

## Skills in Major Concepts

### Algebraic Functions

10 Skills in 3 Major Concepts

SEGMENT

#### ■ Function Properties:

Understanding the Multiple Characteristics of a Function  
Algebra 1

- Function Notation F548 I will use function notation and identify the domain and range of functions.
- Avg. Rate of Change F554 I will calculate and interpret the average rate of change of a function over a specified interval.
- Compare Functions F555 I will compare properties of two functions each represented in a different way.

#### ■ Linear Functions:

Recognizing Constant Change in a Scenario  
8th Grade

- Slope & Y-Intercept F145 I will determine the slope and y-intercept of a line from a graph, and explain what slope and y-intercept mean in real world and mathematical problems.
- Construct Functions F224 I will construct a function to model a linear relationship and describe the rate of change and initial value.
- Linear Relationships F232 I will represent, analyze, and compare linear relationships in graphs, equations, and tables.
- Slope Given 2 Points F322 I will determine the slope and the equation of a line given the coordinates of two points on the line.

#### ■ Understanding Functions:

Making Sense of When Two Variables are Connected  
8th Grade

- Linear Functions F167 I will use graphs to represent linear functions given by equations or linear data from a table.
- Function Rules F188 I will determine function rules of functions represented in tables.
- Functions F325 I will define and identify functions in tables, graphs, and ordered pairs.

## Dimensional Geometry

5 Skills in 2 Major Concepts

SEGMENT

### ■ Understanding Area:

Recognizing Attributes of 2-D Figures  
Pre: 2nd-4th Grade Foundational

- Rectangular Area G248 I will find the area of a rectangle by counting the number of square units needed to cover it and show this is the same as calculating the area by multiplying the length by the width.
- Perimeter & Area G153 I will explore the relationship between the perimeter and area of rectangles.
- Additive Area G589 I will recognize area as additive and find the area of polygons composed of rectangles.

### ■ Understanding Volume:

Recognizing Attributes of Solid Figures  
5th Grade

- Rectangular Volume G112 I will develop and use a volume formula for rectangular prisms by counting the cubic units needed to fill the rectangular prism without gaps or overlaps.
- Additive Volume G519 I will solve real world and mathematical problems involving additive volume and right rectangular prisms.

## Evaluating Expressions

5 Skills in 2 Major Concepts

SEGMENT

### ■ Evaluating Algebraic Expressions:

Grasping the Power of Substitution and Variables  
6th Grade

- Substitution A116 I will use substitution to evaluate algebraic expressions or formulas using the order of operations, including parentheses and exponents.
- Substitution A203 I will substitute values into algebraic expressions and evaluate the expressions.
- Equal Expressions A478 I will apply the properties of operations to generate equivalent expressions and check the equivalency using substitution.

### ■ Evaluating Numerical Expressions:

Unraveling How Operations Work Together  
6th Grade

- Order of Operations A138 I will evaluate numerical expressions using the order of operations, including parentheses and exponents.
- Exponents A265 I will translate between repeated multiplication and exponential form and find the value of a whole number raised to a power.

## Fraction Operations

13 Skills in 4 Major Concepts

SEGMENT

### ■ Adding and Subtracting Like Fractions:

Applying Basic Operations to Fractions  
Pre: 2nd-4th Grade Foundational

- Rewrite Fractions N109 I will decompose a fraction or mixed number into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation.
- Add/Subtract Like Fractions N171 I will add and subtract fractions with like denominators.
- Add/Subtract Like Mixed Numbers N515 I will add and subtract mixed numbers with like denominators.

### ■ Dividing Fractions:

Grappling With How Division Can Result in a Larger Answer  
5th, 6th Grade

- Divide Fractions by Whole Numbers N505 I will divide unit fractions by whole numbers in real world and mathematical problems.
- Divide Whole Numbers by Fractions N506 I will divide whole numbers by unit fractions in real world and mathematical problems.
- Divide Fractions N318 I will divide fractions.

### ■ Adding and Subtracting Unlike Fractions:

Making the Connection Between Equivalent Fractions and Addition  
5th Grade

- Add/Subtract Unlike Mixed Numbers N257 I will add and subtract mixed numbers with unlike denominators.
- Add/Subtract Unlike Fractions N283 I will add and subtract fractions with unlike denominators.

### ■ Multiplying Fractions:

Grappling with How Multiplication Can Result in a Smaller Answer  
5th Grade

- Multiply Fractions N107 I will multiply fractions.
- Multiply Mixed Numbers N187 I will multiply mixed numbers.
- Multiply Whole Numbers by Fractions N391 I will multiply whole numbers by fractions.
- Fractional Area N527 I will find the area of a rectangle with fractional side lengths.
- Multiplication as Scaling N617 I will interpret multiplication as scaling.

## Operations with Algebraic Expressions

7 Skills in 2 Major Concepts

SEGMENT

### ■ Operations with Linear Expressions:

Applying Integer Operation Rules to Algebraic Expressions  
7th Grade

- Linear Expressions A139 I will add and subtract linear algebraic expressions.
- Expand Expressions A541 I will expand linear expressions.
- Factor Expressions A546 I will factor linear algebraic expressions

### ■ Polynomial Operations:

Applying Basic Operations to Complex Algebraic Expressions  
Algebra 1

- Add/Subtract Polynomials A237 I will add and subtract polynomials.
- Multiply Polynomials A259 I will multiply a binomial by a monomial or a binomial.
- Polynomials A267 I will identify polynomials and represent them in standard form.
- Multiple/Divide Monomials A337 I will multiply and divide monomial expressions with a common base.

## Percents

9 Skills in 3 Major Concepts

SEGMENT

### ■ Applying Percents:

Making Sense of Percents and the World Around Us  
7th Grade

- Simple Interest N243 I will solve real world and mathematical problems about simple interest.
- Percent Change/Error N299 I will calculate percent of change and percent of error.
- Multistep Percents N509 I will solve multistep percent problems.
- Percent Increase/Decrease N584 I will solve problems involving percent increase/decrease.

### ■ Understanding Percents:

Recognizing Parts Per Hundred  
6th Grade

- Find Percentages From Ratios N141 I will determine percents from ratios.
- Real World Percents N292 I will solve real world and mathematical problems involving percents, including finding the whole, given a part and percent.
- Represent Percents N588 I will represent percents as decimals to hundredths, fractions out of 100, and on a 100 grid.

### ■ Representing Rational Numbers:

Converting Between Multiple Forms of the Same Number  
7th Grade

- Represent Fractions as Decimals N231 I will represent fractions as terminating or repeating decimals.
- Rational Numbers A250 I will represent rational numbers in multiple ways.

## Place Value

11 Skills in 4 Major Concepts

SEGMENT

### ■ Compare Whole Numbers:

Applying Place Value to Evaluate Numerical Magnitude  
Pre: 2nd-4th Grade Foundational

- Compare Whole Numbers N582 I will compare two three-digit numbers.
- Compare Whole Numbers N169 I will compare whole numbers up to millions.

### ■ Properties and Powers of 10:

Conceiving How Place Value is Impacted  
5th Grade

- Multiply/Divide by Powers of 10 N101 I will explain patterns about multiplying or dividing decimal numbers by powers of ten.
- Multiply by powers of 10 N578 I will explain patterns in the number of zeros in the products when multiplying whole numbers by 10; 100; and 1,000.

### ■ Decimal Place Value:

Representing Parts Per Ten, Hundred, Thousand  
5th Grade

- Compare Decimals N176 I will compare and order decimals using the math symbols  $<$ ,  $>$ , and  $=$ .
- Rounding Decimals N196 I will use rounding rules to round numbers to the ones place and decimal place values.
- Read/Write Decimals N277 I will read and write decimal numbers using base ten numerals, number names, and expanded form.
- Decimal Place Value N616 I will understand the value of a single digit in a multi-digit number and explain the relationship between digits.

### ■ Whole Number Place Value:

Making Sense of Our Numbers  
Pre: 2nd-4th Grade Foundational

- Read/Write Whole Numbers N580 I will read and write numbers to 1,000 using base-ten numerals, number names, and expanded form.
- Round Whole Numbers N142 I will round whole numbers to the nearest ten, hundred, or thousand.
- Read/Write Whole Numbers N576 I will read and write whole numbers up to millions using base-ten numerals, number names, and expanded form.

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## Ratio Reasoning

10 Skills in 3 Major Concepts

SEGMENT

### ■ Proportional Relationships: Grappling With How Two Quantities are Related 7th, 8th Grade

- Proportion Graphs N161 I will graph a proportional relationship and explain what a point  $(x, y)$  on the graph means in terms of a situation.
- Ratios/Proportions N230 I will use ratio reasoning to decide if two quantities are in a proportional relationship.
- Proportion Equations N510 I will represent proportional relationships by equations.

Compare Proportions A513 I will graph proportional relationships, interpreting the unit rate as the slope of the graph and compare two different proportional relationships represented in different ways.

### ■ Ratios: Representing the Relationship Between Two Values 6th Grade

- Equivalent Ratios N117 I will make tables of equivalent ratios, find missing values in the tables, plot the pairs of values on a coordinate plane, and use tables to compare ratios.
- Ratios N213 I will know how ratios work and express ratios in different forms using ratio language.
- Ratio/Rate Reasoning N317 I will use ratio reasoning to convert measurement units and manipulate and transform units appropriately when multiplying or dividing quantities in real world and mathematical problems.

### ■ Rates: Understanding How Values Change in Relation to Each Other 6th, 7th Grade

- Unit Rates N226 I will understand the concept of rate and calculate and compare unit rates.
- Constant Rates N523 I will solve real world and mathematical problems involving constant rates.
- Fractional Unit Rate N501 I will compute unit rates associated with ratios of fractions.

## Rational Numbers

9 Skills in 2 Major Concepts

SEGMENT

### ■ Operations with Rational Numbers: Realizing Rules for Integer Operations 7th Grade

- Multiply/Divide Rational Numbers N106 I will multiply and divide integers and other rational numbers.
- Subtract Rational Numbers N152 I will subtract integers and other rational numbers with and without the use of a number line.
- Add Rational Numbers N182 I will add integers and other rational numbers with and without the use of a number line.
- Add, Subtract, Multiply, Divide Rational Numbers N522 I will solve real world and mathematical problems involving the four operations with rational numbers, especially negative numbers.
- Add Opposites N618 I will make sense of situations where an integer is combined with its opposite.

### ■ Rational Numbers and the Number Line: Making Sense of the Numbers Around Us 6th Grade

- Coordinate Plane N209 I will identify and plot points in all four quadrants of a coordinate plane.
- Absolute Value N304 I will find and interpret the absolute value of positive and negative rational numbers in mathematical and real world situations.
- Order Rational Numbers N499 I will write, interpret, and explain statements of order for rational numbers on the number line and in real world contexts.
- Represent Integers N567 I will use integers and other rational numbers to represent numerical situations and place them on a number line.

## Solving Basic Equations

6 Skills in 3 Major Concepts

SEGMENT

### ■ Basic Algebraic Thinking: Realizing the Connection Between Operations Pre: 2nd-4th Grade Foundational

- Add/Subtract Equations N133 I will determine an unknown whole number in an addition or subtraction equation.
- Multiply/Divide Equations A149 I will determine an unknown whole number in a multiplication or division equation.

### ■ Two-Step Equations: Making Sense of Balance When Solving for the Unknown 7th Grade

- 2-Step Equations A179 I will solve two-step equations.
- 2-Step Equations A389 I will solve two-step equations with positive and negative numbers.

### ■ Simple Equations: Understanding Equivalency to Solve for the Unknown 6th Grade

- 1-Step Equations A222 I will solve one-step algebraic equations.
- 1-Step Equations A524 I will solve problems by writing, solving, and interpreting one-step equations.

## Solving Complex Equations

9 Skills in 3 Major Concepts

SEGMENT

### ■ Manipulating Linear Equations: Grappling with Different Applications of Linear Functions Algebra 1

- Linear Equations A326 I will write the equation of a line, given its slope and the coordinates of a point on the line.
- Slope Given Equation F329 I will determine the slope of a line, given its equation in any form.

### ■ Solving Complex Linear Equations: Expanding on Inverse Operations to Solve for the Unknown Algebra 1

- Algebraic Situations A331 I will write algebraic equations or inequalities that represent a situation.
- Literal Equations A345 I will solve literal equations for a given variable.
- Linear Equations A358 I will analyze and solve verbal problems whose solution requires solving a linear equation in one variable.

### ■ Multi-Step Equations: Grappling With Complex Equations In Order to Solve for the Unknown 7th, 8th Grade

- Distributive Property A294 I will solve algebraic equations using the distributive property.
- Multi-Step Equations A204 I will solve multistep equations with rational numbers.
- Variables Both Sides A240 I will solve equations by moving variables to one side of an equation.
- Solutions to Equations A601 I will give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions.

## Solving Quadratics

6 Skills in 2 Major Concepts

SEGMENT

### ■ Graphing Quadratics:

Visualizing Non-Linear Functions  
Algebra 1

- Parabola Aspects F319 I will find the roots, vertex, and axis of symmetry of a parabola given its graph.
- Quadratic Graphs F547 I will graph quadratic relationships from equations or tables of values.

### ■ Solving Quadratic Functions:

Manipulating Equations to Solve for Certain Values  
Algebra 1

- Solve Quadratics A333 I will analyze and solve verbal problems that involve quadratic equations.
- Multiplication Properties of Zero A349 I will understand and apply the multiplication property of zero to solve quadratic equations by factoring.
- Solve Quadratics A549 I will solve quadratic equations by completing the square.
- Quadratic Formula A551 I will derive the quadratic formula and use it to solve quadratic equations.

## Systems of Functions

7 Skills in 2 Major Concepts

SEGMENT

### ■ Advanced Systems of Functions:

Solving for Overlap Across Multiple Types of Functions  
Algebra 1

- Systems of Equations A324 I will solve systems of linear and quadratic equations graphically.
- Systems of Equations A336 I will solve a system of one linear and one quadratic equation in two variables algebraically.

### ■ Systems of Linear Equations:

Grappling With How to Satisfy Multiple Functions  
8th Grade

- Systems on Graphs A236 I will solve systems of two linear equations graphically.
- Systems of Equations A332 I will analyze and solve verbal problems whose solution requires solving systems of linear equations in two variables.
- Systems of Equations A335 I will solve systems of two linear equations in two variables by using substitution.
- Systems of Equations A544 I will recognize systems of linear equations that have one solution, no solution, or infinitely many solutions.
- Algebraic Systems A553 I will solve systems of two linear equations in two variables by using elimination.

## Transformational Geometry

7 Skills in 2 Major Concepts

SEGMENT

### ■ Series of Transformations:

Making Sense of How Transformations Relate to Each Other  
8th Grade

- Transformations G114 I will use transformations to map a figure onto a congruent figure.
- Transformations N205 I will understand similarity and describe a sequence of transformations that exhibits similarity between two figures.

### ■ Types of Transformations:

Exploring How Objects Can Change Shape, Size and Direction  
8th Grade

- Dilations G173 I will draw the image of a figure under a dilation on a coordinate plane.
- Reflections G194 I will draw the image of a figure under a reflection on a coordinate plane.
- Rotations G242 I will draw the image of a figure under a rotation on a coordinate plane.
- Transformations G262 I will verify experimentally the properties of rotations, reflections, and translations.
- Translations G284 I will draw the image of a figure under a translation on a coordinate plane.

## Understanding Fractions

6 Skills in 2 Major Concepts

SEGMENT

### ■ Fraction Equivalence:

Realizing Multiple Representations of the Same Quantity  
Pre: 2nd-4th Grade Foundational, 5th Grade

- Compare Fractions N110 I will compare and order fractions using the math symbols  $<$ ,  $>$ , and  $=$ .
- Equivalent Fractions N126 I will create equivalent fractions and explain fraction equivalence.
- Simplify Fractions N239 I will simplify fractions to lowest terms.
- Compare Fractions N619 I will compare fractions with the same numerator or denominator.

### ■ Representing Fractions:

Understanding Parts of a Whole  
Pre: 2nd-4th Grade Foundational

- Describe Fractions N147 I will describe fractions using numbers, words, and pictures.
- Represent Fractions N579 I will represent fractions on a number line.
- Understand Decimals N295 I will understand decimals are part of a whole and express decimals as fractions to tenths or hundredths.

## Whole Number Operations

12 Skills in 4 Major Concepts

SEGMENT

### ■ Multiply and Divide Multi-Digit Whole Numbers:

Expanding on Arithmetic Operations  
5th Grade

- Multiply Whole Numbers N192 I will fluently multiply multi-digit whole numbers using the standard algorithm.
- Divide Large Whole Numbers N282 I will divide large whole numbers by whole numbers with two or more digits and explain remainders within context.

### ■ Understanding Addition and Subtraction:

Understanding How Numbers Grow and Reduce  
Pre: 2nd-4th Grade Foundational

- Add/Subtract on a Number Line N581 I will find sums and differences within 100 and represent them on the number line.
- Subtract Whole Numbers N210 I will subtract large whole numbers.
- Add Large Whole Numbers N528 I will add large whole numbers.

### ■ Understanding Division:

Grasping the Idea of Sharing Equally  
Pre: 2nd-4th Grade Foundational, 5th Grade

- Division Facts A530 I will interpret division as equal shares and know division facts with one-digit numbers.
- Divide Large Whole Numbers N390 I will divide large whole numbers by one-digit whole numbers and explain remainders within context.
- Fractions as Division N518 I will interpret fractions as division of the numerator by the denominator and solve whole number division problems leading to answers in the form of fractions or mixed numbers.

### ■ Understanding Multiplication:

Making the Connection Between Multiplication and Addition  
Pre: 2nd-4th Grade Foundational

- Multiplication Facts A272 I will understand multiplication and know multiplication facts up to 10 times 10.
- Multiples of 10/100 N115 I will multiply one-digit whole numbers by multiples of 10.
- Distributive Property A185 I will identify and use the distributive property of multiplication over addition, relating it to area models.
- Multiply Large Whole Numbers N288 I will represent and analyze linear relationships in tables, equations, and graphs in the first quadrant of the coordinate plane.

## Additional Major Concepts

59 Skills in 21 Major Concepts

### ■ Adding and Subtracting Decimals:

Applying Basic Operations to Decimals  
5th Grade

- Add/Subtract Decimals N533 I will add and subtract decimals using a variety of strategies.

### ■ Dividing Decimals:

Grappling with Division and Place Value  
5th Grade

- Divide Decimals by Whole Numbers N535 I will divide a decimal by a whole number using a variety of strategies.
- Divide Decimals by Decimals N583 I will divide a decimal by a decimal using multiple strategies.

### ■ Algebraic Inequalities:

Recognizing Constraints and Limitations  
7th Grade

- 2-Step Inequalities A144 I will solve one and two-step inequalities and graph the solution set of an inequality on a number line.
- Translate Algebraic Inequalities A215 I will translate verbal sentences into algebraic inequalities.
- Equation/Inequality A526 I will write equations or inequalities to represent real world or mathematical problems using rational numbers and solve, comparing arithmetic solutions to algebraic solutions.

### ■ Exponential Functions:

Grasping the Power of Rapid Growth and Decay  
Algebra 1

- Compound Interest F300 I will calculate compound interest and solve real world and mathematical problems involving interest.
- Exponential Growth A334 I will analyze and solve verbal problems that involve exponential growth and decay.
- Exponential Function F365 I will identify and graph exponential functions.
- Functions F622 I will distinguish between situations that can be modeled with linear and exponential functions.

### ■ Factoring Polynomials:

Grasping How to Re-Arrange Complex Expressions  
Algebra 1

- GCF of Polynomials A200 I will factor polynomial expressions using the greatest common factor (GCF) of the terms.
- Factor Quadratics A285 I will factor quadratic expressions with three terms.
- Factor Quadratics A342 I will identify and factor the difference of two perfect squares.
- Factor Expressions A343 I will factor algebraic expressions completely.
- Factor Trinomials A550 I will factor trinomials where the leading coefficient is not equal to 1.

### ■ Interpreting Functions:

Making Sense of Different Types of Functions  
8th Grade

- Graphs in Context F129 I will create graphs to match given descriptions of situations involving a relationship between two variables or describe situations that could match given graphs.
- Linear vs Non-Linear A146 I will distinguish between linear and non-linear relationships.

### ■ Missing Angles:

Understanding Special Angle Relationships  
8th Grade

- Transversals G249 I will determine angle relationships when two lines (parallel or not) are cut by a transversal and use angle relationships to solve real world and mathematical problems.
- Triangle Similarity G316 I will explore and explain triangle similarity, especially the angle angle criterion.
- Exterior Angles G512 I will establish facts about the angle sum and exterior angles of triangles.

### ■ Graphing Linear Inequalities:

Graphing Restrictions and Finding Solutions to Systems  
Algebra 1

- Graph Linear Inequalities A363 I will graph linear inequalities in two variables.
- Systems of Linear Inequalities A364 I will graph and solve systems of linear inequalities with rational coefficients in two variables.

### ■ Laws of Exponents:

Grappling With How to Write Equivalent Exponent Expressions  
8th Grade

- Laws of Exponents A111 I will develop and apply the laws of exponents for multiplication and division to generate equivalent numerical expressions.
- Laws of Exponents A552 I will generate equivalent expressions in which an exponent is raised to another exponent.
- Negative Exponents A620 I will understand and simplify expressions containing integer exponents.

### ■ Multiplying Decimals:

Grappling with Multiplication and Place Value  
5th Grade

- Multiply Decimals by Whole Numbers N534 I will multiply a decimal by a whole number using a variety of strategies.
- Multiply Decimals by Decimals N577 I will multiply a decimal by a decimal using a variety of strategies.

## ■ **Pythagorean Theorem:**

Make Sense of the Relationship Between Sides of a Right Triangle  
8th Grade

- Pythagorean Theorem G261 I will explore and explain the Pythagorean Theorem.
- Pythagorean Theorem G275 I will use the Pythagorean Theorem to determine the unknown length of a side of a right triangle and explore Pythagorean triples.
- Distance Formula G308 I will use and explain the distance formula on a coordinate plane.
- Pythagorean Theorem G221 I will solve real world and mathematical problems using the Pythagorean Theorem.

## ■ **Rational Expressions:**

Apply Fraction Operations to Complex Operations  
Post-Algebra

- Undefined Fractions A339 I will find values of a variable for which an algebraic fraction is undefined.
- Algebraic Fractions A340 I will add or subtract fractional expressions with monomial or like binomial denominators.
- Algebraic Fractions A341 I will multiply and divide algebraic fractions and express the product or quotient in simplest form.
- Polynomial Fractions A360 I will simplify fractions with polynomials in the numerator and denominator by factoring both and rewrite in simplest terms.

## ■ **Sequences:**

Recognizing and Applying Complex Patterns  
Post-Algebra

- Geometric Sequences F560 I will recognize geometric sequences are functions and write them both recursively and explicitly.
- Arithmetic Sequences F564 I will recognize arithmetic sequences are functions and write them both recursively and explicitly.

## ■ **Square and Cube Roots:**

Grappling with Radicals  
8th Grade

- Square Roots A178 I will recognize and state the value of the square root of a perfect square and estimate square roots of other whole numbers.
- Square & Cube Roots N313 I will calculate or estimate square and cube roots of numbers and understand the inverse relationship of powers and roots.

## ■ **Rational Equations:**

Applying Concepts of Fraction Equivalence to Solve Complex Equations  
Post-Algebra

- Algebraic Fractions A347 I will solve equations involving fractional expressions which can be simplified to linear equations in one variable.
- Algebraic Proportion A348 I will solve algebraic proportions in one variable which result in linear or quadratic equations.

## ■ **Scientific Notation:**

Making Sense of Exceedingly Large and Small Numbers  
8th Grade

- Scientific Notation A270 I will write and compare numbers in scientific notation.
- Scientific Notation A280 I will solve real world and mathematical problems involving numbers in scientific notation.
- Express Big/Small Numbers A542 I will use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.

## ■ **Solving Complex Linear Inequalities:**

Expanding on Inverse Operations to Represent Limits and Restrictions  
Algebra 1

- Multi-step Linear Inequalities A273 I will solve multi-step inequalities and graph the solution set of an inequality on a number line.
- Solve Inequalities A346 I will analyze and solve verbal problems whose solution requires solving a linear inequality in one variable.

## ■ **Translating Expressions:**

Representing Situations in Multiple Ways  
6th, 7th Grade

- Simple Inequalities A177 I will write an inequality to represent a condition or constraint and make sense of solutions on and off the number line.
- Variables A290 I will use variables to represent numbers and write expressions to represent a real world or mathematical problem.
- Creating Expressions A279 I will translate real world situations into algebraic expressions and equations.

## ■ **Understanding 2-D Objects:**

Recognizing Attributes of Different Shapes  
Pre 2-4th Foundational

- Draw/Measure Angles G172 I will draw and measure angles and classify angles as acute, obtuse, right, and straight.
- Types of Lines G183 I will identify and draw intersecting, perpendicular, and parallel lines.

## ■ **Trigonometric Ratios:**

Understand How Sides and Angles of Right Triangles Relate to Each Other  
Post-Algebra

- Sine/Cosine/Tangent G354 I will find and explain sine, cosine, and tangent ratios of right triangles.
- Sine/Cosine/Tangent G355 I will use inverse sine, cosine, and tangent functions to find the measures of angles in right triangles.
- Sine/Cosine/Tangent G356 I will use sine, cosine, and tangent functions to find side lengths of right triangles.

## ■ **Understanding Correlation:**

Exploring the Relationship Between Two Variables  
8th Grade, Algebra 1

- Scatterplots S150 I will make and use lines of best fit on scatterplots and their equations to analyze data.
- Correlation and Causation S381 I will distinguish between correlation and causation.
- Corr. Coefficient S558 I will compute and interpret the correlation coefficient of a linear fit.
- Scatterplots S538 I will make and use scatterplots to analyze associations in bivariate data.
- Statistics & Probability: Data S623 I will use residuals to analyze how well a function fits data.

## Additional Skills

124 Skills

These skills not pictured in Major Concept Map

### Algebra

STRAND

#### Pre, 2nd-4th Grade Foundational

- Generate Patterns A108 I will generate a number or shape pattern that follows a given rule and identify features of the pattern.
- Operation Properties A212 I will define, identify, and use the commutative and associative properties of addition and multiplication.
- Identify Factors A220 I will identify all the factors of a given whole number and identify prime and composite numbers.
- Find/List Multiples A238 I will calculate and list multiples of whole numbers.
- Add, Subtract, Multiply, Divide Whole Numbers A529 I will solve word problems involving operations with whole numbers.

#### 5th Grade

- Order of Operations A274 I will use the order of operations, including parentheses, to evaluate numerical expressions involving whole numbers.
- Number Sentences A507 I will write expressions to record operations with numbers, and interpret numerical expressions without evaluating them.
- Numerical Patterns A516 I will generate two numerical patterns using two given rules, graph ordered pairs of corresponding terms on a coordinate plane, and identify apparent relationships between corresponding terms.

#### 6th Grade

- Linear Relationships A228 I will represent and analyze linear relationships in tables, equations, and graphs in the first quadrant of the coordinate plane.

#### 7th Grade

- Distributive Property A294 I will solve algebraic equations using the distributive property.

#### 8th Grade

- Similar Triangles and Slope A514 I will use similar triangles to explain constant slope and derive equations to describe lines.

#### Algebra 1

- Histograms A384 I will summarize, represent, and interpret data in histograms and cumulative frequency histograms.
- Box & Whisker Plots A385 I will summarize, represent, and interpret data in box plots, find percentiles, and use a five number summary.
- Systems & Elimination A553 I will solve systems of linear equations by eliminating variables.
- Complete the Square A556 I will complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

#### Algebra 2

- Solve Exponentials A621 I will solve exponential equations in one variable
- Solve Radical Equations A626 I will solve equations involving radicals.

#### Enrichment

- Verbal Expressions A168 I will write verbal expressions or sentences that match given mathematical expressions or equations.
- Distance/Rate/Time A180 I will know the relationships among distance, rate, and time and use it to solve real world and mathematical problems.
- Compound Inequalities A207 I will graph compound inequalities on a number line and explain their meaning in mathematical and real world problems.
- Transversals A241 I will apply algebra to determine the measure of angles formed by parallel lines cut by a transversal.
- Angles & Algebra A291 I will apply algebra to determine the measure of angles formed by intersecting lines.
- Points on a Line A323 I will determine whether a given point is on a line, given the equation of the line.

### Functions

STRAND

#### Algebra 1

- Parabola Aspects F320 I will determine the vertex and axis of symmetry of a parabola, given its equation.
- Parallel Equations F352 I will determine if two lines are parallel, given their equations in any form.
- Effect on Quadratics F366 I will identify the effects of transformations on equations and graphs of quadratic functions.
- Inverse Functions F559 I will explore the concept of inverse functions and find inverses of linear functions.
- Piecewise Functions F561 I will graph piecewise-defined functions including step functions and absolute value functions.
- Linear vs. Exponential F622 I will distinguish between situations that can be modeled with linear and exponential functions.

#### Algebra 2

- Square Root Functions F566 I will identify and graph square root functions.
- Sum of Geometric Series F624 I will develop and use a formula for finding the sum of a geometric series.
- Polynomial Graphs F625 I will find the zeros of polynomial functions and use them to sketch a graph.
- Degrees & Radians F627 I will measure angles in radians and convert between degrees and radians.
- Trig Graphs F628 I will model situations using trigonometric functions by adjusting period and amplitude.
- Trig Graphs F629 I will model situations using trigonometric functions using vertical and phase shifts.
- Logarithms F630 I will represent and solve exponential equations using logarithms.

### Geometry & Measurement

STRAND

#### Pre, 2nd-4th Grade Foundational

- Ruler Measurements G256 I will use a ruler to measure to the nearest inch or fraction of an inch.
- Irregular Perimeter G287 I will calculate the perimeter of regular or irregular polygons and solve problems involving perimeter.

## 5th Grade

- Line Graphs G124 I will make and use line graphs to represent and analyze data.
- Quadrilaterals G184 I will classify and draw quadrilaterals by their angles and sides.
- Customary Units G223 I will identify and convert among customary units of length, capacity, and mass/weight.
- Metric Units G229 I will identify and convert among metric units of length, capacity, and mass/weight.
- Triangles G301 I will classify and draw triangles by their angles and sides and find the missing measure of angles in triangles.
- Fraction Line Plots G504 I will make line plots to display a data set measured in fractions and use operations with fractions to solve problems involving the data set.
- Coordinate Plane G517 I will use a pair of perpendicular lines, called axes, to define a coordinate system and locate points using coordinates.

## 6th Grade

- Triangle Area G120 I will develop and use an area formula in order to determine the area of any triangle.
- Nets of 3-D Shapes G122 I will identify two-dimensional shapes that make up the faces and bases of three-dimensional objects and use nets to represent the objects.
- Shapes on Graphs G245 I will plot points and determine the area and/or perimeter of shapes drawn on all four quadrants of a coordinate plane.
- Quadrilateral Area G264 I will develop and use area formulas in order to determine the area of different types of quadrilaterals.
- Fractional Volume G487 I will find the volume of a right rectangular prism with fractional edge lengths and solve real world and mathematical problems using volume.
- Nets & Surface Area G508 I will represent figures using nets made up of rectangles and triangles and use the nets to find the surface area of these figures.
- Complex Shapes G543 I will find the area and/or perimeter of complex shapes composed of polygons on or off a coordinate plane.

## 7th Grade

- Map Scale G154 I will solve real world and mathematical problems using maps and scale drawings.
- Circumference G174 I will explore the relationship between the circumference and diameter of a circle in order to determine the circumference of a circle.
- Area of 2-D Shapes G181 I will use a variety of strategies to find the area of two-dimensional geometric shapes composed of polygons and circles.
- Area of Circles G198 I will determine the area of circles and the area of sectors of circles.
- Angle Relationships G211 I will use angle relationships of intersecting lines to solve mathematical and real world problems.
- Similar Triangles G271 I will solve real world and mathematical problems using similar triangles or other similar shapes.
- Planes & 3-D Shapes G315 I will explore how planes intersect with three-dimensional shapes.
- Draw Triangles G500 I will construct triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
- Scale Drawings G511 I will reproduce scale drawings at a different scale.
- Surface Area & Volume G600 I will solve problems involving volume and surface area of three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

## 8th Grade

- Volume of Cylinders G613 I will develop and use a formula to determine the volume of cylinders.
- Volume of Cones G614 I will develop and use a formula to determine the volume of cones.
- Volume of Spheres G615 I will develop and use a formula to determine the volume of spheres.

## High School Geometry

- Law of Sines G602 I will understand the Law of Sines and use it to solve problems.
- Find Midpoints G603 I will solve problems involving midpoints on the coordinate plane.
- Law of Cosines G604 I will understand the Law of Cosines and use it to solve problems.
- Line & Rotational Symmetry G605 I will describe line and rotational symmetry.
- Triangle Congruence G606 I will determine when triangles are congruent and use congruence to solve problems.
- Similarity G607 I will identify similar triangles and other shapes using a variety of strategies and use them to solve problems.
- Central and Inscribed Angles G608 I will understand inscribed and central angles and use them to solve problems.
- Tangents to Circles G609 I will solve problems involving tangents to circles.
- Arc Length G610 I will develop and use the formula for finding arc length.
- Sector Area G611 I will develop and use the formula for finding the area of a sector.
- Equations of Circles G612 I will describe a circle on the coordinate plane using different representations.

## Enrichment

- 3-D Volume G127 I will calculate the volume of prisms and cylinders using appropriate formulas.
- 3-D Shapes G159 I will make and use top, front, and side views of three-dimensional shapes.
- Surface Area G191 I will determine the surface area of prisms and cylinders.
- Fahrenheit/Celsius G206 I will convert temperatures among measurement systems (Fahrenheit and Celsius).
- Angles of Polygons G244 I will use the relationship of the measures of the angles of polygons to solve real world and mathematical problems.
- Circle Word Problems G255 I will solve real world and mathematical problems involving circles.
- Dimensional Measures G309 I will explore and explain how perimeter, area, and volume are affected when the dimensions of three-dimensional objects are scaled.

## Number Sense

STRAND

### 5th Grade

- Decimal Operations N520 I will solve real world and mathematical problems involving operations with decimal numbers that require unit conversions.
- Add, Subtract, Multiply Fractions N521 I will solve real world and mathematical problems involving addition, subtraction, and multiplication of fractions including mixed numbers.
- Order of Operations N531 I will evaluate numerical expressions including decimals and fractions with parentheses using the order of operations or properties of operations.

## 6th Grade

- LCM N170 I will find common multiples and the least common multiple (LCM) of two or more whole numbers.
- Multiply Decimals N186 I will fluently multiply multi-digit decimals using the standard algorithm.
- Divide Large Decimals N216 I will fluently divide multi-digit decimals using the standard algorithm.
- Add/Subtract Large Decimals N233 I will fluently add and subtract multi-digit decimals using the standard algorithm.
- GCF Whole Numbers N247 I will find common factors and the greatest common factor (GCF) of two or more whole numbers and rewrite expressions using common factors and the distributive property.
- Divide Whole Numbers N532 I will fluently divide multi-digit whole numbers using the standard algorithm.

## 8th Grade

- Irrational Numbers N263 I will compare irrational numbers by approximating their value and placing them on a number line and estimate the value of expressions involving irrational numbers.
- Rational/Irrational N310 I will know that the numbers that are not rational are called irrational and understand the decimal expansions of different kinds of numbers, including converting repeating decimals into fractions.

## Algebra 1

- Simplify Radicals N371 I will simplify radical terms.
- Add, Subtract, Multiply, Divide Radicals N372 I will perform the four arithmetic operations using like and unlike radical terms and express the result in simplest form.
- Add/Multiply (ir)rational Numbers N557 I will explore and explain properties of sums and products of rational and irrational numbers.
- Rational Exponents N563 I will explain how the system of integer exponents extends to rational number exponents, including representing radicals in terms of rational exponents.

## Enrichment

- Order Rational Numbers N155 I will order positive and negative rational numbers in different forms and locate them on a number line.
- Write/Identify Percents N260 I will read, write, and identify percents less than 1% and greater than 100%.
- Prime Factorization N289 I will determine the prime factorization of a number and write it in exponential form.
- Divisibility Rules N314 I will explore divisibility rules.

## Statistics & Probability

### STRAND

## 6th Grade

- Mean of Data Sets S105 I will calculate the mean of a data set and use it to describe the data set.
- Box & Whisker Plots S123 I will make and use box plots to represent, analyze, and find the range of data.
- Histograms S140 I will record data in frequency tables and make and use histograms to represent and analyze data.
- Dot/Line Plots S225 I will make and use dot or line plots to represent and analyze data.
- Median & Mode S293 I will determine the median and mode of a data set and use these measures of center to describe the data set.
- Measure of Center S302 I will choose appropriate measures of center to describe data sets in real world and mathematical situations.
- Mean Abs. Deviation S536 I will calculate the mean absolute deviation of a data set and use it to describe the data set.
- Describe Data Sets S537 I will describe data sets and their overall shape.

## 7th Grade

- Compound Probability S102 I will recognize independent and dependent events and calculate the probabilities of compound events.
- Simple Probability S119 I will identify the outcomes of an event and determine the probability of an outcome represented by a ratio, fraction, decimal, or percent.
- Compare Data Sets S156 I will compare data sets by describing and summarizing the data.
- Compound Events S166 I will list the possible outcomes for compound events.
- Sampling Methods S199 I will explore and explain the validity of sampling methods.
- Predict Outcomes S219 I will interpret data to establish experimental probabilities and use probabilities to predict the outcome of an experiment.
- Random Sample Data S502 I will use data from random samples to draw inferences about a population and gauge variation in estimates or predictions using multiple samples.

## 8th Grade

- 2-Way Tables S503 I will make and use two-way tables to understand and interpret bivariate data.

## Algebra 1

- Relative Frequencies S562 I will interpret relative frequencies in two-way tables in the context of the data and recognize possible associations and trends in the data.
- Standard Deviation S565 I will find the standard deviation of a data set and use it describe and compare data sets.
- Residuals A623 I will use residuals to analyze how well a function fits data.

## Enrichment

- Venn Diagrams S118 I will make and use Venn diagrams to represent and analyze data.
- Interpret Graphs S135 I will read and interpret different types of graphs.
- Stem & Leaf Plots S163 I will make and use stem and leaf plots to represent and analyze data.
- Possible Outcomes S234 I will understand and use the fundamental counting principle.
- Misleading Stats S251 I will identify and explain misleading statistics and graphs.
- Circle Graphs S266 I will make and use circle graphs to represent and analyze data.
- Perms & Combs S374 I will determine the number of possible combinations and permutations of a set of items.
- Probability S378 I will know the definition of and use conditional probability.
- Complements of Sets S379 I will calculate the probability of an event and its complement.
- Probability S380 I will calculate the probability of a series of independent events, two mutually exclusive events, or two events that are not mutually exclusive.