

North Carolina K-12 Mathematics Overview

The organization of the NC Mathematics standards provides an opportunity for algebra skills to be used every year by continuing the integrated courses from K-8 through the first 3 math courses in high school. This integrated organization of standards provides for advanced work in mathematics without isolating students' ability to think more deeply about mathematics and how it relates to the world around them. The *Standards for Mathematical Practice* (SMP) continue to be included as the foundation for reasoning mathematically in all grades. Their inclusion in each grade and course emphasizes the importance of providing opportunities throughout ALL content standards for students to analyze, argue, model, and problem solve in meaningful ways.

Modeling with mathematics also remains an integral part of all grades, including the high school courses, in all content domains. While modeling with mathematics is the fourth SMP, we use the definition from The Consortium for Mathematics and its Applications (COMAP) and the Society for Industrial and Applied Mathematics (SIAM) to detail more specifically the process of mathematical modeling that the Standards for Mathematical Practice bring to the content standards:

Mathematical modeling is a process that uses mathematics to represent, analyze, make predictions or otherwise provide insight into real-world phenomena.

(Guidelines for Assessment and Instruction in Mathematical Modeling Education (GAIMME), 2015)

Mathematical modeling is the way students connect the mathematical content they are learning to the real world in which they live. The vision for mathematics education in North Carolina is to ensure North Carolina students have mathematical understanding at or above the level of their national and international peers, ensuring that they are life, college and career ready.

Elementary School Mathematics

Students in **Kindergarten** develop an understanding between numbers and quantities, and count to answer "How many?" They begin to develop an understanding of single-digit addition and subtraction based on subitizing. Students develop meanings for addition and subtraction as they encounter problem situations in Kindergarten, and they extend these meanings as they encounter increasingly difficult problem situations subsequent grades. In **grades 3-5**, students focus on understanding the meaning and properties of multiplication and division, and they extend these meanings as they encounter increasingly difficult problem situations. Developing an understanding of the properties of place value and the base ten number system is fundamental in elementary school. Students begin to develop an understanding of addition and subtraction using place value properties. As students progress they begin to use place value understanding to develop fluency with procedures and to solve problems by selecting and applying appropriate methods. Students also begin building a foundational understanding of fractions by partitioning circles and rectangles into equal shares which builds to an understanding of fractions as numbers. They develop an understanding of equivalence and begin to apply this understanding to compare quantities. Using models, student develop an understanding of the algorithms for adding, subtracting and multiplying fractions. Students learn to describe and compare measureable attributes, as well as, estimating and measuring in length units and comparing lengths. Students start to solve real-world problems using customary and metric units of measurement finding the areas, perimeter and volume of geometric shapes. In elementary school, students work with categorical and numerical data, answering simple questions regarding the data in graphs. Students pose questions, collect and analyze data, generate appropriate mathematical

North Carolina K-12 Mathematics Overview

representations, and interpret the data to answer questions. In geometry, students begin to identify and compose shapes. They develop an understanding of measureable attributes to describes shapes. Students understand that geometric figures can be described, analyzed, compared, and classified based on their properties, such as the presence or absence of parallel or perpendicular sides, angle measures, and