

NJDOE MODEL CURRICULUM

CONTENT AREA: Math

GRADE: 3

UNIT: # 2

UNIT NAME: Properties of Operations

STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS	
1	Recognize the Commutative, Associative, and Distributive Properties as strategies to add and multiply whole numbers.	3.OA.5	Apply properties of operations as strategies to multiply and divide. Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$ (Distributive property). (Students need not use formal terms for these properties)
2	Solve division of whole numbers by representing the problem as an unknown factor problem.	3.OA.6	Understand division as an unknown factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.
3	Multiply and divide within 40 using strategies such as the relationship between multiplication and division.	3.OA.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations.
4	Use multiplication within 100 to solve word problems using measurement quantities by creating drawings or arrays.	3.OA.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
5	Use multiplication within 100 to solve word problems modeled as equal groups or arrays by writing equations to represent equal groups or arrays.		
6	Recognize arithmetic patterns in addition or multiplication tables and explain the pattern using the properties of operations.	3.OA.9	Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.
7	Use the area model (with rectangles) to explain the Distributive Property.	3.MD.7c	Relate area to the operations of multiplication and addition. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.
8	Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.	3.MD.7d	Relate area to the operations of multiplication and addition. d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

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 #2 In a division problem, analyze given information and the relationship between multiplication and division to solve the problem.

SLO #7 Use concrete objects or pictures to help conceptualize area models in order to explain the Distributive Property.

SLO #8 Use concrete objects or pictures to help conceptualize areas of rectilinear figures in order to solve real world area problems.

2. Reason abstractly and quantitatively.

SLO #2 Make sense of quantities and their relationships in division problems that are represented as unknown factor problems.

SLO #3 Apply both multiplication and division abilities to problems involving quantitative relationships.

SLO #6 Know and flexibly use different properties of operations to analyze addition or multiplication tables.

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

SLO #1 Use previously established definitions to recognize that the Commutative, Associative, and Distributive Properties are strategies to add and multiply whole numbers.

SLO #6 Use previously established property of operations to establish reasoning about patterns in addition or multiplication tables.

SLO #6 Justify and be able to explain conclusions made about patterns in addition or multiplication tables.

4. Model with mathematics.

SLO #4 Apply previously learned multiplication skills to solve word problems that involve multiplication, measurement, arrays, & drawings.

SLO #5 Apply previously learned multiplication and equation writing skills to solve world problems.

SLO #8 Use and apply previously learned concepts about addition and decomposing to solve real world area problems.

5. Use appropriate tools strategically.

SLO #4 Use available and appropriate tools such as drawings and arrays, when solving multiplication word problems that require the use of drawings or arrays.

SLO #7 Consider available and appropriate tools, such as arrays, models, and drawings, when using the area model to explain the Distributive Property.

SLO #8 Consider available and appropriate tools, such as arrays, models, and drawings, when finding the area of rectilinear figures.

6. Attend to precision.

SLO #6 Precisely communicate arithmetic patterns in addition and multiplication tables.

SLO #7 Communicate precisely how the area model can illustrate the Distributive Property.

7. Look for and make use of structure.

SLO #6 discern arithmetic patterns in addition or multiplication tables.

8. Look for and express regularity in repeated reasoning.

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

Greater Brunswick Charter School Curriculum

Grade level: 3		Subject: Math			Unit #: 2		
Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources (in addition to MyMath)
					Whole Group	Small Group / Stations	
1	Multiplication facts Commutative Property	3, 6	<ul style="list-style-type: none"> Fluently multiply factors up to 5 Use Commutative Property 	<i>Why is it helpful to me to know my multiplication facts by heart to figure out problems later on?</i>	<p style="color: red;">Most sections of My Homework in this page range have a portion of the homework dedicated to practicing the Commutative Property</p>	Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	<ul style="list-style-type: none"> MyMath p.365-466 of your choosing Multiplication worksheets Math-Aids multiplication sheets Interactive sheets Basic multiplication worksheets Common Core sheets Self-correcting quizzes from Multiplication.com i-Ready lesson can also be set for multiplication drills over these three days.
2			<ul style="list-style-type: none"> Fluently multiply factors up to 7 Use Commutative Property 			Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	
3			<ul style="list-style-type: none"> Fluently multiply factors up to 9 Use Commutative Property 			Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	
4	Addition by partial sums (Five days dedicated to fluent calculation)	6	Mentally, fluently add two digit numbers from left to right	<i>Why is it helpful for me to add larger numbers easily to figure out problems later on?</i>	<ul style="list-style-type: none"> Good mental math practices call for people to mentally add larger numbers from the left column to the right column. Many people get trapped always adding as if they always have paper in front of them, i.e. right to left. This is possibly not the way you (the teacher) add two digit numbers in your head. 	Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	<ul style="list-style-type: none"> Lesson for adding using partial sums <ul style="list-style-type: none"> Don't get hung up on estimating unless you choose to. Page 4 has the algorithm illustrated well. Follow-up page to the lesson above.
5						Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	
6	Fluent mental operations	3, 6				<ul style="list-style-type: none"> Review Assessment 	
7	Multiplication properties	1	Determine readiness for further work	<i>Do I know enough to be successful going forward?</i>		Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.495

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8	Distributive Property	1, 7	Decompose a factor into two smaller numbers that, when used in the Distributive Property, will reconstitute the original product.	<i>How can I break numbers apart to make it easier to multiply them?</i>		Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.501-506
9					<i>The examples used in the workbook for this lesson may not make applicable sense, but they provide practice for the concept.</i>	Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.507-512
10	Associative Property	1	Group three factors to arrive at a product	<i>In what order should I multiply numbers to arrive at the correct answer?</i>	<i>This lesson can be used to reinforce the order of operations – multiply left to right – then to reinforce the Commutative Property</i>	Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.513-518
11				<i>Does it matter which order I use to multiply numbers?</i>		Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.519-524
12	Properties of Multiplication	1	Progress check			Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.525-526
13	Properties of Multiplication					• Review Assessment	
13	Multiplication facts Patterns of factors of 5	3, 4, 5, 6	Multiply and divide fluently using 5	What patterns do I see when I multiply by 5? What information can I use to divide by 5?	<i>This is a revisit of previous content. Seeing it for the 2nd time can be more effective than seeing it more slowly the 1st time.</i>	Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.313-332 Use the pages most useful for your students.
14	Multiplication facts Patterns of factors of 10	3, 4, 5, 6	Multiply and divide fluently using 10	What patterns do I see when I multiply by 10? What information can I use to divide by 10?	<i>Focus on the relationship between multiples of 5 and multiples of 10.</i>	Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.333-355 Use the pages most useful for your students.

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					Whole Group	Small Group / Stations	
15	Multiplication facts Patterns of factors of 5, 10	3, 4, 5, 6	Multiply and divide fluently using 5 and 10	What patterns do I see when I multiply by 5 or 10? What information can I use to divide by 5 or 10?	One more day to practice problems using 5 and 10 to increase fluency. There is no harm in practicing skip counting with each factor.	Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	Schoolhouse Rock (5) Mr. R's song (5) Multiplication Jukebox (5) Mr. R's song (10)
16	Multiplication facts Patterns of factors of 3	3, 4, 5, 6	Multiply and divide fluently using 3	What patterns do I see when I multiply by 3? What information can I use to divide by 3?	It is important students see that these multiplication families of 3, 6, and 9 are related	Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.365-376
17	Multiplication facts Patterns of factors of 6	3, 4, 5, 6	Multiply and divide fluently using 6	What patterns do I see when I multiply by 6? What information can I use to divide by 6?		Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.429-434, parts of p.441-446 that deal with multiples of 6
18	Multiplication facts Patterns of factors of 9	3, 4, 5, 6	Multiply and divide fluently using 9	What patterns do I see when I multiply by 9? What information can I use to divide by 9?		Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.456-460, parts of p.461-466 that deal with multiples of 9
19	Multiplication facts Patterns of factors of 3, 6, 9	3, 4, 5, 6	Multiply and divide fluently using 3, 6, and 9	What patterns do I see when I multiply by 3, 6 or 9? What information can I use to divide by 3, 6 or 9?		Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath - All pages from three prior lessons
20	Multiplication facts		Catch-up or intervention day				
21	Multiplication facts Patterns of factors of 4	3, 4, 5, 6	Multiply and divide fluently using 4	What patterns do I see when I multiply by 4? What information can I use to divide by 4?		Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.383-394

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					Whole Group	Small Group / Stations	
22	Multiplication facts Patterns of factors of 8	3, 4, 5, 6	Multiply and divide fluently using 8	What patterns do I see when I multiply by 8? What information can I use to divide by 8?		Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.449-455, part of p.46-466 that deal with multiples of 8
23	Multiplication facts Patterns of factors of 4, 8	3, 4, 5, 6	Multiply and divide fluently using 4 and 8	What patterns do I see when I multiply by 4 or 8? What information can I use to divide by 4 or 8?		Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath – All pages from prior two lessons
24	Multiplication facts Patterns of factors of 7	3, 4, 5, 6	Multiply and divide fluently using 7	What patterns do I see when I multiply by 7? What information can I use to divide by 7?		Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.435-440, parts of p.441-446 that deal with multiples of 7
25	Fluent multiplication and division up to 100					Review Assessment	
26	Unit Square	8	Use the unit square to determine the area of a figure using multiple unit squares	How can I find the area of a big figure using a bunch of little figures?		Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.765-770 Kahn Academy
27	Complex areas	8	Use unit squares to determine the area of more complex figures			Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.771-776 And more Khan Academy
28	Area of rectangles	8	Use the area formula, derived from the use of unit squares, to find the area of rectangles	How can I use unit squares to find the area when I can't see them?		Warm-up or Prep Lesson Independent Practice Intervention/Enrichment i-Ready	MyMath p.779-790

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Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources (in addition to MyMath)
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<u>Authentic Application</u>							
Your Goal:	The buy objects in the store in multiples of 2, 3, 4, 5, 6, 7, 8, 9, and 10. Your total purchase is to be between \$190 and \$210.						
Your Role:	Your team is buying items for nine other people in your class.						
Your Audience:	You must buy items that will be liked by the people for whom you are buying them.						
The Situation:	From the list of items, you must buy: 2 of one item, 3 of another item, 4 of a different item, 5 of something else, 6 of yet another item, 7 of something different, 8 of something else, 9 of another item, and 10 of the last different thing.						
Your Product:	Each group of item you buy must be listed with the number of items bought and the total cost clearly listed. The name of the person for whom each group of items is bought must also be listed. The total cost of all of the items must also appear at the bottom of your list.						
Your Success:	You must have a total between \$190 and \$210. You must have one different item purchased for each of the number of items (2 of one item bought, 3 of another item bought, etc.) The items on your list must be liked by the people for whom each is purchased. The closer your total is to \$200, the more bonus point you earn.						