UbD: Algebra 1 - Linear Equations, Inequalities and Systems

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<tr><td>Time Frame: 26 Lessons</td><td>Unit 2: Linear Equations, Inequalities & Systems</td><td>Course Name: Algebra 1</td></tr>
<tr><td colspan="3">Stage 1: Desired Results</td></tr>
<tr><td>Established Goal(s)</td><td colspan="2">Transferable Skills</td></tr>
<tr><td rowspan="4">Competencies Addressed:
Linear Equations
Inequalities
Systems of Equations

Standards Addressed:
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.
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. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.
HSA-CED.A.4- Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example,</td><td colspan="2">Students will be able to independently use their learning to...

● apply knowledge of linear relationships to analyze real-world situations and use mathematical reasoning to solve real-world problems.
● develop clear and effective communication.
● increase self-direction.
● develop creative and practical problem-solving.
● become responsible and involved citizens.
● develop informed and integrative thinking.</td></tr>
<tr><td colspan="2">Meaning</td></tr>
<tr><td>Understandings

● Writing and Modeling with Equations
● Manipulating Equations and Understanding Their Structure
● Solve Systems of Linear Equations in Two Variables
● Solve Linear Inequalities in One Variable
● Solve Linear Inequalities in Two Variables
● Solve Systems of Linear Inequalities in Two Variables</td><td>Essential Questions

● How do the solutions of linear inequalities and equations apply to real life situations?
● How are the properties of real numbers useful when solving equations and simplifying expressions?
● What are the similarities and differences in the procedures for solving and expressing the solutions of equations and inequalities?
● Why is it important to understand how to solve linear equations and inequalities?</td></tr>
<tr><td colspan="2">Acquisition</td></tr>
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rearrange Ohm's law to highlight resistance . **HSN-Q.A.2** - Define appropriate quantities for the purpose of descriptive modeling. **HSA-REI.A** Understand solving equations as a process of reasoning and explain the reasoning. **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. **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. **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	*Students will know...* ● Comprehend the term "constraint" to mean a limitation on the possible or reasonable values a quantity could have. ● Identify and describe (orally and in writing) patterns in tables of values and in calculations. ● Use patterns to generalize relationships ● Explain (orally and in writing) the meaning of solutions to equations in one variable and two variables ● Find solutions to equations in one variable and in two variables by reasoning about the relationships in context ● Comprehend that the graph of a linear equation in two variables represents all pairs of values that are solutions to the equation. ● "Equivalent equations" are equations that have exactly the same solutions ● Understand that equations that are not true for any value of the variable(s) do not have solutions ● comprehend that different scenarios require you to solve for a specific ● analyze how the numbers in an equation ax + by = c are reflected on its graph and are related to the rate of change in the relationship ● Determine slope and vertical intercepts of linear equations ● Solve systems of linear equations by reasoning with tables and by graphing	*Students will be able to...* ● Use variables and the symbols =,< ,> and to represent simple constraints in a situation. ● Write expressions with numbers and letters to represent the quantities in a situation. ● I can explain the meaning of the term "constraints." ● I can tell which quantities in a situation can vary and which ones cannot. ● I can use letters and numbers to write expressions and equations representing the quantities in a situation. ● Write equations with numbers and variables to describe relationships and constraints. ● Use words and equations to describe the patterns in a table of values or in a set of calculations. ● When given a description of a situation, I can use representations like diagrams and table ● Solve equations in one variable and in two variables. ● Explain what it means for a value or pair of values to be a solution to an equation. ● Interpret points on a graph of a linear equation to answer questions about the quantities in context ● Use graphing technology to graph linear equations and identify solutions to the equations. ● identify equivalent expressions ● Solve for a particular variable when the equation would be more useful in that form ● Describe the connections between an equation of the form ax + by = c, the features of its graph, and the rate of change in the situation ● Find the slope and vertical intercept of a line with the equation ax + by = c ● Use various methods to solve systems of equations (graphing, substitution, elimination) ● Solve one variable inequalities and graph the solution set on a number line

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plane, often forming a curve (which could be a line). **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. **HSA-SSE.A.1** - Interpret expressions that represent a quantity in terms of its context. **HSN-Q.A.2** - Define appropriate quantities for the purpose of descriptive modeling.	and recognize what the solution represents in the graph and or real-world scenario ● Recognize that systems of equations can have 0, 1 or infinitely many solutions ● Inequalities can be written to represent constraints of real world situations ● Understand that the solution to an inequality is a range of values that make the inequality true ● Inequalities in two variables allow us to represent real world constraints and scenarios ● understand that the solution set of a system of inequalities in two variables is comprised of any pair of values that make both inequalities true	● Write one and two variable inequalities to represent real world scenarios and constraints ● Graph a two-variable inequality ● Find the solutions to a two-variable inequality ● Use technology to find the solution to a two-variable inequality ● Write a system of inequalities to describe a situation, find the solutions by graphing, and interpret the points in the solution Mathematical Practices: ● 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. ● look for and make use of structure. ● look for and express regularity in repeated reasoning.