

UbD: Algebra 1 - Linear Equations, Inequalities and Systems

Time Frame: 26 Lessons	Unit 2: Linear Equations, Inequalities & Systems	Course Name: Algebra 1	
Stage 1: Desired Results			
Established Goal(s)	Transferable Skills		
<p>Competencies Addressed: Linear Equations Inequalities Systems of Equations</p> <p>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,</p>	<p><i>Students will be able to independently use their learning to...</i></p> <ul style="list-style-type: none"> ● 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. 		
	Meaning		
	<p>Understandings</p> <ul style="list-style-type: none"> ● 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 	<p>Essential Questions</p> <ul style="list-style-type: none"> ● 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? 	
Acquisition			

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<p>rearrange Ohm's law to highlight resistance .</p> <p>HSN-Q.A.2 - Define appropriate quantities for the purpose of descriptive modeling.</p> <p>HSA-RE.I.A Understand solving equations as a process of reasoning and explain the reasoning.</p> <p>HSA-RE.I.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.</p> <p>HSA-RE.I.B.3 - Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</p> <p>HSA-RE.I.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.</p> <p>HSA-RE.I.C.6 - Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.</p> <p>HSA-RE.I.D.10 - Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate</p>	<p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● 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 	<p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> ● 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.