

## Achieving Uncommon Results with the CCSSM

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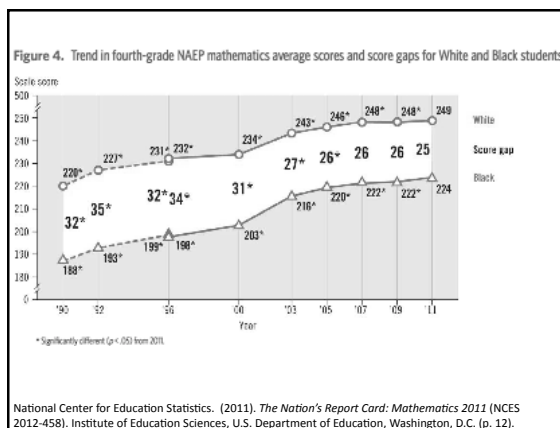
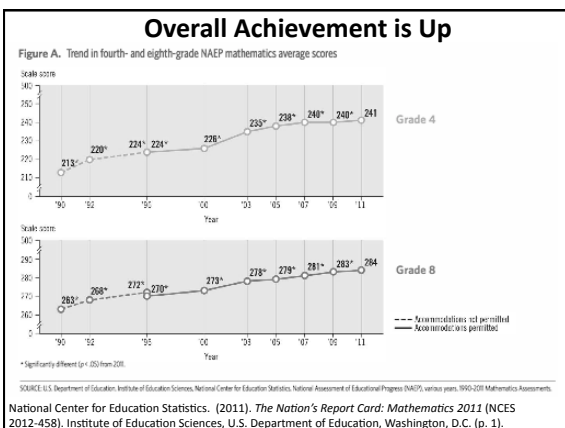
**Handout Available at**  
<http://www.nctm.org/conferences/content.aspx?id=26991>

### Looking Ahead by Looking Back

**1989 & 2000:** NCTM  
*Curriculum and Evaluation Standards for School Mathematics*  
*Principles and Standards for School Mathematics*  
Key recommendations: Content strands, content standards (grade bands), and mathematical processes

**2006:** NCTM *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics*  
Key recommendation: Critical content areas for emphasis.

**2009:** *Focus in High School Mathematics: Reasoning and Sense Making*



### We Know What Makes a Difference

- [1] These include the quality of teachers and teaching;
- [2] access to challenging curriculum, which ultimately determines a greater quotient of students' achievement than their initial ability levels; and
- [3] schools and classes that are organized so that students are well known and well supported.

Darling-Hammond, L. (2006). 2006 DeWitt Wallace-Reader's Digest Distinguished Lecture – Securing the right to learn: Policy and practice for powerful teaching and learning. *Educational Researcher*, 35(7), 13-24.

### What Does the Research Tell Us About A Challenging Curriculum?

**A<sup>2</sup> = Alignment & Access**

### Common Core and Cognitive Demand

**“... the Common Core standards emphasize the cognitive demand category ‘demonstrate understanding’ more than state standards do ...” and twice the emphasis on “solve nonroutine problems” than state standards do (p. 105).**

Porter, A., McMaken, J., Hwang, J., & Yang, R. (2011). Common core standards: The new U.S. intended curriculum. *Educational Researcher*, 40(3), 103-116.

### Quality Teaching

#### Planning for Instruction Focused on the Mathematical Practices

### However, CCSSM Content Standards Alone Likely Will Not Address Achievement Differentials

**“The Common Core may reduce variation in achievement between states, but as a source of achievement disparities, that is not where the action is. Within-state variation is four to five times greater” (p. 12).**



Loveless, T. (2012). *The 2012 Brown Center Report on American Education: How Well are American Students Learning?* Brown Center on Education Policy at Brookings.

### Some Features of Effective Instruction – T<sup>2</sup>

#### Tasks

- Conceptual Engagement & Productive Struggle

#### Talk

- Mathematical Discourse

### Conceptually Engaging Tasks are Atypical

**“... typical classroom mathematics teaching in the United States tends not to use challenging tasks, nor to promote students’ thinking about and engagement with mathematical ideas, and thus fails to help students develop understanding of the mathematics they are learning” (p. 1).**

Silver, E. (2010). Examining what teachers do when they display their best practice: Teaching mathematics for understanding. *Journal of Mathematics Education at Teachers College*, 1(1), 1-6.

### We Don’t Emphasize Perseverance (MP 1)

**Students often urge the teacher to make mathematical “tasks more explicit by breaking them down into smaller steps, specifying exact procedures to be followed, or actually doing parts of tasks for them. Should the teacher succumb to such requests, the ... sense-making aspects of the task are reduced or eliminated ...” (p. 351).**



Stein, M.K., Remillard, J., & Smith, M.S. (2007). How curriculum influences student learning. In F. Lester (Ed.), *Second Handbook of Research on Mathematics Teaching and Learning* (pp. 319-370). Charlotte, NC: Information Age Publishing.

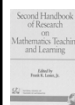
***If your students are going home at the end of the day less tired than you are, the division of labor in your classroom requires some attention.***



William, D. (2011). *Embedded formative assessment*. Bloomington, IN: Solution Tree Press.

### **Supporting Perseverance by Emphasizing Mathematical Practices 2 and 3**

**Teachers' questions play a central role to the outcome of a lesson. "Asking questions that scaffold or support students' continued engagement with a task and that press students to explain and justify their thinking are key to sustaining the cognitive demands of mathematical tasks" (p. 351).**



Stein, M.K., Remillard, J., & Smith, M.S. (2007). How curriculum influences student learning. In F. K. Lester (Ed.), *Second handbook of research on mathematics teaching and learning*. Charlotte, NC: Information Age Publishing.

### **School Organization to Support All Learners (and Teachers)**

### ***Educide by the Low-Slow Group***

**Too often, schools serving large populations of minority students emphasize "slowing down" or providing less mathematics content, rather than providing more challenging content.**

Walker, E. N. (2007). Why aren't more minorities taking advanced math? *Educational Leadership*, 65(3), 48-53.

### **The Power of Formative Assessment Processes**

**"Based on its review of research, the Panel recommends regular use of formative assessment, particularly for students in elementary grades ... for struggling students, frequent (e.g., weekly or biweekly) use of these assessments appears to be optimal, so that instruction can be adapted based on student progress" (p. 47).**



National Mathematics Advisory Panel. (2008). *Foundations for Success: The Final Report of the National Mathematics Advisory Panel*. U.S. Department of Education: Washington, DC.

### **Formative Assessment**

**"If students have left the classroom before teachers have made adjustments to their teaching on the basis of what they have learned about the students' achievement, then they are already playing catch-up. If teachers do not make adjustments before students come back the next day, it is probably too late" (p. 191).**

William, D. (2007). Content then process: Teacher learning communities in the service of formative assessment. In *Ahead of the curve: The power of assessment to transform teaching and learning*. Ed. D. Reeves. 183-204. Bloomington, IN: Solution Tree Press.

### ***Time Must Become the Variable, Not Learning***

**Time and support must become variables. Some students will require more time to learn, and so the school must develop strategies to provide students with that time during the school day.**



DuFour, R., DuFour, R., Eaker, R., & Karhanek, G.. (2004). Whatever it takes: How professional learning communities respond when kids don't learn. Bloomington, IN: National Education Service. p. 35.

**Addressing the Culture and Supporting Teachers as they Engage Students with the Mathematical Practices**

### ***Change is Hard***

**The most likely reason for the stability of teaching practices over time is that teaching is a cultural activity and cultural activities, by their very nature, are highly resistant to change.**

Stigler, J. W., & Thompson, B. J. (2009). Thoughts on creating, accumulating, and utilizing shareable knowledge to improve teaching. *The Elementary School Journal*, 109(5), 442-457.

### ***Change Takes Perseverance***

***When teachers try to change more than two or three things about their teaching at the same time, the typical result is that their teaching deteriorates and they go back to doing what they were doing before. My advice is that each teacher chooses one or two techniques and tries them out in the classroom. If they appear to be effective, then the goal should be practice them until they become second nature.***



William, D. (2011). *Embedded formative assessment*. Bloomington, IN: Solution Tree Press.

### ***We Must Move Beyond Pockets of Excellence***

***Teachers working alone in their classrooms develop inconsistencies in instructional practices and rigor and create inequity in student learning experiences.***

Ferrini-Mundy, J., Graham, K., Johnson, L., & Mills, G. (1998). *Making change in mathematics education: Learning from the field*. Reston, VA: National Council of Teachers of Mathematics.

### ***The Importance of Professional Learning Communities (PLCs) as a Vehicle to Improve Consistency in Instructional Quality***

**Teachers have a professional responsibility to participate in group decision making to improve the art and practice of teaching. One of the most powerful forums for teacher improvement is involvement in a professional learning community.**



Stigler, J. W., & Hiebert, J. (1999). *The teaching gap: Best ideas from the world's teachers for improving education in the classroom*. New York: The Free Press.

### Perhaps We Don't Have an "Achievement" Gap

When African American and White students complete the same mathematics courses, the differences in average achievement gains are statistically insignificant. Additionally, there are no statistically significant differences in achievement between high- and low-SES students who complete the same courses.

Hoffer, T. B., Rasinski, K. A., & Moore, W. (1995). Social background differences in high school mathematics and science course taking and achievement. Washington, DC: U.S. Department of Education.

### *The Importance of Persisting in the Curriculum*

Of all pre-college curricula, the highest level of mathematics in secondary school has the strongest continuing influence on bachelor's degree completion. Finishing a course beyond Algebra 2 more than doubles the odds that a student who enters post-secondary education will complete a bachelor's degree.

Adelman, C. (2006). Answers in the toolbox: academic intensity, attendance patterns, and bachelor's degree attainment. (Office of Educational Research and Improvement Publication.) <http://www.ed.gov/pubs/Toolbox/Title.html>

### *Will the CCSSM help us close our instructional gaps? Yes, but only if .....*

- We focus first and foremost on the Mathematical Practices, i.e. if we make this reform effort about instruction and not just content.
- If we put structures in place to support all students and teachers in achieving the goals of the CCSSM.
- If we address the cultural resistance to change, both within schools and in our culture at large.

### *The CCSSM May Be Our Last Opportunity to Get it Right*

The unprecedented adoption of the same set of mathematics standards by nearly all states ... provides the opportunity for educators nationwide to press the "reset" button on mathematics education. (p. 48).



Larson, M. R. (2011). *Administrator's guide: Interpreting the Common Core State Standards to improve mathematics education*. Reston, VA: NCTM.

