Agile Mind Mathematics 6 Scope and Sequence, 2016-2017
Common Core State Standards for Mathematics

In the three years preceding Grade 6, students have acquired a strong foundation in numbers and operations, geometry, measurement, and data. They are fluent in multiplication of multi-digit whole numbers and have a solid conceptual understanding of all four operations with positive decimals. Understanding of measurement concepts (e.g. length, area, volume, angles), and of the representation and interpretation of data, are also emerging. The Grade 6 course outlined in this document begins by building on students' understanding of multiplication and division and equivalent fractions as a basis for understanding ratios and proportional reasoning. Work with positive rational numbers continues as students build fluency with standard algorithms for fraction and multi-digit decimal operations. Formal work with expressions and equations also begins at this level as students use variables to represent relationships and solve problems. Students then extend their understanding of numbers to include negative rational numbers, absolute value as a distance, and coordinates of points in all quadrants of the coordinate plane. Students also extend their understanding of length, area, and volume as they solve problems involving the areas of triangles, special quadrilaterals, and polygons, and volume of rectangular prisms. Finally, formal work with statistics begins at this grade level in the final two units as students represent data in various ways and build their understanding of statistical variation.

Throughout this Grade 6 course, students should continue to develop proficiency with the eight Standards for Mathematical Practice:

1. **Make sense of problems and persevere in solving them.**
2. **Reason abstractly and quantitatively.**
3. **Construct viable arguments and critique the reasoning of others.**
4. **Model with mathematics.**
5. **Use appropriate tools strategically.**
6. **Attend to precision.**
7. **Look for and make use of structure.**
8. **Look for and express regularity in repeated reasoning.**

These practices should become the natural way in which students come to understand and do mathematics. While, depending on the content to be understood or on the problem to be solved, any practice might be encouraged by teachers and applied by students, some practices may prove more useful than others in a given lesson, a problem, or a topic.

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Common Core State Standards for Mathematics

These course materials are designed to support 138-141 blocks of instruction and assessment (1 block equals 45 minutes).

Agile Mind Topics	Time allotment (1 block = 45 minutes)	Topic Descriptions	Common Core State Standards Standards for Mathematical Content • Standards listed in black are the primary instructional focus of the topic. • Standards in gray support topic content or indicate foundations for future work.
Whole numbers, ratios, and rates			
1: Operations with whole numbers	9 blocks	This topic reinforces the use of operations with whole numbers and moves students toward fluency with the division algorithm. Students also apply common factors and multiples in a variety of contexts, including using the Distributive Property in numerical contexts, and will extend their understanding of order of operations to include the use of exponents. Students will continue to build fluency with whole number division in subsequent topics, including **Understanding and representing rates**, **Multiplying and dividing rational numbers**, **Rates and measurement**, **Using equations and inequalities**, **Length and area**, **Surface area and volume**, and **Describing data**.	**The Number System — 6.NS** B. Compute fluently with multi-digit numbers and find common factors and multiples. 2. Fluently divide multi-digit numbers using the standard algorithm. 4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4 (9 + 2).* **Expressions and Equations — 6.EE** A. Apply and extend previous understandings of arithmetic to algebraic expressions. 1. Write and evaluate numerical expressions involving whole-number exponents. 2. Write, read, and evaluate expressions in which letters stand for numbers. b. Identify parts of an expression using mathematical terms (sum, ~~term~~, product, factor, quotient, ~~coefficient~~); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms*. c. ~~Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems~~. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$*. 3. Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*

2: Understanding and representing ratios	9 blocks	This topic investigates the uses of ratios and proportional reasoning in solving real-world problems. Student use tables and graphs to reason about ratio relationships, and they explore geometric representations of proportional relationships by investigating the use of scale factors to enlarge and reduce figures. They express proportional relationships in multiple ways and associate the multiple representations interchangeably.	**The Number System — 6.NS** C. Apply and extend previous understandings of numbers to the system of rational numbers. 8. Solve real-world and mathematical problems by graphing points in ~~all four quadrants of~~ the coordinate plane. ~~Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.~~ **Ratios and Proportional Relationships — 6.RP** A. Understand ratio concepts and use ratio reasoning to solve problems. 1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."* 3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole- number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
3: Understanding and representing rates	8 blocks	This topic explores the concept of rate through the use of tables, graphs, ratios, and equations. Students use rates in situations to solve real-world problems such as determining the "best buy" using unit prices. Hourly rates, miles per gallon, percentages, and batting averages are also used to model and apply this concept. Students also represent percents and use them to solve real-world problems. This topic provides numerous opportunities for students to build fluency with whole number division.	**Ratios and Proportional Relationships — 6.RP** A. Understand ratio concepts and use ratio reasoning to solve problems. 2. Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."* [1] NOTE: [1]Expectations for unit rates in this grade are limited to non-complex fractions. 3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. **The Number System — 6.NS**

			B. Compute fluently with multi-digit numbers and find common factors and multiples. 2. Fluently divide multi-digit numbers using the standard algorithm. C. Apply and extend previous understandings of numbers to the system of rational numbers. 8. Solve real-world and mathematical problems by graphing points in ~~all four quadrants of~~ the coordinate plane. ~~Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.~~
Rational numbers and their applications			
4: Equivalent forms: fractions, decimals, and percents	9* blocks **Because local standards often require it, Block 2 introduces the conversion of fractions to decimals through proportional reasoning. Additionally, for completeness, students are exposed to conversion through long division, including repeating decimals.*	This topic investigates the multiple representations of rational numbers as fractions, decimals, and percents. Students explore real-world settings and practice ordering rational numbers, from least to greatest and greatest to least. Students also practice converting from one form of a rational number to another through multiple representations.	**Ratios and Proportional Relationships — 6.RP** A. Understand ratio concepts and use ratio reasoning to solve problems. 1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."* 2. Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."* [1] NOTE: [1]Expectations for unit rates in this grade are limited to non-complex fractions. 3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. **The Number System — 6.NS** C. Apply and extend previous understandings of numbers to the system of rational numbers. 6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. c. Find and position ~~integers and~~ other rational numbers on a horizontal or vertical number line diagram; ~~find and position pairs of integers and other rational numbers on a coordinate plane~~.

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5: Adding and subtracting rational numbers	8 blocks	This topic provides students with opportunities to solve problems by adding and subtracting fractions and decimals, while reinforcing fluency with whole number operations. A variety of models that use appropriate tools allow interactive exploration of these operations. Students will apply their fluency with positive rational number addition and subtraction in subsequent topics, including **Using equations and inequalities**, **Length and area**, **Surface area and volume**, and **Describing data**.	**The Number System — 6.NS** B. Compute fluently with multi-digit numbers and find common factors and multiples. 3. Fluently add, subtract, ~~multiply, and divide~~ multi-digit decimals using the standard algorithm for each operation.
6: Multiplying and dividing rational numbers	10 blocks	This topic provides students with opportunities to solve problems by multiplying and dividing fractions and decimals. A variety of models and appropriate tools allow interactive exploration of these operations and reinforce students' fluency with whole number operations, especially the division algorithm. This learning is extended to include explorations with multiple operations in a single numerical expression. Students will apply their fluency with positive rational number operations in subsequent topics, including **Rates and measurement**, **Using equations and inequalities**, **Length and area**, **Surface area and volume**, and **Describing data**.	**The Number System — 6.NS** A. Apply and extend previous understandings of multiplication and division to divide fractions by fractions. 1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?* B. Compute fluently with multi-digit numbers and find common factors and multiples. 2. Fluently divide multi-digit numbers using the standard algorithm. 3. Fluently ~~add, subtract~~, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
7: Rates and measurement	7-8 blocks *Block 6 is an optional block that can be used as extension content.*	This topic investigates the relationship between distance, rate, and time through multiple representations such as equations, models, tables, and graphs. The solid understanding of the distance, time, and rate relationship is used as a springboard for investigating conversions between measurement units. Using proportional reasoning, students solve problems from real-world situations. Students also work interactively with motion as they visualize the graphical representation of increased and	**Ratios and Proportional Relationships — 6.RP** A. Understand ratio concepts and use ratio reasoning to solve problems. 3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about ~~tables of equivalent ratios~~, tape diagrams, double number line diagrams, or equations. b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

		decreased speed. This topic provides numerous opportunities for students to build and apply fluency with positive rational number operations.	**The Number System — 6.NS** B. Compute fluently with multi-digit numbers and find common factors and multiples. 2. Fluently divide multi-digit numbers using the standard algorithm. 3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
8: Extending the number system	9 blocks	This topic focuses on models that represent integers. Students learn about the position of integers and other rational numbers on number lines and develop an understanding of opposites and absolute value. They explore real-world examples of integers in a variety of contexts. Students then extend their understanding of integers and other rational numbers as they graph points in all four quadrants, and examine how the coordinates of points are impacted by reflections across the x- and y-axes.	**The Number System — 6.NS** C. Apply and extend previous understandings of numbers to the system of rational numbers. 5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. 6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite. b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. 7. Understand ordering and absolute value of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right*. b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write –3 ℃ > –7 ℃ to express the fact that –3 ℃ is warmer than –7 ℃.* c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or

			negative quantity in a real-world situation. *For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.* d. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars*. 8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. ~~Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.~~
Expressions, equations, and inequalities			
9: Variables and expressions	12 blocks	In this topic, students explore patterns and relationships through multiple representations such as tables, graphs, models, and algebraic rules. They use variables to represent numbers and write expressions when solving problems. Students will also generate and compare equivalent expressions.	**The Number System — 6.NS** B. Compute fluently with multi-digit numbers and find common factors and multiples. 2. Fluently divide multi-digit numbers using the standard algorithm. 3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. C. Apply and extend previous understandings of numbers to the system of rational numbers. 8. Solve real-world and mathematical problems by graphing points in ~~all four quadrants of~~ the coordinate plane. ~~Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.~~ **Ratios and Proportional Relationships — 6.RP** A. Understand ratio concepts and use ratio reasoning to solve problems. 3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole- number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. ~~Use tables to compare ratios.~~ b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* **Expressions and Equations — 6.EE** A. Apply and extend previous understandings of arithmetic to algebraic expressions. 2. Write, read, and evaluate expressions in which letters stand for numbers.

			a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y*. b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms*. c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, ~~including those involving whole-number exponents,~~ in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length s = 1/2*. 3. Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.* 4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for*. 6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. C. Represent and analyze quantitative relationships between dependent and independent variables. 9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.*

10: Equality and inequality	6 blocks	This topic explores the idea of equality and inequality in a concrete, meaningful manner. Students make connections between models and explanations of the concept of equality. Students work with basic number properties to build an understanding that is both intuitive and abstract.	**Ratios and Proportional Relationships — 6.RP** A. Understand ratio concepts and use ratio reasoning to solve problems. 3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* **The Number System — 6.NS** B. Compute fluently with multi-digit numbers and find common factors and multiples. 2. Fluently divide multi-digit numbers using the standard algorithm. 3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. C. Apply and extend previous understandings of numbers to the system of rational numbers. 6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; ~~find and position pairs of integers and other rational numbers on a coordinate plane~~. 7. Understand ordering and absolute value of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right*. b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write –3 ℃ > –7 ℃ to express the fact that –3 ℃ is warmer than –7 ℃.* **Expressions and Equations — 6.EE** B. Reason about and solve one-variable equations and inequalities. 6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. 8. Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that

			inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
11: Using equations and inequalities	9 blocks	In this topic, students explore the relationships among different representations of patterns and continue to develop algebraic rules to describe patterns. They also formulate simple equations and inequalities that arise from algebraic rules and solve them with concrete models and properties of equality. As students solve equations, they continue to build and apply fluency with positive rational number operations.	**Ratios and Proportional Relationships — 6.RP** A. Understand ratio concepts and use ratio reasoning to solve problems. 3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? **The Number System — 6.NS** B. Compute fluently with multi-digit numbers and find common factors and multiples. 2. Fluently divide multi-digit numbers using the standard algorithm. 3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. C. Apply and extend previous understandings of numbers to the system of rational numbers. 6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; ~~find and position pairs of integers and other rational numbers on a coordinate plane~~. 7. Understand ordering and absolute value of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right*. b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write –3 ℃ > –7 ℃ to express the fact that –3 ℃ is warmer than –7 ℃.* 8. Solve real-world and mathematical problems by graphing points in ~~all four quadrants of~~ the coordinate plane. ~~Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.~~ **Expressions and Equations — 6.EE** A. Apply and extend previous understandings of arithmetic to algebraic

			expressions. 2. Write, read, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation of "Subtract y from 5" as 5 – y.* c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length s = 1/2*. B. Reason about and solve one-variable equations and inequalities. 5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. 6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. 7. Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q and x are all nonnegative rational numbers. 8. Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams. C. Represent and analyze quantitative relationships between dependent and independent variables. 9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time*.

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Common Core State Standards for Mathematics

Geometry			
12: Length and area	13 blocks	In this topic, students will build on their understanding of length and area in triangles and rectangles. Students will estimate lengths and areas in polygons and other atypical shapes and then verify those estimates through application of what they know about the areas of rectangles and quadrilaterals. Students will also analyze polygons in the coordinate plane and determine simple distances by applying their understanding of integers and other rational numbers. As students find length and area, they continue to build and apply fluency with positive rational number operations.	**Ratios and Proportional Relationships — 6.RP** A. Understand ratio concepts and use ratio reasoning to solve problems. 3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. **The Number System — 6.NS** B. Compute fluently with multi-digit numbers and find common factors and multiples. 2. Fluently divide multi-digit numbers using the standard algorithm. 3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. C. Apply and extend previous understandings of numbers to the system of rational numbers. 8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. **Expressions and Equations — 6.EE** A. Apply and extend previous understandings of arithmetic to algebraic expressions. 1. Write and evaluate numerical expressions involving whole-number exponents. 2. Write, read, and evaluate expressions in which letters stand for numbers. c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas V = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = 1/2. **Geometry — 6.G** A. Solve real-world and mathematical problems involving area, surface area, and volume. 1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. 3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first

			coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
13: Surface area and volume	7-9 blocks *Blocks 7 and 8 can be used as an extension activity related to different views of 3-dimensional shapes.*	This topic introduces volume and surface area of prisms. Students will use nets to construct three-dimensional shapes and to determine surface area. Students will solve problems involving surface area and volume in a variety of contexts. As students find surface area and volume, they continue to build and apply fluency with positive rational number operations.	**Ratios and Proportional Relationships — 6.RP** A. Understand ratio concepts and use ratio reasoning to solve problems. 3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. **The Number System — 6.NS** B. Compute fluently with multi-digit numbers and find common factors and multiples. 2. Fluently divide multi-digit numbers using the standard algorithm. 3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. **Expressions and Equations — 6.EE** A. Apply and extend previous understandings of arithmetic to algebraic expressions. 2. Write, read, and evaluate expressions in which letters stand for numbers. c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas V = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = 1/2. **Geometry — 6.G** A. Solve real-world and mathematical problems involving area, surface area, and volume. 2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. 4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Agile Mind Mathematics 6 Scope and Sequence, 2016-2017
Common Core State Standards for Mathematics

Data analysis			
14: Graphical representations of data	8 blocks	This topic explores graphical representations of data including bar graphs, circle graphs, line plots, stem-and-leaf plots, and histograms. Students explore the characteristics of each representation and use them to both pose and answer questions. Students learn to choose a representation based on the type of data (categorical or numerical) they have collected and the purpose of the representation.	**Ratios and Proportional Relationships — 6.RP** A. Understand ratio concepts and use ratio reasoning to solve problems. 3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. **The Number System — 6.NS** B. Compute fluently with multi-digit numbers and find common factors and multiples. 2. Fluently divide multi-digit numbers using the standard algorithm. 3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. **Statistics and Probability — 6.SP** A. Develop understanding of statistical variability. 1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students'* B. Summarize and describe distributions. 4. Display numerical data in plots on a number line, including dot plots, histograms, ~~and box plots~~.
15: Describing data	14 blocks	This topic explores the measures of central tendency: mean, median, and mode. Students learn how to compute the measures and how to choose one measure to represent their data. They learn how to make a visual representation of data, such as a line plot, box-and-whisker plot, or a histogram, and describe the shape and variability of their data, including finding the range, mean absolute deviation, and interquartile range, and identifying outliers. As students find measures of center and spread, they continue to build and apply fluency with positive rational number operations.	**The Number System — 6.NS** B. Compute fluently with multi-digit numbers and find common factors and multiples. 2. Fluently divide multi-digit numbers using the standard algorithm. 3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. **Statistics and Probability — 6.SP** A. Develop understanding of statistical variability. 2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. 3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number. 4. Display numerical data in plots on a number line, including dot plots,

			histograms, and box plots. 5. Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.