Principal’s Guide to Supporting Transition and Implementation of the CCSS in Elementary Mathematics

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Webinar
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The Plan

• Leadership Priorities
• Knowing and Understanding the Standards
• Action Items for Successful Implementation
• Next Steps and Key Takeaways
Leadership Priorities

• How can you help?

• What’s important?

• How do you do this?

• What’s the plan?
How can you help?

• Knowing

• Supporting

• Build Leadership
  – Mathematics Instructional Leaders
  – Establishing Learning Communities
Poll Question

• My building’s status regarding the CCSS can be best described as:

A. Transitioning to the CCSS
B. Implementing the CCSS
C. Thinking about the CCSS
D. I work in Virginia or Texas or Minnesota or Alaska.
You can’t do this alone...

But – you make it happen.
Principals are difference makers!!!
What’s Important?

• Awareness and knowledge of the CCSS and
• What this looks like inside YOUR building – implementation-wise.

• Recognizing strengths and needs
Driving the CCSS
History in the making…

• These Standards are not intended to be the new names for old ways of doing business. They are a call to take the next step….It is time to recognize that standards are not just promises to our children, but promises we intend to keep (CSSM, p. 5)

• College and career ready.
And now...
A First Step: Implementing the 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.
The Practices – What do we know?

• Well accepted as a starting point... ✓
• Derived from NCTM Process and Adding it Up... ✓
• Observable... ✓
• Planning and pedagogy related... ✓
• Consider for some more than others
  ✓ Mathematics
  ✓ Developmental levels
Mrs. Logan went to the school bake sale to buy some brownies. All the pans of brownies are square. A pan of brownies cost $12. Customers could buy any fractional part of a pan and pay that fraction of $12 (For example, ½ a pan costs ½ of $12). Mrs. Logan bought ¾ of a pan that was 2/5 full. How much did she pay?

Problem Solving, reasoning, modeling...

Doing What Works – Problem Solving, 2012
The Brownies Problem

• What’s the math?
  • CCSS 5.NF.3, .4, .6

• Why is it important?

• Which of the Mathematical Practices might students engage in as they solve this problem?

1. Make sense of problems and persevere in solving them.
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8. Look for and express regularity in repeated reasoning.
In the Classroom

• *The Practices* and Planning
• *The Practices* and Teaching
• *The Practices* and Assessment
How and What do you look for?
## Standards for Mathematical Practice

<table>
<thead>
<tr>
<th>Key student dispositions:</th>
<th>Teacher actions that will engage students in practices:</th>
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**Comments:**

*All indicators are not necessary for providing full evidence of practice(s). Each practice may not be evident during every lesson.*

NCSM Summer Leadership Academy • Draft 2011
<table>
<thead>
<tr>
<th>Mathematics Practices</th>
<th>Students:</th>
<th>Teachers:</th>
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| **1. Make sense of problems and persevere in solving them** | □ Understand the meaning of the problem and look for entry points to its solution  
□ Analyze information (givens, constraints, relationships, goals)  
□ Make conjectures and plan a solution pathway  
□ Monitor and evaluate the progress and change course as necessary  
□ Check answers to problems and ask, “Does this make sense?” | □ Involve students in rich problem-based tasks that encourage them to persevere in order to reach a solution  
□ Provide opportunities for students to solve problems that have multiple solutions  
□ Encourage students to represent their thinking while problem solving |
| **6. Attend to precision** | □ Communicate precisely using clear definitions  
□ State the meaning of symbols, carefully specifying units of measure, and providing accurate labels  
□ Calculate accurately and efficiently, expressing numerical answers with a degree of precision  
□ Provide carefully formulated explanations  
□ Label accurately when measuring and graphing | □ Emphasize the importance of precise communication by encouraging students to focus on clarity of the definitions, notation, and vocabulary used to convey their reasoning  
□ Encourage accuracy and efficiency in computation and problem-based solutions, expressing numerical answers, data, and/or measurements with a degree of precision appropriate for the context of the problem |
| **2. Reason abstractly and quantitatively** | □ Make sense of quantities and relationships in problem situations  
□ Represent abstract situations symbolically and understand the meaning of quantities  
□ Create a coherent representation of the problem at hand  
□ Consider the units involved  
□ Flexibly use properties of operations | □ Facilitate opportunities for students to discuss or use representations to make sense of quantities and their relationships  
□ Encourage the flexible use of properties of operations, objects, and solution strategies when solving problems  
□ Provide opportunities for students to decontextualize (abstract a situation) and/or contextualize (identify referents for symbols involved) the mathematics they are learning |
| **3. Construct viable arguments and critique the reasoning of others** | □ Use definitions and previously established causes/effects (results) in constructing arguments  
□ Make conjectures and use counterexamples to build a logical progression of statements to explore and support ideas  
□ Communicate and defend mathematical reasoning using objects, drawings, diagrams, and/or actions  
□ Listen to or read the arguments of others  
□ Decide if the arguments of others make sense and ask probing questions to clarify or improve the arguments | □ Provide and orchestrate opportunities for students to listen to the solution strategies of others, discuss alternative solutions, and defend their ideas  
□ Ask higher-order questions which encourage students to defend their ideas  
□ Provide prompts that encourage students to think critically about the mathematics they are learning |
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<tr>
<td>4. Model with mathematics</td>
<td>□ Apply prior knowledge to solve real world problems&lt;br&gt;□ Identify important quantities and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and/or formulas&lt;br&gt;□ Use assumptions and approximations to make a problem simpler&lt;br&gt;□ Check to see if an answer makes sense within the context of a situation and change a model when necessary</td>
<td>□ Use mathematical models appropriate for the focus of the lesson&lt;br&gt;□ Encourage student use of developmentally and content-appropriate mathematical models (e.g., variables, equations, coordinate grids)&lt;br&gt;□ Remind students that a mathematical model used to represent a problem’s solution is ‘a work in progress,’ and may be revised as needed</td>
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<td>5. Use appropriate tools strategically</td>
<td>□ Make sound decisions about the use of specific tools (Examples might include: calculator, concrete models, digital technologies, pencil/paper, ruler, compass, protractor)&lt;br&gt;□ Use technological tools to visualize the results of assumptions, explore consequences, and compare predictions with data&lt;br&gt;□ Identify relevant external math resources (digital content on a website) and use them to pose or solve problems&lt;br&gt;□ Use technological tools to explore and deepen understanding of concepts</td>
<td>□ Use appropriate physical and/or digital tools to represent, explore and deepen student understanding&lt;br&gt;□ Help students make sound decisions concerning the use of specific tools appropriate for the grade level and content focus of the lesson&lt;br&gt;□ Provide access to materials, models, tools and/or technology-based resources that assist students in making conjectures necessary for solving problems</td>
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<td>7. Look for and make use of structure</td>
<td>□ Look for patterns or structure, recognizing that quantities can be represented in different ways&lt;br&gt;□ Recognize the significance in concepts and models and use the patterns or structure for solving related problems&lt;br&gt;□ View complicated quantities both as single objects or compositions of several objects and use operations to make sense of problems</td>
<td>□ Engage students in discussions emphasizing relationships between particular topics within a content domain or across content domains&lt;br&gt;□ Recognize that they quantitative relationships modeled by operations and their properties remain important regardless of the operational focus of a lesson&lt;br&gt;□ Provide activities in which students demonstrate their flexibility in representing mathematics in a number of ways e.g., $76 = (7 \times 10) + 6$; discussing types of quadrilaterals, etc.</td>
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<td>8. Look for and express regularity in repeated reasoning</td>
<td>□ Notice repeated calculations and look for general methods and shortcuts&lt;br&gt;□ Continually evaluate the reasonableness of intermediate results (comparing estimates), while attending to details, and make generalizations based on findings</td>
<td>□ Engage students in discussion related to repeated reasoning that may occur in a problem’s solution&lt;br&gt;□ Draw attention to the prerequisite steps necessary to consider when solving a problem&lt;br&gt;□ Urge students to continually evaluate the reasonableness of their results</td>
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http://splaysoft.weebly.com/ccl4s.html
Math Practices & Content

• The Mathematical Practices function differently from content. One can teach content (sadly) without practices; but not *practices* without content.

• The Mathematical Practices should *must* be authentically connected to specific content.

• The Mathematical Practices should be involved in all assessment components.
## The Content

**Grades K-2**
- Counting and Cardinality (K only)
- Operations and Algebraic Thinking
- Number and Operations in Base Ten
- Measurement and Data
- Geometry

**Grades 3-5**
- Operations and Algebraic Thinking
- Number and Operations in Base Ten
- **Number and Operations – Fractions**
- Measurement and Data
- Geometry
### Grades 6, 7

- Ratios and Proportional Relationships
- The Number System
- Expressions and Equations
- Geometry
- Statistics and Probability

### Grade 8

- The Number System
- Expressions and Equations
- Functions
- Geometry
- Statistics and Probability
A Glimpse … Not Fair

Standards/Expectations

<table>
<thead>
<tr>
<th>Grade</th>
<th>Standards</th>
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<tbody>
<tr>
<td>K</td>
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<td>33</td>
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Less is MORE!!!!

The number of standards is NOT the story!
Content and Pedagogical Issues

1. Focus – *depth, time, linger, importance, where the standards focus.*

2. Coherence – *development time, flow, consider cross grade issues, link to major topics in each grade level.*

3. Rigor – *For major topics, it’s conceptual understanding, procedural skill and fluency and doing math in context.*
Considering Focus

1. Focus – depth, time, linger, importance, where the standards focus.

Critical areas, Focal Points

Bite size!!!
Understanding

4.NBT

• Generalize place value \textit{understanding} for multi-digit whole numbers.

• Use place value \textit{understanding} and properties of operations to perform multi-digit arithmetic.
Representation

• 3.NF.2 – Understand a fraction as a number on the number line; represent fractions on a number line diagram.

• 4.NBT.5 – Multiply a whole number...Illustrate and explain...by using equations, rectangular arrays, and/or area models.
Here’s the point...

- Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie? (4.NF.4c)

- Understanding + Representations = Time; Stuff; Rigor

Conceptual understanding is NOT an option, It’s an expectation!
Across Levels, time to learn

2. Coherence – development time, flow, consider cross grade issues, link to major topics in each grade level.
Gaps

• **Pre-requisites.** What’s the plan – for two years, forever?

• **RtI** – defining tier needs with a CCSS curriculum

• **Advanced students?** Enrichment and/vs Acceleration – particularly between elementary and middle school.
What’s Important?

- Connecting Focus, Coherence and Rigor
- Consider (any grade or conceptual category)
  - What’s familiar?
  - What’s new?
  - What’s challenging
So, what’s your plan?

• Building your math team!
  – Content and pedagogical capacity – building wide

• Communication plan – community members, parents.

• Providing time (maybe more time) for mathematics

• Monitoring the implementation
  – What are other places doing?
  – How can you learn from them?
  – http://grade3commoncoremath.hcpss.wikispaces.net
Poll Question

• How would you describe your building’s professional development (PD) for the CCSS?

A. Planning for PD – building and district wide
B. PD for the Mathematical Practices
C. PD for mathematics content
D. Not yet
Questions Emerging

Research Needs

The influence of the CCSS will be strongly mediated by the consortial assessments.

PARCC or SMARTER Balanced?
Resources

https://sites.google.com/site/emstlonline/

http://www.achieve.org/publications

Finally – How can you help?

- Knowing

- Supporting

- Build Leadership
  - Empower and **support** mathematics leaders
  - Establishing Learning Communities
YOUR Turn – Questions
YOU are the difference maker!

What are your needs as you implement the CCSS? How can I/we help?

Share...
For more information visit

www.ffennell.com

www.dreambox.com