

Description of the Session 8: Supporting students’ narrations; and using a “public-recording-space checklist”

In Session 7, participants used a fractions-comparison task to explore mathematics, student thinking, and teaching practices. This work is continued in Session 8. Participants analyze a fractions-of-an-area task in terms of the mathematics and student thinking. They also practice narrating a solution to this task. Participants then use this same task to explore how teachers might support students in explaining their use of representations. Next, participants examine images from a blackboard to explore students’ strategies for comparing fractions. Finally, participants analyze their own use of public recording space using a checklist for the process of planning and using public recording space.

Activities and goals of the session

Activities	Times	Corresponding parts of the session	Goals
I. Preview	5 minutes	Part 1	<ul style="list-style-type: none"> • Participants will be oriented to the work of the session.
II. Supporting students’ use of representations	55 minutes	Parts 2 & 3	<ul style="list-style-type: none"> • Participants will be able to: <ul style="list-style-type: none"> ○ identify various methods for determining and comparing fractions of an area; ○ identify errors that students will likely make when finding fractions of an area of an unequally partitioned rectangle; ○ narrate the use of a representation to solve a mathematics task; and ○ identify ways that teachers can support students in using representations in their mathematical explanations.
III. Analyzing students’ methods for comparing fractions	20 minutes	Part 4	<ul style="list-style-type: none"> • Participants will be able to: <ul style="list-style-type: none"> ○ analyze records of public recording space to identify student strategies; and ○ identify strategies for comparing fractions.
IV. Using a checklist to analyze records of public recording space*	35 minutes	Part 5	<ul style="list-style-type: none"> • Participants will be able to: <ul style="list-style-type: none"> ○ use a checklist to help them analyze records from their use of public recording space; and ○ identify a goal for improving their recording in public space.
V. Wrap up	5 minutes	Part 6	<ul style="list-style-type: none"> • Participants will understand ways of connecting the session content to their classroom.

*Includes conversation about a Classroom Connection Activity from last time.

Classroom Connection Activities

Required	Optional
Type of task: Collection and analysis of public recording space Description: Develop, enact, and analyze public recording space, providing more details about student participation, and then use of a framework for analysis of public recording space use	Type of task: Reading Description: Chapin & Johnson (2006) book excerpt from <i>Math matters</i> .
Type of task: Analysis of a task Description: Analyze a fractions task by considering students, mathematics, and teaching practices.	

Preparing for the session

- Make copies as needed:
 - *Resources:* Handout: A fractions-of-an-area task (Part 2); Handout: Narrating the construction and use of a representation (Part 2); Transcript: Clarifying the problem (Part 3); Transcript: Describing the use of a representation (Part 3); Transcript: Summarizing the discussion (Part 3); Handout: Attending to mathematics teaching through images (Part 4); Handout: Public recording space checklist (Part 5)
 - *Supplements:* Math notes: Analysis of the fractions-of-a-length task (Part 2); Handout: Narrating the construction and use of a representation (Part 3)
- Customize the Classroom Connection Activities and make copies as needed
- Test technical setups: Internet connection, speakers, projector

Developing a culture for professional work on mathematics teaching (ongoing work of the facilitator throughout the module)

1. Encourage participation: talking in whole-group discussions; rehearsing teaching practices; coming up to the board as appropriate.
2. Develop habits of speaking and listening: speaking so that others can hear; responding to others' ideas, statements, questions, and teaching practices.
3. Develop norms for talking about teaching practice: close and detailed talk about the practice of teaching; supporting claims with specific examples and evidence; curiosity and interest in other people's thinking; serious engagement with problems of mathematics learning and teaching.
4. Develop norms for mathematical work:
 - a) Reasoning: explaining in detail; probing reasons, ideas, and justifications; expectation that justification is part of the work; attending to others' ideas with interest and respect.
 - b) Representing: building correspondences and making sense of representations, as well as the ways others construct and explain them.
 - c) Carefully using mathematical language.

5. Help participants make connections among module content and develop the sense that this module will be useful in helping them improve their mathematics teaching, their knowledge of mathematics, their understanding of student thinking, and their ability to learning from their own teaching.
6. Help participants understand connections between module content and the Common Core Standards for School Mathematics.

Scope of the module (focal content of this session in bold)

Mathematics	Student thinking	Teaching practice	Learning from practice
<ul style="list-style-type: none"> • representing fractions • defining fractions • using and explaining methods and representations for comparing fractions • understanding how equivalence (of fractions) can be represented and used 	<ul style="list-style-type: none"> • identifying and analyzing student conceptions, explanations, and representations of fractions • identifying and analyzing student strategies for comparing fractions 	<ul style="list-style-type: none"> • selecting and generating representations • connecting representations • narrating the process of representing • supporting students in narrating the use of a representation • recording contributions and emerging mathematical ideas 	<ul style="list-style-type: none"> • studying public recording space to learn from practice • using a conceptual framework to guide the planning, use, and analysis of public recording space

Part 1: Preview (~5 minutes)

<u>Goals</u>	<u>Instructional sequence</u>	<u>Resources</u>
<ul style="list-style-type: none"> Participants will be oriented to the work of the session. 	<ol style="list-style-type: none"> Introduce the session and watch introductory video. 	<ul style="list-style-type: none"> Video (03:04): Overview of session

Detailed description of activity	Comments & other resources
<p>1. Introduce session: <i>Session 7 used a fractions-comparison task to explore mathematics, student thinking, and teaching practice. It also continued the work on learning from and improving the use of recordings in public space.</i></p> <p><i>This session continues to explore these ideas through the analysis and narration of a fractions-of-an-area task. The session also introduces a checklist for planning, using, and reflecting on the use of public recording space.</i></p> <p>Have participants watch the <i>video</i> in which Dr. Ball frames the work of the session.</p> <div data-bbox="716 521 1102 813" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p style="text-align: center; background-color: #003366; color: white; padding: 2px;">Overview of Session 8</p> <ul style="list-style-type: none"> Supporting students' use of representations Analyzing students' methods for comparing fractions Using a checklist to analyze records of public recording space <p style="font-size: 8px; margin-top: 5px;">This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License. https://creativecommons.org/licenses/by-nc/4.0/ © 2018 Mathematics Teaching and Learning to Teach • School of Education • University of Michigan • Ann Arbor, MI 48109-1259 • mtl@umich.edu</p> </div>	

Part 2: Analyzing and narrating a fractions-of-an-area task (~35 minutes)

<u>Goals</u>	<u>Instructional sequence</u>	<u>Resources</u>
<ul style="list-style-type: none"> Participants will be able to identify various methods for determining and comparing fractions of an area. Participants will be able to identify errors that students will likely make when finding fractions of an area of an unequally partitioned rectangle. Participants will be able to narrate the use of a representation to solve a mathematics task. 	<ol style="list-style-type: none"> Introduce Part 2 and solve the fractions-of-an area task individually. Analyze the fractions-of-an-area task using the focus questions in the slide. Watch Videos A-C in which teachers in the professional development series discuss the focus questions. In pairs, narrate the solution to the fractions-of-an-area task. 	<ul style="list-style-type: none"> Video A (03:17): Advantages and disadvantages of the way a task is stated Video B (00:59): Students' use of visualization Handout: A fractions-of-an-area task Handout: Narrating the construction and use of a representation <p><u>Supplements</u></p> <ul style="list-style-type: none"> Math notes: Analysis of the fractions-of-an-area task Video C (01:54): Example narration 1 Video D (01:30): Example narration 2 Video E (03:53): Example narration 3

Detailed description of activity	Comments & other resources
<p>1. Introduce Part 2: This part focuses on analyzing a fractions-of-an-area task with respect to the mathematics and student thinking and on narrating a possible solution to the task.</p> <p>Distribute the <i>handout</i> (A fractions-of-an-area task) and have participants solve the fractions-of-an-area task individually.</p> <div data-bbox="417 836 804 1128" data-label="Complex-Block"> <p>A fractions-of-an-area task</p> <p>Which shaded region is a larger part of the big rectangle?</p> <ul style="list-style-type: none"> What mathematical ideas are involved in the problem? What strategies and solutions do you anticipate from students? </div>	<p><i>In this task, the big rectangle is partitioned into six regions of varying sizes and shapes. A part-whole interpretation of fractions is used to compare the fraction of the big rectangle covered by the green triangle and the blue rectangle. Because the big rectangle has been unequally partitioned, simply counting the number of regions into which the big rectangle is divided (i.e., six) will not yield the number of equal parts. While the question asks which region is a larger part of the big rectangle, in this case, the answer is "neither" as they are equal in area (i.e., they both cover 1/8 of the big rectangle). There are different ways of showing the areas are equal including:</i></p> <ul style="list-style-type: none"> <i>It takes 8 copies of either the blue triangle or the green rectangle to cover the whole; thus each region is 1/8 of the big rectangle.</i> <i>If you overlay the blue triangle on top of the green rectangle, a small piece of the triangle can be cut and moved to show that the area covered by the blue triangle is the same as the green rectangle; (c) if you overlay the green rectangle on top of the blue triangle, a small piece of the rectangle can be cut and moved to show that the area covered by the green rectangle is the same as the blue triangle; or</i> <i>Each shaded region can be shown to be one-half of one-fourth of the big rectangle.</i> <p><i>Caution: Participants might try to find the area of each shape (the triangle and the rectangle) by measuring and then comparing the areas. Measurement error may result in participants' concluding that either the rectangle is larger than the triangle or the triangle is larger than the rectangle.</i></p>

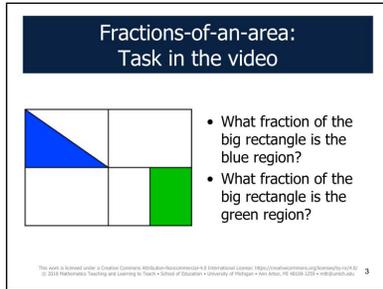
Detailed description of activity	Comments & other resources
<p>2. Have participants analyze the fractions-of-an-area task (in small groups or whole group) using the focus questions in the slide.</p>	<p><i>What mathematical ideas are involved in the problem? (see description of the task above)</i></p> <p><i>What strategies and solutions do you anticipate from students?</i></p> <ul style="list-style-type: none"> • <i>Some students might say that you can't determine which shaded region is larger because one region is a rectangle and one is a triangle.</i> • <i>Other students might say that either the blue triangle or the green rectangle is larger because it looks larger.</i> • <i>Other students might make arguments that neither shaded region is larger because both regions have the same area (see possible strategies in the description on the previous page).</i> • <i>Some students might say that the blue triangle is $\frac{1}{6}$ of the large rectangle because the large rectangle is divided into 6 parts and 1 of those parts is shaded (a similar argument might be made for the green rectangle).</i> <p><i>CCSSM Link: In working on this activity, participants are engaged in several of the CCSSM mathematical practices including: making sense of problems and persevering in solving them (#1), reasoning abstractly and quantitatively (#2), constructing viable arguments and critiquing the reasoning of others (#3), and precisely communicating their thinking to others (#6). While the major focus on using models to represent fractions starts in Grade 3 (3.NF), in the earlier grades, students work on foundational ideas such as partitioning shapes into equal shares and naming a share using fraction language (1.G.3, 2.G.3, 3.G.2). Comparing the blue and green regions requires an application of the definition of a fraction, which is introduced in Grade 3.</i></p>
<p>3. Have participants watch <i>Videos A – B</i> in which teachers in the professional development course discuss the focus questions. Encourage participants to compare their responses with the responses of the teachers in the videos.</p> <p>Elicit some comments in whole group.</p>	

Detailed description of activity	Comments & other resources
<p>4. Have participants narrate their solution to the problem with a partner. Encourage participants to consider when and how the representation is used in the narrations.</p>	<p><i>It may be useful distribute the Handout: Narrating the construction and use of a representation (see the Resources for Part 2).</i></p> <p><i>Participants may tend to use language such as "I would tell/ask" rather than actually narrating. Encourage participants to use the actual language that they would use with students.</i></p> <p><i>See Videos C – E in the Supplements section for three sample narrations. If it is useful, participants could watch and analyze these narrations.</i></p> <ul style="list-style-type: none"> • <i>Video C: partitioning the large rectangle into all blue-triangle-shaped regions and seeing that there are 8 (so $1/8$) and then partitioning the large rectangle into all green-rectangle-shaped regions and seeing that there are 8 (so $1/8$).</i> • <i>Video D: partitioning the large rectangle into fourths and seeing that the shaded regions are each $1/2$ of a $1/4$.</i> • <i>Video E: cutting the shaded regions out and directly comparing their areas. The video goes on to show how you can determine the value of one of the shaded regions by partitioning the large rectangle using one of the shapes (you can do this with just one of the shapes since you already showed the two shaded regions are equivalent)</i>

Part 3: Supporting students' narrations (~20 minutes)

<u>Goals</u>	<u>Instructional sequence</u>	<u>Resources</u>
<ul style="list-style-type: none"> Participants will be able to identify ways that teachers can support students in using representations in their mathematical explanations. 	<ol style="list-style-type: none"> Introduce Part 3, and watch Videos A-C in which a teacher scaffolds fifth-grade students' narrations of a problem related to the task analyzed in the Part. Discuss the scaffolding. 	<ul style="list-style-type: none"> Video A (02:30): Clarifying the problem Video B (04:39): Describing the use of the representation Video C (02:58): Summarizing the discussion Transcript: Clarifying the problem Transcript: Describing the use of the representation Transcript: Summarizing the discussion

Detailed description of activity	Comments & other resources
<p>1. Introduce Part 3: Students need opportunities to communicate about their mathematical reasoning and to hear ways in which their peers think about mathematics. Therefore, in addition to being able to narrate representations themselves, teachers also need to support students' efforts to use and explain representations. In this part of the session, participants will consider ways that teachers can scaffold students' narrations.</p> <p>Have participants watch a sequence of videos (<i>Videos A – C</i>) in which a teacher scaffolds fifth-grade students' narrations of a problem related to, but different from the task participants analyzed in Part 2 (see slide in Part 2). The videos have been organized by different components of the narrating process. You may want to distribute the accompanying <i>transcripts</i>.</p> <ul style="list-style-type: none"> <i>Video A</i>: The teacher clarifies the problem context (<i>Transcript: Clarifying the problem</i>) <i>Video B</i>: The teacher describes and gives meaning to the representation (<i>Transcript: Describing the use of the representation</i>) <i>Video C</i>: The teacher summarizes what was accomplished (<i>Transcript: Summarizing the discussion</i>) <p>As participants watch the videos, they should make note of the way the teacher supports students in each component. After watching the series of videos, have participants briefly discuss the videos with a partner or in small groups.</p>	<p><i>In this particular case, the representation that student will use to solve the task is given to students. In other cases, a teacher might need to scaffold why a particular representation is a useful for a problem. For example, a teacher might describe why a number line is a useful representation for solving a fraction comparison task.</i></p> <p><i>If Video C is shown, it could be paused in order to highlight the use of public recording space.</i></p> <p><i>Examples of ways the teacher supports students' narrations:</i></p> <p><i>Video A: Clarifying the problem</i></p> <ul style="list-style-type: none"> <i>Clarifying for individual student how to interpret the representation</i> <i>Making sure that everyone understands and agrees about what the problem is asking</i> <i>Helping students use the wording of the task to interpret a representation</i> <i>Establishing what is the whole and emphasizing the importance of this step</i> <i>Suggesting methods students can use to make clear what part of the representation they are referring to (i.e. coming up to board and tracing with finger)</i>

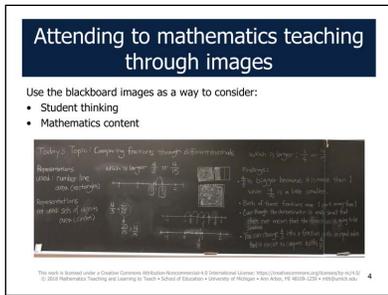


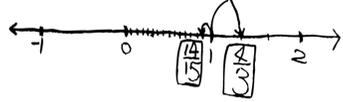
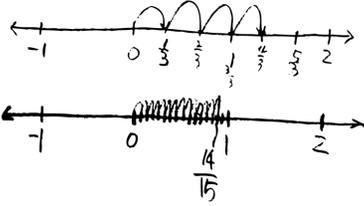
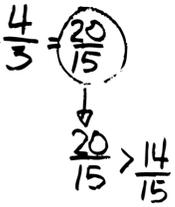
Detailed description of activity	Comments & other resources
	<p><i>Video B: Describing the use of the representation</i></p> <ul style="list-style-type: none"> • Asking students to come to the board to explain • Prompting students to show what they are referring to on the representation • Directing other students to look and listen to speaker • Preparing extra copies of the representation for students to use/write on in during their explanations • Asking questions that help students elaborate important parts of their explanations • Asking students to restate another student's explanation • Focusing on one part of the problem at a time • Arranging the space so that the class can see the representation • Prompting students to talk louder • Recapping the main components of a student's explanation <p><i>Video C: Summarizing the discussion</i></p> <ul style="list-style-type: none"> • Naming what the class has been doing well • Explicitly naming the key ideas that need to be included in an explanation • Explaining how the key ideas show up in the problem statement and in students' explanations • Recording the key ideas on chart paper to make a public record • Contributing mathematical ideas that did not come up in students' explanations <p><i>CCSSM Link: The classroom video contains examples of fifth grade students who are engaged in at least three of the mathematical practices (1, 3, and 6). In this segment, the students are making sense of the problem and persevering in solving the problem (#1), constructing viable arguments about their solution (#3), and communicating their reasoning to others (#6).</i></p>

Part 4: Analyzing students' methods for comparing fractions (~20 minutes)

<u>Goals</u>	<u>Instructional sequence</u>	<u>Resources</u>
<ul style="list-style-type: none"> Participants will be able to analyze records of public recording space to identify student strategies. Participants will be able to identify strategies for comparing fractions. 	<ol style="list-style-type: none"> Introduce Part 4 and watch the video in which Dr. Ball introduces the use of blackboard images as a way to learn about student thinking. Analyze Methods A – D using the focus questions. 	<ul style="list-style-type: none"> Video (00:35): Introduction to using blackboard images to learn about student thinking Handout: Attending to mathematics teaching through images

Detailed description of activity	Comments & other resources
<p>1. Introduce Part 4: Records of student solutions to mathematics tasks provide a vehicle for exploring student thinking. Teachers can use their analysis to deepen their understanding of mathematics and to inform and improve their lesson planning and instruction. In this part, participants use images from public recording space to analyze student solution methods for a fraction-comparison task.</p> <p>Have participants watch the <i>video</i> in which Dr. Ball frames the use of blackboard images to learn about student thinking.</p>	
<p>2. The blackboard image in the slide is a record of a class's work on the problem: <i>Which is larger $4/3$ or $14/15$?</i> Participants will use this image to explore student thinking about the comparison of fractions.</p> <p>Distribute the <i>handout</i> of Methods A – D (these are the images from the slide shown in the viewer with the colors changed to make the images more readable). Have participants work in small groups to analyze the images using the focus questions:</p> <ul style="list-style-type: none"> What are the mathematical requirements of using the strategy? What questions might you ask students about the representation? For what purposes? 	<p><u>CCSSM Link:</u> <i>Comparing fractions with different numerators and denominators is a Grade 4 standard (4.NF).</i></p> <p><i>Method A:</i></p> <ul style="list-style-type: none"> <i>Representation: a single number line</i> <i>Mathematical requirements of using a single number line to compare two fractions: identifying the whole as the interval from 0 to 1; partitioning the whole into 15 equal parts; locating $14/15$ at the right end of the fourteenth part; recognizing that $4/3$ is one-third greater than 1; partitioning the interval from 1 to 2 into three equal parts; locating $4/3$ at the right end of the first third to the right of 1; recognizing that the fraction that is further to the right on the number line ($4/3$) is the greater fraction.</i> <i>Possible questions to ask students:</i> <ul style="list-style-type: none"> How did you figure out where to put $4/3$? $14/15$? How do you know which fraction is larger? How much larger is $4/3$?



Detailed description of activity		Comments & other resources
<p>Method A</p> <p>Which is larger $\frac{4}{3}$ or $\frac{14}{15}$</p> 	<p>Method B</p>	<p><i>Method B:</i></p> <ul style="list-style-type: none"> • <i>Representation: shaded parts of area</i> • <i>Mathematical requirements of using shaded parts of area to compare two fractions: identifying the whole as one large rectangle; making the wholes equally sized; partitioning the whole into 15 equal parts; representing 14/15 by shading fourteen of those equal parts, and in order to "line up" the rectangles to do the comparison, selecting consecutive parts starting from the left; recognizing that 4/3 requires two wholes to be represented; partitioning each whole into three equal parts; shading four of those parts; recognizing that the greater shaded area corresponds to the greater fractions.</i> • <i>Note: While one can clearly see that one fraction is less than one whole and one fraction is greater than one whole, the drawn wholes differ in size.</i> • <i>Possible questions to ask students:</i> <ul style="list-style-type: none"> ○ <i>Which fraction is larger? How do you know?</i> ○ <i>(Notice that the whole differs in size). This part (14/15) looks larger than this part of area (4/3). How do you know that 14/15 is less than 4/3?</i>
<p>Method C</p> 	<p>Method D</p> 	

Detailed description of activity	Comments & other resources
	<p><i>Method C:</i></p> <ul style="list-style-type: none"> • <i>Representation: two number lines</i> • <i>Mathematical requirements of using two number lines to compare two fractions: identifying the whole as the interval from 0 to 1; partitioning the intervals from 0 to 1 and 1 to 2 each into three equal parts; locating $4/3$ at the right end of the first third to the right of 1; drawing a second number line so that corresponding points are aligned vertically; partitioning the interval from 0 to 1 into 15 equal parts; locating $14/15$ at the right end of the fourteenth part; recognizing that the fraction that is further to the right is the greater fraction.</i> • <i>Note: $14/15$ is really $14/16$ as the interval from 0 to 1 is partitioned into sixteen parts and the end of the fourteenth part is labeled.</i> • <i>Possible questions to ask students:</i> <ul style="list-style-type: none"> ○ <i>How did you figure out where to put $4/3$? $14/15$?</i> ○ <i>(Notice that $14/15$ is really $14/16$). How did you know how many equal parts to make? Can you show me the equal parts?</i> ○ <i>How do you know which fraction is larger?</i> ○ <i>How much larger is $4/3$?</i> <p><i>Method D:</i></p> <ul style="list-style-type: none"> • <i>Representation: common denominator</i> • <i>Mathematical requirements of using a common denominator to compare two fractions: strategically selecting a denominator that both fractions can be rewritten in terms of; identifying fifteenths as such a denominator; rewriting $4/3$ as $20/15$; recognizing that $20/15$ is greater than $14/15$ because it has more of the same-sized pieces</i> • <i>Possible questions to ask students:</i> <ul style="list-style-type: none"> ○ <i>How do you know that $4/3 = 20/15$?</i> ○ <i>How do you know which fraction is larger?</i> ○ <i>How much larger is $4/3$?</i>

Part 5: Using a checklist to analyze records of public recording space (~35 minutes)

<u>Goals</u>	<u>Instructional sequence</u>	<u>Resources</u>
<ul style="list-style-type: none"> Participants will be able to use a checklist to help them analyze records from their use of public recording space. Participants will be able to identify a goal for improving their recording in public space. 	<ol style="list-style-type: none"> Introduce Part 5 and discuss most recent cycle of learning from the use of public recording space using a “checklist” for the process of planning and using public recording space. Write a goal for improving use of public recording space. Discuss engagement in this process of learning from teaching using the focus questions. 	<ul style="list-style-type: none"> Handout: Public recording space checklist

Detailed description of activity	Comments & other resources
<p>1. Introduce Part 5: Participants will discuss with a partner their most recent cycle of learning from the use of public recording space. To support their analysis, they will use a “checklist” that identifies key elements in the process of planning and using public recording space.</p> <p>Distribute copies of the <i>Handout: Public recording space checklist</i>. Have partners to share the context of their work and then use the checklist to analyze their plans, images, and reflections.</p> <div data-bbox="699 634 1087 922" data-label="Diagram"> <p style="font-size: small;">This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License. https://creativecommons.org/licenses/by-nc/4.0/ © 2018 Mathematics Teaching and Learning to Teach • School of Education • University of Michigan • Ann Arbor, MI 48109-1259 • mttt@umich.edu</p> </div>	<p><i>The ideas on the checklist grew out of participants’ work in Session 7. If time allows, consider linking back to some of the ideas raised in Session 7 and show how they are represented on the checklist.</i></p>
<p>2. Have participants write a goal for improving their use of public recording space.</p>	<p><i>Possible goals might include:</i></p> <ul style="list-style-type: none"> <i>Making posters ahead of time.</i> <i>Recording key points on poster paper so they can be saved for the next class.</i> <i>Showing the task next to the solution.</i>
<p>3. Have a whole-group discussion of their engagement in this process of learning from teaching, sharing ideas related to the following questions:</p> <ul style="list-style-type: none"> What ideas in the checklist stood out to you as important to think more about? What ways of documenting your plans or images of the board have been effective/ineffective in supporting your engagement in this process? Which records seem particularly useful in reflecting on your practice? What additional documentation might help? 	

Part 6: Wrap up (~5 minutes)

<u>Goals</u>	<u>Instructional sequence</u>	<u>Resources</u>
<ul style="list-style-type: none"> Participants will understand ways of connecting the session content to their classroom. 	<ol style="list-style-type: none"> Summarize the session. Explain the Classroom Connection Activities. 	

Detailed description of activity	Comments & other resources
<p>1. Summarize the session. In Session 8, participants analyzed a fractions-of-an-area task and engaged in the cycle of learning from teaching. In these activities, participants considered ways to support students in sharing their use of representations. Participants also identified different strategies for comparing fractions. At the end of the session, participants developed goals for improving the use of public recording space in their teaching.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center; background-color: #003366; color: white; padding: 2px;">Summary</p> <p>In this session task analysis and the cycle of learning from teaching supported:</p> <ul style="list-style-type: none"> • Consideration of ways to support students in sharing their use of a representation • Identifying strategies for comparing fractions • Developing goals for improving the use of public recording space in teaching <p style="font-size: 8px; margin-top: 5px;">This work is licensed under a Creative Commons Attribution-NonCommercial-4.0 International License. https://creativecommons.org/licenses/by-nc/4.0/ © 2018 Mathematics Teaching and Learning to Teach • School of Education • University of Michigan • Ann Arbor, MI 48109-1259 • mtl@umich.edu 6</p> </div>	
<p>2. Distribute the <i>handout</i> you customized with selected <i>Classroom Connection Activities</i> and accompanying documents described below.</p> <p><u>Required:</u></p> <ul style="list-style-type: none"> • Planning for, enacting, and analyzing public recording space • Analysis of a fractions task: attending to students, mathematics, and teaching practices <p><u>Optional:</u></p> <ul style="list-style-type: none"> • Chapin & Johnson (2006) book excerpt on equivalence of fractions. 	<p><i>As was the case last session, the records and responses participants generate in response to the first activity are the basis for a substantial portion of Session 9. It is essential to establish a way for participants to have their responses and records available at the next session.</i></p> <p><i>Explain that the series of CCAs focused on the use of public recording space are providing a collection of records that participants can use to see changes and improvements in their teaching.</i></p> <p><i>Each CCA has been a bit more elaborated with respect to the process of learning from teaching and more sophisticated with respect to the teaching practices that are being worked on. Both of these layers of professional development (the process of learning and the practices of teaching) are important, but may not be immediately apparent to participants.</i></p>