

NJDOE MODEL CURRICULUM

CONTENT AREA: Mathematics	GRADE: 4	UNIT: # 3	UNIT NAME: Properties of Operations with Multi-Digit Arithmetic. Fraction Addition, and Subtraction
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#	STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS
1	Decompose a fraction into a sum of fractions with the same denominator in more than one way; record the decomposition as an equation and justify with a visual fraction model.	4.NF.3a 4.NF.3b	<p>Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.</p> <p>a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.</p> <p>b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2\ 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.</p>
2	Add and subtract mixed numbers with like denominators by replacing each mixed number with an equivalent fraction.	4.NF.3c	<p>Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.</p> <p>c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.</p>
3	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	4.NF.3d	<p>Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.</p> <p>d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.</p>
4	Multiply a fraction by a whole number using visual fraction models and equations, demonstrating a fraction a/b as a multiple of $1/b$.	4.NF.4a 4.NF.4b	<p>Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.</p> <p>a. Understand a fraction a/b as a multiple of $1/b$. For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.</p> <p>b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. In general, $n \times (a/b) = (n \times a)/b$.</p>
5	Solve 1-step word problems involving multiplication of a fraction by a whole number. For example, if each person at a party will eat $3/8$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?	4.NF.4c	<p>Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.</p> <p>c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat $3/8$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?</p>

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS	
6	Express measurement comparisons within a single system of measurement and record in a two-column chart within a single system of measurement; e.g., <i>know that 1 ft. is 12 times as long as 1 in.</i>	4.MD.1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. <i>For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36).</i>
7	Compose equations from information supplied in word problems using letters to represent unknowns and solve the word problems with addition and subtraction.	4.OA.3	Solve multistep word problems with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation & estimation strategies including rounding.
8	Add and subtract two multi-digit whole numbers using the standard algorithm fluently (with speed and accuracy) without a calculator.	4.NBT.4	Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Selected Opportunities for Connection to Mathematical Practices

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

- SLO #5 Explain the meaning and the process of finding a solution to a word problem that involves multiplication of a fraction by a whole number.
- SLO #7 Explain correspondences between composed equations and equations represented as word problems.

2. Reason abstractly and quantitatively.

- SLO #1 Understand and make sense of decomposed fraction quantities and understand the relationship to its parts.
- SLO #2 Understand and make sense of addition and subtraction of mixed number quantities and their relationship to an equivalent fraction.
- SLO #3 Understand and make sense of fraction quantities in the context of addition and subtraction word problems.
- SLO #4 Understand and make sense of multiplied fraction quantities.
- SLO #4 Use quantitative reasoning to create a coherent representation of fraction multiplication and understand the fraction quantities involved.
- SLO #5 Understand and makes sense of whole number and fraction quantities in the context of multiplication.

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

4. Model with mathematics.

- SLO #1 Apply and use previously learned concepts about fractions in order to decompose fractions and record the decomposition in an equation.
- SLO #1 Map the relationship between decomposed fraction units using tools that include a visual fraction model.
- SLO #3 Apply and use previously learned concepts about fractions in order to solve addition and subtraction word problems utilizing fractions.
- SLO #3 Map the relationship between fractions sums and differences using tools.
- SLO #5 Apply previously learned concepts regarding rectangles to solve area and perimeter problems involving rectangles.
- SLO #6 Use specific and appropriate units of measurement when comparing two objects within a single system.

5. Use appropriate tools strategically.

- SLO #1 Consider and use available tools, such as models and graphs, when solving problems that relate to number and shape patterns.
- SLO #4 When multiplying fractions consider and use available tools that include equations and visual fraction models.

6. Attend to precision.

- SLO #6 Specify units of measure in order to clarify the correspondence with the given quantities.

7. Look for and make use of structure.

- SLO #7 Look for and discern patterns to determine factor pairs and multiples of whole numbers up to 100.

8. Look for and express regularity in repeated reasoning.

SLO #6 Look for and express regularity in repeated reasoning when determining prime numbers between 1 and 100.

SLO #7 Look for and express regularity in repeated reasoning when determining factor pairs and multiples of whole numbers.

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

Greater Brunswick Charter School Curriculum

Grade level: 4		Subject: Math			Unit #: 3		
Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources (in addition to MyMath)
					Whole Group	Small Group / Stations	
1	Mixed numbers	1	To compose and decompose a mixed number.	<i>How can I show something like more than 2 but less than 3?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 8.9 p.537-542
2	Improper fractions	1, 7	To convert numbers between mixed number and improper fraction forms.	<i>How can I express a number to make it easier for me to add or multiply?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 8.10 p.543-548
3	Mixed numbers and improper fractions	1, 7	To increase fluency in using the two forms interchangeably.	<i>When is it best to use mixed numbers or improper fractions?</i>	<i>There is going to be multiplication soon in which improper fractions will be important.</i>	<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath p.549-552
4	Assessment				<i>This assessment may include a number of concepts addressed prior to the unit assessment.</i>	<ul style="list-style-type: none"> •Review •Assessment 	
5	Adding Fractions	1, 2, 3	To add fractions with like denominators.	<i>How does it make sense to add fractions when the denominators are the same?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 9.1 p.561-566
6	Adding fractions	1, 2, 3, 7	To add fractions with like denominators without regrouping.	<i>How can I add "like" fractions in my head?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 9.2 p.567-572
7	Subtracting like fractions	1, 2, 3, 7	To subtract fractions with the same denominators.	<i>How does it make sense to subtract a fraction from another one when the denominators are the same?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 9.3 p.573-578
8	Subtracting like fractions	1, 2, 3, 7	To subtract fractions with the same denominators without regrouping.	<i>How can I subtract "like" fractions in my head?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 9.4 p.579-584

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Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources (in addition to MyMath)
					Whole Group	Small Group / Stations	
9	Adding and subtracting fractions	1, 2, 3, 7	To increase fluency in adding and subtracting like fractions without regrouping.	<i>How can I do these quickly without making mistakes?</i>		<ul style="list-style-type: none"> •Independent Practice •Intervention/Enrichment as needed with strugglers •i-Ready 	MyMath p.585-586
10	Problems with fractions	1, 2, 3, 7	To solve life like problems involving adding or subtracting fractions	<i>How can I use my skills to do something real with them?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 9.5 p.587-592
11	Adding mixed numbers	1, 2, 3, 7	To add mixed numbers with regrouping.	<i>How does a whole number included with the fraction make any difference in adding them?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 9.6 p.593-598
12	Subtracting mixed numbers	1, 2, 3, 7	To subtract mixed numbers with regrouping.	<i>How does a whole number included with the fraction make any difference in subtracting them?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 9.7 p.599-604
13	Adding and subtracting mixed numbers	1, 2, 3, 7	To add or subtract mixed numbers	<i>Do I know enough to move forward to multiplying fractions and mixed numbers?</i>		<ul style="list-style-type: none"> •Independent Practice •Intervention/Enrichment as needed with struggler •i-Ready 	MyMath p.605-606
14	Assessment					<ul style="list-style-type: none"> •Review •Assessment 	
15	Multiplying fractions	4, 5	To multiply fractions as a product of a unit fraction.	<i>How are fractions like adding together unit fractions?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 9.8 p.607-612
16	Multiplying fractions by whole numbers	4, 5, 7	To multiply a fraction by a whole number.	<i>How is multiplying fractions just like multiplying whole numbers and how is it different?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 9.9 p.613-618

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Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources (in addition to MyMath)
					Whole Group	Small Group / Stations	
17	Multiplying fractions by whole numbers	4, 5, 7	To improve fluency multiplying fractions	<i>How can I be sure I don't make mistakes?</i>		<ul style="list-style-type: none"> •Independent Practice •Intervention/Enrichment as needed with strugglers •i-Ready 	MyMath p.619-622
18	Assessment					<ul style="list-style-type: none"> •Review •Assessment 	
19	Customary units of measure	6	To determine readiness for study in customary units	<i>What do I already know about customary units that will help me now?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath p.687-696
20	Customary units of length	6	To estimate and measure using customary units.	<i>What can I use on my body to help me estimate customary units?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 11.1 p.697-702
21	Converting customary units of length	6	To convert measures from one customary unit to another.	<i>How are all of the customary units connected to each other?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 11.2 p.703-708
22	Metric units of length	6	To measure and estimate items in metric units of length.	<i>How are metric units like customary units? How are they different?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 12.1 p.775-780
23	Customary units of capacity	6	To estimate the reasonable customary unit for capacity	<i>What references can I use to help me estimate liquid capacity?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 11.3 p.709-714
24	Converting customary units of capacity	6	To convert measures from one customary unit to another.	<i>How are all of the customary units connected to each other?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 11.4 p.715-720

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					Whole Group	Small Group / Stations	
25	Metric units of capacity	6	To estimate the reasonable metric unit for capacity.	<i>What references can I use to help me estimate liquid capacity?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 12.2 p.781-786
25	Customary units of weight	6	To estimate the reasonable customary unit for weight.	<i>What references can I use to help me estimate weights?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 11.5 p.723-728
26	Convert customary units of weight	6	To convert measures from one customary unit to another.	<i>How are all of the customary units connected to each other?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 11.6 p.729-734
27	Metric units of weight	6	To estimate the reasonable metric unit for weight.	<i>What references can I use to help me estimate weights?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 12.3 p.787-792
28	Convert metric units	6	To convert units in the metric system using powers of 10.	<i>How is converting units in the metric system easier than converting them in the customary system?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 12.5 p.801-806
29	Customary and metric units of length, capacity, and weight	6	To improve fluency in the application of the measures.	<i>How can I apply my skills to make it easier for me to solve real problems?</i>		<ul style="list-style-type: none"> •Independent Practice •Intervention/Enrichment as needed with strugglers •i-Ready 	MyMath p.721, 722, 793, 794
30	Assessment					<ul style="list-style-type: none"> •Review •Assessment 	
31	Convert units of time	6	To convert units of time	<i>How are the units of time related so I can know how much time has passed?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 11.7 p.735-740

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					Whole Group	Small Group / Stations	
32	Measurement problems	6, 8	To solve applications in measurement.	<i>How can I use my skills with units of measure to find answers to real life situations?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath 11.8 is optional MyMath 11.9 p.749-758
33	Measurement problems	6, 8	To solve applications in measurement.	<i>How can I use my skills with units of measure to find answers to real life situations?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment •i-Ready 	MyMath p.759-763, 795-800
34	Measurement problems	6, 8	To solve applications in measurement.	<i>How can I use my skills with units of measure to find answers to real life situations?</i>		<ul style="list-style-type: none"> •Lesson/Guided Practice •Independent Practice •Intervention/Enrichment i-Ready 	MyMath 12.6 p.807-815
<u>Word Wall Candidates</u>							
Numerator Like Fractions		Denominator Simplest form		Fraction	Mixed Number	Improper Fraction	
Length Inch Meter		Foot Millimeter		Yard Centimeter	Mile Kilometer		
Capacity Fluid ounce Liter		Cup Milliliter		Pint	Quart	Gallon	
Weight = Mass Ounce Gram		Pound Milligram		Ton Kilogram	Convert		
Second		Minute		Hour	Estimate	Reasonable	

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Authentic Application

Your goal: Create a classroom for a race of aliens from another planet that are 5 times 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 larger sizes to make them large enough for the aliens' children to use. One item must be measure in liquid capacity, one item must be measured in weight or mass, and one item must be measured in length. The other two items can be in any measure, but they must be measured using the metric system.

You need to measure the items making sure that two of your item measures involve fractions or mixed numbers. Then you must multiply them by 5 to make them large enough for the aliens, then you must convert them to the largest unit. One example: A pencil is $7\frac{1}{2}$ inches long. To make it large enough for the aliens, it must be 5 times as large. That would be $7\frac{1}{2} \times 5 = 37\frac{1}{2}$ inches. But $37\frac{1}{2}$ inches can be expressed with larger units, so you would convert it to be 1 yard and $1\frac{1}{2}$ inches or 3 feet and $1\frac{1}{2}$ inches.

Your Product: A table that includes the name of each item, its 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.
Upscales	All of the multiplication is correct	There is one multiplication error	There are two multiplication errors	There are three multiplication errors
Conversions	All of the measures are converted to the largest possible units	All but one of the measures are converted to the largest possible units	All but two of the measures are converted to the largest possible units	All of the measures are converted to the largest possible units
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.

