

EDHD 322: The Young Child as Mathematician

Fall 2018

Wednesdays 2:00-4:00

Benjamin Building Room 2121

Instructor: Geetha Ramani, Ph.D.

Office: 3304R Benjamin Building

Office Phone: 301-405-8777

Email: gramani@umd.edu

Office Hours: Wednesday 11:00 – 12:00 or
by appointment

REQUIRED TEXT

Van de Walle, John A., Lovin, LouAnn H., Karp, Karen H., and Jennifer M. Bay Williams (2017). *Teaching Student-Centered Mathematics: Developmentally Appropriate Instruction for Grades Pre K-2 (Volume 1), 3rd Edition*. New York: Pearson Education. (ISBN-13: 978-0134090689)

COURSE DESCRIPTION AND GOALS

The fundamental goal of this course is to understand how children develop mathematics skills during the early childhood years and how to create an environment that helps young children develop mathematical reasoning, problem solving, and understanding.

The goals, objectives, and assignments of the course are consistent with Standards of the NAEYC, University College of Education Conceptual Framework, InTASC Core Teaching Standards, PDS Performance Assessment Indicators, NCTM Principles and Standards, and Essential Dimensions of Teaching (InTASC, College of Education, and NAEYC standards).

By the end of this course, you should be able to:

- Understand how children develop mathematical understanding and how to create learning opportunities that support children's math development. (InTASC 1, 2, 3; EC 1, Subject Matter; NAEYC 1, 4b, 4c, 5)
- Understand how students differ in their approaches to understanding mathematics and how to plan for instructional opportunities that respond to diverse approaches. (InTASC 2, 3, 7, 8; EC 1, 2, 3, 5, Pedagogy, Learners, Social and Cultural Contexts; NAEYC 2, 4a)
- Understand, develop, and use a variety of instructional strategies to encourage students' mathematical thinking and problem solving, including evidence-based instruction and technology. (InTASC 4, 5, 6, 7, 8; EC 1, 5, Pedagogy, Curriculum, Educational Goals and Assessment; NAEYC 1, 4b, 4c, 5)
- Understand and implement the Common Core State Standards in mathematics. (NAEYC 3, 4, 5; CEC 3, 4, 5; INTASC 4, 5, 6, 7, 8; COE 1, 3)

- Understand how to base instruction to attain curriculum goals and build on students' prior understanding and knowledge. (InTASC 1, 4, 5, 6, 7, 8; EC Learners, Curriculum, Educational Goals and Assessment; NAEYC 1, 3, 4, 5)
- Learn effective techniques to foster active inquiry, collaboration, and positive social interaction in the classroom during mathematics lessons. (InTASC 3, 5, 6, 7, 8; EC 3, 7, Pedagogy, Knowledge of Educational Goals and Assessment; NAEYC 1, 3b, 3c, 4a, 4b, 4c, 5)
- Understand and use formal and informal assessment strategies to evaluate mathematical understanding and ensure continuous progress of students. (InTASC 6; EC Curriculum, Educational Goals and Assessment; NAEYC 3)
- Reflect on personal practices and make changes in instructional plans based on children's progress. (InTASC 8, 9, 10; CEC 4; NAEYC 3)

RESPONSIBILITIES AND ASSIGNMENTS

In-class Activities: At least five in-class activities will be assigned randomly to help increase your knowledge of the topic of the week. Participation and completion of each activity is worth 5 points (20 points total). Your lowest score will be dropped. There will be no make-ups of in-class activities and if you miss one, that score will be dropped as your lowest score. These activities will include creating math activities and open-ended problematic questions/tasks. (InTASC 3, 4, 6, 7, 8; EC 3, 4, Pedagogy, Learners, Curriculum; NAEYC 1, 4, 5; NCTM 1b, 1c, 3a, 3b, 3c, 4b, 4c, 4d, 5c, 5d, 5e)

Group Presentation: Once during the semester you will participate in a group of students to present a design of a mathematics center, problematic task, or lesson plan based on the topic of the week. The group will be required to write up a handout that will be distributed to the class and posted on ELMS. (InTASC 3, 4, 6, 7, 8; EC 3, 4, Pedagogy, Learners, Curriculum; NAEYC 1, 4, 5; NCTM 1b, 1c, 3, 4b, 4c, 4d, 5)

Mathematics Mini-Lessons: You will develop four mini-lessons during the semester. Each mini-lesson assignment will involve writing 2-4 pages that include the goals, objectives, and description of the implementation of the lesson. Detailed instructions for each mini-lesson will be posted on ELMS. (InTASC 3, 4, 6, 7, 8; EC 3, 4, Pedagogy, Learners, Curriculum; NAEYC 1, 4, 5; NCTM 1b, 1c, 3a, 3b, 3c, 4b, 4c, 4d, 5c, 5d, 5e)

Mathematics Game: You will create a mathematics game that you will implement in your placement classroom in October. You will also write a reflection paper after the implementation. (InTASC 3, 4, 5, 6, 7 EC 6, 7, Subject Matter, Pedagogy, Learners, Education, Goal and Assessments; NAEYC 1, 3, 4, 5; NCTM 1, 2c, 3, 4, 5)

Developing a Lesson Plan: You will prepare a math lesson plan that utilizes the problem-solving process as an instructional approach. You will then implement the lesson in your placement, as well as analyze and reflect on the lesson implementation. (InTASC 3, 4, 5, 6, 7, 8,

9; EC 2, 6, 7, Subject Matter, Pedagogy, Learners, Curriculum, Education, Goal and Assessments, Knowledge of Social and Cultural Contexts; NAEYC 1, 3, 4b, 4c, 4d, 5; NCTM 1a, 1b, 1c, 2c, 3a, 3b, 3c, 3d, 4a, 4b, 4c, 4d, 5a, 5d)

Class Attendance/Class Participation: Class attendance and class participation is **HIGHLY** recommended. Attending class will help you do well in this course. The in class experience cannot be replicated through readings alone. In the case of absence, you are responsible for retrieving class notes and handouts from classmates.

Assignments: All papers must be typewritten, double spaced, with 1-inch standard margins, 12-point font size, and be written according to APA format, including references when appropriate.

Assignment Submissions: Assignments will be accepted in hard copy in class on the day for which the assignment is due or submitted through ELMS. Specific instructions will be given for each assignment. Emailed assignments will only be accepted in extenuating circumstances that require special arrangements. Such arrangements must be made prior to the assignment due date.

Late Assignments: Assignments will automatically be marked down one letter grade for each day that they are handed in late. If you are unable to turn in an assignment on time, you **MUST** tell me in advance, except in cases of emergency.

GRADING

The various course requirements will combine to a total of 300 points.

In-Class Activities	20
Mini-lessons	100
Group Presentation	30
Mathematics Game	50
Math Lesson Plan	100
TOTAL	300

Grading Scale

98.0000% - 100% A+	88.0000% - 89.9999% B+	78.0000% - 79.9999% C+	68.0000% - 69.9999% D+
92.0000% - 97.9999% A	82.0000% - 87.9999% B	72.0000% - 77.9999% C	62.0000% - 67.9999% D
90.0000% - 91.9999% A-	80.0000% - 81.9999% B-	70.0000% - 71.9999% C-	60.0000% - 61.9999% D-
			59.9999% and below F

CAMPUS POLICIES

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

ELMS (CANVAS)

We will be using the University's ELMS, <https://elms.umd.edu>. The syllabus, announcements, additional readings, and assignments will be posted on ELMS. Readings may change throughout the semester and changes will be posted on ELMS as well. Students can login to the website using their University ID and Password. Please let me know if you have trouble accessing the course website.

CLASS POLICIES

Academic integrity: The University of Maryland, College Park has a student-administered Honor Code and Honor Pledge. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.studenthonorcouncil.umd.edu/whatis.html>. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. The code prohibits students from cheating, fabrication, facilitating academic dishonesty, and plagiarism. Instances of this include submitting someone else's work as your own, submitting your own work completed for another class without permission, or failing to properly cite information other than your own (found in journals, books, online, or otherwise). Any form of academic dishonesty will not be tolerated, and any sign of academic dishonesty will be reported to the appropriate University officials.

Special needs: If you have a registered disability that will require accommodation, please see me so necessary arrangements can be made. If you have a disability and have not yet registered with the University, please contact Disability Support Services in the Shoemaker Building (301.314.7682, or 301.405.7683 TTD) as soon as possible.

Cell Phones and laptops: The use of cell phones will not be permitted at any time during class. This includes using cell phones for text messaging. All cell phones must be turned off or put on silent prior to the beginning of every class. Laptops are permitted in class for note taking only. No web browsing or emailing will be permitted. Laptops will not be permitted during exams.

Religious observances: The University of Maryland policy on religious observances states that students not be penalized in any way for participation in religious observances. Students shall be allowed, whenever possible, to make up academic assignments that are missed due to such absences. However, they must contact me **before** the absence with a written notification of the projected absence, and arrangements will be made for make-up work or examinations.

Course evaluations: As a member of our academic community, students have a number of important responsibilities. One of these responsibilities is to submit course evaluations each term through CourseEvalUM in order to help faculty and administrators improve teaching and learning at Maryland. All information submitted to CourseEvalUM is confidential. Campus will notify you when CourseEvalUM is open for you to complete your evaluations for fall semester courses. Please go directly to the website (www.courseevalum.umd.edu) to complete your evaluations. By completing all of your evaluations each semester, you will have the privilege of accessing

online, at Testudo, the evaluation reports for the thousands of courses for which 70% or more students submitted their evaluations.

Missed single class due to illness: Once during a semester, a student's self-authored note will be accepted as an excuse for missing a minor scheduled grading event in a single class session if the note documents the date of the illness, acknowledgement from the student that information provided in the note is correct, and a statement that the student understands that providing false information is a violation of the Code of Student Conduct. Students are expected to attempt to inform the instructor of the illness prior to the date of the missed class.

Major scheduled grading events: Major Scheduled Grading Events (MSGES) are indicated on the syllabus in bold under the section Grading. The conditions for accepting a self-signed note do not apply to these events. Written, signed documentation by a health care professional, or other professional in the case of non-medical reasons (see below) of a University-approved excuse for the student's absence must be supplied. This documentation must include verification of treatment dates and the time period for which the student was unable to meet course requirements. Providers should not include diagnostic information. Without this documentation, opportunities to make up missed assignments or assessments will not be provided.

Non-consecutive, medically necessitated absences from multiple class sessions: Students who throughout the semester miss multiple, non-consecutive class sessions due to medical problems must provide written documentation from a health care professional that their attendance on those days was prohibited for medical reasons.

Non-medical excused absences: According to University policy, non-medical excused absences for missed assignments or assessments may include illness of a dependent, religious observance, involvement in University activities at the request of University officials, or circumstances that are beyond the control of the student. Students asking for an excused absence for any of those reasons must also supply appropriate written documentation of the cause and make every attempt to inform the instructor prior to the date of the missed class.

Fall 2018 Class Schedule Please note that changes may be made during the semester if the need arises.			
Date	Topic	Reading	Assignments Due Date
8/29	No Class- Immersion Week		
9/5	No Class- Immersion Week		

9/12	Course Overview Teaching Mathematics for Understanding Teaching Mathematics through Problem-Solving	Chapter 1 and 2 Beilock et al., 2010	
9/19	Developing Early Number Concepts and Number Sense	Chapter 8 Taylor-Cox, 2009 (Intro and Ch1)	Mini-lesson #1 Due
9/26	Developing Meaning for the Operations Assessing for Learning Group Presentation #1	Chapter 3 and 9	Math Game Design Plan Due
10/3	Mastering Basic Number Combinations; Mental Math and Estimation Group Presentation #2	Chapter 10 Ramani & Eason, 2015	
10/10	No Class- Immersion Week		Implement Math Game
10/17	Understanding Our Base-Ten Numeration System Group Presentation #3	Chapter 11 Clements & Sarama, 2011	Math Game and Reflection Paper Due
10/24	Strategies for Whole Number Computation/ Promoting Algebraic Reasoning Group Presentation #4	Chapter 12 & 13	
10/31	Early Fraction Concepts Group Presentation #5	Chapter 14 McNeil, 2008	Mini-lesson #2 Due
11/7	Building Measurement Concepts Group Presentation #6	Chapter 15	Draft Lesson Plans (Optional)
11/14	Developing Geometric Reasoning and Concepts Group Presentation #7	Chapter 16 Ginsburg & Amit, 2008	Mini-Lesson #3
11/21	No Class – Thanksgiving		

11/28	No Class - Full week in schools Collaborating with Families and Community – Lecture posted on ELMS	Chapter 7	Implement Lesson Plans
12/5	Helping Children use Data Review Group Presentation #8	Chapter 17	Mini-lesson #4 Due
TBA			Final Exam/Lesson Plan Assignment Due

Additional Readings (Posted on Blackboard)

- Beilock, S. L., Gunderson, E. A., Ramirez, G., & Levine, S. C. (2010). Female teachers' math anxiety affects girls' math achievement. *PNAS Proceedings of the National Academy of Sciences of the United States of America*, 107(5).
- Clements, D. H., & Sarama, J. (2011). Early childhood mathematics intervention. *Science*, 333, 968-970.
- Ginsburg, H. P., & Amit, M. (2008). What is teaching mathematics to young children? A theoretical perspective and case study. *Journal of Applied Developmental Psychology*, 29(4), 274-285.
- Taylor-Cox, J. (2009). *Math Intervention: Building Number Power with Formative assessments, differentiation, and games Grades Prek-2* (ISBN: 978-1-59667-108-9).
- McNeil, N. M. (2008). Limitations to teaching children $2+2=4$: Typical arithmetic problems can hinder learning of mathematical equivalence. *Child Development*, 79(5), 1524-1537.
- Ramani, G. B. & Eason, S. (2015). It all adds up: Learning early math through play and games. *Phi Delta Kappan*, 96(1), 27-32.