Bridging for Math Strength Resources

Standards of Learning Curriculum Framework (SOL)

Standard of Learning (SOL) 4.5c Solve single-step and multistep practical problems involving addition and subtraction with fractions and mixed numbers



Student Strengths	Bridging Concepts	Standard of Learning
Students can add and subtract fractions with like denominators. Students can solve practical problems with proper fractions with like denominators.	Students can find equivalent fractions to add and subtract fractions with unlike denominators.	Students can solve single-step and multistep practical problems involving addition and subtraction with fractions and mixed numbers.

Understanding the Learning Trajectory

Big Ideas:

- In mathematics, real-world actions for addition and subtraction of whole numbers are the same for operations with fractions and decimals (Charles, 2005).
- Benchmark fractions like 1/2 (0.5) and 1/4 (0.25) can be used to estimate calculations involving fractions and these estimations can be used to check the reasonableness of exact answers (Charles, 2005).
- Fraction number sense skills, including estimation skills, will be necessary when solving practical problems to determine the reasonableness of an answer. Estimating with fractions is critical to understanding their magnitude or position on the number line (Van De Walle et al., 2018).
- When solving practical word problems with fractions, use the same ideas developed for whole-number computation and apply these ideas to fractional parts instead of whole numbers (Van De Walle et al., 2018).
- In mathematics, when solving practical word problems the focus should be on thinking and reasoning rather than on keywords. Expose students to a variety of different problem types and opportunities to create and solve their own practical problems. For more information about addition/subtraction problem types see the Grade 3 VDOE Curriculum Framework.
- Counting fractional parts should be done just like counting objects like apples or pencils (Van De Walle et al., 2018).

Formative Assessment:

- Just in Time Mathematics Quick Check 4.5c PDF

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- Just in Time Mathematics Quick Check 4.5c Desmos

Important Assessment Look Fors:

- The student uses the context of a problem to plan an approach to solve it.
- The student represents their thinking using models and/or manipulatives.
- The student uses estimation strategies when solving practical word problems with fractions to determine the reasonableness of their answer.
- The student solves single step word problems with like and unlike denominators using a variety of strategies.
- The student represents the resulting fraction in simplest form.

Purposeful Questions:

- Based on your estimation, does your answer seem reasonable? Explain why or why not.
- What strategy did you use when solving the problem? Is there another way that you could solve it?
- Does your solution make sense? Explain your answer.
- Is the sum or difference more or less than a whole? Explain your answer.

Bridging Activity to Support the Standard	Instructional Tips
Routines: Number Talks ESTIMATE THE SUM $\frac{9}{10} + 2\frac{7}{8} =$ Explain your reasoning.	Number talks is a routine in which students communicate their thinking through reasoning. There are several different activities such as number strings, visual models, estimation, mental computation, and number lines that students can explore with the fraction number talk routines. These routines will deepen students' understanding of fractions and support the development of student reasoning. Find more information and examples of number talks here: Building Fractions Understanding through Number Talks
Choral Counting (by ½, ¼, ⅛, or other common unit fractions)	Choral Counting is a routine in which the teacher leads students in counting aloud together by a given number, such as fourths (¼). As the students call out each number the teacher can record, creating a chart that can be used to identify patterns and other connections.
Rich Tasks: Pouring Paint VDOE	This VDOE task focuses on using problem solving skills to determine which fractions of unlike denominators can be combined together that would be close or equal to one whole. Students can use a variety of strategies such as estimation, benchmark fractions, finding common denominators, adding fractions, or converting fractions to decimals.
Games/Tech: Math Playground: Thinking Blocks, Fractions Desmos 4.5c The Hike	In Thinking Blocks: Fractions, Students explore a variety of word problems using models to solve the problems. Students are able to select a variety of sets such as solving for the part, the whole, adding like denominators, and unlike denominators. This Desmos problem fits in the upper elementary content range (4th/5th), but may be useful for MS students as well. The focus is on understanding the problem before calculation. Students will look at a numberless word problem and discuss solving strategies before having the numbers revealed and solving.

Other Resources:

- Practical Problems: Google slide of practical word problems that encourage estimation strategies to allow for understanding and additional space to show representations using virtual manipulatives.
- Math in Our World: Breakfast Plans. The Math in our World website uses real world tasks for students to explore. Teacher Reference Guide with sample responses and follow up questions.
- Links to Interactive Manipulatives
    - Interactive Area Fraction Models
    - Interactive Number Line
    - Interactive Fraction Strips
    - Interactive Fraction Circles
    - Interactive 2-Color Counters
    - Interactive 2-Color Counters Ten Frame
- VDOE Mathematics Instructional Plans (MIPS)
    - 4.5c – Adding and Subtracting Fractions: Understanding the Context (Word)/PDF Version
- VDOE Co-Teaching Mathematics Instruction Plans (MIPS)
    - 4.5c – Math Mat Problem Solving (Word)/PDF Version
- VDOE Algebra Readiness Remediation Plans
    - Adding and Subtraction Fractions – Using Pattern Blocks (Word)/PDF Version
- VDOE Word Wall Cards: Grade 4 (Word and PDF Version)
    - Fraction: Addition
    - Fraction: Subtraction
    - Least Common Multiple
    - Greatest Common Factor
- VDOE Rich Mathematical Tasks: Pouring Paints Task
    - 4.5c Pouring Paints Task Template (Word/PDF Version)
    - 4.5c Pouring Paints Student Version of Task (Word/PDF Version)
    - 4.5c Pouring Paints Anchor Papers (Word/PDF Version)
    - 4.5c Pouring Paints Anchor Papers Scoring Rationales (Word/PDF Version)

Learning Trajectory Resources:

Charles, R. (2005). Big ideas and understandings as the foundation for elementary and middle school mathematics. *Journal of Mathematics Education Leadership*, *7*(3), NCSM.

Common Core Standards Writing Team. (2019). Progressions for the Common Core State Standards for Mathematics. Tucson, AZ: Institute for Mathematics and Education, University of Arizona.

Van De Walle, J., Karp, K. S., & Bay-Williams, J. M. (2018). *Elementary and Middle School Mathematics: Teaching Developmentally.* (10th edition) New York: Pearson (2019:9780134802084)

VDOE Curriculum Framework for All Grades - Standard of Learning Curriculum Framework (SOL)