

Southington Public Schools
Curriculum Map

Subject: Algebra I

Grade: 9

UNIT TITLE	Using Properties for Solving Equations	Equations in Two Variables	Linear Inequalities
CONTENT	<ul style="list-style-type: none"> Understand, apply, and solve problems using linear equations Evaluate expressions involving exponents and scientific notation 	<ul style="list-style-type: none"> Identify, describe, and graph points of a linear equation Model data with equations in two variables 	<ul style="list-style-type: none"> Understand, apply and solve linear inequalities Graph linear inequalities in one and two variables
STATE STANDARDS	<p>1.3 a (9-12C) Manipulate equations, (inequalities and functions) to solve problems. <i>(1) Model and solve problems with linear, (quadratic and absolute value) equations and (linear inequalities).</i></p> <p><i>(2) Determine equivalent representations of an algebraic equation (or inequality) to simplify and solve problems.</i></p> <p>2.1 a (9-12C) Extend the understanding of numbers to include integers, rational numbers and (real numbers). <i>(2) Select and use an appropriate form of number (integer, fraction, decimal, ratio, percent, exponential, scientific notation, (irrational)) to solve practical problems involving order, magnitude, measures, labels, locations and scales</i></p> <p>2.1 b (9-12C) Interpret and represent large sets of numbers with the aid of technology. <i>(1) Use technological tools such as (spreadsheets, probes), computer algebra systems and graphing utilities to organize and analyze large amounts of numerical information.</i></p>	<p>1.1.a (8) Analyze physical phenomena, functions, and patterns to identify relationships and make generalizations. <i>(1) Write recursive and explicit functions to generalize patterns.</i></p> <p><i>(2) Identify relationships that are linear and non-linear and compare and contrast their properties using tables, graphs, equations, and verbal descriptions.</i></p> <p><i>(3) Recognize and solve problems of direct variation.</i></p> <p>1.2.a (8) Describe the affects of characteristics of linear relationships on the way the relationship is represented verbally and in tables, graphs, and equations. <i>(1) Determine the constant rate of change in a linear relationship and recognize this as the slope of the line.</i></p> <p><i>(2) Compare and contrast the graphs of lines with the same slope versus those with different slopes.</i></p> <p><i>(3) Interpret slope and y-intercepts from contextual situations, graphs, and linear equations.</i></p> <p>1.1.a (9-12C) Describe relationships and make generalizations about patterns and functions.</p>	<p>1.3 a (9-12C) Manipulate equations, inequalities, and functions to solve problems. <i>(1) Model and solve problems with linear, quadratic, and absolute value equations; and linear inequalities.</i></p> <p><i>(2) Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.</i></p> <p>2.1 a (9-12C) Extend the understanding of number to include integers, rational numbers, and real numbers <i>(1) Compare, locate, label and order real numbers on number lines, scales, coordinate grids and measurement tools.</i></p> <p><i>(2) Select and use an appropriate form of number (integer, fraction, decimal, ratio, percent, exponential, scientific notation, irrational) to solve practical problems involving order, magnitude, measures, labels, locations and scales</i></p> <p>4.1 a (9-12C) . Create the appropriate visual or graphical representation of real data. <i>(1) Collect real data and create meaningful graphical representations of the data</i></p>

	<p>2.2 a(9-12C) Develop strategies for computation and estimation using properties of number systems to solve problems.</p> <p>(1) Select and use appropriate methods for computing to solve problems in a variety of contexts.</p> <p>(2) Solve problems involving scientific notation (and absolute value).</p>	<p>1.2.a (9-12C) Represent and analyze linear (and non-linear) functions and relations symbolically and with tables and graphs.</p> <p>1) <i>Identify, describe, create, and generalize numeric, geometric, and statistical patterns with tables, graphs, words, and symbolic rules.</i></p> <p>2) <i>Make and justify predictions based on patterns.</i></p> <p>3) <i>Identify the characteristics of functions and relations including domain and range.</i></p> <p>4) <i>Describe and compare properties and classes of linear, quadratic, and exponential functions.</i></p>	<p>(2) <i>Develop, use, and explain applications and limitations of linear and non-linear models and regression in a variety of contexts.</i></p>
<p>ASSESSMENT</p>	<p><u>PERFORMANCE TASK</u></p> <p>The students are landscapers who must find the area of an irregular garden given formulas and a variety of shapes. They will write an equation to combine areas, simplify and name the property used, state the order of operations needed to solve, and given the value of the variable, find the solution. The students will factor to find possible lengths of a rectangular garden given a quadratic and an area.</p> <p>Differentiated Version of Task:</p> <p>Draw figures to help create and check factoring. Create a list of all properties learned in this unit.</p>	<p><u>PERFORMANCE TASK</u></p> <p>SHOELACE PROJECT</p> <p><i>In this task you are asked to think mathematically about shoelaces. You will need to create a rule for predicting the length of shoelaces, given the number of lace holes.</i></p> <p><i>You will need to produce a table, a graph, and a formula.</i></p> <p>You work in a factory that makes shoes. You have to decide what length of shoelace to select when you know the number of lace holes in a shoe. The shoes can have up to ten pairs of lace holes.</p> <ol style="list-style-type: none"> 1. Estimate the length of shoelace you need for the shoe shown on the next page. (It is shown full size.) Remember to allow enough extra length for tying a bow. 2. Create a rule that will tell you the length of shoelace you need when the number of pairs of lace holes in a shoe is given. Explain how you arrived at your rule. 3. Now design three signs that can be 	<p><u>PERFORMANCE TASK</u></p> <p>USE YOUR INEQUALITY project</p> <p>Pick 5 of the following situations. For each one complete the following.</p> <ol style="list-style-type: none"> a. Write a word sentence that describes the inequality situation. b. Identify the variables of the situation. c. Write an algebraic inequality. d. Solve the inequality. e. Graph the inequality. <p>Differentiated Version of Task:</p> <p>Other levels may require more situations to be solved, or may provide more difficult or easier situations</p>

	<p><u>OTHER EVIDENCE</u></p> <ul style="list-style-type: none"> • Student completion of homework. • Quizzes • Group work 	<p>displayed in the factory to help people select the correct length of shoelaces if they know the number of pairs of lace holes.</p> <p>Your sign should describe your rule as clearly and simply as possible.</p> <ol style="list-style-type: none"> One sign must use a table. One sign must use a graph One sign must use a formula <p>4. Which of the signs do you think would be the most useful in the factory? Give reasons for your answer.</p> <p>5. What is the slope of your equation? Explain what that means in context of this problem.</p> <p><u>OTHER EVIDENCE</u></p> <ul style="list-style-type: none"> • Initials Activity • “Situation” worksheet • CBR project...walk the walk • Fuzzy Friends p.171 Math Conn 1a • Problem Set 3.6 <u>Math Conn a</u> 	<p><u>OTHER EVIDENCE</u></p> <ul style="list-style-type: none"> • Worksheets: see UbD binder • Observation of class discussion • Quizzes • test
<p>SKILLS</p>	<ul style="list-style-type: none"> • Write equations from tables and word problems. • Use variables and equations to describe real world relationships • Solve equations. • Evaluate expressions. • Use scientific notation to represent very large and very small numbers. • Use laws of exponents to simplify exponential expressions. • Operate on integers • Create factor trees • “Factor Out” GCF 	<ul style="list-style-type: none"> • Graph points. • Create an x/y chart from an equation. • Write an equation to represent a pattern. • Write an equation from: graph of a line, given slope and y-intercept, given two points. • Determine slope: from graph, from equation, when given two points. • Identify a function. • Describe the properties of a linear function. 	<ul style="list-style-type: none"> • Solve and graph an inequality in one variable. • Solve and graph inequalities in two variables. • Use an inequality to model a real life situation • Use an inequality to answer questions about real-life situations.

	<ul style="list-style-type: none">• FOIL binomials.• Un-FOIL to factor.	<ul style="list-style-type: none">• Attach real meaning to intercepts and slope.• Use linear functions to solve problems and make predictions.• Construct scattergrams.• Recognize and interpret trends.• Interpolate algebraically and graphically.• Calculate regression lines on the TI 83 and use to make prediction.	
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Curriculum Map**

Subject: Algebra I

Grade: 9

UNIT TITLE	Systems of Equations	Exploring & Evaluating Non-Linear Functions	
CONTENT	<ul style="list-style-type: none"> • Solve systems of two equations using substitution, elimination, and graphical techniques • Model real world problems using a system of two equations 	<ul style="list-style-type: none"> • Understand, apply, and solve problems using non-linear equations • Determine the roots of non-linear equations 	
STATE STANDARDS	<p>1.1.a. (9-12C) Describe relationships and make generalizations about patterns and functions. <i>(1) Identify, describe, create and generalize numeric, geometric, and statistical patterns with tables, graphs, words, and symbolic rules.</i></p> <p>1.2.a (9-12C) Represent and analyze linear and non-linear functions and relations symbolically and with tables and graphs <i>(1) Represent functions and relations on the coordinate plane.</i> <i>(2) Identify an appropriate symbolic representation for a function or relation displayed graphically or verbally.</i> <i>(3) Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation.</i> <i>(4) Evaluate and interpret the graphs of linear, [exponential, and polynomial] functions</i></p> <p>1.3.a (9-12C) Manipulate equations, inequalities, and functions to solve problems. <i>(1) Model and solve problems with linear, [</i></p>	<p>1.1.a. (9-12C) Describe relationships and make generalizations about patterns and functions. <i>(1) Identify, describe, create and generalize numeric, geometric, and statistical patterns with tables, graphs, words, and symbolic rules.</i></p> <p>1.2.a (9-12C) Represent and analyze linear and non-linear functions and relations symbolically and with tables and graphs <i>(1) Represent functions and relations on the coordinate plane.</i> <i>(2) Identify an appropriate symbolic representation for a function or relation displayed graphically or verbally.</i> <i>(3) Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation.</i> <i>(4) Evaluate and interpret the graphs of linear, [exponential, and polynomial] functions</i></p> <p>1.3.a (9-12C) Manipulate equations, inequalities, and functions to solve problems. <i>(1) Model and solve problems with linear, [</i></p>	

	<p><i>quadratic, and absolute value equations]; and linear inequalities.</i></p> <p><i>(2) Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.</i></p> <p><i>(3) Solve systems of two linear equations using algebraic or graphical method.</i></p> <p>2.1b (9-12C) Interpret and represent large sets of numbers with the aid of technology</p> <p><i>1) Use technological tools such as spreadsheets, probes, computer algebra systems and graphing utilities to organize and analyze large amounts of numerical information.</i></p> <p>4.1a (9-12C) Create the appropriate visual or graphical representation of real data.</p> <p><i>(1) Collect real data and create meaningful graphical representations of the data.</i></p>	<p><i>linear inequalities.</i></p> <p><i>(2) Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.</i></p> <p><i>(3) Solve systems of two linear equations using algebraic or graphical method.</i></p> <p>2.1b (9-12C) Interpret and represent large sets of numbers with the aid of technology</p> <p><i>1) Use technological tools such as spreadsheets, probes, computer algebra systems and graphing utilities to organize and analyze large amounts of numerical information.</i></p> <p>4.1a (9-12C) Create the appropriate visual or graphical representation of real data.</p> <p><i>(1) Collect real data and create meaningful graphical representations of the data.</i></p>	
ASSESSMENT	<p><u>PERFORMANCE TASK</u></p> <p>Topic: solving systems of equations The students will be required to solve a real world problem using all three methods of solving systems.</p> <p>Summary: You want to compare the speeding penalties in two states. You will write the equation for each state, and use systems of equations to compare the data. You will present your findings to the class in the form of a graph and an explanation of other methods of solving the system.</p>	<p><u>PERFORMANCE TASK</u></p> <p>You have been given \$1500, which must be invested for a minimum of 1 years and a maximum of 5 years. Your task is to determine which form of savings you will choose based on how long you will leave the money in the bank. Determine your time frame based on your purpose for saving. Explain graphically and in paragraph form which option you will choose and why. Show a minimum of 3 comparisons.</p>	

	<p><u>OTHER EVIDENCE</u></p> <ul style="list-style-type: none"> • Bouncing balls activity • Worksheets on solving systems • Quizzes- solving systems by graphing • Quizzes – solving systems by substitution • Quizzes – solving systems by elimination • End of unit quiz • Informal observation through class discussion 	<p><u>OTHER EVIDENCE</u></p> <ul style="list-style-type: none"> • Completion of Homework • Quiz: Identify type of non-linear functions; find roots by factoring and graphing. • Quiz: Non-linear functions to solve problems and make predictions. 	
SKILLS	<ul style="list-style-type: none"> • graph a linear equation. • graph a system of equations. • solve a system of equations by the substitution method • solve a system by the elimination method. • solve a system using a graphing calculator. • solve and graph a system of linear inequalities. 	<ul style="list-style-type: none"> • Identify non-linear functions from graph and from equations. • Find roots of quadratics by graphing and by factoring. • Describe the properties of different types of non-linear functions. • Attach real meaning to roots and other attributes of non-linear functions. • Use non-linear functions to solve problems and make predictions. • Calculate compound interest. 	