Grade 4 Mathematics
Achievement Level Descriptors

MAJOR CONTENT

The student solves problems involving the Major Content for the course with connections to the Standards for Mathematical Practice.

Major Content				
Content	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
Compare Fractions and Compare Decimals 4.NF.A.1 4.NF.A.2 4.NF.C.5 4.NF.C.6 4.NF.C.7 LEAP.I.4.1	Compares decimals to hundredths; uses decimal notations for fractions (tenths and hundredths). Compares fractions, with like or unlike numerators and denominators, by creating equivalent fractions and comparing to a benchmark fraction.	Given a visual model, compares decimals to hundredths; **expresses a fraction with denominator 10 as an equivalent fraction with denominator 100;** uses decimal notation for fractions (tenths and hundredths); and compares fractions, with like or unlike numerators and denominators, **by creating equivalent fractions and comparing to a benchmark fraction.**	Given a visual model, compares decimals to hundredths; uses decimal notations for fractions (tenths and hundredths); and compares fractions, with like **or unlike numerators and denominators by comparing to a benchmark fraction**.	Given a visual model, compares decimals to hundredths; uses decimal notations for fractions (tenths and hundredths); and **compares fractions with like denominators.**
	Recognizes that decimals and fractions must refer to the same whole in order to compare.	Recognizes that decimals and fractions must refer to the same whole in order to compare.	**Recognizes that decimals and fractions must refer to the same whole in order to compare.**	
	Shows results using symbols.	Shows results using symbols.	**Shows results using symbols.**	
	Demonstrates the use of conceptual understanding of fractional equivalence and ordering when solving simple word problems requiring fraction comparison.	Solves simple word problems requiring fraction comparison.	**Solves simple word problems requiring fraction comparison with scaffolding.**	

	Major Content			
Content	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
	Adds fractions with denominators of 10 and 100.			
Solve Fraction Problems 4.NF.B.3 LEAP.I.4.6	**Understands and** solves mathematical and word problems involving the addition and subtraction of fractions and mixed numbers with like denominators by joining and separating parts referring to the same whole**, and justifies the solution with a visual model**.	Using visual models, solves mathematical **and word** problems involving the addition and subtraction of fractions **and mixed numbers** with like denominators by joining and separating parts referring to the same whole.	Using visual models, solves mathematical problems involving the addition and subtraction of fractions with like denominators by joining and separating parts referring to the same whole.	Using visual models, solves mathematical problems involving the addition and subtraction of fractions with like denominators by joining and separating parts referring to the same whole.
	Decomposes a fraction into a sum of fractions with the same denominator in more than one way and records the decomposition using an equation.	Decomposes a fraction into a sum of fractions with the same denominator **in more than one way** and records the decomposition using an equation.	**Decomposes a fraction into a sum of fractions with the same denominator and records the decomposition using an equation.**	
Multiply Fractions by Whole Numbers 4.NF.B.4	**Describes** a visual fraction model and solves mathematical and real-world problems by recognizing that a fraction a/b is a multiple of $1/b$ and multiplies a fraction by a whole number.	Using visual models, solves mathematical **and real-world** problems by recognizing that a fraction a/b is a multiple of $1/b$ and multiplies a fraction by a whole number.	Using visual models, solves mathematical problems by recognizing that a fraction a/b is a multiple of $1/b$ **and multiplies a fraction by a whole number**.	Using visual models, solves mathematical problems by recognizing that a fraction a/b is a multiple of $1/b$.
Multiplicative Comparison 4.OA.A.1 4.OA.A.2	Interprets multiplication equations as comparisons and represents statements of comparisons as multiplication equations.	Interprets multiplication equations as comparisons or represents statements of comparisons as multiplication equations.	Interprets multiplication equations as comparisons or represents statements of comparisons as multiplication equations.	Interprets multiplication equations as comparisons or represents statements of comparisons as multiplication equations.

Major Content				
Content	**Level 5: Advanced**	**Level 4: Mastery**	**Level 3: Basic**	**Level 2: Approaching Basic**
	Uses multiplication or division to solve **multi-step** word problems involving multiplicative comparisons.	Uses multiplication or division to solve one- or two-step word problems involving multiplicative comparisons.	Uses multiplication or division to solve **scaffolded** one - or two-step word problems involving multiplicative comparisons.	
	Uses a symbol for the unknown number in an equation or expression.			
Solve Multi-step Problems 4.OA.A.3 4.NBT.B.5 4.NBT.B.6 LEAP.I.4.2 LEAP.I.4.3 LEAP.I.4.4 LEAP.I.4.5	Solves **multi-step** word problems using the four operations with whole numbers.	Solves two-step **word** problems using the four operations with whole numbers.	Solves one- **or two-step** problems using the four operations with whole numbers.	Solves one-step problems using the four operations with whole numbers.
	Multiplies a three- **or four-digit** by a one-digit number, or two two-digit numbers.	Multiplies a three-digit by a one-digit number, or two two-digit numbers.	Multiplies a three-digit by a one-digit number, or two two-digit numbers.	Multiplies a three-digit by a one-digit number, or two two-digit numbers.
	Finds whole number quotients and remainders with up to **four-**digit dividends and one-digit divisors and interprets remainders.	Finds whole number quotients and remainders with up to three-digit dividends and one-digit divisors **and interprets remainders**.	Finds whole number quotients and remainders with up to three-digit dividends and one-digit divisors.	Finds whole number quotients and remainders with up to three-digit dividends and one-digit divisors.
Place Value 4.NBT.A.1 4.NBT.A.2 4.NBT.A.3	In any **multi**-digit whole number, recognizes a digit in one place represents 10 times as much as it represents in the place to its right.	In any **four-**digit whole number, recognizes a digit in one place represents 10 times as much as it represents in the place to its right.	In any three-digit whole number, recognizes a digit in one place represents 10 times as much as it represents in the place to its right.	In any three-digit whole number, recognizes a digit in one place represents 10 times as much as it represents in the place to its right.

Major Content				
Content	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
	Reads, writes, and compares **multi**-digit whole numbers using base-10 numerals, number names in expanded form and symbols (>, <, =), rounds to any place value.	Reads, writes, and compares **four**-digit whole numbers using base-10 numerals, number names in expanded form and symbols (>, <, =), and rounds to any place value.	**Reads, writes, and compares three-digit whole numbers using base-10 numerals, number names in expanded form and symbols (>, <, =), and rounds to any place value with scaffolding.**	
Addition and Subtraction 4.NBT.B.4 LEAP.I.4.7 LEAP.I.4.8	Fluently adds and subtracts multi-digit whole numbers	**Fluently** adds and subtracts multi-digit whole numbers.	Adds **and** subtracts multi-digit whole numbers.	Adds or subtracts multi-digit whole numbers.
	Solves **multi**-step problems by adding or subtracting multi-digit whole numbers.	Solves **two**-step problems by adding and subtracting multi-digit whole numbers.	Solves one-step problems by adding and subtracting multi-digit whole numbers.	Solves one-step problems by adding and subtracting multi-digit whole numbers.

ADDITIONAL & SUPPORTING CONTENT

The student solves problems involving the Additional & Supporting Content for the course with connections to the Standards for Mathematical Practice.

Additional & Supporting Content				
Content	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
Operations and Factors 4.OA.B.4	Recognizes a whole number is a multiple of factors and determines **all** factor pairs and multiples of whole numbers within the range of 1-100.	Recognizes a whole number is a multiple of factors and determines factor pairs or multiples of whole numbers within the range of 1-100.	Recognizes a whole number is a multiple of factors and **determines** factor pairs or multiples of whole numbers within the range of 1-100.	Recognizes a whole number is a multiple of factors and identifies factor pairs or multiples of whole numbers within the range of 1-100.
	Determines whether a whole number in the range 1-100 is prime or composite.	Determines whether a whole number in the range 1-100 is prime or composite.	**Determines, with scaffolding, whether a whole number in the range 1-100 is prime or composite.**	
Measurement and Conversion 4.MD.A.1 4.MD.A.2 4.MD.A.3 LEAP.I.4.6	Solves measurement word problems with whole numbers, including calculating area and perimeter **(when side lengths are not provided),** using all four operations, and using addition, subtraction, and multiplication of simple fractions.	Solves measurement **word** problems with whole numbers**, including calculating area and perimeter (when information about side lengths is provided),** using all four operations, and using addition, subtraction, and multiplication of simple fractions.	Solves mathematical measurement problems with whole numbers using all four operations, and using addition, subtraction, **and multiplication** of simple fractions.	Solves mathematical measurement problems with whole numbers, using all four operations, and using addition and subtraction of simple fractions.
	Records measurement equivalents in a two-column table.	Records measurement equivalents in a two-column table.	**Records measurement equivalents in a two-column table.**	

Additional & Supporting Content				
Content	**Level 5: Advanced**	**Level 4: Mastery**	**Level 3: Basic**	**Level 2: Approaching Basic**
	Uses knowledge of measurement units within one system to solve problems by converting from larger units to smaller units.	Uses knowledge of measurement units within one system to **solve problems by** converting from larger units to smaller units.	Uses knowledge of measurement units within one system to convert from larger units to smaller units.	
	Represents measurement quantities using diagrams **and provides the appropriate measurement scale given the context**.	**Represents measurement quantities using diagrams with a given measurement scale.**		
Represent and Interpret Data 4.MD.B.4	Makes a line plot to display a data set of measurements in fractions of a unit with like denominators of 2, 4, or 8, **(including mixed numbers)** and uses addition and subtraction of fractions to solve problems involving information in the line plots **and evaluates the solution in relation to the data.**	Makes a line plot to display a data set of measurements in fractions of a unit with like denominators of 2, 4, **or 8** and **uses addition and subtraction of fractions to solve problems involving information in the line plot.**	**Makes** a line plot to display a data set of measurements in fractions of a unit with like denominators of 2 or 4.	Identifies a correct line plot that displays a data set of measurements in fractions of a unit with like denominators of 2 or 4.
Geometric Measurement 4.MD.C.5 4.MD.C.6 4.MD.C.7	Understands and applies concepts of angle measurement **recognizing that angles are measured in reference to a circle.**	Understands and applies concepts of angle measurement.	Understands and **applies** concepts of angle measurement.	Understands and identifies concepts of angle measurement.
	Recognizes how angles are formed and that angle measures are additive.	**Recognizes how angles are formed and that angle measures are additive.**		

		Additional & Supporting Content		
Content	**Level 5: Advanced**	**Level 4: Mastery**	**Level 3: Basic**	**Level 2: Approaching Basic**
	Uses a protractor to measure and sketch angles.	Uses a protractor to measure **and sketch** angles.	Uses a protractor to measure angles.	
	Solves mathematical and real-world problems by composing and decomposing angles and **using an equation with a symbol for the unknown angle measure.**	**Solves mathematical and real-world problems by composing and decomposing angles.**		
Additive Area 4.MD.D.8	Recognizes area as additive and find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real-world problems.	Recognizes area as additive and find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, **applying this technique to solve real-world problems.**	**Recognizes area as additive and find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts.**	
Lines, Angles and Shapes 4.G.A.1 4.G.A.2 4.G.A.3	**Fluently** identifies and uses points, lines, line segments, rays, angles (right, obtuse and acute), perpendicular lines, parallel lines, lines of symmetry, and right triangles to classify **or describe** two-dimensional figures.	Identifies and uses points, lines, line segments, rays, angles (right, obtuse and acute), perpendicular lines, parallel lines, lines of symmetry, and right triangles to classify **two-dimensional figures**.	Identifies and **uses** points, lines, line segments, rays, angles (right, obtuse and acute), perpendicular lines, parallel lines, lines of symmetry, and right triangles **to classify quadrilaterals and triangles**.	Identifies points, lines, line segments, rays, angles (right, obtuse and acute), perpendicular lines, parallel lines, lines of symmetry, and right triangles.

		Additional & Supporting Content		
Content	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
Generate and Analyze Patterns 4.OA.C.5	Generates a number or shape pattern that follows a given rule and identifies **apparent** features of the pattern **(not explicit in the rule) and describes the rule for generating the number or shape pattern.**	Generates a number or shape pattern that follows a given rule **and identifies explicit features of the pattern**.	**Generates** a number or shape pattern that follows a given rule.	Identifies a number or shape pattern that follows a given rule.

EXPRESSING MATHEMATICAL REASONING

In connection with course content, the student expresses course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.

Content	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
	In connection with the content knowledge and skills described in Major Content, the student **clearly** constructs and communicates a		In connection with the content knowledge and skills described in Major Content, the student constructs and communicates a	
LEAP.II.4.1 LEAP.II.4.2 LEAP.II.4.3 LEAP.II.4.4 LEAP.II.4.5 LEAP.II.4.6 LEAP.II.4.7	**complete** written response based on properties of operations; the relationships between addition and subtraction and between multiplication and division; and identification of arithmetic patterns		written response based on properties of operations; the relationships between addition and subtraction and between multiplication and division; and identification of arithmetic patterns	
	well-organized and complete response based on operations using concrete referents such as diagrams, including number lines, (whether provided in the prompt **or constructed by the student**) and connecting the diagrams to a written (symbolic) method		response based on operations using concrete referents such as diagrams, including number lines, (provided in the prompt) and connecting the diagrams to a written (symbolic) method	
	well-organized and complete response by presenting and defending solutions to multi-step problems as valid chains of reasoning; using symbols appropriately; **evaluating** reasoning; and presenting **and defending** corrected reasoning	**well-organized** and complete response by presenting **and defending** solutions to multi-step problems as valid chains of reasoning; using symbols appropriately; distinguishing correct reasoning from flawed; and identifying and describing a flaw in reasoning or in solutions to multi-step problems; and presenting corrected reasoning	complete response by presenting solutions to **multi-step** problems as valid chains of reasoning; using symbols appropriately; distinguishing correct reasoning from flawed; and identifying and **describing a flaw in reasoning or solutions to multi-step problems; and presenting corrected reasoning**	response by presenting solutions to scaffolded two-step problems as valid chains of reasoning; using symbols appropriately; distinguishing correct reasoning from flawed; and identifying a flaw in reasoning

Expressing Mathematical Reasoning			
Content	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
	Responses may include:			
	a logical/defensible approach based on a conjecture and/or stated assumptions, using mathematical connections	a logical/**defensible** approach based on a conjecture and/or stated assumptions, **using mathematical connections**	a **logical** approach based on a conjecture and/or stated assumptions	an approach based on a conjecture and/or stated or faulty assumptions
	an **efficient** and logical progression of steps **with appropriate justification**	a logical progression of steps	a **logical**, but incomplete, progression of steps	an incomplete or illogical progression of steps
	precision of calculation	precision of calculation	minor calculation errors	an intrusive calculation error
	fluent use of grade-level vocabulary, symbols, and labels	**fluent** use of grade-level vocabulary, symbols, and labels	limited use of grade-level vocabulary, symbols, and labels	limited use of grade-level vocabulary, symbols, and labels
	justification of a conclusion	justification of a conclusion	partial justification of a conclusion based on calculations	partial justification of a conclusion based on calculations
	determining whether an argument or conclusion is generalizable			
	evaluating, interpreting and critiquing the validity of responses, reasoning, and approaches, using mathematical connections and **providing a counter-example where applicable**	evaluating, **interpreting, and critiquing** the validity of responses, **reasoning,** and approaches **using mathematical connections**	**evaluating the validity of responses, approaches, and conclusions**	

MODELING & APPLICATION

In connection with content, the student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.

Modeling & Application				
Content	**Level 5: Advanced**	**Level 4: Mastery**	**Level 3: Basic**	**Level 2: Approaching Basic**
	In connection with the content knowledge, skills, and abilities described in Major Content, the student devises a plan and applies mathematics to solve multi-step, real-world contextual word problems by:			
LEAP.III.4.1 LEAP.III.4.2	using stated assumptions and approximations or making assumptions to simplify a real-world situation	using stated assumptions and approximations or **making assumptions** to simplify a real-world situation	using stated assumptions and approximations to simplify a real-world situation	using stated assumptions and approximations to simplify a real-world situation
	analyzing and/or creating constraints, relationships, and goals			
	mapping relationships between quantities by selecting appropriate tools to create models	**mapping relationships** between quantities by **selecting appropriate** tools to create models	**illustrating relationships between quantities** by using provided tools to create models	identifying quantities by using provided tools to create models
	analyzing relationships mathematically between quantities to draw conclusions	analyzing relationships mathematically between quantities to draw conclusions	analyzing relationships mathematically **between quantities** to draw conclusions	analyzing relationships mathematically to draw conclusions
	justifying and defending models to lead to a conclusion			
	interpreting mathematical results in the context of the situation	interpreting mathematical results **in the context of the situation**	**interpreting mathematical results in a simplified context**	

		Modeling & Application		
Content	**Level 5: Advanced**	**Level 4: Mastery**	**Level 3: Basic**	**Level 2: Approaching Basic**
	In connection with the content knowledge, skills, and abilities described in Major Content, the student devises a plan and applies mathematics to solve multi-step, real-world contextual word problems by:			
	reflecting on whether results make sense	reflecting on whether results make sense	**reflecting on whether results make sense**	
	improving a model if it has not served its purpose	modifying **and/or improving** a model if it has not served its purpose	**modifying a model if it has not served its purpose**	
	writing a **concise** arithmetic expression or equation to describe a situation	writing an arithmetic expression or equation to describe a situation	writing an arithmetic expression or equation to describe a situation	writing an arithmetic expression or equation to describe a situation