new knowledge.
    d. Problem solving
        i. Describe and give evidence that you facilitated students' ability to develop future inquiries based on current analyses.
3. Overview the changes made from your draft lesson plan to your polished lesson plan
    a. Describe the changes you made to your lesson plan from draft to final
    b. Explain why you made these changes
    c. Explain how they enhance student learning
    d. Predict how the lesson would go if it was taught a second time to a new group of students—are there, if so which, components you want to see in action with students to evaluate their effectiveness?
4. Closing: Give a final paragraph or so that summarizes your overall reflection of the group lesson study process

Individual Components

1. Individual Coaching Field Journal **Due: 10/03 and 10/31**
    a. **Each time** your group meets (during synchronous class AND outside of class time) you write an entry in your Individual Coaching Field Journal.
    b. Record and reflect upon your role in the group. How are you supporting your group members? What specific actions are you taking to coach your peers? Be sure to discuss the following components throughout your journal (See the description of the Individual Final report and rubric for specifics about each category):
        i. Assessment
        ii. Sequencing
        iii. Tools
        iv. Technology
        v. Investigation

Note: A check in of this journal is **due on 10/03** (**Lesson Study Component 3**). The completed journal will appear as Appendix A in your Individual Final Report due on 10/31.

2. **Individual Final Report Due: 10/31**

Write a 3-8 page report addressing the following topics:

a. What was your role in the project?
b. What aspects of the research lesson did you attempt? What were the results?
c. How did you support your peers in each of the following area (give specific examples and evidence):
    i. **Assessment**-- Assist teachers in using formative and summative assessments addressing essential mathematical proficiencies
    ii. **Sequencing**-- Coach/mentor teachers in creating developmentally appropriate, sequential, and challenging learning opportunities in which students connect new learning to prior knowledge and experiences
    iii. **Tools**-- Coach/mentor teachers in applying 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.
    iv. **Technology**-- 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.
    v. **Investigation**-- Assist peers in designing a task that uses developmentally appropriate mathematical activities and investigations that require active student engagement in building new knowledge.
d. What did you learn about yourself as a current/future math specialist through this project?
e. Include your Individual Coaching Field Journal as Appendix A of this final report.

Lesson Study Final Project Rubrics

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)				
a) TASK NCTM Indicator 3E.1 Implement and promote techniques for actively engaging students in learning and doing mathematics.	The task implements and promotes techniques for actively engaging students in learning and doing mathematics. Complete a second round of Lesson Study	The task has a cognitive demand of “Procedures with Connections”	The task has a cognitive demand of “Procedures without Connections”	The task has a cognitive demand of “Memorization”

	using a revised task.			
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.	Includes the grade level, major concept, objective/goals, VA SOL's, NCTM process standards, mathematical practice CCSS, and prerequisite knowledge. 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.	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.	Includes the grade level, major concept, objective/goals, VA SOL's, NCTM process standards, mathematical practice CCSS, and prerequisite knowledge.	Lesson plan is not based on research. Many aspects of the plan are missing.
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 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	Plan contains key questions and student expectations to aid teacher when implementing the task to maintain rigor. Plan contains questions and expected student expectations to address misconceptions. Plan contains questioning strategies to guide productive mathematical discussions in classrooms centered on key mathematical ideas.	Plan contains key questions and student expectations to aid teacher when implementing the task to maintain rigor but lacks some clarity. Plan contains questions and expected student expectations to address misconceptions. Questions engage students and teachers in communicating about mathematics.	Plan contains questions low in cognitive demand. Student expectations are also low in rigor.	Plan does not contain key questions. Student expectations are missing.

opportunities for learning.	Questions engage students and teachers in communicating about mathematics. Plan describes how student misconceptions will be used as opportunities for learning. Complete a second round of Lesson Study using targeted questions that were identified through data analysis.			
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 enhance teaching and learning and recognize both the insights to be gained and possible limitations of such tools.	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. 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.	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. 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.	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. Make and nurture sound decisions about when instructional tools enhance teaching and learning and recognize both the insights to be gained OR possible limitations of such tools.	Does not use tools and/or does not make sound decisions about when to use the tool.

	*Different tools can be used in additional rounds of lesson study.			
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.	Your choice of technology is explained regarding how it will enhance learning. Tool engages students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge. Plan contains a detailed explanation of how the students will interact with the tool.	Your choice of technology is explained regarding how it will enhance learning. Tool engages students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge.	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.	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.
f) DIFFERENTIATION NCTM Indicator 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.	Plan identifies the grade level standard (VA SOL & CCSS) and at least two other grade levels and describes the progression and vertical alignment. Modifications to the lesson are given for different developmental levels to meet all student needs. Collaborated with peers to coach and give feedback on the	Plan includes how to modify the lesson to gear down and gear up to meet all student needs but is lacking clarity or completeness. Modifications are given that are appropriate for the given level but may lack clarity or completeness. Collaborated with peers to coach and give feedback on the differentiation of others' task.	Plan includes how to modify the lesson to gear down and gear up to meet all student needs but is lacking clarity and completeness. Grade modifications are given that are appropriate for the given level but may lack clarity and completeness.	Plan differentiation and modifications are very minimal.

	differentiation of others' task.			
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.	Plan and create sequential learning opportunities in which students connect new learning to prior knowledge and experiences. 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. Create a developmentally appropriate and challenging sequence of instruction for all students that shows a progression of learning over time toward proficiency and understanding.	Plan and create sequential learning opportunities in which students connect new learning to prior knowledge and experiences. 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. Describe the sequence of instruction for all students that shows a progression of learning over time toward proficiency and understanding.	Plan and create sequential learning opportunities in which students connect new learning to prior knowledge or experiences. Describe the sequence of instruction for all students that shows a progression of learning over time toward proficiency and understanding.	Plan and create sequential learning opportunities in which students connect new learning to prior knowledge or experiences.
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.	Plan a formative and summative assessment to inform instruction by reflecting on mathematical proficiencies essential for all students. Select, implement,	Plan a formative and summative assessment to inform instruction by reflecting on mathematical proficiencies essential for all students. Select, implement,	Plan a formative and summative assessment to inform instruction by reflecting on mathematical proficiencies essential for all students. Select, implement,	Plan a formative and summative assessment to inform instruction by reflecting on mathematical proficiencies essential for all students.

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

	paper includes insightful, thoughtful reflections that indicate group learning and growth.		how it meets the research goals.	Reflection summarizes the lesson your group implemented and how it meets the research goals.
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.	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. The lesson was modified for the second round of lesson study to address equity and high expectations of all students.	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.	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.	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.
j) 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 efforts in	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	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	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	Collect, organize, analyze, and reflect on diagnostic, formative, OR summative assessment data.

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.	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. Complete a second round of Lesson Study using the same lesson and data results.	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.	instruction or their efforts in coaching/mentoring teachers.	
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.	Reflection shows evidence that students were engaged in developmentally appropriate mathematical activities and investigations that require active engagement in building new knowledge.	Reflection shows evidence that students were engaged in investigations that require active engagement in building new knowledge.	Reflection shows evidence that students were engaged in investigations that require active engagement.	Reflection of lesson implementation is missing.
l) LESSON REFLECTION - PROBLEM SOLVING NCTM Indicator 5B.4 Facilitate students' ability to develop future inquiries based on current analyses.	Reflection shows evidence that you facilitated students' ability to develop future inquiries based on current analyses.	Reflection shows evidence that you facilitated students' ability to develop inquiries about the task.	Reflection shows evidence that you facilitated students' ability solve the task.	There is no expectation of students communicating their problem solving strategies.
Individual Reflection Paper				
Coach is a reflective practitioner	Kept a detailed journal of coaching actions with insightful reflections	Kept a detailed journal of coaching actions	Kept a journal of individual contributions to the group but coaching actions	Journal is incomplete or lacks focus and clarity

	Clearly communicated effective evidence of coaching actions throughout individual final report	Communicated evidence of coaching actions throughout individual final report	and/or reflections were missing from the journal	
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 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,	Coach/mentor teachers in applying mathematical content and pedagogical knowledge to select and use 3 or more tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets,	Coach/mentor teachers in applying mathematical content and pedagogical knowledge to select and use 2 tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation	Coach/mentor teachers in applying mathematical content and pedagogical knowledge to select and use 1 tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation	Does not coach/mentor teachers in applying mathematical content and pedagogical knowledge to select and use tools such as manipulatives and physical models, drawings, virtual

presentation tools, and mathematics-specific technologies.	presentation tools, and mathematics-specific technologies.	tools, and mathematics-specific technologies.	tools, and mathematics-specific technologies.	environments, spreadsheets, presentation tools, and mathematics-specific technologies.
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.	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.	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.	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.	The candidate does not participate in learning opportunities that address current and emerging technologies in support of mathematics learning.
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.	Assist peers in designing a task that uses developmentally appropriate mathematical activities and investigations that require active student engagement in building new knowledge.	Assist peers in designing a task that is developmentally appropriate and uses investigations.	Assist peers in thinking about their task.	Does not collaborate with peers during task creation.

(84 Total Points)