1 Common Core State Standards for Mathematics

Mathematics Content and Mathematical Practices

Dear professor:

I've been teaching for fifteen years, and I'm pretty busy. The days at school with the children consume all my attention, and then after school I have to plan for the next day. I'm pretty tired by the time I get home (and I also have school-age children), but I'm a professional and I try to keep abreast of the new happenings in education. Now all the talk is about the Common Core standards. I'm sure there is information about the Common Core on the Internet, but they haven't given us much information at school, just saying that we need to get ready and we need to get students ready, because it is coming and it will be different. Someone told me that almost all the states will be using Common Core and that our teachers won't be ready to teach it. Some gloomily predict that vast numbers of our students will fail the new assessments. All this talk is really frustrating, and frankly, frightening. What is actually going on? Why are we changing standards now? I am not the oldest member of the staff here, but I know that this is not the first time that the administration has tried to "reform" our curriculum. It seems as if just about the time we finally learn how to teach a mathematics curriculum, somebody changes it. Are these changes different? What will I have to do now as a teacher? Can we expect this reform to last? I wish someone would help me understand what I should know and do about the Common Core.

Sincerely,
A fourth-grade teacher

Quantitative data and technology were the driving forces behind the global economy in which we are now interacting, which makes mathematics a critical element in both national and international undertakings. Hence mathematics education is a field vibrant with new and paradigm-changing adventures required to support these driving forces. The most recent adventure in the field of mathematics education involves the unveiling of the Common Core State Standards (CCSS) for Grades K–12. The CCSS includes content for language arts and mathematics. We refer to the Common Core State Standards for mathematics as CCSSM. The mission of the CCSS is to

> . . . provide a consistent, clear understanding of what students are expected to learn, so teachers and parents know what they need to do to help them. The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need for success in college and careers. With American students fully prepared for the future, our communities will be best positioned to compete successfully in the global economy (National Governors Association Center for Best Practices (NGA) & Council of Chief State School Officers (CCSSO), 2010, p. 93).

In this chapter, we address many important and relevant questions: Why do we need the CCSSM? What supported the development of the CCSSM? And how does the CCSSM differ from already existing standards related to the teaching and learning of mathematics? Knowing the answers to these questions equips you to address inquiries from peers, school administrators, parents, and even students. We also recommend that you begin to collect your own additional questions and any questions posed from others so that as you answer these questions, you become more informed about the CCSSM. Table 1.1 is a CCSSM Information Log provided to record questions in order to facilitate building your knowledge of the CCSSM.

CREATING THE COMMON CORE STATE STANDARDS FOR MATHEMATICS

The CCSSM developed quickly, but the antecedents have been in existence for many years. Likewise, concern about the educational issues necessitating adoption of these standards has been the focus of policy makers and educators for several decades. Working together, political and educational leaders joined to develop the CCSSM.

Table 1.1 Sample CCSSM Information Log

	Questions I have about the CCSSM	Responses
	Why are we changing standards now?	
	How are these standards different from previous standards?	
	What will I have to do now as a teacher of mathematics or an instructional coach of mathematics teachers?	
	Can we expect this reform to last?	
	What will assessments look like?	

Impetus for the CCSSM

There are several reasons why the CCSSM became a reality. One impetus for the CCSSM is supported by examination of historical mathematics achievement data of students in the United States compared with students in other countries around the world. In 2004, the United States Department of Education (USDOE) indicated that

> international and domestic comparisons show that American students have not been succeeding in the mathematical part of their education at anything like a level expected of an international leader. Particularly disturbing is the consistency of findings that American students have often achieved in mathematics at a mediocre level by comparison to peers worldwide. (p. 12)

Years of data show that U.S. students struggle behind other nations to achieve in mathematics and this research provided the platform for educators and other leaders to suggest that as a nation, we need to address our standards for what mathematics we expect students to know and execute. The need to have our students do well in mathematics so that they can succeed in a global economy drives the selection of what mathematics we teach and how we teach it.

Another impetus for the CCSSM is the mathematics achievement gap, which is "the difference between the average scores of two student subgroups on the standardized assessment" (National Center for Education Statistics (NCES), 2011, p. 12). In the range of mathematics assessments from 1992 to 2009, the National Assessment for Educational Progress (NAEP) reported that White students in Grades 4, 8, and 12 scored higher in mathematics than Black and Hispanic students in the same grades (NCES, 2011, p. 12).

> The achievement gap between Black and White 4th-grade students in 2009 (-26 points) was not measurably different from the gap in 2007, but it was smaller than the gap in 1990 (-32 points). The 21-point achievement gap between White and Hispanic 4th-grade students in 2009 was not measurably different from the gap in 2007 or the gap in 1990. (NCES, 2011, p.12)

As we make progress in the field of mathematics education, making certain that we are giving attention to every subgroup of learners is important to the goal of overall academic success for our students. The CCSSM provides clarity on the mathematics that every student needs to learn in order to be a productive and active citizen in an increasingly complex society.

We do know that improvement in students' mathematics achievement is possible. As Table 1.2 indicates,

> In 2011, the average NAEP mathematics scores for 4th-grade and 8th-grade students were higher than their average scores in all previous assessment years, and from 1990 to 2011, the average 4th-grade NAEP mathematics score increased by 28 points, from 213 to 241. During that same time period, the average 8th-grade score increased by 21 points, from 263 to 284. (NCES, 2011, p. 1)

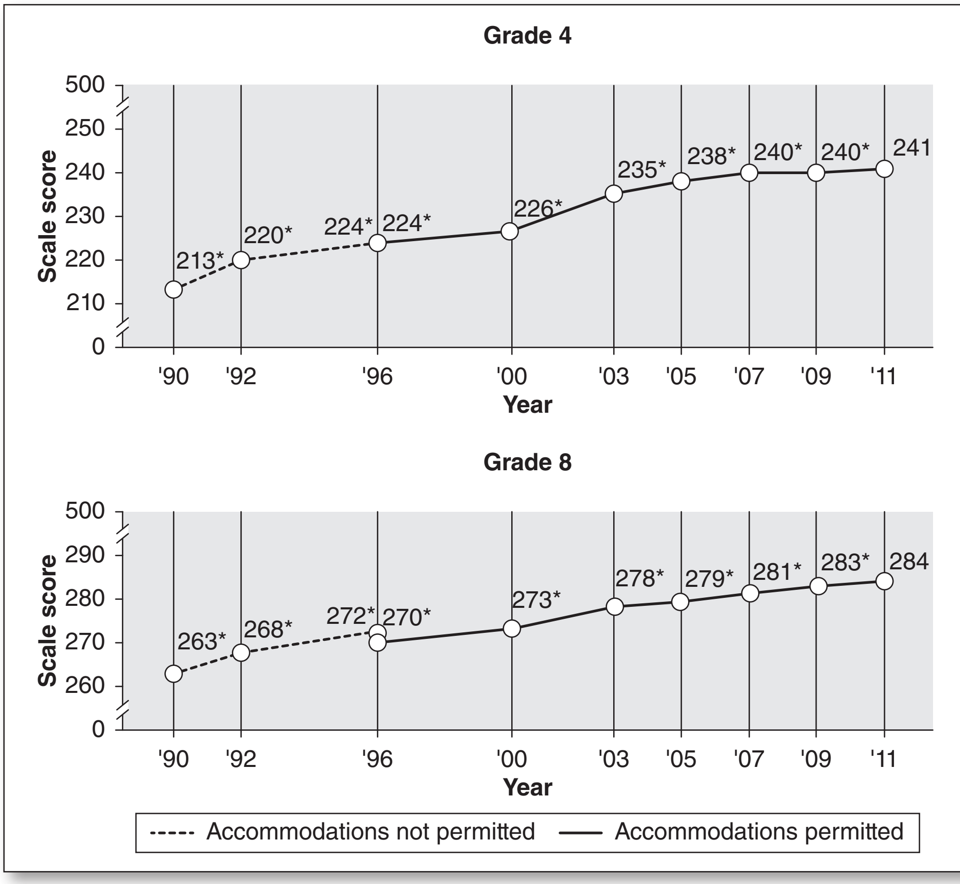
The changes in the positive direction provide support for engaging in more efforts to improve students' mathematics achievement. These efforts include work by the National Council of Teachers of Mathematics (NCTM) and efforts by teachers of mathematics to transform research to practice.

Twelfth-graders were most recently assessed in 2009; in that year, the average 12th-grade mathematics score was 3 points higher than in 2005, the first year that the revised assessment was administered (NCES, 2011, para. 4).

Having the ability to capture at specific grade levels the trajectory of growth in students' mathematics achievement and targeting students' mathematical needs is an advantage for the CCSSM's mission of preparing students for college and career readiness.

A third impetus for the CCSSM is the goal of being able to deliver mathematics instruction that is deliberate and consistent throughout the United States. A review of previous mathematics standards and mathematics instruction from state to state revealed a lack of consistency between individual state standards (Hirsch & Reys, 2009). However

Table 1.2 Trend in NAEP Mathematics Average Scores



Source: National Center for Education Statistics, 2011, p.1.

"a focused, coherent progression of mathematics learning, with an emphasis on proficiency with key topics, should become the norm in elementary and middle school mathematics curricula" (USDOE, 2008, p. 16). The lack of consistency in mathematics content and instruction from state to state directly influences mathematics teaching and learning in response to the active mobility of students across the United States. "Students who move often between schools may experience a range of problems, such as: lower achievement levels due to discontinuity of curriculum between schools" (Education Week, 2004). The problem of students learning different mathematics based on where they happen to reside at any particular time can be tackled by presenting mathematics standards that are acknowledged more broadly across the United States. Finally, there is more of a need to further strengthen the mathematics curricula as students are expected to become more proficient in mathematics. We recognize that "A curriculum is more than a collection of activities: It must be coherent, focused on important mathematics, and well articulated across the grades" (NCTM, 2009a, para. 3). When we consider avenues of improvement, we can look to the CCSSM to determine the quality of mathematics content and learning experiences that are essential for students as they progress through the years of their mathematics learning. The changing needs of the national and international careers provide more incentive for the CCSSM.

> The U.S. education system must be improved, top to bottom so that our most precious resource—our children—can compete in the increasingly global world economy. Statistically, our K–12 students are falling farther behind students in Korea, China and elsewhere in the physical sciences. We can and must do better (Case, Doerr, Otellini, & Sandberg, 2011, para. 5).

The CCSSM provides clarity on how we can do better teaching the mathematics necessary for our students to engage in careers and post-secondary education that require mathematics as a foundation.

Ultimately, when we consider that our aim for schools is to prepare students to be active, informed, literate, and productive citizens who contribute to the good of themselves and society at large, it is critical that we consider any and every opportunity to propel our students forward. This is the opportunity offered by the CCSSM. The challenge, of course, is to make the best use of this opportunity to empower students as they pursue college and careers to be mathematically proficient.

Developers of the Common Core State Standards for Mathematics

The Council of Chief State School Officers (CCSSO) and the National Governors Association Center for Best Practices (NGA) sponsored the development of the CCSSM. However, individuals who invested in the writing of the CCSSM included William McCallum, Phil Daro, and Jason Zimba. Numerous stakeholders also contributed to the development of the CCSSM. These stakeholders included educators at various levels (e.g., schools, colleges, and universities), content experts, researchers, national professional organizations (e.g., ACT, a college readiness assessment test, the Achieve organization, which provides standard-setting and benchmarking services, and the College Board), classroom teachers, parents, community organizations, and industry leaders. The fact that the CCSSM had broad participation for its development is an indicator of the range of support and diversity of ideas that are reflected in the CCSSM. In addition, this broad contribution to the development of the CCSSM provided the opportunity for the content of the CCSSM to represent both academic and workforce positions.

Adoption of the Common Core State Standards for Mathematics

As of 2013, 45 states, the District of Columbia, and four territories have adopted the CCSSM (CCSS Initiative, 2013, http://www.corestandards.org/in-the-states, para. 1). For some states, the CCSSM is a major divergence from the state's previous mathematics standards. For other states, the state's previous mathematics standards were aligned to the CCSSM at a greater percentage. In either case, states that adopted the CCSSM made a commitment to enact the CCSSM with fidelity, and subsequently to administer a high-stakes assessment aligned with the CCSSM to determine students' mathematics achievement levels under the context of the CCSSM.

THEORETICAL BASIS OF THE COMMON CORE STATE STANDARDS FOR MATHEMATICS

The developers of CCSSM were purposeful in constructing the CCSSM. Visualizing the intent of the standards and the hope of adoption by many states, the CCSS Initiative drew from significant resources that documented current research in mathematics instruction.

Principles Used to Develop CCSSM

Many principles provide a foundation for the CCSSM. Countless of these were developed by the NCTM and presented in several of NCTM's key documents, such as the following:

- *Curriculum and Evaluation Standards for School Mathematics* (NCTM, 1989)
- *Professional Standards for Teaching Mathematics* (NCTM, 1991)
- *Assessment Standards for School Mathematics* (NCTM, 1995)
- *Principles and Standards for School Mathematics* (NCTM, 2000)
- *Curriculum Focal Points* (NCTM, 2006)
- *High School Reasoning and Sense Making* (NCTM, 2009b)

Of particular focus is the set of NCTM Process Standards presented in the *Curriculum and Evaluation Standards for School Mathematics.* The NCTM Process Standards identified are problem solving, reasoning and proof,

Table 1.3 Mathematics Process Standards

Process standard	Summary	What does this look like?		
		Grade 3	Grade 4	Grade 5
Reasoning	Conjecture about mathematics; develop arguments and prove them	Explain their strategy for solving a complex problem		
Problem solving	Apply a variety of strategies to solve mathematics problems			

communication, connections, and representations. The Process Standards underpin the CCSSM Mathematical Practices (to be discussed later) and support the approach to the mathematics of the CCSSM that believes that students need to become active learners. The Process Standards provide a basis for the type of mathematical activities students need to engage in and are the preamble to meaningful mathematics learning in a highly interactive classroom setting. It is helpful for teachers to review these and other NCTM documents in order to develop a sense of the trajectory of mathematics standards for K–12 students. Table 1.3 is designed to guide these reviews and support subsequent discussions.

In 2001, the National Research Council (NRC) published *Adding It Up.* In this document, the NRC presented five Strands of Mathematical Proficiency: strategic competence, adaptive reasoning, conceptual understanding, productive disposition, and procedural fluency. When intertwined, these strands present a comprehensive picture of the characteristics of a learner with mathematical proficiency. For instance, a learner who has a productive disposition (e.g., recognizes the challenge of solving a problem as an opportunity for learning and so perseveres rather than accept a road block and gives up on the problem) is more likely to develop skills that promote working toward solutions for a broad range of problem types. The strands of mathematical proficiency are reflected in the CCSSM content standards (e.g., focus on students' development of procedural fluency) and in the mathematical practices (e.g., focus on students modeling mathematics through conceptual understanding of mathematical concepts). The connection between the strands and the aim of the CCSSM is even more apparent given the evident focus on the learner of mathematics as an active participant in the learning process. While the CCSSM does not propose how teachers should teach mathematics, the expected outcome of the CCSSM necessitates that teachers provide the appropriate context (e.g., instructional environment, curriculum materials, learning experiences, etc.) for students to develop mathematical proficiency.

Another consideration in developing the CCSSM was the expectation for mathematical learning to extend beyond K–12. Some subscribe to the position that in order to prepare students for college readiness and particularly for careers in science, technology, engineering, and mathematics (STEM), students need to complete algebra I prior to high school (in some cases, as early as Grade 6 or 7) and calculus by high school graduation. Given that argument, then certain steps must be taken in elementary and middle school to prepare students to accomplish these goals.

As students progress through school mathematics, they should be progressing through the mathematics curriculum instead of repeating mathematical concepts over and over through repetition at each grade level. Hence, the CCSSM's grade-by-grade approach reflects a trajectory of mathematics concepts that helps prepare students for mathematical growth from one grade to the next.

Because of the employment marketplace changing so rapidly as a result of advanced technologies, the ease of national and international travel, the increase in diverse environments, and many other factors, it is important to the developers of the CCSSM that attention be given to mathematics that trains high school graduates to compete for jobs that require problem solving, critical thinking, and quantitative literacy. Most importantly, the aim is to prepare high school graduates to become productive members of society so that they can apply the mathematics learned during the previous twelve years to problem solving in real-world situations.

The development of the CCSSM involved many other considerations, including evidence from the field and research, and focus on conceptual as well as procedural understanding. The important and meaningful mathematics of the CCSSM is reflected in the richness of each of these influences.

Intent of the Common Core State Standards for Mathematics

Though we addressed intent prior to this section, we address it again more explicitly to try to eliminate the misconception that the CCSSM leads to nowhere except where we have already been with previous mathematics standards. Furthermore, we want to simplify the matter for those who are anxious that this is just the same content in a new package. The intent of the CCSSM is simple: "These standards define the knowledge and skills students should have within their K–12 education careers so that they will graduate high school able to succeed in entry-level, credit-bearing academic college courses and in workforce training programs" (CCSS Initiative, 2012, http://www.corestandards.org/resources/frequently-asked-questions, para. 4). Of course, intent does not promise outcome. However, one of the primary purposes of this book is to support mathematics teaching and learning so that CCSSM's intent is more readily realized.

STRUCTURE OF THE COMMON CORE STATE STANDARDS FOR MATHEMATICS

The CCSSM is structured in two components: Standards for Mathematical Content and Standards for Mathematical Practice (SMPs). Both of these components are important to students' mathematics learning as they represent the two sides of the coin of effective mathematics instruction.

The Content Standards

The CCSSM's Standards for Mathematical Content is divided into three sections grouped by grade:

- In Grades K–5, the mathematics presented in the CCSSM is focused on number and basic operations (addition, subtraction, multiplication, and division) of whole numbers, fractions, and decimals. The expectation is that young children build a strong foundation for understanding mathematical concepts and the mathematical procedures needed to operationalize these concepts. In these grades, students also need support in thinking critically about the mathematics they are learning so they can make use of relationships between mathematics concepts and develop a long-term conceptual understanding of mathematics.
- In Grades 6–8, the mathematics presented in the CCSSM is focused on the study of space (geometry), generalizations of and relationships with numbers (algebra), the study of chance (probability), and the study of data (statistics). Middle school mathematics sets the stage for students to think abstractly about mathematics and to begin development of mathematical skill sets that lay the foundation for deeper problem solving and applications in mathematics.
- In Grades 9–12, the mathematics presented in the CCSSM is focused on application of mathematics across a variety of contexts, such as those found in real-life problems. At this stage, students proficient in mathematics are able to make decisions based on data derived

from mathematical applications. At this stage, mathematical meanings developed in the earlier grades are significant to the students' continued mathematical success.

This book focuses on Grades 3 through 5. Thus, we address our discussion of the CCSSM from that perspective. "While the Standards focus on what is most essential, *they do not describe all that can or should be taught.* A great deal is left to the discretion of teachers and curriculum developers" (CCSS, 2012, http://www.corestandards.org/resources/frequently-asked-questions, para. 6). Specific lesson plans or curriculum documents on *how* the standards are implemented in the classroom need to be developed by teachers and curriculum developers.

The Practice Standards

"The Standards for Mathematical Practice (SMPs), which are the same across all grades, describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important 'processes and proficiencies' with longstanding importance in mathematics education" (NGA & CCSSO, 2010, p. 6). The SMPs and brief statements to provide clarity for each one are listed in the following table.

Table 1.4 Standards for Mathematical Practice

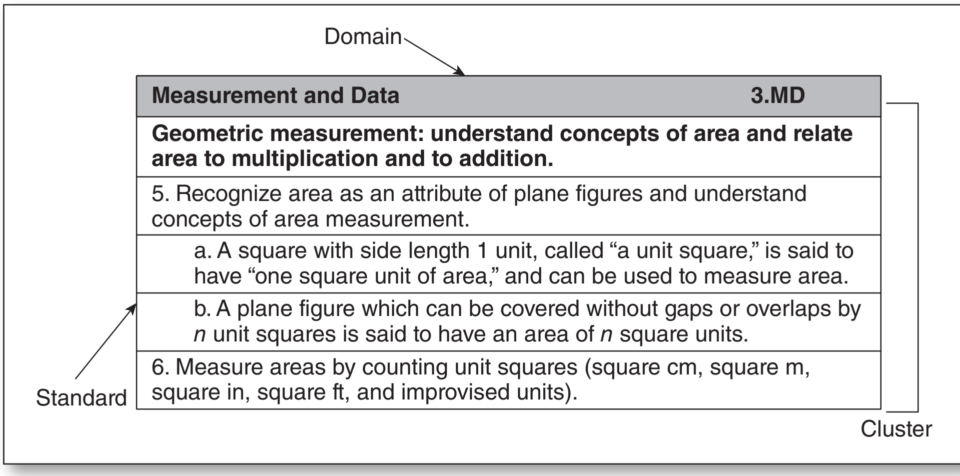
1. Make sense of problems and persevere in solving them. For students to be proficient in mathematics, they need mathematical experiences that support the students' development of their problem-solving skills. These skills include students' ability to understand mathematical problems and to select appropriate strategies to engage in solving the problems. Students also need guidance in how to become "courageous" problem solvers so that they learn how to take risks with problems—with focus on the process of the problem as well as the product of the problem.
2. Reason abstractly and quantitatively. The concept of number (e.g., magnitude, operations on number, applications of number) is the foundation of mathematics and ultimately students who are proficient in mathematics are able to reason with mathematics, think abstractly (e.g., thinking required to make generalizations needed in algebraic reasoning), and to understand number.

(Continued)

Table 1.4 (Continued)

3. Construct viable arguments and critique the reasoning of others. There are instances in mathematics where there are alternative ways of interpreting the mathematics. Students need opportunities to communicate their mathematical understanding, to test their hypotheses, and to safely question the hypotheses of others. Being able to explain, justify, conjecture, and debate mathematical perspectives are critical skills for students' mathematical development.
4. Model with mathematics. One area of power that mathematics affords is being able to use mathematics to make sense of real-life phenomena. For example, the use of tables and graphs in the collection and analysis of data is a very important skill that is applicable to a variety of disciplines (e.g., science, finances).
5. Use appropriate tools strategically. At each level of mathematics learning, there are tools that can be made available to students for studying mathematics. Students benefit from opportunities to learn how to select appropriate tools (e.g., tangible and intangible tools) and subsequently to use those tools to engage in mathematics.
6. Attend to precision. Precision in mathematics is very important because accuracy is needed in order to experience success in mathematics procedures and applications. However, precision transcends number and also includes other areas, such as mathematical language. For instance, how well students develop precise definitions in mathematics is particularly relevant as students move further in mathematics learning.
7. Look for and make use of structure. One of the benefits of recognizing structure in mathematics is being able to build a history of understanding in mathematics. For example, there are often classes of problems that are solved in a similar way. This often does not become apparent to students until a teacher draws their attention to the need to stop and examine the structure of mathematics. Taking the time to build this practice into instruction helps students when they face problems that they have some familiarity with because they can recognize the structure of the problems.
8. Look for and express regularity in repeated reasoning. The basis of algebraic reasoning is repetition that leads to the ability to construct a generalization. However, students need explicit opportunities to reason about mathematics.

Figure 1.1 Example of Common Core State Standards



Source: NGA & CCSSO, 2010, Std. 3.MD.

Reading the Common Core State Standards for Mathematics Document

Knowing how to read the CCSSM document is critical for teachers' planning and professional development processes as this provides a road-map to the specific areas that each student is required to master, illustrated in Figure 1.1. The *domain*s represent a collection of standards. The *standards* represent what students are expected to learn and apply, and the *cluster* is a breakdown of a particular standard.

TWO BRIEF NOTES

The consequences of the CCSSM on curriculum, instruction, and assessment are many and the following notes about these implications provide some context for the learning offered in this book.

Instruction With the Common Core State Standards for Mathematics

The CCSSM criteria present the mathematics that students need to know and accomplish as they progress from one grade level to the next. While the CCSS are grade-specific and apply to all students, they do not delineate intervention methods or direct teachers to any specific instructions to support this wide range of CCSSM standards. "The Standards should be read as allowing for the widest possible range of students to participate fully from the outset, along with appropriate accommodations to ensure maximum participation of students with special education needs" (NGA & CCSSO, 2010, p. 4). What we do know is that a gamut of effective instruction and best practices is necessary for mathematics instruction. Although this list is not exhaustive, teachers and curriculum leaders can include these or similar best practices in their lesson plans and classrooms:

- Modeling processes and thinking/reasoning
- Providing students' opportunities for practice, application, and discourse
- Providing specific and timely feedback
- Encouraging students to think, question, and justify
- Backward design (Wiggins & McTighe, 2005)
- Differentiated instruction (Small, 2009)

Schools may also decide to develop a Response to Intervention (RTI) model or Multi-tiered Systems of Support (MTSS), which is "screening all students to identify those at risk for potential mathematics difficulties and provide interventions to students identified as at risk" (Gersten et al. 2009, p. 13). The goal is to identify desired results, determine acceptable evidence, and plan for learning experiences and instruction (Alliance for Curriculum Enhancement, 2006).

The development and implementation of the CCSSM definitely changes the approach to mathematics instruction. Learning experiences involve more than simply teaching mathematical content. Teachers need to be committed to "changing children's beliefs from a focus on ability to a focus on effort that increases their engagement in mathematics learning, which in turn improves their mathematics outcomes . . ." (National Mathematics Advisory Panel, 2008, p. 20). Students are not one-dimensional, signifying that they have various layers that may hinder their success in mathematics. Teachers should be aware of the academic and social diversity in their classrooms and learn how to connect outside experiences to mathematics. "Mathematics performance and learning of groups that have traditionally been underrepresented in mathematics fields can be improved by interventions that address social, affective, and motivational factors" (National Mathematics Advisory Panel, 2008, p. 19). The approach to instruction also needs to adjust the way that students are currently taught mathematical concepts. Traditional classrooms tend to teach procedures first with little conceptual understanding. The CCSSM goes beyond surface-level mathematics. While the United States has been criticized for falling behind other countries academically, it is not necessarily based on *what* students are learning, but *how* students are required to learn mathematics (Lester, 2003). One recommendation is that we " . . . do not teach symbolic representations before students have begun to demonstrate conceptual understanding of what the symbols or procedures actually mean . . ." (Hess, 2010). Traditional algorithms and procedures are not necessarily the most efficient methods nor the best anchors for students; allowing for alternative and invented algorithms provides more opportunities for students to engage in learning mathematics.

Assessment of the Common Core State Standards for Mathematics

A change in instruction indicates a difference in assessments. Assessments are not limited to pencil, paper, and computer-based tasks, but are expanded to become part of an ongoing process of instruction. There are three types of assessments: diagnostic, formative, and summative, which can range from verbal to performance-based. Assessments should be varied, should reflect students' learning needs and strengths, and should include methods, such as demonstration, observation, and writing. Most importantly, assessment data should be used appropriately to modify curriculum and instruction to improve student learning.

The mission of the CCSS (2010) proclaims that our communities will be best positioned to successfully compete in a global economy with new preparation of American students. The question then becomes how the assessments change to align with the CCSSM. Two consortiums, Partnership for Assessment of Readiness for College and Careers (PARCC) and Smarter Balanced Assessment Consortium, have taken the responsibility of developing assessments for the states in English language arts, literacy, and mathematics. Of the 45 states that have adopted the CCSS, about half are members of the PARCC and half are members of the Smarter Balanced consortium. Pennsylvania and North Dakota are members of both; as of June 2013, six states have joined neither group.

According to the PARCC vision (2013) the goals of PARCC assessments list the following priorities

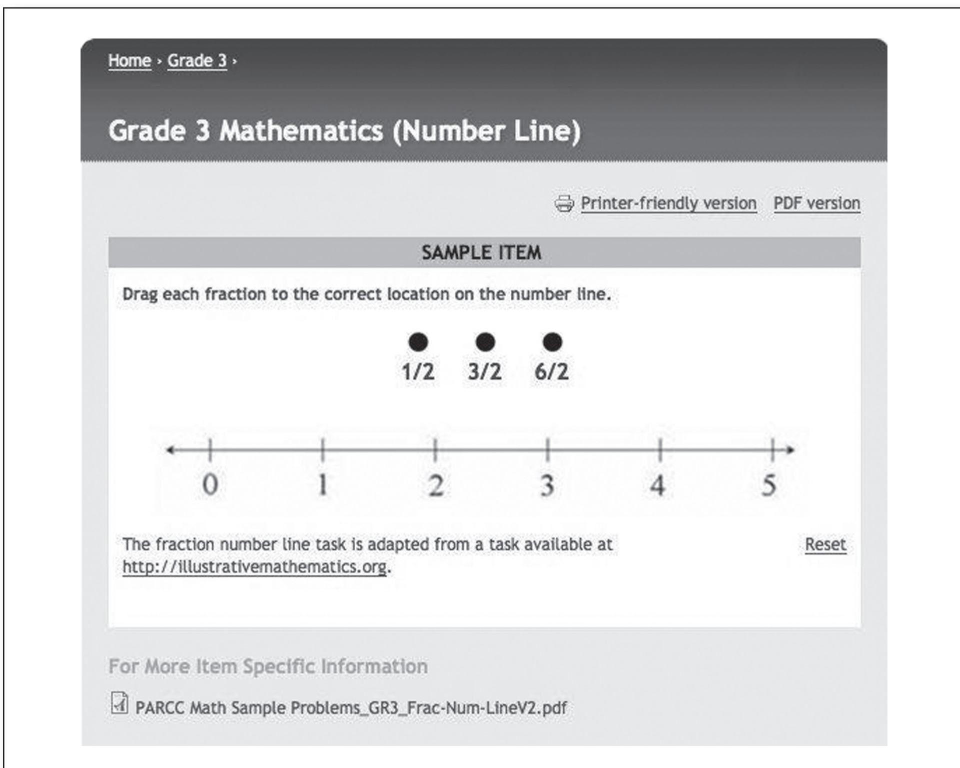
1. Determine whether students are college- and career-ready or on track
2. Assess the full range of the CCSS, including standards that are difficult to measure
3. Measure the full range of student performance, including the performance of high- and low-performing students

4. Provide data during the academic year to inform instruction, interventions, and professional development
5. Provide data for accountability, including measures of growth
6. Incorporate innovative approaches throughout the assessment system

The members of PARCC focused their attention on developing a K–12 assessment system for the nearly 24 million students they serve (PARCC, 2013). The PARCC assessments are offered in four components and are geared toward preparing students for colleges and careers: two required, summative, performance-based and end-of-year assessments, and two optional, nonsummative, diagnostic and mid-year assessments (PARCC, 2013). Each state or district determines how to approach this matter. The assessments are aligned to the CCSSM and provide data and feedback for schools. It is helpful to explore resources provided by PARCC. Consider the sample PARCC test item in Figure 1.2. What do you find significant or interesting about this sample test item?

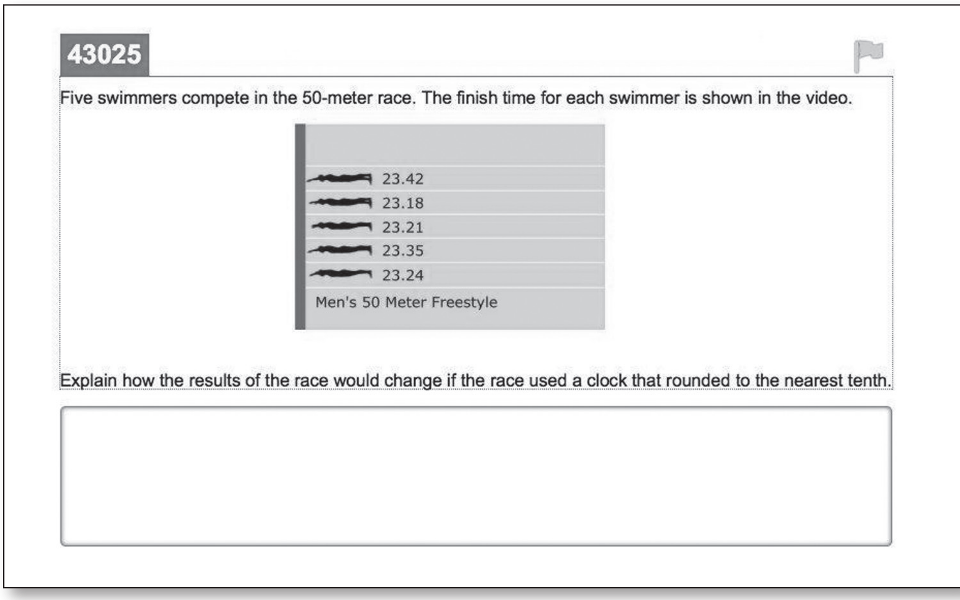
The Smarter Balanced Assessment Consortium provides assessments for the remaining states focusing on Grades 3–8 and 11 "that will go

Figure 1.2 Sample PARCC Test Item



Source: Partnership for Assessment of Readiness for College and Careers, 2013, http://www.parcconline.org.

Figure 1.3 Smarter Balanced Assessment Item for Fifth Grade



Source: Smarter Balanced Assessment Consortium, 2012, http://sampleitems.smarterbalanced.org/itempreview/sbac/index.htm. Used with permission.

beyond multiple-choice questions to include extended response and technology enhanced items, as well as performance tasks that allow students to demonstrate critical-thinking and problem-solving skills" (Smarter Balanced, 2012, http://www.smarterbalanced.org/resources-events/faqs/#2446, Q. 8). The assessment components include a summative assessment, an optional interim assessment, and formative assessment practices (Smarter Balanced, 2012). The assessment items from the Smarter Balanced Assessment Consortium include item specifications separated into three subgroups: Grades 3–5, Grades 6–8, and high school. Item specifications are not limited to the content, but also include technology guidelines, performance tasks, and other guidelines that pertain to English Language Learners and accessibility for all. The Smarter Balanced assessments' goal is also to "accurately measure student achievement and growth toward college- and career-readiness" (Smarter Balanced, 2012). Consider the sample Smarter Balanced test item in Figure 1.3. What do you find significant or interesting about this sample test item?

Summary

In a very short time, almost all the states in the United States adopted the Common Core State Standards for Mathematics. As the school districts in these states prepared for implementation, the impacted teachers often believe that they are the "last to know" what is going on. This chapter explains the reasons for development and adoption of these standards. Designed to prepare students successfully for both college programs and careers in a global economy, the standards are focused and coherent across grade levels. The specifics for grade bands are provided, as well as a description of the Standards for Mathematical Practice. We point out that the pedagogy for instruction is not delineated in the CCSSM, but will be determined by the local educational leaders. Two high-stakes assessment consortiums are creating measurement tools to assess the achievement of the standards. Many changes are occurring in mathematics instruction; they are happening very quickly, but with the concerted effort to improve the mathematics achievement of the nation's students.

Questions and Tasks for Reflection

1. What is your definition of "standards"?
2. Have you used standards in your instruction to this point? How did you incorporate standards into your lessons?
3. Find an instructional example of each of the NCTM Process Standards: problem solving, reasoning & proof, communication, connections, and representations. Were these standards among the ones you thought about when you answered the first question?
4. What do the NRC's (National Research Council) Strands of Mathematical Proficiency (strategic competence, adaptive reasoning, conceptual understanding, productive disposition, and procedural fluency) mean to you? Recall a few students in your class. Think about how you would evaluate them in these proficiencies. Consider one practice that you could use to teach each of the proficiencies.
5. Mathematical practices are now an essential component of the mathematics standards. What challenges do you foresee in incorporating the SMPs in instruction? Can you identify those that you will incorporate most easily? Why? Which ones will be more difficult?
6. How do you think mathematics instruction will change in the context of the CCSSM?
7. What are the similarities and differences between PARCC and Smarter Balance?