



Course Outline

In this course, teachers will take a deeper look at the Operations and Algebraic Thinking domain and the clusters of standards it includes at each grade level. Course activities provide teachers an opportunity to study the content of the domain, learn about the computational problem types and levels of student problem solving strategies, work on math tasks related to each cluster, and also learn more about the mathematics education research behind the Common Core State Standards.

Specifically, teachers learn: 1) how the Operations and Algebraic Thinking domain is organized into clusters of related standards focused on addition, subtraction, multiplication, and division; 2) how the mathematical content in Operations and Algebraic Thinking fits into the development of students' algebraic reasoning; and 3) the important role that computational fluency plays in helping students developing algebraic thinking.

Throughout the course, opportunities are provided for teachers to connect their learning across sessions and to explicitly consider the implications of that learning for classroom practice. Teachers will also be able to revisit their work and reflections by viewing their individual Course Portfolios.

Goals & Purpose

Session 1 – Introduction to Operations and Algebraic Thinking

- Appreciate how the Operations and Algebraic Thinking domain builds on students' early experiences in Counting and Cardinality
- Analyze how the mathematical content in Operations and Algebraic Thinking fits in the progression of the development of students' algebraic reasoning
- Assess your current understanding of and confidence in implementing this domain
- Consider implications for your classroom practice

Session 2 – Operations and Algebraic Thinking in K-2

- Learn about how the Operations and Algebraic Thinking domain is organized into clusters of related standards focused on addition and subtraction for grades K-2
- Review the addition and subtraction problem types that students in grades K-2 encounter and methods for solving single-digit addition and subtraction problems
- Reflect on students' work in the Operations and Algebraic Thinking domain and how it can incorporate the Standards for Mathematical Practice: work on tasks, analyze student's computational thinking, observe classroom lessons, and think about your own experiences

Session 3 – Operations and Algebraic Thinking in Grades 3-5

- Understand how the Operations and Algebraic Thinking domain is organized and how students' work on multiplication and division can incorporate the Standards for Mathematical Practice
- Examine the main multiplication and division problem types that students in grades 3-5 encounter and the three "levels" for solving single-digit multiplication and division problems to examine student thinking and your understanding around the three "levels"

Session 4 – Computational Fluency

- Find out about computational fluency is and why it is important
- Study strategies for engaging students in tasks that support the development of computational fluency through observation classroom lessons, articles, and experiences
- Identify key links between computational fluency and the Standards for Mathematical Practice

Session 5 – Operations and Algebraic Thinking Summary

- Summarize your knowledge about how the mathematical content in Operations and Algebraic Thinking fits in the progression of the development of students' algebraic reasoning and how this domain is organized into clusters of related standards focused on addition and subtraction for grades K-2 and on multiplication and division for grades 3-5
- Synthesize your learning about the problem types that students in grades K-2 and grades 3-5 encounter and the methods for solving single-digit addition and subtraction problems (K-2) and multiplication and division problems (3-5)
- Reflect on strategies for supporting students in developing proficiency in the content standards and SMPs
- Take stock of what you've learned about the Common Core Standards State in Mathematics content standards and how comfortable you feel with implementing them in your classroom