

Course Title: Creating Meaningful Math Engagement	
Number of Content Modules: 4	Grade Levels: K-12
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Course Description

This course on creating meaningful math engagement will provide educators with the knowledge and skills necessary to effectively engage their students in meaningful math learning.

The course will cover key strategies for developing engaging math lessons that foster perseverance, problem-based learning, and inquiry. Educators will learn the importance of rigor in math instruction and explore techniques for integrating formative assessment into their lessons to support student learning and growth.

In addition, the course will examine the role of the teacher in fostering a positive and supportive math learning environment, including the importance of building a growth mindset and promoting a sense of belonging and inclusion for all students.

Throughout the course, educators reflect on their teaching practices and develop a plan to incorporate engaging and meaningful math instruction. The goal of the course is to empower educators to become confident and competent teachers who create positive and meaningful math learning experiences for students.

Course Objectives

- CO.1:** Apply strategies for guided and independent practice in standards-based lessons to develop conceptual understanding of math content. [Danielson Component #1a, 1b, 1e, 3b, 3c, 3d]
- CO.2:** Construct a rigorous assessment program that incorporates measures of multi-step, open-ended, process oriented problems. [Danielson Component #1c, 1f, 3b, 3d,]
- CO.3:** Use project-based learning to build endurance, patience, and perseverance for solving problems. [Danielson Component #1b, 1e, 2a, 2b, 2c, 3b, 3c]
- CO.4:** Evaluate the extent to which assessment tasks assess students' understanding of mathematical concepts. [Danielson Component #1c, 1f, 3d]
- CO.5:** Apply culturally responsive instructional practices to make mathematics relevant and engaging to students. [Danielson Component #1b, 2b, 3b,3c]
- CO.6:** Analyze student work for conceptual understanding, fluency with procedures, and application of mathematical knowledge. [Danielson Component #1f, 2d, 3d, 3e, 4a, 4b]
- CO.7:** Analyze disaggregated state assessment data by available demographics to identify learning disparities for students of color, multilingual learners, and students with disabilities.[Danielson Component #1b, 1c, 1f, 2b, 3a, 3d, 4d, 4f]
- CO.8:** Use formative assessment and instructional scaffolds to prepare students to perform proficiently on assessments. [Danielson Component #1e, 2b, 3d, 3e]
- CO.9:** Apply the eight mathematical practices into daily math instruction to develop the “processes and proficiencies” students require to build a deep understanding. [Danielson Component #1b, 1d, 2b, 3b, 3d]
- CO.10:** Identify and apply elements of a classroom culture that provide equitable access to rigorous content and instruction. [Danielson Component #1b, 1c, 1e, 2a,2b, 3a, 3b, 3d, 3e]
- CO.11:** Design effective lesson plans which clearly align with the goals, instruction, and assessment outlined by the state standards for mathematics. [Danielson Component #1c,1f, 2b, 3a, 3d]
- CO.12:** Apply cultural responsiveness to planning, instruction and assessment using their current mathematics curriculum. [Danielson Component #1b, 1c, 1d, 1e, 1f3d, 4f]
- CO.13:** Evaluate the ways underlying personal and institutional biases, assumptions, and norms contribute to practices that disadvantage students from historically marginalized and underserved groups, including students of color, multilingual learners, students with disabilities and students who identify as LGBTQIA+. [Danielson Component #1b, 2a, 3e, 4a,]

CO.14: Rehumanize and reframe research findings about achievement gaps to include sociocultural and sociopolitical perspectives. [Danielson Component #4a]

CO.15: Attribute causes of “achievement gaps” to racism, negation and devaluation of students at the margins, and constrained, White-centric definitions and measures of “achievement”. [Danielson Component #4a]

CO.16: Reflect in brave learning spaces to a) center experiences and perspectives of non-dominant groups, b) surface and interrogate beliefs, norms, assumptions, and practices that contribute to inequity, and c) reflect on the influence of socialization, identity, and culture on teaching and learning. [Danielson Component #4a]

Course Outline

Course Introduction Module

Course available completely online
(24/7 and Self-Paced)

Assignments due by the end of the term.

Module Topics

In this module, you will learn about the course set-up, expectations for learning and collaborating, meet your colleagues, and reflect on your prior knowledge about teaching with artificial intelligence.

- Course Navigation & Methodology
- Course Description
- A Transformative Approach to Education
- Expectations and Community Agreements for Engaging in Brave Dialogue
- Community Building Circle: Course Story
- Course Objectives

Module 1: Setting Students up for Success in the Mathematics Classroom

Module Topics

Educators will create classroom environments that nurture intellectual growth by providing safe spaces for learning, engaging students in problem-based learning, and hooking students' interest in relevant, authentic problems.

Section 1: Designing Safe Spaces for Learning Mathematics

- Reflect on it! Making Over the Math Classroom
- Learn about It! Effects of Microaggressions and Stereotype Threat on Performance
- Practice It! Microaggressions in the Mathematics Classroom
- Reflect on it! The Problematic Practice of Gap Gazing

Section 2: Anchoring Students in the Math

- Learn about It! (Re)Humanizing Math: Students at the Center
- Reflect on It! Math Identity
- Practice It! Expressing Math Identity through Photo Journaling

Section 3: An Introduction to Problem-Based Learning in Mathematics

- Learn about It! Establishing a Problem-Centered Approach to Math Instruction
- Learn about It! Elements of a Problem-Based Lesson Plan
- Practice It! Student Learning Objectives
- Practice It! Unpacking Standards
- Practice It! Planning Culturally Relevant Instruction
- Learn about It! Introducing a Math Lesson

- Reflect on It! Lesson Analysis: Introduction Element

Section 4: Module 1 Wrap-Up

- Master It! Problem-Based Mathematics Task Design

Module 2: Designing Math Lessons for Cognitive Engagement and Rigor

Module Topics

In this module, educators will explore elements of rigor and cognitive engagement, including higher-order thinking skills and purposeful questioning.

Section 1: Establishing Expectations for Higher Order Thinking

- Learn about It! Principles of Practice [30min]
- Learn about It! Model with Mathematics [30min]
- Practice It! Higher Order Thinking [90min]
- Learn about It! Purposeful Questioning Techniques [30min]
- Learn About it! Connecting Math Concepts, Content, and Processes [15 min]

Section 2: Maintaining Rigor

- Learn about It! Defining Rigor for the 21st Century [30min]
- Learn about It! Myths About Rigor [45min]
- Reflect on It! Lesson: The Crooked Path [90min]
- Practice It! Lesson Analysis: Teaching with Rigor [90 min]
- Learn about It! Levels of Cognitive Demand [30min]
- Reflect on It! Socialized Beliefs about Higher Order Thinking and Rigor in Math [90min]

Section 3: Module Wrap-Up

- Learn about It! Principles of Practice [30min]
- Learn about It! Model with Mathematics [30min]

Module 3: Productive Struggle and Persistence in the Problem-Centered Classroom

Module Topics

In this module, educators will discuss how productive struggle and persistence in the problem-centered classroom affect learning and motivation.

Section 1: Reasoning and Persistence in Problem-Solving

- Learn About It! Benefits of Problem-Centered Mathematics [45min]
- Practice It! A Problem Based Learning Case Study [75min]

- Learn about It! Mathematical Reasoning in the Problem-Centered Classroom [60min]
- Learn About It! Productive Student Struggle [60min]

Section 2: Strategies for Building Student Persistence

- Reflect on It! Rehumanizing Mathematics Education for Neurodiverse Students [60min]
- Practice It! Asset-Focused Approaches [60min]
- Practice It! Lesson Analysis: Mathematical Reasoning and Dialogue [120min]
- Learn about It! Math Discourse [45min]
- Learn about It! Engaging Families in Support of Student Learning [45min]

Section 3: Module 3 Wrap-Up

- Reflect on It! Asset-Focused Pedagogies and Persistence [60min]

Module 4: Leveraging Assessments to Measure Learning

Module Topics

In this module, educators will analyze summative and formative assessments in mathematics and use the information to evaluate achievement of learning outcomes, measure progress, and inform instruction.

Section 1: Summative Assessments

- Reflect on It! Culturally Responsive Assessment Practices
- Learn about It! Summative Assessments [45min]
- Practice It! New York State Testing Program: Mathematics [90min]
- Learn about It! Portfolios [45min]

Section 2: Formative Assessments

- Learn about It! Using Formative Assessments to Improve Learning [30min]
- Learn about It! Types of Formative Assessments [30min]
- Learn about It! Dialogue as Formative Assessment [30min]
- Learn about It! Student Interviews and Conferences [30min]

Section 3: Actionable Feedback

- Learn about It! Providing Substantive Student Feedback [60min]
- Reflect on It! Elements of Actionable Feedback [60min]
- Reflect on It! Student Feedback [60min]

Section 4: Module 4 Wrap-Up

- Master It! Standards-Based Formative and Summative Assessment [120min]

Course Wrap-Up Module

Module Topics

In the Course Wrap-Up Module, you will reflect on your self-efficacy for mastering the course objectives.

Section 1: Summative Course Reflection

- Master It! Summative Course Reflection [30min]
- Reflect on It! Course Evaluation and Feedback [30min]
- Learn about It! Course Reference List