

Grade 3

Unit 3.1	Unit Title Multiplication and Division Problem Solving	Lesson 1 of 4	Day 1 - 4
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Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
<p>3.OA.3 Use multiplication...to solve word problems in situations involving equal groups arrays and measurement quantities, e.g. using drawing or an equations with a symbol for the unknown number to represent the problem.*</p> <p>*See Glossary Table 2 CCSS</p>	<ul style="list-style-type: none"> •Solving division problems by using the strategy <i>act it out</i>. •Use repeated subtraction and a number line to relate subtraction to division. •Model division using arrays. •Use models to represent division by 2. •Count up by 5s,count back on a number line, or use 10s facts and doubles to divide by 5. 	<p>SMP2 Reason abstractly and quantitatively.</p> <p>SMP4 Model with mathematics.</p> <p>SMP5 Use appropriate tools strategically.</p> <p>SMP7 Look for and make use of structure.</p>	<ul style="list-style-type: none"> •How can you use the strategy <i>act it out</i> to solve problems with equal groups? •How is division related to subtraction? •How can you use arrays to solve division problems? •What does dividing by 2 mean? •What does dividing by 5 mean?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<ul style="list-style-type: none"> •Model multiplication using counters. •Distribute objects into a given number of groups. •Subtract using basic facts. •Multiply within 100. •Model a division to find how many in each group. •Model division to find the number of equal groups. •Count up or count back by 5s. •Understand division as a way to find a number of equal groups. 	<p>Array</p>		<p>OnCore Lessons 11 - 15 Student pp. 21 - 30 Counters Base-ten blocks Square tiles</p>

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
<p>Teachers will guide children to solve division problems by using the strategy <i>act it out</i>, use repeated subtraction and a number line to relate subtraction to division, model division by using arrays, use models to represent division by 2, and count up by 5's, cout back on a number line, or use 10s facts and doubles to divide by 5 following the lesson guidelines in OnCore lessons 11-15 (TM pp. 12-16), teachers will:</p> <p>Guide students to see division as sharing a number of items to find how many groups can be made or how many items will be in a group. • Guide students to see division as repeated subtraction. •Model division by separating a group of objects into equal groups. •Help students keep track of the number of times they count up or back by a number to determine the number of groups.</p>	<p>In Lessons 11-15 students will:</p> <ul style="list-style-type: none"> • Solve problems by modeling division. •Draw diagrams to show how to act out the problem with counters. • Write division equations representing repeated subtraction. •Use repeated subtraction or a number line to solve. •Use an array to describe a division problem and write the division equation. •Separate a group of objects into equal groups of 2, draw a picture for it, and write a division equation for the picture. <p>Count by 5s forward and back and find the quotient to problems dividing by 5.</p> <ul style="list-style-type: none"> • Complete On Core Student Practice pp. 21-30

Grade 3

Unit 3.1	Unit Title Multiplication and Division Problem Solving	Lesson 2 of 4	Day 5 - 9
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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"> •Use repeated subtraction, a number line, or a multiplication table to divide by 10. •Use equal groups, an array, factors, a number line, or a related multiplication fact to divide by 3, 4, 6, 7, and 9. 	<p>SMP1 Make sense of problems and persevere in solving them.</p> <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>SMP8 Look for and express regularity in repeated reasoning</p>	<ul style="list-style-type: none"> •What strategies can you use to divide by 10? •What strategies can you use to divide by 3? •What strategies can you use to divide by 4? •What strategies can you use to divide by 6? •What strategies can you use to divide by 7? •What strategies can you use to divide by 9?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<ul style="list-style-type: none"> •Use a multiplication table to find a product. •Relate multiplication and division as inverse operations. •Model a division to find how many in each group. •Model division by subtracting on a number line. •Model division by using arrays. •Use repeated subtraction to divide. 	<p>Factor Dividend Quotient Product Divisor Array</p>	<p>Where we see children struggle with divisions they often have only one way into a problem; sharing in ones. They do not make connections with counting in larger steps or known multiplication facts, often because they do not understand division as grouping. It is important that children do experience and understand division as both sharing and grouping.</p>	<p>OnCore Lessons 28 - 33 Student pp. 55 - 66</p>

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
<p>Teachers will guide children to use repeated subtraction, a number line, equal groups, an array, factors, a related multiplication fact, or a multiplication table to divide by 3, 4, 6, 7, 9, and 10 following the lesson guidelines in OnCore lessons 28-33 (TM pp. 29-33), teachers will:</p> <ul style="list-style-type: none"> •Check students' recall of the terms <i>factor, product, dividend, divisor, and quotient</i>. Remind students that multiplication and division are opposite operations and point out that the way to use the multiplication table to divide is the opposite of the way it is used to multiply. •Remind students that they can think of division as a way to find a number of equal groups when they know how many are in each group. •Remind students that they learned to divide by jumping backward on a number line and by arranging a number of objects in equal rows. •Remind students that multiplication and division are inverse operations and that they will use a multiplication table to learn division facts. NOTE: Although lesson 32 has students "sharing in ones", this is not the only way it is presented. Other lessons in this unit have students also experiencing division as grouping (using the multiplication table, repeated subtraction, number line, etc.) •Remind students one way to divide is to subtract the divisor from the dividend as many times as possible until the result is 0. 	<p>In Lessons 28-33 students will:</p> <ul style="list-style-type: none"> • Use the multiplication table to find the unknown factor and quotient. •Draw a picture and circle the equal groups to find the quotient. • Draw tiles to make an array and then find the quotient. •Use repeated subtraction on a number line to divide. • Solve for unknown factors or quotients. •Use the multiplication table to divide. •Use an array to describe a division problem and write the division equation. •Place counters into groups to find the number in each group. • Divide by subtracting the divisor from the dividend as many times as possible until the result is 0. • Complete On Core Student Practice pp. 55-66

Grade 3

Unit 3.1	Unit Title Multiplication and Division Problem Solving	Lesson 3 of 4	Day 10 - 13
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Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
<p>3.OA.8 Solve 2-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.³</p> <p>³ This standard is limited to problems posed with whole numbers and having whole numbers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).</p>	<ul style="list-style-type: none"> •Solve one-and two-step problems by using the strategy <i>draw a diagram</i>. •Solve multiplication problems by using the strategy <i>make a table</i>. •Solve two-step problems by using the strategy <i>act it out</i>. •Perform operations in order when there are no parentheses. 	<p>SMP1 Make sense of problems and persevere in solving them.</p> <p>SMP6 Attend to precision.</p>	<ul style="list-style-type: none"> •How can you use the strategy <i>draw a diagram</i> to solve one-and two-step problems? •How can you use the strategy <i>make a table</i> to solve multiplication problems? •How can you use the strategy <i>act it out</i> to solve one-and two-step problems? •Why are there rules such as the order of operations?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<ul style="list-style-type: none"> •Understand multiplication as combining equal groups. •Skip count to find a total. •Multiply two one-digit numbers. •Solve problems involving two operations. •Add and subtract 1-digit a 2-digit numbers. •Multiply and divide within 100. •Add, subtract, multiply, and divide to solve a problem. 		<p>Students may not know that multiplication and division have equal priority, and must be performed in order from left to right. The same is true for addition and subtraction. Many students think multiplication comes before division and addition comes before subtraction.</p>	<p>OnCore Lessons 35 - 38 Student pp. 69 - 76 Counters</p>

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
<p>Teachers will guide children to solve-one- and two- step problems by using the strategy <i>draw a diagram</i>, solve multiplication problems by using the strategy <i>make a table</i>, solve two-step problems by using the strategy <i>act it out</i>, and perform operations in order when there are no parentheses following the lesson guidelines in OnCore lessons 35-38 (TM pp. 36-39), teachers will:</p> <ul style="list-style-type: none"> •Review with students the relationship between multiplication and equal groups. Help students see how to use a bar model to represent a problem about equal groups. •Remind students that in some problems they were given a set of data and they organized it in a table. Explain how they will use multiplication and other operations to create their own set of data for a problem and will use patterns to organize their data in a table. •Share with students that an effective way to solve two-step problems is to act out the situation to provide a conceptual basis to perform the operations symbolically. Have the students act out the steps to a problem. •Remind students when you have an expression with more than one operation, it is possible to get different values if the operations are performed in different orders. Tell them that they will learn a set of rules to follow that mathematicians have agreed on for performing the four operations. 	<p>In Lessons 35-38 students will:</p> <ul style="list-style-type: none"> • Use bar models to represent multiplication problems. •Use the strategy <i>draw a diagram</i> to solve a problem. •Use the strategy <i>make a table</i> to solve a problem •Use the strategy <i>act it out</i> to solve a problem. • Draw tiles to make an array and then find the quotient. •Use repeated subtraction on a number line to divide. • Follow the order of operations to solve problems. • Complete On Core Student Practice pp. 69-76

Grade 3

Unit 3.1	Unit Title Multiplication and Division Problem Solving	Lesson 4 of 4	Day 14 - 15
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Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
3.OA.9 Identify arithmetic patterns (including patterns in the addition table, or multiplication table), and explain them using properties of operations.	<ul style="list-style-type: none"> •Identify and explain patterns on the multiplication table. •Identify and describe a number pattern shown on a function table. 	SMP7 Look for and make use of structure.	<ul style="list-style-type: none"> •How can you use properties to explain patterns on the multiplication table? •What are some ways you can describe a pattern on the table?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<ul style="list-style-type: none"> •Identify and describe whole-number patterns. •Describe and extend simple addition patterns. •Multiply within 100. 	Even Odd Pattern		OnCore Lessons 40 - 41 Student pp. 79 - 82

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Teachers will guide children to identify and explain patterns on the multiplication table and identify and describe a number pattern found in a function table following the lesson guidelines in OnCore lessons 40-41 (TM pp. 41-42), teachers will: <ul style="list-style-type: none"> •Ask students to share and describe examples of patterns found in the multiplication table. •Discuss the meaning of the terms even and odd. •Check students understanding of the word pattern. Have students explore patterns in a function table in which the relationship of one quantity depends on another. 	In Lessons 40-41 students will: <ul style="list-style-type: none"> • Describe all the patterns they see in the multiplication table. •Describe patterns in a function table. •Complete patterns in a function table. • Complete On Core Student Practice pp. 79-82