

## Common Core State Standards Content Brief – *Mathematics*

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On March 10, 2010, the Council of Chief State School Officers and the National Governors Association Center for Best Practices released a draft of the English Language Arts and Mathematics K-12 Common Core State Standards. Education standards – the outline of the skills and knowledge young people need to be successful in college and in their careers – are an important, yet often mystifying, component of our systems of education across the country.

The following document attempts to shed light on the recently released draft and provide: an overview of the evidence base from which they were drawn, key areas of focus, and an outline of the supports built into the standards to enrich teacher understanding.

### Overview

The draft *Common Core State Standards in Mathematics* is a breakthrough in focus and coherence. The *Standards* articulate a progression of learning that deepens a student’s ability to understand and use mathematics. The draft concentrates on core conceptual understandings and procedures starting in the early grades, thus enabling teachers to take the time needed to teach core concepts and procedures well – and to give students the opportunity to really master them.

### Evidence Base

The *Standards* have made careful use of a large and growing body of evidence, including scholarly research; surveys on what skills are required of students entering college and workforce training programs; assessment data identifying college- and career-ready performance; and comparisons to standards from high-performing states and nations. Notable in the research base are conclusions from TIMSS and other studies of high-performing countries that the traditional US mathematics curriculum must become substantially more coherent and focused in order to improve student achievement. To deliver on the promise of common standards, the *Standards* must address the problem of a curriculum that is “a mile wide and an inch deep.”

### Responding to the Evidence Base

- *Focus as seen in high performing countries.* In current practice, many teachers must rush through material in an effort to cover a broad swath of topics. As a result, students learn enough to get by on the next test but do not engage in deep learning. Teachers must then spend significant time reviewing concepts again the following year. The *Standards* focus on critical elements for future learning and application, giving students more time to develop the procedural fluency and conceptual understanding that are needed to truly master mathematical concepts.
- *A solid foundation in whole numbers, addition, subtraction, multiplication, division, fractions, and decimals.* Taken together, these elements support a student’s ability to learn and apply more demanding math concepts and procedures. The *Standards* devote attention to these building blocks, thus aligning with practices of high performing countries and the recommendations of our own National Research Council’s Early Math Panel report. For example, kindergarten is focused on the *number core*: learning how numbers correspond to quantities, and learning how to put numbers together and take them apart (the beginnings of addition and subtraction).

- *Preparation for algebra in grade 8.* The *Standards* for middle school are robust and provide a coherent and rich preparation for high school mathematics. Students who have mastered the content and skills through the 7th grade will be well- prepared for algebra in grade 8.
- *Application to the real world.* The middle school and high school standards call on students to practice applying mathematical ways of thinking to real world issues and challenges; they prepare students to think and reason mathematically. The *Standards* set a rigorous definition of college and career readiness, not by piling topic upon topic, but by demanding that students develop a depth of understanding and ability to apply mathematics to novel situations, as college students and employees regularly do.
- *Emphasis on mathematical modeling.* The *Standards* require middle school and high school students to use mathematics and statistics to analyze empirical situations, understand them better, and improve decisions. As students choose and use appropriate strategies, they develop a better sense of quantities and their relationships in physical, economic, public policy, social, and everyday situations. Students are encouraged to use technology in developing mathematical models, allowing them to vary assumptions, explore consequences, and compare predictions with data.

### **Support for Teacher Understanding and Innovation**

The K-5 standards provide *detailed guidance to teachers* on how to navigate their way through knotty topics such as fractions, negative numbers, and geometry, and do so by maintaining a continuous progression from grade to grade. Today's best state standards as well as international models, education research, and the insights of professional mathematicians informed these grade-by-grade progressions.

By drawing on the best lessons from high performing countries, the standards provide the *foundation for redesigning and focusing the math curriculum* – and moving sharply away from the "mile wide and an inch deep" curricula currently in place throughout the U.S.

The *Standards* ensure that students spend sufficient time mastering the building blocks of mathematical thinking in K-5, allowing middle school and high school teachers to engage students in hands-on learning and real world application in geometry, algebra and probability and statistics.

In response to requests from states, an extensive appendix has been developed to demonstrate options for crafting high school courses from the *Standards*. The information in the appendix is meant to generate discussion among those who review the *Standards*.

### **About the Common Core State Standards**

The *Standards*, the development of which was led by the Council of Chief State School Officers (CCSSO) and the National Governors Association Center for Best Practices (NGA Center), build on the foundation laid by states in their decades-long work on crafting high-quality education standards, including their work on the American Diploma Project with Achieve. The *Standards* also draw on the most important international models as well as research and input from numerous sources, including scholars, assessment developers, professional organizations, and educators from kindergarten through college.

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