

## NJDOE MODEL CURRICULUM

<b>CONTENT AREA: Mathematics</b>	<b>GRADE: 5</b>	<b>UNIT: # 4</b>	<b>UNIT NAME: Fraction Multiplication by a Whole Number and Scaling</b>
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#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Multiply fractions by whole numbers and draw visual models or create story contexts. Interpret the product $(a/b) \times q$ as $a$ parts of a whole partitioned into $b$ equal parts added $q$ times. In general, if $q$ is a fraction $c/d$ , then $(a/b) \times (c/d) = a(1/b) \times c(1/d) = ac \times (1/b)(1/d) = ac(1/bd) = ac/bd$ .	5.NF.4a
2	Find the area of a rectangle with fractional side lengths by tiling unit squares and multiplying side lengths.	5.NF.4b
3	Explain how a product is related to the magnitude of the factors.	5.NF.5a 5.NF.5b
4	Solve real world problems involving multiplication of fractions (including mixed numbers), using visual fraction models or equations to represent the problem.	5.NF.6
5	Divide a unit fraction by a non-zero whole number and interpret by creating a story context or visual fraction model.	5.NF.7a
6	Divide a whole number by a unit fraction and interpret by creating a story context or visual fraction model.	5.NF.7b
7	Solve real world problems involving division of unit fractions by whole numbers or whole numbers by unit fractions.	5.NF.7c

**Major Content** **Supporting Content** **Additional Content** (Identified by PARCC Model Content Frameworks).

**Bold type indicates grade level fluency requirements.** (Identified by PARCC Model Content Frameworks).

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### Selected Opportunities for Connection to Mathematical Practices

**1. Make sense of problems and persevere in solving them.**

SLO #1 Explain correspondences between equations involving multiplication of fractions by whole numbers.

SLO #2 Analyze the givens and relationships of an area model with fractional side lengths.

SLO #4 Explain correspondences between real world problems and equations involving multiplication of fractions.

SLO #5 Explain correspondences between story contexts and visual fraction models when dividing a unit fraction by a whole number.

SLO #6 Explain correspondences between story contexts and visual fraction models when a whole number by a unit fraction.

**2. Reason abstractly and quantitatively.**

SLO #1 Use quantitative reasoning to create a coherent representation of multiplication of fractions by whole numbers, and understand their quantities and the quotients quantities.

SLO #3 Understand and make sense of the factor and product quantities involved in multiplication.

SLO #5 Understand and make sense of the quantities and relationships when dividing unit fractions by whole numbers.

SLO #5 Use quantitative reasoning to create a coherent representation and understand the quantities when dividing unit fractions by whole numbers.

SLO #6 Understand and make sense of the quantities and relationships when dividing whole numbers by unit fractions.

SLO #6 Use quantitative reasoning to create a coherent representation and understand the quantities when dividing whole numbers by unit fractions.

**3. Construct viable arguments and critique the Model with mathematics.**

SLO #3 Analyze the factors and products of multiplication problems by separating them into cases.

**4. Model with mathematics.**

SLO #2 Apply previously learned concepts about area to solve area problems with fractional side length.

SLO #2 Map the relationships in area problems with fractional sides using diagrams and other tools.

SLO #4 Apply previously learned concepts about multiplication of fractions in order to solve real world problems.

SLO #4 Map the relationship, using tools, between real world problems involving multiplication of fractions, and the models and equations that represent them.

SLO #7 Apply previously learned concepts about division of unit fractions and whole numbers to solve real world problems.

**5. Use appropriate tools strategically.**

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<p>SLO #1 Consider available tools, such as visual models and story contexts, when multiplying fractions by whole numbers.</p> <p>SLO #4 Consider available tools, such as visual models and equations, when solving real world problems that involve multiplication of fractions.</p> <p>SLO #5 Consider and use available tools, such as visual models and story contexts, when solving division problems involving unit fractions by whole numbers.</p> <p>SLO #5 Consider and use available tools, such as visual models and story contexts, when solving division problems involving whole numbers by unit fractions.</p> <p><b>6. Attend to precision.</b></p> <p>SLO #3 Communicate and explain how a product is related to the magnitude of the factors.</p> <p><b>7. Look for and make use of structure.</b></p> <p>SLO #1 Look for and discern a pattern in equations that involve multiplication of fractions by whole numbers.</p> <p><b>8. Look for and express regularity in repeated reasoning.</b></p>
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***Bold type identifies possible starting points for connections to the SLOs in this unit.***

Code #	Common Core State Standards
<b>5.NF.4a</b>	Interpret the product $(\mathbf{a/b}) \times \mathbf{q}$ as $\mathbf{a}$ parts of a partition of $\mathbf{q}$ into $\mathbf{b}$ equal parts; equivalently, as the result of a sequence of operations $\mathbf{a} \times \mathbf{q} \div \mathbf{b}$ . For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$ and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$ . (In general $(\mathbf{a/b}) \times (\mathbf{c/d}) = \mathbf{ac/bd}$ .)
<b>5.NF.4b</b>	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as it would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
<b>5.NF.5a</b>	Interpret multiplication as scaling (resizing) by comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.

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<b>5.NF.5b</b>	Interpret multiplication as scaling (resizing) by explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers as a familiar case); explaining why multiplying a given number less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying $a/b$ by 1.
<b>5.NF.6</b>	Solve real world problems involving multiplication of fractions and mixed numbers, e.g. by using visual fraction models or equations to represent the problem.
<b>5.NF.7a</b>	Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(1/3) \div 4$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$ .
<b>5.NF.7b</b>	Interpret division of a whole number by a unit fraction, and compute such quotients. <i>For example, create a story context for <math>4 \div (1/5)</math>, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that <math>4 \div (1/5) = 20</math> because <math>20 \times (1/5) = 4</math>.</i>
<b>5.NF.7c</b>	Solve real world <i>problems</i> involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. <i>For example, how much chocolate will each person get if 3 people share <math>\frac{1}{2}</math> pound of chocolate equally? How many <math>1/3</math> cup servings are in 2 cups of raisins?</i>

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