

Agenda

Fractions: Making Sense of Fraction Computation (Grades 3-5)

OVERVIEW

This two-day course focuses on the priority domain of Number and Operations—Fractions for students in Grades 3-5. The emphasis of the course is on building understanding of fraction computation. In this course, participants learn to build on students' understanding of whole number operations to make sense of fraction computation. Strategies that support the development of fraction operation sense are highlighted.

OUTCOMES

- Articulate the progression of current state standards related to fraction operations
- Apply properties of operations in fraction computation
- Characterize teaching strategies for building fraction sense and distinguish the importance of each
- Implement instructional strategies that engage students in the habits of mathematical thinkers and build deep understanding of fraction content called for in current state standards
- Use rich tasks, multiple models and representations, and classroom discourse to support learning of mathematics

Day One

Opening

This introduction includes the course goals, an introduction to the course experiences, and pertinent logistical information.

Making Sense of Fraction Addition and Subtraction

Computation with fractions is built on an understanding of the operations and on fraction sense. In this session, participants examine how students develop strategies for the fraction operations of addition and subtraction that are flexible and responsive to the numbers and contexts involved. Through experiences such as Tell Me All You Can and Draw a Picture, participants learn strategies they can use to help students understand that fractions are numbers that can be added or subtracted using decomposition.

BREAK

Examining the Role of Problem Solving

This session focuses on a structure for lessons that maximizes students' opportunities to struggle constructively to make sense of important mathematical ideas. During the session, the instructor makes explicit connections to each phase of the lesson structure and clearly communicates the role of the teacher during each phase.

Generalizing Strategies for Adding and Subtracting Fractions

Learning to add and subtract fractions and mixed numbers requires that students understand the idea of equivalence and can represent fractions as equivalent fractions. In this session, participants experience a series of activities that make use of classroom discussions and a variety of models as tools to build fluency adding and subtracting fractions using strategies based on decomposition and properties of operations.

LUNCH

Investigating Multiplication of Fractions

While continuing the focus of helping students to make sense of the mathematics they are asked to learn, this part of the day uses ideas about multiplying whole numbers and properties of operations as a foundation for deepening teachers' understanding so that they can better support students as they learn about multiplying with fractions.

Closing

Participants take time to reflect on the experiences of the day and ways that these experiences will positively impact their classroom instruction.

Day Two

Opening

This introduction includes the course goals and working agreements. It provides an opportunity to review the learning and experiences from the first day of the course and answer questions.

Exploring Division of Fractions

This session provides experiences that revisit ideas about dividing whole numbers and properties of operations and the relationship between multiplication and division as a foundation for developing students' understanding about division with fractions. Participants are asked to identify patterns, estimate quotients, defend their answers, and exploring the relationship between multiplication and division.

BREAK

Looking at Fraction Operations through an Algebra Lens

Participants use mathematical sentences as a context for conversation about important mathematical ideas such as equivalence, number sense, unit fractions, and properties. Following their experiences, participants reflect on how teaching arithmetic in ways that support understanding of algebra can enhance the understanding of arithmetic.

LUNCH

How Students Learn Fractions

Learning with understanding occurs when people create, or construct, their own comprehension of mathematical concepts and relationships through interactions between their minds and concrete experiences in the real world. This session is designed to give participants insight into what it means to

do fraction computation with understanding. Participants use pattern blocks and previous knowledge about computing with whole numbers as tools to make sense of computation strategies for fractions.

Closing

This session connects back to the course outcomes so that participants are prepared to move forward as they go back into classrooms and implement both the instructional strategies and content lessons modeled throughout the course.

Math Solutions Guiding Principles

Drawing upon academic work and our own classroom-grounded research and experience, Math Solutions has identified the following four instructional needs as absolutely essential to improving instruction and student outcomes:

- Robust Content Knowledge
- Understanding of How Students Learn
- Insight into Individual Learners through Formative Assessment
- Effective Instructional Strategies

These four instructional needs drive the design of all Math Solutions courses, consulting and coaching. We consider them our guiding principles and strive to ensure that all educators:

- Know the math they need to teach—know it deeply and flexibly enough to understand various solution paths and students' reasoning.
- Understand the conditions necessary for learning, what they need to provide, and what students must make sense of for themselves.
- Recognize each student's strengths and weaknesses, content knowledge, reasoning strategies, and misconceptions.
- Have the expertise to make math accessible for all students, to ask questions that reveal and build understanding, and help students make sense of and solve problems.