ExploreLearning Gizmos®

Correlations for the 2012 Texas Essential Knowledge and Skills (TEKS) for Mathematics

Explorelearning®

Third Grade

1: The student uses mathematical processes to acquire and demonstrate mathematical understanding.

1.C: select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

Multiplying Decimals (Area Model)

1.D: communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

Fraction, Decimal, Percent (Area and Grid Models)

1.E: create and use representations to organize, record, and communicate mathematical ideas;

Fraction, Decimal, Percent (Area and Grid Models)

2: The student applies mathematical process standards to represent and compare whole numbers and understand relationships related to place value.

2.A: compose and decompose numbers up to 100,000 as a sum of so many ten thousands, so many thousands, so many hundreds, so many tens, and so many ones using objects, pictorial models, and numbers, including expanded notation as appropriate;

Number Line Frog Hop (Addition and Subtraction)

2.B: describe the mathematical relationships found in the base-10 place value system through the hundred thousands place;

Modeling Whole Numbers and Decimals (Base-10 Blocks)

2.C: represent a number on a number line as being between two consecutive multiples of 10; 100; 1,000; or 10,000 and use words to describe relative size of numbers in order to round whole numbers; and

Number Line Frog Hop (Addition and Subtraction)
Rounding Whole Numbers (Number Line)

2.D: compare and order whole numbers up to 100,000 and represent comparisons using the symbols >, <, or =.

Modeling Whole Numbers and Decimals (Base-10 Blocks)

3: The student applies mathematical process standards to represent and explain fractional units.

3.A: represent fractions greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 using concrete objects and pictorial models, including strip diagrams and number lines;

Adding Fractions (Fraction Tiles)
Equivalent Fractions (Fraction Tiles)
Fraction Artist 1 (Area Models of Fractions)
Fraction Artist 2 (Area Models of Fractions)
Fraction Garden (Comparing Fractions)
Fractions Greater than One (Fraction Tiles)
Modeling Fractions (Area Models)
Toy Factory (Set Models of Fractions)

3.B: determine the corresponding fraction greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 given a specified point on a number line;

Fraction Garden (Comparing Fractions)
Fractions Greater than One (Fraction Tiles)
Modeling Fractions (Area Models)

3.C: explain that the unit fraction 1/b represents the quantity formed by one part of a whole that has been partitioned into b equal parts where b is a non-zero whole number;

Fraction Artist 2 (Area Models of Fractions)

3.D: compose and decompose a fraction a/b with a numerator greater than zero and less than or equal to b as a sum of parts 1/b;

- Equivalent Fractions (Fraction Tiles)
- Fraction Artist 1 (Area Models of Fractions)
- Fraction Artist 2 (Area Models of Fractions)
- Fraction Garden (Comparing Fractions)
- Modeling Fractions (Area Models)
- Toy Factory (Set Models of Fractions)

3.E: solve problems involving partitioning an object or a set of objects among two or more recipients using pictorial representations of fractions with denominators of 2, 3, 4, 6, and 8;

- Fraction Artist 1 (Area Models of Fractions)
- Modeling Fractions (Area Models)

3.F: represent equivalent fractions with denominators of 2, 3, 4, 6, and 8 using a variety of objects and pictorial models, including number lines;

- Adding Fractions (Fraction Tiles)
- Equivalent Fractions (Fraction Tiles)
- Factor Trees (Factoring Numbers)
- Fraction Artist 1 (Area Models of Fractions)
- Fraction Artist 2 (Area Models of Fractions)
- Fraction Garden (Comparing Fractions)
- Fractions Greater than One (Fraction Tiles)
- Modeling Fractions (Area Models)
- Toy Factory (Set Models of Fractions)

3.G: explain that two fractions are equivalent if and only if they are both represented by the same point on the number line or represent the same portion of a same size whole for an area model; and

- Adding Fractions (Fraction Tiles)
- Equivalent Fractions (Fraction Tiles)
- Factor Trees (Factoring Numbers)
- Fraction Artist 1 (Area Models of Fractions)
- Fraction Artist 2 (Area Models of Fractions)
- Fraction Garden (Comparing Fractions)
- Fractions Greater than One (Fraction Tiles)
- Modeling Fractions (Area Models)
- Toy Factory (Set Models of Fractions)

3.H: compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models.

Adding Fractions (Fraction Tiles)
Equivalent Fractions (Fraction Tiles)
Fraction Artist 1 (Area Models of Fractions)
Fraction Artist 2 (Area Models of Fractions)
Fraction Garden (Comparing Fractions)
Modeling Fractions (Area Models)
Toy Factory (Set Models of Fractions)

4: The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy.

4.A: solve with fluency one-step and two-step problems involving addition and subtraction within 1,000 using strategies based on place value, properties of operations, and the relationship between addition and subtraction;

Adding Whole Numbers and Decimals (Base-10 Blocks)
Cargo Captain (Multi-digit Subtraction)
Number Line Frog Hop (Addition and Subtraction)
Subtracting Whole Numbers and Decimals (Base-10 Blocks)
Target Sum Card Game (Multi-digit Addition)
Whole Numbers with Base-10 Blocks

4.B: round to the nearest 10 or 100 or use compatible numbers to estimate solutions to addition and subtraction problems;

Rounding Whole Numbers (Number Line)

4.D: determine the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10;

Chocomatic (Multiplication, Arrays, and Area)

4.E: represent multiplication facts by using a variety of approaches such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line, and skip counting;

Chocomatic (Multiplication, Arrays, and Area)
Critter Count (Modeling Multiplication)
Number Line Frog Hop (Addition and Subtraction)

4.F: recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division facts;

Critter Count (Modeling Multiplication)

4.G: use strategies and algorithms, including the standard algorithm, to multiply a two-digit number by a one-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties;

Chocomatic (Multiplication, Arrays, and Area)

4.H: determine the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally;

No Alien Left Behind (Division with Remainders)

4.K: solve one-step and two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recall of facts.

Chocomatic (Multiplication, Arrays, and Area)
Critter Count (Modeling Multiplication)
No Alien Left Behind (Division with Remainders)

5: The student applies mathematical process standards to analyze and create patterns and relationships.

5.A: represent one- and two-step problems involving addition and subtraction of whole numbers to 1,000 using pictorial models, number lines, and equations;

Adding Whole Numbers and Decimals (Base-10 Blocks)
Subtracting Whole Numbers and Decimals (Base-10 Blocks)

5.B: represent and solve one- and two-step multiplication and division problems within 100 using arrays, strip diagrams, and equations;

Chocomatic (Multiplication, Arrays, and Area)
Critter Count (Modeling Multiplication)
Multiplying Decimals (Area Model)
No Alien Left Behind (Division with Remainders)

6: The student applies mathematical process standards to analyze attributes of two-dimensional geometric figures to develop generalizations about their properties.

6.A: classify and sort two- and three-dimensional solids, including cones, cylinders, spheres, triangular and rectangular prisms, and cubes, based on attributes using formal geometric language;

Classifying Quadrilaterals

6.B: use attributes to recognize rhombuses, parallelograms, trapezoids, rectangles, and squares as examples of quadrilaterals and draw examples of quadrilaterals that do not belong to any of these subcategories;

Classifying Quadrilaterals

6.C: determine the area of rectangles with whole number side lengths in problems using multiplication related to the number of rows times the number of unit squares in each row;

Chocomatic (Multiplication, Arrays, and Area)
Critter Count (Modeling Multiplication)

6.D: decompose composite figures formed by rectangles into non-overlapping rectangles to determine the area of the original figure using the additive property of area; and

Fido's Flower Bed (Perimeter and Area)

7: The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving customary and metric measurement.

7.A: represent fractions of halves, fourths, and eighths as distances from zero on a number line;

Fraction Garden (Comparing Fractions)
Fractions Greater than One (Fraction Tiles)
Modeling Fractions (Area Models)

7.B: determine the perimeter of a polygon or a missing length when given perimeter and remaining side lengths in problems;

Fido's Flower Bed (Perimeter and Area)

7.C: determine the solutions to problems involving addition and subtraction of time intervals in minutes using pictorial models or tools such as a 15-minute event plus a 30-minute event equals 45 minutes;

Elapsed Time

8: The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data.

8.A: summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals; and

Forest Ecosystem
Mascot Election (Pictographs and Bar Graphs)
Reaction Time 1 (Graphs and Statistics)

8.B: solve one- and two-step problems using categorical data represented with a frequency table, dot plot, pictograph, or bar graph with scaled intervals.

Mascot Election (Pictographs and Bar Graphs)
Reaction Time 1 (Graphs and Statistics)

9: The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security.

9.C: identify the costs and benefits of planned and unplanned spending decisions;

Road Trip (Problem Solving)

9.F: identify decisions involving income, spending, saving, credit, and charitable giving.

Road Trip (Problem Solving)

Fourth Grade

1: The student uses mathematical processes to acquire and demonstrate mathematical understanding.

1.C: select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

Multiplying Decimals (Area Model)

1.D: communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

Fraction, Decimal, Percent (Area and Grid Models)
Graphing Skills

1.E: create and use representations to organize, record, and communicate mathematical ideas;

Fraction, Decimal, Percent (Area and Grid Models)
Graphing Skills

2: The student applies mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value.

2.A: interpret the value of each place-value position as 10 times the position to the right and as one-tenth of the value of the place to its left;

Adding Whole Numbers and Decimals (Base-10 Blocks)
Modeling Decimals (Area and Grid Models)

Modeling Whole Numbers and Decimals (Base-10 Blocks)
Rounding Whole Numbers (Number Line)
Subtracting Whole Numbers and Decimals (Base-10 Blocks)
Treasure Hunter (Decimals on the Number Line)
Whole Numbers with Base-10 Blocks

2.B: represent the value of the digit in whole numbers through 1,000,000,000 and decimals to the hundredths using expanded notation and numerals;

Cannonball Clowns (Number Line Estimation)
Modeling Decimals (Area and Grid Models)
Modeling Whole Numbers and Decimals (Base-10 Blocks)
Treasure Hunter (Decimals on the Number Line)
Whole Numbers with Base-10 Blocks

2.C: compare and order whole numbers to 1,000,000,000 and represent comparisons using the symbols >, <, or =;

Modeling Whole Numbers and Decimals (Base-10 Blocks)

2.D: round whole numbers to a given place value through the hundred thousands place;

Rounding Whole Numbers (Number Line)

2.E: represent decimals, including tenths and hundredths, using concrete and visual models and money;

Fraction, Decimal, Percent (Area and Grid Models)
Modeling Decimals (Area and Grid Models)
Modeling Whole Numbers and Decimals (Base-10 Blocks)
Multiplying Decimals (Area Model)
Subtracting Whole Numbers and Decimals (Base-10 Blocks)
Treasure Hunter (Decimals on the Number Line)

2.F: compare and order decimals using concrete and visual models to the hundredths;

Adding Whole Numbers and Decimals (Base-10 Blocks)
Modeling Decimals (Area and Grid Models)
Modeling Whole Numbers and Decimals (Base-10 Blocks)
Subtracting Whole Numbers and Decimals (Base-10 Blocks)
Treasure Hunter (Decimals on the Number Line)

2.G: relate decimals to fractions that name tenths and hundredths; and

Fraction, Decimal, Percent (Area and Grid Models)
Modeling Decimals (Area and Grid Models)

2.H: determine the corresponding decimal to the tenths or hundredths place of a specified point on a number line.

Fraction, Decimal, Percent (Area and Grid Models)
Modeling Decimals (Area and Grid Models)
Treasure Hunter (Decimals on the Number Line)

3: The student applies mathematical process standards to represent and generate fractions to solve problems.

3.A: represent a fraction a/b as a sum of fractions 1/b, where a and b are whole numbers and b > 0, including when a > b;

Adding Fractions (Fraction Tiles)
Fraction Artist 1 (Area Models of Fractions)
Fraction Artist 2 (Area Models of Fractions)
Modeling Fractions (Area Models)

3.B: decompose a fraction in more than one way into a sum of fractions with the same denominator using concrete and pictorial models and recording results with symbolic representations;

Adding Fractions (Fraction Tiles)
Factor Trees (Factoring Numbers)
Fraction Artist 1 (Area Models of Fractions)
Fraction Artist 2 (Area Models of Fractions)
Fractions Greater than One (Fraction Tiles)
Modeling Fractions (Area Models)

3.C: determine if two given fractions are equivalent using a variety of methods;

Adding Fractions (Fraction Tiles)
Equivalent Fractions (Fraction Tiles)
Factor Trees (Factoring Numbers)
Fraction Artist 1 (Area Models of Fractions)
Fraction Artist 2 (Area Models of Fractions)
Fraction Garden (Comparing Fractions)
Fractions Greater than One (Fraction Tiles)
Modeling Fractions (Area Models)
Toy Factory (Set Models of Fractions)

3.D: compare two fractions with different numerators and different denominators and represent the comparison using the symbols >, =, or <;

Modeling Fractions (Area Models)

3.E: represent and solve addition and subtraction of fractions with equal denominators using objects and pictorial models that build to the number line and properties of operations;

Adding Fractions (Fraction Tiles)
Fraction Artist 2 (Area Models of Fractions)
Fractions Greater than One (Fraction Tiles)
Modeling Fractions (Area Models)

3.G: represent fractions and decimals to the tenths or hundredths as distances from zero on a number line.

Modeling Decimals (Area and Grid Models)

4: The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy.

4.A: add and subtract whole numbers and decimals to the hundredths place using the standard algorithm;

Adding Whole Numbers and Decimals (Base-10 Blocks)
Cargo Captain (Multi-digit Subtraction)
Number Line Frog Hop (Addition and Subtraction)
Subtracting Whole Numbers and Decimals (Base-10 Blocks)
Target Sum Card Game (Multi-digit Addition)

4.C: represent the product of 2 two-digit numbers using arrays, area models, or equations, including perfect squares through 15 by 15;

Chocomatic (Multiplication, Arrays, and Area)

4.D: use strategies and algorithms, including the standard algorithm, to multiply up to a four-digit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include mental

math, partial products, and the commutative, associative, and distributive properties;

Chocomatic (Multiplication, Arrays, and Area)
Critter Count (Modeling Multiplication)

4.E: represent the quotient of up to a four-digit whole number divided by a one-digit whole number using arrays, area models, or equations;

No Alien Left Behind (Division with Remainders)

4.F: use strategies and algorithms, including the standard algorithm, to divide up to a four-digit dividend by a one-digit divisor;

No Alien Left Behind (Division with Remainders)

4.H: solve with fluency one- and two-step problems involving multiplication and division, including interpreting remainders.

Critter Count (Modeling Multiplication)
Factor Trees (Factoring Numbers)
Multiplying Decimals (Area Model)
No Alien Left Behind (Division with Remainders)
Pattern Flip (Patterns)
Toy Factory (Set Models of Fractions)

5: The student applies mathematical process standards to develop concepts of expressions and equations.

5.B: represent problems using an input-output table and numerical expressions to generate a number pattern that follows a given rule representing the relationship of the values in the resulting sequence and their position in the sequence;

Function Machines 1 (Functions and Tables)

5.D: solve problems related to perimeter and area of rectangles where dimensions are whole numbers.

Chocomatic (Multiplication, Arrays, and Area)
Fido's Flower Bed (Perimeter and Area)

6: The student applies mathematical process standards to analyze geometric attributes in order to develop generalizations about their properties.

6.A: identify points, lines, line segments, rays, angles, and perpendicular and parallel lines;

City Tour (Coordinates)
Classifying Quadrilaterals
Elevator Operator (Line Graphs)

6.B: identify and draw one or more lines of symmetry, if they exist, for a two-dimensional figure;

Quilting Bee (Symmetry)

6.C: apply knowledge of right angles to identify acute, right, and obtuse triangles; and

Classifying Triangles

6.D: classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size.

Classifying Quadrilaterals

8: The student applies mathematical process standards to select appropriate customary and metric units, strategies, and tools to solve problems involving measurement.

8.B: convert measurements within the same measurement system, customary or metric, from a smaller unit into a larger unit or a larger unit into a smaller unit when given other equivalent measures represented in a table; and

Cannonball Clowns (Number Line Estimation)

8.C: solve problems that deal with measurements of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate.

Elapsed Time

9: The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:

9.A: represent data on a frequency table, dot plot, or stem-and-leaf plot marked with whole numbers and fractions; and

Mascot Election (Pictographs and Bar Graphs)
Reaction Time 1 (Graphs and Statistics)
Reaction Time 2 (Graphs and Statistics)

9.B: solve one- and two-step problems using data in whole number, decimal, and fraction form in a frequency table, dot plot, or stem-and-leaf plot.

Mascot Election (Pictographs and Bar Graphs)
Reaction Time 1 (Graphs and Statistics)

10: The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security.

10.D: describe how to allocate a weekly allowance among spending; saving, including for college; and sharing; and

Road Trip (Problem Solving)

Fifth Grade

1: The student uses mathematical processes to acquire and demonstrate mathematical understanding.

1.C: select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

Multiplying Decimals (Area Model)

1.D: communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

Fraction, Decimal, Percent (Area and Grid Models)
Graphing Skills

1.E: create and use representations to organize, record, and communicate mathematical ideas;

Fraction, Decimal, Percent (Area and Grid Models)
Graphing Skills

2: The student applies mathematical process standards to represent, compare, and order positive rational numbers and understand relationships as related to place value.

2.A: represent the value of the digit in decimals through the thousandths using expanded notation and numerals;

Comparing and Ordering Decimals
Modeling Decimals (Area and Grid Models)
Modeling Whole Numbers and Decimals (Base-10 Blocks)
Treasure Hunter (Decimals on the Number Line)

2.B: compare and order two decimals to thousandths and represent comparisons using the symbols >, <, or =; and

Comparing and Ordering Decimals
Modeling Decimals (Area and Grid Models)
Modeling Whole Numbers and Decimals (Base-10 Blocks)
Treasure Hunter (Decimals on the Number Line)

3: The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy.

3.A: estimate to determine solutions to mathematical and real-world problems involving addition, subtraction, multiplication, or division;

- Adding Whole Numbers and Decimals (Base-10 Blocks)
- Critter Count (Modeling Multiplication)
- Multiplying Decimals (Area Model)
- Subtracting Whole Numbers and Decimals (Base-10 Blocks)

3.C: solve with proficiency for quotients of up to a four-digit dividend by a two-digit divisor using strategies and the standard algorithm;

- No Alien Left Behind (Division with Remainders)

3.D: represent multiplication of decimals with products to the hundredths using objects and pictorial models, including area models;

- Multiplying Decimals (Area Model)
- Multiplying with Decimals

3.E: solve for products of decimals to the hundredths, including situations involving money, using strategies based on place-value understandings, properties of operations, and the relationship to the multiplication of whole numbers;

- Multiplying Decimals (Area Model)
- Multiplying with Decimals

3.H: represent and solve addition and subtraction of fractions with unequal denominators referring to the same whole using objects and pictorial models and properties of operations;

- Adding Fractions (Fraction Tiles)
- Fraction Artist 2 (Area Models of Fractions)
- Fractions Greater than One (Fraction Tiles)
- Modeling Fractions (Area Models)

3.K: add and subtract positive rational numbers fluently; and

- Adding Fractions (Fraction Tiles)
- Adding Whole Numbers and Decimals (Base-10 Blocks)
- Fractions Greater than One (Fraction Tiles)
- Fractions with Unlike Denominators
- Modeling Fractions (Area Models)
- Subtracting Whole Numbers and Decimals (Base-10 Blocks)
- Sums and Differences with Decimals

4: The student applies mathematical process standards to develop concepts of expressions and equations.

4.A: identify prime and composite numbers;

- Chocomatic (Multiplication, Arrays, and Area)
- Factor Trees (Factoring Numbers)

4.D: recognize the difference between additive and multiplicative numerical patterns given in a table or graph;

- Function Machines 1 (Functions and Tables)
- Function Machines 3 (Functions and Problem Solving)
- Pattern Flip (Patterns)

4.E: describe the meaning of parentheses and brackets in a numeric expression;

- Order of Operations

4.F: simplify numerical expressions that do not involve exponents, including up to two levels of grouping;

- Order of Operations

4.G: use concrete objects and pictorial models to develop the formulas for the volume of a rectangular prism, including the special form for a cube (V = l x w x h, V = s x s x s, and V = Bh); and

- Balancing Blocks (Volume)

4.H: represent and solve problems related to perimeter and/or area and related to volume.

- Area of Triangles
- Balancing Blocks (Volume)
- Chocomatic (Multiplication, Arrays, and Area)
- Fido's Flower Bed (Perimeter and Area)
- Pyramids and Cones

5: The student applies mathematical process standards to classify two-dimensional figures by attributes and properties.

The student is expected to classify two-dimensional figures in a hierarchy of sets and subsets using graphic organizers based on their attributes and properties.

Classifying Quadrilaterals
Classifying Triangles
Isosceles and Equilateral Triangles
Parallelogram Conditions
Special Parallelograms

6: The student applies mathematical process standards to understand, recognize, and quantify volume.

6.A: recognize a cube with side length of one unit as a unit cube having one cubic unit of volume and the volume of a three-dimensional figure as the number of unit cubes (n cubic units) needed to fill it with no gaps or overlaps if possible; and

Balancing Blocks (Volume)
Cannonball Clowns (Number Line Estimation)
Pyramids and Cones

6.B: determine the volume of a rectangular prism with whole number side lengths in problems related to the number of layers times the number of unit cubes in the area of the base.

Balancing Blocks (Volume)
Prisms and Cylinders

8: The student applies mathematical process standards to identify locations on a coordinate plane.

8.A: describe the key attributes of the coordinate plane, including perpendicular number lines (axes) where the intersection (origin) of the two lines coincides with zero on each number line and the given point (0, 0); the x-coordinate, the first number in an ordered pair, indicates movement parallel to the x-axis starting at the origin; and the y-coordinate, the second number, indicates movement parallel to the y-axis starting at the origin;

City Tour (Coordinates)
Elevator Operator (Line Graphs)

Function Machines 2 (Functions, Tables, and Graphs)
Function Machines 3 (Functions and Problem Solving)
Points in the Coordinate Plane
Points, Lines, and Equations

8.B: describe the process for graphing ordered pairs of numbers in the first quadrant of the coordinate plane; and

City Tour (Coordinates)
Elevator Operator (Line Graphs)
Function Machines 2 (Functions, Tables, and Graphs)
Function Machines 3 (Functions and Problem Solving)
Points in the Coordinate Plane
Points, Lines, and Equations

8.C: graph in the first quadrant of the coordinate plane ordered pairs of numbers arising from mathematical and real-world problems, including those generated by number patterns or found in an input-output table.

City Tour (Coordinates)
Elevator Operator (Line Graphs)
Function Machines 2 (Functions, Tables, and Graphs)
Function Machines 3 (Functions and Problem Solving)
Points in the Coordinate Plane
Points, Lines, and Equations

9: The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data.

9.A: represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots;

Mascot Election (Pictographs and Bar Graphs)
Reaction Time 1 (Graphs and Statistics)
Reaction Time 2 (Graphs and Statistics)

9.B: represent discrete paired data on a scatterplot; and

Graphing Skills
Trends in Scatter Plots

9.C: solve one- and two-step problems using data from a frequency table, dot plot, bar graph, stem-and-leaf plot, or scatterplot.

Graphing Skills
Mascot Election (Pictographs and Bar Graphs)
Reaction Time 1 (Graphs and Statistics)
Trends in Scatter Plots

10: The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security.

10.D: develop a system for keeping and using financial records;

Road Trip (Problem Solving)

10.F: balance a simple budget.

Road Trip (Problem Solving)

Sixth Grade

1: The student uses mathematical processes to acquire and demonstrate mathematical understanding.

1.A: apply mathematics to problems arising in everyday life, society, and the workplace;

Estimating Population Size

1.B: use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

Estimating Population Size

1.C: select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

Estimating Sums and Differences
Multiplying Decimals (Area Model)

1.D: communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

Biconditional Statements
Fraction, Decimal, Percent (Area and Grid Models)
Graphing Skills
Using Algebraic Expressions

1.E: create and use representations to organize, record, and communicate mathematical ideas;

Describing Data Using Statistics
Graphing Skills
Stem-and-Leaf Plots
Using Algebraic Expressions

1.G: display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Biconditional Statements
Using Algebraic Expressions

2: The student applies mathematical process standards to represent and use rational numbers in a variety of forms.

2.B: identify a number, its opposite, and its absolute value;

Absolute Value with Linear Functions
Integers, Opposites, and Absolute Values
Rational Numbers, Opposites, and Absolute Values

2.C: locate, compare, and order integers and rational numbers using a number line;

Comparing and Ordering Decimals
Fraction Garden (Comparing Fractions)
Integers, Opposites, and Absolute Values
Modeling Decimals (Area and Grid Models)
Modeling Fractions (Area Models)
Rational Numbers, Opposites, and Absolute Values

2.D: order a set of rational numbers arising from mathematical and real-world contexts; and

- Comparing and Ordering Decimals
- Estimating Population Size
- Integers, Opposites, and Absolute Values
- Modeling Fractions (Area Models)
- Rational Numbers, Opposites, and Absolute Values

2.E: extend representations for division to include fraction notation such as a/b represents the same number as a ÷ b where b ? 0.

- Fraction Artist 1 (Area Models of Fractions)

3: The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying solutions.

3.B: determine, with and without computation, whether a quantity is increased or decreased when multiplied by a fraction, including values greater than or less than one;

- Multiplying Fractions
- Multiplying Mixed Numbers

3.C: represent integer operations with concrete models and connect the actions with the models to standardized algorithms;

- Adding and Subtracting Integers
- Adding on the Number Line

3.D: add, subtract, multiply, and divide integers fluently; and

- Adding and Subtracting Integers
- Adding and Subtracting Integers with Chips
- Adding on the Number Line
- Addition of Polynomials

3.E: multiply and divide positive rational numbers fluently.

- Adding and Subtracting Integers
- Dividing Fractions
- Dividing Mixed Numbers
- Multiplying Fractions
- Multiplying Mixed Numbers

Multiplying with Decimals

4: The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations.

4.C: give examples of ratios as multiplicative comparisons of two quantities describing the same attribute;

Beam to Moon (Ratios and Proportions)
Part-to-part and Part-to-whole Ratios
Proportions and Common Multipliers
Road Trip (Problem Solving)

4.E: represent ratios and percents with concrete models, fractions, and decimals;

Beam to Moon (Ratios and Proportions)
Modeling Decimals (Area and Grid Models)
Part-to-part and Part-to-whole Ratios
Percent of Change
Percents and Proportions
Percents, Fractions, and Decimals
Proportions and Common Multipliers

4.F: represent benchmark fractions and percents such as 1%, 10%, 25%, 33 1/3%, and multiples of these values using 10 by 10 grids, strip diagrams, number lines, and numbers;

Estimating Sums and Differences
Part-to-part and Part-to-whole Ratios

4.G: generate equivalent forms of fractions, decimals, and percents using real-world problems, including problems that involve money; and

Dividing Mixed Numbers
Fraction, Decimal, Percent (Area and Grid Models)
Improper Fractions and Mixed Numbers
Modeling Decimals (Area and Grid Models)
Part-to-part and Part-to-whole Ratios
Percents, Fractions, and Decimals

4.H: convert units within a measurement system, including the use of proportions and unit rates.

- Unit Conversions

5: The student applies mathematical process standards to solve problems involving proportional relationships.

5.A: represent mathematical and real-world problems involving ratios and rates using scale factors, tables, graphs, and proportions;

- Beam to Moon (Ratios and Proportions)
- Estimating Population Size
- Part-to-part and Part-to-whole Ratios
- Percents and Proportions
- Proportions and Common Multipliers
- Road Trip (Problem Solving)

5.B: solve real-world problems to find the whole given a part and the percent, to find the part given the whole and the percent, and to find the percent given the part and the whole, including the use of concrete and pictorial models; and

- Percent of Change
- Percents and Proportions
- Polling: Neighborhood

5.C: use equivalent fractions, decimals, and percents to show equal parts of the same whole.

- Fraction, Decimal, Percent (Area and Grid Models)
- Percents, Fractions, and Decimals

6: The student applies mathematical process standards to use multiple representations to describe algebraic relationships.

6.C: represent a given situation using verbal descriptions, tables, graphs, and equations in the form y = kx or y = x + b.

- Absolute Value Equations and Inequalities
- Function Machines 1 (Functions and Tables)
- Function Machines 2 (Functions, Tables, and Graphs)
- Introduction to Functions
- Points, Lines, and Equations

Solving Equations on the Number Line
Using Algebraic Equations
Using Algebraic Expressions

7: The student applies mathematical process standards to develop concepts of expressions and equations.

7.A: generate equivalent numerical expressions using order of operations, including whole number exponents and prime factorization;

Equivalent Algebraic Expressions I
Factor Trees (Factoring Numbers)
Finding Factors with Area Models
Order of Operations

7.B: distinguish between expressions and equations verbally, numerically, and algebraically;

Solving Equations on the Number Line
Using Algebraic Equations

7.C: determine if two expressions are equivalent using concrete models, pictorial models, and algebraic representations; and

Equivalent Algebraic Expressions I
Equivalent Algebraic Expressions II
Simplifying Algebraic Expressions I
Simplifying Algebraic Expressions II
Using Algebraic Expressions

7.D: generate equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties.

Equivalent Algebraic Expressions I
Equivalent Algebraic Expressions II
Modeling the Factorization of x^2+bx+c
Simplifying Algebraic Expressions I
Simplifying Algebraic Expressions II
Solving Algebraic Equations II
Using Algebraic Expressions

8: The student applies mathematical process standards to use geometry to represent relationships and solve problems.

8.A: extend previous knowledge of triangles and their properties to include the sum of angles of a triangle, the relationship between the lengths of sides and measures of angles in a triangle, and determining when three lengths form a triangle;

- Classifying Triangles
- Concurrent Lines, Medians, and Altitudes
- Isosceles and Equilateral Triangles
- Polygon Angle Sum
- Triangle Angle Sum
- Triangle Inequalities

8.B: model area formulas for parallelograms, trapezoids, and triangles by decomposing and rearranging parts of these shapes;

- Area of Parallelograms
- Area of Triangles
- Perimeter and Area of Rectangles

8.C: write equations that represent problems related to the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers; and

- Area of Parallelograms
- Area of Triangles
- Perimeter and Area of Rectangles
- Prisms and Cylinders

8.D: determine solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers.

- Area of Parallelograms
- Area of Triangles
- Balancing Blocks (Volume)
- Chocomatic (Multiplication, Arrays, and Area)
- Perimeter and Area of Rectangles
- Prisms and Cylinders

9: The student applies mathematical process standards to use equations and inequalities to represent situations.

9.A: write one-variable, one-step equations and inequalities to represent constraints or conditions within problems;

- Exploring Linear Inequalities in One Variable
- Linear Inequalities in Two Variables
- Modeling One-Step Equations
- Solving Equations on the Number Line
- Solving Linear Inequalities in One Variable

9.B: represent solutions for one-variable, one-step equations and inequalities on number lines; and

- Exploring Linear Inequalities in One Variable
- Solving Equations on the Number Line
- Solving Linear Inequalities in One Variable

9.C: write corresponding real-world problems given one-variable, one-step equations or inequalities.

- Linear Inequalities in Two Variables
- Solving Equations on the Number Line

10: The student applies mathematical process standards to use equations and inequalities to solve problems.

10.A: model and solve one-variable, one-step equations and inequalities that represent problems, including geometric concepts; and

- Compound Inequalities
- Exploring Linear Inequalities in One Variable
- Linear Inequalities in Two Variables
- Modeling One-Step Equations
- Modeling and Solving Two-Step Equations
- Solving Algebraic Equations I
- Solving Algebraic Equations II
- Solving Equations on the Number Line
- Solving Linear Inequalities in One Variable

10.B: determine if the given value(s) make(s) one-variable, one-step equations or inequalities true.

- Compound Inequalities
- Exploring Linear Inequalities in One Variable
- Linear Inequalities in Two Variables
- Modeling One-Step Equations
- Modeling and Solving Two-Step Equations

Solving Algebraic Equations II
Solving Equations on the Number Line
Solving Linear Inequalities in One Variable

12: The student applies mathematical process standards to use numerical or graphical representations to analyze problems.

12.A: represent numeric data graphically, including dot plots, stem-and-leaf plots, histograms, and box plots;

Box-and-Whisker Plots
Describing Data Using Statistics
Histograms
Mascot Election (Pictographs and Bar Graphs)
Mean, Median, and Mode
Reaction Time 1 (Graphs and Statistics)
Reaction Time 2 (Graphs and Statistics)
Stem-and-Leaf Plots

12.B: use the graphical representation of numeric data to describe the center, spread, and shape of the data distribution;

Describing Data Using Statistics
Mean, Median, and Mode
Movie Reviewer (Mean and Median)
Populations and Samples
Reaction Time 1 (Graphs and Statistics)
Reaction Time 2 (Graphs and Statistics)
Real-Time Histogram
Stem-and-Leaf Plots

12.C: summarize numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution; and

Box-and-Whisker Plots
Describing Data Using Statistics
Mean, Median, and Mode
Movie Reviewer (Mean and Median)
Reaction Time 1 (Graphs and Statistics)
Reaction Time 2 (Graphs and Statistics)
Real-Time Histogram
Stem-and-Leaf Plots

12.D: summarize categorical data with numerical and graphical summaries, including the mode, the percent of values in each category (relative frequency table), and the percent bar graph, and use these summaries to describe the data distribution.

Stem-and-Leaf Plots

13: The student applies mathematical process standards to use numerical or graphical representations to solve problems.

13.A: interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots; and

Box-and-Whisker Plots
Describing Data Using Statistics
Histograms
Mean, Median, and Mode
Reaction Time 1 (Graphs and Statistics)
Reaction Time 2 (Graphs and Statistics)
Stem-and-Leaf Plots

Seventh Grade

1: The student uses mathematical processes to acquire and demonstrate mathematical understanding.

1.A: apply mathematics to problems arising in everyday life, society, and the workplace;

Estimating Population Size

1.B: use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

Estimating Population Size

1.C: select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

Estimating Sums and Differences

1.D: communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

Biconditional Statements
Graphing Skills
Using Algebraic Expressions

1.E: create and use representations to organize, record, and communicate mathematical ideas;

Describing Data Using Statistics
Graphing Skills
Stem-and-Leaf Plots
Using Algebraic Expressions

1.G: display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Using Algebraic Expressions

3: The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions.

3.A: add, subtract, multiply, and divide rational numbers fluently; and

Adding Fractions (Fraction Tiles)
Adding and Subtracting Integers
Adding on the Number Line
Dividing Fractions
Dividing Mixed Numbers
Equivalent Algebraic Expressions I
Estimating Sums and Differences
Fractions Greater than One (Fraction Tiles)
Fractions with Unlike Denominators
Improper Fractions and Mixed Numbers
Multiplying Fractions
Multiplying Mixed Numbers
Multiplying with Decimals
Sums and Differences with Decimals

3.B: apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.

- Adding Fractions (Fraction Tiles)
- Adding and Subtracting Integers
- Adding on the Number Line
- Dividing Fractions
- Dividing Mixed Numbers
- Estimating Sums and Differences
- Fractions Greater than One (Fraction Tiles)
- Fractions with Unlike Denominators
- Improper Fractions and Mixed Numbers
- Multiplying Fractions
- Multiplying Mixed Numbers
- Multiplying with Decimals
- Sums and Differences with Decimals

4: The student applies mathematical process standards to represent and solve problems involving proportional relationships.

4.A: represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphical, and algebraic representations, including d = rt;

- Cat and Mouse (Modeling with Linear Systems)
- Distance-Time Graphs
- Earthquakes 1 - Recording Station
- Elevator Operator (Line Graphs)
- Point-Slope Form of a Line
- Road Trip (Problem Solving)

4.B: calculate unit rates from rates in mathematical and real-world problems;

- Household Energy Usage
- Road Trip (Problem Solving)

4.C: determine the constant of proportionality (k = y/x) within mathematical and real-world problems;

- Direct and Inverse Variation

4.D: solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems; and

- Beam to Moon (Ratios and Proportions)
- Estimating Population Size
- Household Energy Usage
- Part-to-part and Part-to-whole Ratios
- Percent of Change
- Percents and Proportions
- Percents, Fractions, and Decimals
- Proportions and Common Multipliers
- Real-Time Histogram
- Road Trip (Problem Solving)
- Time Estimation

4.E: convert between measurement systems, including the use of proportions and the use of unit rates.

- Unit Conversions

5: The student applies mathematical process standards to use geometry to describe or solve problems involving proportional relationships.

5.A: generalize the critical attributes of similarity, including ratios within and between similar shapes;

- Beam to Moon (Ratios and Proportions)
- Circles
- Similar Figures
- Similarity in Right Triangles

5.B: describe ? as the ratio of the circumference of a circle to its diameter; and

- Circumference and Area of Circles

5.C: solve mathematical and real-world problems involving similar shape and scale drawings.

- Similar Figures

6: The student applies mathematical process standards to use probability and statistics to describe or solve problems involving proportional relationships.

6.A: represent sample spaces for simple and compound events using lists and tree diagrams;

- Independent and Dependent Events
- Permutations and Combinations
- Theoretical and Experimental Probability

6.B: select and use different simulations to represent simple and compound events with and without technology;

- Geometric Probability
- Independent and Dependent Events

6.C: make predictions and determine solutions using experimental data for simple and compound events;

- Independent and Dependent Events
- Probability Simulations

6.D: make predictions and determine solutions using theoretical probability for simple and compound events;

- Independent and Dependent Events
- Probability Simulations
- Theoretical and Experimental Probability

6.E: find the probabilities of a simple event and its complement and describe the relationship between the two;

- Theoretical and Experimental Probability

6.F: use data from a random sample to make inferences about a population;

- Polling: City
- Polling: Neighborhood
- Populations and Samples

6.G: solve problems using data represented in bar graphs, dot plots, and circle graphs, including part-to-whole and part-to-part comparisons and equivalents;

Graphing Skills
Mean, Median, and Mode
Movie Reviewer (Mean and Median)
Reaction Time 1 (Graphs and Statistics)
Reaction Time 2 (Graphs and Statistics)

6.H: solve problems using qualitative and quantitative predictions and comparisons from simple experiments; and

Independent and Dependent Events
Spin the Big Wheel! (Probability)
Theoretical and Experimental Probability

6.I: determine experimental and theoretical probabilities related to simple and compound events using data and sample spaces.

Independent and Dependent Events
Probability Simulations
Theoretical and Experimental Probability

8: The student applies mathematical process standards to develop geometric relationships with volume.

8.A: model the relationship between the volume of a rectangular prism and a rectangular pyramid having both congruent bases and heights and connect that relationship to the formulas;

Pyramids and Cones

8.C: use models to determine the approximate formulas for the circumference and area of a circle and connect the models to the actual formulas.

Circumference and Area of Circles

9: The student applies mathematical process standards to solve geometric problems.

9.A: solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids;

Prisms and Cylinders
Pyramids and Cones

9.B: determine the circumference and area of circles;

Circumference and Area of Circles

9.C: determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles; and

Area of Triangles
Fido's Flower Bed (Perimeter and Area)

9.D: solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net.

Surface and Lateral Areas of Prisms and Cylinders
Surface and Lateral Areas of Pyramids and Cones

10: The student applies mathematical process standards to use one-variable equations and inequalities to represent situations.

10.A: write one-variable, two-step equations and inequalities to represent constraints or conditions within problems;

Linear Inequalities in Two Variables
Solving Equations on the Number Line
Solving Two-Step Equations

10.B: represent solutions for one-variable, two-step equations and inequalities on number lines; and

Absolute Value Equations and Inequalities
Compound Inequalities
Exploring Linear Inequalities in One Variable
Solving Equations on the Number Line

11: The student applies mathematical process standards to solve one-variable equations and inequalities.

11.A: model and solve one-variable, two-step equations and inequalities;

Absolute Value Equations and Inequalities
Compound Inequalities
Exploring Linear Inequalities in One Variable
Linear Inequalities in Two Variables
Modeling One-Step Equations
Modeling and Solving Two-Step Equations
Solving Algebraic Equations I
Solving Algebraic Equations II
Solving Equations on the Number Line
Solving Two-Step Equations

11.B: determine if the given value(s) make(s) one-variable, two-step equations and inequalities true; and

Exploring Linear Inequalities in One Variable

11.C: write and solve equations using geometry concepts, including the sum of the angles in a triangle, and angle relationships.

Triangle Angle Sum

12: The student applies mathematical process standards to use statistical representations to analyze data.

12.A: compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads;

Box-and-Whisker Plots
Mean, Median, and Mode
Reaction Time 1 (Graphs and Statistics)
Reaction Time 2 (Graphs and Statistics)

12.B: use data from a random sample to make inferences about a population; and

Polling: City
Polling: Neighborhood
Populations and Samples

12.C: compare two populations based on data in random samples from these populations, including informal comparative inferences about differences between the two populations.

Polling: City
Polling: Neighborhood
Populations and Samples

13: The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor.

13.B: identify the components of a personal budget, including income; planned savings for college, retirement, and emergencies; taxes; and fixed and variable expenses, and calculate what percentage each category comprises of the total budget;

Road Trip (Problem Solving)

13.C: create and organize a financial assets and liabilities record and construct a net worth statement;

Household Energy Usage
Percent of Change

13.E: calculate and compare simple interest and compound interest earnings; and

Compound Interest

13.F: analyze and compare monetary incentives, including sales, rebates, and coupons.

Household Energy Usage
Percent of Change

Eighth Grade

1: The student uses mathematical processes to acquire and demonstrate mathematical understanding.

1.A: apply mathematics to problems arising in everyday life, society, and the workplace;

Estimating Population Size

1.B: use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

Estimating Population Size

1.C: select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

Estimating Sums and Differences

1.D: communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

Biconditional Statements
Using Algebraic Expressions

1.E: create and use representations to organize, record, and communicate mathematical ideas;

Describing Data Using Statistics
Stem-and-Leaf Plots
Using Algebraic Expressions

1.G: display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Using Algebraic Expressions

2: The student applies mathematical process standards to represent and use real numbers in a variety of forms.

2.B: approximate the value of an irrational number, including ? and square roots of numbers less than 225, and locate that rational number approximation on a number line;

Circumference and Area of Circles
Square Roots

2.C: convert between standard decimal notation and scientific notation; and

Number Systems
Unit Conversions
Unit Conversions 2 - Scientific Notation and Significant Digits

2.D: order a set of real numbers arising from mathematical and real-world contexts.

Comparing and Ordering Decimals
Integers, Opposites, and Absolute Values
Rational Numbers, Opposites, and Absolute Values

3: The student applies mathematical process standards to use proportional relationships to describe dilations.

3.A: generalize that the ratio of corresponding sides of similar shapes are proportional, including a shape and its dilation;

Dilations
Similar Figures

3.B: compare and contrast the attributes of a shape and its dilation(s) on a coordinate plane; and

Dilations

3.C: use an algebraic representation to explain the effect of a given positive rational scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation.

Dilations

4: The student applies mathematical process standards to explain proportional and non-proportional relationships involving slope.

4.B: graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship; and

- Direct and Inverse Variation

4.C: use data from a table or graph to determine the rate of change or slope and y-intercept in mathematical and real-world problems.

- Cat and Mouse (Modeling with Linear Systems)
- Function Machines 2 (Functions, Tables, and Graphs)
- Function Machines 3 (Functions and Problem Solving)
- Point-Slope Form of a Line
- Points, Lines, and Equations
- Quadratics in Polynomial Form
- Slope
- Slope-Intercept Form of a Line

5: The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions.

5.A: represent linear proportional situations with tables, graphs, and equations in the form of y = kx;

- Direct and Inverse Variation
- Proportions and Common Multipliers

5.B: represent linear non-proportional situations with tables, graphs, and equations in the form of y = mx + b, where b ? 0;

- Function Machines 1 (Functions and Tables)

5.C: contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a linear relationship from a graphical representation;

- Correlation
- Trends in Scatter Plots

5.D: use a trend line that approximates the linear relationship between bivariate sets of data to make predictions;

- Correlation
- Least-Squares Best Fit Lines
- Solving Using Trend Lines
- Trends in Scatter Plots

5.E: solve problems involving direct variation;

- Direct and Inverse Variation

5.G: identify functions using sets of ordered pairs, tables, mappings, and graphs;

- Function Machines 1 (Functions and Tables)
- Function Machines 2 (Functions, Tables, and Graphs)
- Function Machines 3 (Functions and Problem Solving)
- Introduction to Functions
- Linear Functions
- Points, Lines, and Equations
- Quadratics in Polynomial Form

5.H: identify examples of proportional and non-proportional functions that arise from mathematical and real-world problems; and

- Direct and Inverse Variation

5.I: write an equation in the form y = mx + b to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations.

- Slope-Intercept Form of a Line

6: The student applies mathematical process standards to develop mathematical relationships and make connections to geometric formulas.

6.A: describe the volume formula V = Bh of a cylinder in terms of its base area and its height;

- Prisms and Cylinders
- Pyramids and Cones

6.B: model the relationship between the volume of a cylinder and a cone having both congruent bases and heights and connect that relationship to the formulas; and

Pyramids and Cones

6.C: use models and diagrams to explain the Pythagorean theorem.

Circles
Pythagorean Theorem
Pythagorean Theorem with a Geoboard
Surface and Lateral Areas of Pyramids and Cones

7: The student applies mathematical process standards to use geometry to solve problems.

7.A: solve problems involving the volume of cylinders, cones, and spheres;

Prisms and Cylinders
Pyramids and Cones

7.B: use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders;

Surface and Lateral Areas of Prisms and Cylinders

7.C: use the Pythagorean Theorem and its converse to solve problems; and

Circles
Distance Formula
Pythagorean Theorem
Pythagorean Theorem with a Geoboard
Surface and Lateral Areas of Pyramids and Cones

7.D: determine the distance between two points on a coordinate plane using the Pythagorean Theorem.

Circles
Distance Formula

8: The student applies mathematical process standards to use one-variable equations or inequalities in problem situations.

8.A: write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants;

- Absolute Value Equations and Inequalities
- Solving Equations on the Number Line
- Solving Linear Inequalities in One Variable

8.B: write a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants;

- Solving Equations on the Number Line

8.C: model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants; and

- Absolute Value Equations and Inequalities
- Modeling One-Step Equations
- Modeling and Solving Two-Step Equations
- Solving Algebraic Equations II
- Solving Two-Step Equations

8.D: use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

- Constructing Congruent Segments and Angles
- Isosceles and Equilateral Triangles
- Polygon Angle Sum
- Similar Figures
- Triangle Angle Sum

10: The student applies mathematical process standards to develop transformational geometry concepts.

10.A: generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane;

- Dilations
- Rock Art (Transformations)
- Rotations, Reflections, and Translations

Translations

10.B: differentiate between transformations that preserve congruence and those that do not;

Dilations
Reflections
Rock Art (Transformations)
Rotations, Reflections, and Translations
Translations

10.C: explain the effect of translations, reflections over the x- or y-axis, and rotations limited to 90°, 180°, 270°, and 360° as applied to two-dimensional shapes on a coordinate plane using an algebraic representation; and

Dilations
Rock Art (Transformations)
Translations

10.D: model the effect on linear and area measurements of dilated two-dimensional shapes.

Dilations

11: The student applies mathematical process standards to use statistical procedures to describe data.

11.A: construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data;

Correlation
Least-Squares Best Fit Lines
Solving Using Trend Lines
Trends in Scatter Plots

11.C: simulate generating random samples of the same size from a population with known characteristics to develop the notion of a random sample being representative of the population from which it was selected

Polling: City
Populations and Samples

12: The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor.

12.A: solve real-world problems comparing how interest rate and loan length affect the cost of credit;

Compound Interest

12.B: calculate the total cost of repaying a loan, including credit cards and easy access loans, under various rates of interest and over different periods using an online calculator;

Compound Interest

12.D: calculate and compare simple interest and compound interest earnings;

Compound Interest

12.E: identify and explain the advantages and disadvantages of different payment methods;

Household Energy Usage
Percent of Change

12.F: analyze situations to determine if they represent financially responsible decisions and identify the benefits of financial responsibility and the costs of financial irresponsibility; and

Household Energy Usage
Percent of Change

Algebra I

1: The student uses mathematical processes to acquire and demonstrate mathematical understanding.

1.A: apply mathematics to problems arising in everyday life, society, and the workplace;

Determining a Spring Constant
Estimating Population Size

1.B: use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

Estimating Population Size

1.C: select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

Estimating Sums and Differences

1.D: communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

Biconditional Statements
Using Algebraic Expressions

1.E: create and use representations to organize, record, and communicate mathematical ideas;

Describing Data Using Statistics
Stem-and-Leaf Plots
Using Algebraic Expressions

1.G: display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Using Algebraic Expressions

2: The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations.

2.A: determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities;

Function Machines 3 (Functions and Problem Solving)

2.B: write linear equations in two variables in various forms, including y = mx + b, Ax + By = C, and y - y? = m(x - x?), given one point and the slope and given two points;

Point-Slope Form of a Line
Points, Lines, and Equations
Slope-Intercept Form of a Line
Solving Equations by Graphing Each Side
Standard Form of a Line

2.C: write linear equations in two variables given a table of values, a graph, and a verbal description;

Point-Slope Form of a Line
Points, Lines, and Equations
Solving Equations by Graphing Each Side
Standard Form of a Line

2.D: write and solve equations involving direct variation;

Direct and Inverse Variation

2.G: write an equation of a line that is parallel or perpendicular to the X or Y axis and determine whether the slope of the line is zero or undefined;

Point-Slope Form of a Line
Slope-Intercept Form of a Line
Standard Form of a Line

2.H: write linear inequalities in two variables given a table of values, a graph, and a verbal description; and

Linear Inequalities in Two Variables
Systems of Linear Inequalities (Slope-intercept form)

2.I: write systems of two linear equations given a table of values, a graph, and a verbal description.

Cat and Mouse (Modeling with Linear Systems)
Solving Equations by Graphing Each Side
Solving Linear Systems (Matrices and Special Solutions)
Solving Linear Systems (Slope-Intercept Form)
Solving Linear Systems (Standard Form)

3: The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations.

3.A: determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including y = mx + b, Ax + By = C, and y - y? = m(x - x?);

Cat and Mouse (Modeling with Linear Systems)
Function Machines 2 (Functions, Tables, and Graphs)
Function Machines 3 (Functions and Problem Solving)
Introduction to Functions
Linear Inequalities in Two Variables
Point-Slope Form of a Line
Slope
Slope-Intercept Form of a Line
Standard Form of a Line

3.B: calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems;

Cat and Mouse (Modeling with Linear Systems)
Compound Interest
Direct and Inverse Variation
Function Machines 1 (Functions and Tables)
Function Machines 3 (Functions and Problem Solving)
Point-Slope Form of a Line
Points, Lines, and Equations
Slope-Intercept Form of a Line

3.C: graph linear functions on the coordinate plane and identify key features, including x-intercept, y-intercept, zeros, and slope, in mathematical and real-world problems;

Absolute Value with Linear Functions
Cat and Mouse (Modeling with Linear Systems)
Compound Interest
Exponential Functions
Function Machines 2 (Functions, Tables, and Graphs)
Function Machines 3 (Functions and Problem Solving)
Graphs of Polynomial Functions
Linear Functions
Point-Slope Form of a Line
Points, Lines, and Equations
Polynomials and Linear Factors
Slope-Intercept Form of a Line
Standard Form of a Line

3.D: graph the solution set of linear inequalities in two variables on the coordinate plane;

Linear Inequalities in Two Variables
Systems of Linear Inequalities (Slope-intercept form)

3.E: determine the effects on the graph of the parent function f(x) = x when f(x) is replaced by af(x), f(x) + d, f(x - c), f(bx) for specific values of a, b, c, and d;

Absolute Value with Linear Functions
Exponential Functions
Introduction to Exponential Functions
Quadratics in Factored Form
Quadratics in Polynomial Form
Rational Functions
Slope-Intercept Form of a Line
Translating and Scaling Functions
Translations

3.F: graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist;

Solving Linear Systems (Matrices and Special Solutions)
Solving Linear Systems (Slope-Intercept Form)
Solving Linear Systems (Standard Form)
Systems of Linear Inequalities (Slope-intercept form)

3.G: estimate graphically the solutions to systems of two linear equations with two variables in real-world problems; and

Solving Linear Systems (Matrices and Special Solutions)
Solving Linear Systems (Slope-Intercept Form)

3.H: graph the solution set of systems of two linear inequalities in two variables on the coordinate plane.

Linear Programming
Systems of Linear Inequalities (Slope-intercept form)

4: The student applies the mathematical process standards to formulate statistical relationships and evaluate their reasonableness based on real-world data.

4.A: calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity as a measure of the strength of the linear association;

Correlation

4.B: compare and contrast association and causation in real-world problems; and

Correlation

4.C: write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.

Correlation
Least-Squares Best Fit Lines
Solving Using Trend Lines

5: The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions.

5.A: solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides;

Modeling One-Step Equations
Modeling and Solving Two-Step Equations
Solving Algebraic Equations I
Solving Algebraic Equations II
Solving Equations by Graphing Each Side
Solving Equations on the Number Line
Solving Two-Step Equations

5.B: solve linear inequalities in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides; and

Compound Inequalities
Exploring Linear Inequalities in One Variable
Solving Linear Inequalities in One Variable

5.C: solve systems of two linear equations with two variables for mathematical and real-world problems.

Solving Equations by Graphing Each Side
Solving Linear Systems (Matrices and Special Solutions)
Solving Linear Systems (Slope-Intercept Form)
Solving Linear Systems (Standard Form)

6: The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations.

6.B: write equations of quadratic functions given the vertex and another point on the graph, write the equation in vertex form ($f(x) = a(x - h)^2 + k$), and rewrite the equation from vertex form to standard form ($f(x) = ax^2 + bx + c$); and

Parabolas

6.C: write quadratic functions when given real solutions and graphs of their related equations.

Quadratics in Polynomial Form

7: The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations.

7.A: graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry;

- Graphs of Polynomial Functions
- Polynomials and Linear Factors
- Quadratics in Factored Form
- Quadratics in Polynomial Form
- Quadratics in Vertex Form
- Translating and Scaling Functions

7.B: describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions; and

- Modeling the Factorization of x^2+bx+c
- Polynomials and Linear Factors
- Quadratics in Factored Form

7.C: determine the effects on the graph of the parent function $f(x) = x^2$ when f(x) is replaced by af(x), f(x) + d, f(x - c), f(bx) for specific values of a, b, c, and d.

- Exponential Functions
- Quadratics in Factored Form
- Quadratics in Polynomial Form
- Quadratics in Vertex Form
- Translating and Scaling Functions
- Translations
- Zap It! Game

8: The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data.

8.A: solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula; and

Modeling the Factorization of x^2+bx+c
Quadratics in Factored Form
Roots of a Quadratic

9: The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data.

9.A: determine the domain and range of exponential functions of the form f(x) = ab to the x power and represent the domain and range using inequalities;

Exponential Functions
Logarithmic Functions

9.B: interpret the meaning of the values of a and b in exponential functions of the form f(x) = ab to the x power in real-world problems;

Compound Interest
Introduction to Exponential Functions

9.C: write exponential functions in the form f(x) = ab to the x power (where b is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay;

Compound Interest
Exponential Growth and Decay
Introduction to Exponential Functions

9.D: graph exponential functions that model growth and decay and identify key features, including y-intercept and asymptote, in mathematical and real-world problems; and

Compound Interest
Exponential Growth and Decay
Introduction to Exponential Functions
Logarithmic Functions

10: The student applies the mathematical process standards and algebraic methods to rewrite in equivalent forms and perform operations on polynomial expressions.

10.A: add and subtract polynomials of degree one and degree two;

Addition and Subtraction of Functions
Addition of Polynomials

10.B: multiply polynomials of degree one and degree two;

Modeling the Factorization of x^2+bx+c

10.C: determine the quotient of a polynomial of degree one and polynomial of degree two when divided by a polynomial of degree one and polynomial of degree two when the degree of the divisor does not exceed the degree of the dividend;

Dividing Polynomials Using Synthetic Division

10.D: rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property;

Equivalent Algebraic Expressions II
Modeling the Factorization of x^2+bx+c
Simplifying Algebraic Expressions I
Simplifying Algebraic Expressions II

10.E: factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two; and

Factoring Special Products
Modeling the Factorization of ax^2+bx+c
Modeling the Factorization of x^2+bx+c

10.F: decide if a binomial can be written as the difference of two squares and, if possible, use the structure of a difference of two squares to rewrite the binomial.

Factoring Special Products

11: The student applies the mathematical process standards and algebraic methods to rewrite algebraic expressions into equivalent forms.

11.A: simplify numerical radical expressions involving square roots; and

Operations with Radical Expressions
Simplifying Radical Expressions

11.B: simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents.

Dividing Exponential Expressions
Exponents and Power Rules
Multiplying Exponential Expressions
Simplifying Algebraic Expressions II

12: The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions.

12.A: decide whether relations represented verbally, tabularly, graphically, and symbolically define a function;

Introduction to Functions
Linear Functions
Points, Lines, and Equations

12.B: evaluate functions, expressed in function notation, given one or more elements in their domains;

Logarithmic Functions

12.C: identify terms of arithmetic and geometric sequences when the sequences are given in function form using recursive processes;

Arithmetic Sequences
Geometric Sequences

12.D: write a formula for the nth term of arithmetic and geometric sequences, given the value of several of their terms; and

Arithmetic Sequences
Arithmetic and Geometric Sequences
Geometric Sequences

12.E: solve mathematic and scientific formulas, and other literal equations, for a specified variable.

Area of Triangles
Solving Formulas for any Variable

Geometry

1: The student uses mathematical processes to acquire and demonstrate mathematical understanding.

1.A: apply mathematics to problems arising in everyday life, society, and the workplace;

Determining a Spring Constant
Estimating Population Size

1.B: use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

Estimating Population Size

1.D: communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

Biconditional Statements
Using Algebraic Expressions

1.E: create and use representations to organize, record, and communicate mathematical ideas;

- Describing Data Using Statistics
- Stem-and-Leaf Plots
- Using Algebraic Expressions

1.G: display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

- Using Algebraic Expressions

2: The student uses the process skills to understand the connections between algebra and geometry and uses the one- and two-dimensional coordinate systems to verify geometric conjectures.

2.B: derive and use the distance, slope, and midpoint formulas to verify geometric relationships, including congruence of segments and parallelism or perpendicularity of pairs of lines; and

- Circles
- Distance Formula

3: The student uses the process skills to generate and describe rigid transformations (translation, reflection, and rotation) and non-rigid transformations (dilations that preserve similarity and reductions and enlargements that do not preserve similarity).

3.A: describe and perform transformations of figures in a plane using coordinate notation;

- Dilations
- Rotations, Reflections, and Translations
- Translations

3.B: determine the image or pre-image of a given two-dimensional figure under a composition of rigid transformations, a composition of non-rigid transformations, and a composition of both, including dilations where the center can be any point in the plane;

Dilations
Rotations, Reflections, and Translations

3.D: identify and distinguish between reflectional and rotational symmetry in a plane figure.

Holiday Snowflake Designer

4: The student uses the process skills with deductive reasoning to understand geometric relationships.

4.A: distinguish between undefined terms, definitions, postulates, conjectures, and theorems;

Biconditional Statements
Investigating Angle Theorems
Isosceles and Equilateral Triangles

4.B: identify and determine the validity of the converse, inverse, and contrapositive of a conditional statement and recognize the connection between a biconditional statement and a true conditional statement with a true converse;

Biconditional Statements
Conditional Statements

5: The student uses constructions to validate conjectures about geometric figures.

5.A: investigate patterns to make conjectures about geometric relationships, including angles formed by parallel lines cut by a transversal, criteria required for triangle congruence, special segments of triangles, diagonals of quadrilaterals, interior and exterior angles of polygons, and special segments and angles of circles choosing from a variety of tools;

Inscribed Angles
Polygon Angle Sum
Triangle Angle Sum

5.B: construct congruent segments, congruent angles, a segment bisector, an angle bisector, perpendicular lines, the perpendicular bisector of a line segment, and a line parallel to a given line through a point not on a line using a compass and a straightedge;

Constructing Congruent Segments and Angles
Constructing Parallel and Perpendicular Lines
Segment and Angle Bisectors

5.C: use the constructions of congruent segments, congruent angles, angle bisectors, and perpendicular bisectors to make conjectures about geometric relationships; and

Constructing Congruent Segments and Angles
Constructing Parallel and Perpendicular Lines
Segment and Angle Bisectors

5.D: verify the Triangle Inequality theorem using constructions and apply the theorem to solve problems.

Triangle Inequalities

6: The student uses the process skills with deductive reasoning to prove and apply theorems by using a variety of methods such as coordinate, transformational, and axiomatic and formats such as two-column, paragraph, and flow chart.

6.A: verify theorems about angles formed by the intersection of lines and line segments, including vertical angles, and angles formed by parallel lines cut by a transversal and prove equidistance between the endpoints of a segment and points on its perpendicular bisector and apply these relationships to solve problems;

Investigating Angle Theorems
Segment and Angle Bisectors
Triangle Angle Sum

6.B: prove two triangles are congruent by applying the Side-Angle-Side, Angle-Side-Angle, Side-Side-Side, Angle-Angle-Side, and Hypotenuse-Leg congruence conditions;

Congruence in Right Triangles
Proving Triangles Congruent

6.C: apply the definition of congruence, in terms of rigid transformations, to identify congruent figures and their corresponding sides and angles;

Dilations
Reflections
Rotations, Reflections, and Translations
Translations

6.D: verify theorems about the relationships in triangles, including proof of the Pythagorean Theorem, the sum of interior angles, base angles of isosceles triangles, midsegments, and medians, and apply these relationships to solve problems; and

Cosine Function
Isosceles and Equilateral Triangles
Polygon Angle Sum
Pythagorean Theorem
Pythagorean Theorem with a Geoboard
Sine Function
Triangle Angle Sum
Triangle Inequalities

6.E: prove a quadrilateral is a parallelogram, rectangle, square, or rhombus using opposite sides, opposite angles, or diagonals and apply these relationships to solve problems.

Classifying Quadrilaterals
Parallelogram Conditions
Special Parallelograms

7: The student uses the process skills in applying similarity to solve problems.

7.A: apply the definition of similarity in terms of a dilation to identify similar figures and their proportional sides and the congruent corresponding angles; and

Circles
Dilations
Similar Figures

7.B: apply the Angle-Angle criterion to verify similar triangles and apply the proportionality of the corresponding sides to solve problems.

Perimeters and Areas of Similar Figures

8: The student uses the process skills with deductive reasoning to prove and apply theorems by using a variety of methods such as coordinate, transformational, and axiomatic and formats such as two-column, paragraph, and flow chart.

8.A: prove theorems about similar triangles, including the Triangle Proportionality theorem, and apply these theorems to solve problems; and

Similar Figures

8.B: identify and apply the relationships that exist when an altitude is drawn to the hypotenuse of a right triangle, including the geometric mean, to solve problems.

Similarity in Right Triangles

9: The student uses the process skills to understand and apply relationships in right triangles.

9.A: determine the lengths of sides and measures of angles in a right triangle by applying the trigonometric ratios sine, cosine, and tangent to solve problems; and

Cosine Function
Sine Function
Sine, Cosine, and Tangent Ratios
Sum and Difference Identities for Sine and Cosine
Tangent Function

9.B: apply the relationships in special right triangles 30°-60°-90° and 45°-45°-90° and the Pythagorean theorem, including Pythagorean triples, to solve problems.

Cosine Function
Pythagorean Theorem
Pythagorean Theorem with a Geoboard
Sine Function

Tangent Function

10: The student uses the process skills to recognize characteristics and dimensional changes of two- and three-dimensional figures.

10.B: determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and non-proportional dimensional change

Perimeter and Area of Rectangles
Surface and Lateral Areas of Prisms and Cylinders
Surface and Lateral Areas of Pyramids and Cones

11: The student uses the process skills in the application of formulas to determine measures of two- and three-dimensional figures.

11.A: apply the formula for the area of regular polygons to solve problems using appropriate units of measure;

Area of Triangles

11.B: determine the area of composite two-dimensional figures comprised of a combination of triangles, parallelograms, trapezoids, kites, regular polygons, or sectors of circles to solve problems using appropriate units of measure;

Area of Triangles

11.C: apply the formulas for the total and lateral surface area of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure; and

Surface and Lateral Areas of Prisms and Cylinders
Surface and Lateral Areas of Pyramids and Cones

11.D: apply the formulas for the volume of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure.

Prisms and Cylinders
Pyramids and Cones

12: The student uses the process skills to understand geometric relationships and apply theorems and equations about circles.

12.A: apply theorems about circles, including relationships among angles, radii, chords, tangents, and secants, to solve non-contextual problems;

Chords and Arcs
Inscribed Angles

12.E: show that the equation of a circle with center at the origin and radius r is $x^2 + y^2 = r^2$ and determine the equation for the graph of a circle with radius r and center (h, k), $(x - h)^2 + (y - k)^2 = r^2$.

Circles

13: The student uses the process skills to understand probability in real-world situations and how to apply independence and dependence of events.

13.A: develop strategies to use permutations and combinations to solve contextual problems;

Binomial Probabilities
Permutations and Combinations

13.C: identify whether two events are independent and compute the probability of the two events occurring together with or without replacement;

Binomial Probabilities
Independent and Dependent Events

13.D: apply conditional probability in contextual problems; and

Independent and Dependent Events

13.E: apply independence in contextual problems.
Independent and Dependent Events

PreCalculus

1: The student uses mathematical processes to acquire and demonstrate mathematical understanding.

1.A: apply mathematics to problems arising in everyday life, society, and the workplace;
Determining a Spring Constant
Estimating Population Size

1.B: use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
Estimating Population Size

1.D: communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
Biconditional Statements
Using Algebraic Expressions

1.E: create and use representations to organize, record, and communicate mathematical ideas;
Describing Data Using Statistics
Stem-and-Leaf Plots
Using Algebraic Expressions

1.G: display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Using Algebraic Expressions

2: The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems.

2.C: represent a given function as a composite function of two or more functions;

Function Machines 1 (Functions and Tables)

2.F: graph exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions;

Absolute Value with Linear Functions
Compound Interest
Cosine Function
Exponential Functions
General Form of a Rational Function
Graphs of Polynomial Functions
Introduction to Exponential Functions
Logarithmic Functions
Logarithmic Functions: Translating and Scaling
Polynomials and Linear Factors
Quadratics in Factored Form
Quadratics in Vertex Form
Rational Functions
Sine Function
Tangent Function
Translating and Scaling Functions

2.G: graph functions, including exponential, logarithmic, sine, cosine, rational, polynomial, and power functions and their transformations, including af(x), f(x) + d, f(x - c), f(bx) for specific values of a, b, c, and d, in mathematical and real-world problems;

Absolute Value with Linear Functions
Compound Interest
Cosine Function

Exponential Functions
General Form of a Rational Function
Graphs of Polynomial Functions
Introduction to Exponential Functions
Logarithmic Functions
Logarithmic Functions: Translating and Scaling
Polynomials and Linear Factors
Quadratics in Factored Form
Quadratics in Vertex Form
Rational Functions
Sine Function
Tangent Function
Translating and Scaling Functions
Translating and Scaling Sine and Cosine Functions
Translations
Zap It! Game

2.I: determine and analyze the key features of exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions such as domain, range, symmetry, relative maximum, relative minimum, zeros, asymptotes, and intervals over which the function is increasing or decreasing;

Exponential Functions
General Form of a Rational Function
Graphs of Polynomial Functions
Introduction to Exponential Functions
Logarithmic Functions
Polynomials and Linear Factors
Radical Functions
Rational Functions

2.J: analyze and describe end behavior of functions, including exponential, logarithmic, rational, polynomial, and power functions, using infinity notation to communicate this characteristic in mathematical and real-world problems;

Exponential Functions
General Form of a Rational Function
Graphs of Polynomial Functions
Logarithmic Functions
Logarithmic Functions: Translating and Scaling
Rational Functions

2.K: analyze characteristics of rational functions and the behavior of the function around the asymptotes, including horizontal, vertical, and oblique asymptotes;

General Form of a Rational Function
Rational Functions

2.L: determine various types of discontinuities in the interval (-?, ?) as they relate to functions and explore the limitations of the graphing calculator as it relates to the behavior of the function around discontinuities;

General Form of a Rational Function

2.M: describe the left-sided behavior and the right-sided behavior of the graph of a function around discontinuities;

General Form of a Rational Function

2.N: analyze situations modeled by functions, including exponential, logarithmic, rational, polynomial, and power functions, to solve real-world problems;

Compound Interest
General Form of a Rational Function
Linear Functions
Rational Functions

2.O: develop and use a sinusoidal function that models a situation in mathematical and real-world problems; and

Translating and Scaling Sine and Cosine Functions

2.P: determine the values of the trigonometric functions at the special angles and relate them in mathematical and real-world problems.

Cosine Function
Sine Function
Tangent Function
Translating and Scaling Functions

3: The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations.

3.F: determine the conic section formed when a plane intersects a double-napped cone;

- Ellipses
- Hyperbolas

3.H: use the characteristics of an ellipse to write the equation of an ellipse with center (h, k); and

- Ellipses

3.I: use the characteristics of a hyperbola to write the equation of a hyperbola with center (h, k).

- Hyperbolas

4: The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems.

4.A: determine the relationship between the unit circle and the definition of a periodic function to evaluate trigonometric functions in mathematical and real-world problems;

- Cosine Function
- Sine Function
- Tangent Function

4.B: describe the relationship between degree and radian measure on the unit circle;

- Cosine Function
- Sine Function
- Tangent Function

4.C: represent angles in radians or degrees based on the concept of rotation and find the measure of reference angles and angles in standard position;

Cosine Function
Rotations, Reflections, and Translations
Sine Function
Tangent Function

4.D: represent angles in radians or degrees based on the concept of rotation in mathematical and real-world problems, including linear and angular velocity;

Rotations, Reflections, and Translations

4.E: determine the value of trigonometric ratios of angles and solve problems involving trigonometric ratios in mathematical and real-world problems;

Cosine Function
Sine Function
Sine, Cosine, and Tangent Ratios
Tangent Function

4.F: use trigonometry in mathematical and real-world problems, including directional bearing;

Sine, Cosine, and Tangent Ratios

4.I: use vectors to model situations involving magnitude and direction;

Adding Vectors
Vectors

4.K: apply vector addition and multiplication of a vector by a scalar in mathematical and real-world problems.

Adding Vectors

5: The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms.

5.B: represent arithmetic sequences and geometric sequences using recursive formulas;

Arithmetic Sequences
Geometric Sequences

5.C: calculate the nth term and the nth partial sum of an arithmetic series in mathematical and real-world problems;

Arithmetic Sequences

5.E: calculate the nth term of a geometric series, the nth partial sum of a geometric series, and sum of an infinite geometric series when it exists;

Geometric Sequences

5.G: use the properties of logarithms to evaluate or transform logarithmic expressions;

Logarithmic Functions: Translating and Scaling

5.I: generate and solve exponential equations in mathematical and real-world problems;

Exponential Functions

5.M: use trigonometric identities such as reciprocal, quotient, Pythagorean, cofunctions, even/odd, and sum and difference identities for cosine and sine to simplify trigonometric expressions; and

Simplifying Trigonometric Expressions
Sum and Difference Identities for Sine and Cosine

5.N: generate and solve trigonometric equations in mathematical and real-world problems.

Sine, Cosine, and Tangent Ratios
Translating and Scaling Sine and Cosine Functions