

Unit Title: “World Records: Graphing and Systems of Linear Equations”

Course: Algebra I (Middle School)

Subject Area: Mathematics

Time Frame: 14 days

Standards

Algebra I Standards	Sunshine State Standards and Benchmarks	NCEE New Standards
<p>The student will:</p> <p>1.2 Evaluate variable expressions for specified values.</p> <p>1.3 Use appropriate mathematical symbols to translate word phrases into variable expressions and word sentences into equations or inequalities.</p> <p>6.2 Add and subtract polynomials</p> <p>7.4 Graphs sets of ordered pairs, linear equations in two variables by using intercepts, slope and a point, and point-plotting.</p> <p>10.1 Solve systems of linear equations by graphing, substitution, and linear combination.</p>	<p>MA.A.3.3.2 The student selects the appropriate operation to solve problems involving addition, subtraction, multiplication, and division of rational numbers, ratios, proportions, and percents, including the appropriate application of the algebraic order of operations.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none"> • Knows the appropriate operations to solve real-world problems involving integers, ratios, rates, proportions, numbers expressed as percents, decimals, and fractions. • Solves real-world problems involving integers, ratios, proportions, numbers expressed as percents, decimals, and fractions in two- or three-step problems. • Solves real-world problems involving percents including percents greater than 100% (for example, percent of change, commission). • Write and simplifies expressions from 	<p>The student:</p> <p>M1a Consistently and accurately adds, subtracts, multiplies, and divides rational numbers using methods and raises rational number to whole number powers.</p> <p>M3a Discovers, describes, and generalizes patterns, including liner, exponential, and simple quadratic relationships, i.e., those of the form $f(n) = n^2$ or $f(n) = cn^2$, for constant c, including $A = \pi r^2$, and represents them with variables and expressions.</p> <p>M3b Represents relationships with tables, graphs in the coordinate plane, and verbal or symbolic rules.</p> <p>M3c Analyzes tables, graphs, and rules to determine functional relationships.</p> <p>M3d Finds solutions for unknown quantities in linear equations and in simple equations and inequalities.</p> <p>M6a Computes accurately with arithmetic operations on rational numbers.</p>

	<p>real-world situations using the order of operations.</p> <p>MA.C.3.3.2 The student identifies and plots ordered pairs in all four quadrants of a rectangular coordinate system and applies simple properties of lines.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none"> • When given an equation or its graph, find ordered-pair solutions. • When given the graph of a line, identifies the slope of the line (including the slope of vertical and horizontal lines). • When given the graph of a linear relationship, determine the x- and y-intercepts of the line. • When given the graph of a linear relationship, applied and explains the properties of liens on a graph. <p>MA.D.1.3.1 The student describes a wide variety of patterns, relationships, and functions through models, such as manipulatives, tables, graphs, expression, equations, and inequalities.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none"> • Read, analyze, and describe graphs of linear relationships. • Uses variables to represent unknown quantities in real-world problems. 	<p>M6b Knows and uses the correct order of operations for arithmetic computations.</p>
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	<ul style="list-style-type: none"> • Uses the information provided in a table, graph, or rule to determine if a function is linear and justifies reasoning. • Finds a function rule to describe tables of related input-output variables. • Predicts outcomes based upon function rules. <p>MA.D.2.3.1 The student represents and solves real-world problems graphically, with algebraic expression, equations, and inequalities.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none"> • Translates verbal expressions and sentences into algebraic expressions, equations, and inequalities. • Translates algebraic expressions, equations, or inequalities representing real-world relationships into verbal expressions or sentences. • Solve single- and multi-step linear equations and inequalities in concrete or abstract form. • Graph linear equations on the coordinate plane using tables of values. • Graphically displays real-world situations represented by algebraic equations or inequalities. • Evaluate algebraic expressions, equations, and inequalities by substituting integral values for variables and simplifying the results. • Simplifies algebraic expressions that 	
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	<p>represent real-world situations by combining like terms and applying the properties of real numbers.</p> <p>MA.D.2.3.2 The student uses algebraic problem-solving strategies to solve real-world problems involving linear equations and inequalities.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none">• Simplifies algebraic expressions with a maximum of two variables.• Solve single- and multi-step linear equations and inequalities that represent real-world situations.	
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Desired Results

Enduring Understanding	Essential Questions	Knowledge and Skills
<p>Students will understand:</p> <ul style="list-style-type: none"> • One of the most important ideas in the study of algebra is the relationship between two variables and how one can be used to predict values of the other. • Linear relationships are one of the most important and basic of the families of functions in algebra. • The symbolic expression and manipulations for equations is connected to graphs and tables of the equations. 	<ul style="list-style-type: none"> • How can I tell if two expressions are equivalent? • Which form of an expression should I use? • What properties of real numbers are useful to help confirm that two or more expressions are equivalent? • How can the distributive property be applied to solve problems? • What properties of real numbers are needed to solve linear equations? • How can an equation express a relationship we see in the everyday world? • When two related quantities change, how can we tell whether the change is predictable? • How can we tell whether it can be expressed by a mathematical equation? • What tools can be used to solve equations? • How can one decide which tool or method is best? • What kind of problems can be solved by using mathematical tables and equations? 	<p>Students will know</p> <ul style="list-style-type: none"> • Key terms (i.e., algebraic expression, distributive property, equivalent expressions, roots, term, coordinate pairs, linear relationships, point of intersection, rise, run, slope, y-intercept). <p>Students will be able to</p> <ul style="list-style-type: none"> • Evaluate variable expression for specified values. • Use appropriate mathematical symbols to translate word phrases into variable expressions and word sentences into equations or inequalities. • Graph sets of ordered pairs, linear equations in two variables by using intercepts, slope and a point, and point-plotting. • Solve systems of linear equations by graphing, substitution, and linear combination. • Add and subtract polynomials.

Acceptable Evidence

Performance Tasks	Quizzes, Test, and Work Samples	Observations and Dialogues
<ul style="list-style-type: none">• World Records Students work together to determine strategies in matching given graphs to equations. The strategies are discussed and recorded.• Graphing Lines Students graph linear equations in two variables by using two points, slope and y-intercept, and point-plotting.• Systems of Linear Equations. Students find solutions to systems of linear equations in two variables by graphing and finding the points of intersection and by method of substitution.	Check-Up 1 Quiz A Check-Up 2 Quiz B Unit Test	Teacher observations of students during work on performance tasks. Accountable talk during work on performance tasks.

