

A. NUMBERS, OPERATIONS & ALGEBRAIC THINKING

I indicated Introduced

R indicates Reviewed

M indicates Mastered

A1. Counting and Cardinality

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
OBJECTIVE A1.1 Know and use number names and the count sequence.											
SKILLS:											
Use models (i.e. number lines, drawings, manipulatives) to identify, order and compare numbers	I	R	R	M							
Count to 100 by ones and tens	I	R	R	M							
Count forward beginning from a given number		I	R	M							
Count to 120 starting at any number less than 120			I	R	M						
Count within 1000				I	R	M					
Skip count by 2s, 5s, 10s, 100s	I	R	R	R	M						
Identify even and odd numbers		I	R	R	M						
Read and write numbers from 0 to 20		I	M								
Read and write numbers up to 120			I	R	M						
Read and write words for numbers				I	R	M					
Read and write numbers to 1000 using base-ten numbers, number names and expanded form				I	R	M					
Write whole numbers in expanded form				I	R	M					
Write decimals in expanded form						I	R	M			
Write exponents in expanded form							I	R	M		
Identify, read and write ordinal numbers, first, second, etc.			I	R	M						
Identify Roman Numerals				I	R	R	R	R	R	R	R
OBJECTIVE A1.2 Count to tell the number of objects											
SKILLS:											
Explain the relationship between numbers and quantities	I	R	M								
Say the number names in standard order when counting objects	I	R	M								
Pair objects and number names	I	R	M								
Explain that the last number name said tells the number of objects counted	I	R	M								
Show that the number of objects is the same regardless of arrangement or order counted		I	R	M							
Count to answer "how many"		I	M								
Identify the highest and lowest number		I	R	M							
Given a number, identify more than, less than, equal to, most, least or fewest		I	R	R	M						
Identify dozen, half-dozen, pair, etc.				I	R	M					

A2. Operations and Algebraic Thinking

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
OBJECTIVE A2.1 Demonstrate addition as putting together and adding to.											
SKILLS:											
Represent addition with objects, fingers, mental images, drawings, sounds (i.e. claps), acting out situations, verbal explanation, expressions or equations	I	R	R	R	M						

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
Relate counting to addition (i.e. count on 2 to add 2)		I	R	M							
Solve addition word problems		I	R	R	M						
Solve word problems by adding three whole numbers			I	R	M						
Add within 10 by using objects or drawings	I	R	M								
Decompose numbers less than or equal to 10 (i.e. $5=2+3$ and $5=4+1$) using objects or drawings		I	R	R	M						
Apply the commutative property of addition (i.e. If $8+3=11$ then $3+8=11$)			I	R	M						
Apply the associative property of addition [i.e. $(2+6)+4=2+(6+4)=12$]			I	R	R	M					
Find the number that makes 10 when added to a given number			I	R	M						
Fluently add within 5	I	R	M								
Add within 20			I	R	M						

OBJECTIVE A2.2 Demonstrate subtraction as taking apart and taking from.

SKILLS:

Represent subtraction with objects, fingers, mental images, drawings, sounds (i.e. claps), acting out situations, verbal explanation, expressions or equations	I	R	R	M							
Relate counting to subtraction (i.e. count on 2 to take away 2)		I	R	R	M						
Solve subtraction word problems		I	R	R	M						
Associate subtraction as an unknown-addend problem (i.e. subtract $10-8$ by finding the number that makes 10 when added to 8)			I	R	M						
Subtract within 10 using objects and drawings		I	R	M							
Fluently subtract within 5		I	M								
Subtract within 20			I	R	M						

OBJECTIVE A2.3 Work with addition and subtraction equations

SKILLS:

Use the strategy of using the relationship between addition and subtraction ($8+4=12$ thus $12-8=4$)			I	R	M						
Use the strategy of creating equivalent but easier or known sums to add and subtract ($6+7=6+6+1=12+1=13$)			I	R	M						
Explain the meaning of the equal sign		I	R	R	M						
Determine if equations involving addition and subtraction are true or false (i.e. $6=6$, $7=8-1$, $5+2=2+5$, $4+1=5+2$)			I	R	M						
Determine the unknown whole number in an addition or subtraction equation (i.e. $8+?=11$, $5=0-3$, $6+6=0$)			I	R	M						
Use addition and subtraction within 100 to solve one- and two-step word problems				I	R	M					
Know from memory all sums of two one-digit numbers			I	R	M						
Add up to four two-digit numbers				I	R	M					
Fluently add and subtract multi-digit numbers					I	R	M				

OBJECTIVE A2.4 Use properties of multiplication and division

SKILLS:

Determine whether a group of objects has an odd or even number of members			I	R	R	M					
Write an equation to express an even number as a sum of two equal addends				I	R	M					
Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and columns				I	R	M					
Write an equation to express the total as a sum of equal addends				I	R	M					
Interpret models as products of whole numbers (i.e. describe					I	R	M				

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
a context in which a total number of objects can be expressed as 5×7)											
Interpret models as whole-number quotients of whole numbers (i.e. describe the context in which a number of shares or a number of groups can be expressed as $56 \div 8$)					I	R	M				
Explain division as an unknown-factor problem					I	R	M				
Represent whole-number products as rectangular areas in mathematical reasoning						I	R	M			
OBJECTIVE A2.5 Multiply and divide											
SKILLS:											
Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities					I	R	M				
Determine the unknown whole number in a multiplication or division equation relating three whole numbers ($8 \times ? = 48$, $5 = 0 \div 3$, $6 \times 6 = ?$)					I	R	M				
Apply the commutative property of multiplication (if $6 \times 4 = 24$ then $4 \times 6 = 24$)					I	R	M				
Apply the associative property of multiplication [i.e. $(3 \times 5) \times 2 = 3(5 \times 2) = 30$]					I	R	M				
Apply the distributive property [i.e. $8(5+2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$]					I	R	R	M			
Fluently multiply and divide within 100 using fact families, relationships strategies or properties of operations					I	R	M				
Know from memory all products of two one-digit numbers					I	R	M				
Multiply a whole number of up to four digits by a one-digit whole number						I	R	M			
Multiply two two-digit numbers						I	R	M			
Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors						I	R	M			
Multiply multi-digit whole numbers						I	R	M			
Divide multi-digit numbers						I	R	R	M		
OBJECTIVE A2.6 Solve problems using the four operations											
SKILLS:											
Solve multi-step word problems using the four operations					I	R	M				
Solve word problems in which remainders must be interpreted						I	R	M			
Assess the reasonableness of answers using mental computation and estimation strategies (including rounding)					I	R	R	M			
Represent verbal statements of comparisons as equations						I	R	R	M		
Multiply and divide to solve word problems involving multiplicative comparisons						I	R	R	M		
Use parentheses, brackets or braces in numerical expressions and evaluate expressions with these symbols					I	R	R	M			
Write simple expressions that record calculations with numbers and interpret numerical expressions without evaluating them (i.e. express the calculation "add 8 and 7, then multiply by 2" as $2 \times (8+7)$).							I	R	M		
Use matrices to represent and manipulate data										I	I
Multiply matrices by scalars to produce new matrices											I
Add, subtract and multiply matrices of appropriate dimensions											I
Explain that, unlike multiplication of numbers, matrix multiplications for square matrices is not a commutative operation, but still satisfies the associative and distributive properties											I
Solve problems involving integers using the four operations					I	R	M				

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
OBJECTIVE A2.7 Explain and use factors and multiples											
SKILLS:											
Find all factors for a whole number in the range 1-100						I	R	M			
Recognize that a whole number is a multiple of each of its factors						I	R	M			
Determine whether a given whole number is divisible by a given one digit number						I	R	M			
Determine whether a given whole number in the range of 1-100 is prime or composite						I	R	M			
Find the greatest common factor of two whole numbers less than or equal to 100							I	R	M		
Find the least common multiple of two whole numbers less than or equal to 12							I	R	M		
Use distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor (i.e. express $36+8$ as $4(9+2)$)								I	R	M	M
OBJECTIVE A2.8 Generate and analyze patterns and relationships											
SKILLS:											
Identify and explain arithmetic patterns (including patterns in addition and multiplication tables)			I	R	M						
Generate a number or shape pattern that follows a given rule		I	M								
Identify apparent features of a pattern without a given rule						I	R	R	M		
Generate two numerical patterns using two given rules							I	R	M		
Identify apparent relationships between corresponding terms							I	R	M		
Form ordered pairs consisting of corresponding terms from two patterns and graph the ordered pairs on a coordinate plane							I	R	R	M	
Write arithmetic and geometric sequences both recursively and with an explicit formula									I	R	M
OBJECTIVE A2.9 Demonstrate an understanding of ratio concepts and use ratio reasoning to solve problems.											
SKILLS:											
Explain the concept of a ratio							I	R	M		
Use ratio language to describe ratio relationship between two quantities							I	R	R	M	M
Explain the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$.								I	R	M	M
Use rate language in the context of a ratio relationship (i.e. "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger")								I	R	M	M
Use ratio and rate reasoning to solve real-world problems								I	R	M	M
Use tables to compare ratios and unit rates								I	R	M	M
Solve unit rate problems including those involving unit pricing and constant speed.								I	R	M	M
Find a percent of a quantity as a rate per 100 (i.e. 30% of a quantity means $30/100$ times the quantity)							I	R	R	M	M
Solve problems involving finding the whole, given a part and the percent								I	R	M	M
Use ratio reasoning to convert measurement units								I	R	M	M
Convert and transform units appropriately when multiplying or dividing quantities								I	R	M	M
Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units								I	R	M	M

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
Choose and interpret units consistently in formulas and multi-step problems										I	I
Recognize and represent proportional relationships between quantities								I	R	M	M
Decide whether two quantities are in a proportional relationship (i.e. test for equivalent ratios)								I	R	M	M
Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams and verbal descriptions of proportional relationships									I	R	M
Represent proportional relationships by equations									I	R	M
Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation with special attention to the points (0, 0) and (1, r) where r is the unit rate									I	R	M
Use proportional relationships to solve multistep ratio and percent problems									I	R	M
While focusing on proportions graph proportional relationships interpreting the unit rate as the slope of the graph									I	R	M
Compare two different proportional relationships represented in different ways									I	R	M
Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane										I	R
Apply proportional reasoning to solve problems involving scale and indirect measurement.									I	R	M
OBJECTIVE A2.10 Apply and extend previous understandings of numbers to the system of rational numbers.											
SKILLS:											
Explain that positive and negative numbers are used together to describe quantities having opposite directions of values							I	R	M		
Use positive and negative numbers to represent quantities in real-world contexts explaining the meaning of 0 in each situation							I	R	M		
Use a rational number as a point on the number line							I	R	M		
Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line							I	R	M		
Recognize that the opposite of the opposite of a number is the number itself							I	R	R	M	M
Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane							I	R	R	M	M
Recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes							I	R	R	M	M
Find and position pairs of integers and other rational numbers on a coordinate plane							I	R	R	M	M
Find and position integers and other rational numbers on a horizontal or vertical number line diagram						I	R	R	M		
Explain ordering and absolute value of rational numbers							I	R	R	M	M
Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram							I	R	M		
Write, interpret and explain statements of order for rational numbers in real-world contexts (i.e. write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°C)							I	R	M		
Describe the absolute value of a rational number as its distance from 0 on the number line							I	R	R	M	M
Interpret absolute value as magnitude for a positive or negative quantity in a real-world situation							I	R	R	R	R
Apply and extend previous understandings to add and								I	R	M	M

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
subtract rational numbers											
Represent addition and subtraction on a horizontal or vertical number line diagram							I	R	M		
Describe situations in which opposite quantities combine to make 0.							I	R	M		
Explain why the sum or product of two rational numbers is rational										I	I
Explain why the sum of a rational number and an irrational number are irrational										I	I
Explain why the product of a nonzero rational number and irrational number is irrational										I	I
Demonstrate $p+q$ as the number located a distance $ q $ from p in the positive or negative direction depending on whether q is positive or negative							I	R	R	M	M
Interpret the sums of rational numbers by describing real-world contexts							I	R	R	M	M
Demonstrate subtraction of rational numbers as using the additive inverse, $p-q=p+(-q)$							I	R	R	M	M
Show that the distance between two rational numbers on the number line is the absolute value of their difference							I	R	R	M	M
Apply and extend previous understandings of fractions to multiply and divide rational numbers							I	R	R	M	M
Explain that integers can be divided provided that the divisor is not zero and every quotient of integers is a rational number							I	R	R	M	M
Apply properties of operations as strategies to multiply and divide rational numbers in real world context							I	R	R	M	M
Convert a rational number to a decimal using long division							I	R	R	M	M
Recall that the decimal form of a rational number terminates in 0s or eventually repeats							I	R	R	M	M
Know that numbers that are not rational are called irrational								I	R	M	M
Explain and informally that every number has a decimal expansion								I	R	M	M
Convert a rational number into a repeating decimal and vice versa								I	R	R	R
Use rational approximations of irrational numbers to compare the size of irrational numbers									I	R	M
Locate irrational numbers approximately on a number line, diagram and estimate the value of the numbers									I	R	M
Rewrite simple rational expressions in different forms											I
Demonstrate how rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression											I
Add, subtract, multiply and divide rational expressions											I
Simplify rational expressions									I	R	M
OBJECTIVE A2.11 Apply and extend previous understandings of arithmetic to algebraic expressions											
SKILLS:											
Write and evaluate numerical expressions involving whole-number exponents							I	R	R	M	M
Write, read and evaluate expressions in which letters stand for numbers							I	R	M		
Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient) while viewing one or more parts of an expression as a single entity							I	R	R	M	M
Evaluate expressions with specific values of their variables							I	R	R	M	M
Perform arithmetic operations including those involving whole						I	R	R	M		

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
number exponents in the conventional order when there are no parentheses to specify a particular order											
Apply the properties of operations to generate equivalent expressions								I	R	M	M
Identify when two expressions are equivalent								I	R	M	M
Apply properties of operations to expressions with rational coefficients									I	R	M
Explain that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related									I	R	M
Solve multi-step real-life problems posed with positive and negative rational numbers in any form									I	R	M
Apply properties of operations to calculate with numbers in any form by converting between forms and assessing the reasonableness of answers using mental computation and estimation strategies								I	R	R	M
Construct simple equations and inequalities to solve problems								I	R	M	M
Solve word problems using equations and inequalities with rational numbers									I	R	R
Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach									I	R	R
Demonstrate how that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication										I	I
Add, subtract and multiply polynomials										I	I
Explain and apply the Remainder Theorem (i.e. for a polynomial $p(x)$ and a number a , the remainder on division by $x-a$ is $p(a)$, so $p(a) = 0$ if and only if $(x-a)$ is a factor of $p(x)$)											I
OBJECTIVE A2.12 Reason about and solve one-variable equations and inequalities.											
SKILLS:											
Explain solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true?								I	R	M	M
Use substitution to determine whether a given number in a specified set makes an equation or inequality true								I	R	M	M
Use variables to represent numbers and write expressions when solving a real-world problem, and solve							I	R	R	M	M
Explain that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set							I	R	R	M	M
Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world problem								I	R	M	M
Recognize and represent in a number line diagram that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions								I	R	R	M
Graph the solution set of the inequality and interpret it in the context of the problem									I	R	M
OBJECTIVE A2.13 Work with radicals and integer exponents.											
SKILLS:											
Use properties of integer exponents to simplify rational exponents										I	I
Explain and apply the properties of integer exponents to generate equivalent numerical expressions										I	I
Use square root and cube root symbols to represent solutions											I

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
to equations of the form $x^2=p$ and $x^3=p$ where p is a positive rational number											
Evaluate square roots of small perfect squares and cube roots of small perfect cubes								I	R	R	M
Explain that $-\sqrt{2}$ is irrational										I	R
Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities (scientific notation)								I	R	M	M
Perform operations with numbers expressed in scientific notation									I	R	M
Use scientific notation and appropriate units for measurements of very large or very small quantities								I	R	R	M
Interpret scientific notation that has been generated by technology									I	R	R
Simplify radical expressions									I	R	R
OBJECTIVE A2.14 Analyze and solve linear equations and pairs of simultaneous linear equations.											
SKILLS:											
Solve linear equations with one variable								I	R	R	M
Analyze and solve pairs of simultaneous linear systems											I
Explain that solutions to a system of two linear systems in two variables correspond to points of intersection of their graphs											I
Solve systems of two linear equations in two variables by substitution or elimination method											I
Estimate solutions of linear systems by graphing the equations											I
Analyze simple cases of linear systems (no solution)											I
Solve real-world problems leading to two linear equations with two variables											I
Represent constraints by equations or inequalities and by systems of equations and/or inequalities											I
Interpret solutions as viable or non-viable options in a modeling context											I
Solve systems of linear equations exactly and approximately											I
Graph the solutions to a linear inequality in two variables as a half-plane											I
Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes											I
Write linear equations in different forms (slope-intercept, point-slope, standard)											I
Solve using slope-intercept, point-slope, and standard forms											I
Write equations of parallel and perpendicular lines											I
OBJECTIVE A2.15 Define, evaluate and compare functions.											
SKILLS:											
Use variables to represent two quantities in a real-world problem that change in relationship to one another							I	R	R	M	M
Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable									I	R	M
Analyze the relationship between the dependent and independent variables using graphs and tables and relate these to the equation									I	R	M
Explain that a function is a rule that assigns to each input exactly one output									I	R	M
Compare properties of two functions each represented in a different way									I	R	R

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
Interpret the equation $y=mx+b$ as defining a linear function whose graph is a straight line									I	R	M
Determine the rate of change and initial value of the function from a description of a relationship or from two values											I
Interpret the rate of change and initial value of a linear function in terms of the situation it models											I
Construct a function to model a linear and exponential relationship between two quantities											I
Describe qualitatively the functional relationship between two quantities by analyzing a graph											I
Sketch a graph that exhibits the qualitative features of a function that has been described verbally											I
Factor a quadratic expression to reveal the zeros of the function it defines											I
Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines											I
Rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations											I
Solve simple rational and radical equations in one variable and give examples showing how extraneous solutions may arise											I
Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters									I	R	M
Solve quadratic equations in one variable											I
Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically											I
Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context											I
Graph functions expressed symbolically and show key features of the graph											I
Graph linear and quadratic functions and show intercepts, maxima and minima											I
Graph square roots, cube roots, and piecewise-defined functions, including step functions and absolute value functions											I
Graph polynomial functions, identifying zeros when suitable factorizations are available and showing end behavior											I
Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available and showing end behavior											I
Graph exponential and logarithmic functions showing intercepts and end behavior and trigonometric functions showing period, midline and amplitude											I
Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function											I
Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values and symmetry of the graph											I
Use the properties of exponents to interpret expressions for exponential functions											I
Compare properties of two functions each represented in a different way											I
Find inverse functions											I
Distinguish between situations that can be modeled with linear functions and with exponential functions											I

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically or as a polynomial function											I
Define the scale and interval of a linear or exponential function based on the context of the problem											I

A3. Numbers and Operations of Base Ten

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
OBJECTIVE A3.1 Compare numbers.											
SKILLS:											
Compare two numbers between 1 and 10		I	R	M							
Compare two multi-digit numbers based on meanings of the digits in each place			I	R	M						
Compare using the symbols $>$, $<$, and $=$			I	R	M						
Compare two decimals to thousandths based on meanings of the digits in each place using $<$, $>$, and $=$					I	R	R	M			
OBJECTIVE A3.2 Explain and use the place value system.											
SKILLS:											
Explain that the numbers 11-19 are composed of ten ones and one, two, three, four, five, six, seven, eight or nine ones.		I	R	R	M						
Compose and decompose numbers from 11 to 19 into ten ones and some further ones		I	R	M							
Explain that 10 can be thought of as a bundle of ten ones – called a “ten”, 100 as ten tens... etc.		I	R	M							
Explain that the two digits of a two-digit number represent amounts of tens and ones			I	R	M						
Explain that the three digits of a three-digit number represent amounts of hundreds, tens and ones				I	R	M					
Explain that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones), and 100, 200, 300, etc. refer to one, two, three, etc. hundreds		I	R	R	M						
Round whole numbers to the nearest 10 or 100				I	R	M					
Round multi-digit whole numbers to any place					I	R	M				
Recognize that in a multi-digit number, a digit in one place represents ten times what it represents in the place to its right (i.e. $700 \div 70 = 10$) and $1/10$ of what it represents in the place to its left					I	R	R	M			
Explain patterns in the number of zeros of the product when multiplying or dividing a number by powers of 10						I	R	M			
Use whole-number exponents to denote powers of 10							I	R	M		
Read, write and compare decimals to thousandths using base-ten numbers, number names and expanded form						I	R	R	M		
OBJECTIVE A3.3 Use place value understanding and properties of operations to do arithmetic.											
SKILLS:											
Add within 100 by adding a two-digit number and a one-digit number			I	R	M						
Add within 100 by adding a two-digit number and a multiple of 10			I	R	M						
Add and subtract within 100 and 1000 using concrete models or drawings and strategies based on place value, properties of			I	R	R	M					

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
operations and/or the relationship between addition and subtraction											
Relate strategies to a written method and explain the reasoning			I	R	M						
Demonstrate that in adding two-digit numbers, one adds tens and tens, ones and ones and sometimes it is necessary to compose a ten			I	R	M						
Demonstrate that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones and sometimes it is necessary to compose or decompose tens or hundreds				I	R	M					
Given a two-digit number, mentally find 10 more or 10 less without having to count			I	R	M						
Mentally add and subtract 10 or 100 to or from a given number 100-900				I	R	M					
Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range of 10-90			I	R	M						
Multiply one-digit whole numbers by multiples of 10 in the range 10-90					I	R	M				
Use and explain problem solving strategies based on place value and properties of operations				I	R	M					
Illustrate and explain the calculation of a problem by using equations, rectangular arrays and/or area models						I	R	R	M		
Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations and/or the relationship between multiplication and division							I	R	M		
Add, subtract, multiply and divide decimals to hundredths using concrete models or drawings and strategies based on place value, properties of operations and/or the relationship between addition and subtraction						I	R	R	M		
Add, subtract, multiply and divide multi-digit decimals							I	R	M		

A4. Numbers and Operations - Fractions

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
OBJECTIVE A4.1 Develop understanding of fractions as numbers											
SKILLS:											
Recognize the division of an object or unit into equal parts: halves		I	R	M							
Explain a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts (i.e. $1/3$)			I	R	M						
Explain a fraction a/b as the quantity formed by a parts of size $1/b$ (i.e. $2/3$ is equal to 2 parts of $1/3$)				I	R	M					
Represent a fraction as a number on the number line					I	R	R	M			
Explain, represent and generate equivalent fractions				I	R	R	R	M			
Explain equivalence of fractions by attending to the number and size of the parts when two fractions themselves are the same size						I	R	M			
Compare fractions by using symbols of $<$, $>$, or $=$					I	R	R	M			
Compare two fractions with different numerators and different denominators and justify the conclusions						I	R	R	M		
Convert between improper fractions and mixed numbers							I	R	M		
OBJECTIVE A4.2 Build fractions from unit fractions by applying and extending previous understandings of											

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
operations on whole numbers.											
SKILLS:											
Explain addition and subtraction of fractions as joining and separating parts referring to the same whole				I	R	R	M				
Breakdown a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation				I	R	R	M				
Add and subtract mixed numbers with like denominators						I	R	M			
Solve word problems involving addition and subtraction of fractions referring to the same whole, having like denominators and unlike denominators						I	R	R	M		
Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators							I	R	M		
Multiply a fraction by a whole number or by a fraction							I	R	M		
Describe a fraction a/b as a multiple of $1/b$							I	R	M		
Solve word problems involving multiplication of a fraction by a whole number							I	R	M		
Use a fraction model or story to represent a problem using fractions.							I	R	M		
Interpret multiplication as scaling (resizing)								I	R	M	
Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number and why multiplying a given number by a fraction less than 1 results in a product smaller than the given number								I	R	M	
Interpret a fraction as division of the numerator by the denominator							I	R	M		
Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers							I	R	M		
Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions							I	R	M		
Solve problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions							I	R	M		
Compute quotients of fractions								I	R	M	
Demonstrate the use of reciprocals in dividing fractions								I	R	M	
OBJECTIVE A4.3 Compare decimal, fractions and percent notations											
SKILLS:											
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 (i.e. express $3/10$ as $30/100$ and add $3/10+4/100=34/100$)								I	R	M	
Use decimal notation for fractions with denominators 10 or 100 (i.e. rewrite 0.62 as $62/100$; describe a length as 0.62 meters)						I	R	M			
Compare two decimals to hundredths by reasoning about their size by using the symbols $<$, $>$, or $=$ and justify the conclusion						I	R	R	M		
Convert between percent, decimals and fractions							I	R	R	M	
Find the percent of a number including percent of change								I	R	M	
Find simple interest									I	R	M

B. MEASUREMENT AND DATA

I indicated Introduced

R indicates Reviewed

M indicates Mastered

B1. Measurements

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
OBJECTIVE B1.1 Describe and compare measurable attributes.											
SKILLS:											
Describe several measurable attributes of objects (i.e. length, weight, temperature)		I	R	R	R	M					
Compare two objects with a measurable attribute in common		I	R	R	M						
Order three objects by length	I	R	M								
Compare the length of two objects indirectly by using a third object			I	R	M						
Express the length of an object as a whole number of length units by laying multiple copies of a shorter object end to end			I	R	M						
Explain that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps			I	R	M						
Classify objects into given categories	I	R	R	M							
Count and sort the categories of objects	I	R	R	M							
Describe temperature as hot, warm, cold, warmer than, cooler than, as warm as, etc.	I	R	R	M							
Associate temperature in degrees Fahrenheit with weather	I	R	R	M							
OBJECTIVE B1.2 Measure and estimate lengths											
SKILLS:											
Measure the length of an object by selecting and using appropriate tools, i.e. ruler, yardstick, meter stick, measuring tape				I	R	M					
Estimate lengths using units of inches, feet, centimeters and meters				I	R	M					
Measure the length of an object twice using length units of different lengths and describe how the two measurements relate to the size of the chosen unit (cm, m, in., ft.)				I	R	M					
Measure to determine how much longer one object is than another				I	R	M					
Choose a level of accuracy appropriate to limitations on measurement when reporting quantities									I	R	M
OBJECTIVE B1.3 Solve problems using measurement.											
SKILLS:											
Recognize that temperature is measured in degrees		I	R	M							
Identify temperatures in degrees Celsius and Fahrenheit		I	R	R	R	M					
Observe Celsius and Fahrenheit thermometers to measure and record temperature to the nearest degree			I	R	R	M					
Use addition and subtraction within 100 to solve word problems involving lengths				I	R	M					
Measure and estimate liquid volumes and masses of objects using grams (g), kilograms (kg) and liters (l)				I	R	R	R	R	M		
Use the four operations to solve word problems involving measurement units					I	R	M				

Know relative sizes of measurement units within one system			I	R	R	R	R	R	M		
--	--	--	---	---	---	---	---	---	---	--	--

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
of units including km, m, cm; kg, g; lb, oz; l, ml; hr, min, sec, degrees											
Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit (i.e. Express the length of a 4 ft snake as 48 in.)						I	R	R	M		
Generate a conversion table						I	R	R	M		
Convert among different-sized standard measurement units within a given measurement system							I	R	M		
Use conversions to solve multi-step real world problems								I	R	M	M
Apply the area and perimeter formulas for rectangles in real world and mathematical problems (i.e. 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)						I	R	R	R	M	

B2. Time

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
OBJECTIVE B2.1 Work with time.											
SKILLS:											
Describe orientation in time: today, yesterday, tomorrow, morning (AM), afternoon (PM), etc.	I	R	M								
Tell and write time in hours and half-hours using analog and digital clocks			I	R	M						
Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.			I	R	M						
Tell and write time to the nearest minute					I	R	M				
Measure time intervals in minutes					I	R	M				
Read the clock to tell time in terms of minutes before and after the hour			I	R	R	M					
Solve word problems involving addition and subtraction of time intervals in minutes					I	R	M				
Identify measurement of time in seconds					I	R	M				
Locate dates on a calendar	I	R	M								
Indicate days of the week and months of the year	I	R	M								
Write the date using words and numbers			I	R	M						

B3. Money

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
OBJECTIVE B3.1 Work with money.											
SKILLS:											
Identify and recognize relative value of penny, nickel, dime, quarter and dollar		I	R	R	M						
Show how different combinations of coins equal the same amount of money			I	R	R	M					
Solve problems involving dollar bills, quarters, dimes, nickels and pennies			I	R	M						
Use \$ and ¢ symbols appropriately			I	R	R	M					

B4. Data

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
OBJECTIVE B4.1 Represent and interpret data.											
SKILLS:											
Organize, represent and interpret data with up to three categories			I	R	M						
Ask and answer questions about the total number of data points – how many, how many more or less			I	R	M						
Generate measurement data by measuring lengths of several objects to the nearest whole unit or making repeated measurements of the same object				I	R	M					
Show data by making a line plot				I	R	M					
Solve problems by using line plots						I	R	M			
Show data with a picture graph and a bar graph		I	R	R	R	R	R	M			
Solve simple put-together, take-apart and compare problems using information presented in a graph		I	R	R	R	M					
Represent a data set with several categories on a scaled picture graph and a scaled bar graph				I	R	R	M				
Solve one- and two-step “how many more” and “how many less” problems using information presented in a graph		I	R	R	M						

B5. Geometric Measurements

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
OBJECTIVE B5.1. Explain and use geometric measurements											
SKILLS:											
Solve real-world problems involving perimeters of polygons					I	R	R	R	M		
Find the perimeter of a polygon given the side lengths, an unknown side length, same perimeters and different areas, and same area and different perimeter						I	R	R	M		
Recognize areas as an attribute of plane figures					I	R	R	M			
Explain concepts of area measurement				I	R	R	R	M			
Measure areas by counting unit squares (i.e. square cm, square m, square in, square ft)				I	R	M					
Relate area to the operations of multiplication and addition					I	R	M				
Find the area of a rectangle with whole-number side lengths by tiling it				I	R	M					
Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world problems					I	R	M				
Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b+c$ is the sum of $a \times b$ and $a \times c$					I	R	R	R	M		
Recognize area as additive				I	R	R	M				
Find the areas of complex figures						I	R	R	R	M	
Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes while applying the context of real-world problems							I	R	M		
Know the formulas for the area and circumference of a circle and use them to solve problems							I	R	R	M	
Give an informal derivation of the relationship between the circumference and area of a circle								I	R	M	

Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint						I	R	M			
Describe and use concepts of angle measurement						I	R	M			

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
Measure and sketch angles in whole-number degrees using a protractor						I	R	M			
Recognize angle measure as additive							I	R	M		
Solve addition and subtraction problems to find unknown angles on a diagram in real world							I	R	R	M	
Use facts about supplementary, complementary, vertical and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure							I	R	R	M	M
Recognize volume as an attribute of solid figures							I	R	R	M	
Describe and use concepts of volume measurement							I	R	R	M	
Measure volumes by counting unit cubes using cubic cm, in, ft and improvised unites							I	R	M		
Relate volume to the operations of multiplication and addition with three dimensional figures							I	R	M		
Solve real world problems involving volume							I	R	R	M	
Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base.							I	R	R	M	
Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems							I	R	R	M	
Find volumes of solid (3D) figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts									I	R	R
Apply the formulas $V=lwh$ and $V=bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems								I	R	R	M
Solve real-world problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms									I	R	R
Use the formulas to determine the volumes and surface areas of cones, cylinders and spheres and use them to solve real-world and mathematical problems										I	R
Find the missing measurement in triangles and quadrilaterals							I	R	R	M	

C. GEOMETRY

I indicated Introduced

R indicates Reviewed

M indicates Mastered

C1. Shapes

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
OBJECTIVE C1.1 Identify and describe shapes											
SKILLS:											
Describe objects in the environment using names of shapes		I	R	M							
Describe the relative positions of objects (i.e. above, below, beside, in front of, behind, next to)	I	R	R	M							
Correctly name shapes regardless of orientation or size (square, circle, triangle, rectangle, hexagon, cube, cone, cylinder, sphere)		I	R	R	M						
Identify quadrilaterals and pentagons				I	R	M					
Recognize rhombuses, rectangles and square as quadrilaterals				I	R	M					
Identify shapes as two-dimensional		I	R	R	M						
Identify shapes as three-dimensional		I	R	R	R	M					
OBJECTIVE C1.2 Analyze, compare, create, classify and compose shapes											
SKILLS:											
Analyze and compare two- and three-dimensional shapes		I	R	R	R	M					
Distinguish between defining attributes (i.e. triangles are closed and three-sided) versus non-defining attributes (i.e. color, orientation, overall size)			I	R	M						
Build and draw shapes to possess defining attributes		I	R	R	R	M					
Use informal language to describe similarities, different parts and other attributes of shapes		I	R	R	R	M					
Show understanding that shapes in different categories (i.e. rhombus and rectangle) may share attributes (i.e. four sides) and that the shared attributes can define a larger category (i.e. quadrilaterals)					I	R	M				
Model shapes in the world by building and drawing shapes		I	R	R	M						
Compose simple shapes to form larger shapes (i.e. join two triangles to make a rectangle)		I	R	R	M						
Compose two-dimensional shapes or three-dimensional shapes to create a composite shape			I	R	R	M					
Compose new shapes from composite shapes			I	R	R	R	M				
Partition rectangles into row and columns				I	R	M					
Partition circles and rectangles into equal shares			I	R	R	M					
Describe the divisions of shapes using the words halves, half of, fourths, fourth of, quarters and quarter of.			I	R	R	M					
Describe the whole of a shape as two of or four of the shares, two halves, three thirds, etc.			I	R	R	M					
Show that decomposing into more equal shares creates smaller shares of an object			I	R	R	M					
Recognize that equal shares of identical wholes need not have the same shape				I	R	M					
Express the area of the parts of a whole shape as unit fractions					I	R	M				
Draw points, lines, line segments, rays, angles and perpendicular and parallel lines				I	R	R	R	M			
Identify angles and lines in two-dimensional figures						I	R	M			

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or angles of specified size						I	R	M			
Recognize and identify right triangles as a category						I	R	M			
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						I	R	M			
Identify line-symmetric figures and draw lines of symmetry						I	R	R	M		
Classify two-dimensional figures in a hierarchy based on properties							I	R	R	M	
Represent three-dimensional figures using nets made up of rectangles and triangles								I	R	R	M
Use nets to find the surface area of figures in the context of solving real-world and mathematical problems								I	R	R	M
Solve problems involving scale drawings of geometric figures (i.e. compute actual lengths and areas from a scale drawing and reproduce a scale drawing at a different scale)									I	M	
Draw geometric shapes with given conditions									I	R	M
Describe the two-dimensional figures that result from slicing three-dimensional figures									I	R	R

C2. Graphing

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg	
OBJECTIVE C2.1 Graph points on the coordinate plane to solve real-world and mathematical problems.												
SKILLS:												
Use a pair of perpendicular number lines (axes) to define a coordinate system with the intersection of the lines (origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers (coordinates)								I	R	M		
Explain that the first number in a coordinate indicates how far to travel from the origin in the direction of one axis and the second number indicates how far to travel in the direction of the second axis								I	R	R	M	
Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane								I	R	R	M	
Interpret coordinate values of points in the context of the situation								I	R	R	M	
Draw polygons in the coordinate plane given coordinates for the vertices									I	R	M	M
Use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate in the context of solving real-world and mathematical problems									I	R	M	M
Solve real-world problems by graphing points in all four quadrants of the coordinate plane									I	R	M	M
While graphing points, include the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate									I	R	M	M
Identify zeros of polynomials when suitable factorizations are available and use the zeros to construct a rough graph of the function defined by the polynomial												I
Graph equations on coordinate axes with labels and scales										I	R	M
Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often											I	R

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
forming a curve											
Explain why the x-coordinates of the points where the graphs of the equations $y=f(x)$ and $y=g(x)$ intersect are the solutions of the equation $f(x)=g(x)$											I
Find the slope of a line given 2 points on the coordinate plane											I

C3. Congruency

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg	
OBJECTIVE C3.1 Understand congruency and similarity using physical models, transparencies and geometry software.												
SKILLS:												
Verify experimentally the properties of rotations, reflections and translations.										I	R	R
Demonstrate that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections and translations										I	R	M
Given two congruent figures, describe a sequence that exhibits the congruence between them.											I	R
Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates										I	R	R
Demonstrate that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations and dilations											I	R
Given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them											I	R
Use informal arguments to establish facts about the single sum and exterior angle of triangles											I	R
Use informal arguments to establish facts about the angles created when parallel lines are cut by a transversal										I	R	R
Use informal arguments to establish the angle-angle criterion for similarity of triangles											I	R

C4. Pythagorean Theorem

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg	
OBJECTIVE C4.1 Explain and apply the Pythagorean Theorem.												
SKILLS:												
Explain a proof of the Pythagorean Theorem and its converse										I	R	M
Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three-dimensions										I	R	M
Apply the Pythagorean Theorem to find the distance between two points in a coordinate system											I	I

D. Statistics and Probability

I indicated Introduced

R indicates Reviewed

M indicates Mastered

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
OBJECTIVE D1. Develop understanding of statistical variability.											
SKILLS:											
Solve a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers								I	R	M	
Show that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread and overall shape									I	R	R
Explain that a measure of center for a numerical data set summarizes all of its values with a single number								I	R	M	
Explain that a measure of variation describes how its values vary with a single number									I	R	R
Demonstrate that statistics can be used to gain information about a population by examining a sample of the population								I	R	M	
Explain that generalizations about a population from a sample are valid only if the sample is representative of the population								I	R	M	
Explain that random sampling tends to produce representative samples and support valid inferences								I	R	M	
Use data from a random sample to draw inferences about a population with an unknown characteristic of interest								I	R	M	
Generate multiple samples of the same size to gauge the variation in estimates or predictions								I	R	R	R
OBJECTIVE D2. Summarize and describe statistical data.											
SKILLS:											
Display numerical data in plots on a number line, including dot plots, histograms and box plots								I	R	R	M
Summarize numerical data sets in relation to their context (i.e. report the number of observations; describe the nature of the attribute under investigation; give quantitative measure of center and variability, describe the overall pattern and deviations, relate choice of measure to the data distribution)								I	R	M	
Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities									I	R	R
Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations									I	R	R
Demonstrate that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring								I	R	M	
Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency (i.e. figure out the probability of an event and test it)								I	R	M	
Develop a probability model and use it to find probabilities of events								I	R	M	
Compare probabilities from a model of observed frequencies								I	R	M	
Develop a uniform probability model by assigning equal probability to all outcomes and use the model to determine probabilities of events (i.e. probability of rolling a die, each has								I	R	M	

Students will be able to...	4K	5K	1	2	3	4	5	6	7	8	Alg
the same chance with a chance of rolling a 2 or 3)											
Develop a probability model by observing frequencies in data generated from a chance process								I	R	M	
Find probabilities of compound events using organized lists, tables, tree diagrams and simulation								I	R	R	M
Demonstrate that the probability of a compound event is the fraction of the outcomes in the sample space for which the compound event occurs									I	R	R
Design and use a simulation to generate frequencies for compound events									I	R	R
Choose and interpret the scale and the origin in graphs and data displays									I	R	R
Explain the difference between theoretical and experimental probability								I	R	M	
Use permutations and combinations to find the possible number of outcomes in a given situation									I	R	R
OBJECTIVE D3. Investigate patterns of association in bivariate data.											
SKILLS:											
Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities										I	I
Describe patterns such as clustering, outliers, positive or negative association, linear association and nonlinear association										I	I
Know that straight lines are widely used to model relationships between two quantitative variables										I	I
For scatter plots that suggest a linear association, informally fit a straight line and informally assess the model fit by judging the closeness of the data points to the line										I	I
Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept										I	I
Understand that the data (i.e. bivariate categorical data) that has been collected can be put into a table to help see the relationship between the data/variables										I	R
Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects										I	R
Use relative frequencies calculated for rows and columns to describe possible association between two variables										I	R