

**George Mason University**  
**College of Education and Human**  
**Development**  
**Secondary Education Program**  
**EDCI 672-001**  
**Advanced Methods of**  
**Teaching Mathematics in the Secondary**  
**School**



Promoting Learning  Development Across the Lifespan

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**Instructor:** Toya Jones Frank, Ph.D.  
**E-mail:** [tfrank4@gmu.edu](mailto:tfrank4@gmu.edu)  
**Phone:** 703-993-5015  
**Office:** Thompson Hall, Room 2202  
**Office Hours:** by appointment  
**Class Meets:** Wednesday 4:30-7:10pm in Thompson L028  
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*Mathematics classrooms are more likely to be places in which mathematical proficiency develops when they are communities of learners and not collections of isolated individuals.*  
(Kilpatrick, Swafford, and Findell, 2001)

*All students should have access to an excellent and equitable mathematics program that provides solid support for their learning and is responsive to their prior knowledge, intellectual strengths, and personal interests.*

*Assessment should not merely be done to students; rather, it should also be done for students.*

(NCTM, 2000)

*Students do not just need mathematics; mathematics needs different people's participation.*

(Gutierrez, 2007)

**Purpose of the Course**

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!

### **Course Description as provided in the Course Catalog**

This course emphasizes developing different styles of teaching and covers curricula, current issues, and research literature in secondary school mathematics. School-based field experience required.

### **Pre-requisites:**

EDCI 372/572

### **Objectives**

Success in this course is measured by the degree to which you are able to:

- demonstrate an ability to critique classroom discourse and the role of the teacher in facilitating that discourse through findings from research on student learning (NCTM SPA Standard 3; CEHD Core Values of Collaboration and Research-Based Practice)
- demonstrate an ability to plan a mathematics lesson that fosters deep understanding of mathematics content for *all* students (NCTM SPA Standards 4, 5; NCTM SPA Indicators 3a, 3b, 3c; CEHD Cores Values of Innovation, Research-Based Practice and Social Justice)
- plan a mathematics lesson 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 (NCTM SPA Standards 1, 2; NCTM SPA Indicators 3d, 3e, 4e, 5b; CEHD Core Values of Innovation, Research-Based Practice, and Social Justice)
- develop assessments that give a teacher insight into student thinking about mathematics content (NCTM SPA Indicators 3f, 3g NCTM SPA Standard 4)
- conduct an analysis of ideas for teaching mathematics in diverse classrooms (NCTM SPA Indicators 3c; NCTM SPA Standard 4; CEHD Core Value of Social Justice)
- 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 (NCTM SPA Indicator 7c; CEHD Core Value of Research-Based Practice)

### **Plan for the Course**

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

#### **I. 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.

#### **II. 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.

#### **III. 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.

#### **IV. 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 to the surrounding community.

### **Textbooks and Materials**

Access to the following materials is required:

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.

Donovan, M. S., & Bransford, J. D. (2005). *How students learn: Mathematics in the classroom*. Washington, D.C.: The National Academies Press. We will look at excerpts from this text, which can be retrieved from the following website: [http://www.nap.edu/catalog.php?record\\_id=11101](http://www.nap.edu/catalog.php?record_id=11101)

Additional readings as assigned. All additional readings will be uploaded to Blackboard.

### Course Expectations/Major Assignments

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

Assessment	Percentage of Grade
Participation and Preparation (including weekly and smaller assignments)	15%
Mini-task Leads	10%
Assessment Assignment	15%
Micro-Teaching	20%
Field Work Assignment	15%
Unit Plan Assignment	25%
(differentiated by undergrad/graduate level)	

### Participation and Preparation

The participation of each class member is vitally important. If you do not come prepared to discuss the readings, to share you work on a given assignment, and to participate in the activities of the day the entire class will suffer. You **must** commit to be 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.

### 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.

### Assignment Descriptions

#### *Unit Plan and Presentation*

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.**

#### *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.

#### *Mini-Task Lead*

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. All candidates taking Methods II are required to use Edthena starting in the fall 2015.

#### *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.

#### **Communication**

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

#### **Evaluation**

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%

## **GMU Policies and Resources for Students**

Students must adhere to the guidelines of the George Mason University Honor Code [See <http://academicintegrity.gmu.edu/honorcode/>].

Students must follow the university policy for Responsible Use of Computing [See <http://universitypolicy.gmu.edu/1301gen.html>].

Students are responsible for the content of university communications sent to their George Mason University 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.

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/>].

Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See <http://ods.gmu.edu/>].

Students must follow the university policy stating that all sound emitting devices shall be turned off during class unless otherwise authorized by the instructor.

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/>].

### **Professional Dispositions**

Students are expected to exhibit professional behaviors and dispositions at all times. [http://cehd.gmu.edu/assets/docs/forms/secondary\\_ed/sec\\_ed\\_handbook.pdf](http://cehd.gmu.edu/assets/docs/forms/secondary_ed/sec_ed_handbook.pdf)

### **Core Values Commitment**

The College of Education & 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/>

### Tentative Schedule

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.

Date	Topic	Text	Assignment Due
Sept 2	<b>The Big Picture:</b> Course Goals and Unit Planning	Donovan and Bransford (2005): pp. 217-224; 231-240  Brahier: pp. 136-141	
Sept 9	<b>Facilitating Mathematical Discourse</b> - Boaler & Broadie (2005) Question Types  <b>Staging a Unit</b>	Selected readings – see course site	Select unit topic Select appropriate NCTM, VA SOL, and CCSM standards that align to Unit and Assessment Plans
Sept 16	<b>Facilitating Mathematical Discourse</b> - Proof & Argumentation - Geometric Habits of Mind	Selected readings – see course site	
Sept 23	<b>Assessment:</b> - Role of Assessment - NCTM Assessment Standards	Brahier (2012) 277-288  Brahier (2012): pp. 311-321	Mini task leads #1 (in class)  Unit idea and sketch of concept map due (Upload to <b>Blackboard</b> )
Sept 30	<b>Creating Meaningful Assessments</b> <b>Class will meet virtually</b>  <b>Effective Questioning</b> - Open Questions - Open-Middled Questions - Closed Questions	Brahier (2001, assessment book) Chapter 1  Selected readings – see course site	Upload Mini Task Lead #1 to Edthema
Oct 7	<b>Assessment</b> - Creating Rubrics for Alternate Assessments - Scoring Alternate Assessments	Brahier pp. 321-333  Selected readings – see course site	Select Micro-teaching Topic (in class)

<b>Oct 14</b>	<b>Assessment:</b> <ul style="list-style-type: none"> <li>- Alternative Assessments</li> <li>- The Role of Homework</li> </ul>	<p>Brahier (2001): Chapters 2 and 3</p> <p>Selected readings – see course site</p>	<p>Drafts of open, open-middled, and closed questions for Unit Plan due (Upload to <b>Blackboard</b> and bring copy to class.)</p>
<b>Oct 21</b>	<b>Assessment:</b> <ul style="list-style-type: none"> <li>- Determining Final Grades</li> <li>- Assessment Plans</li> <li>- Standardized Assessment</li> </ul>	<p>Brahier (2001): Chapters 4 and 5</p> <p>Selected readings – see course site</p>	<p>First lesson plan for Unit Plan due (Upload to <b>Blackboard</b>)</p>
<b>Oct 28</b>	<b>Differentiation, Equity, and Mathematics</b> <ul style="list-style-type: none"> <li>- What is Differentiation?</li> <li>- NCTM's Equity Principle</li> <li>- Equity concerns in Math Education</li> <li>- Equitable Practice in Mathematics Classrooms</li> </ul>	<p>Brahier (2012) Chapter 12</p>	<p><b>Assessment Plan Due</b> (Upload to <b>Blackboard</b>)</p>
<b>Nov 4</b>	<b>Differentiation and Honoring Diversity and Equity in Teaching Mathematics (cont.)</b> <ul style="list-style-type: none"> <li>- Strategies for differentiation</li> <li>- Complex Instruction</li> <li>- Funds of Knowledge</li> </ul>	<p>Selected readings – see course site</p>	<p><b>Mini Task Lead #2 (in class)</b></p>
<b>Nov 11</b>	<b>Differentiation and Honoring Diversity and Equity in Teaching Mathematics</b> <ul style="list-style-type: none"> <li>- Using manipulatives to differentiate</li> <li>- Special Education, IEPs, and the Mathematics Classroom</li> </ul>	<p>Selected readings – see course site</p>	<p><b>Upload Mini Task Lead #2 to Edthena</b></p>
<b>Nov 18</b>	<b>Differentiation and Discourse (cont.)</b> <ul style="list-style-type: none"> <li>- ELL students and Mathematics Instruction</li> <li>- Expectation messages in student-teacher discourse</li> </ul>	<p>Selected readings – see course site</p>	
<b>Nov 25</b>	<p>No Class - Thanksgiving</p> <p><b>Unit Plan Due no later than 11/29</b></p>		

<b>Dec 2</b>	<b>Micro-teaching Presentations</b>		<b>Microteaching lesson plan due</b>
<b>Dec 9</b>	<b>Micro-teaching Presentations</b>		<b>Microteaching lesson plan due</b>
<b>Dec 16</b>	<b>No Class – complete and submit final assignments</b>		<b>Submit Field Experience Reflections and Micro-teaching Reflections</b>



## UNIT PLAN Scoring Rubric

The unit plan will be evaluated using two different rubrics: *InTASC* and *NCTM*. Together, these two rubrics evaluate teacher candidates' ability to demonstrate a variety of NCTM SPA standards for the Planning assessment.

For each of the standards the following scoring criteria are used:

- 0 – unacceptable
- 1 – marginal
- 2 – meets expectations
- 3 – exceeds expectations

**In order to pass this assignment, teacher candidates need to earn a mean score of at least 2.0 on each of the rubrics. Should a unit plan earn less than a mean score of 2.0 on either rubric, the teacher candidate will be asked to redo the unit plan until the minimum standard is met.**

## Rubric for *InTASC* Standards

### Content: *InTASC* Standard 1

SCORE \_\_\_\_\_

The teacher candidate understands the central concepts, tools of inquiry, and structures of the discipline he or she teaches and can create learning experiences that make these aspects of subject matter meaningful to students.

Performance Indicators:

- Uses Essential Relevant Content
- Organizes Instruction Around Unifying Themes
- Builds a Conceptual Framework
- Displays Content Accuracy
- Fosters Understanding of Disciplinary Norms and Ways of Thinking

*Interpretation for Mathematics: Instruction focuses on the “big ideas” of mathematics and shows connections between and among concepts. Students are engaged in discovery/inquiry-based activities whereby students make conjectures, explore relationships, and justify their thinking using multiple types of reasoning.*

Scoring:

0	1	2	3
Content in the lessons is not important or unified, and does not focus on the “big ideas” within mathematics. Students are not actively engaged in learning mathematics through discovery/inquiry-based activities.	Instruction does focus on the “big ideas” of mathematics but does not show connections between and among concepts. Students may or may not be engaged in learning mathematics through discovery/inquiry-based activities.	Instruction focuses on the “big ideas” of mathematics and shows connections between and among concepts. Students are engaged in learning mathematics through discovery/inquiry-based activities.	Instruction focuses on the “big ideas” of mathematics and shows connections between and among concepts. Students are regularly and meaningfully engaged in learning mathematics through discovery/inquiry-based activities.

### Student Learning *InTASC* Standard 2

SCORE \_\_\_\_\_

The teacher candidate understands how students learn and develop and can provide learning opportunities that support a student's intellectual, social, and personal development.

Performance Indicators:

- Fosters Active Student Involvement
- Uses Developmentally Appropriate Activities

*Interpretation for Mathematics: Students are actively engaged in exploration of mathematical ideas and concepts. Progression of activities is appropriately organized to facilitate the development of deep, conceptual understandings of mathematics.*

Scoring:

0	1	2	3
Students are not actively engaged in exploration of mathematical ideas and concepts. Progression of activities is not appropriately organized to facilitate the development of deep, conceptual understanding of mathematics.	Students are rarely actively engaged in exploration of mathematical ideas and concepts. Progression of activities is not appropriately organized to facilitate the development of deep, conceptual understanding of mathematics.	Students are rarely engaged in exploration of mathematical ideas and concepts. Progression of activities is appropriately organized to facilitate the development of deep, conceptual understanding of mathematics.	Students are regularly, actively engaged in exploration of mathematical ideas and concepts. Progression of activities is appropriately organized to facilitate the development of deep, conceptual understanding of mathematics.

### Diverse Learners *InTASC* Standard 3

SCORE \_\_\_\_\_

The teacher candidate understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners.

## Performance Indicators:

- Attends to Different Learning Styles
- Attends to Different Learning Needs (e.g., ELL, learning disabilities, gender, etc.)
- Attends to Different Skill Levels
- Uses Activities Relevant to Students

*Interpretation for Mathematics: Students are actively engaged in meaningful learning of mathematics in ways that connect the mathematics to their worlds. Appropriate scaffolding is used to help students of various skill levels to develop strong understandings of mathematics. Note: This does not mean a lowering of the standards. Rather it means appropriate supports are put in place to help all students learn meaningful mathematics.*

## Scoring:

0	1	2	3
Lessons are not designed to attend to different learning styles, learning needs, or skill levels. Activities are not relevant to students nor do they enable students to engage in meaningful exploration of mathematics.	There is some evidence that lessons attend to different learning styles, learning needs, and skill levels – but it is rare. Activities are rarely relevant to students and rarely enable students to engage in meaningful exploration of mathematics.	Lessons frequently attend to different learning styles, learning needs, and skill levels. Activities are frequently relevant to students so that students are regularly engaging in meaningful exploration of mathematics.	Lessons regularly attend to different learning styles, learning needs, and skill levels. Activities are always relevant to students so that students are regularly engaging in meaningful exploration of mathematics.

**Instruction InTASC Standard 4****SCORE 1 \_\_\_\_ , SCORE 2 \_\_\_\_ , MEAN SCORE \_\_\_\_\_**

The teacher candidate understands and uses a variety of instructional strategies to encourage student development of critical thinking, problem solving, and performance skills.

## Performance Indicators:

- Uses Variety of Strategies and Activities
- Uses Effective Questioning
- Fosters Higher-Order Thinking
- Encourages Student Thinking/Inquiry
- Fosters Student Creativity and Choices
- Demonstrates Teacher Creativity
- Incorporates Sufficient Detail to Teach
- Uses Coherent Connection among Activities

*Interpretation for Mathematics: Students are engaged in the problem-solving process. They are presented with high-level questions and tasks and asked to explore mathematical concepts in a variety of contexts. These tasks are creatively developed or chosen by the teacher and demonstrate connection both within mathematics and of mathematics to the real-world. Students are encouraged to apply and adapt strategies to solve problems and to use a variety of representations.*

## Scoring (2 rubrics for this category):

0	1	2	3
Lessons do not encourage student thinking/inquiry nor do they engage students in higher-level thinking. Lessons do not foster student creativity/choice.	There is some evidence that lessons encourage student thinking/inquiry and engage students in higher-level thinking, but it is rare. Rarely do lessons foster student creativity/choice.	Lessons frequently encourage student thinking/inquiry and engage students in higher-level thinking. Lessons frequently foster student creativity/choice.	Lessons regularly encourage student thinking/inquiry and engage students in higher-level thinking. Lessons regularly foster student creativity/choice

0	1	2	3
Lessons do not exhibit teacher creativity. Activities are not connected coherently nor are they varied. There is not enough detail provided to	Rarely do lessons exhibit teacher creativity. Activities are somewhat coherently connected and varied. Most details are there to teach the	Lessons frequently exhibit teacher creativity. Most activities are coherently connected and varied. There is enough detail provided to	Lessons regularly exhibit teacher creativity. Activities are coherently connected and varied. There is enough detail provided to teach.

teach the lesson.	lesson.	teach.	
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**Learning Environment *InTASC* Standard 5**

SCORE \_\_\_\_\_

The teacher candidate uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.

Performance Indicators:

- Establishes Routines
- Uses Individual Work
- Organizes Group Work
- Anticipates/Avoids Potential Discipline Problems

*Interpretation for Mathematics: The learning environment is set-up (on a daily basis) to promote individual and group work and to support student learning through avoidance of potential discipline problems.*

Scoring:

0	1	2	3
Lessons do not provide structure. There are not opportunities for <u>both</u> individual and group work.	Lessons provide structure. Rarely are there opportunities for <u>both</u> individual and group work.	Lessons provide structure. There are regular opportunities for <u>both</u> individual and group work.	Lessons provide structure. There are frequent opportunities for <u>both</u> individual and group work.

**Communication *InTASC* Standard 6**

SCORE 1 \_\_\_\_, SCORE 2 \_\_\_\_, MEAN SCORE \_\_\_\_\_

The teacher candidate uses knowledge of effective verbal, non-verbal and media communication techniques and appropriate technology to foster active inquiry, collaboration, and supportive interaction in the classroom.

Performance Indicators:

- Uses Effective Communication to Foster Inquiry
- Integrates Technology
- Fosters Collaboration
- Encourages Communication among Students
- Encourages Communication between Students and Teacher

*Interpretation for Mathematics: Instruction incorporates technology facilitate learning of mathematics by enabling students to explore mathematics. The learning environment supports communication between and among teachers and students. Students are actively engaged with questions/tasks that encourage exploration. Students are asked to make conjectures, regularly analyze other students' thinking, and organize their own and others' thinking about mathematics.*

Scoring (2 rubrics for this category):

0	1	2	3
Lessons do not provide opportunities for students to communicate their thinking with each other and the teacher. There are no opportunities for collaboration. .	Lessons rarely provide opportunities for students to communicate their thinking with each other and the teacher. There are rare opportunities for collaboration. .	Lessons regularly provide opportunities for students to communicate their thinking with each other and the teacher. There are regular opportunities for collaboration.	Lessons frequently provide opportunities for students to communicate their thinking with each other and the teacher. There are frequent opportunities for collaboration.

0	1	2	3
Technology is not infused in any lessons.	Technology is infused into some lessons but it is not used to facilitate meaningful mathematical exploration.	Technology is infused into some lessons and it is used to facilitate meaningful mathematical exploration.	Technology is infused into many lessons and is used to facilitate meaningful mathematical exploration.

**Planning InTASC Standard 7**

SCORE \_\_\_\_\_

The teacher candidate plans instruction based upon knowledge of subject matter, state and national standards, students, and the community.

Performance Indicators:

- Clearly Connects to Nat'l/State Standards
- Clearly connects to Course Objectives
- Relates Daily Question(s) or Objective(s) to Unit Question
- Relates Daily Activities to Question(s) or Objective(s)
- Relates Assessment to Questions/Objectives
- Develops Content Logically and Coherently

*Interpretation for Mathematics: Instruction clearly connects to NCTM and VA SOL standards. All activities are appropriately designed to help students meet the specified objectives.*

Scoring:

0	1	2	3
Lesson plans do not connect to standards. Activities and assessment do not align to expressed standards, nor do they develop in a logical way.	Rarely do lesson plans connect to standards. Activities and assessment do not align to expressed standards, nor do they develop in a logical way.	Lesson plans connect to standards. Activities and assessment are regularly aligned to expressed standards and regularly develop in a logical way.	Lesson plans connect to standards. Activities and assessment are frequently aligned to expressed standards and frequently develop in a logical way.

**Assessment InTASC Standard 8**

SCORE \_\_\_\_\_

The teacher candidate understands and uses formal and informal assessment strategies, consistent with instructional goals, to evaluate and ensure the continuous intellectual, social, and physical development of the learner.

Performance Indicators:

- Uses Variety of Formal/Informal Assessments
- Assesses Essential Understanding and Skills
- Assesses Higher Order Thinking Skills
- Incorporates Student Self-Assessment
- Uses Assessment to Inform Instruction

*Interpretation for Mathematics: Assessment focused both on high- and low-level tasks/questions. Questions are designed to gain insight into students' procedural and conceptual understandings of important mathematics concepts and to assess their ability to problem solve. These assessments provide opportunities for students to assess their own understandings and reflect on their problem solving. The teacher uses these assessments to inform instruction.*

Scoring (Score on this rubric is taken from the Assessment Assignment):

0	1	2	3
A variety of assessments are not used. Assessments do not assess higher order thinking, conceptual understanding, procedural skill, or problem solving. Assessment does not encourage self-assessment.	There is some variety in the choice of assessments. Rarely do assessments assess higher order thinking, conceptual understanding, procedural skill, or problem solving. Assessment may or may not encourage self-assessment.	There is some variety in the choice of assessments. Assessments assess higher order thinking, conceptual understanding, procedural skill, and problem solving to some degree. Assessment may or may not encourage self-assessment.	There is some variety in the choice of assessments. Assessments do a great job of assessing higher order thinking, conceptual understanding, procedural skill, and problem solving. Assessments encourage self-assessment.

**Reflection InTASC Standard 9**

SCORE \_\_\_\_\_

The teacher candidate is a reflective practitioner who continually evaluates the effects of his or her choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally.

## Performance Indicators:

- Presents Thoughtful/Coherent Research-based Rationale
- Shows Evidence of Reflection on this Rubric

*Interpretation for Mathematics: The teacher engages in evidence-based reflection on the effectiveness of instruction to promote the development of problem solving skills and procedural/conceptual understanding of students.*

## Scoring:

0	1	2	3
Narrative and lessons do not provide evidence of reflection on research and suggestions of leaders in the field. Claims for instructional decisions are not well justified.	Narrative and lessons provide some evidence of reflection on research and suggestions of leaders in the field. Claims for instructional decisions are not well justified.	Narrative and lessons provide evidence of reflection on research and suggestions of leaders in the field. Claims for instructional decisions are well justified.	Narrative and lessons provide evidence of deep reflection on research and suggestions of leaders in the field. Claims for instructional decisions are very well justified.

**Collaboration InTASC Standard 10**

SCORE \_\_\_\_\_

The teacher candidate fosters relationships with school colleagues, parents, and agencies in the larger community to support students and their well being.

## Performance Indicators:

- Fosters Professional or Community Relationships
- Uses Books, Internet, Research, and Other Resources)

*Interpretation for Mathematics: The teacher is aware of professional resources for mathematics teachers (collaboration, journals, NCTM publications, technology) and consults these resources during planning.*

## Scoring:

0	1	2	3
No professional resources were used in construction of lessons.	There is some evidence of consultation to professional resources in the construction of the lessons.	There is evidence of consultation to professional resources in the construction of the lessons. Modifications to meet the needs of the lesson are mostly appropriate.	There is evidence of consultation to professional resources in the construction of the lessons. Modifications to meet the needs of the lesson are very appropriate.

### Rubric for *NCTM* Standards

#### *NCTM* Standard 1a: Content Knowledge

MEAN SCORE \_\_\_\_\_

Candidates should demonstrate and apply knowledge of mathematical content.

Distinguished (met) 3	Proficient (met) 2	Developing (not met) 1	Unacceptable 0
Lessons are designed to address the big ideas of secondary mathematics content. Throughout, students are consistently engaged in activities that address all 3 indicators.	Lessons are designed to address the big ideas of secondary mathematics content. Students are somewhat engaged in activities that address all 4 indicators.	Lessons are designed to address the big ideas of secondary mathematics content. Students are somewhat engaged in activities that address most of the	Lessons are not designed to address the big ideas of secondary mathematics content. Students are not engaged in activities that address most of the indicators.

Plans include opportunities for students to engage in the following:

Demonstrate knowledge of major mathematical concepts, algorithms, and procedures

Make connections between and among mathematical domains

Apply mathematics to varied contexts

#### *NCTM* Standard 2: Mathematical Practices

MEAN SCORE \_\_\_\_\_

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.

Distinguished (met) 3	Proficient (met) 2	Developing (not met) 1	Unacceptable 0
Lessons are designed to fully engage students in activities that exhibit the mathematical practice.	Lessons are designed to partially engage students in activities in the mathematical practice.	Lessons are designed to engage students in activities that minimally engage students in the mathematical practice.	Lessons are not designed to engage students in activities that address the mathematical practice.

Plans include opportunities for students to engage in the following:

Std.		Score
2a	Use problem solving to develop conceptual understanding, make conjectures and generalizations, and apply and adapt a variety of strategies	
2b	Reason abstractly and quantitatively with attention to precision	
2c	Formulate, represent, analyze, and interpret mathematical models	
2d	Use the language of mathematics (e.g., vocabulary and symbols) to communicate mathematical ideas to others	
2e	Make connections between mathematical domains and the practices of problem solving, reasoning, communicating, connecting, and representing	
2f	Model how the development of mathematical understanding within and among mathematical domains intersects with the mathematical practices of problem solving, reasoning, communicating, connecting, and representing.	

#### *NCTM* Standard 3: Content Pedagogy

MEAN SCORE \_\_\_\_\_

Candidates apply knowledge of curriculum standards for mathematics and their relationship to student learning.

<b>Distinguished (met) 3</b>	<b>Proficient (met) 2</b>	<b>Developing (not met) 1</b>	<b>Unacceptable 0</b>
Lessons are designed to demonstrate exceptional knowledge of the content pedagogy standard.	Lessons are designed to demonstrate proficient knowledge of the content pedagogy.	Lessons are designed to somewhat demonstrate knowledge of content pedagogy.	Lessons are not designed to demonstrate knowledge of the content pedagogy standard.

Plans include evidence of the following:

Std.		Score
3a	Applying knowledge of curriculum standards for secondary mathematics and relationship to student learning within the lessons	
3b	Use of research to create rich mathematical learning experiences	
3c1	Use of instructional technologies to help students build conceptual understanding and procedural fluency	
3c2	A variety of strategies and differentiated instruction for diverse populations	
3d, 3e	Opportunities for engagement and communication about mathematics (e.g, selecting high-quality tasks, guiding mathematical discussions, identifying key mathematical ideas, addressing student misconceptions)	
3f	Plan formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students	

#### **NCTM Standard 4: Mathematical Learning Environment**

**MEAN SCORE** \_\_\_\_\_

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.

<b>Distinguished (met) 3</b>	<b>Proficient (met) 2</b>	<b>Developing (not met) 1</b>	<b>Unacceptable 0</b>
Lessons are designed to demonstrate exceptional knowledge of fostering a productive mathematics-learning environment according to the standard.	Lessons are designed to demonstrate knowledge of fostering a productive mathematics-learning environment. Students are somewhat engaged in activities that address all 3 indicators.	Lessons are somewhat designed to demonstrate knowledge of fostering a productive mathematics-learning environment. Students are somewhat engaged in activities that address most of the indicators.	Lessons are not designed to demonstrate knowledge of fostering a productive mathematics-learning environment. Students are not engaged in activities that address most of the indicators.

Plans include evidence of the following:

Std.		Score
4a	Knowledge of adolescent learning, development, and behavior and foster positive disposition toward mathematics learning	
4b	Developmentally appropriate, sequential, and challenging learning opportunities	
4c	Knowledge of individual differences, including cultural and language diversity	
4e	Use of tools (e.g., manipulatives, physical models, drawings, and mathematics specific technologies) to enhance teaching and learning	



### Score Summary Sheet

<i>InTASC Standard</i>	<b>Score</b>
Content	
Student Learning	
Diverse Learners	
Instruction	
Learning Environment	
Communication	
Planning	
Assessment	
Reflection	
Collaboration	
<i>Mean Score</i>	

<i>NCTM Standard</i>	<b>Score</b>
Mathematical Problem Solving	
Reasoning and Proof	
Mathematical Communication	
Mathematical Connections	
Mathematical Representation	
Technology	
<i>Mean Score</i>	

Did the teacher candidate earn an overall mean score of at least 2.0 on the *InTASC* rubric? \_\_\_\_\_

Did the teacher candidate earn an overall mean score of at least 2.0 on the *NCTM* rubric? \_\_\_\_\_

Overall mean score (sum of all scores divided by 16) \_\_\_\_\_

Grade as Percentage:  $1.5 \left[ \frac{(\text{overall mean} - 2)}{.1} \right] + 85 =$  \_\_\_\_\_

Strengths:

Areas for Development:

## IMPORTANT INFORMATION FOR LICENSURE COMPLETION

### Student Clinical Practice: Internship Requirements

#### Testing

Beginning with Spring 2015 internships, **all** official and passing test scores must be submitted and in the Mason system (i.e. Banner/PatriotWeb) by the internship application deadline. Allow a minimum of six weeks for official test scores to arrive at Mason. Testing too close to the application deadline means scores will not arrive in time and the internship application will not be accepted.

#### Required tests:

- Praxis Core Academic Skills for Educators Tests (or qualifying substitute)
- VCLA
- Praxis II (Content Knowledge exam in your specific endorsement area)

For details, please check <http://cehd.gmu.edu/teacher/test/>

#### Endorsements

Please note that ALL endorsement coursework must be completed, with all transcripts submitted and approved by the CEHD Endorsement Office, prior to the internship application deadline. Since the internship application must be submitted in the semester prior to the actual internship, please make an appointment to meet with the Endorsement Specialist and plan the completion of your Endorsements accordingly.

#### CPR/AED/First Aid

Beginning with spring 2015 internships, verification that the Emergency First Aid, CPR, and Use of AED Certification or Training requirement must be submitted and in the Mason system (i.e. Banner/PatriotWeb) by the application deadline. Students must submit one of the "acceptable evidence" documents listed at <http://cehd.gmu.edu/teacher/emergency-first-aid> to CEHD Student and Academic Affairs. In order to have the requirement reflected as met in the Mason system, documents can be scanned/e-mailed to [CEHDacad@gmu.edu](mailto:CEHDacad@gmu.edu) or dropped-off in Thompson Hall, Suite 2300.

#### Background Checks/Fingerprints

All local school systems require students to complete a criminal background check through their human resources office (not through George Mason University) **prior to beginning the internship**. Detailed instructions on the process will be sent to the student from either the school system or Mason. Students are **strongly advised** to disclose any/all legal incidents that may appear on their records. The consequence of failing to do so, whether or not such incidents resulted in conviction, is termination of the internship.

#### Please Note

Your G-Number must be clearly noted (visible and legible) on the face of the document(s) that you submit.

#### Application

The internship application can be downloaded at <http://cehd.gmu.edu/teacher/internships-field-experience>

**Deadlines**

Spring internship application:

- Traditional: September 15
- On-the Job: November 1

Fall internship application:

- Traditional: February 15
- On-the Job: May 1