



## Math Department Curriculum Guide

## Grade 8 Math

Course Description
The objective of this course is to provide students with the foundational algebraic skills required for Algebra 1 in high school. Students will gain confidence in solving equations, representing linear functions in multiple representations (graph, table, equation, verbal model), and performing operations with Real Numbers. Students will also be introduced to transformational geometry and the Pythagorean Theorem. Throughout the course, there is an emphasis on real world applications and hands-on problem solving.
Content Standards
<a href="#">Grade 8 Massachusetts Curriculum Frameworks - Math</a>



Subject: Grade 8 Math

Units	Concepts / Essential Questions
<p><b>Term 1</b>  <b>Unit - Linear Functions</b></p> <p><b>MA Standards:</b>  <b>8.F.A.1, 8.F.A.2, 8.F.A.3, 8.F.B.4,</b>  <b>8.F.B.5, 8.SP.A.1, 8.SP.A.2, 8.SP.A.3,</b>  <b>8.EE.B.5, 8.EE.B.6</b></p>	<ul style="list-style-type: none"> <li>▪ Represent data using graphs, tables, descriptions in words, and expressions.</li> <li>▪ Use data to make predictions.</li> <li>▪ Use mathematical models to answer questions about linear relationships.</li> <li>▪ Write linear functions from verbal, numerical, or graphical information.</li> <li>▪ Make a line of best fit from data.</li> <li>▪ Construct and analyze two way tables.</li> <li>▪ How can you tell if a relation is a function?</li> <li>▪ How can you determine if a relationship is linear or nonlinear?</li> <li>▪ What are the characteristics of linear functions?</li> <li>▪ How can a linear model be used to help interpret data?</li> <li>▪ How can bivariate data be displayed and interpreted in a two way table?</li> </ul>
<p><b>Term 1</b>  <b>Unit - Expressions &amp; Equations</b></p> <p><b>MA Standards:</b>  <b>8.EE.C.7, 8.G.C.9</b></p>	<ul style="list-style-type: none"> <li>▪ Use properties of real numbers to write equivalent expressions.</li> <li>▪ Use the distributive property and its inverse to rewrite expressions.</li> <li>▪ Model situations with symbolic statements.</li> <li>▪ Solve multi step equations, including problems with variables on both sides.</li> <li>▪ Determine if a linear equation has a finite number of solutions, an infinite number of solutions, or no solution.</li> <li>▪ Use formulas to determine the volume of spheres, cylinders, and cones.</li> <li>▪ Describe the relationship between spheres, cylinders, and cones that have the same height and radius.</li> <li>▪ How can you solve equations?</li> <li>▪ How can the distributive property be used to create equivalent expressions?</li> <li>▪ How can you tell if an equation has one, none, or infinitely many solutions?</li> <li>▪ How are the volume formulas for a cylinder, cone, and sphere related to one another?</li> </ul>



Units	Concepts / Essential Questions
<p><b>Term 2</b>  <b>Unit - Transformational Geometry</b></p> <p><b>MA Standards:</b>  <b>8.G.A.1, 8.G.A.2, 8.G.A.3, 8.G.A.4, 8.G.A.5</b></p>	<ul style="list-style-type: none"> <li>▪ Recognize the properties of reflection, rotation, and translation and symmetric designs.</li> <li>▪ Recognize that two figures are congruent if one is derived from the other one by a sequence of reflections, rotations, and/or translations.</li> <li>▪ Use coordinate rules to perform transformations.</li> <li>▪ Use properties of angles formed by parallel lines and transversals.</li> <li>▪ Recognize that two figures are similar if one can be obtained from the other by a sequence of reflections, rotations, translations, and/or dilations.</li> <li>▪ How can transformations be used to prove that two figures are congruent or similar?</li> <li>▪ How can you use reflectional, rotational, and translational symmetry on a basic design element to create a new image?</li> </ul>
<p><b>Term 2</b>  <b>Unit - Systems of Linear Equations</b></p> <p><b>MA Standards:</b>  <b>8.F.A.3, 8.EE.B.6, 8.EE.C.8</b></p>	<ul style="list-style-type: none"> <li>▪ Recognize that solving a system of linear equations is equivalent to finding values of the variables that will simultaneously satisfy all equations in the system.</li> <li>▪ Choose between graphing and symbolic methods to efficiently solve systems of linear equations.</li> <li>▪ Solve problems that involve solving systems of equations.</li> <li>▪ How can you solve a system of equations graphically? Symbolically?</li> <li>▪ How can a system of equations model real world scenarios?</li> </ul>
<p><b>Term 3</b>  <b>Unit - Real Number System &amp; The Pythagorean Theorem</b></p> <p><b>MA Standards:</b>  <b>8.NS.A.1, 8.NS.A.2, 8.EE.A.1, 8.EE.A.2, 8.EE.A.3, 8.EE.A.4, 8.G.B.6, 8.G.B.7, 8.G.B.8</b></p>	<ul style="list-style-type: none"> <li>▪ Relate the area of a square to the side length of the square and estimate the value of square roots.</li> <li>▪ Relate the volume of a cube to the edge length of the cube and estimate the values of cube roots.</li> <li>▪ Explain a proof of the Pythagorean Theorem and its converse and use it to solve problems.</li> <li>▪ Develop strategies for finding the distance between two points on a coordinate grid.</li> <li>▪ Represent rational numbers as fractions and as terminating or repeating decimals.</li> <li>▪ How can you classify real numbers as rational or irrational?</li> <li>▪ How can you locate irrational numbers on a number line?</li> <li>▪ How does the operation of calculating a square root relate to the area of a square?</li> <li>▪ How can the Pythagorean theorem be used to solve real world problems?</li> <li>▪ Recognize that irrational numbers cannot be represented as a fraction and are non-terminating, non-repeating decimals.</li> <li>▪ Recognize that the square root of a whole number that is not square is irrational.</li> </ul>



Units	Concepts / Essential Questions
<b>Term 3</b> <b>Unit - Properties of Exponents and Exponential Functions</b>  <b>MA Standards:</b> <b>8.EE.A.1, 8.EE.A.2, 8.EE.A.3, 8.EE.A.4</b>	<ul style="list-style-type: none"> <li>▪ Use the properties of exponents (including integer exponents) to solve problems.</li> <li>▪ Perform operations with numbers in scientific notation.</li> <li>▪ Represent an exponential function in a situation, table, graph, and equation.</li> <li>▪ Compare exponential and linear functions.</li> <li>▪ How can you simplify expressions involving exponents?</li> <li>▪ How can scientific notation be used to express very large and very small numbers?</li> <li>▪ What are the characteristics of exponential functions?</li> </ul>

Textbook
<i>Connected Mathematics CMP3</i> ; published by Savvas