

Chambersburg Area School District Mathematic Curriculum
Grade 4

Grade 4 mathematics is about (1) developing understanding and fluency with multi-digit multiplication, and developing an understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; and (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
 4. Model with mathematics.
 5. Use appropriate tools strategically.
 6. Attend to precision.
 7. Look for and make use of structure.
8. Look for and makes sense of regularity in repeated reasoning.

Unit of Study	Unit 1: Place Value, Rounding, and Algorithms for Addition and Subtraction
Time Frame/Pacing	25 days ● Consider omitting lesson 17 and 19 (see page 4 in manual)
Big Ideas	● Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations. ● Mathematical relationships among numbers can be represented, compared, and communicated. ● Patterns exhibit relationships that can be extended, described, and generalized.
Unit Essential Questions	● How are relationships represented mathematically? ● How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations? ● How is mathematics used to quantify, compare, represent, and model numbers? ● How can mathematics support effective communication? ● How can patterns be used to describe relationships in mathematical situations? ● How can recognizing repetition or regularity assist in solving problems more efficiently?

PA Core Standards	● CC.2.2.4.A.1 Represent and solve problems involving the four operations. ● CC.2.1.4.B.1 Apply place value concepts to show an understanding of multi-digit whole numbers. ● CC.2.1.4.B.1 Apply place value concepts to show an understanding of multi-digit whole numbers. ● CC.2.1.4.B.2 Use place value understanding and properties of operations to perform multidigit arithmetic. ● CC.2.1.4.B.1 Apply place value concepts to show an understanding of multi-digit whole numbers.
PA Assessment Anchors	● M04.A-T.1.1 Apply place-value and numeration concepts to compare, find equivalencies, and round ● M04.A-T.2.1 Use operations to solve problems.
PA Eligible Content	● M04.A-T.1.1.1 Demonstrate an understanding that in a multi-digit whole number (through 1,000,000), a digit in one place represents ten times what it represents in the place to its right. Example: Recognize that in the number 770, the 7 in the hundreds place is ten times the 7 in the tens place. ● M04.A-T.1.1.2 Read and write whole numbers in expanded, standard, and word form through 1,000,000. ● M04.A-T.1.1.3 Compare two multi-digit numbers through 1,000,000 based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols. ● M04.A-T.1.1.4 Round multi-digit whole numbers (through 1,000,000) to any place ● M04.A-T.2.1.1 Add and subtract multi-digit whole numbers (limit sums and subtrahends up to and including 1,000,000). ● M04.A-T.2.1.2 Multiply a whole number of up to four digits by a one-digit whole number and multiply 2 two-digit numbers. ● M04.A-T.2.1.3 Divide up to four-digit dividends by one-digit divisors with answers written as whole-number quotients and remainders. ● M04.A-T.2.1.4 Estimate the answer to addition, subtraction, and multiplication problems using whole numbers through six digits (for multiplication, no more than $2 \text{ digits} \times 1 \text{ digit}$, excluding powers of 10).
Learning Objectives (Concepts Taught)	● Build on knowledge of familiar units (hundreds and thousands) and develop their understanding of millions to including rounding, addition, and subtraction. ● Build knowledge of the pattern of <i>times ten</i> in the base ten system on the place value chart. ● Recognize that each sequence of three digits is read as hundreds, tens, and ones followed by the naming of the corresponding base thousand unit (thousand, million, billion).
Performance Objectives (Skills Demonstrated)	Place Value of Multi-Digit Whole Numbers ● Interpret a multiplication equation as a comparison. ● Recognize a digit represents 10 times the value of what it represents in the place to its right.

	• Name numbers within 1 million by building understanding of the place value chart and placement of commas for naming base thousand units. • Read and write multi-digit numbers using base ten numerals, number names, and expanded form. Comparing Multi-Digit Whole Numbers • Compare numbers based on meanings of the digits using $>$, $<$, or $=$ to record the comparison. • Find 1, 10, and 100 thousand more and less than a given number. Rounding Multi-Digit Whole Numbers • Round multi-digit numbers to any place using the vertical number line. • Use place value understanding to round multi-digit numbers to any place value using real world applications. Multi-Digit Whole Number Addition • Use place value understanding to fluently add multi-digit whole numbers using the standard addition algorithm and apply the algorithm to solve word problems using tape diagrams. • Solve multi-step word problems using the standard addition algorithm modeled with tape diagrams and assess the reasonableness of answers using rounding. Multi-Digit Whole Number Subtraction • Use place value understanding to fluently decompose to smaller units at least once and up to multiple times in any place using the standard subtraction algorithm, and apply the algorithm to solve word problems using tape diagrams. • Solve two-step word problems using the standard subtraction algorithm fluently modeled with tape diagrams and assess the reasonableness of answers using rounding. Addition and Subtraction Word Problems • Solve additive compare word problems modeled with tape diagrams. • Solve multi-step word problems modeled with tape diagrams and assess the reasonableness of answers using rounding. • Create and solve multi-step word problems from given tape diagrams and equations
Key Vocabulary:	New or Recently Introduced Terms • millions • ten millions • hundred millions (as places on the place value chart) • ten thousands, hundred thousands • variables Familiar Terms and Symbol • $=$, $<$, $>$ (equal to, less than, greater than) • addend • algorithm • bundling, making, renaming, changing, exchanging, regrouping, trading (e.g., exchanging 10 ones for 1 ten) • compose • decompose • difference • digit

	• endpoint • equation • estimate • expanded form • expression • halfway • number line • number sentence • place value • rounding • standard form • sum • tape diagram (bar diagram) • unbundling, breaking, renaming, changing, regrouping, trading (e.g., exchanging 1 ten for 10 ones) • Word form (e.g., one hundred thirty-five) NOTES ON EXPRESSION, EQUATION, AND NUMBER SENTENCE: *Please note the descriptions for the following terms, which are frequently misused: Expression: A number, or any combination of sums, differences, products, or divisions of numbers that evaluates to a number (e.g., $3 + 4$, 8×3, $15 \div 3$ as distinct from an equation or number sentence). Equation: A statement that two expressions are equal (e.g., $3 \times \underline{\quad} = 12$, $5 \times b = 20$, $3 + 2 = 5$). Number sentence (also addition, subtraction, multiplication, or division sentence): An equation or inequality for which both expressions are numerical and can be evaluated to a single number (e.g., $4 + 3 = 6 + 1$, $2 = 2$, $21 > 7 \times 2$, $5 \div 5 = 1$). Number sentences are either true or false (e.g., $4 + 4 < 6 \times 2$ and $21 \div 7 = 4$) and contain no unknowns.
Assessments	Exit Tickets for all lessons Topic A Quiz - https://docs.google.com/document/d/1CTZM-fna1pg59Wsh8DzJnmBHttpAwY-E187SW-t9j9Q/edit?usp=sharing Topic B & C Quiz - https://docs.google.com/document/d/1ZAUOW-bbOoh5QF3jDDAIzD6eacimD9RaY9wG240PjEY/edit?usp=sharing Topic D & E Quiz - https://docs.google.com/document/d/1AwyjBKyWCVyETPGdHWmKTl4b6IAshGdX5xq672YTnDk/edit?usp=sharing Topic F Quiz - https://docs.google.com/document/d/1zeODWvbu1EA2LCtrdA5favIlio1UuFKXvfOcXgrmpFI/edit?usp=sharing Mid-Module Assessment End-of-Module Assessment (End-of-Module Review available here - https://drive.google.com/file/d/0Bze4eU0rInwwcF9oZIZyM2FEMIU/view?usp=sharing)

Resources and Differentiation Tools	Primary Resource: Eureka Module 1 Other Resources: Zearn Mission 1 (www.zearn.org) Embarc Module 1 (https://embarc.online/course/view.php?id=26) Number Talks 3 Act Math Tasks (https://gfletchy.com/wheres-the-beef/) Tasks from Illustrative Mathematics (Carnival Tickets Thousands and Millions of 4th Graders Threatened and Endangered Wolves Ordering 4-digit Numbers Rounding on the Number Line Rounding to the Nearest 100 and 1000 Rounding to the Nearest 1000 What's My Number? Margie Buys Apples) Inside Mathematics (Diminishing Return (Level A) Got Your Number (Level B, D, and E)) Open Middle (Subtracting Multi-Digit Numbers http://www.openmiddle.com/subtraction-with-regrouping/) ELL Overlay for Listening and Reading in Grades 3-5 Mathematics ELL Overlay for Speaking and Writing in Grades 3-5 Mathematics
Authentic Examples (real-world tasks)	Application Problems (specifically lessons 9, 13, 15)
Visual Representations & Strategies	Number Lines (horizontal and vertical) Personal Whiteboards Place Value Cards Place Value Chart Place Value Disks Tape Diagrams
Writing in Math	Mid-Module Assessment Question 3e ("Use words to explain.") End-of-Module Assessment Question 3e ("Explain Eddie's thinking.")
Culturally Responsive Activities	https://www.engageny.org/resource/grade-4-mathematics-module-1 (see the various language resources under "Downloadable Resources") Reading and Writing Numbers in Different Countries
Grade Level DOK Examples	Grade 4 Sample DOK tasks

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Unit of Study	Unit 2: Unit Conversions and Problem Solving with Metric Measurement
Time Frame/Pacing	7 days
Big Ideas	● Measurement attributes can be quantified and estimated using customary and non-customary units of measure. ● Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations. ● Mathematical relationships among numbers can be represented, compared, and communicated.
Unit Essential Questions	● Why does “what” we measure influence “how” we measure? ● In what ways are the mathematical attributes of objects or processes measured, calculated, and/or interpreted? ● How are relationships represented mathematically? ● How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations? ● How is mathematics used to quantify, compare, represent, and model numbers? ● How can mathematics support effective communication? ● How precise do measurements and calculations need to be?

PA Core Standards	● CC.2.4.4.A.1 Solve problems involving measurement and conversions from a larger unit to a smaller unit.
PA Assessment Anchors	● M04.D-M.1.1 Solve problems involving length, weight (mass), liquid volume, time, area, and perimeter.
PA Eligible Content	● M04.D-M.1.1.1 Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; and c, pt, qt, gal), metric units (cm, m, km; g, kg; and mL, L), and time (sec, min, hr, day, wk, mo, and yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. A table of equivalencies will be provided. Example 1: Know that 1 kg is 1,000 times as heavy as 1 g. Example 2: Express the length of a 4-foot snake as 48 in. ● M04.D-M.1.1.2 Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; money, including problems involving simple fractions or decimals; and problems that require expressing measurements given in a larger unit in terms of a smaller unit. ● M04.D-M.1.1.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems (may include finding a missing side length). Whole numbers only. The formulas will be provided. ● M04.D-M.1.1.4 Identify time (analog or digital) as the amount of minutes before or after the hour. Example 1: 2:50 is the same as 10 minutes before 3:00 Example 2: Quarter past six is the same as 6:15
Learning Objectives (Concepts Taught)	● Build connections and similarities between various mixed units. Example: 2 hr 5 min, \$2.50, 2 km 5 m, 2' 5", and $2\frac{5}{8}$ (hours and minutes, dollars and cents, kilometers and meters, feet and inches, ones and eighths). ● Work with mixed units in the context of length, mass, and capacity in the metric system when moving between larger and smaller units.
Performance Objectives (Skills Demonstrated)	Metric Unit Conversions ● Express metric length measurements in terms of a smaller unit; model and solve addition and subtraction word problems involving metric length. ● Express metric mass measurements in terms of a smaller unit; model and solve addition and subtraction word problems involving metric mass. ● Express metric capacity measurements in terms of a smaller unit; model and solve addition and subtraction word problems involving metric capacity. Application of Metric Unit Conversions ● Know and relate metric units to place value units in order to express measurements in different units. ● Use addition and subtraction to solve multi-step word problems involving length, mass, and capacity.

Key Vocabulary:	New or Recently Introduced Terms • convert • kilometer • mass (the measure of the amount of matter in an object) • milliliter (mL, a unit of measure for liquid volume) • mixed units (e.g., 3 m 43 cm) Familiar Terms and Symbols • =, <, > (equal to, less than, greater than) • algorithm (a step-by-step procedure to solve a particular type of problem) • capacity (the maximum amount that something can contain) • distance • equivalent • kilogram (kg), gram (g) (units of measure for mass) • larger or smaller unit (used in a comparison of units) • length (the measurement of something from end to end) • liter (L) (unit of measure for liquid volume) • measurement (dimensions, quantity, or capacity as determined by comparison with a standard) • meter (m), centimeter (cm) (units of measure for length) • mixed units (e.g., 2 tens 4 ones, 2 kilometers 34 meters) • simplifying strategy (a mental math or recorded method for making a problem easier to solve) • table • times as much as (e.g., 1 hundred is 10 times as much as 1 ten) • weight (the measurement of how heavy something is)
Assessments	Exit Tickets for all lessons Topic A Quiz - https://docs.google.com/document/d/17AyIPdaPvdlHXJozr9B9LDJCIIQfLt9iIqa5ZlIgH140/edit?usp=sharing Topic B Quiz - https://docs.google.com/document/d/1OBQmB5HAORcQ9bKU9-UF6TdGlg0VNLAeJGhEXoytc98/edit?usp=sharing End-of-Module Assessment (End-of-Module Review available here – https://docs.google.com/document/d/1ce7aFwNGu2Oauu8kpqEbVgO2ASX-mkUhCQaakikhL38/edit?usp=sharing)
Resources and Differentiation Tools	Primary Resource: Eureka Module 2 Other Resources: Zearn Mission 2 (www.zearn.org) Embarc Module 2 (https://embarc.online/course/view.php?id=25) Number Talks 3 Act Math Tasks (https://gfletchy.com/dill-er-up/ https://whenmathhappens.com/2014/02/14/sam-houston/) ELL Overlay for Listening and Reading in Grades 3-5 Mathematics ELL Overlay for Speaking and Writing in Grades 3-5 Mathematics

Authentic Examples (real-world tasks)	Application Problems (specifically lesson 1)
Visual Representations & Strategies	Balance scale, weights (masses) Centimeter ruler, meter stick Liter containers with millimeter scale Number line Tape diagram Two-column table
Writing in Math	End-of-Module Assessment Question 2 ("Explain how you know.") End-of-Module Assessment Question 4c ("Explain your thinking.")
Culturally Responsive Activities	https://www.engageny.org/resource/grade-4-mathematics-module-2 (see the various language resources under "Downloadable Resources") Measure Up Activity (https://sites.google.com/site/crmmprojectsite/Home/chapter-3--culturally-responsive-lessons-for-students#TOC-Math) World Map http://chartsbin.com/view/d12
Grade Level DOK Examples	Grade 4 Sample DOK tasks

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Unit of Study	Unit 3: Multi-Digit Multiplication and Division
Time Frame/Pacing	43 days Consider omitting lessons 10, 21, 31, and 33 (see page 5 in manual)
Big Ideas	• Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations. • Mathematical relationships among numbers can be represented, compared, and communicated. • Patterns exhibit relationships that can be extended, described, and generalized.
Unit Essential Questions	• How are relationships represented mathematically? • How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations? • How is mathematics used to quantify, compare, represent, and model numbers? • How can mathematics support effective communication? • How can patterns be used to describe relationships in mathematical situations? • How can recognizing repetition or regularity assist in solving problems more efficiently?
PA Core Standards	• CC.2.2.4.A.1 Represent and solve problems involving the four operations. • CC.2.2.4.A.2 Develop and+/or apply number theory concepts to find factors and multiples.

	● CC.2.1.4.B.2 Use place value understanding and properties of operations to perform multidigit arithmetic. ● CC.2.4.4.A.1 Solve problems involving measurement and conversions from a larger unit to a smaller unit.
PA Assessment Anchors	● M04.B-O.1.1 Use numbers and symbols to model the concepts of expressions and equations. ● M04.B-O.2.1 Develop and apply number theory concepts to represent numbers in various ways. ● M04.A-T.2.1 Use operations to solve problems. ● M04.D-M.1.1 Solve problems involving length, weight (mass), liquid volume, time, area, and perimeter.
PA Eligible Content	● M04.B-O.1.1.1 Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations. Example 1: Interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Example 2: Know that the statement 24 is 3 times as many as 8 can be represented by the equation $24 = 3 \times 8$ or $24 = 8 \times 3$. ● M04.B-O.1.1.2 Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison. Example: Know that 3×4 can be used to represent that Student A has 4 objects and Student B has 3 times as many objects not just 3 more objects. ● M04.B-O.1.1.3 Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole numbers or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity. ● M04.B-O.1.1.4 Identify the missing symbol (+, −, ×, ÷, =, <, and >) that makes a number sentence true (single-digit divisor only). ● M04.B-O.2.1.1 Find all factor pairs for a whole number in the interval 1 through 100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the interval 1 through 100 is a multiple of a given one digit number. Determine whether a given whole number in the interval 1 through 100 is prime or composite. ● M04.A-T.2.1.1 Add and subtract multi-digit whole numbers (limit sums and subtrahends up to and including 1,000,000). ● M04.A-T.2.1.2 Multiply a whole number of up to four digits by a one-digit whole number and multiply 2 two-digit numbers.

	● M04.A-T.2.1.3 Divide up to four-digit dividends by one-digit divisors with answers written as whole-number quotients and remainders. ● M04.A-T.2.1.4 Estimate the answer to addition, subtraction, and multiplication problems using whole numbers through six digits (for multiplication, no more than $2 \text{ digits} \times 1 \text{ digit}$, excluding powers of 10). ● M04.D-M.1.1.1 Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; and c, pt, qt, gal), metric units (cm, m, km; g, kg; and mL, L), and time (sec, min, hr, day, wk, mo, and yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. A table of equivalencies will be provided. Example 1: Know that 1 kg is 1,000 times as heavy as 1 g. Example 2: Express the length of a 4-foot snake as 48 in. ● M04.D-M.1.1.2 Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; money, including problems involving simple fractions or decimals; and problems that require expressing measurements given in a larger unit in terms of a smaller unit. ● M04.D-M.1.1.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems (may include finding a missing side length). Whole numbers only. The formulas will be provided. ● M04.D-M.1.1.4 Identify time (analog or digital) as the amount of minutes before or after the hour. Example 1: 2:50 is the same as 10 minutes before 3:00. Example 2: Quarter past six is the same as 6:15.
Learning Objectives (Concepts Taught)	● Use place value understanding and visual representations to solve multiplication and division problems with multi-digit numbers. ● Develop students' ability to reason about the methods and models chosen to solve problems with multi-digit factors and dividends.
Performance Objectives (Skills Demonstrated)	Multiplicative Comparison Word Problems ● Investigate and use the formulas for area and perimeter of rectangles ● Solve multiplicative comparison word problems by applying the area and perimeter formulas. ● Demonstrate understanding of area and perimeter formulas by solving multi-step real world problems. Multiplication by 10, 100, and 1,000 ● Interpret and represent patterns when multiplying by 10, 100, and 1,000 in arrays and numerically. ● Multiply multiples of 10, 100, and 1,000 by single digits, recognizing patterns. ● Multiply two-digit multiples of 10 by two-digit multiples of 10 with the area model. Multiplication of up to Four Digits by Single-Digit Numbers

	● Use place value disks to represent up to four-digit by one-digit multiplication. ● Multiply three- and four-digit numbers by one-digit numbers applying the standard algorithm. ● Connect the area model and the partial products method to the standard algorithm. Multiplication Word Problems ● Solve two-step word problems, including multiplicative comparison. ● Use multiplication, addition, or subtraction to solve multi-step word problems. Division of Tens and Ones with Successive Remainders ● Solve division word problems with remainders. ● Understand and solve division problems with a remainder using the array and area models. ● Understand and solve two-digit dividend division problems with a remainder in the ones place by using place value disks. ● Represent and solve division problems requiring decomposing a remainder in the tens. ● Find whole number quotients and remainders. ● Explain remainders by using place value understanding and models. ● Solve division problems with or without remainders using the area model. Reasoning with Divisibility ● Find factor pairs for numbers to 100, and use understanding of factors to define prime and composite. ● Use division and the associative property to test for factors and observe patterns. ● Determine if a whole number is a multiple of another number. ● Explore properties of prime and composite numbers to 100 by using multiples. Division of Thousands, Hundreds, Tens, and Ones ● Divide multiples of 10, 100, and 1,000 by single-digit numbers. ● Represent and solve division problems with up to a three-digit dividend numerically and with place value disks requiring decomposing a remainder in the hundreds place. ● Represent and solve three- and four-digit dividend division with divisors of 2, 3, 4, and 5, decomposing a remainder up to three times. ● Solve division problems with a zero in the dividend or with a zero in the quotient. ● Interpret division word problems as either number of groups unknown or group size unknown. ● Interpret and find whole number quotients and remainders to solve one-step division word problems with larger divisors of 6, 7, 8, and 9. ● Explain the connection of the area model of division to the long division algorithm for three- and four-digit dividends Multiplication of Two-Digit by Two-Digit Numbers ● Multiply two-digit multiples of 10 by two-digit numbers using a place value chart or area model. ● Multiply two-digit by two-digit numbers using four partial products. ● Transition from four partial products to the standard algorithm for two-digit by two-digit multiplication.
Key Vocabulary:	New or Recently Introduced Terms

	• associative property (e.g., $96 = 3 \times (4 \times 8) = (3 \times 4) \times 8$) • composite number (positive integer having three or more whole number factors) • distributive property (e.g., $64 \times 27 = (60 \times 20) + (60 \times 7) + (4 \times 20) + (4 \times 7)$) • divisible • divisor • formula (a mathematical rule expressed as an equation with numbers and/or variables) • long division (process of dividing a large dividend using several recorded steps) • partial product (e.g., $24 \times 6 = (20 \times 6) + (4 \times 6) = 120 + 24$) • prime number (positive integer greater than 1 having whole number factors of only 1 and itself) • remainder Familiar Terms and Symbols • algorithm (steps for base ten computations with the four operations) • area (the amount of two-dimensional space in a bounded region) • area model (a model for multiplication and division problems that relates rectangular arrays to area, in which the length and width of a rectangle represent the factors for multiplication, and for division, the width represents the divisor and the length represents the quotient) • array • bundling, grouping, renaming, changing (compose or decompose a 10, 100, etc.) • compare (to find the similarity or dissimilarity between) • distribute (decompose an unknown product in terms of partial product (e.g., $24 \times 6 = (20 \times 6) + (4 \times 6) = 120 + 24$) • prime number (positive integer greater than 1 having whole number factors of only 1 and itself) • remainder
Assessments	Exit Tickets for all lessons Topic A Quiz - https://docs.google.com/document/d/1GoBHjL7liJYKGzpyKdk-_RK1g5BD_50LYRz1CSqJu_o/edit?usp=sharing Topic B Quiz - https://drive.google.com/open?id=1k3z-MTILq1b5HvIZfmKwAZip4g2ukmSq08qNzuLoMJw Topic C Quiz - https://drive.google.com/open?id=1jo4wAmznivtPHJ2cIdAVgqIq1KhsqsvIzt8Ijcydxm4 Topic D Quiz - https://drive.google.com/open?id=1vkbllJwJkTCPgTOHH_1dG6fhpvsNNCDIs9lpVb6by2I Topic E Quiz - https://docs.google.com/document/d/1FXw1XW0bMk3ct26J4XnIGP3Uxkh_zofSt09sle4YdKk/edit?usp=sharing Topic F Quiz - https://docs.google.com/document/d/1AA-TtkW-uWMLoZq9cg4joGKey5Bbnr23Rwc_TkCH09c/edit?usp=sharing

	Topic G Quiz - https://docs.google.com/document/d/1Hb4p7GLs3SQORNdiXFNY7fkLETq-EhFbYBqpHc59qZo/edit?usp=sharing Topic H Quiz - https://docs.google.com/document/d/1SOk4BWsyCEgNOfTTB0gcFxajRBJmIpiB0SGwGunqAPc/edit?usp=sharing Mid Module Assessment (Mid Module Review available here - https://drive.google.com/file/d/0Bze4eU0rInwwRk56NGxPM09IYVk/view?usp=sharing) End-of-Module Assessment (End-of-Module Review available here – https://drive.google.com/file/d/0Bze4eU0rInwwSkgzSG1wdEdJTkU/view?usp=sharing)
Resources and Differentiation Tools	Primary Resource: Eureka Module 3 Other Resources: Zearn Mission 3 (www.zearn.org) Embarc Module 3 (https://embarc.online/course/view.php?id=23) Number Talks 3 Act Math Tasks (https://gfletchy.com/dill-er-up/ https://gfletchy.com/arraybow-of-colors/ https://gfletchy.com/the-spinner/ https://gfletchy.com/krispy-kreme-me/ https://whenmathhappens.com/2014/03/10/snack-packs/ Cookies (teacher may want to either round the dimensions of the cookie sheet, use as an extension activity, or practice with a calculator) https://whenmathhappens.com/2014/02/14/sam-houston/ https://whenmathhappens.com/2014/04/14/crane-rescue/) Tasks from Illustrative Mathematics Comparing Money Raised Karl's Garden Carnival Tickets) Inside Mathematics (Diminishing Return (Level C) The Wheel Shop (Level A-C) Surrounded and Covered (Level A-C) Measuring Up (Level A-B) Squirreling It Away (Level B-E)) Open Middle (Operations and Algebraic Thinking Activities Operations in Base Ten Activities Measurement and Data Activities) ELL Overlay for Listening and Reading in Grades 3-5Mathematics ELL Overlay for Speaking and Writing in Grades 3-5 Mathematics
Authentic Examples (real-world tasks)	Application Problems (specifically lessons 4, 19, and 36) The Wheel Shop Cookies (teacher may want to either round the dimensions of the cookie sheet, use as an extension activity, or practice with a calculator)

Visual Representations & Strategies	Area model Grid paper Number bond Place value disks Tape diagram Ten-thousands place value chart Thousands place value chart
Writing in Math	Mid Module Assessment Questions 3, 4, and 5d.
Culturally Responsive Activities	https://www.engageny.org/resource/grade-4-mathematics-module-3 (see the various language resources under "Downloadable Resources") https://www.atm.org.uk/write/mediauploads/journals/mt176/non-member/atm-mt176-03-05.pdf See page 5 for Ancient Egyptian multiplication.
Grade Level DOK Examples	Grade 4 Sample DOK tasks

Chambersburg Area School District Mathematic Curriculum
Grade 4

Grade 4 mathematics is about (1) developing understanding and fluency with multi-digit multiplication, and developing an understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; and (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
 4. Model with mathematics.
 5. Use appropriate tools strategically.
 6. Attend to precision.
 7. Look for and make use of structure.
8. Look for and makes sense of regularity in repeated reasoning.

Unit of Study	Unit 4: Fraction Equivalence, Ordering, and Operations
Time Frame/Pacing	45 days Consider omitting lessons 4, 29, 40 (see page 5 in manual) Consider consolidating lessons 1-3 (see page 6 in manual) Extend on Lesson 28 to include more opportunity for students to translate information from one type of data display to another (CC.2.4.4.A.2)
Big Ideas	• Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations. • Mathematical relationships among numbers can compared and communicated. • Patterns exhibit relationships that can be extended, described, and generalized. • Data can be modeled and used to make inferences. • Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.
Unit Essential Questions	• How are relationships represented mathematically? • How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations? • How is mathematics used to quantify, compare, represent, and model numbers? • How can mathematics support effective communication?

	• How can patterns be used to describe relationships in mathematical situations? • How can recognizing repetition or regularity assist in solving problems more efficiently? • How does the type of data influence the choice of display? • How can probability and data analysis be used to make predictions? • How can data be organized and represented to provide insight into the relationship between quantities?
PA Core Standards	• CC.2.2.4.A.4 Generate and analyze patterns using one rule. • CC.2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering • CC.2.1.4.C.2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. • CC.2.4.4.A.4 Represent and interpret data involving fractions using information provided in a line plot • CC.2.4.4.A.2 Translate information from one type of data display to another.
PA Assessment Anchors	• M04.B-O.3.1 Recognize, describe, extend, create, and replicate a variety of patterns. • M04.A-F.1.1 Find equivalencies and compare fractions. • M04.A-F.2.1 Solve problems involving fractions and whole numbers (straight computation or word problems). • M04.D-M.2.1 Organize, display, and answer questions based on data.
PA Eligible Content	• M04.B-O.3.1.1 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. Example 1: Given the rule “add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms alternate between odd and even numbers. Example 2: Given the rule “increase the number of sides by 1” and starting with a triangle, observe that the tops of the shapes alternate between a side and a vertex. • M04.B-O.1.1.1 Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations. Example 1: Interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Example 2: Know that the statement 24 is 3 times as many as 8 can be represented by the equation $24 = 3 \times 8$ or $24 = 8 \times 3$. • M04.B-O.1.1.2 Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison. Example: Know that 3×4 can be used to represent that

Student A has 4 objects and Student B has 3 times as many objects not just 3 more objects.

- **M04.B-O.1.1.3** Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole numbers or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity.
- **M04.B-O.1.1.4** Identify the missing symbol (+, −, ×, ÷, =, <, and >) that makes a number sentence true (single-digit divisor only). triangle, observe that the tops of the shapes alternate between a side and a vertex.
- **M04.B-O.3.1.2** Determine the missing elements in a function table (limit to +, −, or × and to whole numbers or money).
- **M04.B-O.3.1.3** Determine the rule for a function given a table (limit to +, −, or × and to whole numbers).
- **M04.A-F.1.1.1** Recognize and generate equivalent fractions.
- **M04.A-F.1.1.2** Compare two fractions with different numerators and different denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100) using the symbols >, =, or < and justify the conclusions.
- **M04.A-F.2.1.1** Add and subtract fractions with a common denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; answers do not need to be simplified; and no improper fractions as the final answer).
- **M04.A-F.2.1.2** Decompose a fraction or a mixed number into a sum of fractions with the same denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100), recording the decomposition by an equation. Justify decompositions (e.g., by using a visual fraction model).
Example 1: $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$ OR $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$ Example 2: $2 \frac{1}{12} = 1 + 1 + \frac{1}{12} = \frac{12}{12} + \frac{12}{12} + \frac{1}{12}$
- **M04.A-F.2.1.3** Add and subtract mixed numbers with a common denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; no regrouping with subtraction; fractions do not need to be simplified; and no improper fractions as the final answers).
- **M04.A-F.2.1.4** Solve word problems involving addition and subtraction of fractions referring to the same whole or set and having like denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100).
- **M04.A-F.2.1.5** Multiply a whole number by a unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number).

	Example: $5 \times (1/4) = 5/4$ ● M04.A-F.2.1.6 Multiply a whole number by a non-unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number). Example: $3 \times (5/6) = 15/6$ ● M04.A-F.2.1.7 Solve word problems involving multiplication of a whole number by a fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100). ● M04.D-M.2.1.1 Make a line plot to display a data set of measurements in fractions of a unit (e.g., intervals of $1/2$, $1/4$, or $1/8$). ● M04.D-M.2.1.2 Solve problems involving addition and subtraction of fractions by using information presented in line plots (line plots must be labeled with common denominators, such as $1/4$, $2/4$, $3/4$). ● M04.D-M.2.1.3 Translate information from one type of display to another (table, chart, bar graph, or pictograph).
Learning Objectives (Concepts Taught)	● Build on previous knowledge of unit fractions to explore fraction equivalence and extend this understanding to mixed numbers. ● Compare fractions and mixed numbers and the representation of both in a variety of models. ● Generalize and reason about relative fraction and mixed number sizes. ● Apply whole number operations to fraction and mixed number operations.
Performance Objectives (Skills Demonstrated)	Decomposition and Fraction Equivalence ● Decompose fractions as a sum of unit fractions using tape diagrams. ● Decompose non-unit fractions and represent them as a whole number times a unit fraction using tape diagrams. ● Decompose fractions into sums of smaller unit fractions using tape diagrams. ● Decompose unit fractions and non-unit fractions using area models to show equivalence. Fraction Equivalence Using Multiplication and ● Use the area model and multiplication to show the equivalence of two fractions. ● Use the area model and division to show the equivalence of two fractions. ● Explain fraction equivalence using a tape diagram and the number line and relate that to the use of multiplication and division. Fraction Comparison ● Reason using benchmarks to compare two fractions on the number line. ● Find common units or number of units to compare two fractions. Fraction Addition and Subtraction ● Use visual models to add and subtract two fractions with the same units, including subtracting from one whole. ● Add and subtract more than two fractions. ● Solve word problems involving addition and subtraction of fractions.

	● Use visual models to add two fractions with related units using the denominators 2, 3, 4, 5, 6, 8, 10, and 12. Extending Fraction Equivalence to Fractions Greater Than 1 ● Add a fraction less than 1 to, or subtract a fraction less than 1 from, a whole number using decomposition and visual models. ● Add and multiply unit fractions to build fractions greater than 1 using visual models. ● Decompose and compose fractions greater than 1 to express them in various forms. ● Compare fractions greater than 1 by reasoning using benchmark fractions or creating common numerators or denominators. ● Solve word problems with line plots. Addition and Subtraction of Fractions by Decomposition ● Estimate sums and differences using benchmark numbers. ● Add a mixed number and a fraction or multiple mixed numbers. ● Subtract a fraction from a mixed number or a mixed number from a mixed number. Repeated Addition of Fractions as Multiplication ● Represent the multiplication of n times a/b as $(n \times a)/b$ using the associative property and visual models. ● Find the product of a whole number and a mixed number using the distributive property. ● Solve multiplicative comparison word problems involving fractions. ● Solve word problems involving the multiplication of a whole number and a fraction including those involving line plots. Exploring a Fraction Pattern ● Find and use a pattern to calculate the sum of all fractional parts between 0 and 1. Share and critique peer strategies.
Key Vocabulary:	New and Recently Introduced Terms ● benchmark ● common denominator ● denominator ● fraction greater than 1 ● line plot ● mixed number ● numerator Familiar Terms ● =, <, > ● Compose ● Decompose ● Equivalent fractions ● Fraction ● Fractional unit ● Multiple ● Non-unit fraction ● Unit fraction

	• Unit interval • Whole See pages 12 and 13 in manual for examples/definitions
Assessments	Exit Tickets for all lessons Topic A Quiz - https://docs.google.com/document/d/162hTZs3KGWX5k9FuogyxQ-DE8wFyreIDc_in-EeM41M/edit?usp=sharing Topic B Quiz - https://docs.google.com/document/d/1D5EIQ2mHK0C0zWEcOT7MJSydiSIYmfPm5FReqqWM9wQ/edit?usp=sharing Topic C Quiz - https://docs.google.com/document/d/1KRfkqR1bMNN93pHVOwQyGAthkUliktZLHWB_UNk8oyw/edit?usp=sharing Topic D Quiz - https://docs.google.com/document/d/1bEYc-q61KaDD_NrEp_sPOGJszechYG3b3bQ4iFSu3Ppg/edit?usp=sharing Topic E Quiz - https://docs.google.com/document/d/1PZjMPtPMwdojNs2VLBLaK2jIlyHifWM6EXi4aiCjUdg/edit?usp=sharing Topic F Quiz - https://docs.google.com/document/d/1eVL6aMsyCGAVUobyN0CbMXF9ZGUqySFERn8y61v36DQ/edit?usp=sharing Topic G Quiz - https://docs.google.com/document/d/1iyZQxROOvaCkdFwu1M2zTUMewKQwQQPoiZ1E4s3MYxc/edit?usp=sharing Mid Module Assessment End-of-Module Assessment (End-of-Module Review available here – https://drive.google.com/file/d/0Bze4eU0rInwwVFB0eWcwTUJleWc/view?usp=sharing)
Resources and Differentiation Tools	Primary Resource: Eureka Module 5 Other Resources: Zearn Mission 5 (www.zearn.org) Embarc Module 5 (https://embarc.online/course/view.php?id=19) Number Talks 3 Act Math Tasks (Do the Dew Drip-Drop The Juicer Card Pickup Crane Rescue) Tasks from Illustrative Mathematics (Fraction Equivalence with Pictures Fractions and Rectangles Doubling Numerators and Denominators Listing Fractions in Increasing Size Using Benchmarks to Compare Fractions)

	Game: Comparing Fractions Using Benchmarks Running Laps Money in the Piggybank Comparing Sums of Unit Fractions Mixed Numbers as Equivalent Fractions Making 22/17 in Different Ways Plastic Building Blocks Cynthia's Perfect Punch Fractions and Peaches Sugar in Six Cans of Soda Comparing Pizzas Button Diameters Inside Mathematics (Fractured Numbers (Level A-C) Got Your Number (Level C) Double Down (Level C) Growing Staircases (Level A-C) Party Time (Level B) Pick a Pocket (Level A) Through the Grapevine (Level A)) Open Middle (Activities with Fractions) ELL Overlay for Listening and Reading in Grades 3-5Mathematics ELL Overlay for Speaking and Writing in Grades 3-5 Mathematics
Authentic Examples (real-world tasks)	Application Problems (especially lessons 8, 10, 19, 22, and 25) Button Line Plot from Illustrative Mathematics (https://tasks.illustrativemathematics.org/content-standards/4/MD/B/4/tasks/1039)
Visual Representations & Strategies	Area model Fraction strips Line plot Number line Rulers Tape diagram
Writing in Math	Mid Module Assessment Question3 ("Explain why...") End-of-Module Assessment Question 3g (Explain your thinking)
Culturally Responsive Activities	https://www.engageny.org/resource/grade-4-mathematics-module-5 (see the various language resources under "Downloadable Resources")
Grade Level DOK Examples	Grade 4 Sample DOK tasks

Chambersburg Area School District Mathematic Curriculum
Grade 4

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Unit of Study	Unit 5: Angle Measure and Plane Figures
Time Frame/Pacing	20 days
Big Ideas	● Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization. ● Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools. ● Patterns exhibit relationships that can be extended, described, and generalized.
Unit Essential Questions	● How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems? ● How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving? ● How can geometric properties and theorems be used to describe, model, and analyze situations? ● How can expressions, equations, and inequalities be use to quantify, solve, model and/or analyze mathematical situations? ● What does it mean to estimate or analyze numerical quantities? ● When is it is appropriate to estimate versus calculate? ● What makes a tool and/or strategy appropriate for a given task? ● How can patterns be used to describe relationships in mathematical situations? ● How can recognizing repetition or regularity assist in solving problems more efficiently?

PA Core Standards	● CC.2.4.4.A.6 Measure angles and use properties of adjacent angles to solve problems. ● CC.2.3.4.A.1 Draw lines and angles and identify these in two-dimensional figures. ● CC.2.3.4.A.2 Classify two-dimensional figures by properties of their lines and angles. ● CC.2.3.4.A.3 Recognize symmetric shapes and draw lines of symmetry.
PA Assessment Anchors	● M04.D-M.3.1 Use appropriate tools and units to sketch an angle and determine angle measurements. ● M04.C-G.1.1 List properties, classify, draw, and identify geometric figures in two dimensions.
PA Eligible Content	● M04.D-M.3.1.1 Measure angles in whole-number degrees using a protractor. With the aid of a protractor, sketch angles of specified measure. ● M04.D-M.3.1.2 Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems. (Angles must be adjacent and non-overlapping.) ● M04.C-G.1.1.1 Draw points, lines, line segments, rays, angles (right, acute, and obtuse), and perpendicular and parallel lines. Identify these in two dimensional figures. ● M04.C-G.1.1.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles ● M04.C-G.1.1.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into mirroring parts. Identify line-symmetric figures and draw lines of symmetry (up to two lines of symmetry).
Learning Objectives (Concepts Taught)	● Construct, recognize, and define points, lines, line segments, rays, and angles, as well as the relationships between them. ● Classify figures and solve geometric problems. ● Create and solve equations to find unknown angle measures. ● Measure an unknown angle with a protractor ● Recognize specific attributes present in and use these to classify two-dimensional figures.
Performance Objectives (Skills Demonstrated)	Lines and Angles ● Identify and draw points, lines, line segments, rays, and angles. Recognize them in various contexts and familiar figures.

	● Use right angles to determine whether angles are equal to, greater than, or less than right angles. Draw right, obtuse, and acute angles. ● Identify, define, and draw perpendicular and parallel lines. Angle Measurement ● Use a circular protractor to understand a 1-degree angle as $\frac{1}{360}$ of a turn. Explore benchmark angles using the protractor. ● Use varied protractors to distinguish angle measure from length measurement. ● Measure and draw angles. Sketch given angle measures and verify with a protractor. ● Identify and measure angles as turns and recognize them in various contexts. Problem Solving with the Addition of Angle Measures ● Decompose angles using pattern blocks. ● Use the addition of adjacent angle measures to solve problems using a symbol for the unknown angle measure. Two-Dimensional Figures and Symmetry ● Recognize lines of symmetry for given two-dimensional figures. Identify line-symmetric figures and draw lines of symmetry. ● Analyze and classify triangles based on side length, angle measure, or both. ● Define and construct triangles from given criteria. Explore symmetry in triangles. ● Classify quadrilaterals based on parallel and perpendicular lines and the presence or absence of angles of a specified size. ● Reason about attributes to construct quadrilaterals on square or triangular grid paper.
Key Vocabulary:	New and Recently Introduced Terms ● acute angle ● acute triangle ● adjacent angle ● angle ● arc ● collinear ● complementary angles ● degree, degree measure of an angle ● diagonal ● equilateral triangle ● figure ● interior of an angle ● intersecting lines ● isosceles triangle ● length of an arc ● line ● line of symmetry ● line segment ● obtuse angle ● obtuse triangle ● parallel ● perpendicular

	• point • protractor • ray • right angle • right triangle • scalene triangle • straight angle • supplementary angles • triangle • vertex • vertical angles Familiar Terms and Symbols • decompose • parallelogram • polygon • quadrilateral • rectangle • rhombus • square • sum • trapezoid • See pages 7 through 9 in manual for examples/definitions
Assessments	Exit Tickets for all lessons Topic A Quiz - https://docs.google.com/document/d/1_Q6xMKRENssEs2aARddT_ZC_yOoaE3Mm9x7nEhXbDDc/edit?usp=sharing Topic B Quiz - https://docs.google.com/document/d/16GnoinSPUAsobDwd2DYJBehFiHSPIpOckOu8H1_sbKU/edit?usp=sharing Topic C Quiz - https://docs.google.com/document/d/1ilfjfpI96DxLETpRAYMRsCuITXNk3F9L69_4mje64_A/edit?usp=sharing Topic D Quiz - https://docs.google.com/document/d/1r8-heCbDb1zq9OrHut_PScStVB7S0KCrGrGCA_XrluZk/edit?usp=sharing Mid Module Assessment (Mid Module Review available here - https://drive.google.com/file/d/0Bze4eU0rInwwREVuRDRELU1SZFk/view?usp=sharing) End-of-Module Assessment (End-of-Module Review available here – https://drive.google.com/file/d/0Bze4eU0rInwwbWhGcWVRSTZiQ1U/view?usp=sharing)
Resources and Differentiation Tools	Primary Resource: Eureka Module 4 Other Resources: Zearn Mission 4 (www.zearn.org) Embarc Module 4 (https://embarc.online/course/view.php?id=21)

	Number Talks 3 Act Math Tasks (https://gfletchy.com/for-the-win/) Tasks from Illustrative Mathematics: Measuring Angles Finding an Unknown Angle The Geometry of Letters What's the Point? What shape am I? Defining Attributes of Rectangles and Parallelograms What is a trapezoid? (PA definition of a trapezoid is a quadrilateral with exactly one pair of parallel sides) Lines of Symmetry for Circles Inside Mathematics (Problem of the Month: Between the Lines Level A-B) Problem of the Month: Infinite Windows (Level A-C) Problem of the Month: William's Polygons (Level A-B)) ELL Overlay for Listening and Reading in Grades 3-5Mathematics ELL Overlay for Speaking and Writing in Grades 3-5 Mathematics
Authentic Examples (real-world tasks)	Application Problems (specifically lessons 8 and 9) Scavenger hunt Paintings
Visual Representations & Strategies	Folded paper models Pattern blocks 180° protractor Rectangular and triangular grid paper Right angle template (created in Lesson 2)/set square/corner of paper Ruler Straightedge
Writing in Math	End-of-Module Assessment Questions 3 and 7
Culturally Responsive Activities	https://www.engageny.org/resource/grade-4-mathematics-module-4 (see the various language resources under "Downloadable Resources")
Grade Level DOK Examples	Grade 4 Sample DOK tasks

Chambersburg Area School District Mathematic Curriculum
Grade 4

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Unit of Study	Unit 6: Decimal Fractions
Time Frame/Pacing	20 days
Big Ideas	● Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations. ● Mathematical relationships among numbers can compared and communicated. ● Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions. ● Patterns exhibit relationships that can be extended, described, and generalized.
Unit Essential Questions	● How are relationships represented mathematically? ● How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations? ● How is mathematics used to quantify, compare, represent, and model numbers? ● How can mathematics support effective communication? ● How can data be organized and represented to provide insight into the relationship between quantities? ● How can patterns be used to describe relationships in mathematical situations? ● How can recognizing repetition or regularity assist in solving problems more efficiently?

PA Core Standards	● CC.2.1.4.C.3 Connect decimal notation to fractions, and compare decimal fractions (base 10 denominator, e.g. ,19/100). ● CC.2.1.4.C.3 Connect decimal notation to fractions, and compare decimal fractions (base 10 denominator, e.g. ,19/100). ● CCC.2.1.4.C.3 Connect decimal notation to fractions, and compare decimal fractions (base 10 denominator, e.g. ,19/100). ● CC.2.4.4.A.1 Solve problems involving measurement and conversions from a larger unit to a smaller unit.
PA Assessment Anchors	● M04.A-F.3.1 Use operations to solve problems involving decimals, including converting between fractions and decimals (may include word problems). ● M04.B-O.1.1 Use numbers and symbols to model the concepts of expressions and equations.
PA Eligible Content	● M04.A-F.3.1.1 Add two fractions with respective denominators 10 and 100. Example: Express $\frac{3}{10}$ as $\frac{30}{100}$, and add $\frac{3}{10} + \frac{4}{100} = \frac{30}{100} + \frac{4}{100} = \frac{34}{100}$. ● M04.A-F.3.1.2 Use decimal notation for fractions with denominators 10 or 100. Example: Rewrite 0.62 as $\frac{62}{100}$ and vice versa. ● M04.A-F.3.1.3 Compare two decimals to hundredths using the symbols $>$, $=$, or $<$, and justify the conclusions. ● M04.B-O.1.1.1 Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations. Example 1: Interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Example 2: Know that the statement 24 is 3 times as many as 8 can be represented by the equation $24 = 3 \times 8$ or $24 = 8 \times 3$. ● M04.B-O.1.1.2 Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison. Example: Know that 3×4 can be used to represent that Student A has 4 objects and Student B has 3 times as many objects not just 3 more objects. ● M04.B-O.1.1.3 Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole numbers or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity.

	● M04.B-O.1.1.4 Identify the missing symbol (+, −, ×, ÷, =, <, and >) that makes a number sentence true (single-digit divisor only).
Learning Objectives (Concepts Taught)	● Explore decimal numbers via their relationship to decimal fractions, expressing a given quantity in both fraction and decimal forms. ● Apply understanding of fractions to decimal numbers
Performance Objectives (Skills Demonstrated)	Exploration of Tenths ● Use metric measurement to model the decomposition of one whole into tenths. ● Use metric measurement and area models to represent tenths as fractions greater than 1 and decimal numbers. ● Represent mixed numbers with units of tens, ones, and tenths with place value disks, on the number line, and in expanded form. Tenths and Hundredths ● Use meters to model the decomposition of one whole into hundredths. Represent and count hundredths. ● Model the equivalence of tenths and hundredths using the area model and place value disks. ● Use the area model and number line to represent mixed numbers with units of ones, tenths, and hundredths in fraction and decimal forms. ● Model mixed numbers with units of hundreds, tens, ones, tenths, and hundredths in expanded form and on the place value chart. ● Use understanding of fraction equivalence to investigate decimal numbers on the place value chart expressed in different units. Decimal Comparison ● Use the place value chart and metric measurement to compare decimals and answer comparison questions. ● Use area models and the number line to compare decimal numbers, and record comparisons using <, >, and =. ● Compare and order mixed numbers in various forms. Addition with Tenths and Hundredths ● Apply understanding of fraction equivalence to add tenths and hundredths. ● Add decimal numbers by converting to fraction form. ● Solve word problems involving the addition of measurements in decimal form. Money Amounts as Decimal Numbers ● Express money amounts given in various forms as decimal numbers. ● Solve word problems involving money.
Key Vocabulary:	New or Recently Introduced Terms ● decimal expanded form ● decimal fraction ● decimal number ● decimal point ● fraction expanded form ● hundredth ● tenth Familiar Terms and Symbols ● expanded form ● fraction

	See page 9 in manual for examples/definitions
Assessments	Exit Tickets for all lessons Topic A Quiz - https://docs.google.com/document/d/1zu5KKXx5IzruJ1JG4HYJbpr_fvnNL4fKPSa-mQPyLqY/edit?usp=sharing Topic B Quiz - https://docs.google.com/document/d/1a6qipTyR9LviwSdwy5v2GPOFvcv0Zs0wEM_tzmxpSTI/edit?usp=sharing Topic C Quiz - https://docs.google.com/document/d/1-VkU_vdMcMeJyBuB2jTCjDsCH0JWQmMk6W9QDPY2p-k/edit?usp=sharing Topic D Quiz - https://drive.google.com/file/d/0Bze4eU0rInwwWVowLWNna1JTNTQ/view?usp=sharing Topic E Quiz - https://docs.google.com/document/d/1dZTW9gJFU9JGWqlbGQo3rtVBeNw7AeuxClbt9r9pBtg/edit?usp=sharing Mid Module Assessment (Mid Module Review available here - https://drive.google.com/file/d/0Bze4eU0rInwwWVowLWNna1JTNTQ/view?usp=sharing) End-of-Module Assessment (End-of-Module Review available here – https://drive.google.com/file/d/0Bze4eU0rInwwVUJTMmRJTW43Uk0/view?usp=sharing)
Resources and Differentiation Tools	Primary Resource: Eureka Module 6 Other Resources: Zearn Mission 6 (www.zearn.org) Embarc Module 6 (https://embarc.online/course/view.php?id=17) Number Talks 3 Act Math Tasks (https://whenmathhappens.com/2014/03/04/cookies/) Tasks from Illustrative Mathematics (Dimes and Pennies) Inside Mathematics (Problem of the Month: Diminishing Return (Level B) Problem of the Month: Digging Dinosaurs (Level C)) Open Middle (Decomposing Tenths and Hundredths Fraction and Decimal Measurement and Data Tasks) ELL Overlay for Listening and Reading in Grades 3-5 Mathematics ELL Overlay for Speaking and Writing in Grades 3-5 Mathematics
Authentic Examples (real-world tasks)	Application Problems (specifically lessons 8 and 15)
Visual Representations & Strategies	1-liter container with milliliter marks Area model

	Centimeter ruler Decimal place value disks (tenths and hundredths) Digital scale Meter stick Number line Place value chart with decimals to hundredths Tape diagram Whole number place value disks (hundreds, tens, and ones)
Writing in Math	Mid Module Assessment Question 6f & g ("Use a model and words to explain...") End-of-Module Assessment Question 6f ("Explain how...")
Culturally Responsive Activities	https://www.engageny.org/resource/grade-4-mathematics-module-6 (see the various language resources under "Downloadable Resources")
Grade Level DOK Examples	Grade 4 Sample DOK tasks

Chambersburg Area School District Mathematic Curriculum
Grade 4

Grade 4 mathematics is about (1) developing understanding and fluency with multi-digit multiplication, and developing an understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; and (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and makes sense of regularity in repeated reasoning.

Unit of Study	Unit 7: Exploring Measurement with Multiplication
Time Frame/Pacing	20 days
Big Ideas	• Measurement attributes can be quantified and estimated using customary and non-customary units of measure. • Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations. • Mathematical relationships among numbers can be represented, compared, and communicated.
Unit Essential Questions	• How do we solve problems involving measurement and conversion of measurement between smaller and larger units? • How do we solve problems using the four operations with whole numbers? • Can you generate and analyze patterns?
PA Core Standards	• CC.2.2.4.A.1 Represent and solve problems involving the four operations. • CC.2.4.4.A.1 Solve problems involving measurement and conversions from a larger unit to a smaller unit.
PA Assessment Anchors	• M04.B-O.1.1 Use numbers and symbols to model the concepts of expressions and equations.

	● M04.D-M.1.1 Solve problems involving length, weight (mass), liquid volume, time, area, and perimeter.
PA Eligible Content	● M04.B-O.1.1.1 Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations. Example 1: Interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Example 2: Know that the statement 24 is 3 times as many as 8 can be represented by the equation $24 = 3 \times 8$ or $24 = 8 \times 3$. ● M04.B-O.1.1.2 Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison. Example: Know that 3×4 can be used to represent that Student A has 4 objects and Student B has 3 times as many objects not just 3 more objects. ● M04.B-O.1.1.3 Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole numbers or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity. ● M04.B-O.1.1.4 Identify the missing symbol (+, −, ×, ÷, =, <, and >) that makes a number sentence true (single-digit divisor only). ● M04.D-M.1.1.1 Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; and c, pt, qt, gal), metric units (cm, m, km; g, kg; and mL, L), and time (sec, min, hr, day, wk, mo, and yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. A table of equivalencies will be provided. Example 1: Know that 1 kg is 1,000 times as heavy as 1 g. Example 2: Express the length of a 4-foot snake as 48 in. ● M04.D-M.1.1.2 Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; money, including problems involving simple fractions or decimals; and problems that require expressing measurements given in a larger unit in terms of a smaller unit. ● M04.D-M.1.1.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems (may include finding a missing side length). Whole numbers only. The formulas will be provided. ● M04.D-M.1.1.4 Identify time (analog or digital) as the amount of minutes before or after the hour. Example 1: 2:50 is the same as 10 minutes before 3:00. Example 2: Quarter past six is the same as 6:15.

Learning Objectives (Concepts Taught)	● Build competencies in measurement as they relate multiplication to the conversion of measurement units. ● Explore multiple strategies for solving measurement problems involving unit conversions.
Performance Objectives (Skills Demonstrated)	Measurement Conversion Tables ● Create conversion tables for length, weight, and capacity units using measurement tools, and use the tables to solve problems. ● Create conversion tables for units of time, and use the tables to solve problems. ● Solve multiplicative comparison word problems using measurement conversion tables. ● Share and critique peer strategies. Problem Solving with Measurement ● Solve problems involving mixed units of capacity, length, weight, and time. ● Solve multi-step measurement word problems. Investigation of Measurements Expressed as Mixed Numbers ● Use measurement tools to convert mixed number measurements to smaller units. ● Solve multi-step word problems involving converting mixed number measurements to a single unit Year in Review ● Create and determine the area of composite figures. ● Practice and solidify Grade 4 fluency and vocabulary.
Key Vocabulary:	New or Recently Introduced Terms ● cup ● customary system of measurement ● customary unit ● gallon ● metric system of measurement ● metric unit ● ounce ● pint ● pound ● quart Familiar Terms and Symbols ● capacity ● convert ● distance ● equivalent ● foot ● gram ● hour ● inch ● interval ● length ● liter ● measurement ● meter, centimeter, kilometer ● minute

	• mixed units • second • table • weight • yard See page 8 in manual for examples/definitions
Assessments	Exit Tickets for all lessons End-of-Module Assessment (End-of-Module Review available here – https://drive.google.com/file/d/1QzF09EzxezNCdzNbBN9s-z1lnB3tRdX/view?usp=sharing)
Resources and Differentiation Tools	Primary Resource: Eureka Module 7 Other Resources: Zearn Mission 7 (www.zearn.org) Embarc Module 7 (https://embarc.online/course/view.php?id=15) Number Talks 3 Act Math Tasks (How tall is Sam Houston? https://whenmathhappens.com/2014/02/14/sam-houston/) Tasks from Illustrative Math Tasks (Who is the tallest?) Inside Mathematics (Problem of the Month: Once Upon a Time (Level A-B)) ELL Overlay for Listening and Reading in Grades 3-5 Mathematics ELL Overlay for Speaking and Writing in Grades 3-5 Mathematics
Authentic Examples (real-world tasks)	Application Problems (specifically lessons 8 and 15)
Visual Representations & Strategies	Analog clock with second hand Balance scale with mass weights Beaker marked with mL and L Composite figure Digital scale (metric and customary units) Gallon, quart, pint, and cup containers Meter stick, yard stick, 12 inch ruler, centimeter ruler Number bond Number line Protractor Stopwatch Tape diagram Two column table
Writing in Math	End-of-Module Assessment Question 6d ("Does his strategy work? Why or why not?")
Culturally Responsive Activities	https://www.engageny.org/resource/grade-4-mathematics-module-7 (see the various language resources under "Downloadable Resources")

Grade Level DOK Examples	Grade 4 Sample DOK tasks
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[General Academic Vocabulary](#)