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| **Title: Unit 1:** Relationships Between Quantities  Unit 2: Reasoning with Equations and Inequalities | | | **Dates:** 10/7-10/11 | **Teacher:** A. Davis/D. Jones |
| **Standards:**  MCC9-12.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.  MCC9-12.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.  MCC9-12.N.Q.1 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.  MCC9-12.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.  MCC9-12.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.  MCC9-12.A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.  MCC9-12.A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations*.*  MCC9-12.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.  MCC9-12.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients.  Standards of mathematical practice - **Make sense of problems and persevere in solving them; Reason abstractly and quantitatively; Construct viable arguments and critique the reasoning of others; Model with mathematics; Use appropriate tools strategically; Attend to precision** | | | | |
| **Learning Plan** | | | | |
| Day | Instructional Framework | Procedures | | |
| **1 Lab** | **Pre- Opening/**  **Daily Routines** | **TITD:**  **Students will come in and find their name listed on cards on each group of desks. They will be seated in groups based on prior performance on quizzes. Instructions for the station activity lesson will be discussed.** | | |
|  | **OPENING** | **Activator:**  Teacher will explain the rules and procedures to completing the work in the centers.  **Standards:**  MCC9-12.N.Q.1 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.  MCC9-12.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.  MCC9-12.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.  **MCC9-12.A.CED.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.  **MCC9-12.A.CED.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations*.*  **MCC9-12.A.SSE.1** Interpret expressions that represent a quantity in terms of its context.  **MCC9-12.A.SSE.1a** Interpret parts of an expression, such as terms, factors, and coefficients.  **MCC9-12.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 the solution method.  **Standards of mathematical practice** -Make sense of problems and persevere in solving them; Reason abstractly and quantitatively; Construct viable arguments and critique the reasoning of others; Model with mathematics; Use appropriate tools strategically; Attend to precision, persevere, strategically selecting tools, construct viable arguments, and reasoning abstractly and quantitatively  **Essential Question:**   * How do I choose and interpret units consistently in formulas? * How do I interpret parts of an expression in terms of context? * How do I create equations and inequalities in one variable and use them to solve problems arising from linear and exponential functions? * How can I write, interpret and manipulate algebraic expressions, equations, and inequalities? * How do I create equations in two or more variables to represent relationships between quantities? * How do I graph equations on coordinate axes with the correct labels and scales? * How can I rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations?   **Vocabulary Development:** Students will understand   * **Algebra:** The branch of mathematics that deals with relationships between numbers, utilizing letters and other symbols to represent specific sets of numbers, or to describe a pattern of relationships between numbers. * **Coefficient:** A number multiplied by a variable. * **Domain**:  The set of *x*-coordinates of the set of points on a graph; the set of *x*-coordinates of a given set of ordered pairs. The value that is the input in a function or relation. * **Equation:** A number sentence that contains an equals symbol. * **Expression:** A mathematical phrase involving at least one variable and sometimes numbers and operation symbols. * **Function**:  A rule of matching elements of two sets of numbers in which an input value from the first set has only one output value in the second set. * **Inequality**: Any mathematical sentence that contains the symbols > (greater than), < (less than), <(less than or equal to), or >(greater than or equal to). * **Ordered Pair**:  A pair of numbers, (*x*, *y*), that indicate the position of a point on a Cartesian plane. * **Pythagorean Theorem:** It is a theorem that states a relationship that exists in any right triangle. If the lengths of the legs in the right triangle are *a* and *b* and the length of the hypotenuse is *c*, we can write the theorem as the following equation:http://intermath.coe.uga.edu/dictnary/images/triangle/pythm.gif * **Range**:  The *y*-coordinates of the set of points on a graph. Also, the *y*-coordinates of a given set of ordered pairs. The range is the output in a function or a relation. * **Substitution:** To replace one element of a mathematical equation or expression with another. * **Variable:** A letter or symbol used to represent a number.   **Direct / Group Instruction:** Teacher facilitates a discussion and model how to unpack the standards. Teacher will provide the essential questions for students to investigate toward mastering the standards. Teacher will facilitate a discussion on breakeven points and what they mean. | | |
| **WORK PERIOD** | **Individual, Pair, or Group Task: Students will complete the assignments in each Center**  Center 1- MCC9-12.A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. (Students will solve literal equations using manipulatives created from notecards. Students will model problems given from worksheet, using manipulatives to visualize the process. Students will also be able to write the problems on their desks using dry erase markers.)  Center 2-MCC9-12.A.REI.1 (Students will be given a set of equations, tables, and word problems. The students must explain the reasoning and property of equality used to solve each step of the problem. Students will use green pencils for addition POE, red for subtraction POE, blue for multiplication POE, and yellow for division POE.)  Center 3- MCC9-12.A.CED.1 Create equations and inequalities in one variable and use them to solve and graph problems. (Students will be given an equation and must create a graph based on the equation. Students will model their graph on poster paper, identifying the quantities represented on the X and Y axes. Students will then create their own context for the equation and display on their poster)  Center 4- MCC9-12.N.Q.1 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (Dimensional analysis worksheet from Mrs. Fields)  Center 5- MCC9-12.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients. (Center 5 worksheet- collaboratively work and discuss equation and inequality problems)  Center 6- MCC9-12.A.SSE.1 Interpret expressions that represent a quantity in terms of its context. (students will highlight independent and dependent quantities in different colors and then write in a sentence what each quantity represents) | | |
| **CLOSING** | **Students will:** share their solutions to the problems and the mathematical practice standards they used. | | |
| **HOMEWORK** | **Students will:**complete Unit 1 Test study guide. | | |
| **Day 1** | **Pre- Opening/**  **Daily Routines** | **TITD**  Students will prepare for assessment | | |
| **OPENING** | **Activator:** Show Carnegie lesson on promethean board and get students input on working the lesson  MCC9-12.N.Q.1 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.  MCC9-12.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.  MCC9-12.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.  **MCC9-12.A.CED.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.  **MCC9-12.A.CED.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations*.*  **MCC9-12.A.SSE.1** Interpret expressions that represent a quantity in terms of its context.  **MCC9-12.A.SSE.1a** Interpret parts of an expression, such as terms, factors, and coefficients.  .  **Essential Question:**   * How do I choose and interpret units consistently in formulas? * How do I interpret parts of an expression in terms of context? * How do I create equations and inequalities in one variable and use them to solve problems arising from linear and exponential functions? * How can I write, interpret and manipulate algebraic expressions, equations, and inequalities? * How do I create equations in two or more variables to represent relationships between quantities? * How do I graph equations on coordinate axes with the correct labels and scales? * How can I rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations?   **Vocabulary Development: Addition: (Add, Plus, Sum, Total, Increased by, More than)**  **Subtraction: (Minus, Difference, Subtract, Less than, Decreased by, less)**  **Multiplication: Product, Times, multiply; Division: Divide, quotient,**  **Consecutive, odd, even, prime**  **Direct / Group Instruction:** Teacher modelsolving problems on Carnegie Cognitive Tutor. | | |
| **WORK PERIOD** | **Individual, Pair, or Group Task:** Students will take Unit 1 Assessment | | |
| **CLOSING** | **Students will:**Complete worksheet on solving and graphing inequality. | | |
| **Lab2** | **Pre- Opening/**  **Daily Routines** | **TITD:**1. y -3 ≤ -10  2. 3v + 7 > 22  Write an expression   1. A number decreased by 7 is at most 13. 2. A sum of a number and 14 is at least 28. | | |
| **OPENING** | **Activator:** Teacher will facilitate discussion that activate prior knowledge and allow the students an opportunity to solve problems that:   * Model and write an equation in one variable and solve a problem in context. * Create one-variable linear equations and inequalities from contextual situations. * Represent constraints with inequalities. * Solve word problems where quantities are given in different units that must be converted to understand the problem.   Teacher will allow the students to unpack the standards for this lesson and review the essential questions.  MCC9-12.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.  MCC9-12.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.  MCC9-12.N.Q.1 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.  MCC9-12.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.  MCC9-12.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities  **Standards of mathematical practice** -Make sense of problems and persevere in solving them; Reason abstractly and quantitatively; Construct viable arguments and critique the reasoning of others; Model with mathematics; Use appropriate tools strategically; Attend to precision; Persevere, strategically selecting tools, construct viable arguments, and reasoning abstractly and quantitatively  **Essential Question:**   * How do I choose and interpret units consistently in formulas? * How do I interpret parts of an expression in terms of context? * How do I create equations and inequalities in one variable and use them to solve problems arising from linear and exponential functions? * How can I write, interpret and manipulate algebraic expressions, equations, and inequalities? * How do I create equations in two or more variables to represent relationships between quantities? * How do I graph equations on coordinate axes with the correct labels and scales? * How can I rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations?   **Vocabulary Development:** Students will understand and create pictures to visualize the key vocabulary: Algebra, Coefficient, Domain, Equation, Expression, Function, Inequality, Ordered Pair, Pythagorean Theorem, Range, Substitution, Variable  **Direct / Group Instruction:** Teacher will review the standards and essential questions. Teacher will facilitate as the students work on graphing inequalities. | | |
| **WORK PERIOD** | **Individual, Pair, or Group Task:** Students will solve word problems using reasoning, drawing and tables. Students will then transfer this knowledge to create expressions that will lead to the equation or inequality to solve word problems. Carnegie 2.3 | | |
| **CLOSING** | **Students will:** share the learning and solutions to the problems and the mathematical practice standards they used. Teacher will choose students to share as they have assessed the different methods as the students were working.  Homework: Students will complete Carnegie2.3 | | |
| **Lab 2** | **Pre- Opening/**  **Daily Routines** | **Independent Reading: Student will read an article on Teens and sleep and school. Students will discuss how the article might change their sleeping habits or how it reaffirms their sleeping habits.** | | |
|  | **OPENING** | **Activator:** Show Carnegie lesson on promethean board and get students input on working the lesson  **Standard:**  **MCC9-12.A.CED.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.  **MCC9-12.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.  **MCC9-12.A.CED.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations*.*  **MCC9-12.N.Q.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.  **MCC9-12.N.Q.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.  **MCC9-12.A.SSE.1** Interpret expressions that represent a quantity in terms of its context.  **MCC9-12.A.SSE.1a** Interpret parts of an expression, such as terms, factors, and coefficients.  **Essential Question:**   * How do I choose and interpret units consistently in formulas? * How do I interpret parts of an expression in terms of context? * How do I create equations and inequalities in one variable and use them to solve problems arising from linear and exponential functions? * How can I write, interpret and manipulate algebraic expressions, equations, and inequalities? * How do I create equations in two or more variables to represent relationships between quantities? * How do I graph equations on coordinate axes with the correct labels and scales? * How can I rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations?   **Vocabulary Development:**  **Direct / Group Instruction:** Teacher will model in small group and provide remediation and conferencing. Teacher will model isolating variables | | |
|  | **WORK PERIOD** | **Individual, Pair, or Group Task:** Students will work on Carnegie Lesson\_ individually. Students will rotate to the conferencing center with teacher in small groups according to needs of standards not met the previous day by teacher assessment and on PAR. | | |
|  | **CLOSING** | **Students will:**write what stuck with them today. | | |
|  | **HOMEWORK** | **CarnegieAssignment and skills Ch 2.4** | | |
| **Day 3** | **Pre- Opening/**  **Daily Routines** | **TITD:**. | | |
|  | **OPENING** | **Activator:**  **Standard: MCC9-12.A.CED.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.  **MCC9-12.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.  **MCC9-12.A.CED.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations*.*  **MCC9-12.N.Q.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.  **MCC9-12.N.Q.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.  **MCC9-12.A.SSE.1** Interpret expressions that represent a quantity in terms of its context.  **MCC9-12.A.SSE.1a** Interpret parts of an expression, such as terms, factors, and coefficients.  **Essential Question:**   * How do I choose and interpret units consistently in formulas? * How do I interpret parts of an expression in terms of context? * How do I create equations and inequalities in one variable and use them to solve problems arising from linear and exponential functions? * How can I write, interpret and manipulate algebraic expressions, equations, and inequalities? * How do I create equations in two or more variables to represent relationships between quantities? * How do I graph equations on coordinate axes with the correct labels and scales? * How can I rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations?   **Vocabulary Development:** Students will create models for the following terms**at least**, **at most**, **greater than**, **less than**, **no more than,no less** t**han** with graphs, words, or symbols in equalities in one variable. Also, **consecutive integers**, **consecutive even integers** along with **more than** and **less than** for creating equations  **Direct / Group Instruction:** Teacher will review the standards and the essential questions. Teacher will have brief discussion about vocabulary activity. Teacher will have a discussion about the break even point. | | |
|  | **WORK PERIOD** | **Individual,Pair, or Group Task:** Students will complete and assessment.. | | |
|  | **CLOSING** | **Students will:**complete a self assessment and determine their performance level.. | | |
|  | **HOMEWORK** | **Carnegie Assignment and skills Lesson 2.4** | | |
| **Day 3 Lab** | **Pre- Opening/**  **Daily Routines** | **Preparation for assessment** | | |
|  | **OPENING** | **Standard:**  **MCC9-12.N.Q.1Students will** -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.  **MCC9-12.A.CED.1Students will-** Create equations and inequalities in one variable and use them to solve problems.  **Essential Question:**  When do you create equations versus inequalities in one variable to solve problems?  **Vocabulary Development: inequalities and constraints; isolating variables**  **Direct / Group Instruction:** Teacher will review standards and essential questions. Teacher will facilitate a discussion on key vocabulary. | | |
|  | **WORK PERIOD** | **Individual, Pair, or Group Task:**  Students will complete an assessment (PAR)... | | |
|  | **CLOSING** | **Students will:**share what was easiest and most difficult standard on test, | | |
|  | **HOMEWORK** | **Students will:**Complete Carnegie SP assignments.. | | |