Skills in Major Concepts

**Algebraic Functions**
10 Skills in 3 Major Concepts

- **Function Properties:**
  - Understanding the Multiple Characteristics of a Function
    - 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
    - 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
    - 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.

**New Classrooms® solution**
**Dimensional Geometry**

5 Skills in 2 Major Concepts

- **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 G252 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

- **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.
    - Exponent A265 I will translate between repeated multiplication and exponential form and find the value of a whole number raised to a power.

- **Evaluating Numerical Expressions:**
  - Unraveling How Operations Work Together
    6th Grade
    - Order of Operations A338 I will evaluate numerical expressions using the order of operations, including parentheses and exponents.

**Fraction Operations**

13 Skills in 4 Major Concepts

- **Adding and Subtracting Like Fractions:**
  - Applying Basic Operations to Fractions
    Pre: 2nd-4th Grade Foundational
    - Subtract Like Fractions N171 I will add and subtract fractions with like denominators.
    - Add/Subtract Like Mixed Numbers N15 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 N25 I will divide unit fractions by whole numbers in real-world and mathematical problems.
    - Divide Whole Numbers by Fractions N50 I will divide whole numbers by unit fractions in real-world and mathematical problems.

- **Multiplying Fractions:**
  - Grappling with How Multiplication Can Result in a Smaller Answer
    5th Grade
    - Multiply Fractions N107 I will multiply fractions.
    - Multiply Whole Numbers by Fractions N39 I will multiply whole numbers by fractions.

**Operations with Algebraic Expressions**

7 Skills in 2 Major Concepts

- **Operations with Linear Expressions:**
  - Applying Integer Operation Rules to Algebraic Expressions
    7th Grade
    - Linear Expressions A39 I will add and subtract linear algebraic expressions.
    - Expand Expressions A54 I will expand linear expressions.
    - Factor Expressions A56 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.
    - Polynomial A267 I will identify polynomials and represent them in standard form.
    - Multiply/Divide Monomials A337 I will multiply and divide monomial expressions with a common base.
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 N289 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 N250 I will represent rational numbers in multiple ways.

Place Value
11 Skills in 4 Major Concepts

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 N559 I will compare whole numbers up to millions.

Decimal Place Value:
Representing Parts Per Ten, Hundred, Thousand
5th Grade

Compare Decimals N576 I will compare and order decimals using the math symbols <, >, and =.
Rounding Decimals N586 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.

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 N678 I will explain patterns in the number of zeros in the products when multiplying whole numbers by 10, 100, and 1,000.

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 N542 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.
### Ratio Reasoning
10 Skills in 3 Major Concepts

- **Proportional Relationships:** Grappling With How Two Quantities are Related 7th, 8th Grade
  - Proportion Graphs N351 I will graph a proportional relationship and explain what a point (x, y) on the graph means in terms of a situation.
  - Ratio/Proportions N235 I will use ratio reasoning to decide if two quantities are in a proportional relationship.
  - Proportion Equations N552 I will represent proportional relationships by equations.
  - Compare Proportions A635 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 N357 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.

### Rational Numbers
9 Skills in 2 Major Concepts

- **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 N382 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 N589 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 N354 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

- **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 A419 I will determine an unknown whole number in a multiplication or division equation.

- **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 A222 I will solve problems by writing, solving, and interpreting one-step equations.

- **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.

### Solving Complex Equations
9 Skills in 3 Major Concepts

- **Manipulating Linear Equations:** Navigating the Complexity of Equations 6th Grade
  - Linear Equations A326 I will write the equation of a line, given its slope and the coordinates of a point on the line.
  - Slope-Intercept Equation F329 I will determine the slope of a line, given its equation in any form.

- **Multi-Step Equations:** Grappling With Complex Equations In Order to Solve for the Unknown 7th, 8th Grade
  - Distributive Property A204 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 M101 I will give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions.

- **Solving Complex Linear Equations:** Expanding on Inverse Operations to Solve for the Unknown 7th Grade
  - 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 A359 I will analyze and solve verbal problems whose solution requires solving a linear equation in one variable.
Solving Quadratics
6 Skills in 2 Major Concepts

- 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 Graph 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 A353 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

- 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 A352 I will analyze and solve verbal problems whose solution requires solving systems of linear equations in two variables.
  Systems of Equations A353 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

- Series of Transformations: Making Sense of How Transformations Relate to Each Other
  8th Grade
  Transformations G284 I will draw the image of a figure under a translation on a coordinate plane.
  Rotations G242 I will draw the image of a figure under a rotation on a coordinate plane.
  Translations G284 I will draw the image of a figure under a translation on a coordinate plane.

- 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.
  Transformations G242 I will verify experimentally the properties of rotations, reflections, and translations.
  Transformations G284 I will draw the image of a figure under a translation on a coordinate plane.

Understanding Fractions
6 Skills in 2 Major Concepts

- Fraction Equivalence: Realizing Multiple Representations of the Same Quantity
  Pre: 2nd-4th Grade Foundational, 5th Grade
  Compare Fractions N100 I will compare and order fractions using the math symbols <, >, and =.
  Equivalent Fractions N262 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.

Whole Number Operations
12 Skills in 4 Major Concepts

- 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 Whole Numbers N282 I will divide large whole numbers by one-digit numbers using the standard algorithm.

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.

Divide Whole Numbers N528 I will divide large whole 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 10x10.

Multiples of 5/10/100 N115 I will multiply one-digit whole numbers by multiples of 10.

Distributive Property A935 I will identify and use the distributive property of multiplication over addition, relating it to area models.

Multiply Whole Numbers N288 I will represent and analyze linear relationships in tables, equations, and graphs in the first quadrant of the coordinate plane.
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.

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.

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.

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.

Dividing Decimals:
Grasping 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.

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 G336 I will explore and explain triangle similarity, especially the angle angle criterion.
- Exterior Angles G312 I will establish facts about the angle sum and exterior angles of triangles.

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 A341 I will analyze and solve verbal problems that involve exponential growth and decay.
- Exponential Function F365 I will identify and graph exponential functions.
- Functions F62 I will distinguish between situations that can be modeled with linear and exponential functions.

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 A235 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.

Additional Major Concepts
59 Skills in 21 Major Concepts

Dividing Decimals:
Applying Basic Operations to Decimals
5th Grade
- Add/Subtract Decimals N533 I will add and subtract decimals using a variety of strategies.

Exponential Functions:
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
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Grappling With How to Write Equivalent Exponent Expressions
8th Grade
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- 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.

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Applying Basic Operations to Decimals
5th Grade
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Grasping the Power of Rapid Growth and Decay
Algebra 1
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Applying Basic Operations to Decimals
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Grasping How to Re-Arrange Complex Expressions
Algebra 1
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Making Sense of Different Types of Functions
8th Grade
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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 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.

Sequences: Recognizing and Applying Complex Patterns
Post-Algebra

- **Geometric Sequences F565**: I will recognize geometric sequences as 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 A478**: 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 N535**: I will calculate or estimate square and cube roots of numbers and understand the inverse relationship of powers and roots.

Rational Equations: Rational Expressions: Applying 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 write in simplest form.

Scientific Notation: Scientific Notation

- **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.

Sequences: Sequences

- **Geometric Sequences F565**: I will recognize geometric sequences as 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: Square and Cube Roots

- **Square Roots A478**: 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 N535**: I will calculate or estimate square and cube roots of numbers and understand the inverse relationship of powers and roots.

Translating Expressions: Translating Expressions

- **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.
- **Types of Lines G185**: I will identify and draw intersecting, perpendicular, and parallel lines.

Understanding Correlation: Understanding Correlation

- **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**: I will use residuals to analyze how well a function fits data.

Trigonometric Ratios: Trigonometric Ratios

- **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.
Additional Skills
124 Skills
These skills not pictured in Major Concept Map

Algebra

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 A354 I will use similar triangles to explain constant slope and derive equations to describe lines.

Algebra 1
- Parabola Aspects F320 I will determine the vertex and axis of symmetry of a parabola, given its equation.
- Parallel Equations F332 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

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** G24: I will make and use line graphs to represent and analyze data.
- **Quadrilaterals** G284: 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

- **Triangles** G220: I will develop and use an area formula in order to determine the area of any triangle.
- **Nets of 3-D Shapes** G222: 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 involving 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 and off a coordinate plane.

7th Grade

- **Map Scale** G514: I will solve real-world and mathematical problems using maps and scale drawings.
- **Circumference** G374: 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** G381: I will use a variety of strategies to find the area of two-dimensional geometric shapes composed of polygons and circles.
- **Area of Circles** G398: I will determine the area of circles and the area of sectors of circles.
- **Similar Triangles** G271: I will solve real-world and mathematical problems using similar triangles or other similar shapes.
- **Planes & 3-D Shapes** G385: I will explore how planes interact 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** G612: 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** G227: I will calculate the volume of prisms and cylinders using appropriate formulas.
- **3-D Shapes** G359: 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** G344: I will use the relationship of the measures of the angles of polygons to solve real-world and mathematical problems.
- **Circle Word Problems** G228: 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

- **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** N353: I will evaluate numerical expressions including decimals and fractions with parentheses using the order of operations or properties of operations.
7th Grade

Compound Probability S102 I will recognize independent and dependent events and calculate the probabilities of compound events.

Simple Probability S109 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.

Product 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.

Statistics & Probability STRAND

6th Grade

LCM N170 I will find common multiples and the least common multiple (LCM) of two or more whole numbers.

Multiply Decimals N286 I will fluently multiply multi-digit decimals using the standard algorithm.

Divide Large Decimals N286 I will fluently divide multi-digit decimals using the standard algorithm.

Add/Subtract Large Decimals N287 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 N363 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/Non-rational N350 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 N372 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 simplified form.

Add/Multiply (Irr)ational 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 N334 I will explore divisibility rules.

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 S226 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

Probability S378 I will calculate the probability of a series of independent events, two mutually exclusive events, or two events that are not mutually exclusive.