

## **AGENDA**

### ***Fraction Nation Foundational Seminar***

#### **OVERVIEW**

This two-day foundational seminar helps teachers gain a deeper understanding of fractions and decimals, including focusing on how students learn about and apply fractions through visual models used in Fraction Nation, providing instruction that supports computing with fractions, and assessing students' understanding of fractions.

#### **DAY 1**

##### **WELCOME, INTRODUCTIONS, AND GOALS**

The introduction to the day includes session goals, an overview of the Number and Operations – Fractions domain of the Common Core and how it aligns with the topics in Fraction Nation, a discussion of common challenges that attend the teaching and learning of fractions, and logistical information pertinent to the day.

##### **ASSESSING STUDENT UNDERSTANDING – DAVID INTERVIEWS**

Observing students provides information that helps us recognize what the student understands and what understandings the student is still developing. Using a video clip of “David,” participants have the opportunity to discuss his mathematical development related to fraction sense.

##### **FRACTIONS ON THE NUMBER LINE**

Understanding fractions as numbers, represented as points on a number line, is an essential element of fraction sense. By using Cuisenaire rods to partition number lines, participants make connections between the linear model (as represented with the Cuisenaire rods) and the distance model of the number line. In addition, the number line is used to explore strategies for comparing fractions and creating equivalent fractions.

##### **UNDERSTANDING FRACTION EQUIVALENCY THROUGH MEASUREMENT**

To develop a deep understanding of fraction equivalency, students must go beyond the ability to use a procedure to create equivalent fractions. They must understand that procedures, such as partitioning in the early grades and multiplying and dividing by  $n/n$  in the upper grades, do not affect the value of fractions, only the way they are represented. It is well documented that a deep understanding of equivalent expressions and equalities is a necessary aspect of algebra readiness. In this session, participants explore equivalent fractions through a measurement task.

#### **DAY 2**

##### **BENCHMARK FRACTIONS**

Just as understanding benchmark numbers is an essential aspect of number sense, understanding fraction benchmarks is an essential aspect of fraction sense. In this session, participants use the twelve-centimeter number lines from the previous session to reason about benchmarks and develop fraction-sense strategies for ordering and comparing fractions.

### **PART TO WHOLE AND WHOLE TO PART**

Fraction sense involves a flexible understanding of part/whole relations. This session models how concrete materials can be used to help students develop their understanding of part/whole relations.

### **TELL ME ALL YOU CAN**

Participants are given calculation problems and asked to tell what they know about the answer without computing the answer. This activity provides an opportunity to discuss a variety of ways to think about a calculation, estimation, mental calculations, and being flexible with numbers. In this activity, participants will not seek an exact answer but will rely on estimation and what they know about numbers to respond to the questions.

### **MAKE A ONE**

This activity gives participants a problem-solving experience that also provides practice with adding fractions. Participants first solve a problem with multiple solutions—finding five fractions that add up to one. They then revisit the problem, this time with the limitation of using cards they draw from a deck.

### **CLOSING AND REFLECTION**

This session reviews the seminar's sessions and connects them to the three key areas from Fraction Nation, the relevant content standards from the CCSS, and the seminar goals.

### **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.