TN State Standards in Mathematics - Grade 5

1st Nine Weeks

TN State Standards	Comments	Resources
5.NBT.A.1 **Recognize that in a multi--digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.** **Vocabulary:** base ten, place value, digit, period, whole number, standard form, word form, value, decimal, tenths, hundredths, thousandths	**5. NBT.A.1** This standard calls for students to reason about the magnitude of numbers. Students should work with the idea that the tens place is ten times as much as the ones place, and the ones place is 1/10th the size of the tens place. In fourth grade, students examined the relationships of the digits in numbers for whole numbers only. This standard extends this understanding to the relationship of decimal fractions. Students use place value charts, base ten blocks, pictures of base ten blocks, and interactive images of base ten blocks to manipulate and investigate the place value relationships. They use their understanding of unit fractions to compare decimal places and fractional language to describe those comparisons. **EngageNY- Module 1- Topic A- Lesson 1** **Example:** The 2 in the number 542 is different from the value of the 2 in 324. The 2 in 542 represents 2 ones or 2, while the 2 in 324 represents 2 tens or 20. Since the 2 in 324 is one place to the left of the 2 in 542 the value of the 2 is 10 times greater. Meanwhile, the 4 in 542 represents 4 tens or 40 and the 4 in 324 represents 4 ones or 4. Since the 4 in 324 is one place to the right of the 4 in 542 the value of the 4 in the number 324 is 1/10th of its value in the number 542. **Example:** Explain how and why the value of the number five changed in 6.52 X 10, 6.52 X100, 6.52 X 1,000 etc…… Students can demonstrate this using place value chart, base ten blocks, or other visual models. **Example:** A manufacturer made 7,234 boxes of coffee stirrers. Each box contains 1,000 stirrers. How many stirrers did they make? Explain your thinking, and include a statement of the solution.	**EnVision** **5.NBT.A.1, 5.NBT.A.2, 5.NBT.A.3**- 7-1, 7-5,1-3, 9-8, 9-9 **5.NBT.A.3, 5.NBT.A.4-** 1-4, 9-10 **5.NBT.B.7** Add decimals: 2-6 Subtract decimals: 2-7 Multiply decimals: 7-1,7-2,7-3,7-4 Divide decimals : 7-5, 7-6, 7-7, 7-8, 7-9, 14-4, 14-5 **5.MD.A.1**- 14-2, 14-5 **5.NBT.B.5, 5.NBT.B.6** - 3-4, 3-5, 3-6, 4-5, 4-6, 5-1, 5-2, 5-4, 5-5, 5-6 **5.OA.A.1, 5.OA.A.2**- 6-4, 6-5, 6-6a, 3-8, 6-1, 6-3 **TnCore Tasks and Task Arcs:** http://tncore.org/math/instructional_resources.aspx username: tneducation password: fastestimproving **Tasks:** **5.NBT.A.1**- Tree House Windows/Place Value Blocks **5.NBT.A.1, 5.NBT.B.7**- Place Value Game: Addition and Subtraction **Task Arcs:** **5.NBT.A.1, 5.NBT.A.2, 5.NBT.A.3, 5.NBT.A.4**- Place Value and Base Ten **5.NBT.B.5, 5.NBT.B.6, 5.NBT.7**- Decimal Operations: Multiplication and Division

5.NBT.A.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.** **Vocabulary:** product, decimal, decimal point, powers of ten, relationship, exponents, multiplication/multiply, division/divide, factor, multiple, base, exponential notation, expanded form, standard form,, dividend, divisor, quotient, value **5.NBT.A.3** **Read, write, and compare decimals to thousandths.** **a.** Read and write decimals to thousandths using base--ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000). **b.** Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. **Vocabulary:** decimals, tenths, hundredths, thousandths, expanded form, number names, base ten numerals, compare/comparison, equivalent, estimate symbols (>, =, and <)	**5. NBT.A.2** This standard includes multiplying by multiples of 10 and powers of 10. Students should have experiences working with connecting the pattern of the number of zeros in the product when you multiply by powers of 10. **EngageNY-Module 1-Topic A-Lesson 2-3** **Example:** $2.5 \times 10^3 = 2.5 \times (10 \times 10 \times 10) = 2.5 \times 1{,}000 = 2{,}500$ Students should reason that the exponent above the 10 indicates how many places the decimal point is moving (not just that the decimal point is moving but that you are multiplying or making the number 10 times greater three times) when you multiply by a power of 10. **Example:** Write the following in standard form (e.g., $4 \times 10^2 = 400$). **Example**: Janice thinks that 20 hundredths is equivalent to 2 thousandths because 20 hundreds is equal to 2 thousands. Use words and a place value chart to correct Janice's error. **5. NBT.A.3.a** This standard references expanded form of decimals with fractions included. Students should build on their work from Fourth Grade, where they worked with both decimals and fractions interchangeably. Expanded form is included to build upon work in 5.NBT.A.2 and deepen students' understanding of place value. Students build on the understanding they developed in fourth grade to read, write, and compare decimals to thousandths. They connect their prior experiences with using decimal notation for fractions and addition of fractions with denominators of 10 and 100. They use concrete models and number lines to extend this understanding to decimals to the thousandths. Models may include base ten blocks and place value charts. **EngageNY- Module1-Topic B- Lesson 5** **Example:** Some equivalent forms of 0.72 are: 72/100 7/10 + 2/100 7 x (1/10) + 2 x (1/100) 0.70 + 0.02 70/100	**Engage NY – This curriculum guide offers pacing, instructional strategies and language along with student work, student work samples, and tasks. EngageNY is referenced in the unpacking of each standard in the comments section of the pacing guide.** www.engageny.org **Module 1-Engage NY-** https://www.engageny.org/resource/grade-5-mathematics-module-1 **Topic A**- Place Value and Multiplicative Patterns (5.NBT.A.1, 5.NBT.A.2, 5.MD.A.1) **Topic B**- Read, Write, and Compare Decimals (5.NBT.A.3) **Topic C**- Place Value and Rounding Decimals (5.NBT.A.4) **Topic D** – Adding and Subtracting Decimals (5.NBT.B.7) **Topic E** – Multiplying Decimals (5.NBT.B.7) **Topic F**- Dividing Decimals (5.NBT.B.7) **Module 2- Engage NY** https://www.engageny.org/resource/grade-5-mathematics-module-2 **Topic A**- Multi-Digit Whole Number Multiplication (5.OA.A.1, 5.OA.A.2, 5.NBT.B.5) **Topic C**- Multiplying Decimals (5.NBT.B.7) **Topic D**- Metric Conversions with Multiplication and Division (5.NBT.B.5, 5.NBT.B.6, 5.MD.A.1)

5.MD.A.1 **Convert among different sized standard measurement units within a given measurement system (e.g., convert 5cm to 0.05m), and use these conversions in multi-step, real world problems.** **Vocabulary:** customary, metric, convert/conversion, (abbreviations for metric units) **5.NBT.A.4** **Use place value understanding to round decimals to any place.**	+ 2/100 0.720 7 x (1/10) + 2 x (1/100) + 0 x (1/1000) 720/1000 **Example**: Express 16 thousandths in expanded, written, standard, and unit form. **Example**: Mr. Pham wrote 2.619 on the board. Christy says it is two and six hundred nineteen thousandths. Amy says it is 2 ones 6 tenths 1 hundredth 9 thousandths. Who is right? Use words and numbers to explain your answer **5. NBT.A.3 b** Comparing decimals builds on work from fourth grade. **EngageNY- Module1-Topic B- Lesson 6** **Example**: Arrange the numbers in decreasing order- 7.608 7.68 7.6 7.068 or Compare 4.5 ___ 4.05 **5.MD.A.1** Students will need to first become familiar with the customary and metric system and units of measure for length, capacity, volume, and weight. The conversion of metric units is tied to powers of ten. Students should be able to use powers of ten to convert mm, cm, m, km, etc… **EngageNY- Module 1-Topic A- Lesson 4** **Example:** 4 centimeters to meters ____ cm = ____ m **Example**: The length of the bar for a high jump competition must always be 4.75 m. Express this measurement in millimeters. Explain your thinking. Include an equation with an exponent in your explanation. **5. NBT.A.4** This standard refers to rounding. Students should go beyond simply applying an algorithm or procedure for rounding. The expectation is that students have a deep understanding of place value and number sense and can explain and reason about the answers they get when they round. Students should	**Topic H** - Metric Conversions with Multiplication and Division (5.NBT.B.5, 5.NBT.B.6, 5.MD.A.1) **Topic F** – Multi-Digit Whole Number Division (5.NBT.B.6) **Topic G**- Dividing with Decimals (5.NBT.B.7)

Vocabulary: rounding, estimating, reasonable, number line, compare	have numerous experiences using a number line to support their work with rounding. When rounding a decimal to a given place, students may identify the two possible answers, and use their understanding of place value to compare the given number to the possible answers. **EngageNY- Module 1-Topic C-Lesson 7-8** **Example:** Round 14.235 to the nearest tenth. Students recognize that the possible answer must be in tenths thus, it is either 14.2 or 14.3. They then identify that 14.235 is closer to 14.2 (14.20) than to 14.3 (14.30).	
5.NBT.B.7 **Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.** **Vocabulary:** illustrate, relationship, reasoning, decimal place value, tenths, hundredths, concrete models, pictorial representation	**5. NBT.B.7** (Add and Subtract decimals) This standard builds on the work from fourth grade where students are introduced to decimals and compare them. In fifth grade, students begin **adding, subtracting**, multiplying and dividing decimals. This work should focus on concrete models and pictorial representations, rather than relying solely on the algorithm. This standard requires students to extend the models and strategies they developed for whole numbers in grades 1--4 to decimal values. Before students are asked to give exact answers, they should estimate answers based on their understanding of operations and the value of the numbers**. EngageNY-Module1-Topic D-Lesson 9-10** **Example:** 3.6 + 1.7 A student might estimate the sum to be larger than 5 because 3.6 is more than 3 ½ and 1.7 is more than1 ½. **Example**: 2 thousandths + 9 ones + 5 thousandths =	
5.OA.A.1 **Use parentheses, brackets, or braces in numerical expressions, and evaluate expression with these symbols.**	**5.OA.A.1** calls for students to evaluate expressions with parentheses ( ), brackets [ ] and braces { } using order of operations. In this unit, students evaluate and write simple expressions to record their calculations using the associative property and parentheses to record the	

Vocabulary: parentheses, brackets, braces, numerical expression, evaluate, algebraic expression, variable, order of operations, corresponding, sequence, term, pattern	relevant order of calculations. Students should be able to draw a model to represent the expression. **EngageNY- Module 2-Topic B-Lesson 3** Example: Solve 3(4 +7)= ; (30 × 2) + (8 × 2)=	
5.OA.A.2 **Write simple expressions that record calculation with numbers, and interpret numerical expression without evaluating them.** **Vocabulary:** parentheses, brackets, braces, numerical expression, evaluate, algebraic expression, variable, order of operations, corresponding, sequence, term, pattern, times, quotient, product, minus, added, sum	**5.OA.A.2** refers to expressions. Expressions are a series of numbers and symbols (+, -, x, ÷) without an equal sign. Equations result when two expressions are set equal to each other (2 + 3 = 4 + 1). Students should be able to write an expression to match a scenario or mathematical sentence. **EngageNY- Module 2-Topic B-Lesson 3** **Example:** Six times the sum of nine and five. 6(9+5) and demonstrate this as 6 groups of 9+5 or 6 groups of 14. **Example**: The sum of 3 sixteens and 2 nines= 3(16)+2(9)= **Example:** Write an expression for the steps "double five and then add 26. (2 x 5) + 26.	
5.NBT.B.5 **Fluently multiply multi--digit whole numbers using the standard algorithm.** **Vocabulary:** standard algorithm, strategies, decompose, recombine, array, area model, distributive property, identity property, associative property, communicative property, factor, product, multiple	**5. NBT.B.5** This standard refers to fluency which means students select and use a variety of methods and tools to multiply, including objects, mental computation, estimation, standard algorithm, distributive property, place value, area model, and paper and pencil. They are accurate and efficient (use a reasonable amount of steps), and flexible (use strategies such as the distributive property) or breaking numbers apart (decomposing and recomposing). While the standard algorithm is mentioned, alternative strategies are also appropriate to help students develop conceptual understanding. The size of the numbers should NOT exceed a three--digit factor by a two--digit factor. In the beginning of the unit, students need to understand the distributive property or mental computation by multiples of 10 Example- 3 X40, 30 X40, 30X400.	

5.NBT.B.6 **Find whole--number quotients of whole numbers with up to four--digit dividends and two--digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.** **Vocabulary:** distributive property, fluently, commutative property, associative property, identity property, zero property, (division/divide, dividend), estimate, reasoning, decompose, quotient, divisor, remainder, partition, partial product, repeated subtraction	Students should look for patterns in multiplication and build mental strategies to multiply familiar numbers. **EngageNY-Module 2-Lesson 1-2** helps to build beginning strategies for multiplication. **EngageNY-Module 2-Lessons 3-9**, work to build flexibility in multiplying using standard algorithm, place value, and area models. When students work to become fluent in multiplying whole numbers, students need to also multiply with decimals (See NBT.B.7) **Example**: see EngageNY- Module 2-Lessons 1-9 for multiple methods of instruction and student work samples. **5. NBT.B.6** This standard references various strategies for division. Division problems can include remainders. Even though this standard leans more towards computation, the connection to story contexts is critical. In fourth grade, students' experiences with division were limited to dividing by one--digit divisors. In fifth grade, students should work with both one-digit and two-digit divisors. When the two--digit divisor is a —familiar number, a student might decompose the dividend using place value/partial product division. Students should be able to reason about their answer using estimation. **EngageNY- Module 2-Topic E Lesson 16-18, Topic F- Lessons-19-23.** After students work to build fluency with division of whole numbers, students need to divide with decimals and in converting metric units (5.NBT.B.7, 5.MD.A.1). **Example:** There are 1,716 students participating in Field Day. They are put into teams of 16 for the competition. How many teams get created? If you have left over students, what do you do with them?	

5.NBT.B.7 **Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.** **Vocabulary**: divisor, quotient, remainder, partition, equal parts, strategies, equation, rectangular array, area models, relationship, reasoning, decimal place value, tenths, hundredths, concrete models, pictorial representation, product, factor, estimate	**5. NBT.7** (Multiply and Divide Decimals) In fifth grade, students begin adding, subtracting, **multiplying and dividing decimals**. This work should focus on concrete models and pictorial representations, rather than relying solely on the algorithm. This standard includes students' reasoning and explanations of how they use models, pictures, and strategies. Before students are asked to give exact answers, they should estimate answers based on their understanding of operations and the value of the numbers. **EngageNY-Module 2-Topic C- Lesson 10-12; Topic D-Lesson 13-15; Topic G-Lesson 24-27** **Example:** 2.3 X 5= solve using standard algorithm **Example**: 6 x 2.4 A student might estimate an answer between 12 and 18 since 6 x 2 is 12 and 6 x 3 is 18. Another student might give an estimate of a little less than 15 because she/he figures the answer to be very close, but smaller than 6 x 2 ½ and think of 2 ½ groups of 6 as 12 (2 groups of 6) + 3 (½ of a group of 6). **Example**: If 98 × 768 = 75,264 then 98 × 7.68 = students should use estimation and reasonableness to solve. **Example:** Edward bikes the same route to and from school each day. After 28 school days, he bikes a total distance of 389.2 miles. Estimate how many miles he bikes in one day. If Edward continues his routine of biking to school, about how many days altogether will it take him to reach a total distance of 500 miles?	

2nd Nine Weeks		
TN State Standards	**Comments**	**Resources**
5.NF.A.1 **Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)** **Vocabulary:** estimate mentally, reasonableness, visual fraction models, equation, represent, fractions, unlike and like denominators, mixed numbers, equivalent fractions, sum, difference, common denominator, visual fraction models, algorithms, simplest form/simplify, benchmark fraction, common multiple, least common multiple (LCM), least common denominator (LCD), prime number, proper fraction, improper fraction, numerator, denominator	**5.NF.A.1** This standard builds on the work in fourth grade where students add fractions with like denominators. In fifth grade, the example provided in the standard has students find a common denominator by finding the product of both denominators. For 1/3 + 1/6, a common denominator is 18, which is the product of 3 and 6. This process should be introduced using visual fraction models (area models, number lines, etc.) to build understanding before moving into the standard algorithm. Students should apply their understanding of equivalent fractions developed in fourth grade and their ability to rewrite fractions in an equivalent form to find common denominators. They should know that multiplying the denominators will always give a common denominator but may not result in the smallest denominator. **EngageNY-Module 3-Topics A-D-Lessons 1-16**	**Envision** **5.NF.B.1, 5.NF.B.2-** 9-3, 9-4, 9-7, 10-2 10-3, 10-4, 10-5, 10-6, 10-5a, 10-7a **5.NF.B.3, 5.NF.B.4**- 11-1, 11-2 **5.NF.B.7**- 11-5, 11-4 **5.MD.B.2**- 18-1 **TnCore Tasks and Task Arcs:** http://tncore.org/math/instructional_resources.aspx username: tneducation password: fastestimproving **Tasks:** **5.NF.A.1, 5.NF.A.2**- Apple Orchard **5.A.1, 5.NF.A.2** – Jenna's Homework **5.NF.B.3, 5.NF.B.7**- Picture Frames **5.NF.B.4**- Art **5.NF.B.4, 5.NF.B.6-** Sally's Garden **5.NF.B.5-** Scaling Points **Task Arcs:** **5.NF.B.4, 5.NF.B.5, 5.NF.B.6**- Multiplying with Fractions: Finding Portions of Numbers **EngageNY** www.engageny.org **Module 3-Engage NY-** **https://www.engageny.org/resource/grade-5-mathematics-module-3**
5.NF.A.2 **Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.** **Vocabulary:** number sense, estimate mentally, reasonableness, visual fraction models, equation, represent, fractions, unlike and like denominators, mixed numbers, equivalent fractions, sum, difference, common denominator, visual fraction models, algorithms, simplest form/simplify, benchmark fraction, common multiple, least common multiple (LCM), least	**5.NF.A.2** This standard refers to number sense, which means students' understanding of fractions as numbers that lie between whole numbers on a number line. Number sense in fractions also includes moving between decimals and fractions to find equivalents, also being able to use reasoning such as 7/8 is greater than3/4 because 7/8 is missing only 1/8 and 3/4 is missing 1/4 so 7/8 is closer to a whole. Also, students should use benchmark fractions to estimate and examine the reasonableness of their answers. **Example**: 5/8 is greater than 6/10 because 5/8 is 1/8 larger than ½ (4/8) and 6/10 is only 1/10 larger than 1/2 (5/10). **Example**: Your teacher gave you 1/7 of the bag of candy. She also gave your friend 1/3 of the bag of candy. If you and your friend combined your candy,	

common denominator (LCD), prime number, proper fraction, improper fraction, numerator, denominator	what fraction of the bag would you have? Estimate your answer and then calculate. How reasonable was your estimate? Student 1: 1/7 is really close to 0. 1/3 is larger than 1/7, but still less than 1/2. If we put them together we might get close to 1/2. 1/7 + 1/3= 3/21 + 7/21 = 10/21. The fraction does not simplify. I know that 10 is half of 20, so 10/21 is a little less than ½. Student 2: 1/7 is close to 1/6 but less than 1/6, and 1/3 is equivalent to 2/6, so I have a little less than 3/6 or ½. **EngageNY-Module 3-Topics B-D-Lessons 3-16; EngageNY-Module 6-Topic E-Lesson 21-25**	**Topic A**- Review of 4th grade Fractions and Equivalents (4.NF.1, 4.NF.3c, 4.NF.3d) **Topic B, Topic C, Topic D**- Adding and Subtracting Fractions (5.NF.A.1, 5.NF.A.2 **Module 4- Engage NY- https://www.engageny.org/resource/grade-5-mathematics-module-4**
5.NF.B.3 **Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?** **Vocabulary:** numerator, denominator, mixed number, quotient, visual fraction models, equation, interpret, assemble, resizing, scaling, reciprocal, simplify	**5.NF.B.3**- This standard calls for students to extend their work of partitioning a number line from third and fourth grade. Students need ample experiences to explore the concept that a fraction is a way to represent the division of two quantities. Students are expected to demonstrate their understanding using concrete materials, drawing models, and explaining their thinking when working with fractions in multiple contexts. They read 3/5 as —three fifths and after many experiences with sharing problems, learn that 3/5 can also be interpreted as —3 divided by 5. **EngageNY-Module 3-Topics A- Lesson 1-2; EngageNY-Module 4- Topic B-Lesson4-5; EngageNY-Module 6-Topic E-Lessons 21-25** **Examples:** Ten team members are sharing 3 boxes of cookies. How much of a box will each student get? When working this problem a student should recognize that the 3 boxes are being divided into 10 groups, so s/he is seeing the solution to the following equation, 10 x n = 3 (10 groups of some amount is 3 boxes) which can also be written as n = 3 ÷ 10. Using models or diagram, they divide each box into 10 groups, resulting in each team member getting 3/10 of a box.	**Topic A**- Line Plots and Measurement with Fractions (5.MD.B.2) **Topic B**- Fractions as Division (5.NF.B.3) **Topic C**- Multiplying a Whole Number and a Fraction (5.NF.B.4a) **Topic D**- Word Problems and Fractions (5.NF.B.4a, 5.NF.B.6, 5.OA.A.1) **Topic E**- Multiplying a Fraction by a Fraction (5.NF.B.4a, 5.NF.B.4b, 5.NF.B.6) **Topic F**- Multiplication of Fractions as Scaling (5.NF.B.6) **Topic G**- Division of Fractions (5.NF.B.7)
5.NF.B.4	**5.NF.B.4** Students need to develop a fundamental understanding that the multiplication of a fraction by a whole number could be represented as repeated	

Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. **a.** Interpret the product (a/b) x q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a x q ÷ b. For example, use a visual fraction model to show (2/3) x 4 = 8/3, and create a story context for this equation. Do the same with (2/3) x (4/5) = 8/15. (In general, (a/b) x (c/d) = ac/bd.) **b.** Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. **Vocabulary:** area of rectangle, fractional side lengths, grids, tiles, visual fraction models, tape diagram (strip diagram, bar model, fraction strip, or length model), resizing, scaling, reciprocal, repeated addition, improper fraction, common factor, numerator, denominator, area, product, factor **5.NF.B.5** **Interpret multiplication as scaling (resizing), by:** **a.** 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. **b.** 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; and relating the principle of fraction equivalence a/b = (nxa)/(nxb) to the effect of multiplying a/b by 1.	addition of a unit fraction. For example: 2 x (1/4) = 1/4 + 1/4 This standard extends student's work of multiplication from earlier grades. In fourth grade, students worked with recognizing that a fraction such as 3/5 actually could be represented as 3 pieces that are each one-fifth (3 x (1/5)). In fifth grade, students are expected to multiply fractions including proper fractions, improper fractions, and mixed numbers. They multiply fractions efficiently and accurately as well as solve problems in both contextual and non-contextual situations. This standard references both the multiplication of a fraction by a whole number and the multiplication of two fractions. Visual fraction models (area models, tape diagrams, number lines) should be used and created by students during their work with this standard. **EngageNY-Module 4-Topic C-Lesson 6-9; EngageNY-Module 4-Topic D-Lesson 10-12; EngageNY-Module 4-Topic E-Lesson 13-20; EngageNY-Module 5-Topic C-Lesson 10-15** **5. NF.B.5.a** This standard calls for students to examine the magnitude of products when multiplying fractions and whole numbers and fractions by fractions. **EngageNY-Module 4-Topic F-Lesson 22-23** **Example 1:** Mrs. Jones teaches in a room that is 60 feet wide and 40 feet long. Mr. Thomas teaches in a room that is half as wide, but has the same length. How do the dimensions and area of Mr. Thomas' classroom compare to Mrs. Jones' room? Draw a picture to prove your answer. **5. NF.B.5.b** This standard asks students to examine how numbers change when we multiply by fractions. Students should have ample opportunities to examine both cases in the standard: a) when multiplying by a	

Vocabulary: compare, product, factor, scaling (resizing), examine, reciprocal, numerator, denominator, compatible benchmark fraction, rounding, estimating, equivalent fraction	fraction greater than 1, the number increases and b) when multiplying by a fraction less the one, the number decreases. This standard should be explored and discussed while students are working with 5.NF.4, and should not be taught in isolation. **EngageNY-Module 4-Topic F-Lessons 21** **Example:** Mrs. Bennett is planting two flower beds. The first flower bed is 5 meters long and 6/5 meters wide. The second flower bed is 5 meters long and 5/6 meters wide. How do the areas of these two flower beds compare? Is the value of the area larger or smaller than 5 square meters? Draw pictures to prove your answer.	
5.NF.B.6 **Solve real world problems involving multiplication of fractions and mixed numbers, e.g. by using visual fraction models or equations to represent the problem.** **Vocabulary:** real world problems, visual fraction models, equations, mixed numbers, strategies, scaling, reciprocal, area	**5. NF.B.6** This standard builds on all of the work done in this cluster. Students should be given ample opportunities to use various strategies to solve word problems involving the multiplication of a fraction by a mixed number. This standard could include fraction by a fraction, fraction by a mixed number or mixed number by a mixed number. **EngageNY-Module 4-Topic D-Lesson 11-12; EngageNY-Module 4-Topic E-Lesson 16; EngageNY-Module 4-Topic F-Lesson 24; EngageNY-Module 5-Topic C-Lesson 14-15; EngageNY-Module 6-Topic E- Lesson 21-25** **Example:** There are 2 ½ bus loads of students standing in the parking lot. The students are getting ready to go on a field trip. 2/5 of the students on each bus are girls. How many busses would it take to carry only the girls?	
5.NF.B.7 **Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the**	**5. NF.B.7a** This standard asks students to work with story contexts where a unit fraction is divided by a non-zero whole number. Students should use various fraction models and reasoning about fractions. **EngageNY-Module 4-Topic G- Lesson 25-31**	

relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.) **a.** Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4= 1/12 because (1/12) x 4 = 1/3. **b.** Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4÷(1/5) = 20 because 20 x (1/5) = 4. **c.** Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins? **Vocabulary:** unit fractions, story context, quotient, interpret, number sentence (equation), real world problems, visual fraction models, reciprocal, simplify	**Example:** You have 1/8 of a bag of pens and you need to share them among 3 people. How much of the bag does each person get? **5. NF.B.7b** This standard calls for students to create story contexts and visual fraction models for division situations where a whole number is being divided by a unit fraction. **EngageNY-Module 4-Topic G- Lesson 25-31** **Example:** Create a story context for 5 ÷ 1/6. Find your answer and then draw a picture to prove your answer and use multiplication to reason about whether your answer makes sense. How many 1/6 are there in 5? **5. NF.B.7c** Extends students' work from other standards in 5.NF.B.7. Students should continue to use visual fraction models and reasoning to solve these real-world problems. **EngageNY-Module 6-Topic E-Lesson 21-25** **Example:** How many 1/3-cup servings are in 2 cups of raisins? Student: I know that there are three 1/3 cup servings in 1 cup of raisins. Therefore, there are 6 servings in 2 cups of raisins. I can also show this since 2 divided by 1/3 = 2 x 3 = 6 servings of raisins.	
5.MD.B.2 **Make a line plot to display a data set of measurement in fractions of a unit (1/2, ¼, 1/8). Use operations on fractions for this grade to solve problems involving information presented on line plots.**	**5.MD.B.2** Students need to interpret and create line plots using fractions. Students should be able to see patterns that occur on the line plot and understand how to accurately plot fractions on a line graph. Students should analyze and look for repeated reasoning amongst the data. **EngageNY-Module 4- Topic A-Lesson 1**	

	Example: Students estimate lengths of pencils, then they measure true length of pencils, Students plot the true measurements on a line plot. **Example**: Students are given a set of fractions (not in order), then plot that data on a line plot.	

3rd Nine weeks		
TN State Standards	**Comments**	**Resources**
5.MD.C.3 **Recognize volume as an attribute of solid figures and understand concepts of volume measurement.** **a.** A cube with side length 1 unit, called "unit cube", is said to have "one cubic unit" of volume, and can be used to measure volume. **b**. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units. **Vocabulary**: three-dimensional shape, solid, faces, cube, edges, vertices/vertex, parallel, base, parallelogram, prism, cylinder, cone, pyramid, polygon, volume, cubic unit, rectangular prism, formula, length, width, height, dimensions, unit **5.MD.C.4** **Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft., and improvised units.** **Vocabulary**: three-dimensional shape, solid, faces, cube, edges, vertices/vertex, parallel, base, parallelogram, prism, cylinder, cone, pyramid, polygon, volume, cubic unit, rectangular prism, formula, length, width, height, dimensions, unit **5.MD.C.5** **Relate volume to the operation of multiplication and addition and solve real world and mathematical problems involving volume.** **a.** Find the volume of a right rectangular prism with whole number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalent by	**5. MD.C.3, 5.MD.C.4, and 5. MD.C.5** represents the first time that students begin exploring the concept of volume. In Third Grade, students begin working with area and covering spaces. The concept of volume should be extended from area with the idea that students are covering an area (the bottom of cube) with a layer of unit cubes and then adding layers of unit cubes on top of bottom layer. Students should have ample experiences with concrete manipulatives before moving to pictorial representations **EngageNY-Module 5-Topic H-Lesson 1-2; EngageNY-Module 5-Topic B-Lesson 5** Example: **5. MD.C.5a & b** involves finding the volume of right rectangular prisms. Students should have experiences to describe and reason about why the formula is true. Specifically, that they are covering the bottom of a right rectangular prism (length x width) with multiple layers (height). Therefore, the formula (length x width x height) is an extension of the formula for the area of a rectangle. **EngageNY-Module 5-Topic B-Lesson 4-9; EngageNY-Module 6-Topic E-Lessons 21-25**	**Envisions** **5.MD.C.3, 5.MD.C.4, 5.MD.C.5**- 13-5, 13-6, 13-6a **5.G.B.3, 5.G.B.4-** 8-3,8-4, 8-5, 8-6 EngageNY **Module 5- Engage NY-** **https://www.engageny.org/resource/grade-5-mathematics-module-5** **Topic A**- Volume (5.MD.C.3, 5.MD.C.4) **Topic B**- Volume (5.MD.C.3, 5.MD.C.5) **Topic C**- Area of Rectangles (5.NF.B.4b, 5.NF.B.6) **Topic D**- Classify 2 Dimensional Shapes (5.G.B.3, 5.G.B.4)

multiplying the height by the area of the base. Represent threefold whole-numbers products as volumes, e.g., to represent the associative property of multiplication. **b.** Apply the formulas V=l x w x h and V=b x h for rectangular prisms to find the volumes of right rectangular prism with whole-number edge lengths in the context of solving real world and mathematical problems. **c.** Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping parts, applying this technique to solve real world problems. **Vocabulary**: three-dimensional shape, solid, faces, cube, edges, vertices/vertex, parallel, base, parallelogram, prism, cylinder, cone, pyramid, polygon, volume, cubic unit, rectangular prism, formula, length, width, height, dimensions, unit	**5.MD.C.5.c** calls for students to extend their work with the area of composite figures into the context of volume. Students should be given concrete experiences of breaking apart (decomposing) 3-dimensional figures into right rectangular prisms in order to find the volume of the prism.	
5.NF.B.4b **Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.** **b.** Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.	**5.NF.B.4b** Students will use their understanding of finding the area of a rectangle and reasoning with area to determine the volume of a prism. **EngageNY-Module 5-Topic C-Lesson 10-11**	
5.G.B.3 **Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all**	**5.G.B.3** calls for students to reason about the attributes (properties) of shapes. Student should have experiences discussing the property of shapes and reasoning. Example: Examine whether all quadrilaterals have right	

rectangles have four right angles and squares are rectangles, so all squares have for right angles. **Vocabulary:** polygon, regular polygon, triangle, quadrilateral, pentagon, hexagon, octagon, closed figure, line segments, vertices, vertex, angle, perimeter, equilateral triangle, isosceles triangle, scalene triangle, right triangle, acute triangle, obtuse triangle, attributes, parallelogram, trapezoid, rectangle, rhombus, square, consecutive equal angles, opposite equal angles, classify, parallel, right angle, acute angle, obtuse angle, congruent, generalization, diagonal, intersect R	angles. Give examples and non-examples. **EngageNY-Module 5-Topic D-Lesson 16-19**	
5.G.B.4 Classify two – dimensional figures in a hierarchy based on properties. **Vocabulary:** polygon, regular polygon, triangle, quadrilateral, pentagon, hexagon, octagon, closed figure, line segments, vertices, vertex, angle, perimeter, equilateral triangle, isosceles triangle, scalene triangle, right triangle, acute triangle, obtuse triangle, attributes, parallelogram, trapezoid, rectangle, rhombus, square, consecutive equal angles, opposite equal angles, classify, parallel, right angle, acute angle, obtuse angle, congruent, generalization, diagonal, intersect R	**5.G.B.4** this stand build on what was done in 4th grade. Figures from previous grades: polygon, rhombus/rhombi, rectangle, square, triangle, quadrilateral, pentagon, hexagon, cube, trapezoid, half/quarter circle, circle. **EngageNY-Module 5-Topic D-Lesson 20-21**	

4th Nine Weeks		
TN State Standards	**Comments**	**Resources**
5.OA.A.1 **Use parentheses, brackets, or braces in numerical expressions, and evaluate expression with these symbols.** **Vocabulary:** parentheses, brackets, braces, numerical expression, evaluate, algebraic expression, variable, order of operations, corresponding, sequence, term, pattern **5.OA.A.2** **Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.** **Vocabulary:** parentheses, brackets, braces, numerical expression, evaluate, algebraic expression, variable, order of operations, corresponding, sequence, term, pattern **5.OA.A.3** **Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form order pairs consisting of corresponding terms from the two patterns and graph the ordered pairs on a coordinate plane.** **Vocabulary:** function, function table, input, output, rule, expressions, equations, variables, linear function **5.G.A.1** **Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of**	**5.OA.A.1, 5.OA.A.2** Students worked this 5.OA.A.1 and 5.OA.A.2 in previous lessons in the school year. Students should at this time have an understanding of writing expressions and evaluating expressions with parenthesis, brackets, and braces. In addition, writing expressions and evaluating expressions using addition, subtraction, multiplication, and addition. Students should be able to evaluate and expression with whole numbers, decimals, and fractions. **EngageNY-Module 4- Topic H- Lesson 32-33.** Students will continue to use 5.OA.A.2 with expressions to determine patterns on coordinate graphs. Students will solve numerical patterns with given rules then plot those points on coordinate graphs using 5.OA.A.3 **EngageNY-Module 6-Topic B- Lesson 7-12** **Example:** See EngageNY- Module 6-Topic A and Topic B for examples of student work and instruction. **5.OA.A.3** extends the work from Fourth Grade, where students generate numerical patterns when they are given one rule. In Fifth Grade, students are given two rules and generate two numerical patterns. The graphs that are created should be line graphs to represent the pattern. This is a linear function which is why we get the straight lines. Students plot the points on a coordinate graph then interpret the graph. **EngageNY-Module 6-Topic B- Lesson 7-12** **5.G.A.1** deals with only the first quadrant (positive numbers) in the coordinate plane. Students move in to plotting points and using them to draw lines in the	**EnVisions** **5.OA.A.2-** 6-4, 6-5, 6-6a, 3-8, 6-1, 6-3 **5.G.A.1, 5.G.A.2**- 17-2, 17-3, 17-4a **EngageNY** **Module 4- EngageNY-** **https://www.engageny.org/resource/grade-5-mathematics-module-4** **Topic H**- Interpret Numerical Expressions (5.OA.A.2, 5.OA.A.1) **Module 6-EngageNY-** **https://www.engageny.org/resource/grade-5-mathematics-module-6** **Topic A**- Coordinate System (5.G.A.1) **Topic B**- Patterns in Coordinate Plane and Graphing Rules (5.OA.A.2, 5.OA.A.3, 5.G.A.1) **Topic C**- Drawing Figures in Coordinate Plane (5.G.A.1, 5.G.A.2) **Topic D**- Problem Solving in Coordinate Plane (5.OA.A.3, 5.G.A.2)

the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y coordinate) **Vocabulary:** coordinate grid, x-axis, y-axis, origin, ordered pair, x coordinate, y coordinate, point, plane, plot, x value, y value, vertical, horizontal, grid, distance, patterns, graph/graphing, interval, table, starting position, ending position	plane (**5.G.A.1**). They investigate patterns relating the x- and y-coordinates of the points on the line and reason about the patterns in the ordered pairs, laying important groundwork for Grade 6 proportional reasoning**.** This continues as students use given rules (e.g., multiply by 2, then add 3) to generate coordinate pairs, plot points, and investigate relationships. Patterns in the resultant coordinate pairs are analyzed, leading students to discover that such rules produce collinear sets of points. Students next generate two number patterns from two given rules, plot the points, and analyze the relationships within the sequences of the ordered pairs (**5.OA.A3**). Patterns continue to be the focus as students analyze the effect on the steepness of the line when the second coordinate is produced through an addition rule as opposed to a multiplication rule (**5.OA.A.2**, **5.OA.A.3**). Students also create rules to generate number patterns, plot the points, connect those points with lines, and look for intersections. In addition, students draw figures in the coordinate plane by plotting points to create parallel, perpendicular, and intersecting lines. They reason about what points are needed to produce such lines and angles, and then investigate the resultant points and their relationships. Students also reason about the relationships among coordinate pairs that are symmetric about a line (**5.G.A.1**). **EngageNY-Module 6-Topic A-Lessons 1-6**; **EngageNY-Module 6-Topic B-Lesson 7-12; EngageNY-Module 6- Topic C- Lessons 13-17** **Examples**: See Engage NY- Module 6-Topic A, Topic B, and Topic C for multiple examples of student work and instruction	
5.G.A.2 **Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate**	**5.G.A.2**.references real-world and mathematical problems, including the traveling from one point to another and identifying the coordinates of missing points in geometric figures, such as squares, rectangles,	

plane, and interpret coordinate values of points in the context of the situation. **Vocabulary:** coordinate grid, x-axis, y-axis, origin, ordered pair, x coordinate, y coordinate, point, plane, plot, x value, y value, vertical, horizontal, grid, distance, patterns, graph/graphing, interval, table, starting position, ending position	and parallelograms. To round out the topic, students use coordinate planes to solve real world problems **EngageNY-Module 6-Topic D- Lessons 18-20**	