Grade: 3rd
Course: Math
Year: 2023

Grade 3 EM² Pacing Guide

Unit: **Operations and Algebraic Thinking**
Essential Questions: What are different meanings for multiplication/division? What strategies can be used to solve multiplication and division word problems? How can multiplication and division situations be represented in equations using a symbol for the unknown? How are multiplication and division related? What are the properties of multiplication and how can they be applied? How are multiplication and division related? How can patterns and known facts be used to find unknown facts? What strategies can be used to assess the reasonableness of an answer? How can identifying patterns in the addition and multiplication table be helpful in finding answers? What is rounding? What are various strategies for adding and subtracting multi-digit numbers? How does knowing basic multiplication facts and understanding place value help when multiplying one-digit whole numbers by multiples of ten?
Big Idea: Multiplication and Division are inverse operations.
Big Idea: Using patterns and knowledge of certain facts will help you solve other facts.
Big Idea:
Unit Vocabulary: multiplication, factor, product, division, divisor, dividend, quotient, interpret, model, expression, equation, commutative property, reasonable

Connection to Vision of a Lakewood Ranger	Creative and Critical Thinking Growth Mindset Communication
Assessment of Learning Options **How will we know if they learned this skill?**	• ODE Assessments: https://oh-reset.portal.cambiumast.com/ • Module Pre-assessment • Module Mid-unit assessment • Module End of Unit Assessment

Suggested Pacing	Content Standards	Learning and Performance Expectations What must students know and be able to do?	Resources Options
EM² 2023			
Module 1 **Module 3**	**Represent and solve problems involving multiplication and division.** **3.OA.1** Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. **3.OA.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. **3.OA.3** Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities. **3.OA.4** Determine the unknown whole number in a multiplication or division equation relating three whole numbers.	-Students must understand multiplication and division through 100 as equal groups. -Students work from using arrays to area models. -Students will explore the meaning of division types and how multiplication relates to division in missing factor situations. -Students develop and interpret mathematical situations using the symbolic representations of multiplication and division with unknowns in all positions.	Relate Addition to Multiplication Equal Groups Word Problem Arrays Identify the Unknown Missing Numbers: Division 3rd Grade Math Journal Everyday Arrays Math Project Georgia Performance Tasks **Literature Links**: *One Hundred Hungry Ants* by Elinor J. Pinczes *Six Dinner Sid* by Inga Moore *Amanda Bean's Amazing Dream* by Cindy Neuschwander *The Doorbell Rang* by Pat Hutchins
	Understand properties of multiplication and the relationship between multiplication and division. 3.OA.5 Apply properties of operations as strategies to multiply and divide. For example, 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). Students need not use formal terms for these properties.	Students will connect their understanding of the relationship between addition and multiplication to develop a conceptual understanding of additive and multiplicative properties, such as ordering and rearranging numbers to find the product. Students will explore decomposing factors to develop efficient strategies	Turn your Array Division as an Unknown Factor 3rd Grade Math Journal Literature Link: *Each Orange Had Eight Slices* by Paul Giganti, Jr.

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	3.OA.6 Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.	for solving multiplication and division situations. Students will use the relationship between multiplication and division to solve unknown-factor division problems.	
All Modules	**Multiply and divide within 100.** 3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division, e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8, or properties of operations.	Students must be able to multiply fluently through 100 (10 x 10).	Fill the Grid Multiply it Division Bump 2-5 Division Squares 3 & 6 3rd Grade Math Journal Math Fact Mastery Folder Mastering Math Facts in Multiplication and Division Building Conceptual Understanding and Fluency Through Games
Module 1 **Module 2** **Module 3**	**Solve problems involving the four operations, and identify and explain patterns in arithmetic.** **3.OA.8** Solve two-step word problems using the four operations. Represent these problems using equations with a letter or a symbol, which stands for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. **3.OA.9** Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.	Students will work to assess the reasonableness of solutions through the use of estimation and rounding strategies when solving two-step word problems using all four operations with whole numbers. Students will use a letter to represent an unknown and may use parentheses for clarification within expressions Students will identify and explain patterns using properties of operations.	Two Step Word Problems Roll a Rule Odd and Even Products 3rd Grade Math Journal

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Unit: **Numbers in Base 10**
Essential Questions: How can you use different strategies to add and subtract multi-digit numbers? What is rounding? How does knowing basic multiplication facts and understanding place value help when multiplying one-digit whole numbers by multiples of ten? How can knowing the properties of operations help in multiplying single-digit numbers by multiples of 10?
Big Idea: Different strategies can be used to efficiently add and subtract multi-digit numbers.
Big Idea: Knowledge of basic math facts can help solve multiplication problems involving multiples of 10.
Vocabulary: multiply, divide, round, place value

Connection to Social Emotional Standards and/or Social Justice Standards

Social Emotional Standards
Seek help and acknowledge constructive feedback from others that addresses challenges and builds on strengths
Demonstrate confidence in the ability to complete a range of tasks and address challenges while expressing positive attitudes towards self.
Identify ways to respectfully advocate for academic and personal needs

Diversity Standard:
I feel connected to other people and know how to talk, work and play with others even when we are different or when we disagree.
I will speak up or do something when I see unfairness, and I will not let others convince me to go along with injustice.
Students will express comfort with people who are both similar to and different from them and engage respectfully with all people.

Connection to Vision of a Lakewood Ranger

Critical & Creative Thinking
Growth Mindset
Communication
Collaboration

Assessment of Learning Options
How will we know if they learned this skill?

- Module 2/3 Pre-assessment
- Module 2/3 Mid-unit assessment
- Module 2/3 End of Unit Assessment

Suggested Pacing	Content Standards	Learning and Performance Expectations What must students know and be able to do?	Resources Options
Module 2 **Module 3**	**3.NBT.1** Use place value understanding to round whole numbers to the nearest 10 or 100. **3.NBT.2** Fluently add and subtract within 1,000 using strategies and algorithms. based on place value, properties of operations, and/or the relationship between addition and subtraction. **3.NBT.3** Multiply one-digit whole numbers by multiples of 10 in the range 10-90, e.g., 9 × 80, 5 × 60 using strategies based on place value and properties of operations.	Students will be able to use efficient strategies to fluently add and subtract within 1,000. Students will round whole numbers to the nearest 10 or 100. Students will multiply one-digit whole numbers by multiples of 10 in the range of 10-90.	Rounding to the nearest 100. Estimating Sums Estimating Differences Multiplying One Digit Numbers by Multiples of 10. Word Problems:Addition and Subtraction within 1000. Close to 0 Georgia Performance Tasks Building Conceptual Understanding and Fluency Through Games Literature Link: *365 Penguins* by Jean-Luc Fromental

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Unit: **Numbers and Operations, Fractions**
Essential Questions: What is a fraction? What visual models are most useful when working with fractions? What are different ways to compare fractions? What is fraction equivalence and how can it be recognized? How can whole numbers be expressed as fractions?
Big Idea: Fractions show the relationship between the part and the whole.
Big Idea: Fractions can be represented with visual models such as rectangular area models, arrays, and number lines.
Big Idea: Fractions can be represented on a number line.
Big Idea: Factions can be compared by analyzing the numerator and denominator.
Vocabulary: numerator, denominator, fraction, partition, equivalent, whole, unit fraction

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Connection to Vision of a Lakewood Ranger

Critical & Creative Thinking
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Assessment of Learning Options How will we know if they learned this skill?	• Module 5 Pre-assessment • Module 5 Mid-unit assessment • Module 5 End of Unit Assessment

Suggested Pacing	Content Standards	Learning and Performance Expectations What must students know and be able to do?	Resources Options
Module 5	**Develop understanding of fractions as numbers.** 3.NF.1 Understand a fraction 1 /b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a /b as the quantity formed by a parts of size 1 /b. 3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction 1 /b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1 /b and that the endpoint of the part based at 0 locates the number 1 /b on the number line. b. Represent a fraction a /b (which may be greater than 1) on a number line diagram by marking off a lengths 1 /b from 0. Recognize that the resulting interval has size a /b and that its endpoint locates the number a /b on the number line.	Students will be able to apply the standards to fractions with denominators 2, 3, 4, 6, and 8 The students will develop a more formal understanding of equal parts including the usage of mathematical symbols and number line diagrams. The focus is on students' exploring the meaning and relationships in fractions; the significance of the whole; the unit fraction; and the initial understanding of equivalence of fractions using models and comparison of fractions (with like numerators or like denominators).	Beyond Pizzas and Pies Making Fraction Strips My Fraction Bar Riddle Fractions on a Number LIne Roll a Fraction Literature Links: *Full House: An Invitation to Fractions* by Dayle Ann Dodds *Fraction Fun* by David Adler *Gator Pie* by Louise Matthews Epic Fraction Books
	3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same size or the same point on a number line. b. Recognize and generate simple equivalent fractions, e.g., 1 /2 = 2 /4, 4 /6 = 2 /3. Explain why the fractions are	Students can determine if fractions are equivalent with common denominators. Students can determine if fractions are equivalent with uncommon	Pizza For Dinner Equivalent Fractions on a Geoboard Make One Whole

	equivalent, e.g., by using a visual fraction modelG. c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3 /1; recognize that 6 /1 = 6; locate 4 /4 and 1 at the same point of a number line diagram. d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	denominators. Students can compare fractions using mathematical models. Students can compare fractions using mathematical reasoning. Students can identify unit fractions.	Compare Fractions of a Whole

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Unit: **Measurement and Data**
Essential Questions: How can length of time be measured and found? What are the metric units for measuring capacity and weight? What is mass and how does it relate to weight? What are ways you can collect and organize data? How do you make/read pictograph, bar graph, line plot? How can lengths be measured with rulers marked off in halves and fourths? What is area? What are different ways to find the area of a shape? How is area related to the operations of multiplication and addition? How can visual models be used to help understand and calculate areas and perimeter? How can the area of some rectangles be used to model the Distributive Property? What is perimeter? How can the perimeter of a polygon be measured and found?
Big Idea: Time lines can be used to find the duration of an event.
Big Idea: Graphs can be used to display data to be analyzed
Big Idea: Multiplication can be used as a strategy to find the area of a polygon.
Vocabulary: elapsed time, end point, mass, volume, grams, kilograms, liters, milliliters, scale, key, data, line plot, bar graph, pictograph, frequent, area, square unit, rectilinear, perimeter

Connection to **Social Emotional Standards** and/or **Social Justice Standards**	**Social Emotional Standards** Seek help and acknowledge constructive feedback from others that addresses challenges and builds on strengths Demonstrate confidence in the ability to complete a range of tasks and address challenges while expressing positive attitudes towards self. Identify ways to respectfully advocate for academic and personal needs **Diversity Standard:** I feel connected to other people and know how to talk, work and play with others even when we are different or when we disagree. I will speak up or do something when I see unfairness, and I will not let others convince me to go along with injustice. Students will express comfort with people who are both similar to and different from them and engage respectfully with all people.
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Suggested Pacing	Content Standards	Learning and Performance Expectations What must students know and be able to do?	Resources Options
Module 6	**Solve problems involving money, measurement, and estimation of intervals of time, liquid volumes, and masses of objects.** **3.MD.1** Work with time and money. a. Tell and write time to the nearest minute. Measure time intervals in minutes (within 90 minutes). Solve real-world problems involving addition and subtraction of time intervals (elapsed time) in minutes, b. Solve word problems by adding and subtracting within 1,000, dollars with dollars and cents with cents (not using dollars and cents simultaneously) using the $ and ¢ symbol appropriately	Students add and subtract money (dollars with dollars and cents with cents, not using dollars and cents simultaneously) to solve word problems within 1,000. Students will tell time to the nearest minute and measure elapsed time within 90 minutes.	Word Problems-Time Intervals
Module 2	**3.MD.2** Measure and estimate liquid volumes and masses of objects using standard units of grams, kilograms, and liters. Add, subtract, multiply, or divide whole numbers to solve onestep word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.	They are introduced to measuring masses and liquid volumes with grams, kilograms, and liters.	Estimating Weight More or Less than a Liter
Module 5, 6	**Represent and interpret data. 3.MD.3** Create scaled picture graphs to represent a data set with several categories. Create scaled bar graphs to represent a data set with several categories. Solve two-step "how many more" and "how many less" problems using information presented in the scaled graphs. For example, create a bar graph in which each	Students create scaled picture graphs or bar graphs, with several categories, and solve two-step compare problems using information presented in scaled graphs.	Gummy Bear Graph Paper Ball Throw

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	square in the bar graph might represent 5 pets, then determine how many more/less in two given categories. **3.MD.4** Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by creating a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.	Students generate measurement data and create line plots using scales that include whole numbers, halves, or fourths/quarters.	Measuring Strips Line Plots Squid Eyes
Module 4	**Geometric measurement: understand concepts of area and relate area to multiplication and to addition**. 3.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area. b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units. 3.MD.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). **3.MD.7** Relate area to the operations of multiplication and addition. a. Find the area of a rectangle with whole number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole number products as rectangular areas in mathematical reasoning. 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 × b and a × c (represent the distributive property with visual models including an area model). d. Recognize area as additive. Find the area of figures composed of rectangles by decomposing into nonoverlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real-world problems.	Students will measure area in square units. They first count unit squares in tilings (concrete) and later use multiplication and addition of whole numbers to find areas of figures composed of rectangles in real-world situations. Students move from using arrays to the use of area models, and they use visual models to represent the distributive property when finding area.	Square Units Find the Area Grid Paper Animals Cover Your Notebook Find the Area of a Rectangle Jack's Rectangles Find the areas of Rectilinear Figures
Module 6	**Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. 3.MD.8** Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	Students use the measurement of side lengths to solve for the perimeter of polygons, including problems with an unknown side length. Students will solve real-world problems involving perimeters. Students explore the relationships between area and perimeter of rectangles, i.e., the same perimeters but different areas or the same areas but different perimeters.	Squares on a Geoboard Rectangular Robot

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Unit: **Geometry**
Essential Questions: How can two-dimensional shapes be described, analyzed, and classified? How can equal areas of parts of a shape be expressed?
Big Idea: Polygons can be named based on their characteristics.
Big Idea: Unit fractions can be expressed as one part of a polygon that has been partitioned into equal parts.
Vocabulary: polygon, quadrilateral, parallel, partition

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Suggested Pacing	Content Standards	Learning and Performance Expectations What must students know and be able to do?	Resources Options
Module 4, 5, 6	**Reason with shapes and their attributes.** 3.G.1 Draw and describe triangles, quadrilaterals (rhombuses, rectangles, and squares), and polygons (up to 8 sides) based on the number of sides and the presence or absence of square corners (right angles). 3.G.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.	Students will draw and describe triangles, quadrilaterals (rhombuses, rectangles, and squares), and polygons (up to 8 sides) based on the number of sides and the presence or absence of right angles. Students will partition shapes into equal areas and express the individual parts as unit fractions of the whole (with denominators of 2, 3, 4, 6, and 8).	Shape Match Partition a Square Shape Match Virtual Geoboard Go around the school and playground to find examples of shapes in the real world. Have students create a slideshow of photos identifying the shapes and their attributes. Literature Link: *Square, Rectangles and other Quadrilaterals* by David Adler *Shape Up! Fun with Triangles and other Polygons* by David Adler *The Greedy Triangle* by Marilyn Burns