

NJDOE MODEL CURRICULUM

CONTENT AREA: Mathematics GRADE: 5 UNIT: # 3 UNIT NAME: Operations with Multi-digit Whole Numbers, Decimals and Fractions

STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS	
1	Add and subtract fractions (including mixed numbers) with unlike denominators by replacing the given fractions with equivalent fractions having like denominators.	5.NF.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)
2	Solve word problems involving adding or subtracting fractions including unlike denominators, and determine if the answer to the word problem is reasonable, using estimations with benchmark fractions.	5.NF.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.
3	Interpret a fraction as a division of the numerator by the denominator; solve word problems where division of whole numbers leads to fractional or mixed number answers.	5.NF.3	Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving the division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g. by using visual fraction models or equations to represent the problem. <i>For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3 and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50 pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?</i>
4	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	Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. <i>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 $(a/b) \times (c/d) = ac/bd$.)</i>
5	Find the area of a rectangle with fractional side lengths by tiling unit squares and multiplying side lengths.	5.NF.4b	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.

STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS	
6	Explain how a product is related to the magnitude of the factors.	5.NF.5a,b	<p>5a. 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.</p> <p>5b. 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.</p>
7	Fluently multiply multi-digit whole numbers using the standard algorithm.	5.NBT.5	Fluently multiply multi-digit whole numbers using the standard algorithm.

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).

Selected Opportunities for Connection to Mathematical Practices

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

SLO #4 Explain correspondences between equations involving multiplication of fractions by whole numbers.

SLO #5 Analyze the givens and relationships of an area model with fractional side lengths.

2. Reason abstractly and quantitatively.

SLO #3 Understand and make sense of fraction quotients, including mixed numbers.

SLO #4 Use quantitative reasoning to create a coherent representation of multiplication of fractions by whole numbers, and understand their quantities and the quotients quantities.

SLO #6 Understand and make sense of the factor and product quantities involved in multiplication.

3. Construct viable arguments and critique the reasoning of others.

SLO #6 Analyze the factors and products of multiplication problems by separating them into cases.

4. Model with mathematics.

SLO #5 Apply previously learned concepts about area to solve area problems with fractional side length.

SLO #5 Map the relationships in area problems with fractional sides using diagrams and other tools.

5. Use appropriate tools strategically.

SLO #2 Consider and use available tools, such as diagrams and drawings, when solving addition or subtraction word problems involving fractions with unlike denominators.

6. Attend to precision.

SLO #3 Communicate and explain how a product is related to the magnitude of the factors.

7. Look for and make use of structure.

SLO #4 Look for and discern a pattern in equations that involve multiplication of fractions by whole numbers.

SLO #7 Look for and discern a pattern when using the standard algorithm to multiply multi-digit whole numbers.

8. Look for and express regularity in repeated reasoning.

9. SLO #2 with problems involving addition and subtraction of fractions; continually evaluate the reasonableness of the answers.

Bold type identifies possible starting points for connections to the SLOs in this unit.

Greater Brunswick Charter School Curriculum

Grade level: 5		Subject: Math			Unit #: 3		
Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
1	<ul style="list-style-type: none"> Fractions and Division Multiplication of 2 digit numbers 	1	<ul style="list-style-type: none"> To see a fraction as a division problem. To improve fluency multiplying 2 digit numbers 	<i>What makes a fraction happen?</i>		<ul style="list-style-type: none"> Lesson/Guided practice Independent practice Intervention/Enrichment i-Ready 	MyMath 8.1 p.551-556 MultiplicationPractice
2	Greatest Common Factor	2	To use prime factorization to identify the GCF of two or three numbers.	<i>How can I reliably find the great common factor between two numbers without having to guess?</i>	<i>Obviously, this is a key skill for reducing fractions easily.</i>	<ul style="list-style-type: none"> Lesson/Guided practice Independent practice Intervention/Enrichment i-Ready 	MyMath 8.2 p.557-562
3	Simplest Form of a fraction	6	To rewrite any fraction in simplest form by finding the GCF and reducing the fraction.	<i>How do I get smaller numbers in my fraction to help me work with it more easily?</i>		<ul style="list-style-type: none"> Lesson/Guided practice Independent practice Intervention/Enrichment i-Ready 	MyMath 8.3 p.563-568
4	Simplest form	6	To rewrite any fraction in simplest form by finding the GCF and reducing the fraction.	<i>How do I get smaller numbers in my fraction to help me work with it more easily?</i>		<ul style="list-style-type: none"> Independent practice Intervention/Enrichment as needed for strugglers i-Ready 	MyMath p.569-571 MakeYourOwnPractice
5	Least Common Multiple	2	To use prime factorization to find the LCM of two or three numbers.	<i>How can I reliably find the least common multiple between two numbers without having to guess?</i>	<i>Realize, the LCM is not a requirement to find a common denominator. Students often find it easier and more time efficient to multiply the two denominators together, raise the fractions, perform the operation on the resulting fractions with a like denominator, then reduce the answer.</i>	<ul style="list-style-type: none"> Lesson/Guided practice Independent practice Intervention/Enrichment i-Ready 	MyMath 8.5 p.577-582

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Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
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6	Comparing fractions	6	To determine which of two fractions is larger.	<i>What do I need to be sure I can compare two fractions?</i>		<ul style="list-style-type: none"> Lesson/Guided practice Independent practice Intervention/Enrichment i-Ready 	MyMath 8.6 p.583-588
7	<ul style="list-style-type: none"> Comparing Fractions Multiplication of 2 digit numbers 		To improve fluency multiplying 2 digit numbers			<ul style="list-style-type: none"> Independent practice Intervention/Enrichment as needed for strugglers i-Ready 	MyMath p.575, 576, 601-602 #1-17,24-27 MakeYourOwnPractice MultiplicationPractice
8	Assessment			<i>If we complete this chapter, not called for in this unit, we won't have time to finish the operations with fractions. That's why this jumps to . . .</i>		<ul style="list-style-type: none"> Review Assessment 	
9	Add like fractions Subtract like fractions	2	To add and subtract fractions with like denominators	<i>How is adding or subtracting like fractions similar to adding whole numbers?</i>		<ul style="list-style-type: none"> Lesson/Guided practice Independent practice Intervention/Enrichment i-Ready 	MyMath 9.2, 9.3 p.619-630
10	Unlike denominators	1, 2	To determine equivalent fractions with unlike denominators	<i>Why can I change the denominator in a fraction and what must I do to the top, if I do change the bottom?</i>		<ul style="list-style-type: none"> Lesson/Guided practice Independent practice Intervention/Enrichment i-Ready 	MyMath 9.4 p.631-636
11	Add unlike fractions	1, 2	To add fractions with unlike denominators	<i>What do I need to even think about adding two fractions?</i>		<ul style="list-style-type: none"> Lesson/Guided practice Independent practice Intervention/Enrichment i-Ready 	MyMath 9.5 p.637-642
12	<ul style="list-style-type: none"> Subtracting unlike fractions Multiplication of 2 digit numbers 	1, 2	<ul style="list-style-type: none"> To find common denominators and subtract fractions To improve fluency multiplying 2 digit numbers 	<i>Why can I change the denominator in a fraction and what must I do to the top, if I do change the bottom?</i>		<ul style="list-style-type: none"> Lesson/Guided practice Independent practice Intervention/Enrichment i-Ready 	MyMath 9.6 p.645-650 MultiplicationPractice

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Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
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13	Adding and subtracting fractions	1, 2	To find solutions to real world situations.	<i>How can I use the movie in my mind to understand the problem then my fraction skills to find the answer?</i>		<ul style="list-style-type: none"> Lesson/Guided practice Independent practice Intervention/Enrichment i-Ready 	MyMath 9.8 p.657-662
14	Adding and subtracting fractions	1, 2	To find solutions to real world situations.	<i>How can I use the movie in my mind to understand the problem then my fraction skills to find the answer?</i>		<ul style="list-style-type: none"> Independent practice Intervention/Enrichment as needed for strugglers i-Ready 	MyMath p.669, 670 MathAidsPractice
15	Assessment	1, 2				<ul style="list-style-type: none"> Review Assessment 	
16	Adding mixed numbers	1, 2	To add two mixed numbers.	<i>What do I need to be able to add two fractions? What does the whole number do for me?</i>		<ul style="list-style-type: none"> Lesson/Guided practice Independent practice Intervention/Enrichment i-Ready 	MyMath 9.11 p.677-682
17	<ul style="list-style-type: none"> Subtracting mixed numbers without regrouping Multiplication of 2 digit numbers 	1, 2	<ul style="list-style-type: none"> To subtract two mixed numbers. To improve fluency multiplying 2 digit numbers 	<i>What do I need to be able to subtract two fractions? What does the whole number do for me?</i>		<ul style="list-style-type: none"> Lesson/Guided practice Independent practice Intervention/Enrichment i-Ready 	MyMath 9.12 p.683-688 MultiplicationPractice
18	Subtracting mixed numbers with regrouping	1, 2	To subtract two mixed numbers.	<i>How is regrouping with mixed numbers the same as regrouping with whole numbers?</i>		<ul style="list-style-type: none"> Lesson/Guided practice Independent practice Intervention/Enrichment i-Ready 	MyMath 9.13 p.689-694
19	Adding and subtracting mixed numbers	1, 2	To add and subtract mixed numbers			<ul style="list-style-type: none"> Independent practice Intervention/Enrichment as needed for strugglers i-Ready 	MyMath p.695-698 MathAidsPractice
20	Assessment	1, 2				<ul style="list-style-type: none"> Review Assessment 	

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21	Part of a number	4	To compute the fractional part of a whole number.	<i>When I have $\frac{5}{8}$ of something, how can I find out exactly how much that is?</i>	<i>Begin the notion that "of" translates as multiplication between two numbers.</i>	<ul style="list-style-type: none"> • Lesson/Guided practice • Independent practice • Intervention/Enrichment • i-Ready 	MyMath 10.1 p.707-712
22	<ul style="list-style-type: none"> • Estimating products of fractions • Multiplication of 2 digit numbers 	4	<ul style="list-style-type: none"> • To estimate products of two fractions. • To improve fluency multiplying 2 digit numbers 	<i>How can I figure out if my multiplication answer is reasonable?</i>		<ul style="list-style-type: none"> • Lesson/Guided practice • Independent practice • Intervention/Enrichment • i-Ready 	MyMath 10.2 p.713-718 MultiplicationPractice
23	Using models to depict multiplication to obtain part of all	4	To shade and count within a model to discover how multiplication with fractions works	<i>How can I find a fractional part of a larger group of items?</i>		<ul style="list-style-type: none"> • Lesson/Guided practice • Independent practice • Intervention/Enrichment • i-Ready 	MyMath 10.3 p.719-724
24	Using models to depict multiplication to obtain part of all	4, 5	To shade and count within a model to discover how multiplication with fractions works	<i>How can I find a fractional part of a fraction?</i>	An example solution to a problem for SLO5 <i>The text only pretends to address this.</i>	<ul style="list-style-type: none"> • Lesson/Guided practice • Independent practice • Intervention/Enrichment • i-Ready 	MyMath 10.5 p.733-738 PracticeforSLO5
25	Multiply whole numbers and fractions	4	To compute the product of a fraction and a whole number.	<i>How is multiplying a fraction and a whole number the same as multiplying two fractions?</i>		<ul style="list-style-type: none"> • Lesson/Guided practice • Independent practice • Intervention/Enrichment • i-Ready 	MyMath 10.4 p.725-730
26	Multiply whole numbers and fractions	4	To compute the product of a fraction and a whole number.	<i>How is multiplying a fraction and a whole number the same as multiplying two fractions?</i>		<ul style="list-style-type: none"> • Lesson/Guided practice • Independent practice • Intervention/Enrichment • i-Ready 	MyMath 10.6 p.739-744 AStepFurtherPractice

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Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
27	<ul style="list-style-type: none"> • Multiplying and estimating fraction products • Multiplication of 2 digit numbers 	4	<ul style="list-style-type: none"> • To compute the product of two fraction numbers and determine the reasonableness through estimation. • To improve fluency multiplying 2 digit numbers. 			<ul style="list-style-type: none"> • Independent practice • Intervention/Enrichment as needed for strugglers • i-Ready 	MyMath p.731,732 MathAidsPractice MultiplicationPractice
28	Assessment	4				<ul style="list-style-type: none"> • Review • Assessment 	
<u>Word Wall Candidates</u> Fraction Numerator Denominator Simplest Form Scaling Common Factor Common Multiple Least Common Denominator Multiple Number line Greatest Common Factor Least Common Multiple Equivalent Fractions							

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Authentic Application

Your goal: Create a classroom for a race of aliens from another planet that are $\frac{3}{5}$ as large as humans.

Your role: The design manager who needs to determine the correct sizes for each item.

Your audience: The president of the race of aliens.

The situation: You are to identify five items in the classroom that will be converted to smaller sizes to make them small enough for the aliens' children to use. All of the items are to be measured in inches.

You need to measure the items making sure that all of your item measures involve fractions or mixed numbers. Then, you must find $\frac{3}{5}$ of them to make them small enough for the aliens. One example: A pencil is $7\frac{1}{2}$ inches long. To make it small enough for the aliens, it must be $\frac{3}{5}$ that size. That would be $7\frac{1}{2} \times \frac{3}{5} = 4\frac{1}{2}$ inches.

Your Product: A table that includes the name of each item, it's original measure, and it's new measure for the aliens to use it.

Item name	Original measure	Alien size measure

Success Criteria: Scoring rubric:

	4 points	3 points	2 points	1 point
Original measure	All involve fractions	All are correct	Only one measure is incorrect	More than one measure is incorrect.
Scale	All of the multiplication is correct	There is one multiplication error	There are two multiplication errors	There are three multiplication errors
Table of values	It is neatly completed. No items are repeated in another group's table.	It is neatly completed. One item is repeated in another group's table.	It is almost neatly completed. No items are repeated in another group's table.	It is almost neatly completed. One item is repeated in another group's table.