



Bridging for Math Strength Resources

Standards of Learning Curriculum Framework (SOL)

Standard of Learning (SOL) 5.6b Solve single-step practical problems involving multiplication of a whole number, limited to 12 or less, and a proper fraction, with models



Student Strengths	Bridging Concepts	Standard of Learning
Students can represent equivalent fractions through twelfths, using region/area models, set models, and measurement/length models.	Students can use a set model to determine the fraction of a whole using only unit fractions.	Students can solve single-step practical problems involving multiplication of a whole number, limited to 12 or less, and a proper fraction, with models.

Understanding the Learning Trajectory

Big Ideas:

- Previously students have seen that 3×7 can be represented as the number of objects in 3 groups of 7 objects, and write this as $7 + 7 + 7$. Students apply this understanding to fractions, seeing $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$ as $5 \times \frac{1}{3}$. This allows students to give meaning to the product of a whole number and a fraction (Common Core Writing Team, 2019, p. 14).
- All fractions are a sum of their unit fractions. For example, $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$.
- Fraction operation should begin with Multiplying a whole number by a fraction—specifically a whole number by unit fractions (e.g., $3 \times \frac{1}{3}$) then move to multiplication by whole number by non unit fractions (e.g., $3 \times \frac{2}{3}$).
- Multiplying unit fraction by a whole number can be related to dividing the whole number by the denominator of the fraction. For example, $\frac{1}{3}$ of 6 is equivalent to 2. This understanding forms a foundation for learning how to multiply a whole number by a proper fraction (5th grade Curriculum Framework, p. 21).
- Multiplying a whole number times its reciprocal will result in a product of one whole. (Example $5 \times \frac{1}{5} = \frac{5}{5}$ or 1; $\frac{1}{6} \times 6 = \frac{6}{6}$ or 1).

Formative Assessment:

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

Important Assessment Look Fors:

- The student can write repeated addition of a fraction as the product of a fraction and a whole number.
- The student can create concrete and pictorial models to represent and simplify an expression.
- The student can interpret concrete and pictorial models to represent and solve an expression.
- The student can use the model to justify why the solution makes sense.
- The student can simplify their answer.

Purposeful Questions:

- What do you notice about the product of a fraction and a whole number? Why? (Students should notice it is smaller than the original whole because they are taking only PART of that whole).
- How does your picture represent repeated addition? Where do you see multiplication?
- Where do you see division in your model? How does this relate to the expression/equation you wrote? How does this represent the story in the problem?

Bridging Activity to Support Standard	Instructional Tips
Routines: Notice and Wonder	Make sure to use notice and wonders that hit all the models students are expected to use: area, number line, set, and numerical representations.
Rich Tasks: Pencil Supplies Stephanie Kessinger	Students find the number of pencils each student used by finding the fraction of a whole using a set model. Having actual pencils on hand may help students visualize but many other manipulatives can be used. If students need support, start with $\frac{1}{2}$ and onward. $\frac{3}{4}$ is included at the end in order to create a fruitful discussion that will lead fully into the 5th grade standard.
Games/Tech: Flipping pancake fraction from Education.com Desmos 5.6b Multiplying Fractions	This game uses a set model to flip a set of the pancake collection. Have students play with a partner and say the fraction problem. For example in this figure, it says flip $\frac{1}{3}$ of the total pancake. The partner should say flip $\frac{1}{3}$ of 15 which is 5 pancakes. The visual of the array makes it easy for students to see $\frac{1}{3}$ of the collection. In this activity students explore contexts and models that build an understanding of fraction multiplication (whole number multiplied by a proper fraction).
Other Resources: <ul style="list-style-type: none"> • Number Talks or Number Strings: Use number talks or number strings to introduce repeated fraction addition and its relationship to multiplication. Ex: $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{3} + \frac{1}{3} + \frac{1}{3}$ $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ • Matching: Match the visual to the expression. • Lesson: Extending Multiplication from Whole Numbers to Fractions (Illustrative Mathematics). Students write a story problem for 5×4, draw diagrams, and then look for which diagram can also be used to solve $5 \times \frac{2}{3}$. • 3 Act Tasks by Graham Fletcher: 	

- [Do the Dew](#): How many cups of sugar in a case of Mountain Dew?
- [The Juicer](#): How many grapefruits will fill the cup? ($-\frac{1}{2} \times 6$) Also introduce metric measurement for visualization.
- [The Shrink-O-Matic rich task](#): Students look for a pattern in using the Shrink-o-Matic.
- [Multiplying Fractions Desmos](#) by Maria Swartzentruber
- ["Mixed Numbers Calculator"](#)
 - Citation: Furey, Edward "[Mixed Numbers Calculator](#)"; [CalculatorSoup](#)
- VDOE Mathematics Instructional Plans (MIPS)
 - [5.6ab – Enough Room: Adding and Subtracting Fractions](#) (Word)/[PDF Version](#)
 - [5.6b – Multiplying Fractions and Whole Number](#) (Word)/[PDF Version](#)
 - [5.6b – Multiplying Fractions with Proper Fractions](#) (Word)/[PDF Version](#)
- VDOE Co-Teaching Mathematics Instruction Plans (MIPS)
 - [5.6b – Multiplying Fractions by Whole Number](#) (Word)/[PDF Version](#)
- VDOE Algebra Readiness Formative Assessments
 - [SOL 5.6b](#) (Word)/[PDF Version](#)
- VDOE Algebra Readiness Remediation Plans
 - [Problem Solving – Strategies for Finding the Hidden Question](#) (Word)/[PDF Version](#)
- VDOE Word Wall Cards: Grade 5 ([Word](#) and [PDF](#))
 - Unit Fraction Multiplication
- Desmos Resource
 - [Multiplying Fractions](#) - In this activity, students explore contexts and models that build an understanding of fraction multiplication (whole number multiplied by a proper fraction).

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 \(SOL\)](#)