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. |