

Education 263A: Curriculum and Instruction in Mathematics Summer 2020
1:30 - 3:15 pm July 30 - August 18

Teaching Team:

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Introduction

This is the first of a 3-course sequence focusing on mathematics teaching and learning. The course provides an opportunity for sustained learning and professional growth. Our goals are to help you:

- understand the nature of effective teaching and learning of mathematics,
- increase your knowledge of mathematics and mathematics pedagogy,
- increase your theoretical knowledge and practical experience in planning, teaching, and assessing mathematics,
- understand the mathematical needs of a diverse range of students,
- understand the complexities of diverse, multiple-ability classrooms while broadening your repertoire of teaching techniques, and
- learn from your experiences in schools through informed reflection.

Throughout the three-course sequence, we will consider the Common Core State Standards for Mathematics.

In the first quarter we will analyze teaching practices in many ways, considering the role played by mathematics, the teacher, and the students. Several different examples of practice will be analyzed on video. We will also engage in mathematical tasks that will place you as learners of mathematics and pedagogy. There will be a joint focus throughout the course on research and practice.

Course Requirements

We expect you to come to class having completed the reading, discussion posts, and assignments due for that day and to be prepared to participate in class discussions and activities. This means that you have a clear idea of the main points; you may have formulated some questions; and/or you have noted any related issues that the reading or topic raised for you.

Your participation depends upon your timeliness in attendance. If for any reason, you will miss or be late to class, please email the instructors ahead of time. In the summer quarter, you will be required to complete several assignments, conduct readings (see Course Schedule) and complete daily tasks, which will be described during class.

Major Assignments:

- Maths History: due Wednesday, July 29 at 10 pm
- Number Talk Assignment: due Wednesday, August 12 at 10 pm
- Reflecting on Summer Mathematics: due Wednesday, August 19 at 10 pm

Your Grade

Our expectation is that everyone will receive an A grade. If your work – including the quality of your participation and assignments, the Final Reflection Assignment and Maths History – is not at that standard we will discuss ways to improve it.

Regarding participation, we are looking for you to contribute to both small and whole group discussions. Whether you are more talkative or more introverted in nature, we expect that you make concerted efforts to both listen and contribute, monitoring your level of sharing, and making space for others to join in. We recognize that you may have more to say about one topic over another, but across the two weeks, we should have heard your thoughts and ideas in both small and whole group discussions. This will help your learning as well as the learning of the group.

Course Schedule

Wednesday, July 29th by 10 pm Maths History Due to Canvas

Session 1 – July 30: Mathematical Mindsets

- Nash, R. J. (1996). Fostering moral conversations in the college classroom. *Journal on Excellence in College Teaching*, 7(1), 1-5.

Session 2 – August 3: What is Mathematics?

- Lockhart, P. (2008). Lockhart's lament. *MAA Online*.
- Wolfram, C. (2020). The Math(s) Fix. Chapters 1 and 3.

Session 3 – August 4: Exploring Number Sense

- Greeno, J. G. (1991). Number sense as situated knowing in a conceptual domain. *Journal for research in mathematics education*, 170 -177.
- Boaler, J. (2015). Fluency without fear: Research evidence on the best ways to learn math facts. *Reflections*, 40(2), 7-12.

Session 4 – August 6: Calculus

- Daro, P. & Asturia, H. (2020) Branching Out. Designing High School Math Pathways for Equity.
- Strogatz, S. (2019). Infinite Powers. Introduction.

Session 5 – August 10: Data Science

- National Governors Association Center for Best Practices & Council of Chief State School Officers. (2010). Common Core State Standards for Mathematics.
- California.(2020). Mathematics framework for California public schools: Kindergarten through grade twelve. Data science chapter.

Session 6 – August 11 : Cultural Analyses of Teaching

- Stigler & Hiebert. (1999). *The Teaching Gap: Best Ideas from the World's Teachers for Improving Education in the Classroom*. The Free Press. (Chapter 6)
- Jackson, K. (2009). The social construction of youth and mathematics: The case of a fifth grade classroom. In D.B. Martin (Ed.), *Mathematics teaching, learning, and liberation in the lives of Black children* (pp. 175-199). New York: Routledge.

Session 7 – August 13 : Equity Focused Teaching and Learning

- Boaler, J. (2015). *Mathematical mindsets: Unleashing students' potential through creative math, inspiring messages and innovative teaching*. John Wiley & Sons. (Chapter 6)
- Joseph, N. M., Hailu, M., & Boston, D. (2017). Black women's and girls' persistence in the P–20 mathematics pipeline: Two decades of children, youth, and adult education research. *Review of Research in Education*, 41(1), 203-227.

Session 8 – August 17 : Language Learners and Culturally Relevant Pedagogy

- Chval, K. B, & Chavez, O. (2011). Designing math lessons for English Language Learners. *Mathematics Teaching in the Middle School*, 17(5), 261-265.
- Ladson-Billings, G. (2009). The dreamkeepers: Successful teachers of African American children.

Session 9 – August 18 : Classroom Culture and the Establishment of Socio-mathematical Norms

- Boaler, J. (2002). *Experiencing School Mathematics: Traditional and Reform Approaches to Teaching and Their Impact on Student Learning*. (Revised and Expanded Edition ed.). Mahwah, NJ: Lawrence Erlbaum Association. Chapters 4 and 5.

What to turn in and where:

What:	By When:	Where:	Formatting & Length:
Maths History: An Informal Essay	Wednesday, July 29 by 10 pm	Upload to Canvas	500 words
Number Talk Assignment	Wednesday, August 12 by 10 pm	Upload to Canvas	planning sheet, memo, record of strategies, reflection (500- 1000 words)
Reflecting on Summer Mathematics	Wednesday, August 19 by 10 pm	Upload to Canvas	1000-1500 words