



National Center and State Collaborative

Mathematics Instructional Families – Number Operations

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View of Learning Targets and Families across Grades

Distribution of Instructional Families: Number Operations (Real Numbers)

(K-4) Elementary School Learning Targets					(5-8) Middle School Learning Targets			(9-12) High School Learning Targets
<i>Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:</i> <ul style="list-style-type: none"> Count, model, and estimate quantities; Compare, represent, and order numbers; Apply place value concepts and expanded notation to compose and decompose whole numbers. 					<i>Build flexibility using rational and irrational numbers to expand understanding of number systems:</i> <ul style="list-style-type: none"> Estimate, compare, and represent numbers (fractions, decimals, and percents; integers); Use exponents to express quantities and relationships; Use integers in problem solving. 			<i>Demonstrate flexibility using rational and irrational numbers and number systems, including complex numbers and matrices.</i>
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 6	Grade 7	Grade 8	HS

* No Access Points at Grade 5

Counting and Representing Numbers	Understanding the Base Ten Number System	Determining Relative Position of Numbers
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Distribution of Instructional Families: Number Operations (Real Numbers)

(K-4) Elementary School Learning Targets					(5-8) Middle School Learning Targets				(9-12) High School Learning Targets
<p><i>Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:</i></p> <ul style="list-style-type: none"> • Count, model, and estimate quantities; • Compare, represent, and order numbers; • Apply place value concepts and expanded notation to compose and decompose whole numbers. 					<p><i>Build flexibility using rational and irrational numbers to expand understanding of number systems:</i></p> <ul style="list-style-type: none"> • Estimate, compare, and represent numbers (fractions, decimals, and percents; integers); • Use exponents to express quantities and relationships; • Use integers in problem solving. 				<p><i>Demonstrate flexibility using rational and irrational numbers and number systems, including complex numbers and matrices.</i></p>
<p><i>Build an understanding of computational strategies and algorithms:</i></p> <ul style="list-style-type: none"> • Fluently add, subtract, multiply, divide, and estimate; • Perform and represent operations with whole numbers, fractions, and mixed numbers; • Identify multiples and factors of whole numbers. 					<p><i>Expand use of computational strategies and algorithms to rational numbers:</i></p> <ul style="list-style-type: none"> • Perform operations fluently with rational numbers, including fractions, decimals, and percents; • Identify equivalence of indicated division and fractional parts. 				<p><i>Build an understanding of computational strategies and algorithms including matrices and irrational and complex numbers:</i></p> <ul style="list-style-type: none"> • Use matrix operations and complex and irrational number operations; • Apply exponential expressions (laws and properties).
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	HS

Perform Operations with Whole Numbers	Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers
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Distribution of Instructional Families: Number Operations (Fractions/Ratios/Proportions)

(K-4) Elementary School Learning Targets		(5-8) Middle School Learning Targets			
<p><i>Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:</i></p> <ul style="list-style-type: none"> • <i>Count, model, and estimate quantities;</i> • <i>Compare, represent, and order numbers;</i> • <i>Apply place value concepts and expanded notation to compose and decompose whole numbers.</i> 		<p><i>Build flexibility using rational and irrational numbers to expand understanding of number systems:</i></p> <ul style="list-style-type: none"> • <i>Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);</i> • <i>Use exponents to express quantities and relationships;</i> • <i>Use integers in problem solving.</i> 			
<p><i>Build an understanding of computational strategies and algorithms:</i></p> <ul style="list-style-type: none"> • <i>Fluently add, subtract, multiply, divide, and estimate;</i> • <i>Perform and represent operations with whole numbers, fractions, and mixed numbers;</i> • <i>Identify multiples and factors of whole numbers.</i> 		<p><i>Expand use of computational strategies and algorithms to rational numbers:</i></p> <ul style="list-style-type: none"> • <i>Perform operations fluently with rational numbers, including fractions, decimals, and percents;</i> • <i>Identify equivalence of indicated division and fractional parts.</i> 			
Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8

* No Access Points at K, 1, 2 or HS

Representing	Performing Operations	Determining Equivalency	Problem Solving
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View of Learning Targets, Families, and Access Points by Grade-band

Overview of Access Points: Number Operations (Real Numbers) - Counting and Representing Numbers; Understanding Base Ten Number System; Determining Relative Position of Whole Numbers

(K-4) Elementary School Learning Targets

Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:

- *Count, model, and estimate quantities;*
- *Compare, represent, and order numbers;*
- *Apply place value concepts and expanded notation to compose and decompose whole numbers.*

Grade K	Grade 1	Grade 2	Grade 3	Grade 4
MAFS.K.CC.1.AP.1a Rote count up to 10.	MAFS.1.NBT.1.AP.1a Rote count up to 100.	MAFS.2.NBT.1.AP.3a Identify numerals 0–100.	MAFS.3.NBT.1.AP.1a Use place value to round to the nearest 10 or 100.	MAFS.4.NBT.1.AP.3a Use a hundreds chart or number line to round to any place (i.e., ones, tens, hundreds, thousands).
MAFS.K.CC.1.AP.1b Rote count up to 31.	MAFS.1.NBT.2.AP.2b Identify the value of the numbers in the tens and one place within a given number up to 31.	MAFS.2.NBT.1.AP.3b Identify the numeral between 0 and 100 when presented with the name.		
MAFS.K.CC.1.AP.1c Rote count up to 100.	MAFS.1.NBT.2.AP.3a Compare two-digit numbers up to 31 using representations and numbers (e.g., identify more tens, fewer tens, more ones, fewer ones, larger number, smaller number).	MAFS.2.NBT.1.AP.3c Write or select the numerals 0–100.		MAFS.4.NBT.1.AP.2b Write or select the expanded form for a multi-digit number.
		MAFS.2.OA.3.AP.3a Identify a group of fewer than 10 objects as odd or even.		MAFS.4.NBT.1.AP.2a Compare multi-digit numbers.
MAFS.K.CC.2.AP.4b Count up to 10 objects in a line, rectangle, or array.		MAFS.2.NBT.1.AP.3e Explain what the zero represented in place value (hundreds, tens, ones) in a number.		MAFS.4.NBT.1.AP.1a Compare the value of a digit when it is represented in a different place of two three-digit numbers (e.g., The digit 2 in 124 is ten times the digit 2 in 472).
MAFS.K.CC.2.AP.4c Match the numeral to the number of objects in a set.		MAFS.2.NBT.1.AP.1a With base ten blocks, build representations of three-digit		

(K-4) Elementary School Learning Targets

Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:

- *Count, model, and estimate quantities;*
- *Compare, represent, and order numbers;*
- *Apply place value concepts and expanded notation to compose and decompose whole numbers.*

Grade K	Grade 1	Grade 2	Grade 3	Grade 4
		numbers using hundreds, tens and ones.		
MAFS.K.CC.1.AP.3a Identify numerals 1-10.		MAFS.2.NBT.1.AP.3d Write or select the expanded form for any two-digit number.		
MAFS.K.CC.1.AP.3b Identify the numerals 1–10 when presented with the name of the number.		MAFS.2.NBT.1.AP.4a Compare (greater than, less than, equal to) two numbers up to 100.		
MAFS.K.CC.1.AP.3c Write or select the numerals 1–10.		MAFS.2.NBT.1.AP.4b Compare two-digit numbers using representations and numbers (e.g., identify more tens, fewer tens, more ones, fewer ones, larger numbers, smaller numbers).		
MAFS.K.CC.2.AP.4b Count up to 10 objects in a line, rectangle, or array.		MAFS.2.NBT.1.AP.4c Compare three-digit numbers using representations and numbers (e.g., identify more hundreds, less hundreds, more tens, less tens, more ones, less ones, larger number, smaller number).		
MAFS.K.CC.2.AP.4a Identify the set that has more.				
MAFS.K.CC.3.AP.7a Identify the smaller or larger number given two numbers between 0 and 10.				
Counting and Representing Numbers	Understanding the Base Ten Number System		Determining Relative Position of Numbers	

Overview of Access Points: Number Operations (Real Numbers) - Counting and Representing Numbers; Understanding Base Ten Number System; Determining Relative Position of Whole Numbers

(5-8) Middle School Learning Targets

Build flexibility using rational and irrational numbers to expand understanding of number systems:

- *Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);*
- *Use exponents to express quantities and relationships;*
- *Use integers in problem solving.*

Grade 6	Grades 7- 8
MAFS.6.NS.3.AP.7b Determine the meaning of absolute value using numbers from -30 to 30.	MAFS.8.NS.1.AP.1c Round irrational quotients to the hundredths place.
MAFS.6.EE.1.AP.1b Identify what an exponent represents (e.g., $8^3 = 8 \times 8 \times 8$).	MAFS.7.NS.1.AP.1b Find the distance between two rational numbers on a number line.
MAFS.6.NS.3.AP.6c Identify numbers as positive or negative.	MAFS.8.NS.1.AP.2a Locate approximations of irrational numbers on a number line.
MAFS.6.NS.3.AP.6d Locate positive and negative numbers on a number line.	
MAFS.6.NS.3.AP.6e Plot positive and negative numbers on a number line.	
MAFS.6.NS.3.AP.5a Represent positive or negative numbers on a number line given a real-world situation.	
MAFS.6.NS.3.AP.6a Find given points between -10 and 10 on both axes of a coordinate plane.	
MAFS.6.NS.3.AP.6b Label points between -10 and 10 on both axes of a coordinate plane.	
MAFS.6.NS.3.AP.7a Compare two numbers on a number line (e.g., $-2 > -9$) between -30 and 30.	
Understanding the Base Ten Number System	Determining Relative Position of Numbers

Overview of Access Points: Number Operations (Real Numbers) - Counting and Representing Numbers; Understanding Base Ten Number System; Determining Relative Position of Whole Numbers

(9-12) High School Learning Targets

Demonstrate flexibility using rational and irrational numbers and number systems, including complex numbers and matrices.

HS

MAFS.912.N-RN.1.AP.2a

Convert from radical representation to using rational exponents and vice versa.

Understanding the Base Ten Number System

Overview of Access Points: Number Operations (Real Numbers) - Perform Operations with Whole Numbers; Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

(K-4) Elementary School Learning Targets

Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:

- *Count, model, and estimate quantities;*
- *Compare, represent, and order numbers;*
- *Apply place value concepts and expanded notation to compose and decompose whole numbers.*

Build an understanding of computational strategies and algorithms:

- *Fluently add, subtract, multiply, divide, and estimate;*
- *Perform and represent operations with whole numbers, fractions, and mixed numbers;*
- *Identify multiples and factors of whole numbers.*

Grade K-1	Grade 2	Grade 3	Grade 4
MAFS.K.OA.1.AP.2b Count two sets to find sums up to 10.	MAFS.2.NBT.1.AP.2a Skip count by fives up to 100.	MAFS.3.NBT.1.AP.2a Use the relationships between addition and subtraction to solve problems.	MAFS.4.OA.2.AP.4a Identify multiples for a whole number (e.g., The multiples of 2 are 2, 4, 6, 8, 10...).
MAFS.1.OA.1.AP.2a Solve word problems that include combining three quantities whose sum is less than 10 using objects or drawings.	MAFS.2.NBT.1.AP.2b Skip count by tens up to 200.	MAFS.3.NBT.1.AP.2b Solve multi-step addition and subtraction problems up to 100.	MAFS.4.NBT.2.AP.5a Solve a two-digit by one-digit whole number multiplication problem using two different strategies.
MAFS.K.OA.1.AP.aa Use objects to solve word problems related to addition and subtraction that involve unknowns and quantities up to 5.	MAFS.2.NBT.1.AP.2c Skip count by hundreds up to 1000.	MAFS.3.OA.1.AP.1b Solve multiplication problems with neither number greater than five.	MAFS.4.OA.1.AP.3a Solve and check one- or two-step word problems requiring the four operations within 100.
MAFS.K.OA.1.AP.2c Solve word problems within 10.	MAFS.2.NBT.2.AP.8a Mentally add or subtract 10 from a given set from the tens family (e.g., What is 10 more than 50? What is 10 fewer than 70?).	MAFS.3.OA.1.AP.1a Find the total number inside an array with neither number in the columns or rows greater than five.	
MAFS.1.OA.3.AP.6a Add and subtract within 10, demonstrating fluency for addition and subtraction within 5.		MAFS.3.OA.1.AP.1c Use objects to model multiplication involving up to five groups with up to five objects in each.	

(K-4) Elementary School Learning Targets

Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:

- *Count, model, and estimate quantities;*
- *Compare, represent, and order numbers;*
- *Apply place value concepts and expanded notation to compose and decompose whole numbers.*

Build an understanding of computational strategies and algorithms:

- *Fluently add, subtract, multiply, divide, and estimate;*
- *Perform and represent operations with whole numbers, fractions, and mixed numbers;*
- *Identify multiples and factors of whole numbers.*

Grade K-1	Grade 2	Grade 3	Grade 4
<p>MAFS.1.OA.1.AP.1c Solve one-step addition and subtraction word problems where the change or result is unknown ($4 + _ = 7$) or ($4 + 3 = _$), within 20 using objects, drawings or pictures.</p>	<p>MAFS.2.NBT.2.AP.8b Mentally add or subtract 100 from a given set from the hundreds family (e.g., What is 100 more than 500? What is 100 fewer than 700?).</p>	<p>MAFS.3.OA.1.AP.2a Determine the number of sets of whole numbers, five or less, that equal a dividend.</p>	
<p>MAFS.1.OA.1.AP.1b Solve addition and subtraction word problems within 20.</p>	<p>MAFS.2.NBT.2.AP.6a Combine three two-digit numbers within 20.</p>	<p>MAFS.3.OA.4.AP.8a Solve and check one-step word problems using the four operations within 100.</p>	
	<p>MAFS.2.NBT.2.AP.7a Decompose tens into ones and/or hundreds into tens in subtraction situations.</p>		
	<p>MAFS.2.NBT.2.AP.7b Compose ones into tens and/or tens into hundreds in addition situations.</p>		
	<p>MAFS.2.NBT.2.AP.5b Model addition and subtraction with base ten blocks within 100.</p>		
	<p>MAFS.2.OA.1.AP.1a Solve addition and subtraction word problems within 100 using objects, drawings, or pictures.</p>		
	<p>MAFS.2.OA.1.AP.1c Write or select an equation representing the problems and its solution.</p>		

(K-4) Elementary School Learning Targets

Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:

- *Count, model, and estimate quantities;*
- *Compare, represent, and order numbers;*
- *Apply place value concepts and expanded notation to compose and decompose whole numbers.*

Build an understanding of computational strategies and algorithms:

- *Fluently add, subtract, multiply, divide, and estimate;*
- *Perform and represent operations with whole numbers, fractions, and mixed numbers;*
- *Identify multiples and factors of whole numbers.*

Grade K-1	Grade 2	Grade 3	Grade 4

Perform Operations with Whole Numbers	Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers
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Overview of Access Points: Number Operations (Real Numbers) - Perform Operations with Whole Numbers; Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

(5-8) Middle School Learning Targets

Build flexibility using rational and irrational numbers to expand understanding of number systems:

- *Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);*
- *Use exponents to express quantities and relationships;*
- *Use integers in problem solving.*

Expand use of computational strategies and algorithms to rational numbers:

- *Perform operations fluently with rational numbers, including fractions, decimals, and percents;*
- *Identify equivalence of indicated division and fractional parts.*

Grade 5	Grade 6	Grade 7	Grade 8
MAFS.5.NBT.2.AP.6a Find whole number quotients up to two dividends and two divisors.	MAFS.6.EE.1.AP.1a Solve numerical expressions involving whole-number bases and exponents (e.g., $5 + 24 \times 6 = 101$)	MAFS.7.NS.1.AP.2a Solve single-digit rational number multiplication problems using a number line.	
MAFS.5.NBT.2.AP.6b Find whole number quotients of whole numbers with up to two-digit dividends and two-digit divisors.	MAFS.6.EE.2.AP.7a Solve problems or word problems using equations for cases in which the quantities in the problem are positive rational numbers.	MAFS.7.NS.1.AP.2b Solve division problems with quotients from -100 to 100 using a number line.	
MAFS.5.OA.1.AP.1a Evaluate a simple expression involving one set of parenthesis.	MAFS.6.NS.2.AP.6a Use a variable to represent numbers and write expressions when solving real-world problems.	MAFS.7.NS.1.AP.1a Identify rational numbers that are an equal distance from 0 on a number line as additive inverses.	
	MAFS.6.EE.1.AP.2a Write or select an algebraic expression that represents a real-world situation.	MAFS.7.EE.2.AP.4a Set up equations with one variable based on real-world problems	
		MAFS.7.EE.2.AP.4b Solve equations with one variable based on real-world problems.	
Perform Operations with Whole Numbers		Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers	

Overview of Access Points: Number Operations (Real Numbers) - Perform Operations with Whole Numbers; Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

(9-12) High School Learning Targets

Demonstrate flexibility using rational and irrational numbers and number systems, including complex numbers and matrices.

Build an understanding of computational strategies and algorithms including matrices and irrational and complex numbers:

- *Use matrix operations and complex and irrational number operations;*
- *Apply exponential expressions (laws and properties).*

HS

MAFS.912.A-SSE.1.AP.2a Rewrite algebraic expressions in different equivalent forms, such as factoring or combining like terms.

MAFS.912.A-REI.1.AP.2a Solve simple rational and radical equations in one variable.

MAFS.912.N-RN.2.AP.3a Know and justify that when adding or multiplying two rational numbers the result is a rational number.

Perform Operations with Whole Numbers

Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

Overview of Access Points: Number Operations (Fractions/Ratios/Proportions) - Representation; Determine Equivalency; Perform Operations and; Problem Solving

(K-4) Elementary School Learning Targets

Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:

- *Count, model, and estimate quantities;*
- *Compare, represent, and order numbers;*
- *Apply place value concepts and expanded notation to compose and decompose whole numbers.*

Build an understanding of computational strategies and algorithms:

- *Fluently add, subtract, multiply, divide, and estimate;*
- *Perform and represent operations with whole numbers, fractions, and mixed numbers;*
- *Identify multiples and factors of whole numbers.*

Grade 3	Grade 4
MAFS.3.NF.1.AP.1a Identify the number of highlighted parts (numerator) of a given representation (rectangles and circles).	MAFS.4.NF.1.AP.1a Determine equivalent fractions using visual fraction models and a number line.
	MAFS.4.NF.3.AP.6c Read, write, or select decimals to the tenths place.
MAFS.3.NF.1.AP.1b Identify the total number of parts (denominator) of a given representation (rectangles and circles).	MAFS.4.NF.3.AP.6d Read, write, or select decimals to the hundredths place.
	MAFS.4.NF.1.AP.2a Use =, <, or > to compare two fractions (fractions with a denominator or 10 or less).
MAFS.3.NF.1.AP.1c Identify the fraction that matches the representation of partitioned rectangles and circles into halves, fourths, thirds, and eighths.	MAFS.4.NF.1.AP.2b Compare two given fractions that have different denominators.
	MAFS.4.NF.3.AP.6b Match a fraction (with a denominator of 10 or 100) with its decimal equivalent ($5/10 = 0.5$).
MAFS.3.NF.1.AP.2a Locate given common unit fractions (i.e., $1/2$, $1/4$) on a number line or ruler.	MAFS.4.NF.3.AP.5a Find the equivalent fraction with denominators that are multiples of 10.
	MAFS.4.NF.3.AP.6a Identify the equivalent decimal form for a benchmark fraction.
	MAFS.4.NF.2.AP.3a Using a representation, decompose a fraction into multiple copies of a unit fraction (e.g., $3/4 = 1/4 + 1/4 + 1/4$).
	MAFS.4.NF.3.AP.7b Compare two decimals expressed to the tenths place with a value of less than one using a visual model.

(K-4) Elementary School Learning Targets

Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:

- *Count, model, and estimate quantities;*
- *Compare, represent, and order numbers;*
- *Apply place value concepts and expanded notation to compose and decompose whole numbers.*

Build an understanding of computational strategies and algorithms:

- *Fluently add, subtract, multiply, divide, and estimate;*
- *Perform and represent operations with whole numbers, fractions, and mixed numbers;*
- *Identify multiples and factors of whole numbers.*

Grade 3	Grade 4
	MAFS.4.NF.3.AP.7c Compare two decimals expressed to the hundredths place with a value of less than one using a visual model.
	MAFS.4.NF.3.AP.7a Use =, <, or > to compare two decimals (decimals in multiples of .10).
	MAFS.4.NF.2.AP.3b Add and subtract fractions with like denominators (2, 3, 4, or 8) using representations.
	MAFS.4.NF.2.AP.3c Solve word problems involving addition and subtraction of fractions with like denominators (2, 3, 4 or 8).

Representing	Performing Operations	Determining Equivalency	Problem Solving
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Overview of Access Points: Number Operations (Fractions/Ratios/Proportions) - Representation; Determine Equivalency; Perform Operations and; Problem Solving

(5-8) Middle School Learning Targets

Build flexibility using rational and irrational numbers to expand understanding of number systems:

- *Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);*
- *Use exponents to express quantities and relationships;*
- *Use integers in problem solving.*

Expand use of computational strategies and algorithms to rational numbers:

- *Perform operations fluently with rational numbers, including fractions, decimals, and percents;*
- *Identify equivalence of indicated division and fractional parts.*

Grade 5	Grade 6	Grade 7	Grade 8
MAFS.5.NBT.1.AP.4c Round decimals to the hundredths place.	MAFS.6.RP.1.AP.3d Calculate a percentage of a quantity as rate per 100 using models (e.g., percentage bars or 10 x 10 grids).	MAFS.7.RP.1.AP.2a Identify the rate of change/proportional relationship of a linear equation that has been plotted as a line on a coordinate plane..	
MAFS.5.NBT.1.AP.3a Read, write, or select a decimal to the hundredths place.	MAFS.6.RP.1.AP.1a Write or select a ratio to match a given statement and representation.		
MAFS.5.NBT.1.AP.3b Compare two decimals to the hundredths place, whose values are less than one.	MAFS.6.RP.1.AP.1a Write or select a ratio to match a given statement and representation.	MAFS.7.RP.1.AP.2b Identify lines plotted on a coordinate plane that represent a proportional relationship.	
MAFS.5.NBT.1.AP.4a Round decimals to the nearest whole number.	MAFS.6.RP.1.AP.1b Describe the ratio relationship between two quantities for a given situation using visual representations.	MAFS.7.RP.1.AP.3a Solve word problems involving ratios.	
MAFS.5.NBT.1.AP.4b Round decimals to the tenths place.	MAFS.6.RP.1.AP.3b Solve unit rate problems involving unit pricing using whole numbers.	MAFS.7.RP.1.AP.3b Find percentages in real-world contexts.	
MAFS.5.NF.1.AP.1b Add or subtract fractions with unlike denominators within one whole unit on a number line.	MAFS.6.NS.1.AP.1a Divide fractions using visual fraction models.		

(5-8) Middle School Learning Targets

Build flexibility using rational and irrational numbers to expand understanding of number systems:

- *Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);*
- *Use exponents to express quantities and relationships;*
- *Use integers in problem solving.*

Expand use of computational strategies and algorithms to rational numbers:

- *Perform operations fluently with rational numbers, including fractions, decimals, and percents;*
- *Identify equivalence of indicated division and fractional parts.*

Grade 5	Grade 6	Grade 7	Grade 8
MAFS.5.NF.2.AP.4a Multiply a fraction by a whole or mixed number using visual fraction models.			
MAFS.5.NBT.2.AP.7a Solve one-step problems using decimals.			
MAFS.5.NF.1.AP.2a Solve word problems involving the addition and subtraction of fractions using visual fraction models.			

Representing	Performing Operations	Determining Equivalency	Problem Solving
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View by Instructional Families and Florida Standard Domains

Instructional Family: Number Operations (Real Numbers)

Florida Standar Domain Names: Counting and Cardinality; and Number and Operations in Base Ten		
Counting and Representing Numbers		
Grade K	Grade 1	Grade 2
MAFS.K.CC.1.AP.1a Rote count up to 10.	MAFS.1.NBT.1.AP.1a Rote count up to 100.	MAFS.2.NBT.1.AP.3a Identify numerals 0–100.
MAFS.K.CC.1.AP.1b Rote count up to 31.		MAFS.2.NBT.1.AP.3b Identify the numeral between 0 and 100 when presented with the name.
MAFS.K.CC.1.AP.1c Rote count up to 100.		MAFS.2.NBT.1.AP.3c Write or select the numerals 0–100.
MAFS.K.CC.2.AP.4b Count up to 10 objects in a line, rectangle, or array.		MAFS.2.OA.3.AP.3a Identify a group of fewer than 10 objects as odd or even.
MAFS.K.CC.2.AP.4c Match the numeral to the number of objects in a set.		
MAFS.K.CC.1.AP.3a Identify numerals 1-10.		
MAFS.K.CC.1.AP.3b Identify the numerals 1–10 when presented with the name of the number.		
MAFS.K.CC.1.AP.3c Write or select the numerals 1–10.		

Instructional Family: Number Operations (Real Numbers)

Florida Standard Domain Names: Counting and Cardinality; Number Operations in Base Ten; The Number System; and The Real Number System				
Understanding Base Ten Number System				
Grades 1-2	Grades 3-4	Grades 5-6	Grades 7-8	HS
MAFS.1.NBT.2.AP.2b Identify the value of the numbers in the tens and one place within a given number up to 31.	MAFS.3.NBT.1.AP.1a Use place value to round to the nearest 10 or 100.	MAFS.6.NS.3.AP.7b Determine the meaning of absolute value using numbers from -30 to 30.	MAFS.8.NS.1.AP.1c Round irrational quotients to the hundredths place.	MAFS.9.12.N-RN.1.AP.2a Convert from radical representation to using rational exponents and vice versa.
MAFS.2.NBT.1.AP.3e Explain what the zero represented in place value (hundreds, tens, ones) in a number.	MAFS.4.NBT.1.AP.3a Use a hundreds chart or number line to round to any place (i.e., ones, tens, hundreds, thousands).	MAFS.6.EE.1.AP.1b Identify what an exponent represents (e.g., $8^3 = 8 \times 8 \times 8$).		
MAFS.2.NBT.1.AP.1a With base ten blocks, build representations of three-digit numbers using hundreds, tens and ones.	MAFS.4.NBT.1.AP.2b Write or select the expanded form for a multi-digit number.			
MAFS.2.NBT.1.AP.3d Write or select the expanded form for any two-digit number.				

Instructional Family CCCs: Number Operations (Real Numbers)

Florida Standard Domain Names: Counting and Cardinality; Number, Operations in Base Ten; and The Number System				
Determining Relative Position of Whole Numbers				
Grade K	Grades 1-2	Grades 3-4	Grades 5-6	Grades 7-8
MAFS.K.CC.2.AP.4b Count up to 10 objects in a line, rectangle, or array.	MAFS.1.NBT.2.AP.3a Compare two-digit numbers up to 31 using representations and numbers (e.g., identify more tens, fewer tens, more ones, fewer ones, larger number, smaller number).	MAFS.4.NBT.1.AP.2a Compare multi-digit numbers.	MAFS.6.NS.3.AP.6c Identify numbers as positive or negative.	MAFS.7.NS.1.AP.1b Find the distance between two rational numbers on a number line.
MAFS.K.CC.2.AP.4a Identify the set that has more.	MAFS.2.NBT.1.AP.4a Compare (greater than, less than, equal to) two numbers up to 100.	MAFS.4.NBT.1.AP.1a Compare the value of a digit when it is represented in a different place of two three-digit numbers (e.g., The digit 2 in 124 is ten times the digit 2 in 472).	MAFS.6.NS.3.AP.6d Locate positive and negative numbers on a number line.	MAFS.8.NS.1.AP.2a Locate approximations of irrational numbers on a number line.
MAFS.K.CC.3.AP.7a Identify the smaller or larger number given two numbers between 0 and 10.	MAFS.2.NBT.1.AP.4b Compare two-digit numbers using representations and numbers (e.g., identify more tens, fewer tens, more ones, fewer ones, larger numbers, smaller numbers).		MAFS.6.NS.3.AP.6e Plot positive and negative numbers on a number line.	
	MAFS.2.NBT.1.AP.4c Compare three-digit numbers using representations and numbers (e.g., identify more hundreds, less hundreds, more tens, less tens, more ones, less ones, larger number, smaller number).		MAFS.6.NS.3.AP.5a Represent positive or negative numbers on a number line given a real-world situation.	
			MAFS.6.NS.3.AP.6a Find given points between -10 and 10 on both axes of a coordinate plane.	

Florida Standard Domain Names: Counting and Cardinality; Number, Operations in Base Ten; and The Number System				
Determining Relative Position of Whole Numbers				
Grade K	Grades 1-2	Grades 3-4	Grades 5-6	Grades 7-8
			MAFS.6.NS.3.AP.6b Label points between -10 and 10 on both axes of a coordinate plane.	
			MAFS.6.NS.3.AP.7a Compare two numbers on a number line (e.g., $-2 > -9$) between -30 and 30.	

Instructional Family: Number Operations (Real Numbers)

Florida Standard Domain Names: Counting and Cardinality and Number; Operations in Base Ten; The Number System; and The Real Number System					
Performing Operations with Whole Numbers					
Grade K -1	Grade 2	Grade 3	Grades 4 - 5	Grades 6-8	HS
MAFS.K.OA.1.AP.2b Count two sets to find sums up to 10.	MAFS.2.NBT.1.AP.2a Skip count by fives up to 100.	MAFS.3.NBT.1.AP.2a Use the relationships between addition and subtraction to solve problems.	MAFS.4.OA.2.AP.4a Identify multiples for a whole number (e.g., The multiples of 2 are 2, 4, 6, 8, 10...).	MAFS.7.NS.1.AP.2a Solve single-digit rational number multiplication problems using a number line.	MAFS.912.A-SSE.1.AP.2a Rewrite algebraic expressions in different equivalent forms, such as factoring or combining like terms.
	MAFS.2.NBT.1.AP.2b Skip count by tens up to 200.				
	MAFS.2.NBT.1.AP.2c Skip count by hundreds up to 1000.				
MAFS.1.OA.1.AP.2a Solve word problems that include combining three quantities whose sum is less than 10 using objects or drawings.	MAFS.2.NBT.2.AP.8a Mentally add or subtract 10 from a given set from the tens family (e.g., What is 10 more than 50? What is 10 fewer than 70?).	MAFS.3.NBT.1.AP.2b Solve multi-step addition and subtraction problems up to 100.	MAFS.4.NBT.2.AP.5a Solve a two-digit by one-digit whole number multiplication problem using two different strategies.	MAFS.7.NS.1.AP.2b Solve division problems with quotients from - 100 to 100 using a number line.	MAFS.912.A-REI.1.AP.2a Solve simple rational and radical equations in one variable.
	MAFS.2.NBT.2.AP.8b Mentally add or subtract 100 from a given set from the hundreds family (e.g., What is 100 more than 500? What is 100 fewer than 700?).	MAFS.3.OA.1.AP.1b Solve multiplication problems with neither number greater than five.	MAFS.5.NBT.2.AP.6a Find whole number quotients up to two dividends and two divisors.		
	MAFS.2.NBT.2.AP.6a Combine three two-digit numbers within 20.				

			MAFS.5.NBT.2.AP.6b Find whole number quotients of whole numbers with up to two-digit dividends and two-digit divisors.		

Instructional Family: Number Operations (Real Numbers)

Florida Standard Domain Names: Counting and Cardinality; Number, Operations in Base Ten; The Number System; and The Real Number System					
Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers					
Grade K -1	Grade 2	Grade 3	Grades 4 - 5	Grades 6-8	HS
MAFS.K.OA.1.AP.aa Use objects to solve word problems related to addition and subtraction that involve unknowns and quantities up to 5.	MAFS.2.NBT.2.AP.7a Decompose tens into ones and/or hundreds into tens in subtraction situations.	MAFS.3.OA.1.AP.1a Find the total number inside an array with neither number in the columns or rows greater than five.	MAFS.4.OA.1.AP.3a Solve and check one- or two-step word problems requiring the four operations within 100.	MAFS.5.OA.1.AP.1a Evaluate a simple expression involving one set of parenthesis.	H.NO.2b1 Explain the pattern for the sum or product for combinations of rational and irrational numbers <i>N.RN.3</i>
MAFS.K.OA.1.AP.2c Solve word problems within 10.	MAFS.2.NBT.2.AP.7b Compose ones into tens and/or tens into hundreds in addition situations.	MAFS.3.OA.1.AP.1c Use objects to model multiplication involving up to five groups with up to five objects in each.	MAFS.5.OA.1.AP.1a Evaluate a simple expression involving one set of parenthesis.	MAFS.6.EE.2.AP.7a Solve problems or word problems using equations for cases in which the quantities in the problem are positive rational numbers.	
MAFS.1.OA.3.AP.6a Add and subtract within 10, demonstrating fluency for addition and subtraction within 5.	MAFS.2.NBT.2.AP.5b Model addition and subtraction with base ten blocks within 100.	MAFS.3.OA.1.AP.2a Determine the number of sets of whole numbers, five or less, that equal a dividend.		MAFS.6.NS.2.AP.6a Use a variable to represent numbers and write expressions when solving real-world problems.	
MAFS.1.OA.1.AP.1c Solve one-step addition and subtraction word problems where the	MAFS.2.OA.1.AP.1a Solve addition and subtraction word problems within 100 using objects, drawings, or pictures.	MAFS.3.OA.4.AP.8a Solve and check one-step word problems using the four operations within 100.		MAFS.6.EE.1.AP.2a Write or select an algebraic expression that represents a real-world situation.	

Florida Standard Domain Names: Counting and Cardinality; Number, Operations in Base Ten; The Number System; and The Real Number System

Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

Grade K -1	Grade 2	Grade 3	Grades 4 - 5	Grades 6-8	HS
change or result is unknown ($4 + _ = 7$) or ($4 + 3 = _$), within 20 using objects, drawings or pictures.	MAFS.2.OA.1.AP.1c Write or select an equation representing the problems and its solution.			MAFS.7.NS.1.AP.1a Identify rational numbers that are an equal distance from 0 on a number line as additive inverses.	
MAFS.1.OA.1.AP.1b Solve addition and subtraction word problems within 20.				MAFS.7.EE.2.AP.4a Set up equations with one variable based on real-world problems	
				MAFS.7.EE.2.AP.4b Solve equations with one variable based on real-world problems.	

Instructional Families: Number Operations (Fractions/Ratios/Proportions)

FLORIDA STANDARD Domain Names: Number Operations – Fractions and Ratios and Proportional Relationships	FLORIDA STANDARD Domain Names: Number Operations – Fractions and Ratios, Number Operations in Base Ten, The Number System and Proportional Relationships	FLORIDA STANDARD Domain Names: Number Operations – Fractions and Ratios, The Number System and Proportional Relationships	FLORIDA STANDARD Domain Names: Number Operations – Fractions and Ratios, The Number System and Proportional Relationships
Representating	Determining Equivalency	Performing Operations	Problem Solving
MAFS.3.NF.1.AP.1a Identify the number of highlighted parts (numerator) of a given representation (rectangles and circles).	MAFS.4.NF.1.AP.2a Use =, <, or > to compare two fractions (fractions with a denominator or 10 or less).	MAFS.4.NF.2.AP.3b Add and subtract fractions with like denominators (2, 3, 4, or 8) using representations.	MAFS.4.NF.2.AP.3c Solve word problems involving addition and subtraction of fractions with like denominators (2, 3, 4 or 8).
MAFS.3.NF.1.AP.1b Identify the total number of parts (denominator) of a given representation (rectangles and circles).	MAFS.4.NF.1.AP.2b Compare two given fractions that have different denominators.	MAFS.5.NF.1.AP.1b Add or subtract fractions with unlike denominators within one whole unit on a number line.	MAFS.5.NF.1.AP.2a Solve word problems involving the addition and subtraction of fractions using visual fraction models.
MAFS.3.NF.1.AP.1c Identify the fraction that matches the representation of partitioned rectangles and circles into halves, fourths, thirds, and eighths.	MAFS.4.NF.3.AP.6b Match a fraction (with a denominator of 10 or 100) with its decimal equivalent ($5/10 = 0.5$).	MAFS.5.NF.2.AP.4a Multiply a fraction by a whole or mixed number using visual fraction models.	MAFS.7.RP.1.AP.3a Solve word problems involving ratios.
MAFS.3.NF.1.AP.2a Locate given common unit fractions (i.e., $1/2$, $1/4$) on a number line or ruler.	MAFS.4.NF.3.AP.5a Find the equivalent fraction with denominators that are multiples of 10.	MAFS.5.NBT.2.AP.7a Solve one-step problems using decimals.	MAFS.7.RP.1.AP.3b Find percentages in real-world contexts.
3.NO.115 Locate given common unit fractions (i.e., $1/2$, $1/4$, $1/8$,) on a number line or ruler 3.NF.2	MAFS.4.NF.3.AP.6a Identify the equivalent decimal form for a benchmark fraction.	MAFS.6.RP.1.AP.3b Solve unit rate problems involving unit pricing using whole numbers.	
MAFS.4.NF.1.AP.1a Determine equivalent fractions using visual fraction models and a number line.	MAFS.4.NF.2.AP.3a Using a representation, decompose a fraction into multiple copies of a unit fraction (e.g., $3/4 = 1/4 + 1/4 + 1/4$).	MAFS.6.NS.1.AP.1a Divide fractions using visual fraction models.	
MAFS.4.NF.3.AP.6c Read, write, or select decimals to the tenths place.	MAFS.4.NF.3.AP.7b Compare two decimals expressed to the tenths place		

FLORIDA STANDARD Domain Names: Number Operations – Fractions and Ratios and Proportional Relationships	FLORIDA STANDARD Domain Names: Number Operations – Fractions and Ratios, Number Operations in Base Ten, The Number System and Proportional Relationships	FLORIDA STANDARD Domain Names: Number Operations – Fractions and Ratios, The Number System and Proportional Relationships	FLORIDA STANDARD Domain Names: Number Operations – Fractions and Ratios, The Number System and Proportional Relationships
Representating	Determining Equivalency	Performing Operations	Problem Solving
	with a value of less than one using a visual model.		
MAFS.4.NF.3.AP.6d Read, write, or select decimals to the hundredths place.	MAFS.4.NF.3.AP.7c Compare two decimals expressed to the hundredths place with a value of less than one using a visual model.		
MAFS.5.NBT.1.AP.4c Round decimals to the hundredths place.	MAFS.4.NF.3.AP.7a Use =, <, or > to compare two decimals (decimals in multiples of .10).		
MAFS.5.NBT.1.AP.3a Read, write, or select a decimal to the hundredths place.			
MAFS.6.RP.1.AP.3d Calculate a percentage of a quantity as rate per 100 using models (e.g., percentage bars or 10 x 10 grids).	MAFS.5.NBT.1.AP.3b Compare two decimals to the hundredths place, whose values are less than one.		
	MAFS.5.NBT.1.AP.4a Round decimals to the nearest whole number.		
MAFS.6.RP.1.AP.1a Write or select a ratio to match a given statement and representation.	MAFS.5.NBT.1.AP.4b Round decimals to the tenths place.		
	MAFS.6.RP.1.AP.1a Write or select a ratio to match a given statement and representation.		
	MAFS.6.RP.1.AP.1b Describe the ratio relationship between two quantities for a given situation using visual representations.		

FLORIDA STANDARD Domain Names: Number Operations – Fractions and Ratios and Proportional Relationships	FLORIDA STANDARD Domain Names: Number Operations – Fractions and Ratios, Number Operations in Base Ten, The Number System and Proportional Relationships	FLORIDA STANDARD Domain Names: Number Operations – Fractions and Ratios, The Number System and Proportional Relationships	FLORIDA STANDARD Domain Names: Number Operations – Fractions and Ratios, The Number System and Proportional Relationships
Representating	Determining Equivalency	Performing Operations	Problem Solving
	MAFS.7.RP.1.AP.2a Identify the rate of change/proportional relationship of a linear equation that has been plotted as a line on a coordinate plane.. MAFS.7.RP.1.AP.2b Identify lines plotted on a coordinate plane that represent a proportional relationship.		