



Math Department Curriculum Guide

Grade 7 Accelerated Math

| Course Description |
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| <p>In Accelerated Math 7, students extend their understanding of many concepts from previous years. They will use knowledge of ratios, rates and unit rates and apply this to develop an understanding of proportionality as seen in tables, graphs and equations. Students will develop a better understanding of rational numbers and perform all operations with them. Students will continue their study of geometric concepts through solving real-world and mathematical problems involving area, surface area, volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms, and area and circumference of circles. They will begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences. In addition to the 7th grade curriculum, Accelerated students will learn several 8th grade standards (irrational numbers, transformational geometry, The Pythagorean Theorem and additional volume of three-dimensional shapes). This allows Accelerated students to take Algebra I in 8th grade. Throughout the course, there is an emphasis on real world applications and hands-on problem solving.</p> |
| Content Standards |
| <p>Grade 7 Massachusetts Curriculum Framework - Math</p> |



Subject: Grade 7 Accelerated Math

| Units | Concepts / Essential Questions |
|---|--|
| Term 1 Unit - Ratios and Proportional Relationships MA Standards: 7.RP.1, 7.RP.2, 7.RP.3 | <ul style="list-style-type: none"> ▪ Write, simplify and compare ratios. ▪ Compute unit rates (including complex fractions). ▪ Determine whether a table, graph and an equation shows a proportional relationship. ▪ Identify the constant of proportionality in tables, graphs and equations. ▪ Complete tables, create graphs and write equations for proportional relationships. ▪ Use a proportions to solve part-to-part ratio and part-to-whole ratio problems. ▪ Use a percent proportion to solve percent problems including markup, discount, tip, tax, fee, commission, simple interest and percent of change. ▪ In what ways can ratios of fractions and quantities measured in like or different units be expressed as unit rates? ▪ How would you recognize and represent proportional relationships between quantities measured in like or different units? ▪ How can proportions be used to solve percent and ratio problems? |
| Term 1 Unit - Integers and Rational Numbers MA Standards: 7.NS.1, 7.NS.2, 7.NS.3 | <ul style="list-style-type: none"> ▪ Simplify expressions with opposites and absolute value. ▪ Convert a rational number to a decimal and determine if it is a terminating or a repeating decimal. ▪ Evaluate numerical and variable expressions with integers and other rational numbers. ▪ Solve real-world and mathematical problems using the four operations with integers and other rational numbers. ▪ How do operations with integers relate to operations with all rational numbers? ▪ How can you use previous understanding of operations with fractions to add, subtract, multiply and divide rational numbers? ▪ How can you determine which operation to use when solving real-world word problems? |



| Units | Concepts / Essential Questions |
|---|--|
| <p>Term 1 Unit - Real Number System</p> <p>MA Standards: 8.NS.A.1, 8.NS.A.2, 8.EE.A.1, 8.EE.A.2, 8.EE.A.3, 8.EE.A.4</p> | <ul style="list-style-type: none"> ▪ Relate the area of a square to the side length of the square and estimate the value of square roots. ▪ Relate the volume of a cube to the edge length of the cube and estimate the values of cube roots. ▪ Represent rational numbers as fractions and as terminating or repeating decimals. ▪ Recognize that irrational numbers cannot be represented as a fraction and are non-terminating, non-repeating decimals. ▪ Recognize that the square root of a whole number that is not square is irrational. ▪ How can you classify real numbers as rational or irrational? ▪ How can you locate irrational numbers on a number line? ▪ How does the operation of calculating a square root relate to the area of a square? |
| <p>Term 2 Unit - Properties of Exponents</p> <p>MA Standards: 8.EE.A.1, 8.EE.A.2, 8.EE.A.3, 8.EE.A.4</p> | <ul style="list-style-type: none"> ▪ Use the properties of exponents (including integer exponents) to solve problems. ▪ Perform operations with numbers in scientific notation. ▪ Represent an exponential function in a situation, table, graph, and equation. ▪ How can you simplify expressions involving exponents? ▪ How can scientific notation be used to express very large and very small numbers? |
| <p>Term 2 Unit - Expressions and Equations</p> <p>MA Standards: 7.EE.1, 7.EE.2, 7.EE.3, 7.EE.4</p> | <ul style="list-style-type: none"> ▪ Use properties of operations (Distributive Property) to add, subtract, factor and expand linear expressions. ▪ Solve real-world and mathematical problems involving one-, two- and multi-step equations. ▪ Solve real-world and mathematical problems involving one-, two- and multi-step inequalities and interpret and graph the solutions. ▪ How can properties of operations be used to generate equivalent expressions? ▪ How can numerical and algebraic expressions, equations and inequalities be used to solve real-world and mathematical problems? |



| Units | Concepts / Essential Questions |
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| <p>Term 3 Unit - Geometry</p> <p>MA Standards: 7.G.1, 7.G.2, 7.G.3, 7.G.4, 7.G.5, 7.G.6</p> | <ul style="list-style-type: none"> ▪ Reproduce a scale drawing at a different scale. ▪ Draw two-dimensional shapes with given conditions, with a focus on triangles. ▪ Determine the two-dimensional shape created when a three-dimensional shape is sliced. ▪ Calculate the circumference and area of circles. ▪ Describe the relationship between the radius, diameter and circumference of a circle. ▪ Use angle pairs to write and solve equations to find an unknown angle. ▪ Solve real-world and mathematical problems involving area, surface area and volume of two- and three-dimensional objects. ▪ Use formulas to determine the volume of spheres, cylinders, and cones. ▪ Describe the relationship between spheres, cylinders, and cones that have the same height and radius. ▪ How can you use scale drawings to solve problems? ▪ What is the difference between a unique triangle, more than one triangle or no triangle? ▪ What is the relationship between a circle's radius, diameter, circumference and area? ▪ What are the major classification of angle pairs? ▪ How can formulas be used to solve real-world application problems with three-dimensional shapes? |
| <p>Term 3 Unit - Statistics and Probability</p> <p>MA Standards: 7.SP.1, 7.SP.2, 7.SP.3, 7.SP.4, 7.SP.5, 7.SP.6, 7.SP.7, 7.SP.8</p> | <ul style="list-style-type: none"> ▪ Use random sampling to draw inferences about a population. ▪ Draw informal inferences comparing two populations using measures of center (mean, median) and measures of variability (range, MAD). ▪ Approximate the probability of an event and express it as a number between 0 and 1. ▪ Find the probability of compound events using tables, lists, tree diagrams, and simulations. ▪ How are statistics used to compare populations and draw inferences about them? ▪ How can you investigate chance processes and develop, use and evaluate probability models? ▪ How is probability used to find the frequency of an event? ▪ How are tables, lists, tree diagrams and simulations used to find the probability of an event? |
| <p>Unit - The Pythagorean Theorem</p> <p>MA Standards: 8.G.B.6, 8.G.B.7, 8.G.B.8</p> | <ul style="list-style-type: none"> ▪ Explain a proof of the Pythagorean Theorem and its converse and use it to solve problems. ▪ Develop strategies for finding the distance between two points on a coordinate grid. ▪ How can the Pythagorean theorem be used to solve real world problems? |



| Units | Concepts / Essential Questions |
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| Term 3 Unit - Transformational Geometry MA Standards: 8.G.A.1, 8.G.A.2, 8.G.A.3, 8.G.A.4, 8.G.A.5 | <ul style="list-style-type: none"> Recognize the properties of reflection, rotation, and translation and symmetric designs. Recognize that two figures are congruent if one is derived from the other one by a sequence of reflections, rotations, and/or translations. Use coordinate rules to perform transformations. Use properties of angles formed by parallel lines and transversals. Recognize that two figures are similar if one can be obtained from the other by a sequence of reflections, rotations, translations, and/or dilations. How can transformations be used to prove that two figures are congruent or similar? How can you use reflectional, rotational, and translational symmetry on a basic design element to create a new image? |

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