

## Session Seven Overview

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### BST Session Seven

#### Agenda

Sharing Exit Card Comments	Whole group	5 minutes
Sharing Student Thinking	Small groups	20 minutes
Case Discussion and Math Activity: Multiplication of Decimals	Whole group	5 minutes
	Small groups	30 minutes
	Whole group	20 minutes
Break		15 minutes
Case Discussion and Math Activity: Division of Decimals	Small groups	35 minutes
	Whole group	15 minutes
Case Discussion: Examining Teacher Moves	Whole group	20 minutes
Homework and Exit Cards	Whole group	5 minutes

#### Mathematical Themes

- The same basic principles that govern whole number multiplication and division are also called upon when developing strategies for multiplication and division of numbers involving decimals.
- Developing explanations for the commonly known rules for placing the decimal point when multiplying or dividing decimals is an opportunity to deepen and extend ideas about number and the operations.

#### Connections to the Common Core: Standards for Mathematical Practice

MP2 Reason abstractly and quantitatively.

MP3 Construct viable arguments and critique the reasoning of others.

MP7 Look for and make use of structure.

MP8 Look for and express regularity in repeated reasoning.

## Connections to the Common Core: Content Standards

### Grade 5: Number and Operations in Base Ten

*5.NBT.2: Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10.*

*5.NBT.7: Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.*

*6.NS.3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.*

## Notes to the facilitator regarding the Standards for Mathematical Practice

**MP2** Reason abstractly and quantitatively. *Mathematically proficient students at the elementary grades make sense of quantities and their relationships in problem situations. They can contextualize quantities and operations by using images or stories.*

In case 28, students draw diagrams of the carpet problem and look to see connections between parts of their arithmetic solution and the portions of the diagrams. Finding such connections deepens their understanding of the abstract symbols.

**MP3** Construct viable arguments and critique the reasoning of others. *Mathematically proficient students at the elementary grades construct mathematical arguments—that is, explain the reasoning underlying a strategy, solution, or conjecture—using concrete referents such as objects, drawings, diagrams, and actions.... Mathematically proficient students can listen to or read the arguments of others, decide whether they make sense, ask useful questions to clarify or improve the arguments, and build on those arguments. They can communicate their arguments, compare them to others, and reconsider their own arguments in response to the critiques of others.*

During the Session Seven case and math discussions, participants develop and explain rules for multiplying and dividing with decimals, work to understand their colleagues' explanations and rules, and offer ideas about how to modify them. Refer to Maxine's Journal line numbers 113 to 171 for an example of this kind of discussion. While Maxine does not explicitly cite MP3, you should make the connection explicit.

**MP7** Look for and make use of structure. *Mathematically proficient students at the elementary grades use structures such as place value, the properties of operations, other generalizations about the behavior of the operations (for example, the less you subtract, the greater the difference), and attributes of shapes to solve problems*

As participants work to develop and explain rules for multiplying and dividing with decimals, they use various mathematical structures, such as, place value, and the meaning, behavior, and properties of multiplication and division. As they work, ask questions such as, "What mathematical structure are you using in this approach?" or "How did you enact MP7 in your work?"

**MP8** Look for and express regularity in repeated reasoning. *Mathematically proficient students at the elementary grades look for regularities as they solve multiple related problems, then identify and describe these regularities.*

Through analyzing particular examples, participants articulate and explain rules for multiplying and dividing decimals.

## **BST Session Seven Agenda Changes linked to Common Core**

There are eight refinements to the agenda in Session Seven.

1. Use a few minutes at the beginning of the session to share exit card comments. You might want to focus on comments about the Standards for Mathematical Practice. Look for common threads or misconceptions to be addressed.
2. Distribute the overview for the session.
3. Before small groups start to share their student thinking assignment, remind participants to include discussion of the Standards for Mathematical Practice they had planned to enact during the lesson.
4. There are two math discussions planned for this session, one focused on multiplication of decimals and one focused on division of decimals. If your group of participants is primarily from grades K – 4, you may wish to extend time in this session to work on ideas from Sessions Six and discard one or both of these discussions.
5. After gathering comments on Leslie’s work with Chad and Tori, ask participants to look at the NCTM Mathematics Teaching Practices and identify which they see as related to Leslie’s interactions with her students.
6. Add this item to the poster for the discussion, Examining Teacher Moves. See below for a copy of the poster:

Which Standards for Mathematical Practice are at play in the teacher move or student work?

7. Revised exit card questions for Session Seven:
  - How did this session work for you as a learner?
  - Explain something you figured out about one of the Mathematical Practices highlighted in this session (MP2, 3, 7 or 8).
8. The writing assignment: Teacher Moves has been edited to include reference to the Standards for Mathematical Practice. See below for a new version of the Eighth Homework

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## **Poster for Discussion of Teacher Moves**

- What is the teacher move?
  - What can you infer about the teacher's agenda for her students?
  - How does the teacher's action connect with where she thinks her students are?
  - What do you think the teacher is trying to accomplish?
  - What is the impact of her move in terms of the ideas students engage with?
  - Which Mathematical Practices are at play in the teacher move or student work?
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## SESSION 7

### Eighth Homework

#### Reading assignment: Casebook chapter 8

In the casebook, read chapter 8, “Highlights of Related Research.” As you read, take notes on the following:

1. What did you learn from the research article that wasn’t in the cases?
2. Identify two points in the essay that particularly interested you. Explain what made them interesting.
3. What connections do you see between your classroom and the ideas in the essay?

Bring these notes to the next session to support discussion of this chapter.

#### Writing assignment: Teacher moves

For this assignment, you will write your analysis of the moves a teacher makes (in a case from the casebook) and the impact of that move on the students.

1. Identify places in a case where the teacher’s moves interested you.
2. Analyze each passage by responding to these questions:
  - What did the teacher do?
  - What can you infer about the teacher’s agenda for her students?
  - How does the teacher’s action connect with her assessment of their understanding?
  - What do you think the teacher is trying to accomplish?
  - What is the impact of the move on the students’ thinking?
  - What links to the Standards for Mathematical Practice do you see?

Choose from these cases in *Building a System of Tens*:

Grade K	Case 6	Dawn	Grade 5	Case 27	Nicole
Grade 1	Case 7	Danielle	Grade 6	Case 28	Leslie
Grade 2	Case 12	Lynn	Grade 7	Case 24	Margot
Grade 3	Case 20	Eleanor	Grade 8	Case 29	Bernard
Grade 4	Case 14	Nadine			