



Bridging for Math Strength Resources

Standards of Learning Curriculum Framework (SOL)

Standard of Learning (SOL) 5.6a 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 up to 1 whole. Students can add and subtract mixed numbers with like-denominators. Students can use manipulatives and/or models to find the answer.	Students can add and subtract fractions with unlike denominators to 1 whole. Students can add and subtract fractions with unlike denominators to 2 wholes. Students can add and subtract with mixed numbers and regrouping by renaming.	Students can solve single-step and multistep practical problems involving addition and subtraction with fractions and mixed numbers.

Understanding the Learning Trajectory

Big Ideas:

- To name equivalent fractions students see that multiplying the numerator and denominator of a fraction by the same number, n , corresponds to partitioning each piece of the diagram into n smaller equal pieces. (Arizona, 10)
- Converting an improper fraction to a mixed number is a matter of decomposing the fraction into a sum of a whole number and a number less than 1 (Common Core Writing Team, 2019, p. 12).
- When adding and subtracting fractions, regrouping is necessary based on the “whole” unit. For example, when finding the difference of $6 - 4\frac{3}{4}$ you must regroup 1 whole for an equivalent mixed number of 5 and $\frac{4}{4}$. The same can be said when regrouping in addition.
- The strategies students utilize to break apart and make sense of word problems with whole numbers can be utilized to make sense of word problems with fractions.
- In mathematics, emphasis should be placed on representing the problem and applying reasoning to understand it rather than relying on keywords. (See [Grade 4 VDOE Standards of Learning Document](#) p.19).

Formative Assessment:

- [Just in Time Mathematics Quick Check 5.6a PDF](#)
- [Just in Time Mathematics Quick Check 5.6a Desmos](#)

Important Assessment Look Fors:

- The student can name equivalent fractions by multiplying the numerator and denominator by the same factor (or 1).
- The student can rename an improper fraction as a mixed number and vice-versa.
- The student can reason about regrouping with fractions as renaming a whole into an equivalent whole made of n number of pieces ($1 \text{ whole} = n/n$).
- The student can correctly determine the operation of a single-step word problem.
- The students can use pictures, numbers, or words to represent and explain the process to solve the problem.
- The student can correctly determine the operations of a multi-step word problem and determine a plan of action to solve.
- The student can estimate to check their answer for reasonableness.

Purposeful Questions:

- How does renaming that fraction as an equivalent help you? What are you really doing when you rename it?
- How did you use the manipulatives/drawings/paper etc. and come up with a strategy for solving? How can you write an equation to match your drawing?
- How is regrouping with fractions similar or different to regrouping with whole numbers?
- Is the total known or unknown?
- What is happening in the problem? What does that tell you about which operation(s) you will need to use?
- How do you know your answer is reasonable and what does your answer mean?

Bridging Activity to Support Standard	Instructional Tips
Routines Gimme a Break -3 act task	After watching the video, in act 1, have students take 30 seconds to discuss with their elbow partners what question(s) come to mind before sharing out with the group. Then ask in act 2-How many pieces of a whole KitKat bar are there? Act 3 allows students to share their solution against the final act, the reveal.
Rich Tasks Mixing Paint Stephanie Kessinger Feeding Penguins Stephanie Kessinger Baking with Fractions Henrico County	In Mixing Paint, students will find 2 or 3 fractions that add exactly to 1 whole. This task introduces or has students model their understanding of equivalent fractions. In Feeding Penguins, students find two mixed number addends with like and unlike denominators that add to one whole. In Baking with Fractions, students determine a range of values to answer how much flour was used for cupcakes. Extend it by asking "How little/much flour could she have used for the cupcakes?"
Games/Tech Fraction Tracks Online Version from NCTM Fraction Tracks Printable version of NCTM Illuminations game	Use Fraction Tracks to introduce equivalent fractions. Discuss that there are infinite fractions on one point on a number line, and infinite ways to make 1 whole. Or simply - play the games.

[Desmos 5.6a The Hike](#)

In this Desmos activity, students will explore a numberless word problem to support them in making sense of the context. They will solve the problem. Then, students will analyze and compare two different number line strategies. This activity builds a conceptual understanding of fraction addition and subtraction, and it specifically highlights the relationship between addition and subtraction.

Other Resources:

- [Leapfrog Fractions](#) from Achieve the Core: In this task, students find the missing addend to make 1 whole and must use equivalent fractions.
- [NCTM on Notice and Wonder](#): Videos on how to implement.
- [Fraction Addition Challenge Nrich Math](#): Using paper to make different amounts.
- [Measuring Cups Task](#) from Illustrative Math: multi-step problem solving with unit fractions.
- [Fraction Splat Series](#) by Steve Wyborney: 20 lessons that build on skill. What is the number below the splat with mixed numbers?
- VDOE Mathematics Instructional Plans (MIPS)
 - [5.6ab – Enough Room: Adding and Subtracting Fractions](#) (Word)/[PDF Version](#)
- VDOE Algebra Readiness Remediation Plan
 - [Adding and Subtracting Fractions – Using Pattern Blocks](#) (Word)/[PDF Version](#)
- VDOE Word Wall Cards: Grade 5 ([Word](#) and [PDF](#))
 - Fraction: Addition
 - Fraction: Subtraction
 - Least Common Multiple
 - Greatest Common Factor

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 \(SOL\)](#)