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

EDCI 644.DL1 – Mathematics Learning and Assessment (K-8) 3 Credits, Spring 2021
Tuesdays, 4:30PM-7:10PM, Synchronous Online

**Faculty** 

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#### **COVID 19 Procedures**

Students, please be aware of and follow all policies and procedures for Mason's Safe Return to Campus: <a href="https://www2.gmu.edu/Safe-Return-Campus">https://www2.gmu.edu/Safe-Return-Campus</a>

# Prerequisites/Corequisites

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

#### **University Catalog Course Description**

Introduces students to learning theories and associated assessment practices specific to mathematics education. Intended for mathematics specialists and teachers interested in problems of learning and assessment across K-8 settings in mathematics education. This course is designed for master's level students in the mathematics education leadership program.

#### **Course Overview**

Not Applicable.

#### **Course Delivery Method**

This course will be delivered online (76% or more) using a synchronous format via Blackboard Learning Management system (LMS) housed in the MyMason portal. You will log in to the Blackboard (Bb) course site using your Mason email name (everything before @masonlive.gmu.edu) and email password. The course site will be available on 1/10/2021.

Under no circumstances, may candidates/students participate in online class sessions (either by phone or Internet) while operating motor vehicles. Further, as expected in a face-to-face class meeting, such online participation requires undivided attention to course content and communication.

#### Technical Requirements

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

• High-speed Internet access with standard up-to-date browsers. To get a list of Blackboard's supported browsers see:

https://help.blackboard.com/Learn/Student/Getting Started/Browser Support#supported-browsers

To get a list of supported operation systems on different devices see: <a href="https://help.blackboard.com/Learn/Student/Getting">https://help.blackboard.com/Learn/Student/Getting</a> Started/Browser Support#tested-devices-and-operating-systems

- Students must maintain consistent and reliable access to their GMU email and Blackboard, as these are the official methods of communication for this course.
- Students will need a headset microphone for use with the Blackboard Collaborate web conferencing tool. [Delete this sentence if not applicable.]
- Students may be asked to create logins and passwords on supplemental websites and/or to download trial software to their computer or tablet as part of course requirements.
- The following software plug-ins for PCs and Macs, respectively, are available for free download: [Add or delete options, as desire.]
  - o Adobe Acrobat Reader: <a href="https://get.adobe.com/reader/">https://get.adobe.com/reader/</a>
  - Windows Media Player: https://support.microsoft.com/en-us/help/14209/get-windows-media-player
  - o Apple Quick Time Player: www.apple.com/quicktime/download/

#### **Expectations**

#### • Course Week:

Our course week will begin on the day that our synchronous meetings take place as indicated on the Schedule of Classes.

# • Log-in Frequency:

Students must actively check the course Blackboard site and their GMU email for communications from the instructor, class discussions, and/or access to course materials at least 3 times per week. In addition, students must log-in for all scheduled online synchronous meetings.

#### • Participation:

Students are expected to actively engage in all course activities throughout the semester, which includes viewing all course materials, completing course activities and assignments, and participating in course discussions and group interactions.

# • Technical Competence:

Students are expected to demonstrate competence in the use of all course technology. Students who are struggling with technical components of the course are expected to seek assistance from the instructor and/or College or University technical services.

#### Technical Issues:

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

#### Workload:

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

## • <u>Instructor Support:</u>

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

#### • Netiquette:

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

#### Accommodations:

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

#### **Learner Outcomes or Objectives**

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

- 1. Understand the learning theories fundamental to mathematics education.
- 2. Understand the developmental progressions underpinning mathematics learning.
- 3. Develop an understanding of various forms of mathematics learning assessment related to theories of mathematics learning.
- 4. Understand the assessment of students' thinking at multiple levels.

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

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

## A. **Standard 4:** Mathematical Learning Environment

Effective elementary mathematics specialists exhibit knowledge of child, pre-adolescent, and adult learning, development, and behavior. They use this knowledge to plan, create, and assist teachers in planning and creating 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, promote, and assist teachers in demonstrating and promoting a positive disposition toward mathematical practices and learning and exhibit and support the equitable and ethical treatment of and high expectations for all students. They include and assist teachers in embracing culturally relevant perspectives in teaching, in recognizing individual student differences, and in using instructional tools such as manipulatives, digital tools, and virtual resources to enhance student learning, while recognizing the possible limitations of such tools.

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

#### **Required Texts**

Donovan, M. S. & Bransford, J. (2004). *How students learn: Mathematics in the classroom*. National Research Council.

**FREE PDF:** https://www.nap.edu/catalog/11101/how-students-learn-mathematics-in-the-classroom

Fennell, F., Kobett, B. M., & Wray, J. A. (2017). *The formative 5: Everyday assessment techniques for every math classroom.* Corwin.

Silver, E. A., & Mills, V. L. (Eds.). (2018). *A fresh look at formative assessment in mathematics teaching*. NCTM

#### Recommended Texts

American Psychological Association (2020). *Publication Manual of the American Psychological Association* (7<sup>th</sup> edition). American Psychological Association.

#### **Course Performance Evaluation**

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

This course will introduce students to the diverse learning theories and associated assessment practices specific to mathematics education. Topics will also include the historical development of learning theories as well as emerging theories. Assessment topics will include test design, problem-based assessment as well as other forms of assessment of mathematics learning across K-8. The course is intended for mathematics specialists, mathematics teachers, and pre-service mathematics teachers interested in problems of learning and assessment in mathematics education.

# • Assignments and/or Examinations

#### Reading, Participation, Collaboration & Attendance (15%)

Attendance: It is your responsibility to attend all class sessions. Please report your

reasons for any absences to the instructor in writing.

Tardiness: It is your responsibility to be on time for each class session. Please report

your reasons for any tardiness to the instructor in writing.

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

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

The student ac participates ar continually su	active contribution		outlined procedures.
the members of learning group	6 · · I	Presentations demonstrate	The student is frequently not
the members of		minimal knowledge	prepared for class
class.	demonstrate	of content and/or	and does not
	sufficient	implications for	actively participate
Presentations	knowledge of	teaching.	in discussions.
demonstrate a	deep   content as well as	<b>;</b>	
knowledge of	implications for		Presentations are
content as well	l as teaching.		lacking knowledge
implications f	or		of content and
teaching.			connections to
			teaching.

# **Group Mathematics Topics and Learning Progression Project (40%)**

In groups, the students will explore research literature on their topic, create an annotated bibliography of the literature, select an article that could be shared with teachers, prepare an appropriate assessment within the topic, and prepare a handout on the topic for their peers. Students will explore and present information on one of the following topics and how they address learning progressions for students:

- Presentations in Class 6
  - K-2 Rational Numbers
- Presentations in Class 7
  - 3-5 Rational Numbers
  - 3-8 Rational Numbers
- Presentations in Class 8
  - 6-8 Rational Numbers

#### Clinical Interview (45%)

(NCTM NCATE 4b, 4d, 4e)

This is a Performance-Based Assessment (PBA). Effective teaching requires a keen awareness of how and what your students are thinking and understanding. The experience of conducting a clinical interview is intended to increase your awareness of students' thinking and learning in a detailed manner about a particular mathematics topic. The other focus of this assignment is on concrete manipulatives and their relationship to learning. So, you should select a manipulative (or manipulatives) to accompany the task and then assess how well the manipulative helped the learner to solve the problem. This Performance-Based Assessment will be posted to TK20 for the final evaluation. Additional details for this assignment (project description & rubric) are provided at the end of the syllabus and in Blackboard/Assignments.

# • Other Requirements

# All assignments require APA formatting:

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

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

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

# • Grading

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

# **Course Performance Evaluation Weighting**

- 15% Participation
- 40% Group Mathematics Topics and Learning Progressions Project
- 45% Clinical Interview

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

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

#### TK20/Performance-Based Assessment(s) Submission Requirement:

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

#### • For Master's Degrees:

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

#### • For Endorsement Requirements

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

# **Professional Dispositions**

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

# See https://cehd.gmu.edu/students/polices-procedures/

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

#### Class Schedule

Reading Key

HSL = How Students Learn F5 = Formative 5 AFLFA = A Fresh Look on Formative Assessment

Date	Topics	Readings Due	Assignments Due
Week 1 1/26	Technology Briefing		Profile Picture Posted in Collaborate Ultra
	Class Overview		
Format			
Synchronous	Introduction		
Week 2	Principles of Learning Theories &	HSL: Ch. 1	Introduction Assignment
2/02	Mathematical	F5: Part 1	(Assignments)
	Understanding	AFLAFA: Foreword & Preface	
Format			
Synchronous	Learning Trajectories		
	Mathematics Topics and Learning Progressions		
	Project Explained		

Week 3	Formative Assessment:	HSL: Ch. 5	
2/09	What, Why & How?	F5: Chapter 1	
		AFLAFA: Chapter 1 & 2	
Format	Observations		
Synchronous			
	Library Tools for Research: Anne Driscoll Presentation		
	Clinical Interview PBA Explained		
Week 4	Designing A Clinical	F5: Chapter 2	
2/16	Interview	AFLAFA: Chapter 3 & 4	
Format Synchronous	Cognitively Guided Instruction		
	Interviews		
	Mathematics Topics and Learning Progressions Group Work		
Week 5	Culturally Responsive	F5: Chapter 3	Clinical Interview Part
2/23	Pedagogy	AFLAFA: Chapter 5 & 6	I: The Plan
Format	Show Me		(Assignments)
Synchronous	Mathematics Topics and Learning Progressions Group Work		
Week 6	Whole Number Sense	HSL: Chapter 6	Group 1 & 2
3/02	Learning Progressions		Presentations

Format			Group 1 & 2 Mathematics
Synchronous			Topics and Learning Progressions Project Due
			(Assignments)
Week 7	Rational Number System	HSL: Chapter 7	Group 3 & 4 Presentations
3/09	Learning Progressions		resentations
	2000.0000.00000000000000000000000000000		Group 3 & 4 Mathematics
Format			Topics and Learning Progressions Project Due
Synchronous			(Assignments)
Synomonous			
Week 8	Functions Learning	HSL: Chapter 8	Group 5 & 6
3/16	Progressions		Presentations
Format			Group 5 & 6 Mathematics Topics and Learning
Synchronous			Progressions Project Due
			(Assignments)
Week 9	Hinge Questions	F5: Chapter 4	
3/23	į (	AFLAFA: Chapters 7 & 8	
	Mathematical Tasks	-	
Format	Response to Intervention		
Synchronous			
Week 10	Clinical Interview Work		
3/30	Session		
Format			
Asynchronous			

Week 11 4/06  Format Asynchronous	Clinical Interview Work Session		Clinical Interview Part II: Analysis of Evidence (Assignments)
Week 12 4/13  Format  Synchronous	Improving Mathematics Instruction  Exit Tasks	AFLAFA: Chapters 9 & 10 F5: Chapter 5	Clinical Interview Part III: Evaluation & Instructional Implications (Assignments)
Week 13 4/20  Format Asynchronous	Clinical Interview Work Session	AFLAFA: Chapters 11 & 12	Clinical Interview Part IV: Reflection (Assignments)
Week 14 4/27  Format Synchronous	A Vision  Moving Forward		
Week 15 5/04  Format Synchronous	Sharing of Clinical Interview Projects		Clinical Interview Project Due to TK20 (Assessments)

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

#### **Core Values Commitment**

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

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

#### **Policies**

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

#### Campus Resources

- Support for submission of assignments to Tk20 should be directed to <u>tk20help@gmu.edu</u> or <u>https://cehd.gmu.edu/aero/tk20</u>. Questions or concerns regarding use of Blackboard should be directed to <u>https://its.gmu.edu/knowledge-base/blackboard-instructional-technology-support-for-students/</u>.
- For information on student support resources on campus, see https://ctfe.gmu.edu/teaching/student-support-resources-on-campus

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

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

#### **Clinical Interview Rubric**

#### (Course Performance-Based Assessment)

Level/Criteria	4	3	2	1
	Exceeds	Meets	Developing	Does Not Meet
	Expectations	Expectations		Expectations
<b>CLINICAL INTERVIEW P</b>	ART I: THE PLAN			
THE CHILD	The plan includes	The plan includes	The plan includes	The plan includes
NCTM Standard 4d	an as set-based	an as set-based	an asset-based	an as set-based
Ne ilvi Standard 4d	description of the	description of the	description of the	description of the
Demonstrate and	child with all of the	child with seven of	child with five to	child with four or
encourage equitable	following	the following	six of the following	fewer of the
and ethical treatment	elements:	elements:	elements:	following
of and high	<ul><li>Grade level</li></ul>	<ul><li>Grade level</li></ul>	<ul><li>Grade level</li></ul>	elements:
expectations for all	<ul><li>Age</li></ul>	<ul><li>Age</li></ul>	● Age	<ul><li>Grade level</li></ul>
students.	<ul><li>Gender</li></ul>	<ul><li>Gender</li></ul>	<ul><li>Gender</li></ul>	● Age
	<ul><li>Race</li></ul>	<ul><li>Race</li></ul>	<ul><li>Race</li></ul>	<ul><li>Gender</li></ul>
	<ul> <li>Academicability</li> </ul>	<ul><li>Academicability</li></ul>	<ul> <li>Academicability</li> </ul>	<ul><li>Race</li></ul>
	level	level	level	<ul><li>Academicability</li></ul>
	◆ Child's	◆ Child's	◆ Child's	level
	mathematical	mathematical	mathematical	
	understanding on	understanding on	understanding on	mathematical
	the mathematics	the mathematics	the mathematics	understanding on
	topic assessed	topic assessed	topic assessed	the mathematics
		◆ Child's	◆ Child's	topic assessed
	performancein	performancein	performancein	
	other a cademic	other a cademic	other academic	performancein
	areas	areas	areas	other a cademic
				areas

	● Child's	● Child's	● Child's	● Child's
	performancein	performancein	performancein	performancein
	socialor	socialor	socialor	socialor
	behavioral areas	behavi or al areas	behavi oral areas	behavioral areas
THE MATHEMATICS	The plan describes	The plan describes	The plan describes	The plan describes
CONCEPT & FORMS	the mathematics	the mathematics	the mathematics	the mathematics
OF REPRESENTATION	concept and forms	concept and forms	concept and forms	concept and forms
NCTM Standard 4e	of representation with all of the	of representation with four of the	of repres entation with three of the	of representation with two or fewer
Apply mathematical	following	following	following	of the following
content and	elements:	elements:	elements:	elements:
pedagogical	• Information on	● Information on	• Information on	•Information on
knowledge in the	age-appropriate	age-appropriate	age-appropriate	age-appropriate
selection, use, and	variations of the	variations of the	variations of the	variations of the
promotion of	mathematics	mathematics	mathematics	mathematics
instructional tools	concept	concept	concept	concept
such as manipulatives	<ul><li>One clearly</li></ul>	<ul><li>One clearly</li></ul>	<ul><li>One clearly</li></ul>	<ul><li>One clearly</li></ul>
and physical models,	described and	described and	described and	described and
drawings, virtual	mathematically	mathematically	mathematically	mathematically
environments,	accurate concept ● Three different	accurate concept ● Three different	accurate concept ● Three different	accurate concept ● Three different
presentation tools, and mathematics-	forms of	forms of	forms of	forms of
specific technologies	representation,	representation,	representation,	representation,
(e.g., graphing tools	with different	with different	with different	with different
and interactive	examplesineach	examplesineach	examplesineach	examples in each
geometry s oftware)	form	form	form	form
	<ul><li>Connections</li></ul>	<ul><li>Connections</li></ul>	<ul><li>Connections</li></ul>	<ul><li>Connections</li></ul>
	among	among	among	among
	representational	representational	representational	representational
	forms ● References are	forms	forms	forms
	cited	<ul> <li>References are cited</li> </ul>	<ul> <li>References are cited</li> </ul>	<ul> <li>References are cited</li> </ul>
TASKS & QUESTIONS	The plan includes	The plan includes	The plan includes	The plan includes
	tasks and	tasks and	tasks and	tasks and questions
NCTM Standard 4e	questions designed	questions designed	questions designed	designed to
Apply mathematical	to diagnose the	to diagnose the	to diagnose the	diagnose the
content and	child's	child's	child's	chilďs
pedagogical	understanding with	understanding with	understanding with	understanding with
knowledge in the	all of the following	four of the	three of the	two or fewer of the
selection, use, and promotion of	el ements : ● Tasks are a ligned	following elements:	following elements:	following elements:
instructional tools	with the math	<ul><li>Tasks are aligned</li></ul>	<ul><li>Tasks are a ligned</li></ul>	Tasks are aligned
such as manipulatives	concept	with the math	with the math	with the math
and physical models,	• Questions are	concept	concept	concept
drawings, virtual	aligned with the	• Questions are	• Questions are	• Questions are
environments,	math concept	aligned with the	aligned with the	aligned with the
presentation tools,	<ul><li>Questions allow</li></ul>	math concept	math concept	math concept
and mathematics-	for	<ul><li>Questions allow</li></ul>	<ul><li>Questions allow</li></ul>	• Questions allow
specific technologies	differentiation	for	for	for differentiation
(e.g., graphing tools	and extensions	differentiation	differentiation	and extensions
and interactive	for different	and extensions	and extensions	for different
geometry s of tware)	levels of student performance	for different levels of student	for different levels of student	levels of student performance
	periormance	performance	performance	periormance
		periormance	periormance	<u> </u>

<ul> <li>A variety of tasks</li> </ul>
and questions for
each of the three
forms of
representation

- Tasks are age and developmentally appropriate
- A variety of tasks and questions for each of the three forms of representation
- Tasks are age and developmentally appropriate
- A variety of tasks and questions for each of the three forms of representation
- Tasks are age and developmentally appropriate
- A variety of tasks and questions for each of the three forms of representation
- Tasks are age and developmentally appropriate

#### **CLINICAL INTERVIEW PART II: ANALYSIS OF EVIDENCE**

# STUDENT WORK SAMPLES

#### **NCTM Element 4e**

Apply mathematical content and pedagogical knowledge in the selection, use, and promotion of instructional tools such as manipulatives and physical models, drawings, virtual environments, presentation tools, and mathematicsspecific technologies (e.g., graphing tools and interactive geometry software)

The description of the student's performance includes all of the following:

- A variety of work samples from the childs howing work in the concrete form
- A variety of work samples from the childs howing work in the pictorial form
- A variety of work samples from the child showing work in the abstract form
- An explanatory analysis and overview of each of the child's work samples
- Clearly explained connections between student work samples

The description of the student's performance includes four of the following:

- A variety of work samples from the child showing work in the concrete form
- A variety of work samples from the child showing work in the pictorial form
- A variety of work samples from the child showing work in the abstract form
- An explanatory analysis and overview of each of the child's work samples
- Clearly explained connections between student work samples

The description of the student's performance includes three of the following:

- A variety of work samples from the childs howing work in the concrete form
- A variety of work samples from the childs howing work in the pictorial form
- A variety of work samples from the child showing work in the abstract form
- An explanatory analysis and overview of each of the child's work samples
- Clearly explained connections between student work samples

The description of the student's performance includes two or fewer of the following:

- A variety of work samples from the child showing work in the concrete form
- A variety of work samples from the childs howing work in the pictorial form
- A variety of work samples from the childs howing work in the abstract form
- An explanatory analysis and overview of each of the child's work samples
- Clearly explained connections between student work samples

# TRANSCRIPT EVIDENCE

#### **NCTM Element 4e**

Apply mathematical content and pedagogical knowledge in the selection, use, and promotion of instructional tools such as manipulatives and physical models, drawings, virtual environments,

The transcript includes all of the following:

 Several excerpts from the mathematics assessment using the teacher and the child's actual verbalizations from the assessment (T for teacher; C for child) The transcript includes three of the following:

 Several excerpts from the mathematics assessment using the teacher and the child's actual verbalizations from the assessment (T for teacher; C for child) The transcript includes two of the following:

 Several excerpts from the mathematics assessment using the teacher and the child's actual verbalizations from the assessment (T for teacher; C for child) The transcript includes one or fewer of the following:

• Several excerpts from the mathematics assessment using the teacher and the child's actual verbalizations from the assessment (T for teacher; C for child)

	a Tanah aw/a	a Tanah aw/a	a Tanah aw/a	a Tanahaw/a
presentation tools,	• Teacher's	• Teacher's	● Teacher's	● Teacher's
and mathematics-	questioning	questioning	questioning	questioning
specifictechnologies	<ul><li>Student's</li></ul>	<ul><li>Student's</li></ul>	<ul><li>Student's</li></ul>	<ul><li>Student's</li></ul>
(e.g., graphing tools	responses	responses	responses	responses
and interactive	<ul><li>Teacher's follow-</li></ul>	<ul><li>Teacher's follow-</li></ul>	<ul><li>Teacher's follow-</li></ul>	<ul><li>Teacher's follow-</li></ul>
geometry software)	up questioning	up questioning	up questioning	up questioning
	<ul><li>Student's follow-</li></ul>	Student's follow-up	Student's follow-up	Student's follow-up
	up res ponses	responses	responses	responses
EVIDENCE OF	A description	A description	A description	A description about
QUESTIONING	about questioning	about questioning	about questioning	questioningis
NCTM Standard 4e	is included with all	is included with	is included with	included with one
NCTIVI Standard 4e	of the following:	three of the	two of the	or fewer of the
Apply mathematical	<ul><li>Evidence of a</li></ul>	following:	following:	following:
content and	variety of	<ul><li>Evidence of a</li></ul>	<ul><li>Evidence of a</li></ul>	<ul><li>Evidence of a</li></ul>
pedagogical	questions	variety of	variety of	variety of
knowledge in the	encouraging the	questions	questions	questions
selection, use, and	child to express	encouraging the	encouraging the	encouraging the
promotion of	his/herthinking	child to express	child to express	child to express
instructional tools	• Evidence of	his/herthinking	his/herthinking	his/herthinking
such as manipulatives	higher-level	• Evidence of	• Evidence of	• Evidence of
and physical models,	questions to	higher-level	higher-level	higher-level
drawings, virtual	encourage	questions to	questions to	questions to
environments,	deeper thinking	encourage	encourage	encourage
presentation tools,	and responses	deeper thinking	deeper thinking	deeper thinking
and mathematics-	from the child	and responses	and responses	and responses
specific technologies	Reflection about	from the child	from the child	from the child
(e.g., graphing tools	what was gained	Reflectionabout	Reflectionabout	Reflectionabout
and interactive	from posing	what was gained	what was gained	what was gained
geometry software)	s pecific questions	from posing	from posing	from posing
	to probe for	specific questions	specific questions	specific questions
	understanding ● Reflection about	to probe for	to probe for	to probe for
		understanding	understanding	understanding
	missed	• Reflection about	• Reflection about	• Reflection about
	opportunities for	missed	missed	missed
	questioning	opportunities for	opportunities for	opportunities for
		questioning	questioning	questioning
CLINICAL INTERVIEW				
THE EVALUATION	The evaluation of	The evaluation of	The evaluation of	The evaluation of
NCTM Element 4b	the child's	the child's	the child's	the child's
	understanding	understanding	understanding	understanding
Plan, create, and	includes all of the	includes three of	includes two of the	includes one or
coach/mentor	following:	the following:	following:	fewer of the
teachers in creating	<ul><li>An accurate and</li></ul>	<ul><li>An accurate and</li></ul>	<ul><li>An accurate and</li></ul>	following:
developmentally	detailed	detailed	detailed	<ul> <li>An accurate and</li> </ul>
appropriate,	description of the	description of the	description of the	detailed
sequential, and	child's current	child's current	child's current	description of the
challenging learning	level of	level of	level of	child's current
opportunities	understanding of	understanding of	understanding of	level of
grounded in	the mathematics	the mathematics	the mathematics	understanding of
mathematics	concept	concept	concept	the mathematics
education research in	• Evidence from	• Evidence from	• Evidence from	concept
which students are	the assessment	the assessment	the assessment	• Evidence from
actively engaged in	to support your	to support your	to support your	the assessment
building new	conclusions	conclusions	conclusions	to support your
knowledge from prior	3011010010	301101 0010110	301101 0010110	conclusions
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#### knowledge and Mathematical Mathematical Mathematical Mathematical experiences. terms to describe terms to describe terms to describe terms to describe specific types of specific types of specific types of specific types of behaviors, behaviors, behaviors, behaviors, verbalizations, verbalizations, verbalizations, verbalizations, and observations and observations and observations and observations Conclusions Conclusions Conclusions Conclusions about about about about mathematical mathematical mathematical mathematical understandings understandings understandings understandings are based on are based on are based on are based on sources on sources on sources on sources on mathematics mathematics mathematics mathematics development development development development THE INSTRUCTIONAL The instructional The instructional The instructional The instructional plan includes two **PLAN** plan includes all of plan includes four plan includes three the following: of the following: of the following: or fewer of the **NCTM Element 4b** A detailed A detailed A detailed following: Plan, create, and description of description of description of A detailed coach/mentor developmentally developmentally developmentally description of teachers in creating appropriate next appropriate next appropriate next developmentally appropriate next developmentally steps for steps for steps for steps for appropriate, instruction instruction instruction sequential, and •The next steps for •The next steps for •The next steps for instruction •The next steps for challenging learning instruction are instruction are instruction are opportunities justified by the justified by the justified by the instruction are grounded in child's current child's current child's current justified by the level of level of child's current mathematics level of education research in level of understanding understanding understanding which students are Many specific Many specific Many specific understanding examples of examples of examples of Many specific actively engaged in examples of activities and activities and activities and building new knowledge from prior tasks are tasks are tasks are activities and knowledge and providedto provided to providedto tasks are experiences. support the next support the next support the next provided to support the next steps of steps of steps of instruction instruction instruction steps of Mathematical Mathematical Mathematical instruction terms specific to terms specific to terms specific to Mathematical the mathematical the mathematical the mathematical terms specific to concept are used concept are used concept are used the mathematical to describe next to describe next to describe next concept are used steps of steps of steps of to describe next instruction instruction instruction steps of Instructional next Instructional next Instructional next instruction Instructional next steps are steps are steps are supported by supported by supported by steps are information from information from information from supported by other sources on other sources on other sources on information from

**CLINICAL INTERVIEW PART IV: REFLECTION** 

mathematics

development

mathematics

development

mathematics

development

other sources on

mathematics development

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REFLECTION	The reflection	The reflection	The reflection	The reflection
	includes all of the	includes six of the	includes five of the	includes four or
	following:	following:	following:	fewer of the
	• Implementing the	<ul><li>Implementing the</li></ul>	<ul><li>Implementing the</li></ul>	following:
	assessment	assessment	assessment	<ul><li>Implementing the</li></ul>
	<ul><li>Describing the</li></ul>	<ul><li>Describing the</li></ul>	<ul><li>Describing the</li></ul>	assessment
	clinical interview	clinical interview	clinical interview	<ul><li>Describing the</li></ul>
	<ul><li>Learning about</li></ul>	<ul><li>Learning about</li></ul>	<ul><li>Learning about</li></ul>	clinical interview
	assessment	assessment	assessment	<ul><li>Learning about</li></ul>
	techniques	techniques	techniques	assessment
	<ul><li>◆ Creating</li></ul>	<ul><li>Creating</li></ul>	<ul><li>Creating</li></ul>	techniques
	questions and	questions and	questions and	<ul><li>Creating</li></ul>
	tasks for the	tasks for the	tasks for the	questions and
	mathematics	mathematics	mathematics	tasks for the
	concept	concept	concept	mathematics
	• Adapting the	<ul><li>Adapting the</li></ul>	<ul><li>Adapting the</li></ul>	concept
	interview for	interview for	interview for	<ul><li>Adapting the</li></ul>
	another child	another child	another child	interview for
	Learning a bout	Learning about	Learning a bout	another child
	_	_	_	
	how children	how children	how children	• Learning a bout
	learn	learn	learn	how children
	mathematics	mathematics	mathematics	learn
	<ul><li>Describing how a</li></ul>	<ul><li>Describing how a</li></ul>	<ul><li>Describing how a</li></ul>	mathematics
	classroom	classroom	classroom	<ul><li>Describing how a</li></ul>
	teacher might	teacher might	teacher might use	classroom
	us e a di agnostic	us e a diagnostic	a diagnostic	teacher might
	mathematics	mathematics	mathematics	usea diagnostic
1	assessment	assessment	assessment	mathematics
	assessment	assessment	assessment	mathematics assessment
APA FORMATTING	assessment	assessment	assessment	
APA FORMATTING PAPER	assessment  The paper	assessment The paper	ass essment  The paper	
				assessment
PAPER	The paper	The paper	The paper	assessment The paper
PAPER	The paper organization	The paper organization	The paper organization	The paper organization
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PAPER	The paper organization includes all of the following:  • A cover page with title, author's name, and professional	The paper organization includes five of the following:  • A cover page with title, author's name, and professional	The paper organization includes four of the following:  • A cover page with title, author's name, and professional	The paper organization includes three or fewer of the following:  • A cover page with title, author's name,
PAPER	The paper organization includes all of the following:  • A cover page with title, author's name, and professional affiliation	The paper organization includes five of the following:  • A cover page with title, author's name, and professional affiliation	The paper organization includes four of the following:  • A cover page with title, author's name, and professional affiliation	The paper organization includes three or fewer of the following:  • A cover page with title, author's name, and professional
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PAPER	The paper organization includes all of the following:  • A cover page with title, author's name, and professional affiliation • The paper is well-organized, grammatically	The paper organization includes five of the following:  • A cover page with title, author's name, and professional affiliation • The paper is well-organized, grammatically	The paper organization includes four of the following:  • A cover page with title, author's name, and professional affiliation  • The paper is well-organized, grammatically	The paper organization includes three or fewer of the following:  • A cover page with title, author's name, and professional affiliation • The paper is well-organized,
PAPER	The paper organization includes all of the following:  • A cover page with title, author's name, and professional affiliation  • The paper is well-organized, grammatically correct,	The paper organization includes five of the following:  • A cover page with title, author's name, and professional affiliation • The paper is well-organized, grammatically correct,	The paper organization includes four of the following:  • A cover page with title, author's name, and professional affiliation  • The paper is well-organized, grammatically correct,	The paper organization includes three or fewer of the following:  • A cover page with title, author's name, and professional affiliation • The paper is well-organized, grammatically
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PAPER	The paper organization includes all of the following:  • A cover page with title, author's name, and professional affiliation • The paper is well-organized, grammatically correct, coherent, and complete. • The paper has distinctive focus	The paper organization includes five of the following:  • A cover page with title, author's name, and professional affiliation  • The paper is well-organized, grammatically correct, coherent, and complete.  • The paper has distinctive focus	The paper organization includes four of the following:  • A cover page with title, author's name, and professional affiliation  • The paper is well-organized, grammatically correct, coherent, and complete.  • The paper has distinctive focus	The paper organization includes three or fewer of the following:  • A cover page with title, author's name, and professional affiliation  • The paper is well-organized, grammatically correct, coherent, and complete.  • The paper has
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PAPER	The paper organization includes all of the following:  • A cover page with title, author's name, and professional affiliation  • The paper is well-organized, grammatically correct, coherent, and complete.  • The paper has distinctive focus and voice.  • The paper uses professional language (i.e., no	The paper organization includes five of the following:  • A cover page with title, author's name, and professional affiliation  • The paper is well-organized, grammatically correct, coherent, and complete.  • The paper has distinctive focus and voice.  • The paper uses professional language (i.e., no	The paper organization includes four of the following:  • A cover page with title, author's name, and professional affiliation  • The paper is well-organized, grammatically correct, coherent, and complete.  • The paper has distinctive focus and voice.  • The paper uses professional language (i.e., no	The paper organization includes three or fewer of the following:  • A cover page with title, author's name, and professional affiliation  • The paper is well-organized, grammatically correct, coherent, and complete.  • The paper has distinctive focus and voice.  • The paper uses professional
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		guidelines.