

Session Eight Overview

Making Meaning for Operations: Session 8

Agenda Option One

Sharing Exit Card Comments	Whole group	5 minutes
Discussion of Math Activity	Small group	30 minutes
From Session Seven*	Whole group	30 minutes
Research essay discussion	Small groups	40 minutes
Break		15 minutes
Implications for my classroom	Small groups	30 minutes
	Whole Group	25 minutes
Closing and homework	Whole group	10 minutes

***Alternative: Shorten the discussion of the Math Activity from Session Seven to 30 minutes, leaving time to show videos from the Illustrative Math website of the progression of fractions concepts.**

Mathematical Themes

- The same basic principles that govern operations with whole numbers are called upon to operate with fractions or mixed numbers, but the interpretation of each operation may need to be expanded.

Connections to the Common Core: Standards for Mathematical Practice

MP2 Reason abstractly and quantitatively.

MP3 Construct viable arguments and critique the reasoning of others.

Connections to the Common Core: Content Standards

Grade 5: Number and Operations - Fractions 7

Grade 6: Number and Operations - Fractions 1

5. NF.7. Apply and extend previous understandings of division to divide unit fractions by

whole numbers and whole numbers by unit fractions.1 a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(1/3) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$. b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$. c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share $1/2$ lb of chocolate

6. NF Apply and extend previous understandings of multiplication and division to divide fractions by fractions. 1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.) How much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How many $3/4$ -cup servings are in $2/3$ of a cup of yogurt? How wide is a rectangular strip of land with length $3/4$ mi and area $1/2$ square mi?

Major Focus: *Apply and extend understanding of whole numbers to fractions.*

In Session Eight, participants continue to engage with an overarching idea in the Common Core: As the number system is extended from whole numbers to fractions, ideas that were consolidated for whole numbers are revisited to see what stays the same and what needs to be modified to incorporate these new kinds of numbers. In this session, participants will examine how their thinking about computation with each operation changes when the numbers change from whole numbers to fractions less than one.

MMO Session Eight Agenda Changes linked to Common Core

There are five modifications to the agenda in Session Eight.

1. At the beginning of the session, select and share some of the exit card comments from the previous session including comments related to the Mathematical Practice Standards.
2. Distribute the session overview.
3. Details for the Math Activity Discussion

Discussion of Math Activity From Session Seven

(60 minutes)

Small groups (30 minutes)

Whole group (30 minutes)

Participants should be in different small groups than in Session Seven. Tell them to share their work on the math activity and to make a list of what they noticed as they worked on these problems, specifically relating to how their thinking changed as they moved from whole numbers to numbers less than 1.

In the whole-group discussion, focus on these issues:

- How did participants modify their whole-number contexts and diagrams to accommodate fractions in the second part of the activity?
- What was the same and what was different in the computational procedures they used for whole numbers and for fractions less than 1?
- Did their thinking about what the operations mean change as they moved from whole numbers to fractions less than 1?

4. Details of the Fractions Progression videos (optional)

Shorten the Discussion of the Math Activity to 10 minutes in small groups and 20 minutes in whole group.

Discussion of Fraction Progression Videos

(30 minutes)

Whole group

The Illustrative Mathematics website includes a set of 7 videos explaining the Common Core approach to fractions. The lengths of the videos range from 4 to 7 minutes. Choose two or three of these videos to share with your group. One possible choice:

- Grade 3 Unit 1: The Meaning of Unit Fraction (5 min. 39 sec.)
- Grade 4 Unit 2: Equivalent Fractions (4 min 49 sec.)
- Grade 5 Unit 5: Addition of Fractions (3 min. 57 sec.)

View the videos one at a time, and solicit a few comments about each one. You should also use this opportunity to suggest that they visit the Illustrative Mathematics web site to continue to learn about the Common Core Content and Practice Standards.

5. Details for the “Implications for my classroom” discussion

Implications for my classroom

(55 minutes)

Small Groups (30 minutes)

Whole group (25 minutes)

Ask the small groups to consider their work in this seminar to discuss what they have done differently and what they want to do differently in their classroom as a result of this experience. When there are ten minutes left, announce that each group should compile a poster listing the specific suggestions of group members.

Begin the whole group discussion by asking each group to post and share their list. Once the lists have been shared, open the floor to general comments by asking, “What supports are there in your system to help you work on these suggestions?”