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

Name:	Deborah J Crawford	
Office Hours:	By Appointment	
Office Location:	Thompson Hall	
Office Phone:	540-664-7495 (personal cell)	
Email Addresses:	dcrawfo4@gmu.edu	
	crawford@fcpsk12.net	

COVID 19 Procedures

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

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: <u>https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#supported-browsers</u>

To get a list of supported operation systems on different devices see: <u>https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#tested-devices-and-operating-systems</u>

- 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.]
 - Adobe Acrobat Reader: <u>https://get.adobe.com/reader/</u>
 - Windows Media Player: https://support.microsoft.com/en-us/help/14209/get-windows-media-player
 - Apple Quick Time Player: <u>www.apple.com/quicktime/download/</u>

Expectations

• <u>Course Week:</u>

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.

• <u>Technical Competence:</u>

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.

• <u>Technical Issues</u>:

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

• Workload:

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

• Instructor Support:

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

• <u>Netiquette:</u>

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.

• <u>Accommodations:</u>

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* (7th edition). American Psychological Association.

National Council of Teachers of Mathematics. (2014). *Principles to actions: Ensuring mathematical success for all*. NCTM.

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 PERFORMANCE				
ELEMENT	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 actively participates and continually supports	The student makes active contributions to the learning	student is not prepared for class.	outlined procedures.
the members of the	group and class.	Presentations	The student is
learning group and		demonstrate	frequently not
the members of the	Presentations	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		
knowledge of	implications for		Presentations are
content as well as	teaching.		lacking knowledge
implications for			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:

А	93%-100%	$\mathbf{B}+$	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	HSL: Ch. 1	Introduction Assignment
2/02	Theories & Mathematical	F5: Part 1	(Assignments)
	Understanding	AFLAFA: Foreword & Preface	
Format			
Synchronous	Learning Trajectories		
	Mathematics Topics and Learning Progressions		
	Project Explained		

2/23PedagogyI: The Plan (Assignments)FormatShow Me				
FormatAFLAFA: Chapter 1 & 2SynchronousLibrary Tools for Research: Anne Driscoll PresentationClinical Interview PBA ExplainedF5: Chapter 2 AFLAFA: Chapter 3 & 42/16Designing A Clinical InterviewFormat SynchronousCognitively Guided InstructionNathematics Topics and Learning Progressions Group WorkF5: Chapter 3 AFLAFA: Chapter 3 & 4Week 5 2/23Culturally Responsive PedagogyFormat SynchronousShow MeSynchronousShow MeWathematics Topics and Learning Progressions Group WorkKuthematics Topics and Learning Progressions Group WorkSynchronousShow MeSynchronousShow MeWathematics Topics and Learning Progressions Group WorkSynchronousMathematics Topics and Learning Progressions Group WorkShow MeEst: Chapter 5 & 6Wathematics Topics and Learning Progressions Group WorkShow MeChapter 5 & 6Mathematics Topics and Learning Progressions Group WorkShow MeChapter 5 & 6Mathematics Topics and Learning Progressions Group WorkWeek 6Whole Number SenseHSL: Chapter 6Group 1 & 2	Week 3	Formative Assessment:	HSL: Ch. 5	
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FormatShow MeSynchronousMathematics Topics and Learning Progressions Group WorkWeek 6Whole Number SenseHSL: Chapter 6Group 1 & 2	2/23	Pedagogy	AFLAFA: Chapter 5 & 6	
Mathematics Topics and Learning Progressions Group Work HSL: Chapter 6 Group 1 & 2		Show Me		(Assignments)
1 1	Synchronous	Learning Progressions		
	Week 6	Whole Number Sense	HSL: Chapter 6	
3/02 Learning Progressions Presentations	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		Tresentations
	Learning 1 rogressions		Group 3 & 4 Mathematics
			Topics and Learning Progressions Project Due
Format			(Assignments)
Synchronous			(12008.0000)
Week 8	Functions Learning	HSL: Chapter 8	Group 5 & 6 Presentations
3/16	Progressions		rresentations
			Group 5 & 6 Mathematics
Format			Group 5 & 6 Mathematics Topics and Learning
Synchronous			Progressions Project Due
			(Assignments)
Week 9	Hinge Questions	F5: Chapter 4	
3/23	Mathematical Tasks	AFLAFA: Chapters 7 & 8	
Format	Response to Intervention		
Synchronous			
Week 10	Clinical Interview Work		
3/30	Session		
Format			
Asynchronous			

Week 11 4/06	Clinical Interview Work Session		Clinical Interview Part II: Analysis of Evidence (Assignments)
Format Asynchronous			
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	Clinical Interview Work Session	AFLAFA: Chapters 11 & 12	Clinical Interview Part IV: Reflection (Assignments)
Format Asynchronous			
Week 14	A Vision		
4/27			
	Moving Forward		
Format			
Synchronous			
Week 15	Sharing of Clinical		Clinical Interview
5/04	Interview Projects		Project Due to TK20
			(Assessments)
Format			
Synchronous			

Note: Faculty reserves the right to alter the schedule as necessary, with notification to students. 11

Core Values Commitment

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

GMU Policies and Resources for Students

Policies

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

Notice of mandatory reporting of sexual assault, interpersonal violence, and stalking:

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 titleix@gmu.edu.

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

Clinical Interview Rubric

(Course Performance-Based Assessment)

Level/Criteria	4	3	2	1
	Exceeds	Meets	Developing	Does Not Meet
	Expectations	Expectations		Expectations
CLINICAL INTERVIEW P	ART I: THE PLAN			
THE CHILD	The plan includes	The plan includes	The plan includes	The plan includes
NCTM Standard 4d	an asset-based	an as set-based	an asset-based	an asset-based
NC IN Standaru 40	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	 Gradelevel 	 Grade level 	 Grade level 	elements:
expectations for all	● Age	• Age	● Age	 Gradelevel
students.	• Gender	• Gender	• Gender	• Age
	● Race	• Race	● Race	• Gender
	 Academicability 	 Academicability 	 Academicability 	● Race
	level	level	level	 Academicability
	● Child's	● Child's	● Child's	level
	mathematical	mathematical	mathematical	● Child's
	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	● Child's	topic assessed
	performancein	performancein	performancein	● Child's
	other a cademic	other a cademic	other academic	performancein
	areas	areas	areas	other academic
				areas

	● Child's	● Child's	● Child's	●Child's
	performance in	performancein	performance in	performancein
	socialor	socialor	socialor	socialor
	behavioral areas	behavi oral areas	beha vi oral areas	behavi oral 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	ofrepresentation	ofrepresentation	ofrepresentation	ofrepresentation
Annly methometical	with all of the	with four of the	with three of the	with two or fewer
Apply mathematical content and	following elements:	following elements:	following elements:	of the following 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	 One clearly 	 One clearly 	 One clearly 	 One clearly
and physical models,	described and	described and	described and	described and
drawings, virtual	mathematically	mathematically	mathematically	mathematically
environments,	accurate concept	accurate concept	accurate concept	accurate concept
presentation tools,	• Three different	• Three different	• Three different	• Three different
and mathematics-	forms of	forms of	forms of	forms of
specific technologies	representation, with different	representation, with different	representation, with different	representation, with different
(e.g., graphing tools and interactive	examplesineach	examplesineach	examplesineach	examplesineach
geometry software)	form	form	form	form
Scomen y sortware,	 Connections 	Connections	Connections	Connections
	among	among	among	among
	representational	representational	representational	representational
	forms	forms	forms	forms
	 References are 	 References are 	 References are 	 References are
	cited	cited	cited	cited
TASKS & QUESTIONS	The plan includes	The plan includes	The plan includes	The plan includes
NCTM Standard 4e	tasks and	tasks and	tasks and	tasks and questions
Apply mathematical	questions designed	questions designed	questions designed	designed to
content and	to diagnose the child's	to diagnose the child's	to diagnose the child's	diagnosethe child's
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	elements:	following	following	following
promotionof	 Tasks are aligned 	elements:	elements:	elements:
instructional tools	with the math	 Tasks are aligned 	 Tasks are aligned 	 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, and mathematics-	 Questions allow for 	math concept ● Questions allow	math concept ● Questions allow	math concept ● Questions allow
specific technologies	differentiation	• Questions allow for	• Questions allow for	• Questions allow for differentiation
(e.g., graphing tools	and extensions	differentiation	differentiation	and extensions
and interactive	for different	and extensions	and extensions	for different
geometry software)	levels of student	for different	for different	levels of student
_ , ,	performance	levels of student	levels of student	
	performance	revers of student	revers of student	performance

	 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 devel opmentally appropriate 	 A variety of tasks and questions for each of the three forms of representation Tasks are age and devel opmentally appropriate 	 A variety of tasks and questions for each of the three forms of representation Tasks are age and devel opmentally appropriate
CLINICAL INTERVIEW P	ART II: ANALYSIS OF E	VIDENCE		
STUDENT WORK	The description of	The description of	The description of	The description of
SAMPLES	the student's	the student's	the student's	the student's
NCTM Element 4e	performance includes all of the	performance includes four of the	performance includes three of	performance includes two or
Apply mathematical	following:	following:	the following:	fewer of the
content and	 A variety of work 	 A variety of work 	 A variety of work 	following:
pedagogical	samples from the	samples from the	samples from the	 A variety of work
knowledge in the	childshowing	childshowing	childshowing	samples from the
selection, use, and	workinthe	work in the	workinthe	childshowing
promotion of	concrete form	concrete form	concrete form	workinthe
instructional tools such as manipulatives	 A variety of work samples from the 	 A variety of work samples from the 	 A variety of work samples from the 	concrete form ● A variety of work
and physical models,	childshowing	childshowing	childshowing	samples from the
drawings, virtual	work in the	work in the	work in the	childshowing
environments,	pictorial form	pictorial form	pictorial form	work in the
presentation tools,	• A variety of work	• A variety of work	• A variety of work	pictorial form
and mathematics-	samples from the	samples from the	samples from the	• A variety of work
specifictechnologies	childshowing	childshowing	childshowing	samples from the
(e.g., graphing tools	work in the	work in the	work in the	childshowing
and interactive	abstract form	abstract form	abstract form	workinthe
geometry software)	An explanatory	An explanatory	 An explanatory 	abstract form
	a nalysis and	analysis and	analysis and	• An explanatory
	overview of each of the child's	overview of each of the child's	overview of each	analysis and
	work samples		of the child's	overview of each of the child's
	•Clearly explained	work samples ● Clearly explained	work samples ●Clearly explained	worksamples
	connections	connections	connections	•Clearly explained
	between student	between student	between student	connections
	work samples	work samples	work samples	between student
		•		work samples
TRANSCRIPT	The transcript	The transcript	The transcript	The transcript
EVIDENCE	includes all of the	includes three of	includes two of the	includes one or
NCTM Element 4e	following:	the following: ● Several excerpts	following:	fewer of the
Apply mathematical	 Several excerpts from the 	 Several excerpts from the 	 Several excerpts from the 	following: ●Several excerpts
content and	mathematics	mathematics	mathematics	• Several excerpts from the
pedagogical	assessment using	assessment using	assessmentusing	mathematics
knowledge in the	the teacher and	the teacher and	the teacher and	assessmentusing
selection, use, and	the child's actual	the child's actual	the child's actual	the teacher and
promotion of	verbalizations	verbalizations	verbalizations	the child's actual
instructional tools	from the	fromthe	fromthe	verbalizations
such as manipulatives	assessment (T for	assessment (T for	assessment (T for	fromthe
and physical models,	teacher; C for	teacher; C for	teacher; C for	assessment (Tfor
drawings, virtual	child)	child)	child)	teacher; C for
environments,				child)

presentation tools,	 Teacher's 	● Tea cher's	 Teacher's 	 Teacher's
and mathematics-	questioning	questioning	questioning	questioning
specifictechnologies	 Student's 	 Student's 	 Student's 	 Student's
(e.g., graphing tools	responses	responses	responses	responses
and interactive	 Teacher's follow- 			
geometry software)	up questioning	up questioning	up questioning	up questioning
	 Student's follow- 	Student's follow-up	Student's follow-up	Student's follow-up
	up responses	responses	responses	responses
EVIDENCE OF	A description	A description	A description	A description about
QUESTIONING	about questioning	about questioning	about questioning	questi oning is
NCTM Standard 4e	is included with all	is included with	is included with	included with one
Ne fivi Standal d 4e	of the following:	three of the	two of the	or fewer of the
Apply mathematical	 Evidence of a 	following:	following:	following:
content and	variety of	 Evidence of a 	 Evidence of a 	 Evidence of a
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
specifictechnologies	 Reflectionabout 	from the child	from the child	from the child
(e.g., graphing tools	what was gained	 Reflection about 	 Reflection about 	 Reflection about
and interactive	from posing	what was gained	what was gained	what was gained
geometry software)	specific questions	from posing	from posing	from posing
geometry solutioner,	to probe for	specific questions	specific questions	specific questions
	understanding	to probe for	to probe for	to probe for
	 Reflection about 	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	questioning
			· -	questioning
				The evelvetion of
	The evaluation of	The evaluation of	The evaluation of	The evaluation of
NCINIFlement 4h	the child's	the child's	the child's	the child's
	understanding includes all of the	understanding includesthree of	understanding	understanding
, , , , , , , , , , , , , , , , , , ,			includes two of the	includes one or
	following:	the following:	following:	fewer of the
	• An accurate and	• An accurate and	 An accurate and 	following:
developmentally	detailed	detailed	detailed	 An accurate and
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
	 Evidence from 	 Evidence from 	 Evidence from 	concept
which students are	the assessment	the assessment	the assessment	• Evidence from
which students are actively engaged in	the assessment to support your	to support your	to support your	the assessment
which students are	the assessment			

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	plan includes all of	plan includes four	plan includes three	plan includes two
NCTM Element 4b	the following:	of the following:	of the following:	or fewer of the
NCTWEIEITIETIC45	 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
developmentally	steps for	steps for	steps for	appropriate next
appropriate,	instruction	instruction	instruction	steps for
sequential, and	•The next steps for	•The next steps for	•The next steps for	instruction
challenging learning	instruction are	instruction are	instruction are	 The next steps for
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
mathematics	level of	level of	level of	child's current
education research in	understanding	understanding	understanding	level of
which students are	• Many specific	• Many specific	 Many specific 	understanding
actively engaged in	examples of activities and	examples of activities and	examples of activities and	 Many specific examples of
building new knowledge from prior	tasks are	tasks are	tasks are	activities and
knowledge and	provided to	provided to	provided to	tasks are
experiences.	support the next	support the next	support the next	providedto
experiences.	steps of	steps of	steps of	support the next
	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
	steps are	steps are	steps are	 Instructional next
	supported by	supported by	supported by	steps are
	informationfrom	informationfrom	information from	supported by
	other sources on	other sources on	other sources on	information from
	mathematics	mathematics	mathematics	other sources on
	development	development	development	mathematics
				development
CLINICAL INTERVIEW F	PARTIV: REFLECTION			

REFLECTION	The reflection includes all of the following: Implementing the assessment Describing the clinical interview Learning about assessment techniques Creating questions and tasks for the mathematics concept Adapting the interview for another child Learning about how children learn mathematics Describing how a classroom teacher might use a diagnostic mathematics assessment	The reflection includes six of the following: Implementing the assessment Describing the clinical interview Learning about assessment techniques Creating questions and tasks for the mathematics concept Adapting the interview for another child Learning about how children learn mathematics Describing how a classroom teacher might use a diagnostic mathematics assessment	The reflection includes five of the following: Implementing the assessment Describing the clinical interview Learning about assessment techniques Creating questions and tasks for the mathematics concept Adapting the interview for another child Learning about how children learn mathematics Describing how a classroom teacher might use a diagnostic mathematics assessment	The reflection includes four or fewer of the following: Implementing the assessment Describing the clinical interview Learning about assessment techniques Creating questions and tasks for the mathematics concept Adapting the interview for another child Learning about how children learn mathematics Describing how a classroom teacher might use a diagnostic mathematics assessment
APA FORMATTING				
PAPER ORGANIZATION	 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 jargon). The paper is presented in an accessible style. 	 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 jargon). The paper is presented in an accessible style. 	 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 us es professional language (i.e., no jargon). The paper is presented in an accessible style. 	 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 language (i.e., no jargon).

• The paper meets APA formatting guidelines.	• The paper meets APA formatting guidelines.	 The paper meets APA formatting guidelines. 	 The paper is presented in an accessible style. The paper meets APA formatting guidelines.
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