**SpringBoard Math Unit- At-a-Glance– Algebra 1: Common Core Edition © 2014**

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| **Unit 1- Equations and Inequalities** | | | | | | | | | | | | | | | |
| **Prerequisite Skills:**  • Perform operations with fractions (Items 1, 2) 7.NS.A.1b  • Understand exponents (Item 3) 8.EE.A.1  • Perform operations with mixed numbers (Item 4) 7.NS.A.1b  • Compare and perform operations with integers (Items 5, 6) 7.NS.A.3  • Perform operations with decimals (Item 7) 6.NS.B.3  • Solve one-step equations (Item 8) 8.EE.C.7  • Simplify expressions by combining like terms (Item 9) 7.EE.A.1  • Interpret Venn diagrams (Item 10) 6.SP.B.5 | | | | | | | | | | | | | | | |
| **Activity or EA** | **Activity or EA Standards Focus** | | | | | | | **Lessons within an Activity** | | | | | | **Activity or EA Common Core Standards Benchmarks** | |
| **1**  **(Investigative)**  Investigating Patterns-*Cross Country Adventures* | In previous grades, students began to develop algebraic thinking skills by writing numeric and algebraic expressions to represent situations and by using tables and graphs to examine the relationship between two quantities. In Activity 1, students build on these skills and concepts by using tables, graphs, and expressions to explore linear and nonlinear patterns in real-world situations. They also use patterns to make predictions. | | | | | | | Lessons 1-1 and 1-2  (2 Lessons) | | | | | | **Common Core State Standards for Activity 1**  **HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.  **HSN-Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.  **HSA-SSE.A.1a** Interpret parts of an expression, such as terms, factors, and coefficients.  **HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.\* | |
| **2**  **(Guided)**  Solving Equations-  *What’s My Number?* | In Activity 2, students use properties of equality and inverse operations to write and solve linear equations in one variable, including multi-step equations and equations with variables on both sides. Students also explore linear equations that have no solution or infinitely many solutions, and they solve literal equations for a given variable. Throughout this activity, stress that the equal sign in an equation indicates that the expressions on either side have the same value. If the same operation is performed on both sides of the equation, the two sides will remain equal. | | | | | | | Lessons 2-1 to 2-5  (5 Lessons) | | | | | | **Common Core State Standards for Activity 2**  **HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.  **HSN-Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.  **HSA-REI.A.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.  **HSA-REI.B.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. | |
| **EA 1**  Patterns and Equations-  *Of Music and Monday* | • Identifying patterns  • Modeling patterns with expressions  • Using patterns to make predictions  • Writing, solving, and interpreting  multi-step equations  • Solving literal equations for a  variable | | | | | | |  | | | | | | **TEACHER to TEACHER**  **HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.  **HSN-Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.  **HSA-CED.A.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.  **HSA-CED.A.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. | |
| **3**  **(Guided)**  Solving Inequalities-*Physical Fitness Zones* | In Activity 3, students write and solve linear inequalities in one variable, including multi-step inequalities and inequalities with variables on both sides. They graph solutions of inequalities on number lines and explore how inequalities can represent constraints in real-world situations. They also solve and graph compound inequalities. Throughout this activity, emphasize the importance of paying attention to the inequality sign and the circumstances in which it should be reversed. | | | | | | | Lessons 3-1 to 3-3  (3 Lessons) | | | | | | **HSA-CED.A.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.  **HSA-CED.A.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.  **HSA-REI.B.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. | |
| **4**  **(Guided)**  Absolute Value Equations and Inequalities**-** *Student Distances* | In Activity 4, students use absolute value equations and absolute value inequalities to solve problems. Students apply the definition of absolute value to write an absolute value equation as two separate equations, which they can solve using the algebraic method. They use a similar process when solving and graphing the solutions of absolute value inequalities. | | | | | | | Lessons 4-1 and 4-2  (2 Lessons) | | | | | | **HSA-CED.A.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. | |
| **EA 2**  Inequalities and Absolute Value- *Diet and Exercise* | • Writing, solving, and graphing  inequalities  • Writing and graphing compound  inequalities  • Solving and graphing absolute value inequalities | | | | | | |  | | | | | | **HSA-CED.A.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.  **HSA-CED.A.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.  **HSA-REI.B.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. | |
| **Unit 2- Functions** | | | | | | | | | | | | | | | |
| **Prerequisite Skills:**  • Identify and extend patterns. (Item 1) 4.OA.C.5; 5.OA.B.3  • Solve and interpret inequalities. (Item 2) 6.EE.B.5  • Evaluate algebraic expressions. (Item 3) 6.EE.A.2c  • Graph points on the coordinate plane. (Items 4, 5 and 8) 6.NS.C.8  • Represent data using an equation. (Item 6) 8.F.B.4  • Solve linear equations. (Item 7) 7.EE.B.4a; 8.EE.C.7b | | | | | | | | | | | | | | | |
| **Materials:**  Paper cups; rubber bands; paper clips; measuring tapes; same-sized washers; butcher paper or tag board; rulers; markers; graph paper; colored pencils; graphing calculators | | | | | | | | | | | | | | | |
| **Activity or EA** | | **Activity or EA Focus** | | | | **Lessons within an Activity** | | | | **Activity or EA Common Core Standards Benchmarks** | | | | | |
| **5**  **(Investigative)**  Functions and Function Notation-*Vending Machines* | | Prior to this activity, students begin to express relationships between quantities, using tables, graphs, and equations. In Activity 5, students learn to recognize a function, identify the domain and range of a function and to use function notation. | | | | Lessons 5-1 to 5-3  (3 Lessons) | | | | **HSF-IF.A.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*).  **HSF-IF.A.2** Use function notation, evaluate functions from inputs in their domains, and interpret statements that use function notation in terms of a context. | | | | | |
| **6**  **(Directed)**  Interpreting Graphs of Functions-*Shake, Rattle, and Roll* | | In Activity 6 students determine the domain and range of various relations and identify relative maxima and minima. Students extend their thinking to real-world situations by interpreting key features of graphs within a context and by determining a reasonable domain and range for the problem situation. | | | | Lessons 6-1 to 6-3  (3 Lessons) | | | | **HSF-IF.B.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.  **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.  **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  **HSF-IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima, and minima. | | | | | |
| **7**  **(Investigative)**  Graphs of Functions-*Experiment Experiences* | | In this Activity, students will use functions to explore real-world relationships. They will use equations, graphs and features of functions as tools to describe and understand the relationships. The activity will reinforce what students have already learned about functions as well as use functions to model natural phenomena. | | | | Lessons 7-1 to 7-3  (3 Lessons) | | | | **HSA-REI.D.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).  **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.  **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  **HSF-IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima, and minima.  **HSF-IF.C.7e** Graph exponential functions, showing intercepts and end behavior. | | | | | |
| **8**  **(Investigative)**  Transformations of Functions-*Transformers* | | In this activity students build on their knowledge of functions and their graphs by exploring vertical and horizontal translations of graphs produced by the addition of a constant, *k*, to a function. | | | | Lessons 8-1 and 8-2  (2 Lessons) | | | | **HSF-BF.B.3** Identify the effect on the graph of replacing *f*(*x*) by *f*(*x*) + *k*, *kf*(*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. | | | | | |
| **EA 1**  Representations of Functions-*Bruce Canyon Hiking* | | • Functions, range and domain  • Graphs of functions and their key  features  • Writing and using equations of  functions  • Transforming functions | | | |  | | | | **HSF-IF.A.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 is the graph of the equation *y* = *f*(*x*).  **HSF-IF.A.2** Use function notation, evaluate functions from inputs in their domains, and interpret statements that use function notation in terms of a context.  **HSF-IF.B.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. | | | | | |
| **9**  **(Investigative)**  Rates of Change-  *Ramp it Up* | | In this activity, students explore slope as a rate of change by using the ratio of vertical change to horizontal change and  developing the slope formula. Students make connections between linear functions and the idea of a constant rate of change. They develop an understanding of when the slope of a line is positive, negative, zero, or undefined. | | | | Lesson 9-1 to 9-3  (3 Lessons) | | | | **HSF-IF.B.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.  **HSF-LE.A.1** Distinguish between situations that can be modeled with linear functions and with exponential functions.  **HSF-LE.A.1a** Prove that linear functions grow by equal differences over equal intervals; and that exponential functions grow by equal factors over equal intervals.  **HSF-LE.A.1b** Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. | | | | | |
| **10**  **(Guided)**  Linear Models-*Stacking Boxes* | | In this activity students solve problems by gathering real-world data, recording the results in tables, representing results with graphs, and writing function equations. They also learn to write and use inverse functions. These concepts and skills will be important to students as they use functions in increasingly complex mathematical contexts. | | | | Lessons 10-1 to 10-4  (4 Lessons) | | | | **HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.  **HSA-CED.A.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.  **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.  **HSF-BF.A.1** Write a function that describes a relationship between two quantities.  **HSF-BF.A.1a** Determine an explicit expression, a recursive process, or steps for calculation from a context. | | | | | |
| **11**  **(Guided)**  Arithmetic Sequences-*Picky Patterns* | | In Activity 11, students learn to identify arithmetic sequences of numbers and to express them as functions whose domains are subsets of the integers. Students learn to describe arithmetic sequences algebraically using both explicit and recursive formulas. | | | | Lessons 11-1 to 11-3  (3 Lessons) | | | | **HSF-IF.A.3** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.  **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.  **HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations and translate between the two forms.  **HSF-LE.A.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). | | | | | |
| **EA 2**  Linear Functions and Equations-  *Text Message Plans* | | • Modeling with tables, graphs and linear functions  • Analyzing linear models | | | |  | | | | **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.  **HSF-BF.A.1** Write a function that describes a relationship between two quantities.  **HSF-LE.A.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). | | | | | |
| **12**  **(Guided)**  Forms of Linear Functions-*Under Pressure* | | In Activity 12, students write linear equations in slope-intercept form, point-slope form, and standard form and use these forms to solve problems. They also write the equations of lines parallel or perpendicular to a given line. Throughout this activity, students relate the equations of lines to alternate representations, such as graphs, verbal descriptions, and tables of values. | | | | Lessons 12-1 to 12-4  (4 Lessons) | | | | **HSA-REI.D.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).  **HSF-LE.A.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). | | | | | |
| **13**  **(Investigative)**  Equations from Data-  *Pass the Book* | | In Activity 13, students distinguish between situations that can be modeled with linear and nonlinear functions. They make scatter plots of data sets and determine the equations of trend lines. Students also employ technology to perform regressions. They interpret key features of their function models and apply the models to make predictions. | | | | Lessons 13-1 to 13-3  (3 Lessons) | | | | **HSF-IF.A.2** Use function notation, evaluate functions from inputs in their domains, and interpret statements that use function notation in terms of a context.  **HSF-IF.B.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.  **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  **HSF-IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima, and minima.  **HSF-IF.C.7e** Graph exponential functions, showing intercepts and end behavior. | | | | | |
| **EA 3**  Linear Models and Slope as Rate of Change-*A 10K Run* | | • Scatter plots  • Linear regression  • Line of best fit  • Slope and domain  • Comparing data | | | |  | | | | **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  **HSF-LE.A.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).  **HSF-LE.B.5** Interpret the parameters in a linear or exponential function in terms of a context. | | | | | |
| **Unit 3- Extensions of Linear Concepts** | | | | | | | | | | | | | | | |
| **Prerequisite Skills:**  • Identify linear functions from tables. (Item 1) HSF-LE.A.1b  • Write a linear equation from a table. (Item 2) HSF-LE.A.2  • Represent linear relationships using tables, equations, and graphs. (Item 3) HSF-IF.C.7a, HSF-LE.A.2  • Graph a linear equation in two variables. (Item 4) HSF-IF.C.7a  • Graph horizontal lines. (Item 5) HSF-IF.C.7a  • Identify solutions of linear inequalities in two variables. (Item 6) HSA-REI.D.12  • Graph compound inequalities. (Item 7) 6.EE.B.8  • Identify functions with a constant rate of change. (Item 8) HSF-LE.A.1b | | | | | | | | | | | | | | | |
| **Materials:**  Colored pencils; graph paper | | | | | | | | | | | | | | | |
| **Activity or EA** | **Activity or EA Focus** | | | | | | **Lessons within an Activity** | | | | | | **Activity or EA Common Core Standards Benchmarks** | | |
| **14**  **(Investigative)**  Piecewise-Defined Linear Functions –*Breakfast for Bowser* | In this activity, students expand their study of functions in general, and linear functions specifically, by interpreting, writing, and graphing piecewise-defined functions. | | | | | | Lessons 14-1 to 14-4  (4 Lessons) | | | | | | **HSF-IF.A.2** Use function notation, evaluate functions from inputs in their domains, and interpret statements that use function notation in terms of a context.  **HSF-IF.B.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.  **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  **HSF-IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima and minima.  **HSF-IF.C.7b** Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.  **HSF-IF.C.9** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). | | |
| **15**  **(Investigative)**  Comparing Equations-  *A Tale of a Trucker* | In this activity, students will calculate and interpret rates of change in order to compare linear functions. They will write equations and inequalities from graphs and tables and use them to compare and analyze functions and their graphs. | | | | | | Lessons 15-1 to 15-3  (3 Lessons) | | | | | | **HSF–IF.B.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*.\*  **HSF–IF.B.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.\*  **HSF–IF.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.\*  **HSF–IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima and minima. | | |
| **16**  **(Guided)**  Inequalities in Two Variables-*Shared Storage* | In this Activity, students will write and graph inequalities in two variables. Students will also read and interpret the graph of the solution set of linear inequalities in two variables within a context. | | | | | | Lessons 16-1 and 16-2  (2 Lessons) | | | | | | **HSA-REI.D.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. | | |
| **EA 1**  Graphing Inequalities and Piecewise-Defined Functions-*Earnings on a Graph* | • Linear inequalities  • Piecewise functions  • Graphing inequalities  • Graphing piecewise functions | | | | | |  | | | | | | **HAS-REI.D.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.  **HSF-IF.A.2** Use function notation to evaluate functions from inputs in their domains, and interpret statements that use function notation in terms of a context.  **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.\*  **HSF-IF.C.7b** Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. | | |
| **17**  **(Guided)**  Solving Systems of Linear Equations –  *A Tale of Two Truckers* | In this activity, students will use methods including graphing, making a table, substitution, and elimination to solve and classify systems of equations. They will also interpret the solution to a  system of equations within a real-world context. | | | | | | Lessons 17-1 to 17-5  (5 Lessons) | | | | | | **HSA-REI.D.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, polynomial, rational, absolute value, exponential, and logarithmic functions.  **HSA-REI.C.5** Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.  **HSA-REI.C.6** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. | | |
| **18**  **(Guided)**  Solving Systems of Linear Inequalities –*Which Region Is It?* | In Activity 18, students solve systems of linear inequalities by graphing. They also interpret solutions of the systems as viable or nonviable within the context of a problem. Throughout this activity, it  will be important for students to pay attention to which side of a boundary line should be shaded and whether the line should be solid or dashed. | | | | | | Lessons 18-1 and 18-2  (2 Lessons) | | | | | | **HSA-CED.A.3** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.  **HAS-REI.D.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. | | |
| **EA 2**  Systems of Equations and Inequalities-  *Tilt the Scales* | • Systems of linear equations  • Systems of linear inequalities | | | | | |  | | | | | | **HSA-CED.A.3** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions a viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*  **HSA-REI.C.6** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. | | |
| **Unit 4- Exponents, Radicals, and Polynomials** | | | | | | | | | | | | | | | |
| **Prerequisite Skills:**  • Factors and greatest common factors. (Items 1, 2) 6.NS.B.4, 4.OA.B.4  • Exponential expressions. (Items 3, 4) 6.EE.A.1, 6.EE.A.2c, 6.EE.A.2b  • Distributive property. (Item 5) 3.OA.B.5  • Linear functions. (Item 6) 8.F.B.4  • Graph linear functions. (Item 7) HSF-IF.C.7a  • Ratios. (Item 8) 6.RP.A.1  • Recognize rational and irrational numbers. (Item 9) 8.NS.A.1  • Fraction operations. (Item 10) 5.NF.A.1, 5.NF.B.4, 6.NS.A.1 | | | | | | | | | | | | | | | |
| **Materials:**  Algebra tiles; graphing calculators | | | | | | | | | | | | | | | |
| **Activity or EA** | | **Activity or EA Focus** | | | **Lessons within an Activity** | | | | | | **Activity or EA Common Core Standards Benchmarks** | | | | |
| **19**  **(Guided)**  Exponent Rules-  *Icebergs and Exponents* | | In Activity 19, students investigate and apply properties of exponents to simplify numeric and algebraic expressions. Students will learn that the properties of whole-number exponents also apply to  integer exponents as well as rational exponents. | | | Lessons 19-1 to 19-3  (3 Lessons) | | | | | | **HSN-RN.A.1** Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.  **HSN-RN.A.2** Rewrite expressions involving radicals and rational exponents using the properties of exponents.  **HSA-SSE.B.3c** Use the properties of exponents to transform expressions for exponential functions. | | | | |
| **20**  **(Directed)**  Operations with Radicals –  *Go Fly a Kite* | | In Activity 20, students simplify and perform operations with radical expressions. They also investigate the meaning of rational exponents and learn to write powers with rational exponents in radical form. | | | Lessons 20-1 to 20-3  (3 Lessons) | | | | | | **HSN-RN.A.2** Rewrite expressions involving radicals and rational exponents using the properties of exponents.  **HSA-SSE.A.2** Use the structure of an expression to identify ways to rewrite it. | | | | |
| **21**  **(Investigative)**  Geometric Sequences –  *Go Viral!* | | In Activity 21, students investigate geometric sequences. They identify  sequences as geometric by identifying a common ratio. Students develop recursive  and explicit formulas for geometric sequences and use these formulas to make predictions. | | | Lessons 21- 1 and 21-2  (2 Lessons) | | | | | | **HSF-IF.A.3** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.  **HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.\*  **HSF-LE.A.1** Distinguish between situations that can be modeled with linear functions and with exponential functions.  **HSF-LE.A.1.c** Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. | | | | |
| **EA 1**  Exponents, Radicals, and Geometric Sequences-*Taking Stock* | | • Properties of exponents  • Integer exponents  • Simplifying expressions involving exponents  • Simplifying radical expressions  • Performing operations with radical expressions  • Distinguishing rational and irrational numbers  • Identifying geometric sequences  • Recursive and explicit formulas for geometric sequences  • Finding a given term of a geometric sequence | | |  | | | | | | **HSN-RN.A.2** Rewrite expressions involving radicals and rational exponents using the properties of exponents.  **HSA-SSE.A.2** Use the structure of an expression to identify ways to rewrite it.  **HSA-SSE.B.3c** Use the properties of exponents to transform expressions for exponential functions.  **HSF-IF.A.3** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.  **HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. | | | | |
| **22**  **(Investigative)**  Exponential Functions- *Protecting your Investment* | | In this activity, students explore exponential functions, their application, and their graphs. They learn how different values of the constant factor and the exponent affect the shape of the graph. | | | Lessons 22-1 to 22-3  (3 Lessons) | | | | | | **HSA-CED.A.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*.  **HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.  **HSF-IF.B.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. | | | | |
| **23**  **(Investigative)**  Modeling with Exponential Functions –*Growing, Growing, Gone* | | In this activity, students use exponential functions to model compound interest and population growth. | | | Lessons 23-1 and 23-2  (2 Lessons) | | | | | | **HSA-SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.  **HSA-SSE.B.3c** Use the properties of exponents to transform expressions for exponential functions.  **HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. | | | | |
| **EA 2**  Exponential Functions-*Family Bonds* | | • Exponential functions  • Compound interest | | |  | | | | | | **HSA-SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.  **HSA-SSE.B.3c** Use the properties of exponents to transform expressions for exponential functions.  **HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.  **HSF-IF.B.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. | | | | |
| **24**  **(Guided)**  Adding and Subtracting Polynomials-*Polynomials in the Sun* | | In Activity 24, students classify and identify components of polynomials. They also add and subtract polynomials. | | | Lessons 24-1 to 24-3  (3 Lessons) | | | | | | **HSA-SSE.1** Interpret expressions that represent a quantity in terms of its context.  **HAS-SSE.A.1.a** Interpret parts of an expression, such as terms, factors, and coefficients.  **HAS-SSE.A.1.b** Interpret complicated parts of expressions by viewing one or more of their parts as a single entity.  **HSA-APR.A.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. | | | | |
| **25**  **(Investigative)**  Multiplying Polynomials-*Tri-Com Computers* | | In Activity 25, students explore multiplying polynomials. They also examine the patterns exhibited by the special products of the difference of two squares and the square of a binomial. | | | Lessons 25-1 to 25-3  (3 Lessons) | | | | | | **HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of its context.  **HSA-SSE.A.1a** Interpret parts of an expression, such as terms, factors, and coefficients.  **HSA-SSE.A.1b** Interpret complicated parts of expressions by viewing one or more of their parts as a single entity.  **HSA-APR.A.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. | | | | |
| **EA 3**  Polynomial Operations-*Measuring Up* | | • Adding polynomials  • Multiplying polynomials | | |  | | | | | | **HSA-APR.A.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. | | | | |
| **26**  **(Guided)**  Factoring*-Factors of Construction* **-** | | In Activity 26, students are introduced to the factoring of polynomials. They begin by identifying the GCF of the terms of a polynomial and then using the GCF to factor. Students also use patterns to factor perfect square trinomials and differences of two squares. Throughout this activity, be sure to emphasize that the factored form of a polynomial is equivalent to the original form. | | | Lessons 26-1 and 26-2  (2 Lessons) | | | | | | **HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of its context.\*  **HSA-SSE.A.1.a** Interpret parts of an expression, such as terms, factors, and coefficients.  **HSA-SSE.A.1.b** Interpret complicated expressions by viewing one or more of their parts as a single entity.  **HSA-SSE.A.2** Use the structure of an expression to identify ways to rewrite it. | | | | |
| **27**  **(Directed)**  Factoring Trinomials-*Deconstructing Floor Plans* | | In Activity 27, students continue factoring polynomials. They learn to factor trinomials of the form , both with and without models. They also learn to factor trinomials of the form + *bx* + *c* by using a guess and check method. Emphasize that students can always check that they have factored a polynomial correctly by multiplying the factors. | | | Lessons 27-1 and 27-2  (2 Lessons) | | | | | | **HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of its context.\*  **HSA-SSE.A.1.a** Interpret parts of an expression, such as terms, factors, and coefficients.  **HSA-SSE.A.1.b** Interpret complicated expressions by viewing one or more of their parts as a single entity.  **HSA-SSE.A.2** Use the structure of an expression to identify ways to rewrite it. | | | | |
| **28**  **(Directed)**  Simplifying Rational Expressions-*Totally Rational* | | In Activity 28, students learn to simplify and perform operations with rational expressions. They also divide polynomials and express the remainder  of the division, if any, as a rational expression. Throughout this activity, it is assumed that values of variables that make denominators equal to 0 are excluded values. | | | Lessons 28-1 to 28-4  (4 Lessons) | | | | | | **HSA- APR.D.6** Rewrite simple rational expressions in different forms; write in the form of q(x) + , where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.  **HAS- APR.D.7** (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions. | | | | |
| **EA 4**  Factoring and Simplifying Rational Expressions-*Rock Star Demands* | | • Factoring perfect square trinomials  • Factoring trinomials of the form ++ *c*  • Dividing polynomials  • Expressing the remainder of polynomial division as a rational expression  • Dividing rational expressions  • Simplifying rational expressions | | |  | | | | | | **HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of its context.\*  **HSA-SSE.A.1.a** Interpret parts of an expression, such as terms, factors, and coefficients.  **HSA-SSE.A.1.b** Interpret complicated expressions by viewing one or more of their parts as a single entity.  **HSA-SSE.A.2** Use the structure of an expression to identify ways to rewrite it.  **HSA- APR.D.6** Rewrite simple rational expressions in different forms; write in the form of q(x) + , where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system. | | | | |
| **Unit 5- Quadratic Functions** | | | | | | | | | | | | | | | |
| **Prerequisite Skills:**  • Operations on polynomials (Item 1) HSA-APR.A.1  • Factoring polynomials (Item 2) HSA-SSE.A.2  • Evaluating functions (Item 3) HSF-IF.A.2  • Solving equations (Item 4) 7.EE.B.4a  • Solving inequalities (Item 5) 7.EE.B.4b  • Graphing linear functions (Item 6) HSF-IF.C.7  • Interpreting graphs of linear functions (Items 7–8) HSF-IF.B.4 | | | | | | | | | | | | | | | |
| **Activity or EA** | **Activity or EA Focus** | | | **Lessons within an Activity** | | | | | | | | **Activity or EA Common Core Standards Benchmarks** | | | |
| **29**  **(Investigative)**  Introduction to Quadratic Functions-*Touchlines* | In Activity 29, students expand their knowledge of functions by examining quadratic functions. Students identify, write, and graph quadratic functions.  They also identify the domain, range, vertex, and maximum or minimum of a quadratic function. | | | Lessons 29-1 and 29-2  (2 Lessons) | | | | | | | | **HSF-IF.B.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*.\*  **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.\*  **HSF-IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima, and minima.  **HSF-BF.A.1** Write a function that describes a relationship between two quantities.\*  **HSF-BF.A.1a** Determine an explicit expression, a recursive process, or steps for calculation from a context. | | | |
| **30**  **(Guided)**  Graphing Quadratic Functions-*Transformers* | In Activity 30, students develop fluency in understanding function behavior by graphing, identifying, and distinguishing transformations of the parent quadratic function *y* = *x*2. | | | Lessons 30-1 to 30-3  (3 Lessons) | | | | | | | | **HSF-IF.B.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.  **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.  **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  **HSF-IF.C.7.a** Graph linear and quadratic functions and show intercepts, maxima, and minima. | | | |
| **EA 1**  Graphing Quadratic Functions-*Parabolic Paths* | • Writing quadratic functions  • Analyzing quadratic functions  • Graphing quadratic functions  • Transforming quadratic functions | | |  | | | | | | | | **HSF-IF.B.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*.  **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.  **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **\_**  **HSF-IF.C.7.a** Graph linear and quadratic functions and show intercepts, maxima, and minima. | | | |
| **31**  **(Guided)**  Solving Quadratic Equations by Graphing and Factoring- *Trebuchet Trials* | In this activity, students make connections between the solutions or roots of a quadratic equation and the x-intercepts or zeros of the related function. They determine both the equation of the axis of symmetry and the coordinates of the vertex of a parabola by calculating This information is used to graph the parabola. | | | | Lessons 31-1 to 31-3  (3 Lessons) | | | | | **HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of a context.  **HSA-SSE.A.1a** Interpret parts of an expression, such as terms, factors, and coefficients.  **HSA-SSE.A.1b** Interpret complicated expressions by viewing one or more of their parts as a single entity.  **HSA-SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.  **HSA.SSE.B.3a** Factor a quadratic expression to reveal the zeros of the function it defines. | | | | | |
| **32**  **(Directed)**  Algebraic Methods of Solving Quadratic Equations-*Keeping it Quadratic* | In Activity 32, students solve quadratic equations by using square roots, completing the square and the quadratic formula. Throughout this activity, be sure to emphasize when each of these solution methods might be appropriate. Students also use the discriminant of a quadratic equation to analyze its solutions, and solve quadratic equations with complex solutions. | | | | Lessons 32-1 to 32-5  (5 Lessons) | | | | | **HSA-SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.\*  **HSA-SSE.B.3b** Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.  **HSA-REI.B.4** Solve quadratic equations in one variable.  **HSA-REI.B.4a** Use the method of completing the square to transform any quadratic equation in *x* into an equation of the form that has the same solutions. Derive the quadratic formula from this form. | | | | | |
| **33**  **(Investigative)**  Applying Quadratic Equations-*Rockets in Flight* | In Activity 33, students write quadratic functions to fit data. They then apply the quadratic models to solve problems.  Students also interpret solutions of quadratic equations in real-world contexts. Throughout this activity, be sure to emphasize that the meaning of the variables in a function helps to determine its reasonable domain and range. | | | | Lesson 33-1 and 33-2  (2 Lessons) | | | | | **HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.  **HSA-CED.A.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.*  **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.\*  **HSF-BF.A.1** Write a function that describes a relationship between two quantities.\*  **HSF-BF.A.1a** Determine an explicit expression, a recursive process, or steps for calculation from a context. | | | | | |
| **EA 2**  Solving Quadratic Equations-  *Egg Drop* | • Solving quadratic equations by factoring  • Solving quadratic equations by the square root method  • Solving quadratic equations using the quadratic formula  • Choosing a method to solve a quadratic equation  • Writing the equation of a quadratic function to fit data  • Using a quadratic model to solve problems  • Interpreting solutions of a quadratic equation | |  | | | | | | **HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.  **HSA-SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. **\_**  **HSA-SSE.B.3a** Factor a quadratic expression to reveal the zeros of the function it defines.  **HSA-CED.A.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.  **HSA-REI.B.4** Solve quadratic equations in one variable.  **HSA-REI.B.4b** Solve quadratic equations by inspection (e.g., for = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize that when the quadratic formula gives complex solutions and write them as a± *bi* for real numbers a and b.  **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.  **HSF-IF.C.8** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of a function.  **HSF-IF.C.8a** 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.  **HSF-BF.A.1** Write a function that describes a relationship between two quantities.\* | | | | | | |
| **34**  **(Investigative)**  Graphs of Functions –*Photo App* | In this activity, students will connect what they know about linear, quadratic, exponential and piecewise functions by comparing, contrasting, writing and interpreting appropriate models. | | Lessons 34-1 to 34-3  (3 Lessons) | | | | | | **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  **HSF-IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima, and minima.  **HSF-IF.C.7b** Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.  **HSF-IF.C.7e** Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. | | | | | | |
| **35**  **(Guided)**  Systems of Equations-*Populations Explosion* | In In this activity, students learn to solve linear/exponential and linear/quadratic systems by graphing and by using algebraic methods. | | Lessons 35-1 and 35-2  (2 Lessons) | | | | | | **HSA-REI.C.7** Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.  **HSA-REI.D.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, polynomial, rational, absolute value, exponential, and logarithmic functions. \*  **HSF-IF.C.9** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).  **HSF-LE.A.3** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. | | | | | | |
| **EA 3**  Solving Systems of Equations-*Sports Collector* | • Identifying the type of function necessary to represent the value of items in a table  • Graphing linear, quadratic, and exponential functions  • Identifying the domain of a function  • Identifying increasing and  decreasing functions  • Identifying the function with the greatest maximum value  • Solving systems of equations | |  | | | | | | **HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.  **HSA-REI.C.7** Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.  **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.\*  **HSF-BF.A.1** Write a function that describes a relationship between two quantities.\*  **HSF-LE.A.3** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. | | | | | | |
| **Unit 6- Probability and Statistics** | | | | | | | | | | | | | | | |
| **Prerequisite Skills:**  • Developing a trend line (Item 1) 8.SP.A.2  • Interpreting slope in context (Item 2) 8.F.B.4, 8.SP.A.3  • Determining missing values in a two-way table (Item 3) 8.SP.A.4  • Developing row percentages from two-way tables (Item 4) 8.SP.A.4  • Computing summary measures of center for univariate data (Items 5a, b) 6.SP.A.3, 6.SP.B.5c  • Developing a graph for univariate data (Item 5c) 6.SP.B.4  • Describing the shape of a univariate distribution (Item 5d) 6.SP.A.2, 6.SP.5B.d | | | | | | | | | | | | | | | |
| **Materials:**  Calculator | | | | | | | | | | | | | | | |
| **Activity or EA** | **Activity or EA Focus** | | | | | | | | | | **Lessons within an Activity** | | | | **Activity or EA Common Core Standards Benchmarks** |
| **36**  **(Investigative)**  Measures of Center and Spread-  *To Text or Not to Text* | Measures of center and spread will be developed more extensively using the formulas. The mean will be used to find the mean absolute deviation and standard deviation, which are measures of variability. Skills include calculating and interpreting the standard deviation of a numerical data set, as well as selecting appropriate measures of spread by examining the shape of a distribution. | | | | | | | | | | Lessons 36-1 and 36-2  (2 Lessons) | | | | **HSS-ID.A.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. |
| **37**  **(Investigative)**  Dot and Box Plots and the Normal Distribution-*Disturbing Coyotes* | Students will construct representations of univariate data in a real context, and describe characteristics of the data distribution such as center, shape, and spread using graphs and numerical summaries. They will compare distributions, commenting on similarities and differences among them. Students will learn to create a five-number summary and create a modified box plot. | | | | | | | | | | Lessons 37-1 to 37-3  (3 Lessons) | | | | **HSS-ID.A.1** Represent data with plots on the real number line (dot plots, histograms, and box plots).  **HSS-ID.A.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.  **HSS-ID.A.3** Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).  **HSS-ID.A.4** Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve. |
| **EA 1**  Comparing Univariate Distributions-*Splitting the Bill* | • Visual comparison of univariate graphical displays  • Computational comparisons of center and spread  • Computing specific measures of center and spread (including five number summary)  • Determining outliers  • Creating modified box plots  • Determining appropriate measures of variability | | | | | | | | | |  | | | | **HSS-ID.A.1** Represent data with plots on the real number line (dot plots, histograms, and box plots).  **HSS-ID.A.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.  **HSS-ID.A.3** Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). |
| **38**  **(Investigative)**  Correlation-  *What’s the Relationship?* | Students will assess the relationship between two quantitative variables in terms of form, direction and strength. They will be able to use a scatterplot to relate correlation coefficient values, compute correlation coefficient and distinguish between correlation and causation. | | | | | | | | | | Lessons 38-1 and 38-2  (2 Lessons) | | | | **HSS-ID.C.8** Compute (using technology) and interpret the correlation coefficient of a linear fit.  **HSS-ID.C.9** Distinguish between correlation and causation. |
| **39**  **(Investigative)**  The Best-Fit Line –*Regressing Linearly* | Students will estimate best-fit lines visually, make predictions from best-fit lines, determine the difference between actual variable value and predicted value (i.e., residual), determine the best-fit line (using technology), interpret slope and intercept of a linear model in context, recognize cases where the use of a best-fit line is not recommended, recognize situations that do not fit a linear model, and use a residual plot to decide if a scatterplot has a linear relationship. | | | | | | | | | | Lessons 39-1 to 39-4  (4 Lessons) | | | | **HSS-ID.B.6** 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. Emphasize linear, quadratic, and exponential models.  b. Informally assess the fit of a function by plotting and analyzing residuals.  c. Fit a linear function for a scatter plot that suggests a linear association.  **HSS-ID.C.7** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. |
| **40**  **(Investigative)**  Bivariate Data –  *Categorically Speaking* | Students will learn to summarize categorical data in a two-way frequency table. They will use the table to interpret frequency and relative frequency. By using these tables they will learn to recognize and describe patterns of association. They will also learn about creating row percentages, developing a segmented bar graph, and analyzing row percentages and segmented bar graphs to investigate association. | | | | | | | | | | Lessons 40-1 and 40-2  (2 Lessons) | | | | **HSS-ID.B.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. |
| **EA 2**  Bivariate Distributions-*Dear Traveling Tooth* | • Describing a bivariate numerical relationship and associating that description with a correlation coefficient  • Developing a linear model, interpreting its components, using the model for prediction, and recognizing its limitations  • Reading a two-way table  • Creating row percentages  • Developing a segmented bar graph  • Analyzing row percentages and segmented bar graphs to investigate association | | | | | | | | | |  | | | | **HSS-ID.B.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.  **HSS-ID.B.6** 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. Emphasize linear, quadratic, and exponential models.  b. Informally assess the fit of a function by plotting and analyzing residuals.  c. Fit a linear function for a scatter plot that suggests a linear association.  **HSS-ID.C.7** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.  **HSS-ID.C.8** Compute (using technology) and interpret the correlation coefficient of a linear fit. |