

**Chambersburg Area School District Mathematic Curriculum
Grade 5**

Grade 5 mathematics is about (1) developing fluency with addition and subtraction of fractions, and developing an understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to two-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume.

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 and Decimal Fractions	
Time Frame/Pacing	18 days • Can consolidate lessons 9 and 10 • Note: PA Standards only assess decimal operations to the hundredths (Problem sets in Lesson 11 - 15 may be modified to not include problems with thousandths or include them for students needing enrichment.)	
Big Ideas	• Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions. • Mathematical relationships among numbers can be represented, compared, and communicated. • Patterns exhibit relationships that can be extended, described, and generalized.	
Unit Essential Questions	• What makes a tool and/or strategy appropriate for a given task? • How is mathematics used to quantify, compare, represent, and model numbers? • How can data be organized and represented to provide insight into the relationship between quantities? • How can mathematics support effective communication? • How can recognizing repetition or regularity assist in solving problems more efficiently?	
PA Core Standards		PA Assessment Anchors
Understand the place value system. CC.2.1.5.B.1: Apply place value concepts to show an understanding of operations and rounding as they pertain to whole numbers and decimals.		M05.A-T.1.1 Demonstrate understanding of place-value of whole numbers and decimals, and compare quantities or magnitudes of numbers.
Perform operations with multi-digit whole numbers and with decimals to hundredths.		M05.A-T.2.1 Use whole numbers and decimals to compute accurately (straight computation or word problems).

CC.2.1.5.B.2: Extend an understanding of operations with whole numbers to perform operations including decimals. Convert like measurement units within a given measurement system. CC.2.4.5.A.1:Solve problems using conversions within a given measurement system.	
PA Eligible Content	● M05.A-T.1.1.1 Demonstrate an understanding that in a multi-digit number, a digit in one place represents 1/10 of what it represents in the place to its left. Example: Recognize that in the number 770, the 7 in the tens place is 1/10 the 7 in the hundreds place. ● M05.A-T.1.1.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. Example 1: $4 \times 102 = 400$ Example 2: $0.05 \div 103 = 0.00005$ ● M05.A-T.1.1.3 Read and write decimals to thousandths using base-ten numerals, word form, and expanded form. Example: $347.392 = 300 + 40 + 7 + 0.3 + 0.09 + 0.002 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (0.1) + 9 \times (0.01) + 2 \times (0.001)$ ● M05.A-T.1.1.4 Compare two decimals to thousandths based on meanings of the digits in each place using $>$, $=$, and $<$ symbols. ● M05.A-T.1.1.5 Round decimals to any place (limit rounding to ones, tenths, hundredths, or thousandths place). ● M05.A-T.2.1.1 Multiply multi-digit whole numbers (not to exceed three-digit by three-digit). ● M05.A-T.2.1.2 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors. ● M05.A-T.2.1.3 Add, subtract, multiply, and divide decimals to hundredths (no divisors with decimals).
Learning Objectives (Concepts Taught)	● Students understand the relationships between and among adjacent places on the place value chart to include the thousandths place. ● Students will perform decimal operations through the hundredths place.
Performance Objectives (Skills Demonstrated)	Topic A: Multiplicative Patterns on the Place Value Chart ● explore the multiplicative patterns of the base ten system ● problem solve with metric conversions Topic B: Decimal Fractions and Place Value Patterns ● name decimal fraction numbers in expanded, unit, and word forms ● use exponents and the unit fraction to represent expanded form ● compare decimals to the thousandths Topic C: Place Value and Rounding Decimal Fractions ● use a vertical number line to round decimals, then use approximation Topic D: Adding and Subtracting Decimals ● uses unit form to add/subtract decimals Topic E: Multiplying Decimals ● reason about multiplying a decimal times a one digit whole number Topic F: Dividing Decimals ● divide decimal numbers by one-digit whole numbers
Key Vocabulary	New or Recently Introduced Terms ● Exponent

	• Millimeter • Thousandths Familiar Terms and Symbols • $>$, $<$, $=$ • Base ten units • Bundling, making, renaming, changing, regrouping, trading • Centimeter • Digit • Expanded form • Hundredths • Number line • Number sentence • Place value • Standard form • Tenths • Unbundling, breaking, renaming, changing, regrouping, trading • Unit form • Word form
Assessments	• Exit tickets for lessons • Mid-module assessment • End-of-module assessment review - https://docs.google.com/document/d/1BqVKLTDviMbif0oZd77qQYAwKyR22g0sdlYp0lgzkt0/edit?usp=sharing • End-of-module assessment • Topic A Quiz - https://docs.google.com/document/d/1SA7-jBef8y-468xlUnZvZCiSRj4eckgb14PQ5ANq-3Y/edit?usp=sharing • Topic B Quiz - https://docs.google.com/document/d/15dpZEJSZpr6kFYmx5RDoSWHDkzWTAbvuTABbFzwdsk8/edit?usp=sharing • Topic C Quiz - https://docs.google.com/document/d/1vFhzmLwMGQ4N1fn1qXw01Zalk4F8bHWDBKVCOrb4pfU/edit?usp=sharing • Topic D Quiz - https://docs.google.com/document/d/1RX-zsMSXmYHhS31Ak_DwW1Zu9SkhXJyOm0DGwQfBhsM/edit?usp=sharing • Topic E Quiz - https://docs.google.com/document/d/1VVE2ZdpQkFKOT9L-6ftnwX2tpaoABJCHnLCnnRzRbw/edit?usp=sharing • Topic F Quiz - https://docs.google.com/document/d/1knqBbeLyuQFW7vDJOv-zWC7QoHa0F6AeWNhPPbwNYss/edit?usp=sharing
Resources and Differentiation Tools	• https://whenmathhappens.com/2015/02/25/kerbey-lane-part-2/ • https://whenmathhappens.com/2015/10/05/cups/ • https://gfletchy.com/final-lap/ • https://gfletchy.com/chasing-gold/ • https://www.k-5mathteachingresources.com/support-files/place-value-concentration.pdf - place value concentration (10 times greater/less) • https://tasks.illustrativemathematics.org/content-standards/5/NBT/A • http://www.openmiddle.com/rounding-decimals/ 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 ○ TM pg. 37 ○ TM pg. 77
Visual Representations & Strategies	● Number Lines ● Place value charts ● Place value disks ● Tape diagrams ● Meter stick
Writing in Math	Use these to <u>practice</u> writing in math: ● Lesson 1 homework - question 5 ● Lesson 2 homework - question 4 (Change to “Use a place value chart to show your answer, then explain the shift in the digits.”) ● Lesson 4 homework - question 5 ● Lesson 6 homework - question 4 ● Lesson 13 homework - question 4 Common assessment - Use question #1 on End-of-Module assessment.
Grade Level DOK Examples	Grade 5 DOK Sample Problems

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Grade 5**

Grade 5 mathematics is about (1) developing fluency with addition and subtraction of fractions, and developing an understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to two-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume.

Standards for Mathematical Practice

9. Make sense of problems and persevere in solving them.
10. Reason abstractly and quantitatively.
11. Construct viable arguments and critique the reasoning of others.
12. Model with mathematics.
13. Use appropriate tools strategically.
14. Attend to precision.
15. Look for and make use of structure.
16. Look for and makes sense of regularity in repeated reasoning.

Unit of Study	Unit 2: Multi-Digit Whole Numbers and Decimal Fraction Operations	
Time Frame/Pacing	28 days	- Consider consolidating lessons 5 and 6, 7 and 8, and 11 and 12 - In lesson 5, omit problem 1 of concept development and move directly into renaming with the algorithm after problem 2 - It is <u>not</u> recommended to eliminate any lesson from Topic D because it's foundational for later in the year
Big Ideas		- Patterns exhibit relationships that can be extended, described, and generalized. - Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.
Unit Essential Questions		- How can patterns be used to describe relationships in mathematical situations? - How can recognizing repetition or regularity assist in solving problems more efficiently? - What does it mean to estimate or analyze numerical quantities? - When is it appropriate to estimate versus calculate? - What makes a tool and/or strategy appropriate for a given task?
PA Core Standards		PA Assessment Anchors
Write and interpret numerical expressions. CC.2.2.5.A.1: Interpret and evaluate numerical expressions using order of operations.		M05.A-T.2.1 Use whole numbers and decimals to compute accurately (straight computation or word problems).
Understand the place value system.		M05.B-O.1.1 Analyze and complete calculations by applying the order of operations.

CC.2.1.5.B.1: Apply place value concepts to show an understanding of operations and rounding as they pertain to whole numbers and decimals. Perform operations with multi-digit whole numbers and with decimals to hundredths. CC.2.1.5.B.2: Extend an understanding of operations with whole numbers to perform operations including decimals. Convert like measurement units within a given measurement system. CC.2.4.5.A.1: Solve problems using conversions within a given measurement system.	M05.D-M.1.1 Solve problems using simple conversions (may include multistep, real-world problems).
PA Eligible Content	• M05.A-T.2.1.1 Multiply multi-digit whole numbers (not to exceed three-digit by three-digit). • M05.A-T.2.1.2 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors. • M05.A-T.2.1.3 Add, subtract, multiply, and divide decimals to hundredths (no divisors with decimals). • M05.B-O.1.1.1 Use multiple grouping symbols (parentheses, brackets, or braces) in numerical expressions and evaluate expressions containing these symbols. • M05.B-O.1.1.2 Write simple expressions that model calculations with numbers and interpret numerical expressions without evaluating them. Example 1: Express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$. Example 2: Recognize that $3 \times (18,932 + 921)$ is three times as large as $18,932 + 921$ without having to calculate the indicated sum or product. • M05.D-M.1.1.1 Convert between different-sized measurement units within a given measurement system. A table of equivalencies will be provided. Example: Convert 5 cm to meters.
Learning Objectives (Concepts Taught)	• Students apply the patterns of the base 10 system to mental strategies and the multiplication and division algorithms.
Performance Objectives (Skills Demonstrated)	Topic A: Mental Strategies for Multi-Digit Whole Number Multiplication • Model multi-digit multiplication of place value units using discs • Round factors and discuss reasonableness of their products • Evaluate and write simple expressions using the associative property and parentheses Topic B: The Standard Algorithm for Multi-Digit Whole Number Multiplication • Use area models to show place value understanding of the distributive property Topic C: Decimal Multi-Digit Multiplication • Use place value to multiply decimals Topic D: Measurement Word Problems with Whole Number and Decimal Multiplication • Express equivalent equivalent measures through multiplication Topic E: Mental Strategies for Multi-Digit Whole Number Division • Use place value discs to divide multi-digit whole numbers Topic F: Partial Quotients and Multi-Digit Whole Number Division • Divide multi-digit dividends by 2-digit divisors using standard algorithm Topic G: Partial Quotients and Multi-Digit Decimal Division • Divide decimals by 2-digit divisors Topic H: Measurement Word Problems with Multi-Digit Division • Solve multi-step word problems using multi-digit division

Key Vocabulary	New or Recently Introduced Terms • conversion factor • decimal fraction • multiplier • parentheses Similar Terms and Symbols • decimal • digit • divisor • equation • equivalence • equivalent measures • estimate • exponent • multiple • pattern • product • quotient • remainder • renaming • rounding • unit form
Assessments	• Exit tickets for lessons • Mid-module assessment review - https://drive.google.com/file/d/0Bze4eU0rInwwWFUzdjN4ZDFjR2s/view?usp=sharing • Mid-module assessment • End-of-module assessment review - https://drive.google.com/file/d/0Bze4eU0rInwwWTFRZzBIRWVwMGs/view?usp=sharing • End-of-module assessment • Topic A Quiz - https://docs.google.com/document/d/1TcyNH3dG1uq6VfWgJ5Sraw9G-b4HhalTVyA5Jl1O-_M/edit?usp=sharing • Topic B Quiz - https://docs.google.com/document/d/1WGHQI3fg6haiTYpSjOO2urg3UXNVLvsPocOMi1o-r8 • Topic C Quiz - https://docs.google.com/document/d/1ZHNavs2OcOhAefGKzxm3lt2D60f28OcypauGclORwBQ/edit?usp=sharing • Topic D Quiz - https://docs.google.com/document/d/1UFbCbKT2F1jyUMhf5DQUCCQvBMCN5W5Om aeWm2Gnv0kw/edit?usp=sharing • Topic E Quiz - https://docs.google.com/document/d/1cAtstipZpImZedY-b5rHA6ZeJdvURQb9sFQbAB-Any0/edit?usp=sharing • Topic F Quiz - https://docs.google.com/document/d/1IfIEQECwFT1SkMO7ccxQf08ZaJzkW50HQ0cLYXYPurw/edit?usp=sharing • Topic G Quiz - https://docs.google.com/document/d/1Chwxq1YoEhkimFKd1xZ3TU7-b0uL82hRHPfdUC21Ago/edit?usp=sharing

	• Topic H - Quiz - https://docs.google.com/document/d/17gvNjjLSkeXPVZJ7aiQwmj3XgTnMFs6xZ98q48uAZPM/edit?usp=sharing
Resources and Differentiation Tools	• https://gfletchy.com/let-it-flow/ • https://whenmathhappens.com/2015/01/09/kerbey-lane/ • https://whenmathhappens.com/2014/02/14/sam-houston/ • https://tasks.illustrativemathematics.org/5.OA • https://www.k-5mathteachingresources.com/support-files/equivalent-expressions-match.pdf - (game) - match expressions to words • https://tasks.illustrativemathematics.org/content-standards/5/MD/A • https://tasks.illustrativemathematics.org/content-standards/5/G/B • http://www.openmiddle.com/decimal-addition-3/ • http://www.openmiddle.com/subtracting-decimals-to-make-them-as-close-to-one-as-possible/ • http://www.wouldyourathermath.com/cookies/ • http://www.wouldyourathermath.com/birthday-cake/ • https://www.youtube.com/watch?time_continue=126&v=-IIVhDFuCAAs - 2 min tutorial on translating words to numerical expressions 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 ○ TM pg. 57 ○ TM pg. 82 ○ TM pg. 135 ○ TM pg. 258
Visual Representations & Strategies	• Area models (including arrays) • Number bond • Place value disks • Meter stick
Writing in Math	Use these to <u>practice</u> writing in math: • Lesson 2 homework - question 3 • Lesson 3 homework - question 4a • Lesson 8 homework - question 2 • Lesson 10 problem set - question 3 • Lesson 17 homework - question 3 Common assessment - Use question #2 (a and b) from End-of-Module assessment.
Grade Level DOK Examples	Grade 5 DOK Sample Problems

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Standards for Mathematical Practice

17. Make sense of problems and persevere in solving them.
18. Reason abstractly and quantitatively.
19. Construct viable arguments and critique the reasoning of others.
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21. Use appropriate tools strategically.
22. Attend to precision.
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24. Look for and makes sense of regularity in repeated reasoning.

Unit of Study		Unit 3: Addition and Subtraction of Fractions	
Time Frame/Pacing	17 days	• Omit Lesson 2 (Grade 4 standard) • In Lesson 3, omit the paper folding exercise • In Lesson 15, choose 2-3 problems and use the remainder as future application problems • Consider omitting Lesson 16 and use it for early finishers	
Big Ideas		• Patterns exhibit relationships that can be extended, described, and generalized. • Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.	
Unit Essential Questions		• How can patterns be used to describe relationships in mathematical situations? • How can recognizing repetition or regularity assist in solving problems more efficiently? • What does it mean to estimate or analyze numerical quantities? • When is it appropriate to estimate versus calculate? • What makes a tool and/or strategy appropriate for a given task?	
		PA Core Standards	PA Assessment Anchors
		Use equivalent fractions as a strategy to add and subtract fractions. CC.2.1.5.C.1 - Use the understanding of equivalency to add and subtract fractions.	M05.A-F.1.1 Solve addition and subtraction problems involving fractions (straight computation or word problems using equivalent fractions).
PA Eligible Content		• M05.A-F.1.1.1 Add and subtract fractions (including mixed numbers) with unlike denominators. (May include multiple methods and representations.) Example: $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$	

Learning Objectives (Concepts Taught)	Students will show addition and subtraction of fractions.
Performance Objectives (Skills Demonstrated)	Topic A: Equivalent Fractions - Find equivalent fractions with area model, number line, and numbers Topic B: Making Like Units Pictorially - add and subtract fractions with unlike denominators (using rectangular fraction model) Topic C: Making Like Units Numerically - add and subtract fractions using the number line Topic D: Further Applications - Solve multi-term problems and assess reasonableness of their solutions
Key Vocabulary	New or Recently Introduced Terms - Benchmark fraction - Like denominators - Unlike denominators Familiar Terms and Symbols - between - denominator - equivalent fractions - fraction - fraction greater than or equal to 1 - fraction written in the largest possible unit - fractional unit - hundredth - Kilometer, meter, centimeter, liter, milliliter, kilogram, gram, mile, yard, foot, inch, gallon, quart, pint, cup, pound, ounce, hour, minute, second - more than halfway and less than halfway - number sentence - numerator - one tenth of - tenth - whole unit $<$, $>$, $=$
Assessments	- Exit tickets for lessons - Mid-module review - https://drive.google.com/file/d/0Bze4eU0rInwwd2VZbVdmWXZQbjg/view?usp=sharing - Mid-module assessment - End-of-module assessment review - https://drive.google.com/file/d/0Bze4eU0rInwwbkg3N2l4U3FHTm8/view?usp=sharing - End-of-module assessment - Topic A Quiz - https://docs.google.com/document/d/1oyDdqXEJ7VE9VhbnhgeD2F5vmEilxcM9lq2MUz_ou5I/edit - Topic B Quiz - https://docs.google.com/document/d/1sl-iqGBxC6Q6lZK_7SwEj3iwlTUvMPrb5cBI5Jc_bKk/edit - Topic C Quiz - https://docs.google.com/document/d/1sf6VP2x5ldP7EPQhyqS39pSq9gyUxg5_nBKZ_LENDag/edit

	• Topic D Quiz - https://docs.google.com/document/d/1C5iNmtKPO4abxK9dwD_f74Zu2RBetK4iV17-CtBwXJY/edit
Resources and Differentiation Tools	• https://tasks.illustrativemathematics.org/content-standards/5/NF/A • https://tasks.illustrativemathematics.org/content-standards/5/NF/A/2 • http://www.openmiddle.com/adding-fractions-7/ • http://www.openmiddle.com/adding-fractions-6/ • http://www.openmiddle.com/adding-mixed-numbers-3/ • http://www.openmiddle.com/subtracting-mixed-numbers-2/ 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 ○ TM pg. 27 ○ TM pg. 60 ○ TM pg. 144 ○ TM pg. 176
Visual Representations & Strategies	• Fractions strips • Number line • Paper strips • Rectangular fraction model • Tape diagrams • Fraction strips
Writing in Math	Use these to <u>practice</u> writing in math: • Lesson 5 problem set - question 3 • Lesson 13 problem set - (Prove their answer is correct in words.) Common assessment - Use question #17 from Math item sampler. Grade 5 PSSA Math item Sampler
Grade Level DOK Examples	Grade 5 DOK Sample Problems

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Standards for Mathematical Practice

- 25. Make sense of problems and persevere in solving them.
- 26. Reason abstractly and quantitatively.
- 27. Construct viable arguments and critique the reasoning of others.
- 28. Model with mathematics.
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Unit of Study	Unit 4: Multiplication and Division of Fractions and Decimal Fractions	
Time Frame/Pacing	32 days - Consider omitting Lesson 4 - Consider omitting Lesson 11 but use problems 4 and 5 as an extension in Lesson 12 - Consider omitting Lessons 21 and 28	
Big Ideas	- Patterns exhibit relationships that can be extended, described, and generalized. - Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations	
Unit Essential Questions	- How can patterns be used to describe relationships in mathematical situations? - How can recognizing repetition or regularity assist in solving problems more efficiently? - How are relationships represented mathematically? - How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?	
PA Core Standards		PA Assessment Anchors
Write and interpret numerical expressions. CC.2.2.5.A.1: Interpret and evaluate numerical expressions using order of operations.		M05.A-F.2.1 Solve multiplication and division problems involving fractions and whole numbers (straight computation or word problems). M05.D-M.1.1 Solve problems using simple conversions (may include multistep, real-world problems).

CC.2.1.5.B.2: Extend an understanding of operations with whole numbers to perform operations including decimals. Apply and extend previous understandings of multiplication and division to multiply and divide fractions. CC.2.1.5.C.2: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. Convert like measurements within a given measurement system. CC.2.4.5.A.1: Solve problems using conversions within a given measurement system. Represent and interpret data. CC.2.4.5.A.4: Solve problems involving computation of fractions using information provided in a line plot. CC.2.4.5.A.2: Represent and interpret data using appropriate scale.	M05.D-M.2.1 Organize, display, and answer questions based on data.
PA Eligible Content	• M05.A-F.2.1.1 Solve word problems involving division of whole numbers leading to answers in the form of fractions (including mixed numbers). • M05.A-F.2.1.2 Multiply a fraction (including mixed numbers) by a fraction. • M05.A-F.2.1.3 Demonstrate an understanding of multiplication as scaling (resizing). Example 1: Comparing the size of a product to the size of one factor on the basis of the size of the other factor without performing the indicated multiplication. Example 2: Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number. • M05.A-F.2.1.4 Divide unit fractions by whole numbers and whole numbers by unit fractions. • M05.D-M.1.1.1 Convert between different-sized measurement units within a given measurement system. A table of equivalencies will be provided. Example: Convert 5 cm to meters. • M05.D-M.2.1.1 Solve problems involving computation of fractions by using information presented in line plots. • M05.D-M.2.1.2 Display and interpret data shown in tallies, tables, charts, pictographs, bar graphs, and line graphs, and use a title, appropriate scale, and labels. A grid will be provided to display data on bar graphs or line graphs.
Learning Objectives (Concepts Taught)	• Students will multiply and divide fractions and decimal fractions.
Performance Objectives (Skills Demonstrated)	Topic A: Line Plots of Fraction Measurements • Construct and compare line plots (using measurement to the $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$ inch) Topic B: Fractions as Division • Interpret fractions as division • Interpret remainders as fractions • Solve real world problems and generate story contexts Topic C: Multiplication of a Whole Number by a Fraction • Interpret finding a fraction of a set as multiplication of a whole number by a fraction

	- Find a fraction of a measurement (measurement conversions) Topic D: Fraction Expressions and Word Problems - Evaluate and interpret numerical expressions with parentheses Topic E: Multiplication of a Fraction by a Fraction - Use area models, arrays, and tape diagrams to model multiplication of fractions times fractions Topic F: Multiplication with Fractions and Decimals as Scaling and Word Problems - Reason about scaling (understanding the product to the size of one factor when given the size of the other factor without solving) - Convert between fraction and fraction decimals Topic G: Division of Fractions and Decimal Fractions - Use tape diagrams and number lines to reason about division about a whole number by a unit fraction and a unit fraction by a whole number Topic H: Interpretation of Numerical Expressions - Evaluate fraction by fraction multiplication expressions - Create and solve word problems involving both multiplication and division of fractions and decimal fractions
Key Vocabulary	New or Recently Introduced Terms - decimal divisor - simplify Familiar Terms and Symbols - commutative property - conversion factor - decimal fraction - denominator - distribute - divide, division - equation - equivalent fraction - expression - factors - Foot, mile, yard, inch, gallon, quart, pint, cup, pound, ounce, hour, minute, second - Fraction greater than or equal to 1 - hundredth - line plot - mixed number - numerator - parentheses - quotient - tape diagram - tenth - unit - unknown - whole unit
Assessments	- Exit tickets for lessons - Mid-module assessment review - https://drive.google.com/file/d/0Bze4eU0rInwwN2drUUNqMWZfMWc/view?usp=sharing - Mid-module assessment

	• End-of-module assessment review - https://docs.google.com/document/d/1QYue3_wSX5YflAPgx48s1uDAg0LeS8y7pLKEvPoeWSM/edit?usp=sharing • End-of-module assessment • Topic A Quiz - https://docs.google.com/document/d/1oAHl0fgA-hjSVH61rAgdBZXaaenGulau6QyFvLiK_1c/edit?usp=sharing • Topic B Quiz - https://docs.google.com/document/d/18lP3PedKa0tEAfFiDVXaelOSZqfLnPxGoVVK-l_n_9D8/edit?usp=sharing • Topic C Quiz - https://docs.google.com/document/d/1Y_Z-D1QrOPXFZ_-8nbNr0eDpMMX8UpjPOXE33_yYNdo/edit?usp=sharing • Topic D Quiz - https://docs.google.com/document/d/1hDcS-J8owCSlueRqlrkD6Bc6ccIpGN45SPunmKMmswA/edit?usp=sharing • Topic E Quiz - https://docs.google.com/document/d/1UA20hul-Jhn8PD4I3ict7f74dTf_6rDXTBRwpwr0fbE/edit?usp=sharing • Topic F Quiz - https://docs.google.com/document/d/1yRTVPQua_NkNVy3FP8wzTcUxfaDTSrQA_9bd8a9iNyw/edit?usp=sharing • Topic G Quiz - https://docs.google.com/document/d/1le9Ig55hWz7z3oNyW2eNi_19F30qwk53snIDGH8XFck/edit?usp=sharing • Topic H Quiz - https://docs.google.com/document/d/1s8P8DJ6UDyC64vXQWTrTmBkxepVodk2mEH_1PQNiRVk/edit?usp=sharing
Resources and Differentiation Tools	• https://gfletchy.com/the-nectarine/ • https://gfletchy.com/how-much-dew/ • https://gfletchy.com/the-big-pad/ • https://gfletchy.com/hanging-by-a-hair/ • https://gfletchy.com/straighten-up/ • https://gfletchy.com/tomato-tomato/ • https://gfletchy.com/gassed/ • https://gfletchy.com/sugar-cubes/ • https://whenmathhappens.com/2015/07/20/52-card-pickup/ • https://whenmathhappens.com/2014/04/17/paul-sturgess/ • https://whenmathhappens.com/2014/04/14/crane-rescue/ • https://whenmathhappens.com/2014/03/03/pop-top/ • https://tasks.illustrativemathematics.org/content-standards/5/NBT/B • https://tasks.illustrativemathematics.org/content-standards/5/MD/B • http://www.openmiddle.com/fraction-multiplication-equal-to-1/ 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 ○ TM pg. 142 ○ TM pg. 114 ○ TM pg. 300

Visual Representations & Strategies	• Area models • Number lines • Tape diagrams
Writing in Math	Common assessment - Use question #5 from the End-Of-Module Assessment
Grade Level DOK Examples	Grade 5 DOK Sample Problems

**Chambersburg Area School District Mathematic Curriculum
Grade 5**

Grade 5 mathematics is about (1) developing fluency with addition and subtraction of fractions, and developing an understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to two-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume.

Standards for Mathematical Practice

- 33. Make sense of problems and persevere in solving them.
- 34. Reason abstractly and quantitatively.
- 35. Construct viable arguments and critique the reasoning of others.
- 36. Model with mathematics.
- 37. Use appropriate tools strategically.
- 38. Attend to precision.
- 39. Look for and make use of structure.
- 40. Look for and makes sense of regularity in repeated reasoning.

Unit of Study	Unit 5 - Addition and Multiplication with Volume and Area	
Time Frame/Pacing	20 days - Consider omitting lessons 8 and 9 (use as enrichment if time) - Lessons 14 and 15 can be consolidated (they share the same objective) - use problems 1-2 from each lesson - Consider omitting Lesson 21 (possibly use as a center or morning work)	
Big Ideas	- Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization. - 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 patterns be used to describe relationships in mathematical situations? - How can recognizing repetition or regularity assist in solving problems more efficiently?	
PA Core Standards		PA Assessment Anchors
Apply and extend previous understandings of multiplication and division to multiply and divide fractions.		M05.C-G.2.1 Use basic properties to classify two-dimensional figures. M05.D-M.3.1 Use, describe, and develop procedures to solve problems involving volume.

CC.2.1.5.C.2: Apply and extend previous understanding of multiplication and division to multiply and divide fractions. Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. CC.2.4.5.A.6: Apply concepts of volume to solve problems and relate volume to multiplication and to addition. Classify two-dimensional figures into categories based on their properties. CC.2.3.5.A.2: Classify two-dimensional figures into categories based on an understanding of their properties.	
PA Eligible Content	● M05.C-G.2.1.1 Classify two-dimensional figures in a hierarchy based on properties. Example 1: All polygons have at least three sides, and pentagons are polygons, so all pentagons have at least three sides. Example 2: A rectangle is a parallelogram, which is a quadrilateral, which is a polygon; so, a rectangle can be classified as a parallelogram. ● M05.D-M.3.1.1 Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real-world and mathematical problems. Formulas will be provided. ● M05.D-M.3.1.2 Find volumes of solid figures composed of two non-overlapping right rectangular prisms.
Learning Objectives (Concepts Taught)	● Students will learn volume with the use of cubic units and the formula for volume. ● Students will determine area of rectangular figures with fractional side lengths. ● Students will construct and classify two-dimensional figures based on their attributes. ●
Performance Objectives (Skills Demonstrated)	Topic A: Concepts of Volume ● Determine volume by building and counting unit cubes ● Compose and decompose right rectangular prisms using layers ● Make connections between area and volume Topic B: Volume and the Operations of Multiplication and Addition ● Use multiplication to calculate volume (using the different formulas) ● Find the total volume of solid figures composed of two non-overlapping rectangular prisms ● Solve word problems involving volume of rectangular prisms Topic C: Area of Rectangular Figures with Fractional Side Lengths ● Construct and measure rectangles with fractional side lengths and find their area ● Solve real world problems involving area of figures with fractional side lengths Topic D: Drawing, Analysis, and Classification of Two-Dimensional Shapes ● Draw two-dimensional shapes to analyze their attributes and use the attributes to classify them
Key Vocabulary	New or Recently Introduced Terms ● base ● bisect ● cubic units ● height

	● hierarchy ● unit cube ● volume of a solid Familiar Terms and Symbols ● angle ● area ● attribute ● cube ● degree measure of an angle ● face ● kite ● parallel lines ● parallelogram ● perpendicular ● perpendicular bisector ● plane ● polygon ● quadrilateral ● rectangle ● rectangular prism ● rhombus ● right angle ● right rectangular prism ● solid figure ● square units ● three-dimensional figures ● trapezoid ● two-dimensional figures
Assessments	● Exit tickets for lessons ● Mid-module assessment review - https://docs.google.com/document/d/1JB4JSekjUMrnPmOG42hGUU4gd00RsI2iZUnbJToCHr4/edit?usp=sharing ● Mid-module assessment ● End-of-module assessment review - https://docs.google.com/document/d/1OyfCiwZXySG8yxr4JelkZKXBw5es803d6VVGU6dI_KA/edit?usp=sharing ● End-of-module assessment ● Topic A Quiz - https://docs.google.com/document/d/1e6h4zwsaCOXK6Cju3bT4nBoXssThC5Vk-t71ikVcHYM/edit?usp=sharing ● Topic B Quiz - https://docs.google.com/document/d/1TVerjW69-QHWkvyEGfXOcz8u2QVicAGF4Agd26cL5UE/edit?usp=sharing ● Topic C Quiz - https://docs.google.com/document/d/1pgEgwVE7g67B_YVU3RHnyElXZ004YCRYGiruW7HFIyU/edit?usp=sharing ● Topic D Quiz - https://docs.google.com/document/d/1gMy9UUGkpfYAHoXVSBf-3BVkOB7IhLKftNkQDySPnc8/edit?usp=sharing
Resources and Differentiation Tools	● Protractor ● Ruler ● Set square/Corner of index card or paper

	• Tape diagrams • https://buildingmathematicians.wordpress.com/2018/03/08/zukey-puzzles/ - drawing polygons • https://us-school.pearsoned.com/school/d3b2209a-07e4-420a-8f0e-7928f0b4ef54/D0679169/player.html - Guess My Rule (online game) • https://gfletchy.com/got-cubes/ • https://gfletchy.com/packing-sugar/ • https://gfletchy.com/overflow/ • https://gfletchy.com/the-fish-tank/ • https://tasks.illustrativemathematics.org/content-standards/5/MD/C • http://www.openmiddle.com/volume-of-rectangular-prisms/ • http://www.openmiddle.com/volume/ 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 ○ TM pg. 28 ○ TM pg. 141 ○ TM pg. 84 ○ TM pg. 284
Visual Representations & Strategies	• Area model • Centimeter cubes • Centimeter grid paper • Isometric dot paper • Patty paper • Protractor • Ruler • Set square or right angle template • Tape diagram • Power polygons
Writing in Math	Common Assessment- End-of-Module Assessment question #5
Grade Level DOK Examples	Grade 5 DOK Sample Problems

**Chambersburg Area School District Mathematic Curriculum
Grade 5**

Grade 5 mathematics is about (1) developing fluency with addition and subtraction of fractions, and developing an understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to two-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume.

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Unit of Study	Unit 6: Problem Solving with the Coordinate Plane	
Time Frame/Pacing	38 days	• Lesson 5 and 6 can be consolidated • Lessons 11 and 12 can be omitted
Big Ideas		• Patterns exhibit relationships that can be extended, described, and generalized. • Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations. • Data can be modeled and used to make inferences. • How does the type of data influence the choice of display? • How can probability and data analysis be used to make predictions?
Unit Essential Questions		• How can patterns be used to describe relationships in mathematical situations? • How can recognizing repetition or regularity assist in solving problems more efficiently? • How are relationships represented mathematically? • How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations? • How does the type of data influence the choice of display? • How can probability and data analysis be used to make predictions?
PA Core Standards		PA Assessment Anchors
Write and interpret numerical expressions. CC.2.2.5.A.1: Interpret and evaluate numerical expressions using order of operations. Analyze patterns and relationships. CC.2.2.5.A.4: Analyze patterns using two rules.		M05.B-O.1.1 Analyze and complete calculations by applying the order of operations. M05.B-O.2.1 Create, extend, and analyze patterns. M05.C-G.1.1 Identify parts of a coordinate grid and describe or interpret points given an ordered pair.

Graph points on the coordinate plane to solve real-world and mathematical problems. CC.2.3.5.A.1: Graph points in the first quadrant on the coordinate plane and interpret these points when solving real world and mathematical problems.	
PA Eligible Content	• M05.B-O.1.1.1 Use multiple grouping symbols (parentheses, brackets, or braces) in numerical expressions and evaluate expressions containing these symbols. • M05.B-O.1.1.2 Write simple expressions that model calculations with numbers and interpret numerical expressions without evaluating them. Example 1: Express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$. Example 2: Recognize that $3 \times (18,932 + 921)$ is three times as large as $18,932 + 921$ without having to calculate the indicated sum or product • M05.B-O.2.1.1 Generate two numerical patterns using two given rules. Example: Given the rule “add 3” and the starting number 0 and given the rule “add 6” and the starting number 0, generate terms in the resulting sequences. • M05.B-O.2.1.2 Identify apparent relationships between corresponding terms of two patterns with the same starting numbers that follow different rules. Example: Given two patterns in which the first pattern follows the rule “add 8” and the second pattern follows the rule “add 2,” observe that the terms in the first pattern are 4 times the size of the terms in the second pattern. • M05.C-G.1.1.1 Identify parts of the coordinate plane (x-axis, y-axis, and the origin) and the ordered pair (x-coordinate and y-coordinate). Limit the coordinate plane to quadrant I. • M05.C-G.1.1.2 Represent real-world and mathematical problems by plotting points in quadrant I of the coordinate plane and interpret coordinate values of points in the context of the situation.
Learning Objectives (Concepts Taught)	• Students will develop a coordinate system for the first quadrant of the coordinate plane and use it to solve problems. • Students will use the coordinate system to explore relationships between points, ordered pairs, patterns, lines, and the rules that generate them. • Students will explore the coordinate plane in real-world applications.
Performance Objectives (Skills Demonstrated)	Topic A: Coordinate Systems • Construct number lines in various orientations on a plane • Describe points using coordinate pairs • Investigate patterns in coordinate pairs and parallel lines Topic B: Patterns in the Coordinate Plane and Graphing Number • Plot points and use the points to draw lines • Use given rules to generate coordinate pairs, plot points, and investigate relationships • Analyze patterns among lines Topic C: Drawing Figures in the Coordinate Plane • Draw figures in the coordinate plane by plotting points • Reason about relationships among coordinate pairs Topic D: Problem Solving in the Coordinate Plane • Draw symmetric figures in the coordinate plane • Use coordinate planes to solve real world problems Topic E: Multi-Step Word Problems • Apply concepts learned throughout the year to do multi-step word problems Topic F: The Years In Review: A Reflection on A Story of Units • Reflect on their learning throughout the elementary years

Key Vocabulary	New or Recently Introduced Terms • axis • coordinate • coordinate pair • coordinate plane • ordered pair • origin • quadrant Familiar Terms and Symbols • angle • angle measure • degree • horizontal • line • parallel line • perpendicular line • point • rule • vertical
Assessments	• Exit tickets for lessons • Mid-module assessment review - https://docs.google.com/document/d/1rEUOpsTUIJowSSZZue-EcpSF0gb0c3r7V92n5wt94aA/edit?usp=sharing • Mid-module assessment • End-of-module assessment review - https://drive.google.com/file/d/0Bze4eU0rInwwd2FWalA5T2RWMWc/view?usp=sharing • End-of-module assessment • Topic A Quiz - https://docs.google.com/document/d/1NVcyn_FMRV_xgSe7vxQ3HCsGe5S0YgxEQo4ATKqH8P4/edit?usp=sharing • Topic B Quiz - https://docs.google.com/document/d/1IRyCz0WSsXfwTm1VYX3hWPKHK4-WZJ6ydWdwlj0Q_IJA/edit?usp=sharing
Resources and Differentiation Tools	• https://www.k-5mathteachingresources.com/support-files/patterns-on-the-coordinate-plane.pdf - patterns with 2 rules and coordinate grid activities • https://tasks.illustrativemathematics.org/content-standards/5/G/A 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 ○ TM pg. 16 ○ TM pg. 29 ○ TM pg. 44 ○ TM pg. 59 End-Of-Module Assessment question #4
Visual Representations & Strategies	• Protractor • Ruler • Set Square/corner of index card or paper • Tape diagrams • Graph paper
Writing in Math	Common Assessment - End-of-Module Assessment questions 3f

Grade Level DOK Examples	Grade 5 DOK Sample Problems
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[General Academic Vocabulary](#)