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

Unit Fractions Presentation Guide

Session Description

Through a variety of professional and classroom ready activities participants will gain a deeper understanding of unit fractions and fractions as a number. Discussion will highlight mathematical thinking and anticipated responses.

Importance

Research supports the findings that fraction understandings are underpinned by larger mathematics cognitive processes including proportional reasoning and spatial reasoning. Fraction understanding enhances learning across number systems and algebraic contexts. The research based Fractions Learning Pathways (FLP) identifies unit fractions as foundational to understanding fractions.

Learning Focus

Participants will:

- understand what a unit fraction is and how this changes the way we think about fractions
- examine how unit fractions can support learning across number systems and algebraic contexts
- develop deeper understanding of fraction as a number by engaging in the actions of partitioning, iterating and disembedding

Agenda

Minds On:

- Review of Five Constructs (Meanings)

Action:

- Research Overview: Why Study Fractions?
- Building Understanding of Unit Fractions
- Unit Fractions Counting Game
- Partitioning, Iterating and Disembedding
- Partitioning, Iterating and Disembedding Tasks

Consolidation:

- Unit Fractions Across the K-12 Curriculum
- I Have… Who Has…Task

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
Introduction and Minds On (25 minutes) **Overview of Session (Slides 1 to 4) 5 minutes** **Review of Five Constructs (Slides 5 & 6) 20 minutes** Participants will sort a variety of fractions representations to help refresh and review the constructs discussed in the first session.	• Did your responses differ from others? How? • Did any of the cards pose a challenge?	• I finally understand … (a construct).	• Sorting cards: BLM 1 (one set of 16 cards per table) • BLM 2 (one copy for presenter) • *Math Teaching for Learning: Ways We Use Fractions or Paying Attention to Fractions (one copy/ person)*
Action (95 minutes) **Fractions Research Overview (Slides 7 to 14) 5 minutes** **Unit Fractions – Counting Game and Building Understanding (Slides 15 to 23) 35 minutes** Participants will experience and reflect upon the power of unit fraction thinking. **Fraction Language – Partitioning, Iterating, and Disembedding (Slides 24 to 34) 30 minutes** Participants will do two tasks: place numbers on a number line and partition a shape. Next they will learn about partitioning, iterating and disembedding (key actions of fractions learning) and connect this to their actions in completing the tasks. Participants will then watch a video of student thinking and identify instances of partitioning, iterating and disembedding. **Partitioning, Iterating, and Disembedding Tasks - Brownie and Composition of 2D Shapes (Slides 35 to 47) 25 minutes** The Brownie task will allow participants to reflect upon their own mathematical reasoning and connect it to others', including students.	• What is the role of the numerator? • What is the role of the denominator? • How do you know your thinking is correct?	• Unit thinking is powerful • Unit thinking allows students to understand operations with fractions more readily. • A fraction is a number and we should not always think of it as an operator (e.g. 2/3 "of"…) • Partitioning by paper folding can be difficult • The number of folds is not equal to the numbers of regions created	• Several sheets/ person of scrap letter sized paper (for Brownie Task) • http://www.edugains.ca/newsite/DigitalPapers/

Learning Activities	Questions to Stimulate Conversation	Aha Moments	Materials
Consolidation/Debrief (30 minutes) **Unit Fractions Across the K-12 Curriculum (Slides 48 to 53) 20 minutes** By examining the curriculum for their grade, participants will identify connections between the Fractions Learning Pathways and their instruction. This activity reinforces the importance of unit fractions across the grades. **I have.. Who has? (Slide 54) 9 minutes** Identifying the unit fraction is essential to this classroom-ready task. **Resources (Slide 55) 1 minute** The session wraps up by highlighting available resources.	• What connections do you recognize across number systems and grades? • What significance of the foundation concepts in the curriculum expectations did you identify?	• There are many connections beyond a grade	• Teaching for Learning: Unit Fractions across the K-12 Curriculum (one copy/person) • I have? Who has? Game (1 set/3-4 people) • http://www.edugains.ca/newsite/DigitalPapers/

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

- Select one of the class ready tasks from the Fractions Learning Pathway for participants to complete with their class. Have participants come to the next session in the series with student responses and any trends that they noticed.

Considerations if you are offering the session through Adobe Connect:

- Insert slides and see Unit Fractions_ONLINE_screenshots for Adobe Connect room layout.

Adaptations	Materials
If you have 20 minutes: *Learning Focus:* • Understand what a unit fraction is and how this changes the way we think about fractions *Activities:* • Participants engage in Unit Fractions counting game. Follow up with Math Teaching for Learning: Unit Fractions and show them FLP	*Math Teaching for Learning: Unit Fractions*
If you have 1.5 hours: *Learning Focus:* • Understand what a unit fraction is and how this changes the way we think about fractions • Examine how unit fractions can support learning across number systems and algebraic contexts • Develop deeper understanding of fraction as a number by engaging in the actions of partitioning, iterating and disembedding *Activities:* • Omit slides Brownie Task and I Have…Who Has….	See 2.5 hours outline
If you have 5.5 hours: *Learning Focus:* • Understand what a unit fraction is and how this changes the way we think about fractions • Examine how unit fractions can support learning across number systems and algebraic contexts • Develop deeper understanding of fraction as a number by engaging in the actions of partitioning, iterating and disembedding • Understand effective fraction instruction is achieved through task precision and punctuated instruction rather than extended timelines. *Activities:* • As above and insert after the Brownie activity a jigsaw activity using: (60 minutes) » Being Responsive to Student Thinking » Math Teaching for Learning: Unit Fractions » Math Teaching for Learning: Purposeful Representations » Math Teaching for Learning: Developing Fraction Number Sense » Paying Attention to Fractions: pages 21-23 (unit fractions and representations) • Allow participants to explore the Fractions Learning Pathway online and consider how to incorporate these tasks into their program (60 minutes) • Select an activity from the Fractions Learning Pathway as the last activity (30 minutes)	