

Grade 3

Unit 2.3	Unit Title Using Commutative and Distributive Properties	Lesson 1 of 5	Day 1-2
-------------------------------	---	------------------------------------	------------------------------

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
<p>3.OA.5 Apply properties of operations as strategies to multiply and divide.² 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 $8 \times 5 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)² Students need not use formal terms for these properties.</p>	<p>Apply properties of operations as strategies to multiply.</p>	<p>SMP2 Reason abstractly and quantitatively SMP6 Attend to precision. SMP7 Look for and make use of structure. SMP8 Look for and express regularity in repeated reasoning.</p>	<ul style="list-style-type: none"> •How can you use the Commutative Property of Multiplication to find products? •What happens when you multiply a number by 0 or 1? •How can you use the Distributive Property to find products?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<p>Use an array to model a multiplication sentence. Write a multiplication sentence for an array. Understand multiplication as combining equal groups. Use arrays to model products and factors. Multiply with 1, 2, 3, 4, 5, 6, and 10.</p>	<p>Commutative Property of Multiplication Identity Property of Multiplication Zero Property of Multiplication Distributive Property</p>	<p>Student confuses the identity properties for addition and multiplication.</p>	<p>OnCore Lessons 18 - 20 Student pp. 35 - 40</p>

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
<p>Teachers will guide children to model the Commutative Property of Multiplication and use it to find products, model multiplication with the factors 1 and 0, and use the Distributive Property to find products by breaking apart arrays following the lesson guidelines in lessons 18-20 (TM pp 19-21), teachers will:</p> <ul style="list-style-type: none"> •Explain that arrays show why the order of two factors can change without changing the product. •Ask students why 0 is a special number in addition and lead them to the Identity property of Addition. Now tell students they will see why both 0 and 1 are special numbers in multiplication. Encourage students to think of each multiplication in terms of equal groups. •Have students make array models for one or two familiar multiplication facts. Tell students that they will see how they can learn new facts by breaking apart larger arrays into smaller arrays. Discuss the meaning of the term Distributive Property. Point out that there can be several different ways to break apart each array. 	<p>In Lessons 18-20 students will:</p> <ul style="list-style-type: none"> • Write multiplication sentences for the array models. •Use the Commutative Property of Multiplication to write a related multiplication sentence. •Find products where one factor is either 1 or 0. •Recognize that the Distributive Property is a property of numbers, and using arrays can help them see how it works. •Break apart arrays in a problem to break apart the larger product into two smaller products that might be more familiar. • Complete On Core Student Practice pp. 35 – 40

Grade 3

Unit 2.3	Unit Title Using Commutative and Distributive Properties	Lesson 2 of 5	Day 3-4
-------------------------------	---	------------------------------------	------------------------------

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
<p>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. By the end of Grade 3, know from memory all products of two one-digit numbers.</p>	<ul style="list-style-type: none"> • Multiply within 100. • Know from memory products of two 1-digit numbers. (Please note that this is an expectation by the end of grade 3, but should be worked throughout the year.) 	<p>SMP2 Reason abstractly and quantitatively</p> <p>SMP5 Use appropriate tools strategically</p> <p>SMP7 Look for and make use of structure.</p>	<p>What strategies can you use to multiply with 7?</p> <p>What strategies can you use to multiply with 8?</p> <p>What strategies can you use to multiply with 9?</p> <p>How can you write a set of related multiplication and division facts?</p>
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<p>Skip count on a number line.</p> <p>Multiply with 0, 1, 2, 3, 4, 5, 6, 10.</p> <p>Use arrays to model products and factors.</p> <p>Use the Distributive Property to find products by breaking apart arrays.</p> <p>Represent a multiplication using equal-size groups.</p> <p>Skip count by 9s.</p> <p>Use arrays with multiplication and division.</p> <p>Use basic multiplication facts.</p>	<p>Commutative Property of Multiplication</p> <p>Identity Property of Multiplication</p> <p>Zero Property of Multiplication</p> <p>Distributive Property</p>		<p>OnCore Lessons 24 - 27</p> <p>Student pp. 47 - 54</p>

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
<p>Teachers will guide children to following the lesson guidelines in lessons 24-27 (TM pp 25-28), teachers will:</p> <p>Direct students to look at the number line on p. 47 and ask them to explain how it shows skip counting. Have students skip count by 7s on the number line, reminding them to start at 0, not 7. Point out that they might be able to find some products by applying the Commutative Property of Multiplication to a multiplication fact they already know.</p> <ul style="list-style-type: none"> • Explain to students they will be using the Distributive Property to break apart arrays into smaller arrays to multiply with 8. • Show students equal-size groups of counters, remind them they can represent a multiplication, and ask them what multiplication the counters represent. Encourage students to observe patterns in the products, such as noticing that the sum of the digits in every product (except 0×9) is 9. • Explain to the students they will view an array and learn the 4 related equations, 2 multiplication and 2 division, that can describe it. Define related facts as a set of related multiplication and division facts. 	<p>In Lessons 24-27 students will:</p> <ul style="list-style-type: none"> • Use a number line to skip count by 7s. • Use the Distributive Property to break apart arrays into smaller arrays to multiply with 8. • Use equal-size groups to multiply with 9. • Define related facts using arrays. • Write two multiplication and two division equations for an array. • Complete On Core Student Practice pp. 47 – 54

Grade 3

Unit 2.3	Unit Title Using Commutative and Distributive Properties	Lesson 3 of 5	Day 5-6
-------------------------------	---	------------------------------------	------------------------------

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
3.NBT.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or relationship between addition and subtraction	Fluently add and subtract within 1,000 using strategies and algorithms based on place value and properties of operations.	SMP3 Construct viable arguments and critique the reasoning of others. SMP4 Model with mathematics. SMP7 Look for and make use of structure.	<ul style="list-style-type: none"> •How can you use the break apart strategy to add 3-digit numbers- •How can you use place value to add 3-digit numbers? •What mental math strategies can you use to find sums/differences? •How can you add more than 2 addends?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
Order numbers from 1-1,000. Identify place values, digits, and the value of a digit through 1,000. Round numbers to the nearest 100. Commutative Property of Addition. Find the sum or difference of two 2-digit numbers with regrouping.	Place Value Number Line Commutative Property Associative Property Decomposing (break-apart strategy) Addends Sum/Difference	When subtracting, students will sometimes just subtract the smaller number from the larger number regardless of the position of the digits. (Assumption is that subtraction is commutative.)	K-5 Math Resources Three activities for this standard http://www.k-5mathteachingresources.com/3rd-grade-number-activities.html 3-Digit Activity Cards (w/activity) Numeral cards 0-9, paper, pencil

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Teachers will guide children to add and subtract within 1000 following the activities in K-5 Math Resources. Teachers will: Supply students with 3-digit Addition Split Activity Cards and go over the directions for the 3-Digit Addition Split Activity. Supply students with numeral cards (0-9) and go over directions for the Difference Add Activity.	In the K-5 Math Resources students will: <ul style="list-style-type: none"> •Solve problems by decomposing the addends into hundreds, tens, and ones before adding. •Double sums until they get a sum that is greater than 1,000 and find how close their number is to 1,000. •Work with a partner, shuffle a set of numeral cards and deal 5 to each player. Choose 4 cards and arrange them to make two 2-digit numbers and find the difference between the two numbers. (This difference is their score. They keep playing until one of the students reaches a score of 500.)

Grade 3

Unit	Unit Title	Lesson	Day
2.3	Using Commutative and Distributive Properties	4 of 5	7-8
<i>Lesson Focus</i>			
1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
3.NBT.3 Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 X 80, 5 X 60) using strategies based on place value and properties of operations.	Multiply one-digit whole numbers by multiples of 10 in the range 10-90, understanding that as the one-digit number increases, the total product increases by 10, relatively.	SMP2 Reason abstractly and quantitatively SMP6 Attend to precision. SMP7 Look for and make use of structure. SMP8 Look for and express regularity in repeated reasoning.	How can you use the strategy draw a diagram to multiply with multiples of 10? What strategies can you use to multiply with a multiple of 10? How can you model and record multiplying multiples of 10 by 1-digit whole numbers?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
Use the Distributive Property to find products of two 1-digit numbers. Rename a multiple of 10 as a number of tens. Multiply within 100. Skip count on a number line. Understand whole-number place value through hundreds. Rename tens as hundreds.	Distributive Property Place value Multiple Tens Hundreds Ones		OnCore Lessons 52 - 54 Student pp. 103 - 108
<i>Instruction</i>			
9. Instruction Practices (What are the teachers doing)		10. Learning Practices (What are the students doing)	
Teachers will guide children to solve multiplication problems by using the strategy <i>draw a diagram</i> , use base-ten blocks, a number line, or place value to multiply with multiples of 10, and model and record multiplication with multiples of 10 following the lesson guidelines in lessons 52-54 (TM pp 54-56), teachers will: Discuss the Distributive Property. Remind students how they used the property to break apart a new multiplication fact into two more familiar facts. Using 4×7 as an example, discuss how the multiplication is performed if the product is rewritten as $(2 + 2) \times 7$ or $4 \times (5 + 2)$. Discuss how the Distributive Property can help them multiply when one of the factors is a tens number like 20, 30, or 40. Review the meaning of the terms place value, multiple, and tens. Make sure students recall numbers can be renamed as 1 ten, 2 tens, 3 tens, etc. Point out that 5×2 ones is 10 ones and 5×2 tens is 10 tens .		In Lessons 52-54 students will: <ul style="list-style-type: none"> • Use the Distributive Property to break apart arrays. • Solve word problems using the Distributive Property. • Use basic facts and place-value concepts to mentally multiply a 1-digit number by a multiple of 10. • Use a number line to find products. • Complete On Core Student Practice pp. 103-108 	

Grade 3

Unit 2.3	Unit Title Using Commutative and Distributive Properties	Lesson 5 of 5	Day 9-10
---------------------------	---	--------------------------------	---------------------------

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
3.NBT.3 Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 X 80, 5 X 60) using strategies based on place value and properties of operations.	Multiply one-digit whole numbers by multiples of 10 in the range 10-90, understanding that as the one-digit number increases, the total product increases by 10, relatively.	SMP5 Use appropriate tools strategically SMP7 Look for and make use of structure. SMP8 Look for and express regularity in repeated reasoning.	How can you use known multiplication fact to find an unknown fact?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
Fluent with the 2s, 3s, 4s, 5s, and 10s tables.	Distributive Property Arrays		Inv. Unit 5 Snap-in 3.5B and 3.7A Array Cards Color tiles

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Teachers will be following lesson activities from session 3.5B - 3.7A in the Unit 5 Investigations Snap-In materials. (TM CC42-CC53) In the activity teachers will: <ul style="list-style-type: none"> •Have the students identify and learn multiplication combinations not yet known. •Have students use multiplication combinations to determine the product of more difficult combinations. •Have students use arrays and rectangles made from square tiles, to illustrate the distributive property. 	In Investigations Snap-In 1.7.A students will: <ul style="list-style-type: none"> •Use known multiplication combinations to determine the product of more difficult combinations. •Make a set of multiplication cards. •Multiply by multiples of 10. • Complete Inv. SAB Snap-In pp. C34-C37.