

ALGEBRA I HONORS MATH LEARNING PROGRESSIONS

How are these progressions organized?

By Strand - colors as designated below.

**Number Sense
and Operations**

**Algebraic
Reasoning**

Functions

**Financial
Literacy**

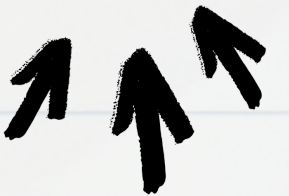
**Data Analysis &
Probability**

These categories are directly outlined in the following documents from the Florida Department of Education:

[Test Item Specifications](#)
[Test Design Summary and Blueprint](#)

(click links above to view these documents)

[Click here for the B1G-M
\(B.E.S.T. Instructional Guide for Mathematics\)
document available on Turnkey.](#)



Number Sense and Operations

MA.912.NSO.1.1 Extend previous understanding of the Laws of Exponents to include rational exponents. Apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions involving rational exponents.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating); Secondary Taxonomy Level: Retrieval Level (Executing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN critique another student's application of the Laws of Exponents with rational exponents, identify any errors in their reasoning or calculations, and explain the correct approach with justification.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension and Retrieval

- I CAN extend my previous understanding of the Laws of Exponents to include rational exponents and apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions involving rational exponents.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the Laws of Exponents for integer exponents (product rule, quotient rule, power rule, power of a product, power of a quotient).
- I CAN recognize rational exponents and their components (numerator and denominator).
- I CAN recall the relationship between rational exponents and radicals ($a^{(m/n)} = \sqrt[n]{a^m}$).
- I CAN execute the procedure of converting between rational exponents and radical form.
- I CAN execute the procedure of evaluating expressions with rational exponents.
- I CAN execute the procedure of simplifying radicals.
- I CAN execute the procedure of applying the Laws of Exponents with integer exponents.
- I CAN recognize equivalent forms of expressions with rational exponents.

Number Sense and Operations

MA.912.NSO.1.2 Generate equivalent algebraic expressions using the properties of exponents.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast multiple equivalent algebraic expressions with exponents to explain which form is most useful for different mathematical purposes (simplification, solving, graphing), and justify my reasoning.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN generate equivalent algebraic expressions using the properties of exponents.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the properties of exponents (product rule, quotient rule, power rule, power of a product, power of a quotient, negative exponents, zero exponent).
- I CAN recognize algebraic expressions with exponents.
- I CAN identify the base and exponent in algebraic expressions.
- I CAN execute the procedure of applying the product rule ($a^m \cdot a^n = a^{(m+n)}$).
- I CAN execute the procedure of applying the quotient rule ($a^m \div a^n = a^{(m-n)}$).
- I CAN execute the procedure of applying the power rule ($(a^m)^n = a^{(mn)}$).
- I CAN execute the procedure of simplifying expressions with negative and zero exponents.
- I CAN recognize when expressions are equivalent.
- I CAN execute the procedure of combining like terms with exponents.

Number Sense and Operations

MA.912.NSO.1.4 Apply previous understanding of operations with rational numbers to add, subtract, multiply and divide numerical radicals.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN critique another student's work when they perform operations with numerical radicals, identify errors in their reasoning or procedures, and explain why certain steps are necessary for correct simplification.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN apply my previous understanding of operations with rational numbers to add, subtract, multiply and divide numerical radicals.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of radicals and recognize radical expressions.
- I CAN recognize like radicals (radicals with the same index and radicand).
- I CAN execute the procedure of simplifying radicals by factoring out perfect squares.
- I CAN execute the procedure of adding and subtracting like radicals.
- I CAN execute the procedure of multiplying radicals using the product property ($\sqrt{a} \cdot \sqrt{b} = \sqrt{ab}$).
- I CAN execute the procedure of dividing radicals using the quotient property ($\sqrt{a} \div \sqrt{b} = \sqrt{a/b}$).
- I CAN execute the procedure of rationalizing denominators.
- I CAN identify perfect squares, cubes, and other perfect powers.
- I CAN execute the procedure of performing operations with rational numbers.

Algebraic Reasoning

MA.912.AR.1.1 Identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast how different parts of equations or expressions represent quantities across various real-world contexts, and explain how viewing parts as single entities changes the interpretation of the mathematical relationship.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the components of algebraic expressions (terms, coefficients, variables, constants, operations).
- I CAN recognize the parts of an equation (expressions on both sides, equal sign).
- I CAN identify terms, factors, and coefficients in expressions.
- I CAN recognize operations (addition, subtraction, multiplication, division, exponents) in expressions.
- I CAN recall vocabulary related to expressions (sum, difference, product, quotient).
- I CAN identify grouping symbols (parentheses, brackets, braces) that indicate a single entity.
- I CAN recognize variables and constants in context.
- I CAN recall that expressions can represent quantities in real-world situations.

Algebraic Reasoning

MA.912.AR.1.2 Rearrange equations or formulas to isolate a quantity of interest.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Retrieval Level (Executing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Comprehension

- I CAN explain why specific steps are necessary when rearranging equations or formulas to isolate a quantity of interest, and describe the relationship between the original and rearranged forms in terms of mathematical equivalence.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Retrieval

- I CAN rearrange equations or formulas to isolate a quantity of interest.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the properties of equality (addition, subtraction, multiplication, division).
- I CAN recognize equations and formulas with multiple variables.
- I CAN identify the variable or quantity to be isolated.
- I CAN execute the procedure of applying inverse operations.
- I CAN execute the procedure of using the distributive property.
- I CAN execute the procedure of combining like terms.
- I CAN execute the procedure of moving terms from one side of an equation to the other.
- I CAN execute the procedure of solving multi-step equations for a variable.
- I CAN recognize when a variable has been successfully isolated.

Algebraic Reasoning

MA.912.AR.1.3 Add, subtract and multiply polynomial expressions with rational number coefficients.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Retrieval Level (Executing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Comprehension

- I CAN explain the mathematical reasoning behind the procedures for adding, subtracting, and multiplying polynomial expressions, and describe how the distributive property and combining like terms ensure accurate results.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Retrieval

- I CAN add, subtract and multiply polynomial expressions with rational number coefficients.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of a polynomial and recognize polynomial expressions.
- I CAN identify terms, coefficients, variables, and exponents in polynomial expressions.
- I CAN recognize like terms (terms with the same variables and exponents).
- I CAN execute the procedure of combining like terms.
- I CAN execute the procedure of applying the distributive property.
- I CAN execute the procedure of adding and subtracting rational numbers.
- I CAN execute the procedure of multiplying rational numbers.
- I CAN execute the procedure of applying the product rule for exponents ($a^m \cdot a^n = a^{(m+n)}$).
- I CAN execute the procedure of multiplying monomials.
- I CAN recall the standard form of a polynomial (terms in descending order of exponents).

Algebraic Reasoning

MA.912.AR.1.4 Divide a polynomial expression by a monomial expression with rational number coefficients.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Retrieval Level (Executing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Comprehension

- I CAN explain the relationship between dividing a polynomial by a monomial and the distributive property, and describe why each term of the polynomial must be divided separately by the monomial.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Retrieval

- I CAN divide a polynomial expression by a monomial expression with rational number coefficients.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of a polynomial and a monomial.
- I CAN recognize polynomial and monomial expressions.
- I CAN identify terms in a polynomial expression.
- I CAN execute the procedure of dividing rational numbers.
- I CAN execute the procedure of applying the quotient rule for exponents ($a^m \div a^n = a^{(m-n)}$).
- I CAN execute the procedure of dividing each term of the polynomial by the monomial.
- I CAN execute the procedure of simplifying fractions.
- I CAN recall that dividing by a monomial is the same as multiplying by its reciprocal.
- I CAN recognize when a quotient is fully simplified.

Algebraic Reasoning

MA.912.AR.1.7 Rewrite a polynomial expression as a product of polynomials over the real number system.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast expanded and factored forms of polynomial expressions to explain when each form is most useful for different mathematical purposes (solving equations, identifying zeros, simplifying), and justify strategic choices.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN rewrite a polynomial expression as a product of polynomials over the real number system.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of factoring (writing an expression as a product).
- I CAN recognize polynomial expressions in standard form.
- I CAN identify the greatest common factor (GCF) of terms in a polynomial.
- I CAN execute the procedure of factoring out the GCF.
- I CAN recognize special factoring patterns (difference of squares, perfect square trinomials).
- I CAN execute the procedure of factoring trinomials ($ax^2 + bx + c$).
- I CAN execute the procedure of factoring by grouping.
- I CAN recall the distributive property and verify factoring by multiplying.
- I CAN recognize when a polynomial is completely factored.

Algebraic Reasoning

MA.912.AR.2.1 Given a real-world context, write and solve one-variable multi-step linear equations.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN investigate multiple real-world scenarios to construct and defend arguments about which situations can be modeled with linear equations, and explain the limitations of linear models in various contexts.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN write and solve one-variable multi-step linear equations given a real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the properties of equality (addition, subtraction, multiplication, division).
- I CAN recognize linear equations in one variable.
- I CAN identify the unknown quantity in a real-world problem.
- I CAN execute the procedure of translating verbal phrases into algebraic expressions.
- I CAN execute the procedure of solving multi-step equations.
- I CAN execute the procedure of applying the distributive property.
- I CAN execute the procedure of combining like terms.
- I CAN execute the procedure of moving variables to one side of an equation.
- I CAN interpret the solution in the context of the real-world problem.
- I CAN recognize key words that indicate operations (sum, difference, product, quotient, more than, less than).

Algebraic Reasoning

MA.912.AR.2.2 Write a linear two-variable equation to represent relationships between quantities from a graph, a written description or a table of values within a mathematical or real-world context.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast linear equations written from different representations (graphs, tables, written descriptions) to explain how the same relationship can be identified and expressed differently, and determine which representation provides the most efficient path to writing the equation.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN write a linear two-variable equation to represent relationships between quantities from a graph, a written description or a table of values within a mathematical or real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the slope-intercept form of a linear equation ($y = mx + b$).
- I CAN recall the standard form of a linear equation ($Ax + By = C$).
- I CAN recognize linear relationships in graphs, tables, and written descriptions.
- I CAN execute the procedure of determining slope from a graph, table, or two points.
- I CAN identify the y-intercept from a graph or table.
- I CAN execute the procedure of calculating slope using the formula $m = (y_2 - y_1)/(x_2 - x_1)$.
- I CAN identify the independent and dependent variables in a context.
- I CAN recognize key vocabulary in written descriptions that indicates rate of change and initial value.
- I CAN execute the procedure of substituting values into slope-intercept form.

Algebraic Reasoning

MA.912.AR.2.3 Write a linear two-variable equation for a line that is parallel or perpendicular to a given line and goes through a given point.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze multiple examples of parallel and perpendicular lines to form general conclusions about the algebraic and geometric relationships between their slopes, and create principles that explain why these relationships always hold true.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN write a linear two-variable equation for a line that is parallel or perpendicular to a given line and goes through a given point.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the slope-intercept form of a linear equation ($y = mx + b$).
- I CAN recall the point-slope form of a linear equation ($y - y_1 = m(x - x_1)$).
- I CAN recall that parallel lines have the same slope.
- I CAN recall that perpendicular lines have slopes that are negative reciprocals.
- I CAN execute the procedure of identifying the slope from a given equation.
- I CAN execute the procedure of finding the negative reciprocal of a number.
- I CAN execute the procedure of substituting a point and slope into point-slope form.
- I CAN execute the procedure of converting between point-slope form and slope-intercept form.
- I CAN recognize ordered pairs and identify x and y coordinates.

Algebraic Reasoning

MA.912.AR.2.4 Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing); Secondary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN critique another student's graph of a linear function and their interpretation of key features, identify any errors in graphing or reasoning, and explain how the key features relate to the mathematical or real-world context.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN graph that function, and determine and interpret its key features given a table, equation or written description of a linear function.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the key features of linear functions (slope, y-intercept, x-intercept, domain, range, rate of change).
- I CAN recognize linear functions in various forms (slope-intercept, standard form, point-slope form).
- I CAN execute the procedure of plotting points on a coordinate plane.
- I CAN execute the procedure of determining slope from an equation, table, or written description.
- I CAN identify the y-intercept from an equation, table, or graph.
- I CAN execute the procedure of finding the x-intercept by setting $y = 0$.
- I CAN execute the procedure of creating a table of values from an equation or description.
- I CAN recognize the independent and dependent variables in context.
- I CAN recall that domain and range for linear functions are typically all real numbers (unless restricted by context).

Algebraic Reasoning

MA.912.AR.2.5 Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving); Secondary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate multiple linear function models for a given real-world situation, determine which model and constraints are most appropriate based on the context, and justify my strategic decisions using mathematical reasoning.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization and Comprehension

- I CAN solve and graph mathematical and real-world problems that are modeled with linear functions, interpret key features and determine constraints in terms of the context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the key features of linear functions (slope, intercepts, domain, range, rate of change).
- I CAN recognize linear functions in various forms and representations.
- I CAN execute the procedure of graphing linear functions from equations, tables, or descriptions.
- I CAN execute the procedure of writing linear equations from real-world contexts.
- I CAN identify constraints in real-world contexts (restrictions on domain and range).
- I CAN recognize when values must be non-negative, whole numbers, or within specific intervals.
- I CAN execute the procedure of solving linear equations.
- I CAN interpret slope and intercepts in the context of real-world problems.
- I CAN recognize the independent and dependent variables in context.

Algebraic Reasoning

MA.912.AR.2.6 Given a mathematical or real-world context, write and solve one-variable linear inequalities, including compound inequalities. Represent solutions algebraically or graphically.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving); Secondary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN investigate real-world scenarios involving constraints and limitations to construct arguments about when compound inequalities versus simple inequalities are necessary, and explain how the solution sets reflect the contextual requirements.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization and Comprehension

- I CAN write and solve one-variable linear inequalities, including compound inequalities, and represent solutions algebraically or graphically given a mathematical or real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the inequality symbols ($<$, $>$, $\leq$, $\geq$) and their meanings.
- I CAN recognize linear inequalities and compound inequalities.
- I CAN recall the properties of inequality (addition, subtraction, multiplication, division).
- I CAN recall that multiplying or dividing by a negative number reverses the inequality symbol.
- I CAN execute the procedure of solving one-variable linear inequalities.
- I CAN execute the procedure of solving compound inequalities (and/or statements).
- I CAN execute the procedure of graphing solutions on a number line (open/closed circles, shading).
- I CAN execute the procedure of writing solutions in interval notation or set notation.
- I CAN identify key words in context that indicate inequalities (at least, at most, minimum, maximum, no more than, no less than).
- I CAN interpret inequality solutions in the context of real-world problems.

Algebraic Reasoning

MA.912.AR.2.7 Write two-variable linear inequalities to represent relationships between quantities from a graph or a written description within a mathematical or real-world context.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast two-variable linear inequalities written from different representations (graphs and written descriptions) to explain how the same constraint can be expressed differently, and determine which inequality symbols are appropriate based on boundary line characteristics and shading.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN write two-variable linear inequalities to represent relationships between quantities from a graph or a written description within a mathematical or real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the inequality symbols ($<$, $>$, $\leq$, $\geq$) and their meanings.
- I CAN recognize linear inequalities in two variables.
- I CAN recall the forms of linear equations (slope-intercept form, standard form).
- I CAN identify the boundary line from a graph of an inequality.
- I CAN recognize when a boundary line is solid ($\leq$ or $\geq$) or dashed ($<$, $>$).
- I CAN identify which region is shaded to determine the inequality symbol.
- I CAN execute the procedure of determining the slope and y-intercept from a graph.
- I CAN recognize key words in written descriptions that indicate inequalities (at least, at most, no more than, no less than, maximum, minimum).
- I CAN identify the independent and dependent variables in context.

Algebraic Reasoning

MA.912.AR.2.8 Given a mathematical or real-world context, graph the solution set to a two-variable linear inequality.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN critique another student's graph of a two-variable linear inequality, identify errors in their boundary line, line type (solid or dashed), or shading, and explain how to correct the mistakes based on the inequality and context.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN graph the solution set to a two-variable linear inequality given a mathematical or real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the inequality symbols ($<$, $>$, $\leq$, $\geq$) and their meanings.
- I CAN recognize two-variable linear inequalities.
- I CAN execute the procedure of graphing a linear equation (boundary line).
- I CAN recall that $\leq$ or $\geq$ inequalities have solid boundary lines.
- I CAN recall that $<$ or $>$ inequalities have dashed boundary lines.
- I CAN execute the procedure of determining which region to shade by testing a point.
- I CAN identify the slope and y-intercept from an inequality in slope-intercept form.
- I CAN execute the procedure of shading above the line ($y >$ or $y \geq$) or below the line ($y <$ or $y \leq$).
- I CAN recognize constraints in real-world contexts that may limit the solution set.
- I CAN interpret the meaning of the shaded region in context.

Algebraic Reasoning

MA.912.AR.3.1 Given a mathematical or real-world context, write and solve one-variable quadratic equations over the real number system.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate multiple methods for solving quadratic equations (factoring, square roots, quadratic formula, completing the square), determine which method is most efficient for a given equation and context, and justify my strategic choice with mathematical reasoning.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN write and solve one-variable quadratic equations over the real number system given a mathematical or real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the standard form of a quadratic equation ($ax^2 + bx + c = 0$).
- I CAN recognize quadratic equations and their characteristics.
- I CAN execute the procedure of solving quadratic equations by factoring.
- I CAN execute the procedure of solving quadratic equations using square roots.
- I CAN execute the procedure of solving quadratic equations using the quadratic formula.
- I CAN execute the procedure of solving quadratic equations by completing the square.
- I CAN recall the zero product property (if $ab = 0$, then $a = 0$ or $b = 0$).
- I CAN identify key information in real-world contexts that can be modeled with quadratic equations.
- I CAN interpret solutions in the context of real-world problems.
- I CAN recognize when solutions are real, imaginary, or when there are no real solutions.

Algebraic Reasoning

MA.912.AR.3.4 Write a quadratic function to represent the relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast quadratic functions written from different representations (graphs, tables, written descriptions) to explain how key features (vertex, intercepts, direction of opening) are identified differently in each form, and determine which representation provides the most efficient path to writing the function.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN write a quadratic function to represent the relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the forms of quadratic functions (standard form: $y = ax^2 + bx + c$, vertex form: $y = a(x - h)^2 + k$, factored form: $y = a(x - p)(x - q)$).
- I CAN recognize quadratic relationships in graphs, tables, and written descriptions.
- I CAN identify key features of quadratic functions (vertex, axis of symmetry, x-intercepts, y-intercept, direction of opening).
- I CAN execute the procedure of finding the vertex from a graph or table.
- I CAN execute the procedure of identifying x-intercepts (zeros) from a graph or table.
- I CAN execute the procedure of identifying the y-intercept from a graph or table.
- I CAN execute the procedure of determining the value of 'a' using a point and the vertex.
- I CAN recognize patterns in tables that indicate quadratic relationships (constant second differences).
- I CAN identify the independent and dependent variables in context.

Algebraic Reasoning

MA.912.AR.3.5 Given the x -intercepts and another point on the graph of a quadratic function, write the equation for the function.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze multiple examples of quadratic functions written from x -intercepts and another point to form general conclusions about how the value of 'a' affects the shape and direction of the parabola, and create principles that explain the relationship between 'a' and key features.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN write the equation for the function given the x -intercepts and another point on the graph of a quadratic function.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the factored form of a quadratic function: $y = a(x - p)(x - q)$, where p and q are x -intercepts.
- I CAN recognize x -intercepts (zeros, roots) on a graph or in ordered pair form.
- I CAN identify ordered pairs and their x and y coordinates.
- I CAN execute the procedure of substituting x -intercepts into factored form.
- I CAN execute the procedure of substituting a point into an equation to solve for 'a'.
- I CAN execute the procedure of solving equations for an unknown variable.
- I CAN execute the procedure of expanding factored form to standard form if needed.
- I CAN recall that the x -intercepts are the values where $y = 0$.
- I CAN recognize that the value of 'a' determines the width and direction of the parabola.

Algebraic Reasoning

MA.912.AR.3.6 Given an expression or equation representing a quadratic function, determine the vertex and zeros and interpret them in terms of a real-world context.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating); Secondary Taxonomy Level: Retrieval Level (Executing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast the vertex and zeros of multiple quadratic functions in different real-world contexts to explain how these key features represent different types of information (maximum/minimum values, break-even points, optimal solutions), and determine which features are most relevant for specific situations.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension and Retrieval

- I CAN determine the vertex and zeros and interpret them in terms of a real-world context given an expression or equation representing a quadratic function.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the forms of quadratic functions (standard form, vertex form, factored form).
- I CAN recognize quadratic functions and their key features.
- I CAN execute the procedure of finding the vertex using $x = -b/(2a)$ in standard form.
- I CAN identify the vertex directly from vertex form: $y = a(x - h)^2 + k$, where (h, k) is the vertex.
- I CAN execute the procedure of finding zeros by factoring.
- I CAN execute the procedure of finding zeros using the quadratic formula.
- I CAN identify zeros directly from factored form: $y = a(x - p)(x - q)$.
- I CAN recall that the vertex represents the maximum or minimum value of the function.
- I CAN recall that zeros represent x-intercepts where $y = 0$.
- I CAN interpret the meaning of vertex and zeros in real-world contexts.

Algebraic Reasoning

MA.912.AR.3.7 Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing); Secondary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN critique another student's graph of a quadratic function and their interpretation of key features, identify any errors in graphing or reasoning, and explain how the key features relate to the mathematical or real-world context.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN graph that function, and determine and interpret its key features given a table, equation or written description of a quadratic function.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the key features of quadratic functions (vertex, axis of symmetry, x-intercepts/zeros, y-intercept, domain, range, maximum/minimum, direction of opening, intervals of increase/decrease).
- I CAN recognize quadratic functions in various forms (standard form, vertex form, factored form).
- I CAN execute the procedure of plotting points on a coordinate plane.
- I CAN execute the procedure of finding the vertex from an equation or table.
- I CAN execute the procedure of finding the axis of symmetry ($x = h$ or $x = -b/(2a)$).
- I CAN execute the procedure of finding x-intercepts (zeros) by setting $y = 0$.
- I CAN identify the y-intercept from an equation or table.
- I CAN execute the procedure of creating a table of values from an equation or description.
- I CAN recognize when a parabola opens upward ($a > 0$) or downward ($a < 0$).
- I CAN identify the domain and range of quadratic functions.

Algebraic Reasoning

MA.912.AR.3.8 Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving); Secondary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization Level (Decision Making)

- I CAN evaluate multiple quadratic function models for a given real-world situation, determine which model and constraints are most appropriate based on the context, and justify my strategic decisions using mathematical reasoning about maximum/minimum values and feasible domains.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization (Problem Solving) with Comprehension (Integrating)

- I CAN solve and graph mathematical and real-world problems that are modeled with quadratic functions, interpret key features and determine constraints in terms of the context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the key features of quadratic functions (vertex, zeros, axis of symmetry, maximum/minimum, domain, range, intercepts).
- I CAN recognize quadratic functions in various forms and representations.
- I CAN execute the procedure of graphing quadratic functions from equations, tables, or descriptions.
- I CAN execute the procedure of writing quadratic equations from real-world contexts.
- I CAN execute the procedure of solving quadratic equations using various methods.
- I CAN identify constraints in real-world contexts (restrictions on domain and range).
- I CAN recognize when values must be non-negative, whole numbers, or within specific intervals.
- I CAN interpret the vertex as maximum or minimum in context (optimal values, peak height, maximum area).
- I CAN interpret zeros in context (break-even points, time when object hits ground, starting/ending points).
- I CAN recognize the independent and dependent variables in context.

Algebraic Reasoning

MA.912.AR.4.1 Given a mathematical or real-world context, write and solve one-variable absolute value equations.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN investigate why absolute value equations can have two solutions, one solution, or no solution, and construct an argument that explains the conditions under which each case occurs, using both algebraic and graphical reasoning.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN write and solve one-variable absolute value equations given a mathematical or real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of absolute value (distance from zero on a number line).
- I CAN recognize absolute value equations and their notation $|x|$.
- I CAN recall that $|x| = a$ means $x = a$ or $x = -a$ (when $a \geq 0$).
- I CAN execute the procedure of isolating the absolute value expression.
- I CAN execute the procedure of setting up two separate equations (positive and negative cases).
- I CAN execute the procedure of solving linear equations.
- I CAN recognize when an absolute value equation has no solution (when $|x| = \text{negative number}$).
- I CAN recognize when an absolute value equation has one solution (when $|x| = 0$).
- I CAN identify key information in real-world contexts that involve distance or deviation from a value.
- I CAN interpret solutions in the context of real-world problems.

Algebraic Reasoning

MA.912.AR.4.2 Given a mathematical or real-world context, write and solve one-variable absolute value inequalities. Represent solutions algebraically or graphically.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving); Secondary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN investigate the differences between "less than" and "greater than" absolute value inequalities to construct an argument about why one type produces a conjunction (and) solution while the other produces a disjunction (or) solution, using algebraic and graphical evidence.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization and Comprehension

- I CAN write and solve one-variable absolute value inequalities and represent solutions algebraically or graphically given a mathematical or real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of absolute value (distance from zero).
- I CAN recognize absolute value inequalities and their notation.
- I CAN recall that $|x| < a$ means $-a < x < a$ (conjunction/"and" statement).
- I CAN recall that $|x| > a$ means $x < -a$ or $x > a$ (disjunction/"or" statement).
- I CAN execute the procedure of isolating the absolute value expression.
- I CAN execute the procedure of setting up compound inequalities based on the inequality symbol.
- I CAN execute the procedure of solving linear inequalities.
- I CAN execute the procedure of graphing solutions on a number line (open/closed circles, shading).
- I CAN execute the procedure of writing solutions in interval notation or set notation.
- I CAN identify key words in context that indicate absolute value inequalities (within, at most distance, at least distance, tolerance).
- I CAN interpret inequality solutions in the context of real-world problems.

Algebraic Reasoning

MA.912.AR.4.3 Given a table, equation or written description of an absolute value function, graph that function and determine its key features.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast absolute value functions with linear and quadratic functions to explain how transformations affect their key features differently, and determine which function type is most appropriate for modeling different real-world situations.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN graph that function and determine its key features given a table, equation or written description of an absolute value function.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the key features of absolute value functions (vertex, axis of symmetry, x-intercepts/zeros, y-intercept, domain, range, maximum/minimum, slope of each piece).
- I CAN recognize absolute value functions in various forms ($f(x) = a|x - h| + k$).
- I CAN execute the procedure of plotting points on a coordinate plane.
- I CAN execute the procedure of identifying the vertex from an equation (h, k) or table.
- I CAN identify the axis of symmetry ($x = h$).
- I CAN execute the procedure of finding x-intercepts by setting $y = 0$.
- I CAN identify the y-intercept from an equation or table.
- I CAN execute the procedure of creating a table of values from an equation or description.
- I CAN recognize the V-shape characteristic of absolute value graphs.
- I CAN identify when the graph opens upward ($a > 0$) or downward ($a < 0$).
- I CAN recognize the domain (all real numbers) and range of absolute value functions.

Algebraic Reasoning

MA.912.AR.5.3 Given a mathematical or real-world context, classify an exponential function as representing growth or decay.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Analysis Level (Matching)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze multiple exponential functions across various real-world contexts to form general conclusions about the characteristics that distinguish growth from decay, and create principles that explain how the base and initial value affect the behavior of exponential functions.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Analysis

- I CAN classify an exponential function as representing growth or decay given a mathematical or real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the general form of an exponential function: $f(x) = a \cdot b^x$ or $f(x) = a(1 + r)^x$.
- I CAN recognize exponential functions in equations, tables, graphs, and written descriptions.
- I CAN recall that exponential growth occurs when $b > 1$ or $r > 0$.
- I CAN recall that exponential decay occurs when $0 < b < 1$ or $-1 < r < 0$.
- I CAN identify the base (b) and growth/decay rate (r) in an exponential function.
- I CAN recognize patterns in tables that indicate exponential relationships (constant ratio/multiplier).
- I CAN identify increasing or decreasing trends in graphs and tables.
- I CAN recognize real-world contexts that involve exponential growth (population, compound interest, appreciation).
- I CAN recognize real-world contexts that involve exponential decay (radioactive decay, depreciation, cooling).

Algebraic Reasoning

MA.912.AR.5.4 Write an exponential function to represent a relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast exponential functions written from different representations (graphs, tables, written descriptions) to explain how the initial value and growth/decay rate are identified differently in each form, and determine which representation provides the most efficient path to writing the function.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN write an exponential function to represent a relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the forms of exponential functions ($f(x) = a \cdot b^x$ or $f(x) = a(1 + r)^x$ or $f(x) = a \cdot b^{(x-h)} + k$).
- I CAN recognize exponential relationships in graphs, tables, and written descriptions.
- I CAN identify the initial value (a) from a graph, table, or description (y-intercept or value when $x = 0$).
- I CAN execute the procedure of finding the base (b) by calculating the common ratio from a table.
- I CAN execute the procedure of determining the growth/decay rate (r) from a written description.
- I CAN recognize patterns in tables that indicate exponential relationships (constant multiplier).
- I CAN execute the procedure of using two points to find the base: $b = (y_2/y_1)^{1/(x_2-x_1)}$.
- I CAN identify key words in written descriptions that indicate exponential relationships (doubles, triples, increases/decreases by a percent, grows/decays by a factor).
- I CAN identify the independent and dependent variables in context.

Algebraic Reasoning

MA.912.AR.5.6 Given a table, equation or written description of an exponential function, graph that function and determine its key features.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN critique another student's graph of an exponential function and their identification of key features, identify any errors in graphing or reasoning, and explain how the key features relate to the mathematical or real-world context.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN graph that function and determine its key features given a table, equation or written description of an exponential function.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the key features of exponential functions (y-intercept, asymptote, domain, range, end behavior, growth/decay classification, rate of change).
- I CAN recognize exponential functions in various forms ($f(x) = a \cdot b^x$, $f(x) = a(1 + r)^x$, $f(x) = a \cdot b^{(x-h)} + k$).
- I CAN execute the procedure of plotting points on a coordinate plane.
- I CAN execute the procedure of creating a table of values from an equation or description.
- I CAN identify the y-intercept (initial value) from an equation or table.
- I CAN identify the horizontal asymptote from an equation ($y = k$ in transformed form, $y = 0$ in basic form).
- I CAN recognize the domain of exponential functions (all real numbers).
- I CAN identify the range of exponential functions based on the asymptote and direction.
- I CAN recognize the characteristic curve of exponential graphs (increasing or decreasing, approaching asymptote).
- I CAN identify whether the function represents growth ($b > 1$) or decay ($0 < b < 1$).

Algebraic Reasoning

MA.912.AR.9.1 Given a mathematical or real-world context, write and solve a system of two-variable linear equations algebraically or graphically.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving); Secondary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization Level (Decision Making)

- I CAN evaluate multiple methods for solving systems of linear equations (graphing, substitution, elimination), determine which method is most efficient for a given system and context, and justify my strategic choice with mathematical reasoning.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization (Problem Solving) with Comprehension (Symbolizing)

- I CAN write and solve a system of two-variable linear equations algebraically or graphically given a mathematical or real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall what a system of linear equations is.
- I CAN recognize linear equations in two variables.
- I CAN execute the procedure of translating real-world contexts into linear equations.
- I CAN execute the procedure of solving systems by graphing.
- I CAN execute the procedure of solving systems using substitution.
- I CAN execute the procedure of solving systems using elimination (addition/subtraction method).
- I CAN execute the procedure of graphing linear equations on the same coordinate plane.
- I CAN identify the point of intersection as the solution to a system.
- I CAN recognize when a system has one solution, no solution, or infinitely many solutions.
- I CAN interpret solutions in the context of real-world problems.
- I CAN identify the independent and dependent variables in context.

Algebraic Reasoning

MA.912.AR.9.4 Graph the solution set of a system of two-variable linear inequalities.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN critique another student's graph of a system of two-variable linear inequalities, identify errors in their boundary lines, line types (solid or dashed), or shading, and explain how to determine the correct solution region where all inequalities are satisfied simultaneously.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN graph the solution set of a system of two-variable linear inequalities.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall what a system of linear inequalities is.
- I CAN recognize two-variable linear inequalities.
- I CAN execute the procedure of graphing a single two-variable linear inequality.
- I CAN recall that $\leq$ or $\geq$ inequalities have solid boundary lines.
- I CAN recall that $<$ or $>$ inequalities have dashed boundary lines.
- I CAN execute the procedure of determining which region to shade for each inequality.
- I CAN execute the procedure of graphing multiple linear equations on the same coordinate plane.
- I CAN identify the solution region where the shaded areas overlap (intersection).
- I CAN execute the procedure of testing points to verify the solution region.
- I CAN recognize when a system has no solution (no overlapping region).

Algebraic Reasoning

MA.912.AR.9.6 Given a real-world context, represent constraints as systems of linear equations or inequalities. Interpret solutions to problems as viable or non-viable options.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving); Secondary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization Level (Decision Making)

- I CAN evaluate multiple constraint scenarios in real-world contexts to determine optimal solutions within the feasible region, assess trade-offs between competing constraints, and justify strategic decisions using mathematical and contextual reasoning.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization (Problem Solving) with Comprehension (Integrating)

- I CAN represent constraints as systems of linear equations or inequalities and interpret solutions to problems as viable or non-viable options given a real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall what constraints are in mathematical contexts (limitations, restrictions, requirements).
- I CAN recognize when to use equations versus inequalities to represent constraints.
- I CAN execute the procedure of translating real-world constraints into linear equations or inequalities.
- I CAN execute the procedure of writing systems of linear equations or inequalities.
- I CAN execute the procedure of solving systems algebraically or graphically.
- I CAN identify the solution set or feasible region of a system.
- I CAN recognize contextual restrictions (non-negative values, whole numbers, maximum/minimum limits).
- I CAN interpret whether a solution makes sense in the context of the problem.
- I CAN identify viable solutions (solutions that satisfy all constraints and context requirements).
- I CAN identify non-viable solutions (solutions that may be mathematically correct but contextually impossible).

Functions

MA.912.F.1.1 Given an equation or graph that defines a function, classify the function type. Given an input-output table, determine a function type that could represent it.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Analysis Level (Matching)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze multiple functions across various representations to form general conclusions about the unique characteristics that distinguish each function type (linear, quadratic, exponential, absolute value), and create principles for identifying function types in any representation.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Analysis

- I CAN classify the function type given an equation or graph that defines a function, and determine a function type that could represent it given an input-output table.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the characteristics of linear functions (constant rate of change, straight line, form $y = mx + b$).
- I CAN recall the characteristics of quadratic functions (parabola, form $y = ax^2 + bx + c$, constant second differences).
- I CAN recall the characteristics of exponential functions (constant ratio, curved graph, form $y = a \cdot b^x$).
- I CAN recall the characteristics of absolute value functions (V-shape, form $y = a|x - h| + k$).
- I CAN recognize the shapes of different function types on graphs.
- I CAN execute the procedure of calculating first differences in tables.
- I CAN execute the procedure of calculating second differences in tables.
- I CAN execute the procedure of calculating ratios between consecutive outputs in tables.
- I CAN identify the degree of polynomials in equations.
- I CAN recognize special notation and operations in equations (absolute value bars, exponents on variables).

Functions

MA.912.F.1.2 Given a function represented in function notation, evaluate the function for an MA.912.F.1.2 input in its domain. For a real-world context, interpret the output.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Retrieval Level (Executing); Secondary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Comprehension

- I CAN explain the relationship between the input and output of a function in real-world contexts, and describe how function notation represents the dependency between variables and what the evaluated output reveals about the situation.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Retrieval and Comprehension

- I CAN evaluate the function for an input in its domain and interpret the output for a real-world context given a function represented in function notation.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall what function notation means ($f(x)$ represents the output when x is the input).
- I CAN recognize function notation and identify the function name, input variable, and expression.
- I CAN identify the input value to be substituted into the function.
- I CAN execute the procedure of substituting a value for the variable in a function.
- I CAN execute the procedure of evaluating expressions using order of operations.
- I CAN execute the procedure of simplifying expressions with various operations (exponents, absolute value, radicals).
- I CAN recognize the domain of a function (valid input values).
- I CAN identify the independent variable (input) and dependent variable (output) in context.
- I CAN interpret the meaning of input and output values in real-world situations.

Functions

MA.912.F.1.3 Calculate and interpret the average rate of change of a real-world situation represented graphically, algebraically or in a table over a specified interval.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating); Secondary Taxonomy Level: Retrieval Level (Executing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast the average rates of change over different intervals of the same function or across different functions to explain what the rates reveal about the behavior of the function, and determine which intervals show the greatest or least change in real-world contexts.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension and Retrieval

- I CAN calculate and interpret the average rate of change of a real-world situation represented graphically, algebraically or in a table over a specified interval.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the formula for average rate of change: $(f(b) - f(a))/(b - a)$ or $(y_2 - y_1)/(x_2 - x_1)$.
- I CAN recognize that average rate of change represents slope over an interval.
- I CAN identify the endpoints of a specified interval.
- I CAN execute the procedure of finding function values at given inputs from a graph, table, or equation.
- I CAN execute the procedure of substituting values into an equation to evaluate the function.
- I CAN execute the procedure of subtracting to find change in output and change in input.
- I CAN execute the procedure of dividing to calculate the rate.
- I CAN recognize ordered pairs and identify coordinates from graphs or tables.
- I CAN interpret the meaning of rate of change in real-world contexts (speed, cost per item, growth rate).
- I CAN identify units of measurement for rate of change in context.

Functions

MA.912.F.1.5 Compare key features of linear functions each represented algebraically, graphically, in tables or written descriptions.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Analysis Level (Matching)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze multiple linear functions represented in various forms to form general conclusions about how key features relate across representations, and create principles that explain when certain representations make specific features more or less apparent.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Analysis

- I CAN compare key features of linear functions each represented algebraically, graphically, in tables or written descriptions.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the key features of linear functions (slope, y-intercept, x-intercept, domain, range, rate of change, increasing/decreasing).
- I CAN recognize linear functions in various representations (equations, graphs, tables, written descriptions).
- I CAN execute the procedure of determining slope from an equation, graph, table, or description.
- I CAN identify the y-intercept from an equation, graph, table, or description.
- I CAN execute the procedure of finding x-intercepts from equations, graphs, or tables.
- I CAN identify the domain and range of linear functions.
- I CAN recognize whether a linear function is increasing (positive slope) or decreasing (negative slope).
- I CAN execute the procedure of converting between different representations of linear functions.
- I CAN recognize when two linear functions have the same or different key features.

Functions

MA.912.F.1.6 Compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Analysis Level (Matching)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze multiple linear and nonlinear functions across various contexts to form general conclusions about the fundamental differences in their behaviors and characteristics, and create principles that explain when each function type is most appropriate for modeling real-world situations.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Analysis

- I CAN compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the key features of linear functions (constant rate of change, straight line, slope, intercepts).
- I CAN recall the key features of nonlinear functions (quadratic: vertex, axis of symmetry, max/min; exponential: asymptote, growth/decay; absolute value: vertex, V-shape).
- I CAN recognize linear and nonlinear functions in various representations (equations, graphs, tables, written descriptions).
- I CAN execute the procedure of identifying function types from equations, graphs, or tables.
- I CAN execute the procedure of calculating rate of change or ratios to distinguish linear from nonlinear patterns.
- I CAN identify constant first differences (linear) versus constant second differences (quadratic) or constant ratios (exponential) in tables.
- I CAN recognize the shapes of different function types on graphs.
- I CAN identify domain and range for different function types.
- I CAN recognize increasing/decreasing intervals and end behavior for various function types.

Functions

MA.912.F.1.8 Determine whether a linear, quadratic or exponential function best models a given real-world situation.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Decision Making)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN investigate multiple real-world situations to construct arguments about why certain function types are better models than others, and develop criteria for evaluating the goodness of fit between function types and contextual characteristics.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN determine whether a linear, quadratic or exponential function best models a given real-world situation.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the characteristics of linear functions (constant rate of change, additive growth).
- I CAN recall the characteristics of quadratic functions (parabolic shape, maximum/minimum values, symmetric growth/decay).
- I CAN recall the characteristics of exponential functions (constant ratio, multiplicative growth/decay, rapid increase/decrease).
- I CAN recognize real-world contexts that involve constant rates (linear: steady speed, hourly wages, constant change).
- I CAN recognize real-world contexts that involve projectile motion or optimization (quadratic: area problems, height of thrown objects).
- I CAN recognize real-world contexts that involve repeated multiplication (exponential: population growth, compound interest, radioactive decay).
- I CAN identify patterns in data that suggest function types (constant differences, constant second differences, constant ratios).
- I CAN recognize key vocabulary that indicates function types (per, each, doubles, triples, maximum, minimum, peak).

Functions

MA.912.F.2.1 Identify the effect on the graph or table of a given function after replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$ and $f(x + k)$ for specific values of k .

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Analysis Level (Matching)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze multiple examples of function transformations to form general principles about how each type of transformation (vertical/horizontal shifts, vertical/horizontal stretches and compressions) affects the graph and table values, and predict the effects of combined transformations.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Analysis

- I CAN identify the effect on the graph or table of a given function after replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$ and $f(x + k)$ for specific values of k .

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall that $f(x) + k$ represents a vertical shift (up if $k > 0$, down if $k < 0$).
- I CAN recall that $kf(x)$ represents a vertical stretch (if $|k| > 1$) or compression (if $0 < |k| < 1$), and reflection over x-axis (if $k < 0$).
- I CAN recall that $f(kx)$ represents a horizontal compression (if $|k| > 1$) or stretch (if $0 < |k| < 1$), and reflection over y-axis (if $k < 0$).
- I CAN recall that $f(x + k)$ represents a horizontal shift (left if $k > 0$, right if $k < 0$).
- I CAN recognize parent functions and their basic shapes.
- I CAN identify key features of functions (vertex, intercepts, asymptotes) before and after transformations.
- I CAN execute the procedure of evaluating transformed functions for specific input values.
- I CAN recognize how coordinates change under different transformations.

Functions

MA.912.F.2.3 Given the graph or table of $f(x)$ and the graph or table of $f(x) + k$, $kf(x)$, $f(kx)$ and $f(x + k)$, state the type of transformation and find the value of the real number k .

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Analysis Level (Matching)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze multiple pairs of original and transformed functions to form general strategies for identifying transformation types and calculating k values, and create principles that explain how to distinguish between transformations that appear similar but have different effects.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Analysis

- I CAN state the type of transformation and find the value of the real number k given the graph or table of $f(x)$ and the graph or table of $f(x) + k$, $kf(x)$, $f(kx)$ and $f(x + k)$.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall that $f(x) + k$ represents a vertical shift.
- I CAN recall that $kf(x)$ represents a vertical stretch/compression or reflection.
- I CAN recall that $f(kx)$ represents a horizontal stretch/compression or reflection.
- I CAN recall that $f(x + k)$ represents a horizontal shift.
- I CAN recognize the four types of transformations by comparing graphs or tables.
- I CAN identify corresponding points on original and transformed graphs or tables.
- I CAN execute the procedure of calculating vertical shift by finding the difference in y-values for the same x-value.
- I CAN execute the procedure of calculating vertical stretch/compression by finding the ratio of y-values for the same x-value.
- I CAN execute the procedure of calculating horizontal shift by finding the difference in x-values for the same y-value.
- I CAN execute the procedure of calculating horizontal stretch/compression by finding the ratio of x-values for the same y-value.

Functions

MA.912.F.3.1 Given a mathematical or real-world context, combine two functions, limited to linear and quadratic, using arithmetic operations. When appropriate, include domain restrictions for the new function.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating); Secondary Taxonomy Level: Retrieval Level (Executing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast the characteristics of combined functions (sum, difference, product, quotient) to their original component functions, and explain how domain restrictions arise from division and real-world context constraints.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension and Retrieval

- I CAN combine two functions, limited to linear and quadratic, using arithmetic operations and include domain restrictions for the new function when appropriate given a mathematical or real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the operations for combining functions: $(f + g)(x) = f(x) + g(x)$, $(f - g)(x) = f(x) - g(x)$, $(f \cdot g)(x) = f(x) \cdot g(x)$, $(f/g)(x) = f(x)/g(x)$.
- I CAN recognize linear and quadratic functions.
- I CAN execute the procedure of adding polynomial expressions.
- I CAN execute the procedure of subtracting polynomial expressions.
- I CAN execute the procedure of multiplying polynomial expressions.
- I CAN execute the procedure of dividing polynomial expressions.
- I CAN recall that domain restrictions occur when denominators equal zero.
- I CAN execute the procedure of finding values that make a denominator zero.
- I CAN recognize domain restrictions from real-world contexts (non-negative values, whole numbers, practical limits).
- I CAN express domain restrictions using interval notation or set notation.

Financial Literacy

MA.912.FL.3.2 Solve real-world problems involving simple, compound and continuously compounded interest.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate different investment or loan scenarios involving simple, compound, and continuously compounded interest to determine which option yields the best financial outcome, and justify my strategic choice using mathematical calculations and contextual reasoning.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN solve real-world problems involving simple, compound and continuously compounded interest.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the simple interest formula: $I = Prt$ or $A = P(1 + rt)$.
- I CAN recall the compound interest formula: $A = P(1 + r/n)^{nt}$.
- I CAN recall the continuously compounded interest formula: $A = Pe^{rt}$.
- I CAN identify the variables in interest formulas (P = principal, r = rate, t = time, n = compounding periods, A = amount, I = interest earned).
- I CAN execute the procedure of converting percentages to decimals.
- I CAN execute the procedure of substituting values into formulas.
- I CAN execute the procedure of evaluating expressions with exponents.
- I CAN execute the procedure of solving equations for unknown variables.
- I CAN recognize different compounding periods (annually, semi-annually, quarterly, monthly, daily).
- I CAN interpret solutions in the context of financial problems.

Financial Literacy

MA.912.FL.3.4 Explain the relationship between simple interest and linear growth. Explain the relationship between compound interest and exponential growth and the relationship between continuously compounded interest and exponential growth.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast simple interest, compound interest, and continuously compounded interest by analyzing their growth patterns over time using graphs, tables, and equations, and explain why exponential growth eventually surpasses linear growth regardless of initial rates.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN explain the relationship between simple interest and linear growth, explain the relationship between compound interest and exponential growth, and explain the relationship between continuously compounded interest and exponential growth.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the simple interest formula: $A = P(1 + rt)$ or $A = P + Prt$.
- I CAN recall the compound interest formula: $A = P(1 + r/n)^{nt}$.
- I CAN recall the continuously compounded interest formula: $A = Pe^{rt}$.
- I CAN recall the characteristics of linear functions (constant rate of change, additive growth).
- I CAN recall the characteristics of exponential functions (constant ratio, multiplicative growth).
- I CAN recognize that simple interest adds the same amount each period.
- I CAN recognize that compound interest multiplies by the same factor each period.
- I CAN identify the form of linear functions ($y = mx + b$).
- I CAN identify the form of exponential functions ($y = a \cdot b^x$).
- I CAN recognize patterns in tables showing linear versus exponential growth.

Data Analysis and Probability

MA.912.DP.1.1 Given a set of data, select an appropriate method to represent the data, depending on whether it is numerical or categorical data and on whether it is univariate or bivariate.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Decision Making)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN investigate multiple data sets and their representations to construct arguments about why certain representation methods are more effective than others for revealing patterns and relationships, and develop criteria for evaluating the appropriateness of data displays.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN select an appropriate method to represent the data, depending on whether it is numerical or categorical data and on whether it is univariate or bivariate, given a set of data.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of numerical data (quantitative data that can be measured or counted).
- I CAN recall the definition of categorical data (qualitative data that can be grouped into categories).
- I CAN recall the definition of univariate data (data with one variable).
- I CAN recall the definition of bivariate data (data with two variables).
- I CAN recognize appropriate representations for numerical univariate data (histograms, box plots, dot plots, stem-and-leaf plots).
- I CAN recognize appropriate representations for categorical univariate data (bar graphs, pie charts, frequency tables).
- I CAN recognize appropriate representations for numerical bivariate data (scatter plots, line graphs).
- I CAN recognize appropriate representations for categorical bivariate data (two-way frequency tables, segmented bar graphs).
- I CAN identify the type of data in a given data set.
- I CAN recognize whether data involves one or two variables.

Data Analysis and Probability

MA.912.DP.1.2 Interpret data distributions represented in various ways. State whether the data is numerical or categorical, whether it is univariate or bivariate and interpret the different components and quantities in the display.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis Level (Matching)

- I CAN compare and contrast multiple data distributions across different representation types to explain how the same data characteristics (center, spread, shape, outliers) are revealed differently in various displays, and determine which representation is most effective for specific analytical purposes.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension (Integrating)

- I CAN interpret data distributions represented in various ways, state whether the data is numerical or categorical, whether it is univariate or bivariate and interpret the different components and quantities in the display.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of numerical data (quantitative, measurable).
- I CAN recall the definition of categorical data (qualitative, grouped by categories).
- I CAN recall the definition of univariate data (one variable).
- I CAN recall the definition of bivariate data (two variables).
- I CAN recognize various data representations (histograms, box plots, dot plots, bar graphs, scatter plots, two-way tables, pie charts).
- I CAN identify the components of different displays (axes, bars, intervals, quartiles, median, outliers, frequencies).
- I CAN recall measures of center (mean, median, mode).
- I CAN recall measures of spread (range, interquartile range, standard deviation).
- I CAN recognize distribution shapes (symmetric, skewed left, skewed right, uniform, bimodal).
- I CAN identify outliers in data displays.

Data Analysis and Probability

MA.912.DP.1.3 Explain the difference between correlation and causation in the contexts of both numerical and categorical data.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze multiple real-world scenarios involving relationships between variables to distinguish between correlation and causation, identify confounding variables or lurking factors, and explain why correlation does not imply causation using evidence from both numerical and categorical data contexts.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN explain the difference between correlation and causation in the contexts of both numerical and categorical data.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of correlation (a relationship or association between two variables).
- I CAN recall the definition of causation (one variable directly causes a change in another variable).
- I CAN recognize that correlation does not imply causation.
- I CAN recall the definition of numerical data (quantitative, measurable).
- I CAN recall the definition of categorical data (qualitative, grouped by categories).
- I CAN identify examples of correlation in numerical data (scatter plots showing relationships).
- I CAN identify examples of correlation in categorical data (two-way tables showing associations).
- I CAN recognize confounding variables (third variables that affect both variables in question).
- I CAN identify examples where correlation exists without causation.
- I CAN recognize key vocabulary (association, relationship, cause-and-effect, lurking variable).

Data Analysis and Probability

MA.912.DP.1.4 Estimate a population total, mean or percentage using data from a sample survey; develop a margin of error through the use of simulation.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Experimenting)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN investigate how sample size and variability affect margin of error through multiple simulations, and construct arguments about the reliability and precision of population estimates based on different sampling methods and sample sizes.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN estimate a population total, mean or percentage using data from a sample survey and develop a margin of error through the use of simulation.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of population (entire group being studied).
- I CAN recall the definition of sample (subset of the population).
- I CAN recall the definition of margin of error (range of values above and below a sample statistic).
- I CAN execute the procedure of calculating the mean from a data set.
- I CAN execute the procedure of calculating percentages.
- I CAN execute the procedure of using proportions to estimate population totals.
- I CAN recognize that sample statistics are used to estimate population parameters.
- I CAN recall that larger samples generally produce more accurate estimates.
- I CAN identify the difference between a sample statistic and a population parameter.
- I CAN recognize that simulation involves repeated sampling to observe variability.

Data Analysis and Probability

MA.912.DP.2.4 Fit a linear function to bivariate numerical data that suggests a linear association and interpret the slope and y -intercept of the model. Use the model to solve real-world problems in terms of the context of the data.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving); Secondary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization Level (Decision Making)

- I CAN evaluate the appropriateness and accuracy of a linear model for a given data set by analyzing residuals and correlation strength, determine whether predictions made from the model are reliable within and beyond the data range, and justify the validity of using the model for real-world decision-making.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization (Problem Solving) with Comprehension (Integrating)

- I CAN fit a linear function to bivariate numerical data that suggests a linear association and interpret the slope and y -intercept of the model, and use the model to solve real-world problems in terms of the context of the data.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the slope-intercept form of a linear equation ($y = mx + b$).
- I CAN recognize bivariate numerical data and linear associations in scatter plots.
- I CAN execute the procedure of fitting a line of best fit to data (informally or using technology).
- I CAN execute the procedure of determining the slope and y -intercept from a linear model.
- I CAN recall that slope represents the rate of change in context.
- I CAN recall that y -intercept represents the starting value or initial amount in context.
- I CAN execute the procedure of substituting values into a linear equation to make predictions.
- I CAN interpret the meaning of slope and y -intercept in real-world contexts.
- I CAN recognize the difference between interpolation (within data range) and extrapolation (beyond data range).
- I CAN identify the independent and dependent variables in context.

Data Analysis and Probability

MA.912.DP.2.5 Given a scatter plot that represents bivariate numerical data, assess the fit of a given linear function by plotting and analyzing residuals.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Analysis Level (Analyzing Errors)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze residual plots from multiple linear models to form general conclusions about the characteristics of residual patterns that indicate good fit versus poor fit, and create principles for determining when a linear model is appropriate or when a nonlinear model would be better.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Analysis

- I CAN assess the fit of a given linear function by plotting and analyzing residuals given a scatter plot that represents bivariate numerical data.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of a residual (the difference between observed and predicted values: $\text{residual} = \text{observed} - \text{predicted}$).
- I CAN recognize bivariate numerical data in scatter plots.
- I CAN execute the procedure of calculating predicted values using a linear function.
- I CAN execute the procedure of calculating residuals for data points.
- I CAN execute the procedure of plotting residuals on a residual plot.
- I CAN recall that a good linear fit shows residuals randomly scattered around zero.
- I CAN recall that patterns in residual plots (curves, clusters) suggest poor linear fit.
- I CAN recognize positive residuals (observed value above predicted) and negative residuals (observed value below predicted).
- I CAN identify when residuals show systematic patterns versus random scatter.
- I CAN interpret what residual patterns reveal about model appropriateness.

Data Analysis and Probability

MA.912.DP.2.6 Given a scatter plot with a line of fit and residuals, determine the strength and direction of the correlation. Interpret strength and direction within a real-world context.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis Level (Matching)

- I CAN compare and contrast multiple scatter plots with different correlation strengths and directions to explain how residual patterns, data clustering, and line fit relate to correlation strength, and determine which relationships are strong enough to make reliable predictions in real-world contexts.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension (Integrating)

- I CAN determine the strength and direction of the correlation and interpret strength and direction within a real-world context given a scatter plot with a line of fit and residuals.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of correlation (a relationship between two variables).
- I CAN recall the types of correlation direction (positive, negative, no correlation).
- I CAN recall the types of correlation strength (strong, moderate, weak).
- I CAN recognize positive correlation (as x increases, y increases).
- I CAN recognize negative correlation (as x increases, y decreases).
- I CAN recognize no correlation (no clear pattern).
- I CAN identify strong correlation (data points close to the line of fit, small residuals).
- I CAN identify weak correlation (data points far from the line of fit, large residuals).
- I CAN recognize that residuals help assess how well the line fits the data.
- I CAN interpret correlation strength and direction in real-world contexts.
- I CAN recall that correlation does not imply causation.

Data Analysis and Probability

MA.912.DP.3.1 Construct a two-way frequency table summarizing bivariate categorical data. Interpret joint and marginal frequencies and determine possible associations in terms of a real-world context.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing); Secondary Taxonomy Level: Analysis Level (Matching)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis Level (Generalizing)

- I CAN analyze multiple two-way frequency tables from various real-world contexts to form general conclusions about how to identify strong versus weak associations between categorical variables, and create principles for determining when associations suggest meaningful relationships worth investigating further.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension (Symbolizing) with Analysis (Matching)

- I CAN construct a two-way frequency table summarizing bivariate categorical data, interpret joint and marginal frequencies and determine possible associations in terms of a real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of bivariate categorical data (data with two categorical variables).
- I CAN recall the definition of categorical data (qualitative data grouped into categories).
- I CAN recognize the structure of a two-way frequency table (rows, columns, cells).
- I CAN identify joint frequencies (frequencies in the interior cells showing combinations of categories).
- I CAN identify marginal frequencies (row and column totals).
- I CAN execute the procedure of counting frequencies for each category combination.
- I CAN execute the procedure of calculating row and column totals.
- I CAN execute the procedure of calculating the grand total.
- I CAN recognize patterns in frequencies that suggest associations between variables.
- I CAN interpret the meaning of frequencies in real-world contexts.

Data Analysis and Probability

MA.912.DP.3.2 Given marginal and conditional relative frequencies, construct a two-way relative frequency table summarizing categorical bivariate data.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN critique a constructed two-way relative frequency table to identify errors in calculations or logic, verify that marginal and conditional relative frequencies are consistent with joint relative frequencies, and explain the mathematical relationships that must hold true in a valid table.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN construct a two-way relative frequency table summarizing categorical bivariate data given marginal and conditional relative frequencies.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of relative frequency (frequency divided by total, expressed as a decimal, fraction, or percentage).
- I CAN recall the definition of marginal relative frequency (row or column total divided by grand total).
- I CAN recall the definition of conditional relative frequency (joint frequency divided by the marginal total for that row or column).
- I CAN recall the definition of joint relative frequency (cell frequency divided by grand total).
- I CAN recognize the structure of a two-way relative frequency table.
- I CAN execute the procedure of calculating relative frequencies from counts.
- I CAN execute the procedure of converting between decimals, fractions, and percentages.
- I CAN execute the procedure of using given information to determine missing values in a table.
- I CAN recognize that all relative frequencies in a table must sum appropriately (rows, columns, grand total = 1 or 100%).

Data Analysis and Probability

MA.912.DP.3.3 Given a two-way relative frequency table or segmented bar graph summarizing categorical bivariate data, interpret joint, marginal and conditional relative frequencies in terms of a real-world context.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast joint, marginal, and conditional relative frequencies across multiple real-world scenarios to explain how each type of frequency reveals different information about relationships between categorical variables, and determine which type is most useful for answering specific contextual questions.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN interpret joint, marginal and conditional relative frequencies in terms of a real-world context given a two-way relative frequency table or segmented bar graph summarizing categorical bivariate data.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of joint relative frequency (proportion of the total for a specific combination of categories).
- I CAN recall the definition of marginal relative frequency (proportion of the total for one category, regardless of the other variable).
- I CAN recall the definition of conditional relative frequency (proportion within a specific row or column).
- I CAN recognize two-way relative frequency tables and their components.
- I CAN recognize segmented bar graphs and their components.
- I CAN identify joint relative frequencies in tables (interior cells).
- I CAN identify marginal relative frequencies in tables (row and column totals).
- I CAN identify conditional relative frequencies by comparing values within rows or columns.
- I CAN recognize that relative frequencies are expressed as decimals, fractions, or percentages.
- I CAN interpret the meaning of relative frequencies in real-world contexts.