

This module has been designed to support those providing Mathematics Professional learning for K-12 classroom educators.

## Ways We Use Fractions Presentation Guide

### Session Description

Through a variety of professional learning and classroom ready activities participants will explore the multiple constructs of fractions (i.e., part-whole, part-part, measure/linear, quotient, operator) and gain an understanding of the importance of context within fractions learning.

### Importance

Fractions instruction in North America tends to have a narrow focus with an over emphasis on part-whole proper fractions. In this session participants will have the opportunity to broaden their awareness of precise language, the importance of using a range of fractions including greater than one, and purposeful representations. This learning will be framed around the multiple constructs of fractions (i.e., part-whole, part-part, measure/linear, quotient, operator).

### Learning Focus

*Participants will:*

- explore the multiple constructs used to think about fractions
- understand how context changes the way we think about a fraction
- recognize the benefits of teaching various constructs simultaneously

### Agenda

#### Minds On:

- Where Do You Use Fractions?
- Sticky Note Fractions (to be discussed further in the Action)

#### Action:

- Overview of Five Constructs
- Deeper Look at Part-Whole and Part-Part
- Look at Student Work

#### Consolidation:

- Fractions Shape Sets
- Resources

### Professional Learning Module Contents

- Presentation Guide: Overview, Learning Activities, Questions to Stimulate Conversations (as needed), Aha Moments (possible participants' insights), Materials, and Adaptations (20 minute, 1.5 hour and 5.5 hour sessions)
- PowerPoint with Script and <<presenter notes>>
- Black Line Masters (BLM)

Learning Activities	Questions to Stimulate Conversation	Aha Moments	Materials
<p style="text-align: center;"><b>Minds On (30 minutes)</b></p> <p><b>Where Do You Use Fractions? (Slide 1) 3 minutes</b> Prior to the start of the session have participants respond to “Where do you use fractions?” on the 11 x 17 paper provided. Their answers will be referenced throughout the session.</p> <p><b>Overview of Session (Slides 2 to 5) 2 minutes</b></p> <p><b>Sticky Note Fractions (Slides 6 to 9) 25 minutes</b> Participants choose a fraction, represent it in as many ways as possible and sort them based on their present knowledge of the constructs. If your group is over 40 participants, then this task will work better if participants do the sort at their table. Participants review the charts and reflect on the kinds of fractions selected (e.g., proper, improper, unit, benchmark) and representations used (e.g., circles, rectangles, number lines or pictures).</p>	<ul style="list-style-type: none"> <li>• If people struggle in the placement of their fractions ask “Can you describe your representation?” Listen for key words such as, “of”, “3 parts of 5”, “3 divided by 5”. Bring the participants attention to these words.</li> </ul>	<ul style="list-style-type: none"> <li>• Fractions can be placed under more than one construct.</li> <li>• There are many ways we use fractions.</li> <li>• We overuse proper fractions as well as circle representations and tend not to use improper fractions and number lines.</li> </ul>	<ul style="list-style-type: none"> <li>• 11x17 sheet of paper titled “Where do you use fractions” (one per table)</li> <li>• Six pieces chart paper with construct headings (BLM1)</li> <li>• Sticky notes (approximately 7 per person)</li> </ul>
<p style="text-align: center;"><b>Action (90 minutes)</b></p> <p><b>Overview of Five Constructs (Slides 10 to 19) 20 minutes</b> Through guided Instruction participants will learn about the multiple constructs in detail</p> <p><b>Deeper Look at Part-Whole and Part-Part (Slides 20 to 24) 50 minutes</b> Apply the knowledge of the five constructs to the participant Sticky Note responses in order to consolidate the information from the overview.</p> <p><b>A Look at Student Work (Slides 25 to 29) 20 minutes</b> Examine student work and real life experiences to extend participant learning of the five constructs. Make connections to the fractions research.</p>	<p>When revisiting Sticky Note Task</p> <ul style="list-style-type: none"> <li>• What fractions were challenging to place? Why?</li> <li>• What fractions were easy to place? Why?</li> <li>• What surprised you? Why?</li> </ul>	<ul style="list-style-type: none"> <li>• Many contexts can be described using part- part and part- whole fractions.</li> <li>• It is very important to annotate and use explicit language.</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#"><i>Math Teaching for Learning: Ways we Use Fractions or Paying Attention to Fractions</i></a> (one copy per participant)</li> <li>• Note: Handouts not to be distributed until slide 10.</li> </ul>

Learning Activities	Questions to Stimulate Conversation	Aha Moments	Materials
<p><b>Consolidation/Debrief (30 minutes)</b>  <b>Fraction Shape Sets (Slides 30 to 32)</b>  20 minutes  Participants further apply understanding of the five constructs in this task.</p> <p><b>Implications and Real-life Examples (Slides 33 to 34) 2 minutes</b></p> <p><b>Resources (Slides 35 and 36) 8 minutes</b>  The session wraps up by highlighting the Fractions Learning Pathways, Paying Attention To Adobe Presenter and Document Briefs.</p>	<ul style="list-style-type: none"> <li>• How did you define the whole?</li> <li>• Did your whole change?</li> <li>• What construct(s) did you use?</li> </ul>	<ul style="list-style-type: none"> <li>• We move between constructs without realizing and clarifying context.</li> <li>• The whole must always be defined.</li> <li>• Context plays a significant role.</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Fraction Shape</a> (one copy per participant)</li> </ul>

**Suggestions if you are offering the session as part of a series:**

- Follow up activity: Each participant completes the Fraction Shape Sets task with students. They come to the next session with student responses and trends noted in the constructs used.

**Considerations if you are offering the session through Adobe Connect:**

- Replace slide 6 and 7 with AC replacement slides – See AC Support.
- Omit slides 7 – 9 and use online polls instead.
- Omit slide 20 and replace slide 21 with online chat pods.
- Omit slide 22 and replace with online chat pods.
- See AC Support for sample AC Room Layouts.

Adaptations	Materials
<p><b>If you have 20 minutes:</b>  <i>Learning Focus:</i></p> <ul style="list-style-type: none"> <li>• Introduction to the research project and the five constructs of fractions</li> </ul> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>• Use only slides 10-19. As people join the session, they could pick a fraction and represent it as many ways as they can think of on one piece of paper. They can then see their own thinking re: constructs and representations.</li> <li>• Provide participants with <i>Math Teaching for Learning: Ways we Use Fractions or Paying Attention to Fractions</i> (draw attention to pages 4-10)</li> </ul>	<p><i>Math Teaching for Learning: Ways we Use Fractions or Paying Attention to Fractions</i> (one copy per participant)</p>
<p><b>If you have 1.5 hours:</b>  <i>Learning Focus:</i></p> <ul style="list-style-type: none"> <li>• See 2.5 hour session</li> </ul> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>• Omit slides on student thinking (25 and 26) and Fractions Shapes Sets task (slides 31 and 32)</li> </ul>	<p>See 2.5 hours outline</p>
<p><b>If you have 5.5 hours:</b>  <i>Learning Focus:</i></p> <ul style="list-style-type: none"> <li>• See 2.5 hour outline for Ways We Use Fractions and Unit Fractions</li> </ul> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>• Follow up with Unit Fractions Module (2.5 hours) and have participants explore the Fractions Learning Pathways (0.5 hour).</li> </ul>	