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| **Prerequisite Skills**  **(Grade 2)** | | **Unit Two Standards**  **Grade 3** | **Looking Ahead**  **(Grade 4)** |
| Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends. | Operations in Algebraic Thinking 1: Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7objects each. *For example, describe* *a context in which a total number of objects can be expressed as 5 x 7.*   * I can multiply to find the product. * I can show products using equal groups, arrays, and repeated addition. | | Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many. |
|  | Operations in Algebraic Thinking 2: Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.   * I can interpret whole-number quotients of whole numbers. * I can explain what the numbers in a division problem represents. | |  |
| Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions*.* | Operations in Algebraic Thinking 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.   * I can use a variety of strategies to solve multiplication word problems. * I can use a variety of strategies to solve division word problems. * I can decide when to multiply or divide to solve word problems. | | Solve multistep word problems posed 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. |
| Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; Write an equation to express the total as a sum of equal addends. | Operations in Algebraic Thinking 5: Apply properties of operations as strategies to multiply and divide. *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known.* *(Commutative property of multiplication.) 3 × 5 × 2 can be found by 3× 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)*   * I can use the properties of multiplication and division to solve problems. * I can explain the commutative property of multiplication. * I can explain the associative property of multiplication. * I can explain the distributive property of multiplication. | | Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. |
| Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions. | Operations in Algebraic Thinking 8: Solve two-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.   * I can construct an equation with a letter standing for the unknown quantity. * I can solve two-step word problems using addition and subtraction. * I can justify my answer using estimation strategies and mental computation. | | Solve multistep word problems posed 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. |

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| **Prerequisite Skills**  **(Grade 2)** | **Unit Two Standards**  **Grade 3** | **Looking Ahead** |
| Count within 1000; skip-count by 5s, 10s, and 100s. | Operations in Algebraic Thinking 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.*   * I can identify patterns. * I can explain rules for a pattern using properties of operations. * I can explain relationships between the numbers in a pattern. | Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Operations in Algebraic Thinking 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.  Operations in Algebraic Thinking 1:  Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe* *a context in which a total number of objects can be expressed as 5 x 7.*  Operations in Algebraic Thinking 2:  Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8. | * I can decide when to multiply or divide to solve word problems. * I can use a variety of strategies to solve multiplication word problems. * I can use a variety of strategies to solve division word problems. * I can represent an unknown with a letter. * I can interpret whole-number quotients of whole numbers. * I can explain what the numbers in a division problem represents. |  |  |  |  |  | | --- | --- | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | | | Students recognize multiplication as a means to determine the total number of objects when there are a specific number of groups with the same number of objects in each group. Multiplication requires students to think in terms of groups of things rather than individual things. Students learn that the multiplication symbol ‘x‘ means ―groups of‖ and problems such as 5 x 7 refer to 5 groups of 7.  These standards reference various strategies that can be used to multiply and divide. Students should apply their skills to solve word problems. Students should use a variety of representations for creating and solving one-step word problems including pictures, stars, boxes, tallies, and tables to represent amounts.  They should begin to use the terms, factor and product, as they describe multiplication. Letters are also introduced to represent unknowns in third grade. | | | | | **Examples of Multiplication:**  **There are 4 rows of desks in the classroom. The teacher put. 6 desks in each row. How many desks are there?** | | **Examples of Division:**  **Division problems follow one of two problem structures. Each structure is defined by what you are trying to determine.** | | | This task can be solved by drawing an array by putting 6 desks in each row. | This task can also be solved by drawing pictures of equal groups. (4 groups of 6 equals 24 objects.) | (Group Size Unknown)  There are 24 students in the class. The teacher divides the class into 4 lines. Write a division equation for this story and determine how many students are in each line.  In this situation the # in each group is unknown. It lends itself to being solved by placing the 24 students equally into groups. This can happen one item at a time, or in larger equal groups. | (# of Groups Unknown)  A bag has 18 new hair clips, and Laura wears 2 each day. How many days can she wear new hair clips?  This problem asks you to determine how many groups can be made from a set. It can be viewed as repeated subtraction. | | This task can by representing the 6 desks with a number rather than a picture.   |  |  |  | | --- | --- | --- | | 6 |  | 6 | |  |  |  | | 6 |  | 6 | | This task can also by splitting the 6 into more easily usable parts.   |  |  |  | | --- | --- | --- | | 5 1 |  | 5 1 | |  |  |  | | 5 1 |  | 5 1 | | | One could also solve this task by showing 4 jumps of 6 on a number line. | |   Lessons and Resources for Operations in Algebraic Thinking 1, 2 and 3 are on the following page.   |  |  |  | | --- | --- | --- | | **Lessons and Resources for Operations in Algebraic Thinking 1, 2 and 3** | | | | Unit 5 Inv 1 | Unit 5 Inv 2 | Unit 5 Inv 3 (begin with 3.1A, 3.2 – additional array cards C27-29, skip 3.5, do 3.5A, 3.5B, 3.7A) | | [Beginning Multiplication, Chapter 2 – Kathy Richardson](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Beginning%20Multiplication%20Chapter%202%20Kathy%20Richardson.pdf) | [Beginning Division, Chapter 3 – Kathy Richardson](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Beginning%20Division%20Chapter%203%20Kathy%20Richardson.pdf) | [CGI Multi-Step Problem Bank](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Multi%20Step%20Problem%20Bank.docx) | | [Khan Video](http://www.youtube.com/watch?v=4I9iibPLdBw&safe=active) | [Looking for Equal Groups in the Real World, Activity 2.1](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Activity%202_1%20Lookinf%20for%20Equal%20Groups%20in%20the%20Real%20World.pdf) | [Patterns and Multiples](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Patterns%20and%20Multiples.pdf) | | [Introducing Concepts of Multiplication and Division](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Introducing%20Concepts%20of%20Multiplication%20and%20Division.pdf) | [Arrays and Slide Arrays](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Multiplication%20and%20Division%20Fact%20Activities.docx) | [Candy Boxes](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Candy%20Boxes.pdf) | | [Circles and Stars](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Circle%20and%20Stars.pdf) | [-Circles and Numbers (variation)](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Multiplication%20and%20Division%20Fact%20Activities.docx)  [-Circles and Numbers – distributive (variation)](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Multiplication%20and%20Division%20Fact%20Activities.docx) | [Multiplying and Dividing on the Number Line](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Multiplying%20and%20Dividing%20on%20the%20Number%20Line.pdf) | | [Khan Video 2](http://www.youtube.com/watch?v=MTzTqvzWzm8&safe=active) | Unit 5 Inv 4 | [The Pet Store](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/The%20Pet%20Store.pdf) | | [Mastering the Basic Math Facts in](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%202%20Multiplying%20by%202.pdf)  [Multiplication and Division Chapter 2](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%202%20Multiplying%20by%202.pdf) | [Mastering the Basic Math Facts in](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%203%20Multiplying%20by%201o.pdf)  [Multiplication and Division Chapter 3](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%203%20Multiplying%20by%201o.pdf) | [Mastering the Basic Math Facts in](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%204%20Multiplying%20by%205.pdf)  [Multiplication and Division Chapter 4](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%204%20Multiplying%20by%205.pdf) | | [Mastering the Basic Math Facts in](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%205%20Multiplying%20by%201.pdf)  [Multiplication and Division Chapter 5](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%205%20Multiplying%20by%201.pdf) | [Mastering the Basic Math Facts in](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%209%20Multiplying%20by%206.pdf)  [Multiplication and Division Chapter 6](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%209%20Multiplying%20by%206.pdf) | [Things that Come in Groups](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Things%20that%20Come%20in%20Groups.pdf) |      |  |  |  | | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | [1. Make sense of problems and persevere in solving them.](http://elementarymath.dmschools.org/1-make-sense-of-problems-and-persevere-in-solving-them3.html) | [4. Model with mathematics.](http://elementarymath.dmschools.org/4-model-with-mathematics3.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objective** | | Operations in Algebraic Thinking 5:  Apply properties of operations as strategies to multiply and divide. *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known.* *(Commutative property of multiplication.) 3 × 5 × 2 can be found by 3× 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property).* | * I can use the properties of multiplication and division to solve problems. * I can explain the commutative property of multiplication. * I can explain the associative property of multiplication. * I can explain the distributive property of multiplication. |  |  |  |  |  | | --- | --- | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | | | This standard references properties of multiplication. While students **DO NOT** need to use the formal terms of these properties, student should understand that properties are rules about how numbers work, students do need to be flexibly and fluently applying each of them.  Students represent expressions using various objects, pictures, words and symbols in order to develop their understanding of properties. They multiply by 1 and 0 and divide by 1. They change the order of numbers to determine that the order of numbers does not make a difference in multiplication (but does make a difference in division). Given three factors, they investigate changing the order of how they multiply the numbers to determine that changing the order does not change the product. They also decompose numbers to build fluency with multiplication. | | | | | **Associative Property** | | **Commutative Property** | | | The sum or product stays the same when the grouping of addends or factors is changed. | | The order of numbers does not matter when adding or multiplying numbers. | | | For example, when a student multiplies 7 x 5 x 2, a student could rearrange the numbers to first multiply 5 x 2 = 10 and then multiply 10 x 7 = 70. | | For example, if a student knows that 5 x 4 = 20, then they also know that 4 x 5 = 20. | | | **Distributive Property**  **(breaking numbers apart)** | | | | | **Student A**  7 x 6  7 x 5 = 35  7 x 1 = 7  35 + 7 = 42 | **Student B**  7 x 6  7 x 3 = 21  7 x 3 = 21  35 + 7 = 42 | | **Student C**  7 x 6  5 x 6 = 30  2 x 6 = 12  30 + 12 = 42 |  |  |  |  | | --- | --- | --- | | **Lessons and Resources for Operations in Algebraic Thinking 3** | | | | **Associative Property** | **Commutative Property** | **Distributive Property** | | **Associative Property**  Property use is embedded in Investigations strategy work but vocabulary will need to be explicitly used during conceptual lessons. Use write-to-learn opportunities for students to explain properties. | **Commutative Property**  Property use is embedded in Investigations strategy work but vocabulary will need to be explicitly used during conceptual lessons. Use write-to-learn opportunities for students to explain properties. | Property use is embedded in Investigations strategy work but vocabulary will need to be explicitly used during conceptual lessons. Use write-to-learn opportunities for students to explain properties.  \*Also see Common Core Adaptation notes in Unit 5.  [Video Lesson](http://learnzillion.com/lessons/966-use-the-distributive-property-of-multiplication-to-solve-unfamiliar-facts) |  |  |  |  |  | | --- | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | | [1. Make sense of problems and persevere in solving them.](http://elementarymath.dmschools.org/1-make-sense-of-problems-and-persevere-in-solving-them3.html) | [4. Model with mathematics.](http://elementarymath.dmschools.org/4-model-with-mathematics3.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure.html) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning5.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Operations and Algebraic Thinking 8:  Solve two-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. | * I can construct an equation with a letter standing for the unknown quantity. * I can solve two-step word problems using the four operations. * I can justify my answer using estimation strategies and mental computation. |  |  |  |  | | --- | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | | This standard refers to two-step word problems using the four operations. Adding and subtracting numbers should include numbers within 1,000, and multiplying and dividing numbers should include single-digit factors and products less than 100.  This standard calls for students to represent problems using equations with a letter to represent unknown quantities.  This standard refers to estimation strategies, including using compatible numbers (numbers that sum to 10, 50, or 100) or rounding. The focus in this standard is to have students use and discuss various strategies. Students should estimate during problem solving, and then revisit their estimate to check for reasonableness.  When students solve word problems, they use various estimation skills which include identifying when estimation is appropriate, determining the level of accuracy needed, selecting the appropriate method of estimation, and verifying solutions or determining the reasonableness of solutions.  Estimation strategies include, but are not limited to:   * using benchmark numbers that are easy to compute * front-end estimation with adjusting (using the highest place value and estimating from the front end * making adjustments to the estimate by taking into account the remaining amounts) * rounding and adjusting (students round down or round up and then adjust their estimate depending on how much the rounding changed the original values) | | | | **Example:** | | | | Mike runs 2 miles a day. His goal is to run 25 miles. After 5 days, how many miles does Mike have left to run in order to meet his goal? Write an equation and find the solution.  **Solution: 2 x 5 + m = 25** | | | | **Example:**  **On a vacation, your family travels 267 miles on the first day, 194 miles on the second day and 34 miles on the third day. How many total miles did they travel?** | | | | Typical Estimation Strategies | | | | **Student A**  I first thought about 267 and 34. I noticed that their sum is about 300. Then I knew that 194 is close to  200. When I put 300 and 200 together, I get 500. | **Student B**  I first thought about 194. It is really close to 200. I also have 2 hundreds in 267. That gives me a total of 4 hundreds. Then I have 67 in 267 and the 34. When I put 67 and 34 together that is really close to 100. When I add that hundred to the 4 hundreds that already had, I end up with 500. | **Student C**  I rounded 267 to 300. I rounded 194 to 200. I rounded 34 to 30. When I added 300, 200 and 30, I know my answer will be about 530. |  |  |  | | --- | --- | | **Lessons and Resources for Operations and Algebraic Thinking 8** | | | [CGI Multi-Step Problem Bank](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Multi%20Step%20Problem%20Bank.docx) |  |  |  |  |  |  | | --- | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | | [1. Make sense of problems and persevere in solving them.](http://elementarymath.dmschools.org/1-make-sense-of-problems-and-persevere-in-solving-them3.html) | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively3.html) | [4. Model with mathematics.](http://elementarymath.dmschools.org/4-model-with-mathematics3.html) | [5. Use appropriate tools strategically.](http://elementarymath.dmschools.org/5-use-appropriate-tools-strategically2.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Operations in Algebraic Thinking 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.* | * I can identify patterns. * I can explain rules for a pattern using properties of operations. * I can explain relationships between the numbers in a pattern. |  |  | | --- | | **What does this standard mean the students will know and be able to do?** | | This standard calls for students to examine arithmetic patterns involving both addition and multiplication. Arithmetic patterns are patterns that change by the same rate, such as adding the same number. For example, the series 2, 4, 6, 8, 10 is an arithmetic pattern that increases by 2 between each term.  This standard also mentions identifying patterns related to the properties of operations.  Examples:  • Even numbers are always divisible by 2. Even numbers can always be decomposed into 2 equal addends (14 = 7 + 7).  • Multiples of even numbers (2, 4, 6, and 8) are always even numbers.  • On a multiplication chart, the products in each row and column increase by the same amount (skip counting).  • On an addition chart, the sums in each row and column increase by the same amount.  • Any sum of two even numbers is even.  • Any sum of two odd numbers is even.  • Any sum of an even number and an odd number is odd.  • The multiples of 4, 6, 8, and 10 are all even because they can all be decomposed into two equal groups.  • The multiples of any number fall on a horizontal and a vertical line due to the commutative property.  • All the multiples of 5 end in a 0 or 5 while all the multiples of 10 end with 0. Every other multiple of 5 is a multiple of 10.  Using a multiplication table, highlight a row of numbers and ask students what they notice about the highlighted numbers.  Explain a pattern using properties of operations.  In an addition table ask what patterns they notice.? Explain why the pattern works this way?  Students need ample opportunities to observe and identify important numerical patterns related to operations. They should build on their previous experiences with properties related to addition and subtraction. Students investigate addition and multiplication tables in search of patterns and explain why these patterns make sense mathematically. |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Lessons and Resources for Operations in Algebraic Thinking 9** | | | | | | Unit 5 Inv 1.3, 2.1-2.6, 3.1-3.7A, 4.1 | | | | | | [Chart It Out](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chart%20it%20Out.pdf) | [Missing Elements](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Missing%20Elements.pdf) | [Real Life Situations](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Real%20Life%20Situations.pdf) | [Money Under the Table](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Money%20Under%20the%20Table.pdf) | [Spin to Win](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Spin%20to%20Win.pdf) |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | | | [1. Make sense of problems and persevere in solving them.](http://elementarymath.dmschools.org/1-make-sense-of-problems-and-persevere-in-solving-them3.html) | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively3.html) | [3. Construct viable arguments and critique the reasoning of others.](http://elementarymath.dmschools.org/3-construct-viable-arguments-and-critique-the-reasoning-of-others2.html) | [4. Model with mathematics.](http://elementarymath.dmschools.org/4-model-with-mathematics3.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure.html) | |

**Optional Lesson Progression – Grade: 3**

Unit 2: Multiplication and Division: Models within 100

Amount of days for Unit: 10 weeks

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| --- | --- | --- | --- |
| **Resource** | **Location** | **Primary Focus** | **Standard** |
| [CGI Multi-Step Problem Bank](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Multi%20Step%20Problem%20Bank.docx) | Word problems embedded throughout unit | * I can use a variety of strategies to solve multiplication word problems. * I can use a variety of strategies to solve division word problems. * I can decide when to multiply or divide to solve word problems. * I can construct an equation with a letter standing for the unknown quantity. * I can solve two-step word problems using addition and subtraction. * I can justify my answer using estimation strategies and mental computation. | 3.OA.3  3.OA.8 |
| Investigations | Unit 5   * Inv 1 * Inv 2 * Inv 3 (begin with 3.1A, 3.2 – additional array cards C27-29, skip 3.5, do 3.5A, 3.5B, 3.7A) * Inv 4 | * I can multiply to find the product. * I can show products using equal groups, arrays, and repeated addition. * I can interpret whole-number quotients of whole numbers. * I can explain what the numbers in a division problem represents. * I can use a variety of strategies to solve multiplication word problems. * I can use a variety of strategies to solve division word problems. * I can decide when to multiply or divide to solve word problems. * I can identify patterns. * I can explain rules for a pattern using properties of operations. * I can explain relationships between the numbers in a pattern. | 3.OA.1  3.OA.2  3.OA.3  3.OA.9 |
| [Mastering the Basic Math Facts in](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%202%20Multiplying%20by%202.pdf)  [Multiplication and Division Chapter 2](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%202%20Multiplying%20by%202.pdf) | Chapter 2 (x2) | * I can multiply to find the product. * I can show products using equal groups, arrays, and repeated addition. * I can interpret whole-number quotients of whole numbers. * I can explain what the numbers in a division problem represents. | 3.OA.1  3.OA.2  3.OA.3 |
| [Mastering the Basic Math Facts in](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%203%20Multiplying%20by%201o.pdf)  [Multiplication and Division Chapter 3](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%203%20Multiplying%20by%201o.pdf) | Chapter 3 (x10) |
| [Mastering the Basic Math Facts in](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%204%20Multiplying%20by%205.pdf)  [Multiplication and Division Chapter 4](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%204%20Multiplying%20by%205.pdf) | Chapter 4 (x5) |
| [Mastering the Basic Math Facts in](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%205%20Multiplying%20by%201.pdf)  [Multiplication and Division Chapter 5](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%205%20Multiplying%20by%201.pdf) | Chapter 5 (x1) |
| [Mastering the Basic Math Facts in](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%209%20Multiplying%20by%206.pdf)  [Multiplication and Division Chapter 6](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%202/Chapter%209%20Multiplying%20by%206.pdf) | Chapter 6 (x0) |

**\*Unit pacing is approximate. Some lessons may take more than one day. Use teacher discretion based on student need when planning unit length.**