



# Hamburg School District

## Office of Curriculum and Instruction

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Our core instructional program for all middle school students, beginning with the 6th grade class of 2009-2010, consists of a three-year integrated sequence of instruction, which covers two years of pre-algebra and one year of Algebra I. These courses are designated as follows: Grade Six Mathematics, Grade Seven Pre-Algebra, and Grade Eight Algebra.

### **Grade Six Mathematics Topics of Study\***

- New Jersey Core Curriculum Mathematics Standards for Grade 6
  - 4.1 Numbers and Numerical Operations
  - 4.2 Geometry and Measurement
  - 4.3 Patterns and Algebra
  - 4.4 Data Analysis, Probability, & Discrete Math
  - 4.5 Problem Solving, Communication, Connections, (Algebraic) Reasoning, Representations, Technology

Visit:

[www.nj.gov/education/njpep/standards/revised\\_standards/math\\_newstandards/TOC.html](http://www.nj.gov/education/njpep/standards/revised_standards/math_newstandards/TOC.html) for specific cumulative progress indicators for grade six.

Base Series: *Connected Mathematics 2*

### **Topic/Concepts include:**

*In Prime Time students will explore Number Theory, certain important properties of whole numbers, especially those related to multiplication and division.*

- *Understand relationships among factors, multiples, divisors, and products;*
- *Recognize and use properties of prime and composite numbers, even and odd numbers, and square numbers;*
- *Use rectangles to represent the factor pairs of numbers;*
- *Develop strategies for finding factors and multiples, least common multiples, and greatest common factors;*
- *Recognize and use the fact that every whole number can be written in exactly one way as a product of prime numbers;*
- *Use factors and multiples to solve problems and to explain some numerical facts of everyday life; and*
- *Develop a variety of strategies for solving problems building models, making lists and tables, drawing diagrams, and solving simpler problems.*

### *Shapes and Designs:*

- *Understand important properties of polygons and recognize polygonal shapes both in and out of the classroom;*
- *Investigate the symmetries of a shape-rotational or reflectional;*



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- *Estimate the size of any angle using reference to a right angle and other benchmark angles;*
- *Use an angle ruler for making more accurate angle measurements;*
- *Explore parallel lines and angles created by lines intersecting parallel lines;*
- *Find patterns that help determine angle sums of polygons;*
- *Determine which polygons fit together to cover a flat surface and why;*
- *Explain the property of triangles that makes them useful as a stable structure for building;*
- *Find that the sum of any two side lengths of a triangle is greater than the third side length;*
- *Find that the sum of any three side lengths of a quadrilateral is greater than the fourth side length; and*
- *Reason about and solve problems involving shapes.*

### *Covering and Surrounding:*

- *Understand area and relate area to covering a figure;*
- *Understand perimeter and relate perimeter to surrounding a figure;*
- *Develop strategies for finding areas and perimeters of rectangular shapes and non-rectangular shapes;*
- *Discover relationships between perimeter and area. including that each can vary while the other stays fixed;*
- *Understand how the areas of simple geometric figures relate to each other (e.g. the area of a parallelogram is twice the area of a triangle with the same base and height);*
- *Develop formulas and procedures-stated in words and/or symbols-for finding areas and perimeters of rectangles, parallelograms, triangles, and circles;*
- *Develop techniques for estimating the area and perimeter of an irregular figure; and*
- *Recognize situations in which measuring perimeter or area will help answer practical questions.*

### *Bits and Pieces I - students will study rational numbers and operations with rational numbers:*

- *Build an understanding of fractions, decimals, and percents and the relationships between and among these concepts and their representations;*
- *Develop ways to model situations involving fractions, decimals, and percents;*
- *Understand and use equivalent fractions to reason about situations;*
- *Compare and order fractions;*
- *Move flexibly between fraction, decimal, and percent representations;*
- *Use benchmarks such as 0,  $\frac{1}{2}$ , 1, and  $\frac{1}{4}$  to help estimate the size of a number or sum;*
- *Develop and use benchmarks that relate different forms of representations of rational numbers (for example, 50% is the same as  $\frac{1}{2}$  and 0.5);*
- *Use physical models and drawings to help reason about a situation;*
- *Look for patterns and describe how to continue the pattern;*
- *Use context to help reason about a situation; and*



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- *Use estimation to understand a situation.*

### *Bits and Pieces II – operations with fractions:*

- *Use benchmarks and other strategies to estimate the reasonableness of results of operations with fractions;*
- *Develop ways to model sums, differences, products, and quotients with areas, strips, and number lines;*
- *Use exact solutions and estimates to make decisions;*
- *Look for and generalize patterns in numbers;*
- *Use knowledge of fractions and equivalence of fractions to develop and learn algorithms for adding, subtracting, multiplying and dividing fractions;*
- *Recognize when addition, subtraction, multiplication, and division is the appropriate operation to solve a problem;*
- *Write fact families to show the inverse relationship between addition and subtraction, and between multiplication and division; and*
- *Solve problems using arithmetic operations on fractions.*

### *Bits and Pieces III, along with Bits and Pieces I and Bits and Pieces II, completes the development of meaning of, and operations on, fractions, decimals, and percents:*

- *Connect to what students already know about operations on fractions and whole numbers;*
- *Develop and use benchmarks and other strategies to estimate the answers to computations with decimals;*
- *Develop meaning of and algorithms for operations with decimals*
- *Use the relationship between decimals and fractions to develop and understand why decimal algorithms work;*
- *Use the place value interpretation of decimals to make sense of short-cut algorithms for operations;*
- *Generalize number patterns to help make sense of decimal operations;*
- *Understand when addition, subtraction, multiplication or division is an appropriate operation to use to solve a problem;*
- *Understand that decimals are often associated with measurements in real world situations;*
- *Solve problems using operations on decimals;*
- *Use understanding of operations and the meaning of percents to solve percent problems of the form  $a\%$  of  $b$  equals  $c$  for any one of the variables  $a$ ,  $b$ , or  $c$ ; and*
- *Create and interpret circle graphs.*

### *How Likely Is It?:*

- *Understand that probabilities are useful for predicting what will happen over the long run;*



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- *Understand the concepts of equally likely and not equally likely;*
- *Understand that a game of chance is fair only if each player has the same chance of winning, not just a possible chance of winning;*
- *Understand that there are two ways to build probability models: by gathering data from experiments (experimental probability) and by analyzing the possible equally likely outcomes (theoretical probability);*
- *Understand that experimental probabilities are better estimates of theoretical probabilities when they are based on larger numbers of trials;*
- *Develop strategies for finding both experimental and theoretical probabilities; and*
- *Critically interpret statements of probability to make decisions or answer questions.*

### *Data About Us:*

- *Understand and use the process of data investigation by posing questions, collecting and analyzing data distributions, and making interpretations to answer questions;*
- *Represent data distributions using line plots, bar graphs, stem-and-leaf plots, and coordinate graphs;*
- *Compute the mean, median, or mode and the range of the data;*
- *Distinguish between categorical data and numerical data and identify which graphs and statistics may be used to represent each kind of data;*
- *Make informed decisions about which graph or graphs and which of the measures of center (mean, median, or mode) and range may be used to describe a data distribution; and*
- *Develop strategies for comparing data distributions.*

*Note ~ for additional practice and information for Grade Six, visit:*

[www.phschool.com/cmp2/webcodes10/index.cfm?fuseaction=home.gotoWebCode&wcprefix=amk&wcsuffix=0099](http://www.phschool.com/cmp2/webcodes10/index.cfm?fuseaction=home.gotoWebCode&wcprefix=amk&wcsuffix=0099)

***\* The grade six program will also include enrichment and remediation topics to prepare students for differentiated programs of study for success in future course work in mathematics at the middle school and high school levels.***