

Abington Heights School District Grade 6 Mathematics Curriculum



In Sixth Grade, students develop their numeracy skills through the following areas of study:

1. Ratios and Proportional Relationships
2. The Number System
3. Expressions and Equations
4. Geometry
5. Statistics and Probability

Board Approval Date: 5/3/2023

Adoption: 2023 - 2024 SY

Review Date:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

AH MATHEMATICS

Where collaborative problem solving and
perseverance lead to excellence



Abington Heights Math Framework

Stakeholders	Actions
Students	<ul style="list-style-type: none"> ★ Engage in mathematical discussions, share their ideas openly, be inquisitive, seek to understand and learn more about mathematical concepts, and try their best daily. ★ Exhibit creativity and curiosity in problem solving individually and collaboratively. ★ Persevere in engaging and challenging daily mathematical practice. ★ Come prepared to learn every day.
Teachers	<ul style="list-style-type: none"> ★ Create a safe and collaborative classroom environment where students feel vested in a shared vision for mathematical excellence. ★ Develop high quality instruction that meets the needs of all learners through differentiation. ★ Use a variety of 21st century methodologies to advance learning. ★ Partner with parents and guardians to support student success. ★ Establish a collaborative community within the building and amongst grade levels to ensure a cohesive level of instruction.
Building Leaders	<ul style="list-style-type: none"> ★ Deeply understand the needs of teachers, students, the instructional materials being used, programs being implemented, and the expectations for state-level assessment scores <ul style="list-style-type: none"> ○ Knowledgeable about program and grade level standards ○ Ensure consistent and equal access to high-quality instructional materials and resources, building. ★ Be partners with teachers, students and families: <ul style="list-style-type: none"> ○ Provide guidance and support to the mathematical community. ○ Understand needs of teachers, students and families. ★ Trust the educators to make professional decisions based on program, student, and district needs.
Central Admin	<ul style="list-style-type: none"> ★ Effectively communicate to the school board and community specific areas of need and how to support teachers and building leaders in a quest for mathematical excellence ★ Deeply understand the needs of teachers, students, the instructional materials being used, programs being implemented, and the expectations for state-level assessment scores <ul style="list-style-type: none"> ○ Have a common metric for mathematical excellence. ○ Ensure consistent and equal access to high-quality instructional materials and resources, district. ○ Re-examine best practices/curriculum routinely (6 years). ★ Support a culture of collaboration between the other stakeholder groups to maintain the standard of excellence of the Abington Heights ★ Trust the educators to make professional decisions based on program, student, and district needs.
Parents/Community	<ul style="list-style-type: none"> ★ Be a strong support system and contribute by building a positive math community for students. ★ Encourage a positive math mindset. ★ Have conversations with their children about school and ask what they are learning about in school. ★ Be open, receptive to the district's ideas about student learning and reach out to teachers/school to learn more about how they can support. ★ Trust the educators to make professional decisions based on program, student, and district needs.
School Board	<ul style="list-style-type: none"> ★ Provide the fiscal resources to support: <ul style="list-style-type: none"> ○ Highly qualified professionals for mathematics ○ High-quality instructional materials ○ Effective and efficient math interventions for remediation ○ Professional development for math content and instructional practices ★ Trust the educators to make professional decisions based on program, student, and district needs.

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PA Core Standards	PA Eligible Content	Big Ideas Mathematics Grade 6 Lessons
Ratios and Proportional Relationships		
CC.2.1.6.D.1 Understand ratio concepts and use ratio reasoning to solve problems.	<p>MO6.A-R.1.1.1 Use ratio language and notation (such as 3 to 4, 3:4, $\frac{3}{4}$) to describe a ratio relationship between two quantities. Example 1: “The ratio of girls to boys in a math class is 2:3 because for every 2 girls there are 3 boys.” Example 2: “For every five votes candidate A received, candidate B received four votes.”</p> <p>MO6.A-R.1.1.2 Find the unit rate a/b associated with a ratio $a:b$ (with $b \neq 0$) and use rate language in the context of a ratio relationship. Example 1: “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $\frac{3}{4}$ cup of flour for each cup of sugar.” Example 2: “We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.”</p> <p>MO6.A-R.1.1.3 Construct tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and/or plot the pairs of values on the coordinate plane. Use tables to compare ratios.</p> <p>MO6.A-R.1.1.4 Solve unit rate problems including those involving unit pricing and constant speed. 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?</p> <p>MO6.A-R.1.1.5 Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $\frac{30}{100}$ times the quantity); solve problems involving finding the whole, given a part and the percentage.</p>	5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 7.4

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The Number System		
CC.2.1.6.E.1 Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	MO6.A-N.1.1.1 Interpret and compute quotients of fractions (including mixed numbers), and solve word problems involving division of fractions by fractions.	2.1, 2.2, 2.3
CC.2.1.6.E.2 Identify and choose appropriate processes to compute fluently with multi-digit numbers.	MO6.A-N.2.1.1 Solve problems involving operations (+, −, ×, and ÷) with whole numbers, decimals (through thousandths), straight computation, or word problems.	1.1, 2.4, 2.5, 2.6
CC.2.1.6.E.3 Develop and/or apply number theory concepts to find common factors and multiples.	<p>MO6.A-N.2.2.1 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.</p> <p>MO6.A-N.2.2.2 Apply the distributive property to express a sum of two whole numbers, 1 through 100, with a common factor as a multiple of a sum of two whole numbers with no common factor. Example: Express $36 + 8$ as $4(9 + 2)$</p>	1.4, 1.5, 1.6, Extension 1.6, 3.4, Extension 3.4
CC.2.1.6.E.4 Apply and extend previous understandings of numbers to the system of rational numbers.	<p>MO6.A-N.3.1.1 Represent quantities in real-world contexts using positive and negative numbers, explaining the meaning of 0 in each situation (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge).</p> <p>MO6.A-N.3.1.2 Determine the opposite of a number and recognize that the opposite of the opposite of a number is the number itself (e.g., $-(-3) = 3$; 0 is its own opposite).</p> <p>MO6.A-N.3.1.3 Locate and plot integers and other rational numbers on a horizontal or vertical number line; locate and plot pairs of integers and other</p>	6.1, 6.2, 6.3, 6.4, 6.5, Extension 6.5

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	<p>rational numbers on a coordinate plane.</p> <p>MO6.A-N.3.2.1 Write, interpret, and explain statements of order for rational numbers in real-world contexts. Example: Write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°C.</p> <p>MO6.A-N.3.2.2 Interpret the absolute value of a rational number as its distance from 0 on the number line and as a magnitude for a positive or negative quantity in a real-world situation. Example: For an account balance of -30 dollars, write $-30 = 30$ to describe the size of the debt in dollars, and recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.</p> <p>MO6.A-N.3.2.3 Solve real-world and mathematical problems by plotting 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.</p>	
Expressions and Equations		
<p>CC.2.2.6.B.1 Apply and extend previous understandings of arithmetic to algebraic expressions.</p>	<p>MO6.B-E.1.1.1 Write and evaluate numerical expressions involving whole-number exponents.</p> <p>MO6.B-E.1.1.2 Write algebraic expressions from verbal descriptions. Example: Express the description “five less than twice a number” as $2y - 5$.</p> <p>MO6.B-E.1.1.3 Identify parts of an expression using mathematical terms (e.g., sum, term, product, factor, quotient, coefficient, quantity). Example: Describe the expression $2(8 + 7)$ as a product of two factors.</p>	<p>1.2, 1.3, 1.5, 3.1, 3.2, 3.3, 3.4, Extension 3.4</p>

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	<p>MO6.B-E.1.1.4 Evaluate expressions at specific values of their variables, including expressions that arise from formulas used in real-world problems. Example: Evaluate the expression $b^2 - 5$ when $b = 4$.</p> <p>MO6.B-E.1.1.5 Apply the properties of operations to generate equivalent expressions. Example 1: Apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$. Example 2: Apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$. Example 3: Apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.</p>	
<p>CC.2.2.6.B.2 Understand the process of solving a one-variable equation or inequality and apply to real-world and mathematical problems.</p>	<p>MO6.B-E.2.1.1 Use substitution to determine whether a given number in a specified set makes an equation or inequality true.</p> <p>MO6.B-E.2.1.2 Write algebraic expressions to represent real-world or mathematical problems.</p> <p>MO6.B-E.2.1.3 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 non-negative rational numbers.</p> <p>MO6.B-E.2.1.4 Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem and/or represent solutions of such inequalities on number lines.</p>	<p>3.2, 3.3, 3.4, 7.1, 7.2, 7.3, 7.5, 7.6, 7.7</p>
<p>CC.2.2.6.B.3 Represent and analyze quantitative relationships between dependent and independent variables.</p>	<p>MO6.B-E.3.1.1 Write an equation to express the relationship between the dependent and independent variables. Example: In a problem involving motion at a constant speed of 65 units, write the equation $d =$</p>	<p>7.4</p>

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	<p>65t to represent the relationship between distance and time.</p> <p>MO6.B-E.3.1.2 Analyze the relationship between the dependent and independent variables using graphs and tables and/or relate these to an equation.</p>	
Geometry		
<p>CC.2.3.6.A.1 Apply appropriate tools to solve real-world and mathematical problems involving area, surface area, and volume.</p>	<p>MO6.C-G.1.1.1 Determine the area of triangles and special quadrilaterals (i.e., square, rectangle, parallelogram, rhombus, and trapezoid). Formulas will be provided.</p> <p>MO6.C-G.1.1.2 Determine the area of irregular or compound polygons. Example: Find the area of a room in the shape of an irregular polygon by composing and/or decomposing.</p> <p>MO6.C-G.1.1.3 Determine the volume of right rectangular prisms with fractional edge lengths. Formulas will be provided.</p> <p>MO6.C-G.1.1.4 Given coordinates for the vertices of a polygon in the plane, use the coordinates to find side lengths and area of the polygon (limited to triangles and special quadrilaterals). Formulas will be provided.</p> <p>MO6.C-G.1.1.5 Represent three-dimensional figures using nets made of rectangles and triangles.</p> <p>MO6.C-G.1.1.6 Determine the surface area of triangular and rectangular prisms (including cubes). Formulas will be provided.</p>	<p>4.1, 4.2, 4.3, Extension 4.3, 4.4, 8.1, 8.2, 8.3, 8.4</p>
Statistics and Probability		

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<p>CC.2.4.6.B.1 Use a set of numerical data to develop an understanding of and recognize statistical variability.</p>	<p>MO6.D-S.1.1.1 Display numerical data in plots on a number line, including line plots, histograms, and box-and-whisker plots.</p> <p>MO6.D-S.1.1.2 Determine quantitative measures of center (e.g., median, mean, mode) and variability (e.g., range, interquartile range, mean absolute deviation).</p> <p>MO6.D-S.1.1.3 Describe any overall pattern and any deviations from the overall pattern with reference to the context in which the data were gathered.</p> <p>MO6.D-S.1.1.4 Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.</p>	<p>9.1, 9.2, 9.3, 9.4, 9.5, 10.2, 10.3, 10.4</p>

Portrait of an Abington Heights 6th Grade Mathematician



By the end of 6th Grade, students will:

The Number System	Ratios & Proportional Relationships	Expressions and Equations	Geometry	Statistics and Probability
<ul style="list-style-type: none"> <input type="checkbox"/> Divide fractions by fractions <input type="checkbox"/> Fluently add, subtract, multiply, and divide with whole numbers and decimals (through thousandths) <input type="checkbox"/> Find greatest common factor and least common multiple <input type="checkbox"/> Understand that positive and negative numbers are used together to describe quantities having opposite directions or values <input type="checkbox"/> Find and position integers and rational numbers/pairs of numbers on a number line/coordinate plane <input type="checkbox"/> Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane including use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. 	<ul style="list-style-type: none"> <input type="checkbox"/> Apply and extend previous understanding of numbers to system of rational numbers <input type="checkbox"/> Understand ratio concepts and use ratio reasoning to solve problems <input type="checkbox"/> Understand unit rate <input type="checkbox"/> Explore and create equivalent ratios <input type="checkbox"/> Find a percent of a quantity as a rate per 100 <input type="checkbox"/> Use ratio reasoning to convert measurement units 	<ul style="list-style-type: none"> <input type="checkbox"/> Apply and extend previous understanding of arithmetic to algebraic expressions <input type="checkbox"/> Write and evaluate numerical expressions involving whole-number exponents <input type="checkbox"/> Write, read, and evaluate expressions in which letters stand for numbers <input type="checkbox"/> Apply the distributive property to expressions <input type="checkbox"/> Apply order of operations <input type="checkbox"/> Apply properties of operations to produce equivalent expressions <input type="checkbox"/> Write and graph an inequality in the form $x > c$ or $x < c$ and $x + c < a$ or $x + c > a$ and recognize that inequalities have infinitely many solutions <input type="checkbox"/> Represent and analyze quantitative relationships between dependent and independent variables by writing and solving equations in the form $x + p = q$ and $px = q$ 	<ul style="list-style-type: none"> <input type="checkbox"/> Find area of triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes <input type="checkbox"/> Apply the formulas $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world problems <input type="checkbox"/> Draw polygons in coordinate plane, using coordinates to find side lengths with the same first or second coordinate <input type="checkbox"/> Represent three-dimensional figures using nets of rectangles and triangles and find surface area of triangular and rectangular prisms 	<ul style="list-style-type: none"> <input type="checkbox"/> Develop understanding of statistical variability <input type="checkbox"/> Summarize and describe distributions and numerical data sets in plots on a number line, including line plots, histograms, and box-and-whisker plots <input type="checkbox"/> Interpret data through measures of central tendency (mean, median, mode) and variability (range, interquartile range, mean absolute deviation) and describe the overall pattern and any deviations

Notes: