Tips for Implementing the Common Core State Standards for Mathematics

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Essential Shifts for the CCSS for Mathematics

Instructional Shifts

- Focus strongly where the Standards focus
- Coherence: think across grades, and link to major topics within grades
- Rigor: require conceptual understanding, procedural skill and fluency, and application with equal intensity

Assessment Shifts: PARCC Task Types

TYPE I: *TASKS ASSESSING CONCEPTS, SKILLS AND PROCEDURES*	TYPE II: *TASKS ASSESSING EXPRESSING MATHEMATICAL REASONING*	TYPE III: *TASKS ASSESSING MODELING / APPLICATIONS*
• A balance of conceptual understanding, fluency, and application • Any or all mathematical practice standards • Machine scorable, innovative, computer-based formats • Included on the End of Year and Performance Based Assessment	• Written arguments, justifications, critique of reasoning, precision in mathematical statements • MP.3, MP.6 and other mathematical practice standards • A mix of innovative, machine scored and hand scored responses • Included on the Performance Based Assessment	• Modeling and application in a real-world context or scenario • MP.4 and other mathematical practice standards • A mix of innovative, machine scored and hand scored responses • Included on the Performance Based Assessment

CCSS Mathematical Practices

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

Implications

- The PARCC assessments take seriously the Standards for Mathematical Practices
- Success on these new assessments will require shifts in instruction, in classroom assessment, and in the nature of the content:
  - Correct answers are insufficient
  - Explanation and reasoning are required
  - Modeling and application are crucial

K-8 Content Shifts

- Primary focus on number in grades K-5
- Fluency with standard algorithms, supported by strategies based in place value
- Fractions as numbers on the number line, built from unit fractions
  - Unit fractions provide meaning for fraction arithmetic
- Much statistics in grade 6-8
- Much algebra and geometry in grades 7-8
  - Fractions $\Rightarrow$ Proportional reasoning $\Rightarrow$ Linear functions

High School Content Shifts

- Number and quantity
  - Number systems, attention to units
- Modeling
  - Threaded throughout the standards
- Geometry
  - Proof for all, based on transformations
- Algebra and functions
  - Organized by mathematical practices
- Statistics and probability
  - Inference for all, based on simulation

Programmatic Shifts

- The CCSSM represent significant curricular acceleration in grades K-8
  - Much Algebra 1, Geometry, and Statistics are in the middle grades
  - Many "accelerated" programs will no longer be ahead
  - The CCSS for Grade 8 is a reasonable, internationally benchmarked response to "Algebra for all" in grade 8
- Accelerating large percentages of students much beyond the CCSS for K-8 is probably unwise
- The CCSSM for high school include much advanced content and much new content for all students
  - Most students will need three years in high school to complete CCSS
- *So we need to rethink mathematics, grades 6-12*

Math Programs for All Students

- Main pathway completing the CCSS in grade 11
  - Rather than Prealgebra in grade 9, provide support for *all* students to reach these standards
  - Provide alternatives to Precalculus for seniors
- Alternative pathway completing the CCSS in grade 10, allowing for AP Calculus in grade 12
  - Determine where "compacting" should happen
- Flexibility for the small numbers of students who are eager for still more mathematics
  - Align with gifted education policies
  - Expect PSEO during senior year

Implementation Resources and Suggestions

Implementation Resources

- The Mathematics Frameworks from the Partnership for Readiness for College and Careers (PARCC)
- The draft Mathematics Content Specifications from the Smarter Balanced Assessment Consortium (SBAC)
- The Mathematics Assessment Project (MAP)
- The Illustrative Mathematics Project (IMP)
- Bill McCallum's Common Core Tools blog
  - Progressions documents
- Common Core videos from the Hunt Institute
- Phil Daro's SERP Institute videos
- Inside Mathematics website

Tips for Implementation

1. Get to know the CCSS
   - Use the critical areas of focus
   - Take a progressions view
2. Lead with the mathematical practices
   - With the content you are teaching now
3. Work collectively
   - You do not need to invent it all yourself
4. Involve administrators and parents
5. Take some transitional steps
   - Changes you can make soon

Tips for Implementation

6. Build support structures for students who are behind
7. Design programs for *all students*, driven by progressions, not course names
8. Require focus and coherence in district initiatives and professional development offerings
9. Document your implementation
   - Treat your implementation work as action research
10. Take a deep breath … and prepare for a long haul
    - Improving instruction and building new systems takes time