

**GHS Curriculum Map  
Math  
Grades 9-12**

**Subject/Course Title:** Algebra 1

**Unit Title:** Linear Equations and Inequalities (Unit 1)

**Unit Overview**

The material in this unit is the heart of algebraic thinking. Students write, simplify, evaluate, and model situations with linear expressions. Students then examine the concept of equality and use linear equations and linear inequalities to model and solve real-world problems.

The properties of real numbers play a prominent role in this unit. The commutative, associative, and distributive properties are used when students simplify and evaluate expressions and solve multi-step equations. Opposites, reciprocals, and order of operations are used when students evaluate expressions and solve equations. Students revisit rational numbers when they solve equations and inequalities with rational number coefficients and rational number solutions.

<b>Time Frame</b>	<b>Priority Standards</b>	<b>Essential Questions</b>	<b>Instructional Strategies</b>	<b>Assessments</b> (Note Writing Tasks and Performance Tasks)	<b>Key Resources/Texts</b>
8 weeks	<p><i>Standards for Math Practice</i></p> <p>1. Make sense of problems and persevere in solving</p> <p><i>CT Core Standards</i></p> <p><b>8EE 7. a, b</b>  <b>A-SSE 1. a</b>            A-SSE 3  <b>A-CED 1</b>            A-CED 4  <b>A-REI 1</b>  <b>A-REI 3</b>            N-Q 1            N-Q 2            N-Q 3</p>	<ol style="list-style-type: none"> <li>How can we use linear equations and linear inequalities to solve real world problems?</li> <li>How can models and technology aid in the solving of linear equations and linear inequalities?</li> </ol>	<ul style="list-style-type: none"> <li>Homework/Practice</li> <li>Note Taking</li> <li>Cooperative Learning</li> <li>Standards based assessment with feedback</li> </ul>	<ul style="list-style-type: none"> <li><b>Linear Model, Single Variable Performance Task:</b> Students will create a model from real world data that is collected through research or experimentation. Students will interpret the results and share their findings with the class.</li> <li><b>Writing: Math Journal</b></li> <li><b>Mid-unit Assessment</b></li> <li><b>End-of-Unit Tests</b> (Versions 1 &amp; 2)</li> </ul>	<p><a href="#">Algebra 1 SDE CT Curriculum</a></p> <p><a href="#">Khan Academy</a></p> <p><a href="#">Virtual Nerd: Math Help</a></p> <p><a href="#">Shodor Interactive</a></p> <p><a href="#">SAS Curriculum Pathways</a></p> <p><a href="#">Desmos</a></p>

**Subject/Course Title:** Algebra 1

**Unit Title:** Functions (Unit 2)

### Unit Overview

Students are introduced to the concept of a function in the first investigation of this unit. After identifying relationships that are or are not functions, they learn how to define the domain and range of a function. Investigation Two provides practice applying the concept of a function through various contextual problems. Students organize and analyze data in tables and graphs and use the information to describe relationships such as that between Fahrenheit and Celsius measurements of temperature. Investigation Three introduces function notation using the concept of a function machine and students use function notation in a variety of contextual situations.

The last investigation introduces students to a variety of parent functions and gives additional contexts in which students look at multiple representations of functions and consolidate their understanding of independent and dependent variables and function notation. Emphasis is on distinguishing between linear functions (which are studied in greater depth in the next unit) and nonlinear functions (which appear later in this course and in subsequent courses). The unit concludes with a performance task based on an experiment with pendulums.

Time Frame	Priority Standards	Essential Questions	Instructional Strategies	Assessments (Note Writing Tasks and Performance Tasks)	Key Resources/Texts
3 weeks	<p><i>Standards for Math Practice</i> 4. Model with mathematics. 5. Use appropriate tools strategically</p> <p><i>CT Core Standards</i> <b>8FA 1</b> <b>8FA 2</b> <b>8FB 5</b> <b>A-CED 2</b> A-CED 10 <b>F-IF 1</b> <b>F-IF 2</b> <b>F-IF 4</b> F-IF 5 F-IF 7b <b>F-IF 9</b></p>	<ol style="list-style-type: none"><li>How can functions be used to model real world situations, make predictions, and solve problems?</li><li>Are all mathematical models functions? How can you tell?</li></ol>	<ul style="list-style-type: none"><li>Homework/Practice</li><li>Note Taking</li><li>Cooperative Learning</li><li>Standards based assessment with feedback</li><li>Graphic and table representations</li></ul>	<ul style="list-style-type: none"><li><b>Performance Task:</b> Students collect data, make a table, and graph the data. They identify the function function based on the graph and compare the predicted value from a formula with their empirical results.</li><li><b>Writing: Math Journal</b></li><li><b>Mid-unit Assessment</b></li><li><b>End-of-Unit Tests</b> (Versions 1 &amp; 2)</li></ul>	<p><a href="#">Algebra 1 SDE CT Curriculum</a> <a href="#">Khan Academy</a> <a href="#">Virtual Nerd: Math Help</a> <a href="#">Shodor Interactive</a> <a href="#">SAS Curriculum Pathways</a> <a href="#">Desmos</a></p>

<b>Subject/Course Title:</b> Algebra 1	<b>Unit Title:</b> Linear Functions (Unit 3)
--	--

**Unit Overview**

Students start Unit 3 by exploring the distinction between linear and nonlinear behavior, and then focus on learning about linear functions. Throughout Unit 3, students derive linear models of real-world situations in order to analyze situations, make predictions or solve problems. Analyzing situations often takes the form of identifying the real world meaning of the slope and the x- and y-intercepts of a linear model. Making predictions involves evaluating models for a given independent variable (given x find y), and solving equations for the independent variable given the dependent variable (given y find x). Problem solving occurs through the use of various representations: algebraic, tabular, graphic and numeric.

<b>Time Frame</b>	<b>Priority Standards</b>	<b>Essential Questions</b>	<b>Instructional Strategies</b>	<b>Assessments (Note Writing Tasks and Performance Tasks)</b>	<b>Key Resources/Texts</b>
6 Weeks	<p><i>Standards for Math Practice</i> 4. Model with mathematics. 5. Use appropriate tools strategically.</p> <p><i>CT Core Standards</i> <b>F-IF 6</b> <b>F-IF 7.a</b> F-IF 8 <b>F-LE 1.b</b> <b>F-LE 2</b> <b>F-LE 5</b></p>	<ol style="list-style-type: none"> <li>How may linear functions model real world situations?</li> <li>How may linear functions help us analyze real world situations and solve practical problems?</li> <li>How do linear functions relate to the previous section on functions?</li> </ol>	<ul style="list-style-type: none"> <li>Homework/Practice</li> <li>Note Taking</li> <li>Cooperative Learning</li> <li>Standards based assessment with feedback</li> <li>Graphic, table, and mathematical models</li> <li>Technology - Desmos demonstrations, Geogebra</li> </ul>	<ul style="list-style-type: none"> <li><b>Performance Task: Linear Models:</b> The task requires students to investigate population growth or population decline. Students will be expected to demonstrate and apply their understanding of key concepts related to linear functions. Students will examine and compare the accuracy of their linear population models and present their findings in class.</li> <li><b>Writing: Math Journals</b></li> <li><b>Mid-Unit Test</b></li> <li><b>Unit 4 Test</b></li> </ul>	<p><a href="#">Algebra 1 SDE CT Curriculum</a> <a href="#">Khan Academy</a> <a href="#">Virtual Nerd: Math Help</a> <a href="#">Shodor Interactive</a> <a href="#">SAS Curriculum Pathways</a> <a href="#">Desmos</a></p>

**Subject/Course Title:** Algebra 1

**Unit Title:** Scatter Plots and Trend Lines (Unit 4)

**Unit Overview**

Students will begin the unit by exploring measures of central tendency and spread and displays of one-variable data including, dot plots, histograms, and box-and- whisker plots. They will use the five number summary to create box-and- whisker plots and identify outliers with the 1.5 X IQR rule. They will be introduced to using the STAT menu on the graphing calculator. In investigation two, students will be introduced to scatter plots and trend lines. They will fit a trendline to a scatter plot by hand and find its equation. They will use the equation of the trend line to make predictions by interpolating or extrapolating. The students will develop a deeper understanding about the meaning of the slope and intercepts in context. These ideas are revisited in subsequent investigations.

In investigation three, students will continue to explore trend lines and predictions. They will use technology (either a graphing calculator or a spreadsheet) to calculate the linear regression equation and to find the correlation coefficient. The students will be able to interpret the meaning of the correlation coefficient and explain the difference between correlation and causation. During investigation four, students will perform experiments in which they collect and analyze data using linear models. In this investigation, students will apply their knowledge from the previous two investigations. In this investigation the teacher will get the class prepared and organized, and then will walk around to observe and ask questions. Investigation five, students will work with data sets that contain outliers to identify the influence that outliers have on the calculation and interpretation of the slope, y-intercept, linear regression equation, and correlation coefficient. In the last investigation students will explore situations in which the data represents more than one trend, will fit a line to each section of the data set, and will use the lines to make predictions. In this way they will be introduced to piecewise linear functions.

Time Frame	Priority Standards	Essential Questions	Instructional Strategies	Assessments (Note Writing Tasks and Performance Tasks)	Key Resources/Texts
4 Weeks	<b>CT Core Standards</b> 8-SP 1 8-SP 2 8-SP 3 <b>S-ID 2</b> <b>S-ID 3</b> <b>S-ID 6, a &amp; c</b> <b>S-ID 7</b> S-ID 8 S-ID 9	1. How do we make predictions and informed decisions based on current numerical information? 2. What are the advantages and disadvantages of analyzing data by hand versus by using technology? 3. What is the potential impact of making a decision from data that contains one or more outliers?	<ul style="list-style-type: none"> <li>● Homework/Practice</li> <li>● Note Taking</li> <li>● Cooperative Learning</li> <li>● Standards based assessment with feedback</li> <li>● Project based</li> <li>● Graphic and table representations of experimental data</li> </ul>	<ul style="list-style-type: none"> <li>● <b>Performance Task: Linearity</b>                      During the course of the unit, have students develop a hypothesis about a real-world ‘nearly’ linear situation interesting to them, find relevant data, model the data, analyze the mathematical features of the model, and make and justify a conclusion. By the end of the unit, all students will present their findings to the class.</li> <li>● <b>Writing: Math Journals</b></li> <li>● <b>Unit 4 Test</b></li> </ul>	<a href="#">Algebra 1 SDE CT Curriculum</a> <a href="#">Khan Academy</a> <a href="#">Virtual Nerd: Math Help</a> <a href="#">Shodor Interactive</a> <a href="#">SAS Curriculum Pathways</a> <a href="#">Desmos</a>

<b>Subject/Course Title:</b> Algebra 1	<b>Unit Title:</b> Systems of Linear Equations (Unit 5)
--	---

**Unit Overview**

In previous units, students studied linear functions and used a linear function to investigate the relationship between two variables. In this unit, students will represent, compare and analyze two linear equations, look for common solutions and use this information to make choices between competing situations in real world contexts. Students will solve systems of equations numerically, graphically, and algebraically. They will be able to explain what the solution of a system of linear equations represents in the context of various applications such as those used by business leaders, economists, scientists, engineers, nutritionists, race car drivers, and athletes. They also will explore the special cases of parallel lines (no solution) and identical lines (infinite solutions).

<b>Time Frame</b>	<b>Priority Standards</b>	<b>Essential Questions</b>	<b>Instructional Strategies</b>	<b>Assessments (Note Writing Tasks and Performance Tasks)</b>	<b>Key Resources/Texts</b>
3 Weeks	<b>CT Core Standards</b> <b>8EE 8.a-c</b> A-CED 3 A-REI 5 <b>A-REI 6</b> A-REI 11	<ol style="list-style-type: none"> <li>1. What are the advantages and disadvantages of solving a system of linear equations graphically versus algebraically?</li> <li>2. What predictions can be made based on the solutions of a linear system?</li> </ol>	<ul style="list-style-type: none"> <li>• Homework/Practice</li> <li>• Note Taking</li> <li>• Cooperative Learning</li> <li>• Standards based assessment with feedback</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Performance Task:</b> Students will complete a task that will involve a real world application of linear systems. It will involve at least two linear functions. Students will interpret results to answer questions about the application</li> <li>• <b>Writing: Math Journal</b></li> <li>• <b>Unit 5 Test</b></li> </ul>	<a href="#">Algebra 1 SDE CT Curriculum</a> <a href="#">Khan Academy</a> <a href="#">Virtual Nerd: Math Help</a> <a href="#">Shodor Interactive</a> <a href="#">SAS Curriculum Pathways</a> <a href="#">Desmos</a>

**Subject/Course Title:** Algebra 1

**Unit Title:** Introduction to Exponential Functions (Unit 6 )

**Unit Overview**

This unit builds on the concepts of a function and patterns of change. Students work with interesting and significant relationships that are exponential in nature. Many of the contexts explored affect their daily lives. Students begin to recognize that real world data is a bit messy and data patterns over restricted domains may be modeled with different functions. Students study the rules of exponents and develop meanings for negative and rational exponents.

The unit helps students develop an understanding of the parameters of an exponential function. They look at functions which model exponential growth and decay. They learn informal methods of fitting an exponential function to a set of data. The relationship between percentage rate of change and exponential growth or decay is also explored. Compound interest and prescription drug decay also are explored and modeled by doubling and half-life applications.

Students will gain an appreciation for the power of mathematics in identifying and addressing solutions and making predictions and decisions about significant real world problems.

<b>Time Frame</b>	<b>Priority Standards</b>	<b>Essential Questions</b>	<b>Instructional Strategies</b>	<b>Assessments</b> (Note Writing Tasks and Performance Tasks)	<b>Key Resources/Texts</b>
4 weeks	<b>CT Core Standards</b> N-RN 1. <b>N-RN 2</b> A-SSE 1b A-SSE 3c F-IF 7.e F-IF 8b <b>F-BF 2</b> F-LE 1 a, c <b>F-LE 2</b> F-LE 3 <b>F-LE 5</b>	<ol style="list-style-type: none"><li>1. What are the limitations of exponential growth models?</li><li>2. How can one differentiate an exponential model from a linear model given a real world data set?</li></ol>	<ul style="list-style-type: none"><li>• Homework/Practice</li><li>• Note Taking</li><li>• Cooperative Learning</li><li>• Standards based assessment with feedback</li><li>• Comparison to Linear</li><li>• Table and graphic representations</li></ul>	<ul style="list-style-type: none"><li>• <b>Performance Task:</b> Students will research some real world phenomenon that will represent an exponential function. They will make a scatter plot, fit a function to the data and make predictions based on their model.</li><li>• <b>Writing: Math Journals</b></li><li>• <b>Unit 6 Test</b></li></ul>	<a href="#">Algebra 1 SDE CT Curriculum</a> <a href="#">Khan Academy</a> <a href="#">Virtual Nerd: Math Help</a> <a href="#">Shodor Interactive</a> <a href="#">SAS Curriculum Pathways</a> <a href="#">Desmos</a>