GRADE 4

Operations and Algebraic Thinking

Use the four operations with whole numbers to solve problems	Major

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.

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• Fluently × and ÷ within 100. • Fluently recall basic multiplication facts. • The answer to a multiplication problem is called the product. • The two numbers that are being multiplied in a multiplication equation are called factors. • Compare numbers in an additive sense (what amount would be added to a quantity in order to result in another). • Explain patterns in arithmetic. • Interpret products of whole numbers. • Interpretation means to communicate symbolically, numerically, abstractly, and/or with a model.	• A multiplicative comparison compares two quantities by showing that one quantity is a specific number "times smaller" or "larger than" the other quantity. • Determine the factor by which to multiply one quantity in order to result in another. • The meaning of "times as many." • The difference in the situations in which you would multiply to find the unknown or divide to find the unknown. • Reason abstractly and quantitatively. • Model with mathematics.	• Use a tape diagram model to make and illustrate multiplicative comparisons. • Write an equation to represent a multiplicative comparison. • Identify unknown quantities in multiplicative comparison equations. • Use a symbol for an unknown number • Identify which number is being multiplied and which number tells "how many times as much".

GRADE 4

Operations and Algebraic Thinking

Use the four operations with whole numbers to solve problems	Major

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.

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• Fluently × and ÷ within 100. • Fluently recall basic multiplication facts. • The answer to a × problem is called the product. • The two numbers that are being multiplied in a × equation are called factors. • The answer to a ÷ problem is called the quotient. • The number being ÷ is called the dividend and the number being ÷ into the dividend is called the divisor. • Compare numbers in an additive sense (what amount would be added to a quantity in order to result in another). • Interpret products and quotients of whole numbers. • Interpretation means to communicate symbolically,	• The difference between two quantities is additive comparison. • A multiplicative comparison compares two quantities by showing that one quantity is a specific number "times smaller" or "larger than" the other quantity. • Determine the factor by which to multiply one quantity in order to result in another. • The meaning of "times as many." • The difference in the situations in which you would × to find the unknown or ÷ to find the unknown. • Reason abstractly and quantitatively. • Model with mathematics.	• Solve × and ÷ word problems that involve the following **comparison** situations: unknown product, group size unknown, number of groups unknown. • Use a tape diagram model to make and illustrate multiplicative comparisons. • Write an equation to represent a multiplicative comparison using a symbol to represent the unknown. • Determine if a word problem is additive comparison or multiplicative comparison. • Identify differences among additive comparison and multiplicative comparison word problems.

	numerically, abstractly, and/or with a model.	• Look for and make use of structure.	

GRADE 4

Operations and Algebraic Thinking

Use the four operations with whole numbers to solve problems	Major

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.

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• A variable represents an unknown quantity. • Write one step equations using variables. • Write two step equations using addition and subtraction (easy to medium difficulty level). • Explain the difference between an expression and an equation. • Equal sign means “is the same as”. • How to +, - , ÷ and × with multi-digit whole numbers. • Define multiplication and division. • Describe the inverse relationship between multiplication and division and addition and subtraction. • Fluently × and ÷ within 100.	• Use of parenthesis in an equation**.** • Read an expression or equation that has more than one step. • Rounding whole numbers to find an estimate that can be used to assess the reasonableness of the answer. • Remainders can be interpreted as: o Remain as a left over o Partitioned into fractions or decimals o Discarded leaving only the whole number answer o Increase the whole number answer up one o Round to the nearest whole number for an	• Identify the differences among +, −, ×, and ÷ word problems. • Perform +, - , ÷ and × with whole numbers. • Interpret remainders and how they affect the whole number answer in a ÷ problem. • Write equations using variables to represent the unknown for multi-step word problems. • Evaluate the reasonableness of an answer by using estimation strategies or mental math strategies. • Write an equation consisting of multiple operations to reflect the situation(s) in a word problem. • Select a word problem that

	• Fluently recall basic multiplication facts. • Fluently add and subtract numbers up to 1,000.	approximate result • Substitute * or • for the "x" in a multiplication equation. • Equations should not involve more than 3 steps. • Make sense of problems and persevere in solving them. • Attend to precision. • Model with mathematics. • Reason abstractly and quantitatively.	matches a specific equation. • Solve addition and subtraction word problems that include the following situations: result unknown, total unknown, both addends unknown, change unknown, difference unknown, bigger unknown, and smaller unknown. (refer to table in Progressions document). • Solve multiplication and division word problems that include the following situations: equal Groups, arrays of objects, and comparison (refer to table in Progressions Document).

GRADE 4

Operations and Algebraic Thinking

Gain familiarity with factors and multiples	Supporting

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.	**Desired Student Performance**		
	A student should know	**A student should understand**	**A student should be able to do**
	• Fluently multiply and divide within 100. • Describe the inverse relationship between multiplication and division. • A factor is a number that is multiplied with another number to get a product. • A product is the answer to a multiplication problem when two factors are multiplied. • The words multiple and product are interchangeable. • Division can be used to find an unknown factor.	• Any whole number is a multiple of each of its factors. • A prime number only has two factors, one and itself. • A composite number has two or more factor pairs. • A factor pair is two factors that create a specific product. • A multiple is divisible by its factors. • Divisibility means that a multiple can be divided evenly by its factor with no remainder.	• List factors for a given whole number. • Classify numbers as prime or composite. • List multiples of a given single digit number. • Decide if a number is a multiple of a given one-digit number.

GRADE 4

Operations and Algebraic Thinking

Generate and analyze patterns	Additional

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.*

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• A pattern is a set of numbers or objects which relate to each other according to a specific rule. • Identify patterns in a multiplication table. • Identify patterns in an addition table. • Fluently add and subtract single digit numbers. • Fluently multiply and divide within 100.	• Patterns can grow or repeat. • Division can be used to help identify properties of repeating patterns when finding the "nth" figure in a pattern (*for example: find the 100th figure in the pattern circle, square, triangle, triangle – since there are 4 figures in the pattern before the pattern repeats, divide 100 by 4. This tells you that there will be 25 full repeats so the 100th figure would be the last shape in the pattern.)* • Reason abstractly and quantitatively. • Attend to precision. • Look for and express regularity in repeated reasoning.	• Construct shape patterns that express a given rule. • Construct number patterns that express a given rule. • Connect a rule for a given pattern with its sequence of numbers or shapes. • Extend a given pattern after determining the rule that the pattern follows. • Make generalizations about patterns that are not apparent within the given rule. • Determine the rule for a given pattern that can be used to find the "n^{th}" number or object in the pattern. • Look for and make use of structure.

GRADE 4

Number and Operations in Base Ten

Generalize place value understanding for multi-digit whole numbers — **Major**

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.*

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• The place name and value of each digit in a number**.** • × one-digit whole numbers by multiples of 10 using strategies of place value and properties of operations (ex: skip-counting and decomposing)**.** • 10 like units make one unit of the next highest place (ten ones make one ten) • Fluently × and ÷ within 100. • × single digits from memory. • Decompose and compose numbers in the base ten system. • When moving to the right across the places in a number, the digits represent smaller values and when moving to the left the places have a larger value.	• In the base-ten system, the value of each place is 10 times the value of the place to the immediate right**.** • The meaning of "times as many." • Multiplying and dividing by multiples of 10 creates a pattern. (ex: Multiplying by 10 creates a product where each digit has been shifted 1 place to the left and dividing by 10 creates a quotient where each digit has been shifted 1 place to the right). • Reason abstractly and quantitatively. • Attend to precision. • Look for and make use of structure.	• Multiply and divide by multiples of 10**.** • Show understanding of the relationship between place values by decomposing equations. • Model place value relationships using base-ten blocks in the place value frame (ex: *10 x 50 represented as 5 tens each taken 10 times*). • Justify understandings by writing statements using "times as many"**.**

GRADE 4

Number and Operations in Base Ten

Generalize place value understanding for multi-digit whole numbers	Major

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.	**Desired Student Performance**		
	A student should know	**A student should understand**	**A student should be able to do**
	• Use standard form, number names, and expanded form to read and write numbers to 1000. • Use place value to compare two three-digit numbers and use <,>, and = symbols to record the comparisons. • Identify the values of the digits represented by the place in the base ten system up to the thousands. • When moving to the right across the places in a number, the digits represent smaller values and when moving to the left the places have a larger value. • 10 like units make one unit of the next highest place (each bundle of 10 makes a new place).	• The role of the comma: 3-digit sequences of hundreds, tens, and ones are separated by commas and is followed by the appropriate base thousand unit name (thousand, million, billion, etc.) • The values of the digits represented by the place in the base ten system extended beyond the thousands up to one million. • Patterns when multiply single digit numbers by 10; 100; 1,000; 10,000; 100,000; 1,000,000). • Place value to the one millions place. • How to use place value to write numbers in expanded notation. • When comparing numbers, the	• Say multi- digit whole numbers (up to 1,000,000). • Write multi-digit whole numbers in expanded form (ex: 2,436 = 2,000 + 400 + 30 + 6 **and** 2,436 = (1,000 x 2) + (100 x 4) + (10 x 3) + (1 x 6). • Write the whole number that is being represented by expanded notation. • Write multi-digit whole numbers from place names of digits (ex: 2 thousands + 4 hundreds + 3 tens + 6 ones = 2,436). • Write whole numbers from word form to standard form and standard form to word form. • Compare two multi-digit numbers by using place

	• To compare numbers you use the largest place value. • Express numbers in expanded form, word form or number names, and number form.	number with the largest place is the largest number. • When comparing numbers that have the same place value, the number that has the largest digit in the largest place is the largest number. • Look for and make use to structure.	value understanding. • Use symbols such as >, =, and < to record comparisons of two multi-digit numbers.

GRADE 4

Number and Operations in Base Ten

Generalize place value understanding for multi-digit whole numbers	Major

4.NBT.3 Use place value understanding to round multi-digit whole numbers to any place.	**Desired Student Performance**		
	A student should know	**A student should understand**	**A student should be able to do**
	• Rounding numbers to the nearest 10 and 100. • Rounding generates numbers that a number is closest to that has no ones, no tens or ones, no hundreds, tens or ones, etc. • Identify the values of the digits represented by the place in the base ten system up to thousands. • When moving to the right across the places in a number, the digits represent smaller values and when moving to the left the places have a larger value.	• In standard notation a comma separates 3-digit sequences of hundreds, tens, and ones and is followed by the appropriate base thousand unit name (thousand, million, billion, etc.) • The values of the digits represented by a place in the base ten system extended beyond the thousands up to one million. • Use a number line to round whole numbers. • Patterns are associated with rounding. • The digits in a place that would make a number round down or make the number round up and the patterns and reasoning associated with it.	• Round multi-digit whole numbers up to the millions place. • Use an open number line to show reasoning and understanding of rounding up to the millions place. • Identify the largest and smallest number that rounds to a specified number. • Create numbers that would round to a specified number *(ex: List 2 numbers that would round to 100,000. 96,789 would round to 100,000 and 104,999 would round to 100,000)* and be able to explain the reasoning for your answer.

GRADE 4

Number and Operations in Base Ten

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

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

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• The relationship between addition and subtraction is an inverse relationship. • Fluently add and subtract numbers up to 1,0000. • Model addition and subtraction by using an open number line and base ten blocks. • Use the properties of operations to add and subtract. • The values of the digits represented by a place in the base ten system extend beyond the thousands up to one million. • When moving to the right across the places in a number, the digits represent smaller values and when moving to the left the places	• Like base ten units are to be added together or subtracted from each other. • Compose or decompose base-ten units as needed in order to add or subtract multi-digit whole numbers. • Digits that are in the same place should be lined up together when adding or subtracting. • The steps and understanding behind the standard algorithm for addition. • The standard algorithm for addition is a step-wise process that relies on base ten place value. • The standard algorithm for subtraction is a step-wise process that relies on base ten place value.	• Add numbers up to 1,000,000 using the standard algorithm for addition. • Subtract numbers up to 1,000,000 using the standard algorithm for subtraction. • Regroup in order to add or subtraction. • Explain the steps of the addition standard algorithm and the subtraction standard algorithm.

	have a larger value. • 10 like units make one unit of the next highest place (each bundle of 10 makes a new place).	• Look for and make use of structure. • Look for and express regularity in repeated reasoning. • Reason abstractly and quantitatively.	

GRADE 4

Number and Operations in Base Ten

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

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.	**Desired Student Performance**		
	A student should know	**A student should understand**	**A student should be able to do**
	• Multiplication is repeated addition. • Fluently multiply and divide within 100. • Multiply single digits from memory. • The answer to a multiplication problem is called the product. • The two numbers that are being multiplied in a multiplication equation are called factors. • Multiplying single digit numbers by 10; 100; 1,000; 10,000; 100,000; and 1,000,000 creates a pattern. • There is an inverse relationship between multiplication and division.	• The properties of multiplication. • Use of the distributive property to find the product of up to a four-digit by one-digit or of a two-digit by two-digit number. • Use and draw an area model for multiplication.000 • Recognize the patterns that occur when multiplying multiples of 10 by other multiples of 10 (ex: 30 x 20, 3 x 2 equals 6, and you use the zero from each factor in the product). • Model with mathematics. • Look for and make use of structure.	• Model multiplication by using base ten blocks, area model, and rectangular arrays. • Find the product of up to a four-digit by a one-digit number. • Explain how to find the product of up to a four digit by a one digit and a two-digit by a two-digit. • Find the product of a two-digit by two-digit number and explain the strategy that was used. •

	• Compose and decompose numbers based on place value. • Use and draw a rectangular array	• Construct viable arguments and critique the reasoning of others. • Reason abstractly and quantitatively.	

GRADE 4

Number and Operations in Base Ten

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

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.

Desired Student Performance

A student should know

- Division is repeated subtraction.
- Division can be used for three purposes: equal sharing; measurement; and finding unknown factors.
- The answer to a division problem is called the quotient.
- The number being divided is called the dividend and the number being divided into the dividend is called the divisor.
- The relationship between division and multiplication is an inverse relationship.
- In the base-ten system, the value of the place to the immediate left of any place is 10 times the value of that place.

A student should understand

- Compose and decompose whole numbers based on place value.
- Patterns are created when dividing multiples of 10 by single digit numbers that divide evenly (ex: 8,000 ÷ 4 = 2,000).
- Remainders can be treated as:
  - a left over
  - fractions or decimals
  - discarded leaving only the whole number answer
  - Increase the whole number answer by one
  - Rounded to the nearest whole number for an approximate result
- Model with mathematics.
- Reason abstractly and quantitatively.

A student should be able to do

- Decompose numbers based on place value to find the quotient of a large number divided by a one-digit number.
- Divide up to four-digit numbers that will result in whole numbers and remainders.
- Interpret remainders and how they affect the quotient.
- Model division by using the area model, rectangular arrays, and writing equations.
- Write an explanation describing how the quotient was found.

	• Name and identify the value of each place in the base ten system up to millions.	• Look for and make use of structure. • Construct viable arguments and critique the reasoning of others.	

GRADE 4

Numbers and Operations - Fractions

Extend understanding of fraction equivalence and ordering	Major

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.

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• Recognize fractions as equivalent based on size or location on a number line. • Recognize and generate simple equivalent fractions and explain why the fractions are equivalent. • Write whole numbers as fractions and identify fractions that are equivalent to whole numbers. • Equivalent fractions represent the same area, interval or amount. • Fractions should be seen and treated as regular numbers. • That the denominator represents the number of parts that comprise the whole and the numerator represents the number of parts that are being identified.	• Two different fractions can be equivalent. • Equivalent fractions are based on the same whole. • Multiplying the numerator and denominator by the same number, n, partitions each unit fraction piece into smaller equal pieces. • Dividing the numerator and denominator by the same number, n, groups the unit fractions together to make larger equal pieces. • Work with fractions with denominators of 2, 3, 4, 6, 8, 10, 12, and 100. • Model with mathematics.	• Plot, label, and identify fractions on a number line. • Use a variety of visual fraction models (tape diagram, number line diagram, or area model). • Write 1 and other whole numbers as a fraction. • Partition a whole into smaller parts to model a fraction that is equivalent to the fraction that is already being represented. • Create an equivalent fraction for a given fraction by partitioning a whole into smaller parts or by combining parts to make larger parts. • Use writing to justify why two fractions are or are not equivalent.

	• A fraction is created by combining a sufficient number of unit fractions. • That equal parts are made up of parts with equivalent measurements.		

GRADE 4

Numbers and Operations - Fractions

Extend understanding of fraction equivalence and ordering	Major

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.

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• Fractions with the same denominator (based on the same whole) are made up of the same size unit fractions. • The sign > is the "greater than" sign, the sign < is the "less than" sign, and the sign = is the "equal to" sign. • When placing 2 fractions on a number line, the one to the left is smaller and the one to the right is larger. • Generate equivalent fractions for ½ and 1. • Equivalent fractions represent the same area, interval, or amount. • Numbers 0, ½, and 1 are benchmark numbers. • Decompose means to break into parts.	• In order to compare fractions, the fractions must be referring to the same whole. • The larger the denominator, the smaller the value of the unit fraction. • When fractions have the same denominator, the fraction with the largest numerator is the larger fraction. • When the numerator is larger than the denominator, the fraction is greater than 1. • Work with fractions with denominators of 2, 3, 4, 6, 8, 10, 12, and 100. • Model with mathematics.	• Make comparisons of fractions by using a variety of visual fraction models (tape diagram, number line diagram, or area model). • Creating equivalent fractions by finding common denominators. • Decompose fractions with the same denominator to justify comparisons. • Draw a model to justify conclusions when comparing two fractions. • Evaluate the reasonableness of a conclusion based on the benchmark fractions of 0, ½, and 1.

GRADE 4

Numbers and Operations – Fractions

Build fractions from unit fractions by applying and extending previous understanding of operations of whole numbers	Major

	Desired Student Performance		
	A student should know	**A student should understand**	**A student should be able to do**
4.NF.3a Understand a fraction a/b with a > 1 as a sum of fractions 1/b. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.	• Fractions that have the same denominator are made up of different quantities of the same size unit fraction. • Addition means joining together and subtraction means separating. • Define the words “sum” and “difference”. • Decompose means to break into parts and compose means to put together. • Addition and subtraction are the inverse of each other. • Write a whole number as a fraction. • Represent a whole number as an equivalent fraction. • Find quotients of whole numbers with and without remainders.	• A fraction is a sum of its unit fractions. • When adding and subtracting fractions, the fractions must be referring to the same whole. • Joining the same size unit fractions creates a larger fraction. • Add and subtract of fractions with denominators of 2, 3, 4, 6, 8, 10, 12, and 100. • A mixed number is a whole number plus a fraction smaller than 1. • Model with mathematics • Attend to precision.	• Plot and label a fraction on a number line. • Decompose a fraction into its sufficient number of unit fractions. • Compose a fraction by combining unit fractions. • Add and subtract fractions together with like denominators. • Convert a mixed number to a fraction by representing the whole number as an equivalent fraction and finding their sum. • Decompose a fraction into a sum of a whole number and a number less than 1 in order to convert to a mixed number.

GRADE 4

Numbers and Operations - Fractions

Build fractions from unit fractions by applying and extending previous understanding of operations of whole numbers	Major

4.NF.3b

Understand a fraction a/b with a > 1 as a sum of fractions 1/b.

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;21/8=1+1+1/8= 8/8 + 8/8 + 1/8.

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• Decompose means to break apart. • Represent one as a fraction in more than one way. • Define the term sum. • Define the term equation • Represent a whole number as a fraction.	• Add fractions with the same denominator. • Fraction a/b, where a is larger than 1, is the sum of a significant amount of unit fractions. • Decompose a fraction in different ways. • The sum of the decomposed parts of a fraction is equal to that fraction. • Work with fractions with denominators of 2, 3, 4, 6, 8, 10, 12, and 100. • Attend to precision. • Look for and make use of structure. • Look for and express regularity in repeated reasoning.	• Decompose a fraction into parts. • Write an equation that represents a specific fraction with its decomposed parts that equal that fraction. • Determine if the sum of a set of fractions equals a given fraction. • Use a variety of visual fraction models (tape diagram, number line diagram, or area model) to justify decompositions. • Model with mathematics

GRADE 4

Numbers and Operations – Fractions

Build fractions from unit fractions by applying and extending previous understanding of operations of whole numbers	Major

4.NF.3c Understand a fraction a/b with a > 1 as a sum of fractions 1/b. 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.	**Desired Student Performance**		
	A student should know	**A student should understand**	**A student should be able to do**
	• Create equivalent fractions. • Write a whole number as a fraction. • A fraction a/b is made up of a sufficient number of unit fractions. • The addition means joining together and subtraction means taking away. • Subtraction and addition are the inverse of each other. • Find quotients of whole numbers with and without remainders.	• A mixed number is a number that is made up of a whole number and a fraction that is less than 1. • When the numerator is larger than the denominator, the fraction is greater than 1. • Convert a mixed number to a fraction by representing the whole number as an equivalent fraction and finding their sum. • Decompose a fraction into a sum of a whole number and a number less than 1 in order to convert to a mixed number. • Add and subtract fractions with like denominators of 2, 3, 4, 6, 8, 10, 12, and 100.	• Use a variety of visual fraction models (tape diagram, number line diagram, or area model). • Create an equivalent fraction for a mixed number (write it as an improper fraction) in order to add or subtract. • Represent the sum as a mixed number by joining a sufficient number of unit fractions together to make as many wholes as possible, and create the fraction by joining together the left over unit fractions. • Model with mathematics. • Reason abstractly and quantitatively. • Look for and make use of structure.

GRADE 4

Numbers and Operations - Fractions

Build fractions from unit fractions by applying and extending previous understanding of operations of whole numbers — **Major**

4.NF.3d

Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.

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.

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• Addition means joining together and subtraction means taking away. • Subtraction and addition are the inverse of each other. • Fraction a/b is made up of a sufficient number of unit fractions. • Create equivalent fractions. • Write a whole number as a fraction. • A mixed number is a number that is made up of a whole number and a fraction that is less than 1.	• Add fractions with like denominators of 2, 3, 4, 6, 8, 10, and 12. • Write an equation using fractions. • When the numerator is larger than the denominator, the fraction is greater than 1. • Convert a mixed number to a fraction by representing the whole number as an equivalent fraction and finding their sum. • Decompose a fraction into a sum of a whole number and a number less than 1 in order to convert to a mixed number. • Attend to precision.	• Use a variety of visual fraction models (tape diagram, number line diagram, or area model) to solve word problems. • Solve word problems that include the following situations: result unknown, total unknown, both addends unknown, change unknown, difference unknown, bigger unknown, and smaller unknown. • Write an equation that represents a word problem. • Model with mathematics. • Make sense of problems and persevere in solving them. • Look for and make use of structure.

GRADE 4

Numbers and Operations - Fractions

Build fractions from unit fractions by applying and extending previous understanding of operations of whole numbers	Major

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

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).*

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• Define the terms multiplication and multiple. • Fluently recall basic multiplication facts. • Multiply whole numbers. • The denominator represents the number of parts that comprise the whole and the numerator represents the number of parts that are being identified. • Fraction a/b is made up of a sufficient number of unit fractions.	• A fraction a/b is a multiple of the unit fraction 1/b. • When multiplying a whole number by a fraction, the whole number is only multiplied by the numerator. • Decompose a fraction to show how many groups of the unit fraction it takes to represent that fraction. • A fraction with a numerator larger than the denominator is greater than 1. • Decompose a mixed number to create a whole as a fraction plus the fraction. • When multiplying a fraction by a whole number, you are multiplying the number of unit fractions by the whole number. • Attend to precision.	• Use a variety of visual fraction models (tape diagram, number line diagram, or area model) to multiply a fraction by a whole number. • Express a multiple of a/b as a multiple of 1/b. • Use multiplication to write an an equation that represents how many groups of a unit fraction it takes to represent a fraction. • Represent the product as a mixed number by joining a sufficient number of unit fractions together to make as many wholes as possible, and join the remaining unit fractions together to create a fraction.

		• Look for and make use of structure. • Look for and express regularity in repeated reasoning.	• Model with mathematics.

GRADE 4

Numbers and Operations - Fractions

Build fractions from unit fractions by applying and extending previous understanding of operations of whole numbers	Major

4.NF.4b

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

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.*

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• Define multiplication and multiple. • Fluently recall basic multiplication facts. • Multiply whole numbers. • The denominator represents the number of parts that comprise the whole and the numerator represents the number of parts that are being identified. • That a fraction a/b is made up of a sufficient number of unit fractions.	• A fraction a/b is a multiple of the unit fraction 1/b. • When multiplying a whole number by a fraction, the whole number is only multiplied by the numerator. • Decompose a fraction to show how many groups of the unit fraction it takes to represent that fraction. • A fraction with a numerator larger than the denominator is greater than 1. • Decompose a mixed number to create a whole as a fraction plus the fraction. • Model with mathematics. • Look for and make use of structure. • Look for and express regularity in repeated reasoning.	• Use a variety of visual fraction models (tape diagram, number line diagram, or area model) to multiply a fraction by a whole number. • Use multiplication to write an equation that represents how many groups of a unit fraction it takes to represent a fraction. • Express a multiple of a/b as a multiple of 1/b. • Represent the product as a mixed number by joining a sufficient number of unit fractions together to make as many wholes as possible, and join the remaining unit fractions together to make the fraction.

GRADE 4

Numbers and Operations - Fractions

Build fractions from unit fractions by applying and extending previous understanding of operations of whole numbers	Major

4.NF.4c	Desired Student Performance		
	A student should know	**A student should understand**	**A student should be able to do**
Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. 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?*	• Define multiplication and multiple. • Fluently recall basic multiplication facts. • Multiply whole numbers. • The denominator represents the number of parts that comprise the whole and the numerator represents the number of parts that are being identified. • A fraction a/b is made up of a sufficient number of unit fractions.	• A multiple of 1/b equals a/b. • A fraction a/b is a multiple of the unit fraction 1/b. • Decompose a mixed number to create a whole as a fraction plus the fraction**.** • A fraction that has a numerator larger than the denominator is larger than 1. • When multiplying a whole number by a fraction, the whole number is only multiplied by the numerator. • Look for and make use of structure. • Look for and express regularity in repeated reasoning.	• Use a variety of visual fraction models (tape diagram, number line diagram, or area model) to multiply a fraction by a whole number. • Write an equation that represents the word problem. • Solve word problems which include situations where: the product is unknown and situations that include a whole number of fractional quantities— not a fraction of a whole-number quantity. • Represent the product as a mixed number by joining a sufficient number of unit fractions together to make as many wholes as possible, and create the fraction by

			joining together the left over unit fractions. • Make sense of problems and persevere in solving them. • Model with mathematics.

GRADE 4

Numbers and Operations - Fractions

Understand decimal notation for fractions, and compare decimal fractions	Major

	Desired Student Performance		
	A student should know	**A student should understand**	**A student should be able to do**
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. *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*	• Equivalent fractions represent the same area, interval, or amount. • Fractions should be seen and treated as regular numbers. • That the denominator represents the number of parts that comprise the whole and the numerator represents the number of parts that are being identified. • Create equivalent fractions. • Fluently recall basic multiplication facts.	• Add fractions with like denominators. • When adding fractions with like denominators, you only add the numerators. • Multiplying the numerator and denominator by the same number, n, partitions each unit fraction piece into smaller equal pieces. • Reason abstractly and quantitatively. • Look for and make use of structure.	• Use a variety of visual models (number line and base ten blocks) to represent a decimal. • Create an equivalent fraction with 100 as the denominator for a fraction that has a denominator of 10. • Add fractions with like denominators. • Write a fraction that has 10 or 100 on the bottom as a decimal. • Model with mathematics.

GRADE 4

Numbers and Operations – Fractions

Understand decimal notation for fractions, and compare decimal fractions	Major

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.*	**Desired Student Performance**		
	A student should know	**A student should understand**	**A student should be able to do**
	• The place value chart does not just extend to the left of the ones place but also to the right. • The denominator represents the number of parts that comprise the whole and the numerator represents the number of parts that are being identified. • A fraction with the denominator of 10 represents "tenths" and a 100 represents "hundredths". • When the numerator and denominator are equal, the fraction represents 1. • When the numerator is larger than the denominator the fraction is greater than 1.	• A decimal fraction is a fraction with 10 or 100 as the denominator. • A whole number contains an "understood" decimal point before it (to the right). • Decimals can be written as fractions. • The number of digits to the right of the decimal point indicates the number of zeros in the denominator of the fraction. • The first place after the decimal point represents the "tenths" place and the second place represents the "hundredths" place. • Fractions with denominators equal to 10 and 100 can be written using a decimal point. • The ones place is 10 times the	• Write a decimal number as a fraction with a denominator of 10 or 100. • Write a fraction with the denominator as 10 or 100 for a decimal number. • Create an equivalent fraction with 100 on the bottom for a fraction that has 10 on the bottom. • Locate and label a decimal number on a number line. • Look for and make use of structure.

		value of the tenths place and the tenths place is 10 times the value of the hundredths place. • Correctly pronounce a decimal number. • Attend to precision. • Look for and express regularity in repeated reasoning.	

GRADE 4

Numbers and Operations - Fractions

Understand decimal notation for fractions, and compare decimal fractions	Major

	Desired Student Performance		
	A student should know	**A student should understand**	**A student should be able to do**
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.	• The sign > is the "greater than" sign, the sign < is the "less than" sign, and the sign = is the "equal to" sign. • When placing two decimals on a number line, the one to the left is smaller and the one to the right is larger. • Decimals can be written as fractions. • A decimal represents part of a whole. • Correctly pronounce a decimal number.	• The ones place is 10 times the value of the tenths place and the tenths place is 10 times the value of the hundredths place. • You can only compare decimals that refer to the same whole. • .1 is equivalent to .10, .2 is equivalent to .20, etc. • Model with mathematics. • Attend to precision. • Reason abstractly and quantitatively.	• Represent a decimal with a visual model (number line or base ten blocks). • Make comparisons of decimals by using a variety of visual models (number line or base ten blocks). • Justify comparisons with a visual model.

GRADE 4

Measurement and Data

Solve problems using measurement and conversions of measurements from a larger unit to a smaller unit	Supporting

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),...*

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• Identify unit measurements related to length/distance, volume/capacity, and weight/mass. • Equivalent means “equal to.” • Tell and write time to the nearest minute. • Measure time intervals in minutes. • Directly or indirectly compare two units of measurement. • Use and read a ruler.	• Units belong to either the metric system or the US customary system. • Units in the metric and US customary systems are used to measure length, capacity, weight, and time. • The metric system is based on base ten place value. • Prefixes and their meanings are added to the basic unit in the metric system. • Multiplicatively compare two different units in a system. • Multiplication is used to convert larger units of measurement to smaller units of measurement in a single system.	• Recognize and identify units of measurements used to measure: length, capacity, weight, and time. • Relate the size of a unit to a benchmark or mental image. • Convert larger units of measurement to smaller units of measurement in a single system. • Create a two-column table of measurement equivalents. • Write an equation to represent a multiplication comparison of two different units. • Look for and make use of structure. • Look for and express regularity in repeated reasoning.

GRADE 4

Measurement and Data

Solve problems using measurement and conversions of measurements from a larger unit to a smaller unit	Supporting

4.MD.2	Desired Student Performance		
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.	**A student should know** • Add, subtract, multiply, and divide whole numbers. • Add and subtract fractions or mixed numbers with the denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. • Write a fraction with 10 or 100 as a decimal and how to write a decimal as a fraction with 10 or 100 as the denominator. • Identify unit measurements related to length/distance, volume/capacity, and weight/mass. • Equivalent means “equal to.” • Tell and write time to the nearest minute. • Measure time intervals in minutes. • Directly or indirectly compare two units of measurement.	**A student should understand** • Word problems will be situations that involve two whole number measurements **or** one whole number measurement and a non-whole number measurement. • Units belong to either the metric system or the US customary system. • Units and their size in the metric and US customary systems are used to measure length, capacity, weight, and time. • The metric system is based on base ten place value. • Prefixes and their meanings can be added to the basic unit in the metric system. • Multiplication is used to convert larger units of	**A student should be able to do** • Convert larger units of measurement to smaller units of measurement in a single system. • Recognize and identify units of measurements used to measure: length, capacity, weight, and time. • Relate the size of a unit to a benchmark or mental image. • Construct a number line diagram, marked in whole numbers and fractions or decimals, to represent a measurement scale. • Read a measurement scale. • Solve word problems related to measurement that include the following situations: result unknown, total unknown, both addends unknown, change

	• Use and read a ruler. • Measure to the nearest cm or mm. • Find area and perimeter in unit squares	measurement to smaller units of measurement in a single system. • Make sense of problems and persevere in solving them. • Reason abstractly and quantitatively. • Model with mathematics. • Attend to precision.	unknown, difference unknown, bigger unknown, smaller unknown, unknown product, group size unknown, and number of groups unknown. • Determine how many times larger a specific unit is than another specific smaller unit. • Calculate area and perimeter using a given unit.

GRADE 4

Measurement and Data

Solve problems using measurement and conversions of measurements from a larger unit to a smaller unit	Supporting

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.*	**Desired Student Performance**		
	A student should know	**A student should understand**	**A student should be able to do**
	• Recall basic multiplication facts. • Multiply whole numbers. • Area is the amount of two-dimensional space that is contained within a boundary. • Area is measured in square units. • Find the area of quadrilaterals by tiling and by using the formula *A = l x w*. • Find the area of figures that are decomposable into rectangles. • Perimeter is the boundary of a two-dimensional shape**.** • Perimeter is measured in units of length • Find the perimeter of figures by adding all side lengths together.	• The multiplicative relationship between the number of square units in the row and the number of square units in the column in a rectangular figure. • The unknown length of a rectangular figure is the unknown factor of the product of the length and width. • By using the inverse operation of multiplication, division, you can find the missing length of one side of a rectangular figure when you know the area and one side of the rectangular figure. • All of the possible lengths and widths of a rectangle can be found by dividing the	• Find the area and perimeter of rectangular figures in real world situations. • Find the unknown length of a rectangular figure when one side length and the area of the rectangle are known **or** when one side length and the perimeter are known. • Find the length and width of a rectangle that has a specific perimeter **or** a specific area **or** a specific perimeter and area together. • Write a “situation equation” that can be used to find the missing length of a rectangle when the length of one side and area of the rectangle is known or the length of one side and perimeter of the

	• Opposite sides of a rectangle are equal.	perimeter in half and finding all of the numbers with a sum of this number. • Model with mathematics. • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure.	rectangle is known. *(The Progression Document states that a "situation equation" refers to the idea that the student constructs an equation as a representation of a situation rather than identifying the situation as an example of a familiar equation.)*

GRADE 4

Measurement and Data

Represent and Interpret Data	Supporting

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.*	**Desired Student Performance**		
	A student should know	**A student should understand**	**A student should be able to do**
	• Data is not just a set of numbers; it is a set of numbers with a context. • Read and write in fraction notation. • Fractions should be seen and treated as regular numbers. • That the denominator represents the number of parts that comprise the whole and the numerator represents the number of parts that are being identified. • Difference is the answer to a subtraction problem. • Identify unit measurements related to length/distance, volume/capacity, and weight/mass.	• When adding and subtracting fractions, the fractions must be referring to the same whole. • Add and subtract fractions with denominators of 2, 3, 4, 5,6, 8, 10, 12, and 100. • A line plot is a type of display that positions the data along the appropriate scale drawn as a number line diagram. • Reason abstractly and quantitatively. • Model with mathematics. • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure.	• Use a ruler to gather measurement data (halves, fourths, eighths) and construct a line plot using the data. • Construct a line plot from a given data set and mark off the appropriate units (denominators limited to 2, 4, and 8). • Analyze and read a line plot. • Add and subtract fractions and/or mixed numbers with like denominators to solve problems involving data on a line plot. • Compare fractions by reasoning about their size. • Use the data in the line plot to answer questions about the data.

GRADE 4

Measurement and Data

Geometric measurement: understand concepts of angle and measure angles	Additional

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

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.

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• A ray is straight with one endpoint. • An angle is formed wherever two rays have a common endpoint. This endpoint is called the vertex of the angle. • The size of an angle is the amount of rotation between two rays forming the angle. • A right angle has a measurement of 90°, an acute angle has a measurement of less than 90°,an obtuse angle has a measurement of more than 90° and less than 180°, a straight angle has a measurement of exactly 180°, and a reflex angle has a measurement of more than 180° and less than 360°. • A fraction represents a part of a whole.	• Degrees are the units used to measure angles. • Angles are measured within degrees of a circle. • Angles are a fraction of a circle. • A circle has 360°. • An angle is named using 3 points in which the middle point labels the vertex. • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure.	• Identify an angle. • Identify benchmark angles (90°, 180°, 270°, 360°). • Recognize that angles are measured within degrees of a circle. • Write an angle's measurement as a fraction. • Explain that an angle measurement is a fraction of a circle. • Categorize angles based on their measurement (acute, obtuse, right, straight, reflex). • Construct examples of an angle with a specific measurement using a protractor. • Measure a given angle using a protractor.

GRADE 4

Measurement and Data

Geometric measurement: understand concepts of angle and measure angles	Additional

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

An angle that turns through n one-degree angles is said to have an angle measure of n degrees.

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• A ray is straight with one endpoint. • An angle is formed wherever two rays have a common endpoint. • The size of an angle is the amount of rotation between the two rays that form the angle. • A right angle has a measurement of 90°, an acute angle has a measurement of less than 90°,an obtuse angle has a measurement of more than 90° and less than 180°, a straight angle has a measurement of exactly 180°, and a reflex angle has a measurement of more than 180° and less than 360°.	• Degrees are the units used to measure angles. • Angles are measured within degrees of a circle. • Angles are a fraction of a circle. • A circle has 360°. • A protractor is used to measure angles. • An angle is named using 3 points in which the middle point labels the vertex. • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure.	• Identify an angle. • Recognize that angles are measured within degrees of a circle. • Recognize benchmark angles (90°, 180°, 270°, 360°). • Explain that an angle measurement is a fraction of a circle. • Categorize angles based on their measurement (acute, obtuse, right, straight, reflex). • Construct examples of an angle with a specific measurement using a protractor. • Measure a given angle using a protractor.

GRADE 4

Measurement and Data

Geometric measurement: understand concepts of angle and measure angles	Additional

4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	**Desired Student Performance**		
	A student should know	**A student should understand**	**A student should be able to do**
	• A ray is straight with one endpoint. • An angle is formed wherever two rays have a common endpoint. • The size of an angle is the amount of rotation between the two rays that form the angle. • A right angle has a measurement of 90°, an acute angle has a measurement of less than 90°,an obtuse angle has a measurement of more than 90° and less than 180°, a straight angle has a measurement of exactly 180°, and a reflex angle has a measurement of more than 180° and less than 360°.	• Degrees are the units used to measure angles. • Angles are measured within degrees of a circle. • Angles are a fraction of a circle. • A circle has 360°. • A protractor is used to measure angles • An angle is named using 3 points in which the middle point labels the vertex. • Use appropriate tools strategically. • Attend to precision.	• Name and identify angles. • Identify benchmark angles (90°, 180°, 270°, 360°). • Categorize angles based on their measurement (acute, obtuse, right, straight, reflex). • Use a protractor to construct examples of an angle with a specific measurement. • Measure a given angle using a protractor.

GRADE 4

Measurement and Data

Geometric measurement: understand concepts of angle and measure angles	Additional

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.

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• An angle is formed wherever two rays have a common endpoint. • A ray is straight with one endpoint. • The size of an angle is the amount of rotation between the two rays that form the angle. • A right angle has a measurement of 90°, an acute angle has a measurement of less than 90°,an obtuse angle has a measurement of more than 90° and less than 180°, a straight angle has a measurement of exactly 180°, and a reflex angle has a measurement of more than 180° and less than 360°. • How to write an equation using a variable to represent	• Degrees are the units used to measure angles. • Angles are measured within degrees of a circle. • Angles are a fraction of a circle. • A circle has 360°. • An angle is named using 3 points in which the middle point labels the vertex. • Two angles that have the same vertex and share a side are called adjacent angles. • Two angles are complimentary if their measurements have the sum of 90°. • Two angles are supplementary if their measurements have the sum of 180°. • Opposite angles created by intersecting lines have the same angle measurement.	• Find the measurement of an angle in a diagram when given the angle's complimentary or supplementary measurement. • Find the measurement of the other 3 angles formed by intersecting lines when given the measurement of one angle. • Write an equation to find the missing measurement of one angle when given the measurement of the 2nd angle for complimentary and supplementary angles and find the measurement of it. • Write an equation to find the missing measurement of an angle inside of a larger angle when the larger angle measurement and one measurement part of the larger

	the unknown.	• Make sense of problems and persevere in solving them. • Model with mathematics. • Attend to precision.	angle is known **and** find the measurement of it.

GRADE 4

Geometry

Draw and identify lines and angles and classify shapes by properties of their lines and angles	Additional

4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	Desired Student Performance		
	A student should know	**A student should understand**	**A student should be able to do**
	• A two-dimensional figure is a figure that lies in a plane or is "flat." • Polygons have attributes. • Regular polygons have all equal sides. • Two-dimensional shapes are closed figures. A shape is closed if exactly two sides meet at every vertex, every side meets exactly two other sides, and no sides cross each other. • Two-dimensional figures are made up of points, lines, and line segments.	• The meaning of the words: point, line, line segment, ray, angle, obtuse angle, acute angle, right angle, parallel, and perpendicular. • Lines are infinite in extent and points have location but no dimension. • The size of an angle is the amount of rotation between the two rays that form the angle. • A right angle has a measurement of 90°, an acute angle has a measurement of less than 90°, an obtuse angle has a measurement of more than 90° and less than 180°. • An angle is formed wherever two rays have a common endpoint. This endpoint is called the vertex of the angle.	• Define and recognize examples of the following: point, line, line segment, ray, angle, acute angle, right angle, obtuse angle, perpendicular, and parallel lines. • Construct examples of angles and triangles that are acute, right, or obtuse. • Construct examples of points, lines, line segments, and parallel and perpendicular lines. • Recognize and identify points, lines, line segments, types of angles, parallel and perpendicular lines in two-dimensional figures. • Attend to precision.

GRADE 4

Geometry

Draw and identify lines and angles and classify shapes by properties of their lines and angles

Additional

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.

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• A two-dimensional figure is a figure that lies in a plane or is "flat". • Two-dimensional shapes are closed figures. A shape is closed if exactly two sides meet at every vertex, every side meets exactly two other sides, and no sides cross each other. • Identify defining attributes of two-dimensional figures. • Defining attributes are geometrical characteristics such as number of vertices, angles, angle size, etc. Examples of non-defining attributes are color, overall size, or orientation of the figure. • Classify shapes based on	• The meaning of the words parallel and perpendicular (and distinguish how they are different). • A right angle is an angle with a measurement of 90°, an acute angle is an angle with a measurement of less than 90°, and an obtuse angle is an angle with a measurement of more than 90°. • The size of an angle is the amount of rotation between the two rays that form the angle. • A right triangle is a triangle that contains a right angle; any triangle that has a right angle can be categorized as a right triangle. • An angle is named using 3 points in which the middle	• Identify shapes that have parallel or perpendicular lines. • Use parallel lines and perpendicular lines to categorize two-dimensional shapes. • Categorize shapes based on similar attributes. • Identify two-dimensional shapes that contain angles with a specific measurement. • Identify and recognize right triangles. • Measure a given angle. • Attend to precision. • Use appropriate tools strategically.

	attributes such as number of sides or angles. • Categorize and classify quadrilaterals based on similar attributes. • Shapes in different categories can share attributes, and the shared attributes can define a larger category (Quadrilaterals). • An angle is formed wherever two rays have a common endpoint. This endpoint is called the vertex of the angle.	point labels the vertex.	

GRADE 4

Geometry

Draw and identify lines and angles and classify shapes by properties of their lines and angles

Additional

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.

Desired Student Performance

A student should know	A student should understand	A student should be able to do
• A two-dimensional figure is a figure that lies in a plane or is "flat". • Two-dimensional shapes are closed figures. A shape is closed if exactly two sides meet at every vertex, every side meets exactly two other sides, and no sides cross each other. • A line is straight.	• A figure is symmetrical if a line can be drawn and one side is the mirror image of the other. • When a figure is folded on a line and the areas match up exactly, the fold creates a line of symmetry. • A figure can have more than 1 line of symmetry. • A figure can have no line of symmetry. • Model with mathematics. • Attend to precision. • Look for and make use of structure.	• Create a symmetrical figure by drawing in the missing half of the figure. • Draw in all of the lines of symmetry in a figure. • Identify symmetrical figures.