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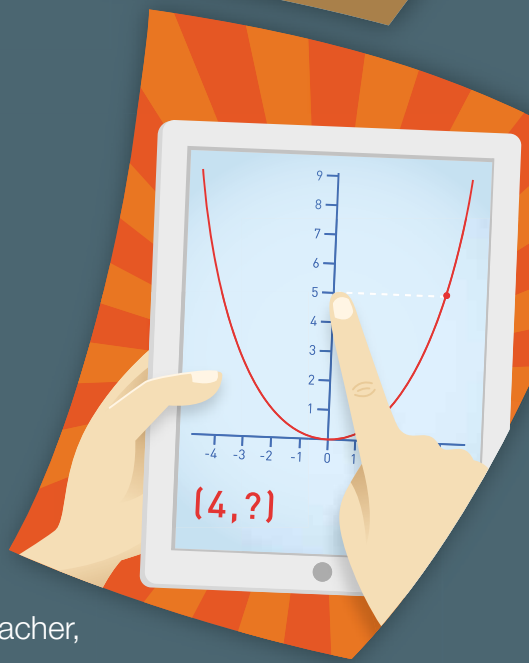

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teaching children mathematics

volume 19 + number 9

NCTM NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

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Teaching Children Mathematics (***TCM***), an official journal of the National Council of Teachers of Mathematics (NCTM), supports the improvement of pre-K–grade 6 mathematics education by serving as a resource for teachers so as to provide more and better mathematics for all students. It is a forum for the exchange of mathematics ideas, activities, and pedagogical strategies, and for sharing and interpreting research. NCTM publications present a variety of viewpoints. The views expressed or implied in *TCM*, unless otherwise noted, should not be interpreted as official positions of NCTM. The appearance of advertising in NCTM's publications and on its websites in no way implies endorsement or approval by NCTM of any advertising claims or of the advertiser, its product, or services. NCTM disclaims any liability whatsoever in connection with advertising appearing in NCTM's publications and on its websites.

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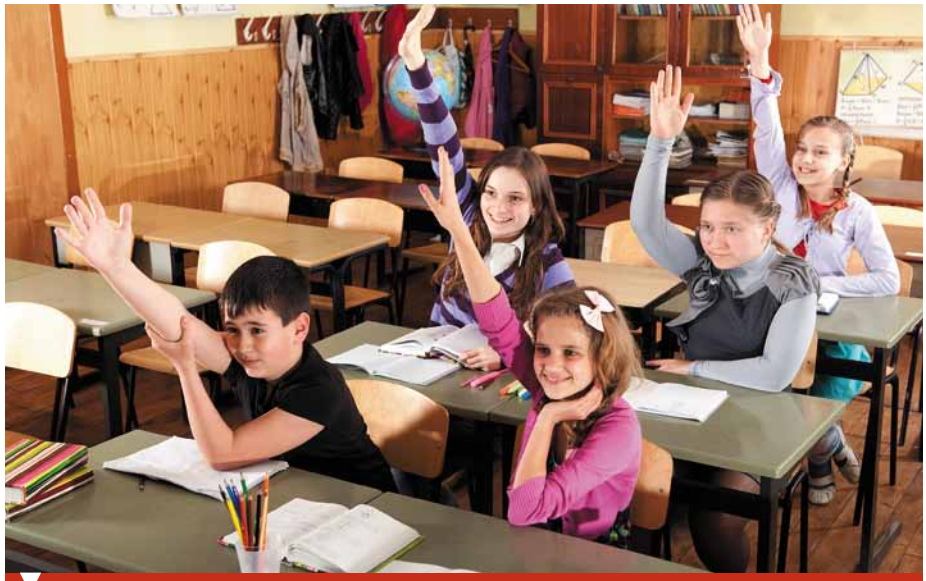
Prepare for more realistic results

Educators *must* begin the process of educating stakeholders about the potential drop in student proficiency rates resulting from the implementation of new assessments in 2014–2015.

BY MATTHEW LARSON AND STEVEN LEINWAND

Educators in forty-five states and the District of Columbia are hard at work interpreting and implementing the Common Core State Standards for Mathematics (CCSSM). This work typically involves teacher participation in professional development activities focused on developing an understanding of the Content Standards as well as the Standards for Mathematical Practice (CCSSI 2010). Across the country, educators are also engaged in analyzing the model content frameworks and item prototypes being released by the two national assessment consortia, the Program for the Assessment of Readiness for College and Careers [PARCC] and the Smarter Balanced Assessment Consortia [SBAC]. Although educators still have to prepare their students for current state assessments, many educators are beginning to ask—with justifiable anxiety, given the consequences attached to student performance—how their students might perform when the new assessments are first administered in the 2014–2015 school year.



In 2009, every state except Massachusetts had a lower grade 4 proficiency standard than the National Assessment of Educational Progress (NAEP) standard.

PETRO FEKETA/VEER

Predicting PARCC and SBAC results

Although knowing with certainty is impossible—and because results will ultimately depend on a variety of factors, including how PARCC and SBAC performance standards required for proficiency will be set—strong evidence exists that educators nationwide should expect significant reductions in the percentage of students deemed to be proficient when compared with the proficiency rates currently reported by states that are using their own assessments.

A case in point: The nagging concern of many during the No Child Left Behind era has been the discrepancy between the proficiency percentage reported on the National Assessment of Education Progress (NAEP) and those reported by individual states. For example, in 2009 only Massachusetts had a state standard for proficient performance in grade 4 mathematics equivalent to the NAEP standard (Bandeira de Mello 2011, p. 12). Every other state's standard for proficient performance on its state assessment was lower than the NAEP standard and resulted in somewhat—to significantly—higher reported rates of proficiency.

A report (Phillips 2010) prepared by the American Institutes for Research (AIR) compared mathematics

proficiency standards in each state with the international benchmark used in the Trends in International Mathematics and Science Study (TIMSS). Comparing current state proficiency standards with international benchmarks is instructive because one of the criterion for the development of the Common Core State Standards for Mathematics was that the standards be internationally benchmarked.

Comparing 2007 fourth-grade mathematics proficiency as reported by states under the requirements of No Child Left Behind with an estimate of percent proficient if the states had used a high, but not advanced, internationally benchmarked common standard, found that the mean fourth-grade state math proficiency rate would drop from 72 percent to 39 percent, and it would drop in each of the forty-eight states included in the study, with the exception of Massachusetts (Phillips 2010).

Everyone who is interested in students' mathematical success must accept that previous assessment scores have been artificially high.

OCEAN PHOTOGRAPHY/VEER

During the 2011–2012 school year, Kentucky administered its new K-PREP statewide assessment, an assessment that was designed to be representative of the Common Core State Standards. At the elementary school level in 2010–2011, Kentucky reported 73 percent of students proficient in mathematics, but that dropped to 40.4 percent proficient under the new assessment in 2011–2012 (Ujifusa 2012). This drop is remarkably similar to the mean estimated drop in the AIR report and, taken together, may indicate that most states will experience a significant drop in their math proficiency rates when the new assessments are implemented.

Preparing the public

Given these expected, and in some cases significant, drops in the percentage of students deemed proficient, it becomes crucial that educators at the state and district levels begin the process of preparing stakeholders for this likelihood, to mitigate the potential panic and overreaction that might occur when results of the new assessments are released for the first time in 2015. What should the key messages be? No matter how difficult it is for many people to accept, this is the crucial message: Most states have set relatively low performance standards, and current proficiency rates reported under No Child Left Behind do not adequately reflect what students need to know and be able to do in mathematics to compete internationally (Phillips 2010). Exacerbating the problem is the fact that most state assessments under No Child Left Behind have a propensity to assess mathematical skills in isolation at a low-level depth of knowledge (Herman and Linn 2013), and have not assessed mathematical processes in addition to content as outlined in the Common Core State Standards for Mathematical Practice. In other words, current state proficiency rates under No Child Left Behind in many states inflate students' true level of mathematical understanding when measured against an international performance standard. We must confront this fact and move forward from a new, more realistic baseline of student achievement. Additional

important messages that ought to be developed and communicated include the following:

- Comparisons to past scores on state assessments will have little value. Results of PARCC and Smarter Balanced will reflect the performance of a new assessment, with new standards, set to a higher performance standard.
- States and school districts that have adopted teacher evaluation systems tied to student performance on assessments will need to consider that any decrease in the percent of proficient students as measured by PARCC or SBAC is likely due to a change in the performance standard under the new assessments and not a decrease in instructional effectiveness.
- School boards and the public must understand that improvement in proficiency rates under the new assessments will take time. Meaningful improvement in teaching and learning is a complex endeavor that will require time and support to achieve.
- Because many states still use paper-and-pencil assessments and the new assessments will be administered via a digital platform, mathematics teachers will need to provide students with experience taking online mathematics assessments to prevent any potential drop in performance due to the change in assessment platform.
- Implementing CCSSM will take time, and students will need time to develop the habits of mind outlined in the Standards for Mathematical Practice. Therefore, math teachers cannot wait until the 2014–2015 academic year to begin the implementation process. Implementation of the Standards for Mathematical Practice can begin immediately; and if teachers work collaboratively to interpret and implement CCSSM (Kanold and Larson 2012), math teachers can successfully begin the implementation process before schools or districts begin formal implementation efforts.
- Adopting higher content standards, and setting a higher performance standard, is essential if we are to give our students the opportunity to learn the mathematics they need to become productive members of society and to compete in an increasingly global marketplace.
- Parents must hold their students "to the highest standards that push them out of their comfort zones" (Friedman and Mandelbaum 2011, p. 124). Without students engaging in meaningful mathematical work, both inside and outside of school, the goals of higher achievement under CCSSM will be impossible to achieve.

Persevering is not just for students

If the results of the new assessments of CCSSM result in lower proficiency rates, it will be easy for teachers to become discouraged; it will be easy for school administrators to over-react and implement counterproductive practices in an effort to find quick fixes; it will be easy for school board members to remove school leaders in an effort to demonstrate that they are taking action; it will be easy for parents to believe that their child's school is failing; it will be easy for business leaders to use lower scores to point to the "failure" of the educational system; and it will be easy for policymakers to declare CCSSM a failure. None of these knee-jerk reactions are likely to be helpful or to improve the teaching and learning of mathematics.

Standard for Mathematical Practice 1 states that students will "make sense of problems and persevere in solving them" (CCSSI 2010, p. 6). Although the Standards for Mathematical Practice are processes that *students* are expected to engage in as they learn the Content Standards, we ought to recognize that to achieve the vision of higher mathematics achievement for all students, *perseverance* will be a critical attribute, not only for students but also for the entire *system*. All those involved in educating children and with an interest in the success of children, will need the perseverance and courage to accept that prior scores were artificially high and to work from a new baseline to support better teaching and learning for all students.

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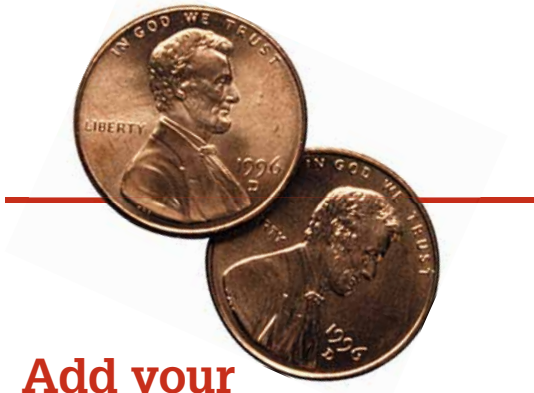

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COACHES' CORNER

Planning and teaching with the Common Core State Standards

BY ROBYN SILBEY, PD AND CAMPUS CONSULTANT

Think about those times when you plan to drive somewhere that you have never been. Specific directions help, and the more detailed they are, the smoother your trip is likely to be. However, if a turn is blocked by construction, a general map is necessary to find an alternate route.

The Common Core State Standards document is the broad road map that provides a context and sequence for specific instructional choices. Although lesson plans call for thinking through a variety of details—choosing the right materials, organizing students, constructing group and/or independent work for students in a mixed-ability classroom—understanding key math ideas that the lesson addresses and where these ideas fit into students' overall math learning is just as crucial for your teachers. CCSS can help.

Let's say the fourth-grade teachers in your school or district are preparing to teach division. CCSS Content Standard 4.NBT.6 is the sixth standard for grade 4 Number and Operations in Base Ten:

> Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

The five previous standards in grade 4 involve place value, rounding, addition, subtraction, and multiplication. These are the prerequisite skills required for a deep understanding of the concept of division, and the first sentence of the Standard makes the connection clear. The second sentence in the Standard ensures that the relationships between division and multiplication are deeply understood through numerical, verbal, and visual representation. The Standards for Mathematical Practice further specify behaviors common to those students who become mathematically proficient at this—and every—Content Standard. Regardless of your teachers' print and online resources, the Common Core State Standards are a vital reference and teacher tool and should always be at the planning table.

Questions and comments about this article can be directed to **rsilbey@hotmail.com**.

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The *MTMS* Word Problem

The Editorial Panel of *Mathematics Teaching in the Middle School* is asking readers to help solve the *MTMS* Word Problem:

Which word or words should be used in a new journal title?

Just as *Mathematics Teacher* and *Teaching Children Mathematics* are descriptive without using the labels "high school" or "elementary school," *MTMS* might better serve a wider range of educators without the words "middle school." What better source for a new title than our readers? Get creative, and send us your favorite names. The rationale of the Editorial Panel and more information are available online at **www.nctm.org/mtmswordproblem**.

Submit your most creative names through **www.nctm.org/mtmswordproblem** by **May 15, 2013.** The Editorial Panel will select four to six choices that will be voted on by *MTMS* readers in September 2013. The most popular name will be presented to the NCTM Board of Directors. Those who submitted the four to six nominated names will each win a $50 gift certificate to the NCTM bookstore.

The individual who submits the winning entry will receive an iPad® and will be featured in the first issue of the newly named journal in August 2014.