

Haddon Township School District

Curriculum Overview

Subject Area: Mathematics

Grade Level: 7th Grade

Course Name: Accelerated Math

Course Overview/Description:

Accelerated Math focuses on four critical areas: (1) developing an understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations as well as formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three- dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples.

Unit Title	Unit Summary	Student Learning Targets
Unit 1: Integers and Rational Numbers	Students will reinforce their understanding of integers and their opposites. They will use this understanding to further extend their knowledge of integer operations by utilizing number lines and algorithms. Students will also write rational numbers as fractions and decimals within this unit. Students will learn about terminating and repeating decimals as well as well as be able to recognize a decimal as its specific type.	Learners will demonstrate the ability to: <ul style="list-style-type: none">• Understand how integers and their opposites are related• Identify rational numbers and write them in decimal form• Add positive and negative integers• Model integer addition in real-life applications• Understand subtraction of integers as adding the additive inverse, $p - q = p + (-q)$• Use properties of operations to add and subtract rational numbers• Multiply positive and negative integers

Haddon Township School District Curriculum Overview

		<ul style="list-style-type: none"> ● Apply integer multiplication to real-life applications ● Find the product of rational numbers ● Understand how to divide integers by applying the rules of multiplying integers ● Determine equivalencies among integer quotients ● Understand how the signs of integers in a multiplication sentence relate to the sign in a related division statement ● Decide which operations to use to solve problems ● Use precision when solving problems with rational numbers ● Use mathematical modeling to represent a problem situation and to propose a solution Test and verify the appropriateness of their math models
<p>Unit 2: Real Numbers</p>	<p>Students build on their understanding of real numbers in order to classify numbers as rational or irrational. Students understand that repeating and terminating decimals can be represented as an equivalent rational number in fraction form. Students will also understand the relationship between squares, square roots, cubes, and cube roots. Students recognize that irrational numbers do not have an exact decimal representation and can be approximated. Students will learn that irrational square roots can be approximated by using perfect squares and decimal approximations. Learning how to estimate very small and very large quantities using powers of 10 is a critical step in learning to</p>	<p>Learners will demonstrate the ability to:</p> <ul style="list-style-type: none"> ● Locate repeating decimals on a number line ● Write repeating decimals as fractions ● Classify a number as rational or irrational ● Understand the concepts of square roots and perfect squares ● Approximate square roots using perfect squares ● Compare and order rational and irrational numbers ● Evaluate square roots and cube roots to solve problems ● Evaluate perfect squares and perfect cubes

Haddon Township School District Curriculum Overview

	<p>compare these quantities. Recognizing how to write very small and very large numbers in scientific notation makes it possible to add, subtract, multiply and divide these numbers using less effort. Students will also understand that any nonzero number raised to the power of zero is equal to one. Students will use patterns to predict and understand integer exponent relationships. Lastly, students will learn the properties of exponents and how to use these properties to add, subtract, multiply, and divide exponential expressions.</p>	<ul style="list-style-type: none"> ● Solve equations involving perfect squares and perfect cubes ● Solve equations involving perfect squares or cubes ● Solve equations involving imperfect squares or cubes ● Multiply and divide expressions with integer exponents ● Find the power of a power ● Simplify exponential expressions using the Zero Exponent Property and the Negative Exponent Property ● Estimate and compare very large and very small quantities using powers of 10 ● Write very large and very small numbers in scientific notation ● Convert scientific notation to standard form ● Use mathematical modeling to represent a problem situation to propose a solution ● Test and verify the appropriateness of math models <p>Add, subtract, multiply and divide in scientific notation</p>
<p>Unit 3: Analyze and Use Proportional Relationships</p>	<p>Students build on their understanding of equivalent rates and determine whether two quantities are in a proportional relationship. They may test for equivalent ratios in a table or graph the data on a coordinate plane. Students know that the relationship between two quantities is preserved with</p>	<p>Learners will demonstrate the ability to:</p> <ul style="list-style-type: none"> ● Use ratios and rates to describe the relationship between two quantities ● Find equivalent ratios and use unit rates to solve multi-step problems

Haddon Township School District Curriculum Overview

	<p>both quantities are multiplied by the same number. They will learn how to identify such numbers as the unit rate, or the constant of proportionality, in tables, graphs, and verbal descriptions. In this unit students will develop the equation $y = kx$ to represent a proportional relationship between the quantities x and y. They identify the ratio of $k = \frac{y}{x}$ as the constant of proportionality. Students will be able to explain what a point (x, y) on the graph of a proportional relationship means with special attention to the points $(0, 0)$ and $(1, r)$, where r is the unit rate.</p>	<ul style="list-style-type: none"> ● Find unit rates with ratios of fractions ● Use unit rates to solve multi-step problems ● Determine whether quantities are proportional by testing for equivalent ratios ● Use the constant of proportionality to write equations that represent proportional relationships ● Use equations to solve problems involving proportional relationships ● Use a graph to recognize proportionality ● Identify a constant of proportionality from a graph ● Interpret a point on a graph of a proportional relationship ● Explain whether a solution represents a proportional relationship <p>Use representations to find entry points into problems</p>
<p>Unit 4: Analyze and Solve Percent Problems</p>	<p>Students know that a percent describes a proportional relationship between the part and the whole. They recognize that a percent is a ratio out of 100, which shows the relationship between quantities. Any percent greater than 100% is a number greater than one, and any percent less than 1% is a number less than one-hundredth. Students deepen their conceptual understanding of proportional relationships to develop the percent equation. They use the formula $\text{part} = \text{percent} \times \text{whole}$, to solve percent problems, when given two out of the three terms. Students use a variety of models, such as bar diagram models, fraction representations, and algebraic models. Students will also extend their previous knowledge of absolute</p>	<p>Learners will demonstrate the ability to:</p> <ul style="list-style-type: none"> ● Understand that equivalent rates can be used to find percents ● Analyze percents of numbers in a real-world context ● Construct a percent proportion ● Use a percent proportion to find an unknown part, whole, or percent ● Understand the relationship between proportional reasoning and percent ● Interpret the results of a percent equation in a real-life scenario ● Solve real-world problems involving percent change and percent error.

Haddon Township School District Curriculum Overview

	<p>value when solving percent error problems. Students also understand that the equations for percent change and percent error are the same. Both of these percentages involve finding the following ratio: the difference between two values to one of those values.</p>	<ul style="list-style-type: none"> ● Understand the percent equation and the different ways it can be used ● Understand and calculate markups and markdowns ● Relate percent change to percent markup and percent markdown ● Identify the parts of interest problems and how the values are related <p>Understand what simple interest is and how it is calculated</p>
<p>Unit 5: Generate Equivalent Expressions</p>	<p>Students generate equivalent expressions to provide different perspectives on a problem. They make tables of values to compare and identify equivalent expressions. Students understand the pattern and relationship between subtracting integers and subtracting expressions. They will apply the concept of adding the opposite and use the Distributive Property to simplify expressions. Students will also develop a deeper understanding of the properties of operations when manipulating expressions. They will make the connection between the Distributive Property and GCF by factoring different types of expressions.</p>	<p>Learners will demonstrate the ability to:</p> <ul style="list-style-type: none"> ● Understand how variables are used to represent unknown values in problems ● Recognize when two expressions are equivalent ● Use properties of operations to write equivalent expressions ● Combine like integer and rational terms ● Use the Distributive Property to expand expressions ● Understand expanding an expression is the reverse of factoring ● Identify the GCF of algebraic terms in expressions ● Use properties of operations to add expressions ● Model addition of expressions in real-life applications ● Use properties of operations to subtract expressions ● Model subtraction of expressions in real-life applications <p>Write equivalent expressions to show how quantities are related in real-life applications</p>

Haddon Township School District Curriculum Overview

<p>Unit 6: Solve Problems Using Equations and Inequalities</p>	<p>Being able to represent a real-world situation is essential to applying Algebra to students' everyday lives. Using bar diagrams helps students to visually represent unknowns and constants. Models can also help students to conceptually understand the meaning of a solution or analyze how an inequality has an infinite number of solutions. Students also interpret what each part of the equation or inequality represents. In this unit students also learn how to use inverse operations to solve equations and inequalities. They understand that the opposite operation will "undo" the calculation and helps them to isolate the variable. This leads students into the concept of properties of equality and how these properties ensure the equation or inequality remains balanced.</p>	<p>Learners will demonstrate the ability to:</p> <ul style="list-style-type: none"> ● Analyze world problems to write two-step equations ● Understand the relationship between the terms of the equation and the values they represent ● Use models to solve two-step equations ● Compare algebraic and arithmetic solutions ● Solve equations using the Distributive Property ● Graph the solutions of an inequality on a number line ● Solve inequalities using the Addition and Subtraction Properties of Inequality ● Write inequalities and solve them using Multiplication and Division Properties of Inequality ● Graph the solutions of an inequality on a number line. ● Write and solve a two-step inequality to solve a problem ● Solve an inequality by multiplying or dividing by a negative rational number ● Explore the relationship between two-step inequalities and multi-step inequalities Apply the Distributive Property to simplify and solve multi-step inequalities
<p>Unit 7: Analyze and Solve Linear Equations</p>	<p>Students understand the mathematical relationship between the equation of a line and the graph of that line. The coordinates of points on the graph can be substituted into the equation of the line to make a true statement. Students will use their understanding of ratios and proportional relationships to demonstrate how the unit rate or constant of</p>	<p>Learners will demonstrate the ability to:</p> <ul style="list-style-type: none"> ● Combine like terms ● Solve equations with like terms on one side of the equation ● Make sense of scenarios and represent them with equations

Haddon Township School District Curriculum Overview

	<p>proportionality can be used to measure the steepness of a line, or slope. In this unit students will also use equation-solving methods they learned previously in order to solve a variety of equations that have either zero, one, or infinitely many solutions. They will incorporate their knowledge of the Distributive Property to solve multi-step equations. Students analyze equations, tables, and linear graphs to compare proportional relationships by interpreting the unit rates in context. They understand the characteristics of a graph that the slope is the same as the constant of proportionality.</p>	<ul style="list-style-type: none"> ● Solve equations with like terms on both sides of the equation ● Make sense of scenarios and represent them with equations ● Plan multiple solution pathways and choose one to find the solution ● Determine the number of solutions to an equation ● Analyze equations, linear graphs, and tables to find unit rates and compare proportional relationships ● Find the slope of a line using different strategies ● Interpret a slope in context and relate it to steepness on a graph ● Understand how the constant of proportionality and the slope relate in a linear equation ● Write a linear equation in the form $y = mx$ when the slope is given ● Graph a linear equation in the form $y = mx$ ● Interpret and extend the table or graph of a linear relationship to find its y-intercept ● Analyze graphs in context to determine and explain the meaning of the y-intercept ● Graph a line from the equation in the form $y = mx + b$ Write an equation that represents the given graph of a line
<p>Unit 8: Use Sampling to Draw Inferences About Populations</p>	<p>In this unit, students reinforce their understanding of a population, and extend the concept to include a subset of data, or a sample, that represents the population accurately. They learn what constitutes a random sample, and how random samples are often</p>	<p>Learners will demonstrate the ability to:</p> <ul style="list-style-type: none"> ● Distinguish between a population and a sample ● Establish whether a sample is representative of a population ● Generate random samples

Haddon Township School District Curriculum Overview

	<p>the best way to obtain representation. Students also understand that different representative samples from one population will not contain exactly the same individuals. Students understand that representative random samples can be used to make valid inferences about populations, if the samples are sufficiently large. They also understand that by taking the data from the sample (or the part) they can use proportional reasoning to say something about the population (whole). In this unit students understand that they can use data displays and measures of central tendency and variation for two random samples to make informal comparisons. They also understand that qualitative inferences are conclusions made from data while quantitative inferences come from statistical measures as the mean and median.</p>	<ul style="list-style-type: none"> ● Make qualitative inferences from a sample data set ● Make quantitative inferences from a sample data set ● Make estimates about a population based on a sample data set, and assess whether the inferences are valid ● Use box plots to compare and make inferences about populations ● Use the median and IQR of datasets to informally compare and make inferences about two populations. Use the mode, range, mean, and mean absolute deviation (MAD) to compare populations
<p>Unit 9: Probability</p>	<p>Before students develop an understanding of probability and probability models or single and compound events they must first explore the ideas of likelihood, fairness, and the chance of an event occurring. Once this concept is gained, the concept of probability can be introduced. Being able to analyze the meaning of a probability value and its implications is a crucial step in reasoning with probability. In this unit students compile sample spaces of all possible outcomes of single and compound events by understanding the sample space. Having students make models to represent sample spaces allows them to gain an understanding of how the probabilities are determined. Understanding the meaning of the sample space gives students the background needed to reason in probability situations. Students</p>	<p>Learners will demonstrate the ability to:</p> <ul style="list-style-type: none"> ● Use probability to describe the likelihood that an event will occur ● Relate probability to mathematical fairness ● Understand theoretical probability and how it can be used ● Use theoretical probability to predict an outcome ● Compare theoretical and experimental probability ● Use experimental probability to make predictions ● Explain differences between theoretical and experimental probability ● Develop a probability model ● Use a probability model to evaluate a situation ● Use a probability model to make an estimate

Haddon Township School District Curriculum Overview

	<p>also need to understand the difference between theoretical and experimental probability. Theoretical probability is the expected or calculated results of an experiment. It is the probability in the perfect simulation. Experimental probability is based on the actual results of an experiment and may not always match the theoretical probability. Students truly understand this when they can state that while the experimental probability may not match theoretical probability for any given trial, as the number of trials increases the experimental probability should approach the theoretical probability.</p>	<ul style="list-style-type: none"> ● Use a tree diagram, a table, or an organized list to represent a sample space for a compound event ● Organize information about a compound event in a table, a tree diagram, or an organized list ● Find the probability of a compound event ● Use different tools to simulate a compound event <p>Model a real-world situation involving a compound even and predict its outcome using a simulation</p>
<p>Unit 10: Solve Problems Involving Geometry</p>	<p>Students know the scale factor to be a constant of proportionality, and use scale factors to compute actual lengths and areas from a scale drawing. They also reproduce scale drawings with different scales. Students understand by observation that the horizontal and vertical cross sections sliced parallel to a face of a rectangular prism are the same size and shape as the surfaces. Students also understand that the horizontal cross sections sliced parallel to the base of a rectangular pyramid are the same shape as the base. If the vertical cross section goes through the vertex, it will have the same height as the pyramid and the same base length as the side of the base that is parallel to the slice.</p>	<p>Learners will demonstrate the ability to:</p> <ul style="list-style-type: none"> ● Use a scale drawing as a representation of actual lengths and area ● Sketch quadrilaterals with given conditions ● Name and classify quadrilaterals according to their properties ● Construct triangles with given conditions ● Conclude whether or not a triangle is formed and what type of triangle it is ● Calculate the measures of angles by using angle relationships ● Calculate the circumference, radius, or diameter of a circle ● Recognize the relationship between the circumference and the diameter of a circle and π. ● Find the area of a circle ● Use the area to find the radius and diameter ● Solve problems involving the area of a circle ● Describe cross sections of right rectangular prisms and pyramids

Haddon Township School District Curriculum Overview

		<ul style="list-style-type: none"> ● Solve problems involving cross sections ● Find the surface area of two-dimensional composite shapes ● Find the surface area of three-dimensional composite shapes ● Calculate the volume of various three-dimensional figures ● Solve problems involving the volume of three-dimensional figures
<p>Unit 11: Congruence and Similarity</p>	<p>Students understand the concept of translating figures and how the resulting images are related to the preimages. Students will also understand the concept of reflecting figures and recognize how the image is a flip of a preimage and that the two figures are an equal distance away from the line of reflection. Students will also develop their understanding of dilation to find and graph images. In this unit students will also recognize that congruent figures have the same shape and size. They know that congruent images are created by a sequence of reflections, rotations, and translations. In this unit, students recognize that parallel lines and a transversal create sets of angles. They will learn that there are angle-based relationships that can be used to categorize and determine the measures of unknown angles. Students will also build on their understanding of angle-based relationships and determine the missing measurements of interior and exterior angles of triangles.</p>	<p>Learners will demonstrate the ability to:</p> <ul style="list-style-type: none"> ● Understand translations ● Translate a figure on a coordinate plane ● Describe a translation ● Understand and describe a reflection ● Reflect two-dimensional figures ● Identify and perform a rotation ● Determine how a rotation affects a two-dimensional figure ● Understand a sequence of transformations ● Describe and perform a sequence of transformations ● Understand congruence of figures using a series of transformations ● Identify congruent figures ● Understand dilations ● Dilate to enlarge or reduce a figure in a coordinate plane ● Understand similarity ● Complete a similarity transformation ● Identify similar figures

Haddon Township School District Curriculum Overview

		<ul style="list-style-type: none"> ● Understand the relationships of angles formed by parallel lines and a transversal ● Find unknown angle measures ● Understand the relationship of the interior angles of a triangle. ● Find unknown angle measures. ● Determine whether triangles are similar <p style="text-align: center;">Solve problems involving similar triangles</p>
<p>Unit 12: Solve Problems Involving Surface Area and Volume</p>	<p>Students further their conceptual understanding of surface area by applying what they know to find the surface area of cylinders and cones. They identify the two-dimensional surfaces that make up three-dimensional figures and draw nets as a strategy for finding surface areas of cylinders and cones. In this unit students will also understand that volume is a measure of capacity. They relate volumes of cones, cylinders, and spheres to the volume of three-dimensional figures they know. They use these relationships to generalize volume formulas for cones, cylinders, and spheres.</p>	<p>Learners will demonstrate the ability to:</p> <ul style="list-style-type: none"> ● Find the surface areas of cylinders, cones, and spheres ● Recognize the relationship between the volume of a rectangular prism and the volume of a cylinder ● Solve real-world problems involving the volume of a cylinder ● Use the formula for volume of a cylinder to find an unknown measure ● Recognize the relationship between the volume of a cylinder and the volume of a cone ● Find the volume of a cone. Given the circumference of the base, find the volume of a cone ● Recognize the relationship between the volume of a cone and the volume of a sphere ● Find the volume of a sphere. Given the surface area, find the volume of a sphere <p style="text-align: center;">Find the volume of a composite figure</p>