

## **EDHD 322: The Young Child as Mathematician**

Fall 2016

Wednesdays 2:00-4:00

Benjamin Building Room 1107

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**Office Hours:** Mondays 12:30 – 1:30 or by appointment

### **REQUIRED TEXT**

Van de Walle, John A., Lovin, LouAnn H., Karp, Karen H., and Jennifer M. Bay Williams (2013). *Teaching Student-Centered Mathematics: Developmentally Appropriate Instruction for Grades Pre K-2 (Volume 1), 2<sup>nd</sup> Edition*. New York: Pearson Education. (ISBN-13: 978-0-13-282482-8)

### **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 six 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 (25 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)

**Discussion Board Posting:** You will use ELMS to post thoughts and reactions to video modules that will support and extend your knowledge of mathematics teaching and learning. The videos, text, class discussions, your internship, and current trends in education will serve as the inspiration for this professional dialogue with your peers. You must post at least two responses for each discussion forum. (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 panel of 2-3 students to present a design of a mathematics center, problematic task, or lesson plan based on the topic of the week. Presentations will begin the week of 9/23. The panel 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 three 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 during the week of 10/14. 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	25
ELMS Discussion Board Posts	30
<b>Mini-lessons</b>	<b>75</b>
<b>Group Presentation</b>	<b>30</b>
<b>Mathematics Game</b>	<b>50</b>
<b>Math Lesson Plan</b>	<b>90</b>
<b>TOTAL</b>	<b>300</b>

**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](http://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, the 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](http://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 (MSGGE) 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 2016 Class Schedule

Please note that changes may be made during the semester if the need arises.

<b>Date</b>	<b>Topic</b>	<b>Reading</b>	<b>Assignments Due Date</b>
8/31	No Class- Immersion Week		
9/7	Course Overview Teaching Mathematics for Understanding Teaching Mathematics through Problem-Solving	Chapter 1 and 2	
9/14	Developing Early Number Concepts and Number Sense Assessing for Learning	Chapter 3 and 8  Beilock et al., 2009	Discussion Board #1 Posting Due
9/21	Developing Meaning for the Operations  Group Presentation #1	Chapter 9 Taylor-Cox, 2009 (Intro and Ch1)	Math Game Design Plan Due
9/28	Mastering Basic Number Combinations; Mental Math and Estimation  Group Presentation #2	Chapter 10  Ramani & Eason, 2015	Mini-lesson #1 Due
10/5	No Class - Full week in schools		Implement Math Game
10/12	Understanding Our Base-Ten Numeration System  Group Presentation #3	Chapter 11	Math Game and Reflection Paper Due
10/19	Strategies for Whole Number Computation  Group Presentation #4	Chapter 12  Clements & Sarama, 2011	
10/26	Promoting Algebraic Reasoning  Group Presentation #5	Chapter 13  McNeil, 2008	Discussion Board #2 Posting Due
11/2	Geometry  Group Presentation #6	Chapter 16	Mini-lesson #2 Due
11/9	Early Fraction Concepts  Group Presentation #7	Chapter 14	Discussion Board #3 Posting Due

11/16	Measurement Connection; Measurement Concepts  Group Presentation #8	Chapter 15  Ginsburg & Amit, 2008	Lesson Plan Draft Due (not mandatory)
<b>Tues, 11/22</b>	Helping Children use Data Review  Group Presentation #9	Chapter 12	
11/30	No Class - Full week in schools  Collaborating with Families and Community – Lecture posted on ELMS	Chapter 7	Mini-lesson #3 Due
12/7	No class - Full week in schools		Implement Lesson Plans
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.