Algebra 1 Curriculum Framework – Overview

**Unit 1: Relationships between Quantities and Reasoning with Equations**

*Students will understand that algebraic expressions and equations are tools that connect abstract mathematical concepts with real-world scenarios.*

• Reason quantitatively and use units to solve problems.

• Interpret the structure of expressions.

• Create equations that describe numbers or relationships.

• Understand solving equations as a process of reasoning and explain the reasoning.

• Solve equations and inequalities in one variable.

**Unit 2: Linear and Exponential Relationships**

*Students will understand that linear relationships exist in the real world, and that every linear model has key features that allow them to make predictions about natural phenomena.*

• Extend the properties of exponents to rational exponents.

• Solve systems of equations.

• Represent and solve equations and inequalities graphically.

• Understand the concept of a function and use function notation.

• Interpret functions that arise in applications in terms of a context.

• Analyze functions using different representations.

• Build a function that models a relationship between two quantities.

• Build new functions from existing functions.

• Construct and compare linear, quadratic, and exponential models and solve problems.

• Interpret expressions for functions in terms of the situation they model.

**Unit 3: Descriptive Statistics**

*Students will understand that a variety of statistical models are required to interpret data in a meaningful way.*

• Summarize, represent, and interpret data on a single count or measurement variable.

• Summarize, represent, and interpret data on two categorical and quantitative variables.

• Interpret linear models.

**Unit 4: Expressions and Equations**

*Students will understand that basic mathematical concepts can be applied in a variety of contexts to solve increasingly complex mathematical problems.*

• Interpret the structure of expressions.

• Write expressions in equivalent forms to solve problems.

• Perform arithmetic operations on polynomials.

• Create equations that describe numbers or relationships.

• Solve equations and inequalities in one variable.

• Solve systems of equations.

**Unit 5: Quadratic Functions and Modeling**

*Students will understand that a variety of non-linear relationships exist in the real world, and that every non-linear model has key features that allow them to describe natural phenomena.*

• Use properties of rational and irrational numbers.

• Interpret functions that arise in applications in terms of a context.

• Analyze functions using different representations.

• Build a function that models a relationship between two quantities.

• Build new functions from existing functions.

• Construct and compare linear, quadratic, and exponential models and solve problems.

Algebra 1 Curriculum Framework – Student View

**Unit 1: Relationships between Quantities and Reasoning with Equations**

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| *…Evaluate numerical and algebraic expressions, and describe the link between expressions and real-world scenarios.* | | |
| **Exceeding (4)** | **Meeting Expectations (3)** | **Approaching (2)** |
| In addition to meeting all of the level 3 indicators, students must be able to: | In order to meet expectations for this indicator, students must be able to: |  |
| * Describe a method for estimating irrational square roots. * Describe the mathematical property used in each step in a simplification process. | * Add, subtract, multiply, and divide rational numbers and terms containing variables. * Use the order of operations to evaluate numerical and algebraic expressions. * Use the distributive property to simplify expressions. * Recognize and use the commutative and associative properties to simplify expressions. * Determine the correct unit for the answer to real-world problems. | Students approaching expectations will be able to meet between 2 and 4 of the level 3 indicators. |

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| *…Manipulate expressions and equations, and connect them to real-world scenarios.* | | |
| **Exceeding (4)** | **Meeting Expectations (3)** | **Approaching (2)** |
| In addition to meeting all of the level 3 indicators, students must be able to: | In order to meet expectations for this indicator, students must be able to: |  |
| * Apply the laws of exponents to solve single variable equation. * Write systems of inequalities that represent the constraints of a real-world scenario. | * Translate verbal expressions into mathematical expressions and vice versa. * Solve multi-step equations, including proportions. * Solve and graph the solutions to multi-step inequalities. * Translate problems into equations or formulas and vice versa. * Solve multi-variable equations for a quantity of interest. | Students approaching expectations will be able to meet between 2 and 4 of the level 3 indicators. |

**Unit 2: Linear and Exponential Relationships**

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| *…Define a function, and apply functions in a real-world context.* | | |
| **Exceeding (4)** | **Meeting Expectations (3)** | **Approaching (2)** |
| In addition to meeting all of the level 3 indicators, students must be able to: | In order to meet expectations for this indicator, students must be able to: |  |
| * Graph basic linear equations (x = k, y = k,   x + y = k, x – y = k).   * Use technology to graph linear relations and functions. | * Determine whether a given relation is a function. * Identify the domain, range, and inverse of a function. * Show relations as sets of ordered pairs, tables, and graphs. * Find a value of a functions for a given element of the domain. | Students approaching expectations will be able to meet between 2 and 4 of the level 3 indicators. |

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| *…Use functions in a variety of forms to interpret real data, to extrapolate, and to draw conclusions.* | | |
| **Exceeding (4)** | **Meeting Expectations (3)** | **Approaching (2)** |
| In addition to meeting all of the level 3 indicators, students must be able to: | In order to meet expectations for this indicator, students must be able to: |  |
| * Write linear equations in Standard Form   (Ax + By = C).   * Given one of the following for a linear relation (table, equation, graph) be able to generate the other two. | * Write equations to represent relations, given some of the solutions for the equation. * Find the slope of a line, given the coordinates of two points on the line. * Write linear equations in Slope-Intercept Form (y = mx + b). * Graph a line given any linear equation. * Determine the x- and y-intercepts of linear relations. | Students approaching expectations will be able to meet between 2 and 4 of the level 3 indicators. |

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| *…Apply concepts of functions and linear relations to inequalities.* | | |
| **Exceeding (4)** | **Meeting Expectations (3)** | **Approaching (2)** |
| In addition to meeting all of the level 3 indicators, students must be able to: | In order to meet expectations for this indicator, students must be able to: |  |
| * Graph any equation (linear and non-linear) by generating a list of solutions. | * Solve linear inequalities involving more than one operation. * Graph inequalities in the coordinate plane. * Simplify expressions with rational exponents. | Students approaching expectations will be able to meet between 2 and 4 of the level 3 indicators. |

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| *…Understand the definition of “solution” in a variety of contexts.* | | |
| **Exceeding (4)** | **Meeting Expectations (3)** | **Approaching (2)** |
| In addition to meeting all of the level 3 indicators, students must be able to: | In order to meet expectations for this indicator, students must be able to: |  |
| * Write equations of lines passing through a given point, parallel or perpendicular to the graph of a given equation. | * Solve systems of equations by graphing. * Solve systems of equations using algebraic methods (elimination, substitution). * Graph the solutions to systems of inequalities. | Students approaching expectations will be able to meet between 2 and 4 of the level 3 indicators. |

**Unit 3: Descriptive Statistics**

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| *…Apply statistical models to represent, interpret, and predict the behavior of data.* | | |
| **Exceeding (4)** | **Meeting Expectations (3)** | **Approaching (2)** |
| In addition to meeting all of the level 3 indicators, students must be able to: | In order to meet expectations for this indicator, students must be able to: |  |
| * Compare data sets based on measures of variance. * Interpret the slope and y-intercept of a line of best fit in the context of the data. | * Select an appropriate representation for single variable data (dot plots, histograms, and box-and-whisker plots). * Represent bivariate data on a scatter plot. * Compare data sets based on measures of central tendency. * Make predictions about a bivariate data set using a line of best fit. | Students approaching expectations will be able to meet between 2 and 4 of the level 3 indicators. |

**Unit 4: Expressions and Equations**

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| *…Perform operations with polynomials, and apply the distributive property in a variety of contexts.* | | |
| **Exceeding (4)** | **Meeting Expectations (3)** | **Approaching (2)** |
| In addition to meeting all of the level 3 indicators, students must be able to: | In order to meet expectations for this indicator, students must be able to: |  |
| * Arrange the terms of a polynomial so that the powers of a variable are in ascending or descending order. | * Multiply and divide monomials. * Simplify expressions containing negative exponents. * Perform operations with numbers expressed in scientific notation. * Add, subtract, multiply, and divide polynomials, with a focus on the distributive property. | Students approaching expectations will be able to meet between 2 and 4 of the level 3 indicators. |

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| *…Write expressions in equivalent forms to solve problems.* | | |
| **Exceeding (4)** | **Meeting Expectations (3)** | **Approaching (2)** |
| In addition to meeting all of the level 3 indicators, students must be able to: | In order to meet expectations for this indicator, students must be able to: |  |
| * Factor complex polynomials using a pattern. | * Factor quadratic trinomials. * Identify and factor binomials that are differences of squares. * Use the zero product property to solve equations. | Students approaching expectations will be able to meet between 2 and 4 of the level 3 indicators. |

**Unit 5: Quadratic Functions and Modeling**

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| *…Write expressions in equivalent forms to solve problems.* | | |
| **Exceeding (4)** | **Meeting Expectations (3)** | **Approaching (2)** |
| In addition to meeting all of the level 3 indicators, students must be able to: | In order to meet expectations for this indicator, students must be able to: |  |
| * Determine if a set of data displays exponential behavior. * Use technology to determine key features of parabolas. | * Determine the coordinate of the vertex of a parabola. * Find the equation of the axis of symmetry of a quadratic function. * Find the roots of quadratic equations by graphing. * Solve quadratic equations by using the quadratic formula. | Students approaching expectations will be able to meet between 2 and 4 of the level 3 indicators. |