Topic One: Multiplication and Division: Meanings and Facts

**Use the four operations with whole numbers to solve problems.**

4.OA.1. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

1-1 Students recognize multiplication as repeated addition of equal groups used in arrays and comparisons.

1-3 Use multiplication properties to simplify computations.

1-7 Students use arrays to write and complete multiplication and division fact families.

4.OA.2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

1-1 Students recognize multiplication as repeated addition of equal groups used in arrays and comparisons.

1-6 Students use and draw models to solve division problems.

1-8 Students use multiplication facts with 0 and 1 to learn about special division rules with 0 and 1.

1-9 Students will identify multiplication facts related to division facts in order to solve division problems.

1-10 Students will draw pictures to problem solve multiplication situations and use their pictures to write number sentences.

4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

1-5 Students will recognize patterns and be able to continue the pattern.

1-8 Students use multiplication facts with 0 and 1 to learn about special division rules with 0 and 1.

1-9 Students will identify multiplication facts related to division facts in order to solve division problems.

1-10 Students will draw pictures to problem solve multiplication situations and use their pictures to write number sentences.

**Gain familiarity with factors and multiples.**

4.OA.4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

1-4 Students will use the Distributive Property to find products of the factors of 3, 4, 6, 7, and 8 by breaking apart problems into simpler problems.

Topic One: Multiplication and Division: Meanings and Facts Cont…

**Generate and analyze patterns.**

4.OA.5. 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. *For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

1-2 Use patterns to find products with factors of 2, 5, and 9.

1-5 Students will recognize patterns and be able to continue the pattern.

Topic Two: Generate and Analyze Patterns

**Use the four operations with whole numbers to solve problems.**

4.OA.5. 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. *For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

2-1 Students will identify and extend repeating geometric or repeating number patterns.

2-2 Students will identify and extend whole number patterns involving addition and subtraction.

2-3 Students will extend tables of ordered pairs for situations involving multiplication, addition, or subtraction.

2-4 Students will find a rule, and extend the table, given a table of number pairs.

2-5 Students will extend patterns of cubes or tiles.

2-6 Students will use the strategies Act It Out and Use Reasoning to solve problems.

4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

2-6 Students will use the strategies Act It Out and Use Reasoning to solve problems.

Topic 3 Place Value

**Generalize place value understanding for multi-digit whole numbers.**

4.NBT.1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*

3-1 Students will read and write 3-digit and 4-digit numbers.

3-2 Students will learn how digits within a multi-digit whole number relate to each other by their place value.

3-6 Students will systematically find and record all possible outcomes for a situation.

4.NBT.2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

3-1 Students will read and write 3-digit and 4-digit numbers.

3-2 Students will learn how digits within a multi-digit whole number relate to each other by their place value.

3-3 Students will compare whole numbers through hundred thousands.

3-4 Students will apply their knowledge of place value to compare and order numbers.

4.NBT.3. Use place value understanding to round multi-digit whole numbers to any place.

3-5 Students will show how to use place value to round whole numbers.

Topic 4: Addition and Subtraction of Whole Numbers

**Generalize place value understanding for multi-digit whole numbers.**

4.NBT.3. Use place value understanding to round multi-digit whole numbers to any place.

4-1 Students will apply a variety of methods to add and subtract whole numbers mentally.

4-2 Students will round whole numbers to estimate sums and differences.

**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

4.NBT.4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.

4-2 Students will round whole numbers to estimate sums and differences.

4-3 Students will add numbers to hundreds and thousands with and without regrouping.

4-4 Students will subtract numbers to thousands with and without regrouping.

4-5 Students will subtract numbers with zeros to thousands.

4-6 Students will use a picture or diagram to translate everyday situation into a number sentence or equation.

**Use the four operations with whole numbers to solve problems.**

4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

4-1 Students will apply a variety of methods to add and subtract whole numbers mentally.

4-2 Students will round whole numbers to estimate sums and differences.

4-6 Students will use a picture or diagram to translate everyday situation into a number sentence or equation.

Topic 5 Number Sense: Multiplying by 1-Digit Numbers

**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

4.NBT.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

5-1 Students will use arrays to multiply by 10 and 100.

5-2 Students will use basic multiplication facts and number patterns to multiply by multiples of 10 and 100.

5-3 Students will break apart numbers and use arrays to multiply 2-digit by 1-digit numbers.

5-4 Students will use compensation to multiply numbers mentally.

5-5 Students will use rounding to estimate solutions to multiplication problems.

5-6 Students will check for reasonableness by making sure their calculations answer the questions asked and by using estimation to make sure the calculation was performed correctly.

**Generalize place value understanding for multi-digit whole numbers.**

4.NBT.3. Use place value understanding to round multi-digit whole numbers to any place.

5-4 Students will use compensation to multiply numbers mentally.

5-5 Students will use rounding to estimate solutions to multiplication problems.

5-6 Students will check for reasonableness by making sure their calculations answer the questions asked and by using estimation to make sure the calculation was performed correctly.

**Use the four operations with whole numbers to solve problems.**

4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

5-4 Students will use compensation to multiply numbers mentally.

5-6 Students will check for reasonableness by making sure their calculations answer the questions asked and by using estimation to make sure the calculation was performed correctly.

Topic 6 Developing Fluency: Multiplying by 1-Digit Numbers

**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

4.NBT.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

6-1 Students will record multiplication using an expanded algorithm.

6-2 Students will multiply 2-digit numbers by 1-digit numbers using paper-and-pencil methods.

6-3 Students will multiply 2-digit numbers by 1-digit numbers using the standard algorithm and estimate to check for reasonableness.

6-4 Students will use the standard algorithm to multiply 3- and 4-digit numbers by 1-digit numbers.

6-5 Students will multiply 2-, 3-, and 4-digit numbers by 1-digit numbers using the standard algorithm and estimate to check for reasonableness.

6-6 Students will identify what information in a problem is missing or is not needed.

**Generalize place value understanding for multi-digit whole numbers.**

4.NBT.3. Use place value understanding to round multi-digit whole numbers to any place.

6-5 Students will multiply 2-, 3-, and 4-digit numbers by 1-digit numbers using the standard algorithm and estimate to check for reasonableness.

**Use the four operations with whole numbers to solve problems.**

4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

6-2 Students will multiply 2-digit numbers by 1-digit numbers using paper-and-pencil methods.

6-3 Students will multiply 2-digit numbers by 1-digit numbers using the standard algorithm and estimate to check for reasonableness.

6-5 Students will multiply 2-, 3-, and 4-digit numbers by 1-digit numbers using the standard algorithm and estimate to check for reasonableness.

6-6 Students will identify what information in a problem is missing or is not needed.

Topic 7 Number Sense: Multiplying by 2-Digit Numbers

**Generalize place value understanding for multi-digit whole numbers.**

4.NBT.3. Use place value understanding to round multi-digit whole numbers to any place.

7-3 Students will use rounding to estimate solutions to multiplication problems involving two 2-digit numbers.

7-4 Students will use compatible numbers and rounding to estimate solutions to multiplication problems involving two 2-digit numbers.

**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

4.NBT.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

7-1 Students will use arrays to multiply 2-digit numbers by multiples of 10.

7-2 Students will discover and use patterns to multiply by multiples of 10.

7-4 Students will use compatible numbers and rounding to estimate solutions to multiplication problems involving two 2-digit numbers.

7-5 Identify and answer hidden questions to solve multi-step problems with operations.

**Use the four operations with whole numbers to solve problems.**

4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

7-2 Students will discover and use patterns to multiply by multiples of 10.

7-3 Students will use rounding to estimate solutions to multiplication problems involving two 2-digit numbers.

7-4 Students will use compatible numbers and rounding to estimate solutions to multiplication problems involving two 2-digit numbers.

7-5 Identify and answer hidden questions to solve multi-step problems with operations.

Topic 8 Developing Fluency: Multiplying by 2-Digit Numbers

**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

4.NBT.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

8-1 Students will use arrays to multiply two-digit numbers by two-digit numbers to find the product.

8-2 Students will use an expanded algorithm to multiply two-digit numbers by two-digit numbers to find the product.

8-3 Students will use grids and patterns to multiply 2-digit numbers and multiples of 10.

8-4 Students will use partial products to multiply 2-digit numbers by 2-digit numbers and find the products.

8-5 Students will solve two-question problems.

**Use the four operations with whole numbers to solve problems.**

4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

8-5 Students will solve two-question problems.

Topic 9 Number Sense: Dividing by 1-Digit Divisors

**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

4.NBT.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

9-5 Students use words and models to represent multiplication and division problems accurately.

4.NBT.6. Find whole-number quotients and remainders with up to four-digit dividends and one-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.

9-1 Students will use basic facts and patterns of zeros to solve division problems with 3-digit dividends and 1-digit divisors.

9-2 Students will use compatible numbers and rounding to estimate quotients.

9-3 Students will estimate quotients of multi-digit division problems using multiplication facts and place-value concepts.

9-4 Students will divide whole numbers by 1-digit divisors resulting in quotients with remainders.

9-5 Students use words and models to represent multiplication and division problems accurately.

9-6 Students will draw pictures and write related number sentences to solve problems.

**Use the four operations with whole numbers to solve problems.**

4.OA.2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

9-6 Students will draw pictures and write related number sentences to solve problems.

4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

9-1 Students will use basic facts and patterns of zeros to solve division problems with 3-digit dividends and 1-digit divisors.

9-2 Students will use compatible numbers and rounding to estimate quotients.

9-3 Students will estimate quotients of multi-digit division problems using multiplication facts and place-value concepts.

9-6 Students will draw pictures and write related number sentences to solve problems.

Topic 10 Developing Fluency: Dividing by 1-Digit Divisors

**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

4.NBT.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

10-8 Students will identify the hidden question in a multi-step problem. They use the answer to that hidden question to solve the original problem.

4.NBT.6. Find whole-number quotients and remainders with up to four-digit dividends and one-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.

10-1 Students will use repeated subtraction to model division.

10-2 Students will record division as repeated subtraction.

10-3 Students will use place value to understand the algorithm of long division.

10-4 Students will use the standard algorithm to divide a two-digit number by a one-digit number.

10-5 Students will use the standard algorithm to divide 3-digit numbers by 1-digit numbers.

10-6 Students will use the standard algorithm to divide 3-digit numbers by 1-digit numbers and properly decide where to begin dividing.

10-7 Students will estimate and find quotients for 4-digit dividends and 1-digit divisors.

**Generalize place value understanding for multi-digit whole numbers.**

4.NBT.1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*

10-3 Students will use place value to understand the algorithm of long division.

**Use the four operations with whole numbers to solve problems.**

4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

10-8 Students will identify the hidden question in a multi-step problem. They use the answer to that hidden question to solve the original problem.

Topic 11 Fraction Equivalence and Ordering

**Extend understanding of fraction equivalence and ordering.**

4.NF.1. Explain why a fraction *a*/*b* is equivalent to a fraction (*n* × *a*)/(*n* × *b*) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

11-4 Students will use models and computation to show equivalent fractions.

11-5 Students use a number line to identify and write equivalent fractions.

11-8 Students will write to explain whether an answer is correct or not.

4.NF.2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

11-4 Students will use models and computation to show equivalent fractions.

11-5 Students use a number line to identify and write equivalent fractions.

11-6 Students will use benchmark fractions to compare fractions with unlike denominators.

11-7 Students will use common denominators and equivalent fractions to order fractions with unlike denominators.

11-8 Students will write to explain whether an answer is correct or not.

**Gain familiarity with factors and multiples.**

4.OA.4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

11-1 Students will learn how to factor whole numbers.

11-2 Students will learn to identify prime and composite numbers.

11-3 Students will find the multiples of a number.

**Generate and analyze patterns.**

4.OA.5. 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. *For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

11-1 Students will learn how to factor whole numbers.

11-3 Students will find the multiples of a number.

Topic 12 Adding and Subtracting Fractions and Mixed Numbers With Like Denominators

**Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.**

4.NF.3. Understand a fraction *a*/*b* with *a* > 1 as a sum of fractions 1/*b*.

12-1 Students will use models to add fractions with like denominators.

4.NF.3a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

12-1 Students will use models to add fractions with like denominators.

12-2 Students use computational procedures to add fractions with like denominators and solve problems.

12-3 Students will use models to subtract fractions with like denominators.

12-4 Students use computational procedures to subtract fractions with like denominators and solve problems.

12-5 Students use the number line to add and subtract fractions with like denominators.

12-11 Students will draw a picture and write an equation to solve a problem.

4.NF.3b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.*

12-6 Students will identify and write mixed numbers as improper fractions and improper fractions as mixed numbers.

12-7 Students will use models to add and subtract mixed numbers.

12-10 Students decompose fractions and represent them as compositions of fractions in a variety of ways.

4.NF.3c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

12-6 Students will identify and write mixed numbers as improper fractions and improper fractions as mixed numbers.

12-7 Students will use models to add and subtract mixed numbers.

12-8 Students will use models and computational procedures to add mixed numbers.

12-9 Students will use models and computational procedures to subtract mixed numbers.

4.NF.3d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

12-2 Students use computational procedures to add fractions with like denominators and solve problems.

12-3 Students will use models to subtract fractions with like denominators.

12-4 Students use computational procedures to subtract fractions with like denominators and solve problems.

12-5 Students use the number line to add and subtract fractions with like denominators.

12-10 Students decompose fractions and represent them as compositions of fractions in a variety of ways.

12-11 Students will draw a picture and write an equation to solve a problem.

Topic 13 Extending Fraction Concepts

**Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.**

4.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

13-2 Students will multiply a fraction by a whole number using models.

13-3 Students will multiply a whole number and a fraction to solve problems.

4.NF.4a Understand a fraction *a*/*b* as a multiple of 1/*b*. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).*

13-1 Students will use fractions and multiplication to describe fractions that are multiples of the unit fractions.

4.NF.4b Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)*

13-2 Students will multiply a fraction by a whole number using models.

13-3 Students will multiply a whole number and a fraction to solve problems.

4.NF.4c Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*

13-3 Students will multiply a whole number and a fraction to solve problems.

**Understand decimal notation for fractions, and compare decimal fractions.**

4.NF.5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.2 *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*

13-4 Students will understand how to write fractions as decimals and decimals as fractions.

13-5 Students will learn to locate and name fractions and decimals on a number line.

13-6 Students will understand how to use equivalent fractions to write fractions as decimals.

4.NF.6. Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*

13-4 Students will understand how to write fractions as decimals and decimals as fractions.

13-5 Students will learn to locate and name fractions and decimals on a number line.

13-6 Students will understand how to use equivalent fractions to write fractions as decimals.

13-10 Students will solve problems using the strategy Draw a Picture.

Topic 13 Extending Fraction Concepts Cont…

4.NF.7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

13-7 Students will use models and place-value charts to represent decimals to hundredths. They will read and write decimals in expanded, standard, and word form.

13-8 Students will use models and place-value charts to compare decimals to hundredths. They will use greater-than and less-than symbols to order decimal numbers.

13-9 Students will use place-value charts to read, write, and compare decimals in tenths and hundredths using money.

**Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.**

4.MD.1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

13-10 Students will solve problems using the strategy Draw a Picture.

4.MD.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and 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. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

13-9 Students will use place-value charts to read, write, and compare decimals in tenths and hundredths using money.

13-10 Students will solve problems using the strategy Draw a Picture.

Topic 14 Measurement Units and Conversions.

**Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.**

4.MD.1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

14-1 Students will estimate and measure length by choosing the most appropriate unit of length.

14-2 Students will estimate fluently with customary capacity units (cups, pints, quarts, and gallons). They will compare the relative sizes of capacity measurements.

14-3 Students will estimate fluently and measure with units of weight.

14-4 Students will be able to convert between customary units.

14-5 Students will solve and explain the answers to each problem in writing.

14-6 Students will estimate and measure length to the nearest centimeter, and choose the most appropriate metric unit for measuring length.

14-7 Students will estimate fluently with milliliters and liters. They will measure capacity using these metric units.

14-8 Students will estimate and measure with units of mass- grams and kilograms.

14-9 Students will be able to convert between metric units.

14-10 Students will compare several different units of time and freely convert from one unit of time to another.

14-11 Students will solve problems that require finding the original times, measurements, or quantities that led to a result that is given.

4.MD.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and 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. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

14-7 Students will estimate fluently with milliliters and liters. They will measure capacity using these metric units.

14-8 Students will estimate and measure with units of mass- grams and kilograms.

14-10 Students will compare several different units of time and freely convert from one unit of time to another.

14-11 Students will solve problems that require finding the original times, measurements, or quantities that led to a result that is given.

Topic 15 Solving Measurement Problems

**Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.**

4.MD.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and 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. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

15-2 Students use diagrams to show data and analyze how the quantities are related to solve real- world measurement problems.

15-3 Students solve real-world problems that involve money and giving change by counting.

15-5 Students will break a problem into smaller, more manageable pieces and find a pattern to fit.

4.MD.3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

15-1 Students will use the formulas for the perimeter and area of rectangles to solve real-world problems.

**Represent and interpret data.**

4.MD.4. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*

15-4 Students construct line plots using given data and use the line plot to answer questions about the data set.

Topic 16 Lines, Angles, and Shapes

**Draw and identify lines and angles, and classify shapes by properties of their lines and angles.**

4.G.1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

16-1 Students will identify and describe points, lines, and planes.

16-2 Students will learn geometric terms to describe parts of lines and types of angles.

16-3 Students will use unit angles and fractions of a circle to find angle measures.

16-4 Students will use a smaller angle to measure a larger angle by repeating the unit.

16-5 Students will be able to measure and draw angles.

4.G.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.

16-7 Students will learn to identify polygons.

16-8 Students will learn to identify and classify triangles.

16-9 Students will learn to identify quadrilaterals.

16-11 Students will solve problems by making and testing generalizations.

4.G.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 matching parts. Identify line-symmetric figures and draw lines of symmetry.

16-10 Students will determine if a plane figure has line symmetry and, if so, how many lines of symmetry it has.

**Geometric measurement: understand concepts of angle and measure angles.**

4.MD.5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

16-3 Students will use unit angles and fractions of a circle to find angle measures.

16-4 Students will use a smaller angle to measure a larger angle by repeating the unit.

4.MD.5a An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a “one-degree angle,” and can be used to measure angles.

16-3 Students will use unit angles and fractions of a circle to find angle measures.

16-4 Students will use a smaller angle to measure a larger angle by repeating the unit.

16-5 Students will be able to measure and draw angles.

16-6 Students will find unknown angle measures by adding and subtracting.

4.MD.5b An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.

16-4 Students will use a smaller angle to measure a larger angle by repeating the unit.

16-5 Students will be able to measure and draw angles.

16-6 Students will find unknown angle measures by adding and subtracting.

Topic 16 Lines, Angles, and Shapes Cont…

4.MD.6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

16-5 Students will be able to measure and draw angles.

16-6 Students will find unknown angle measures by adding and subtracting.

4.MD.7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

16-6 Students will find unknown angle measures by adding and subtracting.

**Generate and analyze patterns.**

4.OA.5. 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. *For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

16-11 Students will solve problems by making and testing generalizations.