

MATH CURRICULUM OVERVIEW

Introduction

Overview RAKAAG Math Curriculum Framework

An information-and technology-based society requires individuals who can think critically about complex issues, analyze and adapt to new situations, solve problems of various kinds, and communicate their thinking effectively. The study of mathematics equips students with knowledge, skills, and habits of mind that are essential for successful and rewarding participation in such a society. To learn mathematics in a way that will serve them well throughout their lives, students need classroom experiences that help them develop mathematical understanding; learn important facts, skills, and procedures; develop the ability to apply the processes of mathematics; and acquire a positive attitude towards mathematics.

The RAK AAG mathematics curriculum for Grades 1 to 12 provides the framework needed to meet these goals. Learning mathematics results in more than a mastery of basic skills. It equips students with a concise and powerful means of communication. Mathematical structures, operations, processes, and language provide students with a framework and tools for reasoning, justifying conclusions, and expressing ideas clearly. Through mathematical activities that are practical and relevant to their lives, students develop mathematical understanding, problem-solving skills, and related technological skills that they can apply in their daily lives and, eventually, in the workplace. Mathematics is a powerful learning tool. As students identify relationships between mathematical concepts and everyday situations and make connections between mathematics and other subjects, they develop the ability to use mathematics to extend and apply their knowledge in other curriculum areas, including science, music, and language.

Course Overview Description

MATH OVERVIEW (K -5)

In Kindergarten, instructional time should focus on two critical areas: (1) representing and comparing whole numbers, initially with sets of objects; (2) describing shapes and space. More learning time in Elementary grades should be devoted to number than to other topics.

GRADE 1 -5 /MATH - OVERVIEW

In Grade 1-5, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.

MATH OVERVIEW (G 6 -8)

This program develops algebraic fluency by providing students with the skills needed to solve equations and perform important manipulations with numbers, variables, equations, and inequalities. Students will gain an understanding of the properties of real numbers, solve linear equations, and use data analysis techniques. In the first half of the Grade 6 Math course, students sharpen their computational and problem-solving skills while learning the language of Algebra.

The Math program in Grade 6-8 develops algebraic fluency by providing students with the skills needed to solve equations and perform important manipulations with numbers, variables, equations, and inequalities. Students also learn concepts central to the abstraction and generalization that algebra makes possible. Students who take Algebra 1 are expected to have mastered the skills and concepts presented in the Grade 5 Math Courses

MATH OVERVIEW (G 9 - 12)

The goal of this course is to provide a solid Algebra experience for future courses in math including Geometry and Algebra I or Algebra II - SAT/Trigonometry. We also aim to review and extend Algebra skills and knowledge needed for successful completion of Calculus in the senior year. A variety of extra-curricular materials are employed to prepare the students for the PSAT/SAT exams.

The following book is required for this course:

HMH (HOUGHTON MIFFIN AND HARCOURT) ALGEBRA 1 & 2 and GEOMETRY & PRECALCULUS BY STEWART

Expectations and Goals

The main design principles in Common Core State Standards (CCSS) for Mathematics standards are focus, coherence and rigor. These principles require that, at each grade level, students and teachers focus their time and energy on fewer topics, to form deeper understandings, gain greater skill and fluency and more robustly apply what is learned. Focus on the curriculum is meant to give students an opportunity to understand concepts and practice with them in order to reach a deep and fluent understanding. Coherence in the curriculum means progressions that span grade levels to build students' understanding of ever more sophisticated mathematical concepts and applications. Rigor means a combination of fluency exercises, chains of reasoning, abstract activities, and contextual activities throughout the module

Grade 1- 5

In Grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.

In Grade 2, instructional time should focus 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.

In Grade 3, instructional time should focus on four 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; and (4) describing and analyzing two-dimensional shapes.

In Grade 4, instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction 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 based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

In Grade 5, instructional time should focus 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 2-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 6-8

In Grade 6, instructional time should focus 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; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.

In Grade 7, instructional time should focus on four critical areas: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and 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.

In Grade 8, instructional time should focus on three critical areas: (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; (2) grasping the concept of a function and using functions to describe quantitative relationships; (3) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.

Grade 9-12

Mathematics Standards for High School

The high school standards specify the mathematics that all students should study to be college and career ready. Additional mathematics students should learn in order to take advanced courses such as calculus, advanced statistics, or discrete mathematics. All standards without a (+) symbol should be in the common mathematics curriculum for all college and career ready students as indicated in the CCSS.

The high school standards are listed in conceptual categories:

Number and Quantity

Algebra

Functions

Modeling

Geometry

Statistics and Probability

Conceptual categories portray a coherent view of high school mathematics; a student's work with functions, for example, crosses a number of traditional course boundaries, potentially up through and including calculus. Modeling is best interpreted not as a collection of isolated topics but in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards.

Course Materials & Resources

Grade 1-6: Envision Math (Pearson)

Grade 7-8: (McGraw Hill) (MH education)

Grade 9-12:

Houghton Mifflin Harcourt Algebra 1

Houghton Mifflin Harcourt Algebra 2

Houghton Mifflin Harcourt Geometry

Stewart 7e - Precalculus

We have the online edition of the above resources for students. Apart from these resources, for mental math we use Xtramath.com/ixl.com/Math splash learn in elementary school.

In Middle and High school, teachers use Kahoot/Mentimeter/Khan Academy Videos /Interactive online Practice sessions of Khan Academy/my.hrw.com/mh education.com/Pearson successnet.com.