RUTGERS
Graduate School of Education

Learning and Teaching
Graduate School of Education
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Teaching Mathematics in PK & Elementary 1: Operations, Algebra and Place Value
15:251:561:91, 2 Credits
Fall 2021, Mondays 9:00 AM-12:00 PM

Instructor: Brittany Marshall	Email: brittany.marshall@gse.rutgers.edu
Email: blm150@scarletmail.rutgers.edu	Room: Zoom
Office Hours: virtual by appointment	Prerequisites or other limitations: Admission to the program
Mode of Instruction: ___ Lecture _x_ Seminar ___ Hybrid ___ Online ___ Other	Permission required: _x_ No __ Yes

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentations: https://ods.rutgers.edu/students/documentation-guidelines. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: https://ods.rutgers.edu/students/registration-form.

Learning goals:
Students will develop:

- knowledge of the mathematics in the early elementary grades;
- detailed knowledge about the development of children's mathematical thinking;
- ways to build instruction based on the development of students mathematical thinking;
- a repertoire of pedagogical techniques and routines related to the above including forms of assessment as well as how to leverage instructional materials for these goals; and
- an understanding of equity and access inside and outside of the mathematics classroom and modifications for various learners.

Continue to reflect on your role as a mathematics teacher within a community.

Course catalog description:
This course focuses on the details of children's mathematics thinking, as well as on how to use student thinking to ground learning about the teaching of mathematics. As we address student thinking and instructional practices we will also discuss ways to accommodate various learners and critical aspects of the teaching and learning of mathematics and: equity (racial, ethnicity, SES, gender, language, (dis)ability), the use of mathematical and pedagogical tools for meeting the needs of all students. We will use the state content standards, readings, student work, classroom video, curricula, practicum placements, instructional scenarios, as well as designing and implementing lessons to examine these issues. The course will help you think about implementing mathematics instruction that is conceptually focused.

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New Jersey Teaching Professional Standards addressed in this course:

Standard 1. Learner Development	The teacher understands how learners grow and develop, recognizing that patterns of learning and development vary
Standard 2. Learning Differences	The teacher uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.
Standard 3. Learning Environments	The teacher works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self motivation.
Standard 4. Content Knowledge	The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches, particularly as they relate to the Common Core Standards and the New Jersey Core Curriculum Content Standards and creates learning experiences that make these aspects of the discipline accessible and meaningful for learners to assure mastery of the content.
Standard 5. Application of Content	The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.
Standard 6. Assessment	The teacher understands and uses multiple methods of assessment to engage learners in examining their own growth, to monitor learner progress, and to guide the teacher's and learner's decision-making.
Standard 7. Planning for Instruction	The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.
Standard 8. Instructional Strategies	The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways

Council for the Accreditation of Educator Preparation (CAEP) Standards:

Standard 1. Understanding and Addressing Each Child's Developmental and Learning Needs	1a - Candidates use their understanding of how children grow, develop and learn to plan and implement developmentally appropriate and challenging learning experiences within environments that take into account the individual strengths and needs of children. 1b - Candidates use their understanding of individual differences and diverse families, cultures, and communities to plan and implement inclusive learning experiences and environments that build on children's strengths and address their individual needs.
Standard 2. Understanding and Applying Content and Curricular Knowledge for Teaching	2b - Candidates demonstrate and apply understandings of major mathematics concepts, algorithms, procedures, applications and mathematical practices in varied contexts, and connections within and among mathematical domains.
Standard 3. Assessing, Planning, and Designing Contexts for Learning	3c - Candidates plan instruction including goals, materials, learning activities and assessments. 3d - Candidates differentiate instructional plans to meet the needs of diverse students in the classroom.
Standard 4. Supporting Each Child's Learning Using Effective Instruction	4a - Candidates use a variety of instructional practices that support the learning of every child. 4c - Candidates explicitly teach concepts, strategies, and skills, as appropriate, to guide learners as they think about and learn academic content. 4d - Candidates provide constructive feedback to guide children's learning, increase motivation, and improve student engagement. 4e - Candidates lead whole class discussions to investigate specific content, strategies, or skills, and ensure the equitable participation of every child in the classroom. 4f - Candidates effectively organize and manage small group instruction to provide more focused, intensive instruction and differentiate teaching to meet the learning needs of each child. 4g - Candidates effectively organize and manage individual instruction to provide targeted, focused, intensive instruction that improves or enhances each child's learning.

New Jersey Student Learning Standards (NJSLS) - Mathematics:
https://www.state.nj.us/education/cccs/2016/math/standards.pdf

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Course materials:

Carpenter et al. (2014). (**CM**) Children's Mathematics: Cognitively Guided Instruction (2nd Edition). Heinemann. (ISBN: 978-0325001371)

Coggins et al. (2007). (**EL**) English Language Learners in the Mathematics Classroom. Corwin Press (1st or 2nd Edition). (ISBN: 978-1483331782)

Featherstone et al. (2011). (**ST**) Smarter Together: Collaboration and Equity in the Elementary Classroom. Reston, VA: National Council of Teachers of Mathematics. (ISBN: 978-0873536561)

Other readings will be available electronically ***on our Sakai site.***

COURSE ASSIGNMENTS

[*explicit guidelines and rubrics will be made available]

Attendance (*this policy is separate from the participation grade*):

- You are allowed **ONE** absence, which I will assume is for a good reason. Beyond that, your final grade will be reduced as indicated (unless, of course, you have a doctor's note or other documentation indicating a bona fide reason): **2 absences—reduction of a full grade; 3 absences—reduction of 2 full grades; 4 absences—failing grade in course.**
- **Again, if it is an excused absence, you are responsible for contacting me, providing the necessary documentation, and making up for the class in order to earn participation points.**

Class Participation (20 points):

- You are expected to participate in class. Each week you will have readings and you will need to be prepared to discuss the content of the readings with classmates and in online discussions. It's important that you formulate and ask questions. Aside from relating to the course texts, we will be working on collaborative activities in pairs and small groups. There will be individual tasks, such as contributing to Threaded Discussions, as well. Your engagement in the course determines how successful the class will be and how much you will learn.
- You can earn a maximum of 2 points each class for in-class participation - evidenced by completed assignments, engagement with your peers and contributions to group activities.
- We only have 30 hours this semester to explore how children think mathematically, as well as explore effective ways to promote mathematical thinking and learning! We need to make the most of this limited time together.

***Curriculum Review (15 points for paired critique + 5 points for individual reflection = 20 points):**

- In pairs, you will critique an existing curricular lesson plan and its resources. Initially, highlighting any of the ways the lesson plan attempts to utilize children's mathematical thinking and patterns of learning, or fails to do so.
- Then you will identify and categorize how the lesson aligns with essential instructional elements of *Teaching for Understanding [differentiation, relevance, hands-on exploration, student choice and direction, et.]*.
- You will provide recommendations for at least five ways to improve the lesson plan so it more closely supports *Teaching for Understanding*.
- Lastly, you are to write a 1-2 page reflection on the process of evaluating the lesson plan and developing effective alternatives.

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***Instructional Practices Video Analysis (30 points):**

- You will analyze a video lesson during the semester. The analysis will focus on various pedagogical elements for effective mathematics instruction and student learning.
- In addition, you will make specific instructional recommendations for transforming the classroom into one that engages in more substantive mathematical learning and a more equitable classroom space.

***Assessment of Student Work (20 points):**

During the assignment, you will begin to develop the knowledge and skills needed to identify student thinking (avoid focusing on what's incorrect or missing) and trajectories of mathematics learning. You will then practice using this knowledge to create learning opportunities to develop student understanding.

- In a small group, you will analyze student work samples in order to
  - detail the specific knowledge evidenced,
  - place the student in terms of where they are in a pattern of learning, and
  - identify specific goals and plan for instructional strategies to develop each student's mathematical conceptual understanding.

The goal of these assignments is to provide evidence of your growing knowledge of instructional practices, how to engage students in ways consistent with the NJSL Standards for Mathematical Practice, and ways to design mathematics tasks for developing understanding. Additionally, you are to show knowledge of instructional practices that take a resource (as opposed to a deficit perspective) of students' experiences, how to support multiple forms of student participation in mathematics, and attention to student interactions than can be shaped by issues of power such as race, gender, language, and status.

Grading policy:

A = 100-90%	B+= 89-87%
B = 86-80%	C+= 79-77%
C = 76-70%	D = 69-60%
F < 60%	

If you need ANY special accommodations during the course, please see me after the *FIRST* class.

Academic Integrity

The highest standards of academic integrity are expected of all students. The failure of any student to meet these standards may result in suspension or expulsion from the university and/or other sanctions as specified in the academic integrity policies at Rutgers University.

Violations of academic integrity include, but are not limited to: cheating, fabrication, tampering, plagiarism, stealing, or facilitating such activities. The university academic integrity policies are available at the link below: http://academicintegrity.rutgers.edu

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Course Schedule (subject to change depending on weather, pacing, and student learning):

Class Date	Topic and Standards	Readings	Assignments
9/8 (Wednesday)	Introduction, Problem Solving, Making Mathematics Meaningful	Sakai: Karp CM: Intro & Ch 1	*FYI: Threaded Discussions are due by midnight **before** class. All other assignments are due by midnight on class day.*
9/13 (Monday)	Addition and Subtraction Problem Types, NJSL Standards, Cognitive Demand	CM: Ch 5 & 12	*Threaded Discussion 1 Due 9/12*
9/20 (Monday)	Addition & Subtraction Strategies, Counting, Strategies for ELLs, Mathematics Curricula	CM: Ch 2 EL: Ch 2 Sakai: Baroody	*Threaded Discussion 2 Due 9/19*
9/27 (Monday)	Counting and Multi-digit Strategies, Evaluation of Mathematics Curricula, Mathematics Status	CM: Ch 3 ST: Intro & Ch 1 Sakai: Schwerdtfeger	**Curriculum Review Due**
10/4 (Monday)	Children's Multi-digit Strategies, Mathematical Tools	CM: Ch 6 ST: Ch 2 Sakai: Friel	*Threaded Discussion 3 Due 10/3*
10/11(Monday)	Algebraic Thinking & Relational Thinking, Analysis of Student Work, Teacher Questioning, Building on student lives	CM: Ch 9 EL: Ch 6 Sahai: Kersaint	**Curriculum Reflection Due**
10/18(Monday)	Algebra and Properties, Classroom Lenses for classrooms, Teaching for developmental differences	CM: Ch 11 Sakai: Ambrose Sakai: Truelove Sakai: Witzel	*Threaded Discussion 4 Due 10/17*
10/25(Monday)	Multiplication and Division Strategies & Problem Types, Relational Interactions	CM: Ch 4 EL: Ch 5	**Video Analysis Due**
11/1 (Monday)	Multi-digit Multiplication	ST: Ch 3 EL: Ch 3 Sakai: Battey	*Threaded Discussion 5 Due 10/31*
11/8 (Monday)	Multi-digit Division	ST: Ch 5 Sakai: Parker	**Assessment of Student Work**