

**George Mason University**  
**College of Education and Human Development**  
Secondary Education

EDCI 672 (003) - Advanced Methods for Teaching Mathematics in the Secondary  
School  
3 Credits, Fall 2016  
Tuesdays, online and face-to-face, Thompson Hall L013

**Faculty**

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**Prerequisites/Corequisites**

EDCI 372 or 572, Teaching Mathematics in the Secondary School

**University Catalog Course Description**

Focuses on learning processes for mathematics. Introduces national and state standards regarding content and methodologies for teaching mathematics. Examines instructional methods and materials in relation to secondary mathematical content, curriculum, and assessment.

**Course Overview**

In *Teaching Mathematics in the Secondary School* course you thought about what it means to *understand* mathematics, were introduced to learning theories, became familiar with standards documents, and learned about characteristics of mathematics instruction that fosters deep understanding of and proficiency in working with mathematics.

In this course, *Advanced Methods of Teaching Mathematics in the Secondary School*, you will learn more about four aspects of mathematics teaching: managing classroom discourse, differentiation, use of technology, equity and assessment. You will explore these aspects of mathematics teaching while keeping a focus on student thinking and learning. Regardless of whether a teacher is engaging with the class, differentiating instruction, or conducting an assessment, the teacher must focus on the development of student thinking about mathematics and a respect for student difference and diversity. You will learn how to do this in this class. This will help you as you embark upon Internship and your first teaching position.

We will address the objectives as we progress through the course, which is organized into four sections:

1. Managing Classroom Discourse: In this part of the course you will critique and learn

more about teacher decisions in managing whole-class mathematical discussions. You will learn more about questioning and will consider appropriate times to ask particular questions. Then, later in the course, you will have the opportunity to practice managing a conversation when you teach a full lesson to the class.

2. **Assessment:** In this final section of the course you will consider the role of assessment in a mathematics classroom and will learn more about ways that teachers might gain insight into student thinking about mathematics.
3. **Differentiation:** In this final section of the course, you will become familiar with strategies for differentiating mathematics instruction. By focusing on student thinking, you will learn how to meet student needs while holding them to high standards.
4. **The Responsibility of the Teacher in Today's Schools** In this final section of the course you will consider the role of a *mathematics* teacher in today's world. You will consider your responsibility to the diverse group of students you will be teaching and the community.

### **Course Delivery Method**

This course will be delivered using a hybrid (50% face-to-face and 50% online) format. The online portion of the course will be delivered using a mostly asynchronous 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.

### *Technical Requirements:*

To participate in this course, students will need the following resources:

- High-speed Internet access with a standard up-to-date browser, either Internet Explorer or Mozilla Firefox. Opera and Safari are not compatible with Blackboard;
- Consistent and reliable access to their GMU email and Blackboard, as these are the official methods of communication for this course
- 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 the course requirements.
- The following software plug-ins for PCs and Macs respectively, available for free downloading by clicking on the link next to each plug-in:
- Adobe Acrobat Reader: <http://get.adobe.com/reader/>
- Windows Media Player: <http://windows.microsoft.com/en-US/windows/downloads/windows-media-player>
- Apple Quicktime Player: [www.apple.com/quicktime/download/](http://www.apple.com/quicktime/download/)
- Apple Quicktime Player
- A headset microphone for use with the Blackboard Collaborate web conferencing tool

### **Learner Outcomes or Objectives**

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

1. Demonstrate an ability to critique classroom discourse and the role of the teacher in

- facilitating that discourse through findings from research on student learning.
2. Demonstrate an ability to plan unit of mathematics instruction that fosters deep understanding of mathematics content for *all* students
  3. Plan a unit of instruction that includes elements of differentiation, assessment, and technology, is problem-based, requires students to engage in sense making, and engages students in mathematical communication while adhering to state and national standards
  4. Develop assessments (formative, summative, and alternative) that give a teacher insight into student thinking about mathematics content
  5. Conduct an analysis of ideas for teaching mathematics in diverse classrooms
  6. Develop knowledge, skills, and professional behaviors across secondary settings, examine the nature of mathematics, how mathematics should be taught, and how students learn mathematics; and observe and analyze a range of approaches to mathematics teaching and learning focusing on tasks, discourse, environment, and assessment

### **Professional Standards – National Council for Teachers of Mathematics (NCTM) Secondary Mathematics Standards**

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

**NCTM Secondary Mathematics Standard 2, Mathematical Practices:** Effective teachers of secondary mathematics solve problems, represent mathematical ideas, reason, prove, use mathematical models, attend to precision, identify elements of structure, generalize, engage in mathematical communication, and make connections as essential mathematical practices. They understand that these practices intersect with mathematical content and that understanding relies on the ability to demonstrate these practices within and among mathematical domains and in their teaching.

**NCTM Secondary Mathematics Standard 3, Content Pedagogy:** Effective teachers of secondary mathematics apply knowledge of curriculum standards for mathematics and their relationship to student learning within and across mathematical domains. They incorporate research-based mathematical experiences and include multiple instructional strategies and mathematics-specific technological tools in their teaching to develop all students' mathematical understanding and proficiency. They provide students with opportunities to do mathematics – talking about it and connecting it to both theoretical and real-world contexts. They plan, select, implement, interpret, and use formative and summative assessments for monitoring student learning, measuring student mathematical understanding, and informing practice.

**NCTM Secondary Mathematics Standard 4, Mathematical Learning Environment:**

Effective teachers of secondary mathematics exhibit knowledge of adolescent learning, development, and behavior. They use this knowledge to plan and create sequential learning opportunities grounded in mathematics education research where students are actively engaged in the mathematics they are learning and building from prior knowledge and skills. They demonstrate a positive disposition toward mathematical practices and learning, include culturally relevant perspectives in teaching, and demonstrate equitable and ethical treatment of and high expectations for all students. They use instructional tools such as manipulatives, digital tools, and virtual resources to enhance learning while recognizing the possible limitations of such tools.

**NCTM Secondary Mathematics Standard 7, Secondary Mathematics Field Experiences and Clinical Practices:** Effective teachers of secondary mathematics engage in a planned sequence of field experiences and clinical practice under the supervision of experienced and highly qualified mathematics teachers. They develop a broad experiential base of knowledge, skills, effective approaches to mathematics teaching and learning, and professional behaviors across both middle and high school settings that involve a diverse range and varied groupings of students. Candidates experience a full-time student teaching/internship in secondary mathematics directed by university or college faculty with secondary mathematics teaching experience or equivalent knowledge base.

**Required Texts**

Brahier, D.J. (2012). *Teaching secondary and middle school mathematics* (4<sup>th</sup> edition). Boston: Pearson Education Inc.

Brahier, D. J. (2001). *Assessment in middle and high school mathematics: A teacher's guide*. New York: Eye on Education.

You will also complete additional readings as assigned. All additional readings will be uploaded to Blackboard.

**Assignments and Examinations****TK20 PERFORMANCE-BASED ASSESSMENT SUBMISSION REQUIREMENT**

Every student registered for any Secondary Education course with a required performance-based assessment is required to submit this assessment, Lesson Plan to Tk20 through Blackboard (regardless of whether the student is taking the course as an elective, a onetime course or as part of an undergraduate minor). Evaluation of the performance-based assessment by the course instructor will also be completed in Tk20 through Blackboard. Failure to submit the assessment to Tk20 (through Blackboard) will result in the course instructor reporting the course grade as Incomplete (IN). Unless the IN grade is changed upon completion of the required Tk20 submission, the IN will convert to an F nine weeks into the following semester. Students are expected to submit all assignments on time in the manner outlined by the instructor (e.g., Blackboard, Tk20, hard copy).

**Due Dates, Late Assignments, and Revised Assignments**

Due Dates: All assignments are due by 11:59pm of the date assigned.

Late Assignments: If an assignment is not uploaded by 11:59pm of the date assigned, and you

have not contacted me to receive an extension, then the assignment will be considered late. All late assignments will receive a *one-letter grade penalty*. If you know that you are going to have an issue with completing an assignment on time, please **notify me ahead of time** to avoid this late grade penalty.

*Revised Assignments:* When students earn less than 80% on an assignment, I often offer them the opportunity to revise and resubmit. As long as students meet the guidelines for resubmission, students may earn up to 75% of the missed points on the assignment. Please keep in mind that it requires additional work to grade revised assignments, so they will require additional time to re-grade.

## **Course Assignment Descriptions**

### *Unit Plan and Presentation*

This is a performance-based assessment (see rubric at the end of the document). Throughout this semester, you will explore many issues related to the teaching and learning of mathematics. In this culminating assignment, you will have the opportunity to use the knowledge, skills, and understandings you've gained in this and the previous semester in the creation of a complete unit of study. Within this unit plan, you will be asked to design lessons that pay attention to the use of technology, the development of student understanding of mathematics content, various standards documents, assessment of student understanding, and ways to differentiate instruction for diverse groups of learners. After submission of the unit plan, you will present your plan to your peers so that the entire class can begin to create a collection of teaching ideas for various content areas within secondary mathematics. **The requirement for this assignment differs for graduate and undergraduate students. You must pass this assignment to continue in the program.**

### *Individualized Lesson Plan*

This is a performance-based assessment (see rubric at the end of the document). You will develop an individualized plan for a child with developmental, learning, physical, or linguistic differences within the context of the general environment and curriculum. This will count as one of the lessons in your unit plan.

### *Assessment Assignment*

In this assessment, you will apply what you learned about assessment to your unit plan. Building on what you learned, you will further develop your assessment plan for the unit and, in so doing, develop two assessment instruments and corresponding grading rubrics. One assessment will be a quiz assessing the goals and objectives from one of the lessons in your unit plan. Another assessment will be an alternative form of assessment used to assess the goals and objectives of the unit.

### *Peer Teaching Activity*

You will record your facilitation of a short task or portion of a task and upload the video clips to Edthena. Then you will code the videos using codes discussed in class and write reflections/self-assessments based on the video clips. Edthena is an online tool that uses video coding as a means for feedback and reflection. Purchase of the software is a requirement for this course.

### *Micro-Teaching Assignment*

In this assignment, you will apply all that you learned about planning and orchestrating classroom discourse to the development, implementation, and reflection upon a lesson surrounding a mathematics concept covered in secondary mathematics classrooms. The instructor will assign the lesson topic. The implementation of the lesson will be video-recorded so as to facilitate the reflection process. This process is valuable to you as you teach and reflect on your teaching of a lesson.

### *Field Work Assignment*

You will complete 15 hours of field work and keep a log of these hours for submission at the end of the semester. During this time, you will remain with one teacher and slowly begin to interact with students. By the end of the experience you will have taught a whole, or part of a whole, lesson. You will submit the lesson and reflect upon its effectiveness. This assignment provides you with an excellent opportunity to work with real students as you prepare to become a teacher.

## **Other Requirements**

### **Participation and Preparation**

The participation of each class member is vitally important. If you do not come prepared to discuss the readings, to share your work on a given assignment, and to participate in the activities of the day the entire class will suffer. You **must** commit to coming to every class on time, being prepared for the evening's activities, and being ready to participate. You can expect that, in addition to work on the larger projects outlined below, there will be weekly readings and assignments that will fall into this category. If, however, there is an emergency and you cannot make it to class, you **must email me ahead of time** and submit all assignments electronically before the end of class.

### **Communication**

You must regularly check your GMU email and Blackboard: <https://courses.gmu.edu>.

## **Course Performance Evaluation Weighting**

The following assignments will help you (and me) to gauge your development throughout the course:

Assessment	Percentage of Grade (UG and Graduate)
Participation and Preparation (including weekly and smaller assignments)	15%
Peer Teaching	10%
Assessment Assignment	15%
Micro-Teaching	10%
Field Work Assignment	15%
Unit Plan Assignment (differentiated by undergrad/graduate level)	20%
Individual Plan	10%

**Grading Policies**

Final course grades will be assigned based upon weighted percentages as indicated by the Course Expectations.

A	93-100%
A-	90-92%
B+	88-89%
B	80-87%
C	70-79%
F	Below 70%

**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*

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

- a. Support for submission of assignments to Tk20 should be directed to [tk20help@gmu.edu](mailto:tk20help@gmu.edu) or <https://cehd.gmu.edu/api/tk20>. Questions or concerns regarding use of Blackboard should be directed to <http://coursesupport.gmu.edu/>.
- b. 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/>).
- c. 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/>).
- d. 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**



**Note:** Faculty reserves the right to alter the schedule as necessary, with notification to students. The dates are subject to change dependent on the progress of the course. I will not move due dates for major assignments to an earlier date, only a later date if necessary. Additional smaller assignments and readings may be made each week. Sometimes students will read different articles or chapters and share their understandings with the class.

\*\* Indicates that the reading is on Bb.

Date	Readings	In-Class Activities and/or Assignments Due
<b>August 30 (F2F)</b> <ul style="list-style-type: none"> <li>• <b>Course Goals</b></li> <li>• <b>Staging a Unit</b></li> </ul>	Brahier (2012) pp. 134-141  **Wiggins & McTighe (2011) pp. 3-12	<ul style="list-style-type: none"> <li>• Discuss Unit Plan Project</li> <li>• Discuss Peer Teaching Activity</li> </ul>
<b>September 6 (online)</b> <ul style="list-style-type: none"> <li>• <b>Facilitating Mathematical Discourse</b></li> </ul>	**Boaler & Broadie (2005)  **Hoffman (2009)	<ul style="list-style-type: none"> <li>• <b>Meet via Collaborate (whole class)</b></li> <li>• Watch “The Border Problem” before class</li> <li>• Complete Question Types Table; upload to Bb before 9/6 class</li> </ul>
<b>September 13 (F2F)</b> <ul style="list-style-type: none"> <li>• <b>Facilitating Mathematical Discourse</b></li> <li>• <b>Proof &amp; Argumentation</b></li> </ul>	**Kazemi (2002)  **NCTM (2012)	<ul style="list-style-type: none"> <li>• Select Unit Plan Topic</li> <li>• Peer Teaching Activity #1</li> <li>• Discuss Assessment Plan Project</li> </ul>
<b>September 20 (online)</b> <ul style="list-style-type: none"> <li>• <b>Intro to Assessment</b></li> <li>• <b>Geometric Thinking</b></li> </ul>	Brahier (2001, assessment book)  **Dekker (2007)	<ul style="list-style-type: none"> <li>• Meet via Collaborate for individual project support (if needed)</li> <li>• Submit Unit Concept Map to Bb by 9/25</li> <li>• Draft closed questions for Assessment Plan; upload to Bb by 9/25</li> </ul>
<b>September 27 (F2F)</b> <ul style="list-style-type: none"> <li>• <b>Assessment – Alternate Assessments &amp; Rubrics</b></li> <li>• <b>Geometric Thinking (Van Hiele)</b></li> </ul>	Select one of the following for discussion leadership  Brahier (2001) Chapter 2  Goetz (2005)  Stutzman & Race (2004)  **Small & Lin (2010)	<ul style="list-style-type: none"> <li>• Bring DRAFT Unit Plan Calendar, and SOL Standards to class.</li> <li>• Submit first lesson plan for Unit Plan project to Bb by 10/2</li> <li>• Upload Peer Teaching Activity #1 and analysis to Edthena by</li> </ul>

		10/2
<b>October 4 (online)</b> <ul style="list-style-type: none"> <li>• <b>Assessment - Homework</b></li> <li>• <b>Geometric Thinking</b></li> </ul>	Brahier (2001) Chapters 3 & 4	<ul style="list-style-type: none"> <li>• Respond to Discussion Board post about final grades by 10/9</li> </ul>
<b>October 11</b>	No Class	
<b>October 18 (F2F)</b> <ul style="list-style-type: none"> <li>• <b>Alternative Assessments</b></li> <li>• <b>Rubrics</b></li> </ul>	Brahier (2001) Chapter 5	<ul style="list-style-type: none"> <li>• Bring Alternative Assessment DRAFT or ideas to class (bring to 10/18 class)</li> <li>• Design one parallel task DRAFT based on the reading for your Unit topic (bring to 10/18) class</li> </ul>
<b>October 25 (online)</b> <ul style="list-style-type: none"> <li>• <b>Assessment</b></li> </ul>	Work on Assessment Projects Assessment Plan Due (upload to Bb by 10/30)	
<b>November 1 (F2F)</b> <ul style="list-style-type: none"> <li>• <b>Intro to Equity in Math Ed</b></li> </ul>	Brahier (2012) – Chapter 12	<ul style="list-style-type: none"> <li>• Peer Teaching Activity #2</li> <li>• Bring Lesson Plan #2 to class for workshop</li> <li>• Discuss Individual Student Plan assignment</li> </ul>
<b>November 8 (online)</b> <ul style="list-style-type: none"> <li>• <b>Equity in Math Ed</b> <ul style="list-style-type: none"> <li>○ <b>Special Education</b></li> <li>○ <b>Gifted Ed</b></li> <li>○ <b>ELLs</b></li> </ul> </li> </ul>	<b>**Principles for Math and ELLs (ALL)</b>  Choose 1 <ul style="list-style-type: none"> <li>○ <b>**Avineri et al. (2011)</b></li> <li>○ <b>**Dieker (2011)</b></li> </ul>	<ul style="list-style-type: none"> <li>• Meet via Collaborate for individual project support (if needed)</li> <li>• Respond to Discussion Board Questions</li> <li>• Upload Peer Teaching Activity #1 and analysis to Edthena by 11/13</li> </ul>
<b>November 15 (F2F)</b> <ul style="list-style-type: none"> <li>• <b>Equity in Math Ed</b></li> <li>• <b>Complex Instruction</b></li> </ul>	<b>**Cohen et al. (1999) – Grad students only</b>  <b>**Nasir et al. (2013) – all students</b>	<ul style="list-style-type: none"> <li>• Microteaching – Group 1</li> </ul>
<b>November 22 (online)</b>	Work on Unit Plans (including individual student plan) Unit Plan Project Due	

Upload to Bb by 11/27		
<b>November 29 (F2F)</b>	Brahier (2012) pp. 370-375	<ul style="list-style-type: none"> <li>• Microteaching – Group 2</li> <li>• Submit Microteaching (Group 1) reflections to Bb</li> </ul>
<b>Dec 6 (F2F)</b> <ul style="list-style-type: none"> <li>• <b>Math Tchr in the community</b></li> </ul>	Brahier (2012) pp. 376-392	<ul style="list-style-type: none"> <li>• Unit Plan Presentations</li> <li>• Submit Field Experience Reflections to Bb</li> <li>• Submit Microteaching (Group 2) reflections to Bb</li> </ul>

**Assessment Rubric(s)**

The following pages of this document are the rubrics for the performance-based assessments for this course, the Unit Plan project and the Individualized Lesson Plan task.

## UNIT PLAN ASSIGNMENT

Due \_\_\_\_\_

Throughout the semester, we have been discussing (1) what it means to understand mathematics, (2) various learning theories and their implications for the teaching and learning of mathematics, (3) NCTM's vision for school mathematics teaching and learning, (4) the role of state and local standards documents in the design of instruction, (5) characteristics of instruction that promote the development of strong understandings of mathematics, and (6) organization and planning of units and lessons. You have had opportunities to observe teaching, to lead the class in problem solving through a mini-teach assignment, and to analyze various aspects of mathematics instruction. Shortly, we will be discussing ways to assess student understanding of mathematics and you will be interviewing a student to have practice in doing so. In this culminating, unit plan project you will have the opportunity to apply all that you have learned (and will learn) to the design of an entire unit of study for secondary students – students you will someday teach!

### Assignment Description

You will develop a unit plan for a significant topic in a standard 6-12 mathematics curriculum. A unit, as defined by Brahier (2009) is “a carefully planned set of learning experiences that are designed to address one or several goals and objectives over time” (p. 136). These goals should be organized around a unifying topic in mathematics.

First, you need to identify a unit. You should pick a topic that is broad enough (and significant enough) to cover 2-4 weeks of instruction (or 15-20 hours). “Solving algebraic equations” is far too broad; “constructing circles with a compass” is far too narrow. The choice of your unit should be consistent with the NCTM and Virginia State Standards. For ideas on choosing a unit, you should consult the standards documents and potentially browse through some of the mathematics textbooks in the Johnson Center library.

Once you have identified a unit, you will develop a unit plan that includes the following components:

1. A top-level outline of the unit
2. A calendar outlining the topics for each day of the unit
3. Lesson plans for **1 week (5 lesson plans, 4 for UG students including the first lesson)** of instruction within the unit.
4. An assessment plan
5. A unit narrative

The following provides a detailed outline of each of the five components of this assignment.

### **1. Top-level outline – Assessed independently from final scoring rubric**

You will submit an outline of your unit. This outline should include:

1. a title (identifying its subject matter or mathematical focus),
2. a description of the students for whom the unit is intended (grade, course, prior knowledge needed, etc.),
3. a statement of the unit's goal(s),

4. a statement (paragraph) of the rationale for the unit describing why it is important (refer to NCTM and/or Brahier), and
5. a list of the objectives relevant to the unit. This should be a comprehensive list for the unit, and *not limited to the objectives of the 2 weeks of lessons you are planning*. The list should indicate how these objectives align to the NCTM and VA SOL standards
6. a concept map highlighting the major concepts covered in the unit and how they relate

**7. Calendar describing the unit – Assessed independently from final scoring rubric**

You will submit a calendar to describe the unit. This calendar should illustrate the progression of the topics and the connections between days of instruction. In so doing, it should outline the topics for each day of instruction within the unit.

**8. One week of the unit (including the first lesson) planned in detail – Assessed using Unit Plan rubric comprised of NCTM Secondary Math Standards**

You will submit one week's worth of detailed lesson plans. Lesson plans should be submitted according to the format discussed in class. They should be interactive and should encourage inquiry. You are responsible for describing the actions of the teacher, the progression of the mathematical activity and the possible responses and questions from the students in the description of the instruction.

It is important that you submit the *first lesson* of your unit. In particular, the first lesson should provide a suitable introduction and motivation for the entire unit. Additionally, all the lessons should be clearly and meaningfully related to one another.

**9. Unit narrative – Assessed using Unit Plan rubric comprised of NCTM Secondary Math Standards**

The final component of your unit plan is a narrative describing the following:

1. Your goals for mathematics teaching and learning and their representation in the unit plan. For instance, if hands-on learning using real-world problem solving is important to you, how have you implemented it in the unit plan?
2. How the teaching strategies you have implemented allow for the diverse learning styles and abilities of your students.
3. How the unit is mathematically and pedagogically cohesive. Explain how the instructional strategies and mathematical content fits together.

**What I'll be looking for:**

The following identifies *some* of the criteria used to judge the quality of your unit assignment:

1. A choice of a meaningful unit topic, according to NCTM and Virginia standards.
2. A *comprehensive* outline of the unit. That is, your objectives should be consistent with your stated goal, and they should span enough of a range to include significant and meaningful coverage of the relevant mathematical ideas. The objectives should highlight the variety of types of knowledge appropriate to the unit's subject matter.
3. Lesson plans that are professional, detailed, and consistent with the standards set by NCTM and the State of Virginia. A variety of instructional strategies should be included, with strategies (i.e., direct instruction, individual work, group work,

whole-class discussions, etc.) appropriately matched to the lesson objectives they are intended to support. Lessons should be appropriately sequenced.

4. Assessments that are appropriate measures of the types of knowledge they are intended to measure (as determined by the lesson's objectives).
5. Creativity. Your book, our readings, and our classroom discussions and activities have focused on the need for classroom lessons that support students' direct engagement, communication, and meaningful thinking. Your unit and lesson plans should demonstrate your efforts to think beyond strictly traditional lessons.

### **Grading Rubric**

The following rubrics are used to assess the final lesson plan submission and accompanying narrative (Parts 3 and 4). The grading rubric for this assignment is in your syllabus and posted on Blackboard. The rubric is an integration of the InTASC *General Evaluation Rubric*, which is used by George Mason University for all secondary unit plans, regardless of content area, and the NCTM Secondary Mathematics rubric and is used only for secondary mathematics students. Please become familiar with the rubric prior to working on the unit plan.

**Teacher Candidate Instruction and Assessment Plan  
Rubric**

Criteria	Does Not Meet Standard 1	Approaches Standard 2	Meets Standard 3	Exceeds Standard 4
<b>Section 1</b>				
<b>Description of Individual Student</b>				
<p><b>The candidate regularly assesses individual and group performance in order to design and modify instruction to meet learners' needs in each area of development (cognitive, linguistic, social, emotional, and physical) and scaffolds the next level of development.</b></p> <p><i>InTASC 1(a)</i></p>	<p>The candidate does not provide a description or the description of student <b>does not</b> include assessment data <b>related to cognitive, linguistic, social, emotional, and/or physical</b> developmental skill levels and abilities, interests, <b>or</b> educational progress.</p>	<p>The candidate provides description of student that includes appropriate assessment data related to <b>some but not all</b> of the following: cognitive, linguistic, social, emotional, and/or physical developmental skill levels and abilities, interests, <b>or</b> educational progress.</p>	<p>The candidate provides description of student that includes appropriate assessment data on <b>all</b> of the following: cognitive, linguistic, social, emotional, and/or physical developmental skill levels and abilities, interests, and educational progress.</p> <p>The candidate describes impact of student characteristics on learning.</p>	<p>The candidate provides description of student that includes both appropriate and multiple forms of assessment data on <b>all</b> of the following: cognitive, linguistic, social, emotional, and/or physical developmental skill levels and abilities, interests, and educational learning need.</p> <p>The candidate describes <b>and</b> provides examples of impact of student characteristics on learning.</p>
<b>Statement of Educational Need</b>				
<p><b>The candidate effectively uses multiple and appropriate types of assessment data to identify each student's learning needs and to develop differentiated learning experiences.</b></p>	<p>The candidate <b>does not</b> address student educational needs or <b>inappropriately uses</b> assessment data to create a statement of educational need.</p>	<p>The candidate uses assessment data to create a statement of educational need that is <b>marginally</b> aligned with assessment results.</p>	<p>The candidate uses assessment data to create an <b>appropriate</b> statement of educational need that is <b>aligned</b> with assessment results.</p>	<p>The candidate <b>effectively</b> uses assessment data from <b>multiple sources</b> to create a <b>thorough and appropriate</b> statement of educational need that is <b>aligned</b> with assessment results.</p>

<i>InTASC 6(g)</i>				
<b>Section 2 Identification of Learning Objectives</b>				
<p>The candidate <b>individually and collaboratively selects and creates learning experiences that are appropriate for curriculum goals and content standards, and are relevant to learners.</b></p> <p><i>InTASC 7(a)</i></p>	<p>The candidate identifies learning objectives that are <b>either</b> (a) <b>incomplete</b> because related outcomes are not identified <b>or</b> (b) the objectives are <b>not directly related</b> to student educational need.</p>	<p>The candidate identifies learning objectives <b>without relevance</b> to student educational need.</p>	<p>The candidate identifies learning objectives with related outcomes that are <b>relevant</b> to individual student needs.</p>	<p>The candidate identifies <b>distinct</b> learning objectives with related outcomes that are <b>relevant</b> to individual student needs.</p>
<b>Identification of Rationale for Learning Objectives</b>				
<p>The candidate <b>plans for instruction based on formative and summative assessment data, prior learner knowledge, and learner interest.</b></p> <p><i>InTASC 7(d)</i></p>	<p>The candidate <b>does not provide</b> rationales which are aligned to the specific learning objectives and/or the relationship of the learning objectives to student educational needs is <b>missing or unclear.</b></p>	<p>The rationales provided <b>are not</b> be aligned to the specific learning objective and the relationship of the learning objectives to student educational needs is <b>unclear.</b></p>	<p>The rationales provided <b>are aligned</b> with the learning objective and the relationship of learning objectives to student educational needs is <b>clearly</b> identified.</p>	<p>The rationales provided <b>are aligned</b> with the learning objective and the relationship of the learning objectives to student educational needs is <b>clearly and effectively</b> identified.</p>
<b>Section 3 Description of Instructional Strategies</b>				
<p>The candidate <b>plans how to achieve each student's learning goals, choosing appropriate strategies and accommodations, resources, and materials to differentiate instruction for individuals and groups of learners.</b></p> <p><i>InTASC 7(b)</i></p>	<p>The candidate <b>does not</b> identify instructional strategies or identifies instructional strategies that are <b>not related</b> to the learning objectives <b>or</b> student learning needs.</p>	<p>The candidate identifies instructional strategies that are <b>marginally</b> related to the learning objectives <b>or</b> student learning needs.</p>	<p>The candidate identifies <b>evidence-based</b> instructional strategies that are aligned to the learning objectives and student learning needs.</p>	<p>The candidate identifies <b>evidence-based</b> instructional strategies that are aligned to <b>specific</b> learning objectives and student learning needs.</p> <p>The candidate provides <b>specific sources of</b> evidence for the instructional strategy.</p>



<b>Rationale for Instructional Strategies</b>				
<p><b>The candidate understands that each learner’s cognitive, linguistic, social, emotional, and physical development influences learning and knows how to make instructional decisions that build on learners’ strengths and needs.</b></p> <p><i>InTASC 1(e)</i></p>	<p>The candidate <b>does not provide</b> rationales which are aligned to the specific instructional strategies <b>and/or</b> the relationship of instructional strategies to the learning objectives and student educational needs is <b>missing or unclear</b>.</p>	<p>The rationales provided <b>do not</b> align to the specific instructional strategies and, the relationship of the instructional strategies to the learning objectives that meet student educational needs is <b>unclear</b>.</p>	<p>The rationales provided <b>are aligned</b> with instructional strategies and, the relationship of the instructional strategies to the learning objectives that meet student educational needs is <b>clearly</b> identified.</p>	<p>The rationales provided <b>are aligned</b> with the strategies and, the relationship of the instructional strategies to <b>specific</b> learning objectives that meet student educational needs is <b>clearly and effectively</b> identified.</p>
<b>Section 4</b>				
<b>Description of Instructional Adaptation</b>				
<p><b>The candidate accesses resources, supports, and specialized assistance and services to meet particular learning differences or needs.</b></p> <p><i>InTASC 2(f)</i></p>	<p>The candidate <b>does not identify</b> either adaptations or accommodations to support student achievement of learning objectives.</p>	<p>The candidate identifies <b>either</b> adaptations or accommodations that <b>minimally support</b> student achievement of learning objectives.</p>	<p>The candidate identifies and describes appropriate adaptations or accommodations that <b>clearly support</b> student achievement of learning objectives.</p>	<p>The candidate identifies and thoroughly describes appropriate adaptations or accommodations that <b>clearly support</b> student achievement of learning objectives.</p>
<b>Rationale for Instructional Adaptation</b>				
<p><b>The candidate knows a range of evidence-based instructional strategies, resources, and technological tools and how to use them effectively to plan instruction that meets diverse learning needs.</b></p>	<p>The candidate <b>does not provide</b> rationales that are aligned to the adaptations and accommodations <b>and/or</b> the relationship of the adaptations and accommodations to student educational needs is <b>missing or unclear</b>.</p>	<p>The rationales <b>marginally provides</b> evidence to support the adaptations and accommodations and the relationship of the adaptations and accommodations to student educational needs is <b>unclear</b>.</p>	<p>The rationales provide <b>adequate</b> evidence to support the adaptations and accommodations and the relationship of the adaptations and accommodations to student educational needs is <b>clearly identified</b>.</p>	<p>The rationales provide <b>evidence-based support</b> for the specific adaptations and accommodations and the relationship of the adaptations and accommodations to student educational needs is <b>clearly and thoroughly</b></p>

<i>InTASC 7(k)</i>				identified.
<b>Section 5 Assessment and Documentation of Student Progress</b>				
<p><b>The candidate designs assessments that match learning objectives with assessment methods and minimizes sources of bias that can distort assessment results.</b></p> <p><i>InTASC 6(b)</i></p>	<p>The candidate <b>does not</b> describe an assessment plan that that evaluates all student learning objectives <b>or</b> describes a plan that <b>does not</b> directly measure all of the student learning objectives (e.g., is <b>not observable, measurable</b>).</p>	<p>The candidate describes an assessment plan that evaluates all student learning objectives but <b>does not</b> include documentation of <b>both</b> formative and summative measures that <b>does not</b> address possible assessment bias.</p>	<p>The candidate describes an assessment plan that evaluates all student learning objectives <b>and includes both</b> formative and summative assessments that minimize sources of bias.</p> <p>The candidate describes the assessment results that would prompt modification of instructional plans <b>and</b> those specific modifications.</p>	<p>The candidate describes an assessment plan that evaluates <b>all</b> student learning objectives, <b>includes</b> formative and summative assessments that minimize sources of bias and includes <b>multiple</b> data sources for each objective.</p> <p>The candidate describes <b>multiple</b> assessment results that would prompt modification of instructional plans <b>and</b> those specific modifications.</p>

**EDCI 472/672 Unit Plan Project Rubric  
NCTM Secondary Mathematics Rubric**

**NCTM Standard 2: Mathematical Practices**

Candidates solve problems, represent mathematical ideas, reason, prove, use mathematical models, attend to precision, identify elements of structure, generalize, engage in mathematical communication, and make connections as essential mathematical practices.

This standard aligns with **InTASC standard 4:** The candidate understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and creates learning experiences that make these aspects accessible and meaningful for learners to ensure content mastery.

*Plans include opportunities for students to engage in the following:*

<b>NCTM CAEP Sub-Element Alignment</b>	<b>Does Not Meet Expectations (1)</b>	<b>Approaches Expectations (2)</b>	<b>Meets Expectations (3)</b>	<b>Exceeds Expectations (4)</b>
<b>2a.1</b>	Lessons provide no evidence of use of problem solving to develop conceptual understanding.	Lessons include limited or unclear uses of problem solving to develop conceptual understanding	Lessons include activities that use problem solving to develop conceptual understanding.	Lessons include activities that provide students with opportunities to use problem solving and to develop conceptual understanding.
<b>2a.2</b>	Lessons do not show evidence of connections to the field of mathematics or real-world contexts	Lessons do not engage students in problem solving activities or the activities only connect to the field of mathematics	Lessons engage students in problem solving activities within the field of mathematics. The candidate makes connections in real-world contexts.	Lessons engage students in problem solving activities within the field of mathematics and to connections in real-world contexts.
<b>2a.3</b>	Lessons offer few opportunities for students to adapt and present a variety of problem solving	Lessons offer opportunities for students to solve problems and to make sense of them and	Lessons create opportunities for students to adapt and present a variety of problem solving	Lessons consistently create opportunities for students to adapt and present a variety of problem solving

	strategies and to make sense of problems and persevere in solving them.	persevere in solving them. Opportunities to present a variety of problem are lacking.	strategies and often lead to students making sense of problems and persevere in solving them.	strategies and to make sense of problems and persevere in solving them.
<b>2a.4</b>	Lessons do not include opportunities for students to formulate and test conjectures in order to frame generalizations.	Lessons include experiences that allow for student discovery but lack the proper foundation for students to frame generalizations.	Lessons include an opportunity for students to formulate and test conjectures in order to frame generalizations.	Lessons include several mathematical activities and investigations that allow for students to formulate and test conjectures in order to frame generalizations
<b>2b.1</b>	Lessons are not designed to allow students opportunities to reason abstractly and quantitatively with attention to precision.	Lessons are designed to allow students opportunities to reason abstractly and quantitatively with attention to precision, yet inappropriate strategies or flawed arguments are within the materials.	Lessons support opportunities to communicate mathematical reasoning with clarity, precision, and logical order.	Lessons support opportunities to reason abstractly, reflectively, and quantitatively with attention to units, constructing viable arguments and proofs.
<b>2b.2</b>	Lessons have no evidence of students having opportunity to understand the mathematical reasoning and strategies of others.	Lessons have evidence of attempts for students having opportunities to reason mathematically or understand the strategies of others. Candidate inconsistently interprets the reasoning of his/her student in the analysis or draws	Lessons have evidence of consistent opportunities for students to reason mathematically and understand the strategies of others. Candidates can meaningfully interpret the reasoning of his/her students.	Lessons have evidence of consistent opportunities for students to reason mathematically and understand the strategies of others. Candidates can meaningfully interpret the reasoning of his/her students.

		limited conclusions.		
<b>2b.3</b>	Lessons do not include opportunities for students to represent or model generalizations using mathematical reasoning.	Lessons include very few opportunities for students to represent or model generalizations using mathematical reasoning.	Lessons include opportunities for students to represent and model generalizations using mathematical reasoning.	Lessons are designed around opportunities for students to represent and model generalizations and to recognize patterns of mathematical reasoning.
<b>2b.4</b>	Lessons only allow student to communicate mathematical ideas using a single representation (e.g., only symbolic representation).	Lessons allow for communication using more than one representation, but no connections are made between/among the representations.	Lessons mostly require student communication and connections across a variety of representations.	Lessons consistently require student communication and connections across a variety of representations.
<b>2b.5</b>	Lessons do not provide opportunities for students to use appropriate vocabulary and symbols to communicate mathematical ideas to other.	Lessons provide very few opportunities for students to use appropriate vocabulary and symbols, OR vocabulary is only used in a definitional way so students do not use it to communicate mathematical ideas.	Lessons mostly require students to use appropriate vocabulary and symbols to communicate mathematical ideas to others.	Lessons consistently require students to use appropriate vocabulary and symbols to communicate mathematical ideas to others.

<b>2c.1</b>	Lessons are not designed to recognize mathematical models derived from real-world contexts.	Lessons incorporate real-world contexts, but do not require students to formulate and represent them.	Lessons provide opportunities for students to formulate and represent mathematical models derived from real-world contexts.	Lessons provide opportunities for students to formulate and represent mathematical models derived from real-world contexts and to build mathematical understanding from the models.
<b>2c.2</b>	Lessons are not designed to recognize mathematical models derived from real-world contexts.	Lessons incorporate real-world contexts, but do not require students to analyze and interpret them.	Lessons provide opportunities for students to analyze and interpret mathematical models derived from real-world contexts.	Lessons provide opportunities for students to analyze and interpret mathematical models derived from real-world contexts and to build mathematical understanding from the models.
<b>2d</b>	Lessons do not create opportunities for students to organize thinking and use precise mathematical language.	Lessons minimally allow for students to organize thinking. Students rarely use the language of mathematics to precisely communicate to multiple audiences.	Lessons allow for students to organize thinking and use the language of mathematics to precisely communicate ideas.	Lessons allow for students to organize thinking and use the language of mathematics to precisely communicate ideas to multiple audiences.

2e.1	Lessons do not demonstrate the interconnectedness of mathematical ideas and how they build on each other.	Lessons minimally allow students to demonstrate the interconnectedness of mathematical ideas and do not allow student to show how they build on each other.	Lessons allow students to demonstrate the interconnectedness of mathematical ideas and often allow students to show how they build on each other.	Lessons consistently allow students to demonstrate the interconnectedness of mathematical ideas how they build on each other.
2e.2	Lessons do not allow student to apply mathematical connections among mathematical ideas and across various content areas and real-world contexts	Lessons allow student to apply mathematical connections among mathematical ideas but not across various content areas and real-world contexts	Lessons often allow student to apply mathematical connections among mathematical ideas and across various content areas and real-world contexts.	Lessons consistently allow student to apply mathematical connections among mathematical ideas and across various content areas and real-world contexts.
2f	Lessons do not model how the development of mathematical understanding within and among mathematical domains intersects with the mathematics practices of problem solving, reasoning communicating, connecting, and representing.	Lessons model how the development of mathematical understanding within and among mathematical domains intersects with <i>some</i> the mathematics practices of problem solving, reasoning communicating, connecting, and representing.	Lessons model how the development of mathematical understanding within and among mathematical domains intersects with all the mathematics practices of problem solving, reasoning communicating, connecting, and representing.	Lessons model and allow student to model how the development of mathematical understanding within and among mathematical domains intersects with some the mathematics practices of problem solving, reasoning communicating, connecting, and representing.
<b>Mean Score for Standard 2</b>				

**NCTM Standard 3: Content Pedagogy**

Candidates apply knowledge of curriculum standards for mathematics and their relationship to student learning within and across mathematical domains. They incorporate research-based mathematical experiences and include multiple instructional strategies and mathematics-specific technological tools in their teaching to develop all students’ mathematical understanding and proficiency. They provide students with opportunities to do mathematics – talking about it and connecting it to theoretical and real-world contexts. They plan, select, implement, interpret, and use formative and summative assessments for monitoring student learning, measuring student mathematical understanding, and informing practice.

This standard aligns with **InTASC Standards 5, 7, and 8:**

**Standard 5, Application of Content:** The candidate understands how to connect concepts and use different perspectives and digital resources to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues

**Standard 7, Planning for Instruction:** The candidate plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of digital age technology, content areas, curriculum, and cross-disciplinary skills.

**Standard 8, Instructional Strategies:** The candidate understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge.

*Lessons include the following:*

<b>3a.</b>	Candidate’s goals of instruction are unclear and/or inappropriate.	Candidate identifies the goals of instruction, but do not align them to appropriate curriculum standards.	Candidate’s Lessons are appropriate and align with the curricular standards.	Candidate clearly identifies the goals of the instruction and how they align with the appropriate curriculum standards. The candidate identifies learning outcomes based on the standards.
<b>3b</b>	Candidate does consider research in planning for rich mathematical learning experiences in their narrative or lesson plans.	Candidate cites research in planning for rich mathematical learning experiences in narrative, but it is not evident in the lessons.	Candidate cites and considers research in planning for rich mathematical learning experiences as evidenced in their narrative and lessons.	Candidate cites, analyzes, and considers research in planning for rich mathematical learning experiences as evidenced in their narrative and lessons.



<b>3c.1</b>	Lessons do not incorporate differentiated learning strategies to support diverse populations	Lessons include only one differentiation strategy across all the lessons in the unit to support diverse populations.	Lessons include more than one differentiated instructional strategy that support diverse populations.	Lessons include a variety of differentiated instructional strategies that support diverse populations.
<b>3c.2</b>	Lessons do not incorporate mathematics-specific technology.	Lessons inappropriately incorporate mathematics-specific technology OR technology use fails to build conceptual understanding and procedural fluency.	Lessons include appropriate mathematics-specific technology in an attempt to build conceptual understanding and fluency.	Lessons include appropriate mathematics-specific technologies to effectively support all students' conceptual understanding and procedural fluency.
<b>3e.1</b>	Lessons do not incorporate selection of high quality tasks.	Lessons rarely incorporate high-quality tasks	Lessons often incorporate high-quality tasks	Lessons consistently incorporate high-quality tasks
<b>3e.2</b>	Candidate does not engage students through guided mathematical discussions.	Candidate rarely engages students in guided mathematical discussions.	Candidate often engage students in guided mathematical discussions.	Candidate consistently engage student in guided mathematical discussions and encourage students to facilitate their own discourse.
<b>3e.3</b>	Lessons do not support students in identifying key mathematical ideas.	Lessons have potential to support students in identifying key mathematical ideas, but candidate does not plan for opportunities for students to conjecture.	Lessons often support students in identifying key mathematical ideas.	Lessons consistently support students in identifying key mathematical ideas.
<b>3e.4</b>	Candidate does not identify and address	Candidate rarely identifies and addresses	Candidate identifies and address student	Candidates identify and address student

	student misconceptions within the lesson plans.	student misconceptions within the lesson plans.	misconceptions in lesson plans.	misconceptions and encourage his/her students to do the same.
<b>3e.5</b>	Candidate does not employ any questioning strategies.	Candidate only uses closed questioning strategies.	Candidate uses a range of open and closed questioning strategies.	Candidate employs a wide range of questioning strategies, with emphasis on open questions that push students to create meaning.
<b>3f.1</b>	Candidate is not competent in planning, selecting, and implementing formative or summative assessments, as evidenced by unit materials and narrative.	Candidate is competent in planning, selecting, and implementing summative or formative assessments, but not both, as evidenced by unit materials and narrative.	Candidate is competent in planning selecting and implementing summative assessments, as evidenced by unit materials and narrative.	Candidate is competent in planning, selecting, implementing formative and summative assessments to inform instruction, as evidenced in unit materials and narrative. Candidate uses results to inform instructional planning as evidenced in narrative.

3f.2	Candidate is not competent in interpreting and using formative assessments, as evidenced by unit materials and narrative.	Candidate is competent in interpreting and using formative assessments or summative assessments, but not both, as evidenced by unit materials and narrative.	Candidate is competent in interpreting and using results of formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students, as evidenced by unit materials and narrative.	Candidate is competent in interpreting in and using results of formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students, as evidenced by unit materials and narrative. Candidate uses assessment results for subsequent instructional planning, as evidenced in narrative.
<b>Mean Score for Standard 3</b>				
<p><b>NCTM Standard 4: Mathematical Learning Environment</b>  Candidates exhibit knowledge of adolescent learning, development, and behavior and use this knowledge to create learning opportunities that are grounded in mathematics education research in which students are actively learning and building on prior knowledge and skills.  This standard also aligns with <b>InTASC Standards 1a, 2, and 3b:</b>  <b>Standard 1a, Learner Development:</b> The candidate assesses individual and group performance to design and modify instruction to meet learners' developmental needs.  <b>Standard 2, Learning Differences:</b> The candidate uses understanding of individual differences, diverse cultures, and communities to ensure inclusive learning environments that enable each learner to meet high standards.  <b>Standard 3b, Learning Environments:</b> The candidate promotes collaboration between students as well as self-direction, development of shared values and respectful interactions, rigorous academic discussions, and responsibility for quality work.  <i>Plans include the following:</i></p>				
4a.1	Candidate does not demonstrate evidence of	Candidate demonstrates minimal evidence of	Candidate demonstrates evidence of general	Candidate demonstrates strong evidence of in-

	in-depth knowledge of adolescent development. Lessons contain activities that do not align with adolescent behavior and development.	general knowledge of adolescent development. Lessons contain some activities that do not align with adolescent behavior and development.	knowledge of adolescent development. Lessons contain activities that align with adolescent behavior and development.	depth knowledge of adolescent development. Lessons contain activities that align with adolescent behavior and development.
<b>4a.2</b>	Candidate demonstrates evidence of fostering growth mind sets with students.	Candidate demonstrates evidence of fostering growth mind sets with students.	Candidate demonstrates evidence of fostering growth mind sets.	Candidate demonstrates strong evidence of fostering growth mind sets.
<b>4b.1</b>	Lesson plan activities were not developmentally appropriate and were not challenging enough or were too challenging.	Lesson plan activities were developmentally appropriate but were not challenging enough or were too challenging.	Lesson plan activities were developmentally appropriate and mostly integrated an adequate amount of challenge.	Lesson plan activities were sequenced to create challenge and learning opportunities that were developmentally appropriate.
<b>4b.2</b>	Instructional strategies are not grounded in mathematics education research.	Candidate references mathematics education research when selecting instructional strategies, but the enactment of strategies does not align with the research.	Instructional strategies are grounded in mathematics education research.	Instructional strategies are grounded in mathematics education research in which students are actively engaged.
<b>4b.3</b>	Lesson plans do not support students in building knowledge from prior knowledge and experiences	Lesson plans minimally support students in building new knowledge from prior knowledge and experiences.	Lesson plans support student in building new knowledge from prior knowledge and experiences.	Lesson plans actively engage students in building new knowledge from prior knowledge and experiences.

<b>4d</b>	Candidate demonstrates equitable treatment and high expectations for all students.	Candidate demonstrates minimal consideration for the equitable treatment and high expectations for all students.	Candidate demonstrates consideration for the equitable treatment and high expectations for all students.	Candidate demonstrates equitable treatment and high expectations for all students and incorporates students' experiences into the curriculum
<b>4e.1</b>	Instructional tools (e.g., manipulatives, models, virtual manipulatives, etc.) are not used in the unit lessons.	Lessons include instructional tools (e.g., manipulatives, models, virtual manipulatives, etc.) that do not enhance teaching and learning.	Lessons incorporate instructional tools (e.g., manipulatives, models, virtual manipulatives, etc.) in ways that enhance teaching and learning.	Lessons incorporate instructional tools (e.g., manipulatives, models, virtual manipulatives, etc.) in ways that enhance teaching and learning. Candidate recognizes both insights to be gained and possible limitations of such tools.
<b>4e.2</b>	Mathematics-specific technologies were not used by the candidate.	Lessons include mathematics-specific technologies that do not enhance teaching and learning.	Lessons incorporate mathematics-specific technologies in ways that enhance teaching and learning.	Lessons incorporate mathematics-specific technologies in ways that enhance teaching and learning. Candidate recognizes both insights to be gained and possible limitations of such tools.
<b>Mean Score for Standard 4</b>				

**NCTM Standard 6: Professional Knowledge and Skills**

Candidates provide evidence of participating in professional development experiences specific to mathematics and mathematics education, draw upon mathematics education research to inform practice, continuously reflect on their practice, and utilize resources

from professional mathematics organizations.  
Candidates demonstrate the following:

<p><b>6c.</b></p>	<p>Candidate does not utilize resources from professional mathematics education organizations.</p>	<p>Candidate cites and/or uses resources from professional mathematics education organizations, but often refers to resources that do not align with professional mathematics education organizations.</p>	<p>Candidate often utilizes resources from professional mathematics organizations such as print, digital, and virtual resources/collections throughout the unit plan.</p>	<p>Candidate consistently utilizes resources from professional mathematics education organizations such as print, digital, and virtual resources/collections throughout the unit plan.</p>
<p><b>Mean Score for Section 6</b></p>				

<b>STANDARDS</b>	<b>Mean Score across Standards</b>
NCTM Standard 2: Mathematical Practices <i>InTASC Standard 4: Content Knowledge</i>	
NCTM Standard 3: Content Pedagogy <i>InTASC Standard 5: Application of Content</i> <i>InTASC Standard 7: Planning for Instruction</i> <i>InTASC Standard 8: Instructional Strategies</i>	
NCTM Standard 4: Mathematical Learning Environment <i>InTASC Standard 1a: Learner Development</i> <i>InTASC Standard 2: Learning Differences</i> <i>InTASC Standard 3b: Learning Environments</i>	
NCTM Standard 5: Impact on Student Learning <i>InTASC Standard 6: Assessment</i>	
NCTM Standard 6: Professional Knowledge and Skills	
<b>Overall Mean Score</b>	

**NOTE: Minimum mean rating of 3.0 (with at least a rating of 2.0 for each standard) is required.**

**Feedback:**

**Secondary Education (SEED) Program  
Teacher Candidate Instruction and Assessment Plan  
Methods II Courses**

**Assessment Objective**

- The candidate will use knowledge of individual learning differences and assessment to develop an instructional plan for a student with developmental, learning, physical or linguistic differences, including a plan for assessing the student's progress.

**Rationale**

Lesson planning is an essential skill for an educator. A lesson plan is a road map for instruction. When planning teachers and teacher candidates need to answer four main questions:

Who are my students? (Context/Student Needs)

What do my students need to know and be able to do? (Objectives)

How will I get all students to know and do the new tasks? (Leaching and learning)

How will I know they know what was taught? (Assessments)

The first step in planning is identifying the learning objectives for the lesson-based upon student abilities, challenges, and prior knowledge. Before developing specific learning activities, determine how you will assess if students have met the lesson objectives. Once you know how you will assess student learning, you can develop activities that align instruction with the assessment. Additionally, a teacher must consider student prior knowledge, how to differentiate to meet student needs, and how to do so within the time allotted. Lesson plans include pacing, transitions, checking for understanding, and ideas for re-teaching or extending learning based upon student needs.

The planning process is the same whether you are planning a lesson for a class or for an individual. For this assessment you will develop an instructional plan for a student with developmental, learning, physical or linguistic differences, including a plan for assessing the student's progress.

**Assessment Task Directions**

Candidates will develop an individualized plan for a child with developmental, learning, physical, or linguistic differences within the context of the general environment and curriculum that includes the following sections:

**Section 1. Description of the individual student** that includes **cognitive, linguistic, social, emotional, and/or physical** developmental skill levels and abilities, interests **and** educational progress and **statement of educational need**. (2 pages or less)

**Section 2. Identification of and rationale for three learning objectives** that support meaningful learning outcomes for the student. (1 page or less)

**Section 3. Description of and rationale for at least three evidence-based instructional strategies** that address the identified learning objectives and reflect the student's **cognitive, linguistic, social, emotional, and/or physical** developmental skill levels and abilities, interests **and** educational needs. (1 page or less)

**Section 4. Description of and rationale for instructional adaptations** and accommodations needed, including the use of augmentative and alternative communication systems and assistive



technologies or other appropriate technologies. (1 page or less)

**Section 5.** Statement of **plan for the assessment and documentation** of the student's progress toward the identified objectives. (1 page or less)

**How to Submit this Assessment:** The plan will be submitted and evaluated via Blackboard under the **Assessments** tab.

**Teacher Candidate Instruction and Assessment Plan  
Rubric**

Criteria	Does Not Meet Standard 1	Approaches Standard 2	Meets Standard 3	Exceeds Standard 4
<b>Section 1</b>				
<b>Description of Individual Student</b>				
<p><b>The candidate regularly assesses individual and group performance in order to design and modify instruction to meet learners' needs in each area of development (cognitive, linguistic, social, emotional, and physical) and scaffolds the next level of development.</b></p> <p><i>InTASC 1(a)</i></p>	<p>The candidate does not provide a description or the description of student <b>does not</b> include assessment data <b>related to cognitive, linguistic, social, emotional, and/or physical</b> developmental skill levels and abilities, interests, <b>or</b> educational progress.</p>	<p>The candidate provides description of student that includes appropriate assessment data related to <b>some but not all</b> of the following: cognitive, linguistic, social, emotional, and/or physical developmental skill levels and abilities, interests, <b>or</b> educational progress.</p>	<p>The candidate provides description of student that includes appropriate assessment data on <b>all</b> of the following: cognitive, linguistic, social, emotional, and/or physical developmental skill levels and abilities, interests, and educational progress.</p> <p>The candidate describes impact of student characteristics on learning.</p>	<p>The candidate provides description of student that includes both appropriate and multiple forms of assessment data on <b>all</b> of the following: cognitive, linguistic, social, emotional, and/or physical developmental skill levels and abilities, interests, and educational learning need.</p> <p>The candidate describes <b>and</b> provides examples of impact of student characteristics on learning.</p>
<b>Statement of Educational Need</b>				
<p><b>The candidate effectively uses multiple and appropriate types of assessment data to identify each student's learning needs and to develop differentiated learning experiences.</b></p> <p><i>InTASC 6(g)</i></p>	<p>The candidate <b>does not</b> address student educational needs or <b>inappropriately</b> uses assessment data to create a statement of educational need.</p>	<p>The candidate uses assessment data to create a statement of educational need that is <b>marginally</b> aligned with assessment results.</p>	<p>The candidate uses assessment data to create an <b>appropriate</b> statement of educational need that is <b>aligned</b> with assessment results.</p>	<p>The candidate <b>effectively</b> uses assessment data from <b>multiple sources</b> to create a <b>thorough and appropriate</b> statement of educational need that is <b>aligned</b> with assessment results.</p>

Section 2 Identification of Learning Objectives				
<p>The candidate <b>individually and collaboratively selects and creates learning experiences that are appropriate for curriculum goals and content standards, and are relevant to learners.</b></p> <p><i>InTASC 7(a)</i></p>	<p>The candidate identifies learning objectives that are <b>either</b> (a) <b>incomplete</b> because related outcomes are not identified <b>or</b> (b) the objectives are <b>not directly related</b> to student educational need.</p>	<p>The candidate identifies learning objectives <b>without relevance</b> to student educational need.</p>	<p>The candidate identifies learning objectives with related outcomes that are <b>relevant</b> to individual student needs.</p>	<p>The candidate identifies <b>distinct</b> learning objectives with related outcomes that are <b>relevant</b> to individual student needs.</p>
Identification of Rationale for Learning Objectives				
<p>The candidate <b>plans for instruction based on formative and summative assessment data, prior learner knowledge, and learner interest.</b></p> <p><i>InTASC 7(d)</i></p>	<p>The candidate <b>does not provide</b> rationales which are aligned to the specific learning objectives and/or the relationship of the learning objectives to student educational needs is <b>missing or unclear.</b></p>	<p>The rationales provided are <b>not</b> aligned to the specific learning objective and the relationship of the learning objectives to student educational needs is <b>unclear.</b></p>	<p>The rationales provided are <b>aligned</b> with the learning objective and the relationship of learning objectives to student educational needs is <b>clearly</b> identified.</p>	<p>The rationales provided are <b>aligned</b> with the learning objective and the relationship of the learning objectives to student educational needs is <b>clearly and effectively</b> identified.</p>
Section 3 Description of Instructional Strategies				
<p>The candidate <b>plans how to achieve each student's learning goals, choosing appropriate strategies and accommodations, resources, and materials to differentiate instruction for individuals and groups of learners.</b></p> <p><i>InTASC 7(b)</i></p>	<p>The candidate <b>does not</b> identify instructional strategies or identifies instructional strategies that are <b>not related</b> to the learning objectives <b>or</b> student learning needs.</p>	<p>The candidate identifies instructional strategies that are <b>marginally</b> related to the learning objectives <b>or</b> student learning needs.</p>	<p>The candidate identifies <b>evidence-based</b> instructional strategies that are aligned to the learning objectives and student learning needs.</p>	<p>The candidate identifies <b>evidence-based</b> instructional strategies that are aligned to <b>specific</b> learning objectives and student learning needs.</p> <p>The candidate provides <b>specific sources of</b> evidence for the instructional strategy.</p>

Rationale for Instructional Strategies				
<p>The candidate understands that each learner's cognitive, linguistic, social, emotional, and physical development influences learning and knows how to make instructional decisions that build on learners' strengths and needs.</p> <p><i>InTASC 1(e)</i></p>	<p>The candidate <b>does not provide</b> rationales which are aligned to the specific instructional strategies <b>and/or</b> the relationship of instructional strategies to the learning objectives and student educational needs is <b>missing or unclear</b>.</p>	<p>The rationales provided <b>do not</b> align to the specific instructional strategies and, the relationship of the instructional strategies to the learning objectives that meet student educational needs is <b>unclear</b>.</p>	<p>The rationales provided <b>are aligned</b> with instructional strategies and, the relationship of the instructional strategies to the learning objectives that meet student educational needs is <b>clearly</b> identified.</p>	<p>The rationales provided <b>are aligned</b> with the strategies and, the relationship of the instructional strategies to <b>specific</b> learning objectives that meet student educational needs is <b>clearly and effectively</b> identified.</p>
Section 4 Description of Instructional Adaptation				
<p>The candidate accesses resources, supports, and specialized assistance and services to meet particular learning differences or needs.</p> <p><i>InTASC 2(f)</i></p>	<p>The candidate <b>does not identify</b> either adaptations or accommodations to support student achievement of learning objectives.</p>	<p>The candidate identifies <b>either</b> adaptations or accommodations that <b>minimally support</b> student achievement of learning objectives.</p>	<p>The candidate identifies and describes appropriate adaptations or accommodations that <b>clearly support</b> student achievement of learning objectives.</p>	<p>The candidate identifies and thoroughly describes appropriate adaptations or accommodations that <b>clearly support</b> student achievement of learning objectives.</p>
Rationale for Instructional Adaptation				
<p>The candidate knows a range of evidence-based instructional strategies, resources, and technological tools and how to use them effectively to plan</p>	<p>The candidate <b>does not provide</b> rationales that are aligned to the adaptations and accommodations <b>and/or</b> the relationship of the adaptations and</p>	<p>The rationale marginally provides evidence to support the adaptations and accommodations and the relationship of the adaptations</p>	<p>The rationales provide <b>adequate</b> evidence to support the adaptations and accommodations and the relationship of the adaptations and accommodations</p>	<p>The rationales provide <b>evidence-based support</b> for the specific adaptations and accommodations and the relationship of the adaptations and</p>

<p><b>instruction that meets diverse learning needs.</b></p> <p><i>InTASC 7(k)</i></p>	<p>accommodations to student educational needs is <b>missing or unclear</b>.</p>	<p>and accommodations to student educational needs is <b>unclear</b>.</p>	<p>to student educational needs is <b>clearly identified</b>.</p>	<p>accommodations to student educational needs is <b>clearly and thoroughly</b> identified.</p>
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**Section 5 Assessment and Documentation of Student Progress**

<p><b>The candidate designs assessments that match learning objectives with assessment methods and minimizes sources of bias that can distort assessment results.</b></p> <p><i>InTASC 6(b)</i></p>	<p>The candidate <b>does not</b> describe an assessment plan that evaluates all student learning objectives <b>or</b> describes a plan that <b>does not</b> directly measure all of the student learning objectives (e.g., is <b>not observable, measurable</b>).</p>	<p>The candidate describes an assessment plan that evaluates all student learning objectives but <b>does not</b> include documentation of <b>both</b> formative and summative measures that <b>does not</b> address possible assessment bias.</p>	<p>The candidate describes an assessment plan that evaluates all student learning objectives <b>and includes both</b> formative and summative assessments that minimize sources of bias.</p> <p>The candidate describes the assessment results that would prompt modification of instructional plans <b>and</b> those specific modifications.</p>	<p>The candidate describes an assessment plan that evaluates <b>all</b> student learning objectives, <b>includes</b> formative and summative assessments that minimize sources of bias and includes <b>multiple</b> data sources for each objective.</p> <p>The candidate describes <b>multiple</b> assessment results that would prompt modification of instructional plans <b>and</b> those specific modifications.</p>
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