

Course Title: Let's Talk About Math: Using Number Talks	
Number of Content Modules: 3	Grade Levels: K-6
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Course Description

This course on number talks will provide educators with the knowledge and skills necessary to facilitate meaningful math dialogue in the classroom. The course will cover key strategies for incorporating daily routines to solve problems using mental math and critical thinking skills.

Numbers talks are short instructional routines about a particular problem that has been crafted in such a way that the key foundational ideas of mathematics can be evaluated and demonstrated and can be solved using mental math, with the end goal being computational fluency for students. Number Talks help students to notice relationships with numbers and operations to build fluency and number sense.

In this course, you will explore the reasons why using Number Talks ensures rigor and high expectations for students through fostering and encouraging students to have meaningful discourse about numbers using this instructional routine that is equitable for all students as it allows students to see and discuss multiple ways of solving the same problem resulting in a deeper understanding of the math and their own ideas. This supports student ownership of their learning. This instruction includes opportunities for students to use critical reasoning, take mathematical risks, and grasp a growth mindset to learn from mistakes.

Throughout the course, educators reflect on their teaching practices and develop a plan for incorporating number talks in their classrooms. The goal of the course is to empower educators to become confident and competent teachers prepared to engage students in meaningful math dialogue.

Course Objectives

- CO.1:** Nurture an anti-bias classroom culture that values and promotes mathematical thinking and risk-taking. [Danielson 1b, 1c, 2a, 2b, 3e, 4a]
- CO.2:** Distinguish elements of dialogue patterns in Indigenous mathematical pedagogies that create cultures of participation. [Danielson 1b, 1c, 2a, 2b, 3e, 4a]
- CO.3:** Use number talks to develop a culture of high expectations and rigorous instruction, especially for multilingual learners, students with disabilities, students with low math self-efficacy, and students with math anxiety, while actively engaging families to support their children's mathematical development. [Danielson 1b, 1c, 2a, 2b, 3e, 4a]
- CO.4:** Apply scaffolds during Number Talks to ensure learners access mathematical content and contribute to high-quality math dialogue. [Danielson 1b, 1c, 2a, 2b, 3e, 4a]
- CO.5:** Justify mathematical ideas and arguments and communicate mathematical thinking using precise mathematical language in written and oral communication. [Danielson 1a, 1c, 1f, 2b, 2c, 3a, 3b, 3c, 4a, 4b]
- CO.6:** Apply mathematical understanding through inquiry and problem-solving. [Danielson 1a, 1b, 1c, 1d, 1e, 2b, 2c, 2e, 3a, 3b, 3c, 3d, 3e, 4b]
- CO.7:** Engage in brave learning conversations to expose understanding of identity, mindset, and mathematical knowledge. [Danielson 2a, 2b, 3e, 4a, 4d, 4e, 4f]
- CO.8:** Explain how number talks support equitable classroom environments through the engagement of students in math discourse. [Danielson 1b, 1c, 2a, 2b, 3e, 4a]
- CO.9:** Create a community of practice that supports the development of students' math identities through social, emotional, and academic support. [Danielson 1b, 1e, 2a, 2b, 2c, 3c, 3e, 4c, 4d, 4f]
- CO.10:** Apply pedagogies for language development and content area instruction that enable Multilingual Learners to access Number Talks, share complex thinking, and clarify understanding of mathematical concepts. [Danielson 1a, 1b, 1c, 1d, 1e, 1f, 2a, 2b, 2c, 2d, 2e, 2f, 3a, 3b, 3c, 3d, 3e, 3f, 4a, 4b, 4e]
- CO.11:** Reflect on the intersectionality of social identities and math identity, and the ways these identities shape teaching and learning. [Danielson 1a, 1b, 1c, 1d, 1e, 1f, 2a, 2b, 2c, 2d, 2e, 2f, 3a, 3b, 3c, 3d, 3e, 3f, 4a, 4b, 4e]
- CO.12:** Interrogate personal and institutional beliefs, norms, and assumptions about identity and inclusion in mathematics, and identify how they may lead to inequitable practices. [Danielson 1a, 1b, 1c, 1d, 1e, 1f, 2a, 2b, 2c, 2d, 2e, 2f, 3a, 3b, 3c, 3d, 3e, 3f, 4a, 4b, 4e]

CO.13: Assess levels of discourse, dialogue structures, and mathematical understanding as students solve mathematical problems and share mathematical reasoning. [Danielson 1a,1b, 1c, 1d, 1e, 2b, 2c, 2e, 3a, 3b, 3c, 3d, 3e, 4b]

CO.14: Reflect on mathematical thinking and reasoning. [Danielson 1a,1b, 1c, 1d, 1e, 2b, 2c, 2e, 3a, 3b, 3c, 3d, 3e, 4b]

CO.15: 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 reflect on the influence of socialization, identity, and culture on teaching and learning. [Danielson 1b, 2b, 3e, 4a, 4e]

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: Introduction to Number Talks

Module Topics

In this module, educators will learn the how the rationale behind Number Talks is crucial for creating a classroom environment where all students feel empowered, supported, and capable of achieving success in mathematics.

Section 1: Examining Identity and Equity in Mathematics Education

- Reflect On It! The Learning of Mathematics [30 min]
- Reflect On It! Empowering Students: Antiracist Approaches to Number Talks [60 min]
- Reflect On It! The Influence of Identity on Mathematics Learning [30 min]
- Reflect On It! Whiteness in Math Education [60 min]
- Reflect On It! Integrating Number Talks for Equitable Mathematics Instruction [30 min]
- Reflect On It! Promoting Equity in Mathematics [60 min]

Section 2: What Are Number Talks?

- Learn About It! ·An Introduction to Number Talks [60 min]
- Reflect On It! Goals for Number Talks [60 min]
- Reflect On It! Creating Equitable Access to Math through Discourse [80 min]
- Reflect On It! Learning from Indigenous Dialogue Patterns [60 min]
- Practice It! Critiquing the White-Centric Practices in Math Discourse and Dialogue [40 min]
- Practice It! Interrogate Scenarios to Identify Examples of White-centric Math Practices [30 min]
- Practice It! Cultures of Participation [90 min]
- Practice It! Examples of Number Talks [60 min]

- Practice It! Critique Number Talks for Inclusion of White-Centric Practice and Assumptions [60 min]
- Reflect On It! Zone of Proximal Development [60 min]

Section 3: Building Strong Foundations: The Role of Mathematical Fluency and Mental Math Strategies in Numeracy

- Reflect On It! Number Talks and Fluency [40 min]
- Reflect On It! The Role of Fluency [40 min]
- Reflect On It! Mental Math Strategies [40 min]

Section 4: Why use Number Talks?

- Practice It! Developing a Culture of High Expectations and Rigorous Instruction [90 min]
- Learn About It! Number Talks and Mindset [90 min]
- Reflect On It! Number Talks and Mathematical Identity [90 min]
- Reflect On It! Developing Students' Identities as Mathematicians [90 min]
- Learn About It! Using Math Talks to Support Multilingual Learners [90 min]
- Learn About It! Using Number Talks to Support Students with Learning Disabilities [90 min]
- Master It! Module 1 Wrap-Up: Communicating With Families About Number Talks [90 min]

Module 2: Context, Routines, and Procedures for Effective Number Talks

Module Topics

In this module, educators learn about the culture of the classroom environment, qualities of dialogue, and routines for implementing Number Talks.

Section 1: Classroom Environment and Culture

- Practice It! Classroom Environment Norms [50 min]
- Learn About It! Routines for Number Talks [40 min]
- Learn About It! Number Talk Protocols [20 min]
- Learn About It! The Value of Errors [60 min]
- Learn About It! The Role of the Teacher in Number Talks [40 min]

Section 2: Classroom Environment and Culture

- Learn About It! Safe Classroom for Courageous Conversation [40 min]
- Practice It! Classroom Environments That Encourage Risk-Taking [80 min]
- Learn About It! Building a Culture of Success [30 min]
- Reflect On It! Classroom Environment and Belonging [30 min]
- Learn About It! Developing a Sense of Agency [30 min]
- Reflect On It! The Impact of Mathematical Anxiety on Student Achievement [30 min]

Section 3: Features of Quality Math Dialogue

- Learn About It! Purposeful Dialogue: Inviting Student Participation in Number Talks [90 min]
- Learn About It Using Sentence Frames to Build Mathematical Confidence [10 min]
- Learn About It! Module 2 Wrap-Up [20 min]

Module 3: Integrating Number Talks into Math Instruction

Module Topics

In this module, educators align Number Talks to standards, understand how to use Number Talks for assessment, and develop a plan for implementing Number Talks effectively.

Section 1: Aligning Number Talks to Standards

- Learn About It! Aligning Number Talks to Standards and SMP's (40 min)
- Learn About It! Mental Math: Beyond the Pencil (40 min)
- Learn About It! Math Accessibility and Diverse Populations (40 min)
- Learn About It! Math Inclusivity for Diverse Populations (60 min)

Section 2: Assessing Number Talks

- Learn About It! Number Talks as Formative Assessment (40 min)
- Practice It! Assessing Mathematical Understanding Through Dot Image Number Talks: A Multi-Level Scenario (40 min)
- Master It! Levels of Discourse (60 min)
- Learn About It! Bring a Number Talk to a Close (20 min)
- Learn About It! Concluding Insights on Number Talks (20 min)

Section 3: Develop Number Talk Lesson

- Practice It! Number Talks Scenario (60 min)
- Master It! Plan A Dot Image Number Talk (60 min)

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

