WEST BOLIVAR
CONSOLIDATED SCHOOL DISTRICT

Mathematics Pacing Guide

ALGEBRA 1

Term 1

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2021 – 2022

Algebra 1

FIRST NINE WEEKS

Unit 1: Expressions and Problem Solving	*Suggested* Number of Days for Unit: 7 days
Standards	***Suggested* Number of Instructional Days**
N-RN.3 Explain why: • the sum or product of two rational numbers is rational; • the sum of a rational number and an irrational number is irrational; and • the product of a nonzero rational number and an irrational number is irrational.	1 Day
MODULE 1: SIMPLE EXPRESSIONS A-SSE.1a Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients. A.APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, ~~and multiplication~~; add, subtract, and ~~multiply~~ polynomials.	3 Days
MODULE 2: PROBLEM SOLVING WITH UNITS N-Q.2 Define appropriate quantities for the purpose of descriptive modeling. N-Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	1 Day
Unit Review	1 Day
Unit Assessment	1 Day

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Unit 2: Equations	*Suggested* Number of Days for Unit: 10 days
Standards	*Suggested* Number of Instructional Days
MODULE 1: EQUATIONS IN ONE VARIABLE A-REI.3 Solve linear equations ~~and inequalities~~ in one variable, including equations with coefficients represented by letters. A-REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	1 Day
A-REI.3 Solve linear equations ~~and inequalities~~ in one variable, including equations with coefficients represented by letters. A-REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. A-CED.3 Represent constraints by equations or ~~inequalities~~, ~~and by systems of equations and/or inequalities,~~ and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.* A-CED.1 Create equations ~~and inequalities~~ in one variable and use them to solve problems. *Include equations arising from linear ~~and quadratic functions, and simple rational and exponential~~ functions.*	4 Days

Unit 2: Equations	*Suggested* Number of Days for Unit: 10 days
Standards	*Suggested* Number of Instructional Days
MODULE 2: FORMULAS & LITERAL EQUATIONS A-CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.* N-Q.1 Use units as a way to understand problems and to guide the solutions to multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin in graphs and data displays.	5 Days

Unit 3: Inequalities in One Variable	*Suggested* Number of Days for Unit: 5 days
Standards	*Suggested* Number of Instructional Days
A-REI.3 Solve linear ~~equations and~~ inequalities in one variable, including equations with coefficients represented by letters. A-CED.3 Represent constraints by ~~equations or~~ inequalities, ~~and by systems of equations and/or inequalities,~~ and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.* A-CED.1 Create ~~equations and~~ inequalities in one variable and use them to solve problems. *Include equations arising from linear ~~and quadratic functions, and simple rational and exponential~~ functions.*	3 Days
Units Review (Units 2 & 3)	1 Day
Units Assessment (Units 2 & 3)	1 Day

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Unit 4: Functions	*Suggested* Number of Days for Unit: 17 days
Standards	*Suggested* Number of Instructional Days
MODULE 1: ARITHMETIC SEQUENCES F-IF.3 Recognize that sequences are functions whose domain is a subset of the integers. F-LE.2 Construct ~~linear and exponential functions, including~~ arithmetic ~~and geometric~~ sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). F-BF.1a Write a function that describes a relationship between two quantities. a. Determine an explicit expression or steps for calculation from a context.	2 Days
MODULE 2: INTRODUCTION TO FUNCTIONS F-IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. F-IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	4 Days
MODULE 3: LINEAR FUNCTIONS F-LE.2 Construct linear ~~and exponential functions, including arithmetic and geometric sequences,~~ given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). A-REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	2 Days

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Unit 4: Functions	*Suggested* Number of Days for Unit: 17 days
Standards	***Suggested* Number of Instructional Days**
F-IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.* F-IF.7a Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph functions (linear and ~~quadratic~~) and show intercepts, ~~maxima~~, and ~~minima~~. F-LE.5 Interpret the parameters in a linear ~~or exponential function~~ in terms of a context. N-Q.1 Use units as a way to understand problems and to guide the solutions to multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin in graphs and data displays.	2 Days
A-CED.2 Create equations in two variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	2 Days
F-LE.1a & F-LE.1b Distinguish between situations that can be modeled with linear functions ~~and with exponential functions.~~ a. Prove that linear functions grow by equal differences over equal intervals ~~and that exponential functions grow by equal factors over equal intervals~~. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. F-IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	3 Days
Unit Review	1 Day
Unit Assessment	1 Day

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Term 2

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Algebra 1

SECOND NINE WEEKS

Unit 5: Inequalities in Two Variable	*Suggested* Number of Days for Unit: 5 days
Standards	***Suggested* Number of Instructional Days**
A-CED.3 Represent constraints by equations or inequalities, ~~and by systems of equations~~ and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.**	1 Day
A-REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), ~~and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.~~	2 Days
Unit Review	1 Day
Unit Assessment	1 Day

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SECOND NINE WEEKS

Unit 6: Systems	*Suggested* Number of Days for Unit: 15 days

Standards	*Suggested* Number of Instructional Days
<u>MODULE 1: Systems of Equations</u> A-CED.2 Create equations in two variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.* [Note this standard appears in future courses with a slight variation in the standard language.] A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.** A-REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. *Include cases where f(x) and/or g(x) are linear, quadratic, absolute value, and exponential functions.** A-REI.5 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. *Include cases where f(x) and/or g(x) are linear, quadratic, absolute value, and exponential functions.**	7 Days

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SECOND NINE WEEKS

Unit 6: Systems	*Suggested* Number of Days for Unit: 15 days
Standards	***Suggested* Number of Instructional Days**
MODULE 1: Systems of Equations (cont'd) A-REI.6 Solve systems of linear equations algebraically, exactly, and graphically while focusing on pairs of linear equations in two variables.	7 Days
MODULE 2: Systems of Inequalities A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.* A-REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	6 Days
Unit Review	1 Day
Unit Assessment	1 Day

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SECOND NINE WEEKS

Unit 7: Sequences & Exponential Functions	*Suggested* Number of Days for Unit: 15 days

Standards	*Suggested* Number of Instructional Days
<u>MODULE 1: Sequences</u> F-IF.3 Recognize that sequences are functions whose domain is a subset of the integers. F-LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).* F-BF.1a Write a function that describes a relationship between two quantities.* a. Determine an explicit expression or steps for calculation from a context.	7 Days
<u>MODULE 2: Exponential Functions</u> F-IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.* F-IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person- hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.* F-IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.*	6 Days

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SECOND NINE WEEKS

Unit 7: Sequences & Exponential Functions	*Suggested* Number of Days for Unit: 15 days

Standards	*Suggested* Number of Instructional Days
<u>MODULE 2: Exponential Functions (cont'd)</u> A-CED.1 Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear ~~and quadratic functions, and simple rational~~ and exponential functions.** A-CED.2 Create equations in two variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.* [Note this standard appears in future courses with a slight variation in the standard language.] A-SSE.3c Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* c. Use the properties of exponents to transform expressions for exponential functions. *For example the expression 1.15t can be rewritten as [1.151/12]12t ≈1.01212t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.* F-LE.1a Distinguish between situations that can be modeled with linear functions and with exponential functions.* a. Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.	6 Days

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SECOND NINE WEEKS

Unit 7: Sequences & Exponential Functions	*Suggested* Number of Days for Unit: 15 days
Standards	***Suggested*** **Number of Instructional Days**
<u>MODULE 2: Exponential Functions (cont'd)</u> F-LE.1c Distinguish between situations that can be modeled with linear functions and with exponential functions.* c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. F-LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*	6 Days
Unit Review	1 Day
Unit Assessment	1 Day

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SECOND NINE WEEKS

Unit 8: Comparing Linear and Exponential Functions	*Suggested* Number of Days for Unit: 5 days
Standards	***Suggested*** **Number of Instructional Days**
F-IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum. F-LE.1a Distinguish between situations that can be modeled with linear functions and with exponential functions.* a. Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals. F-LE.1b Distinguish between situations that can be modeled with linear functions and with exponential functions.* b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. F-LE.5 Interpret the parameters in a linear or exponential function in terms of a context.* F-LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*	3 Days

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SECOND NINE WEEKS

Unit 8: Comparing Linear and Exponential Functions	*Suggested* Number of Days for Unit: 5 days
Standards	***Suggested* Number of Instructional Days**
(cont'd) F-BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.* A-REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. *Include cases where f(x) and/or g(x) are linear, quadratic, absolute value, and exponential functions.**	3 Days
Unit Review	1 Day
Unit Assessment	1 Day

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Algebra 1

THIRD NINE WEEKS

Unit 9: Polynomial and Quadratic Expressions	*Suggested* Number of Days for Unit: 15 days
Standards	***Suggested* Number of Instructional Days**
<u>MODULE 1: Operations with Polynomials</u> A-SSE.1a Interpret expressions that represent a quantity in terms of its context.* a. Interpret parts of an expression, such as terms, factors, and coefficients. A-SSE.1b Interpret expressions that represent a quantity in terms of its context.* b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret P(1+r)n as the product of P and a factor not depending on P.* A-APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. N-RN.3 Explain why: • the sum or product of two rational numbers is rational; • the sum of a rational number and an irrational number is irrational; and • the product of a nonzero rational number and an irrational number is irrational.	6 Days

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THIRD NINE WEEKS	
Unit 9: Polynomial and Quadratic Expressions	*Suggested* Number of Days for Unit: 15 days

Standards	*Suggested* Number of Instructional Days
MODULE 2: Factoring A-SSE.2 Use the structure of an expression to identify ways to rewrite it. *For example, see x4 – y4 as (x2)2 – (y2)2 thus recognizing it as a difference of squares that can be factored as (x2– y2)(x2 + y2).* A-SSE.3a Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* a. Factor a quadratic expression to reveal the zeros of the function it defines.	7 Days
Unit Review	1 Day
Unit Assessment	1 Day

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THIRD NINE WEEKS

Unit 10: Quadratics	*Suggested* Number of Days for Unit: 20 days

Standards	*Suggested* Number of Instructional Days
MODULE 1: Quadratic Equations A-REI.4 Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions. A-CED.1 Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.**	8 Days
MODULE 2: Quadratic Functions A-SSE.3a Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* a. Factor a quadratic expression to reveal the zeros of the function it defines. A-SSE.3b Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	10 Days

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THIRD NINE WEEKS

Unit 10: Quadratics	*Suggested* Number of Days for Unit: 20 days
Standards	***Suggested* Number of Instructional Days**
<u>MODULE 2: Quadratic Functions (cont'd)</u> A-APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial (limit to 1st- and 2nd degree polynomials). A-IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.* A-CED.2 Create equations in two variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.* [Note this standard appears in future courses with a slight variation in the standard language.] F-IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person- hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*	10 Days

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THIRD NINE WEEKS

Unit 10: Quadratics	*Suggested* Number of Days for Unit: 20 days
Standards	***Suggested* Number of Instructional Days**
MODULE 2: Quadratic Functions (cont'd) F-IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.* F-IF.7a Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.* a. Graph functions (linear and quadratic) and show intercepts, maxima, and minima. F-IF.8a Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. F-IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.	10 Days
Unit Review	1 Day
Unit Assessment	1 Day

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FOURTH NINE WEEKS

Unit 11: Other Functions	*Suggested* Number of Days for Unit: 10 days
Standards	***Suggested* Number of Instructional Days**
<u>MODULE 1: Modeling with Other Functions</u> A-CED.1 Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.** F-IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.* F-IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person- hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.* F-IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.*	4 Days

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FOURTH NINE WEEKS

Unit 11: Other Functions	*Suggested* Number of Days for Unit: 10 days
Standards	***Suggested* Number of Instructional Days**
<u>MODULE 1: Modeling with Other Functions (cont'd)</u> F-IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.* F-APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial (limit to 1st- and 2nd degree polynomials). F-BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.* F-REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, quadratic, absolute value, and exponential functions.*	4 Days

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FOURTH NINE WEEKS

Unit 11: Other Functions	*Suggested* Number of Days for Unit: 10 days
Standards	***Suggested* Number of Instructional Days**
MODULE 1: Modeling with Other Functions (cont'd) F-IF.7b Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.* b. Graph square root and piecewise-defined functions, including absolute value functions.	4 Days
MODULE 2: Even/Odd Functions F-BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*	4 Days
Unit Review	1 Day
Unit Assessment	1 Day

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FOURTH NINE WEEKS

Unit 12: Descriptive Statistics	*Suggested* Number of Days for Unit: 10 days
Standards	***Suggested* Number of Instructional Days**
MODULE 1: Data Representation S-ID.1 Represent and analyze data with plots on the real number line (dot plots, histograms, and box plots).* S-ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.* S-ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).* S-ID.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.*	4 Days
MODULE 2: Modeling Data S-ID.6a Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.* a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context.	4 Days

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FOURTH NINE WEEKS

Unit 12: Descriptive Statistics	*Suggested* Number of Days for Unit: 10 days
Standards	***Suggested* Number of Instructional Days**
<u>MODULE 2: Modeling Data (cont'd)</u> S-ID.6b Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.* b. Informally assess the fit of a function by plotting and analyzing residuals. S-ID.6c Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.* Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.* S-ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.* S-ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.* S-ID.9 Distinguish between correlation and causation.*	4 Days
Unit Review	1 Day
Unit Assessment	1 Day