



Mathematics Instruction in the Downingtown Area School District

- Mathematics instruction in the Downingtown Area School District is aligned to the PA Core Standards. This document communicates an overview of the focus of mathematics instruction at each grade level from K-8 and for high school courses addressed in the PA Core Standards. Parents are encouraged to talk with the teacher to find out more about specific strategies, content examples, and resources used in their child’s classroom.
- The PA Core Mathematics Standards include Standards for Mathematical Content and Standards for Mathematical Practice.
- There are four strands in the Standards for Mathematical Content: (1) Numbers and Operations, (2) Algebraic Concepts, (3) Geometry, and (4) Measurement, Data, and Probability.
- All mathematical content instruction is framed around 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 make sense of regularity in repeated reasoning.
- Prekindergarten skills are identified to create an awareness for parents of incoming kindergarten students of the pre-requisite skills necessary for success in Downingtown’s kindergarten program.
- The core resource for teaching the district K-5 mathematics curriculum is *Math In Focus* published by Houghton Mifflin Harcourt in 2013.
- The core resource for teaching the district 6-8 mathematics curriculum is *Big Ideas Math* published by Big Ideas Learning in 2014.

<p>Prekindergarten</p> <p><i>NOTE: The Downingtown Area School District does not offer a prekindergarten program.</i></p>	<p>Prekindergarten mathematics instruction focuses on the understanding of whole numbers using concrete materials and describing shapes in the environment. More learning time in prekindergarten should be devoted to developing the concept of number than to other topics.</p>
<p>Kindergarten</p>	<p>In kindergarten, instructional time focuses on two critical areas:</p> <p>(1) representing, relating, and operating on whole numbers, initially with sets of objects;</p> <p>(2) describing shapes and space.</p> <p>More learning time in kindergarten is devoted to numbers and number sense than to other mathematical topics.</p>
<p>Grade 1</p>	<p>In grade 1, instructional time focuses on four critical areas:</p> <p>(1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20;</p> <p>(2) developing understanding of whole number relationships and place value, including grouping in tens and ones;</p> <p>(3) developing understanding of linear measurement and measuring lengths as iterating length units; and,</p> <p>(4) reasoning about attributes of, and composing and decomposing geometric shapes.</p>



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Grade 2	In Grade 2, instructional time focuses on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes and partitioning them into equal-sized pieces (halves, quarters and thirds) while developing an understanding that the more pieces in the whole, the smaller the piece.
Grade 3	In Grade 3, instructional time focuses on five critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100 (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; (4) describing and analyzing two-dimensional shapes; and (5) solving problems involving measurement and estimation of intervals of time, money, liquid volumes, masses, and lengths of objects.
Grade 4	In Grade 4, instructional time focuses on four critical areas: (1) developing understanding and fluency with multi-digit multiplication including familiarity with patterns, factors and multiples, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction/decimal equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry; and (4) solving problems involving length, weight, liquid, mass, volume, time, area, and perimeter.
Grade 5	In grade 5, instructional time focuses on three critical areas: (1) developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to two-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume.
Grade 6	In Grade 6, instructional time focuses on four critical areas: (1) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers;



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	<p>(3) writing, interpreting, and using expressions and equations; and</p> <p>(4) developing understanding of statistical thinking.</p>
Grade 7	<p>In Grade 7, instructional time focuses on four critical areas:</p> <p>(1) developing understanding of and applying proportional relationships;</p> <p>(2) developing understanding of operations with rational numbers and working with expressions and linear equations;</p> <p>(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</p> <p>(4) drawing inferences about populations based on samples.</p>
Grade 8	<p>In Grade 8, instructional time focuses on three critical areas:</p> <p>(1) formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations;</p> <p>(2) grasping the concept of a function and using functions to describe quantitative relationships;</p> <p>(3) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.</p>
Algebra 1	<p>(1) At this level students formalize and expand on Algebraic concepts established in previous coursework.</p> <p>(2) Students deepen and extend their understanding of linear and exponential relationships by contrasting them with each other and by applying linear models to data that exhibit a linear trend.</p> <p>(3) Students engage in methods for analyzing, and using functions.</p> <p>(4) Students fluently move between multiple representations of functions including but not limited to linear, exponential and quadratics.</p>
Algebra 2	<p>(1) Students extend their repertoire of functions to include polynomial, rational, trigonometric, and radical functions.</p> <p>(2) Working closely with families of functions, students apply their understanding of transformations.</p> <p>(3) Students model situations and solve equations including quadratics over the set of complex numbers and exponential equations using the properties of logarithms.</p> <p>(4) Students use descriptive statistics and probability as a tool for making inferences.</p>
Geometry	<p>(1) In this course, students formalize, deepen and extend their geometric and algebraic experiences.</p> <p>(2) Students continue their work with similarity and congruence.</p> <p>(3) Students explore more complex geometric concepts, and relationships, including: formal mathematical arguments, transformations, the coordinate system, right triangle trigonometry, circles and probability.</p>