Focus on Math CCSS:
An in-depth examination of the
K–12 math standards

Connecticut Common Core Leadership Summit
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West Hartford Public Schools Elementary Curriculum Team

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Session Objectives

- Learn the key shifts and structures of the Common Core Standards for Mathematics
- Identify “look-fors” in teacher and leader practice
- Reflect on your school/district strengths and needs through the lens of one district’s implementation strategies
- Determine key action steps to enhance teacher and leader knowledge, capacity, and outcomes for CCSS-Math implementation
“Let’s change ‘brink of chaos’ to ‘Everything is wonderful.’”
Jazz as Metaphor for Change

“There’s a way of playing safe, there’s a way of using tricks and there’s the way I like to play, which is dangerously, where you’re going to take a chance on making mistakes in order to create something you haven’t created before.”

— Dave Brubeck
“Pause Points” Protocol

- Discussion with table partners
- Signal to reconvene = music stops and blank slide
Introductions

In 30 seconds or less, tell others at your table:

► Who you are and your current role
► Why you have joined this session
► One key word or phrase about your district’s implementation of the Common Core this year
Improving Student Performance by Enhancing Teacher and Leader:

- Knowledge
- Capacity
- Outcomes

- Developing Teacher and Leader Capacity
- Defining Outcomes and Monitoring Progress
- Building Foundational Knowledge
Math Discourse

Grade 7 Math Lesson

http://www.insidemathematics.org/index.php/7th-grade-whats-the-savings

Framing Question:

What is needed in a school/district to have math discourse as an instructional practice outcome in all classrooms?
Framing Question for Discussion (10 min)

What is needed in a school/district to have math discourse as an instructional practice outcome in all classrooms?

- Record 5-7 ideas on sticky notes (one per note) (5 min)
- Work with a partner to find patterns and place into categories (5 min)
Improving Student Performance by Enhancing Teacher and Leader:

- Defining Outcomes and Monitoring Progress
- Developing Teacher and Leader Capacity
- Building Foundational Knowledge

Knowledge Capacity: Outcomes
Defining Outcomes

✓ What are students learning?
  Written and viable curriculum aligned to CCSS-Math

✓ How are they learning?
  Policies, structures/systems, resources, and culture to support teacher & leader capacity and effectiveness

✓ How do you know they learned?
  Student college & career readiness through CCSS-Math mastery
Defining Outcomes

District mission/vision

Instructional Core: Relationship between teacher-content-student

Alignment of goals and strategies

Continuous improvement/growth mindset

Process for Review/Reflection
Rigorous Curriculum Design

Standards
- Prioritization
- Vertical articulation
- “Through-lines”

Unwrapped Standards
- Concepts
- Skills
- Bloom’s Taxonomy/DOK

Learning Plan
- Unit order/pacing
- Teaching Points
- Resources
- Assured Learning Experiences

Assessment
- Initial Assessments
- Post Assessment/Performance Tasks
- Rubrics
Defining Outcomes: Implementation of CCSS-Math

- Culture of continuous improvement
- Focused curriculum design and articulation
- PreK-12 alignment
- Teacher/leader knowledge of mathematics standards
- Effective instructional practices observed in all classrooms
- Processes to monitor implementation
- Structures for collaborative review and feedback
- Assessment of student progress
### Implementation Matrix for CCSS-Math

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Capacity</th>
<th>Outcomes</th>
</tr>
</thead>
</table>
| Building teacher and leader knowledge of CCSS-Math content and instructional shifts | Developing instructional practice and leadership practice supporting CCSS-Math implementation | • Defining outcomes for our work  
• Monitoring progress toward outcomes, incl. opportunities for review/feedback |

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Needs/Opportunities</th>
<th>Questions?</th>
</tr>
</thead>
</table>
| Conditions & strategies that support implementation:  
• Policies  
• Systems/Structures  
• Resources  
• Culture | Consider:  
• Policies  
• Systems/Structures  
• Resources  
• Culture |             |

<table>
<thead>
<tr>
<th>Next Steps/Actions</th>
</tr>
</thead>
</table>

CT Common Core Leadership Summit (West Hartford Public Schools) March 2014
Pause Point: Outcomes (10 minutes)

Take time with 1-2 tablemates to:

1. Reflect upon your district’s **strengths and needs** related to defining and monitoring outcomes of CCSS-Math implementation

2. Record **questions**
   - For us
   - For your school/district team

3. Determine one or two **priority actions steps** for your school/district
Improving Student Performance by Enhancing Teacher and Leader:

- Knowledge
  - Defining Outcomes and Monitoring Progress
- Capacity
  - Developing Teacher and Leader Capacity
- Outcomes
  - Building Foundational Knowledge
### Common Core Mathematics Shifts

#### Focus
- Narrow and deepen core concepts and procedures at each grade
- Develop strong foundations

#### Coherence
- Think of progressions across grades
- Link to major topics within and across grade levels

#### Balance Of Rigor
- Pursue with equal intensity...
  - conceptual understanding
  - procedural skill and fluency
  - application

http://www.illustrativemathematics.org/fractions_progression
Common Core Standards: Mathematics

Content Standards (Domains/Concepts) 
*What?*

Standards for Mathematical Practice (Habits of Mind) 
*How?*
Components of a Balanced Mathematics Program

- Conceptual Understanding
- Computational & Procedural Understanding
- Problem Solving

“WHERE” the mathematics work
“WHY” the mathematics work
“HOW” the mathematics work
Learning Progressions within Mathematical Domains

- Operations and Algebraic Thinking (OA)
- Expressions and Equations (EE)
- Number and Operations in Base Ten (NBT)
- Number System (NSS)
- Number and Operations-Fractions (NF)
- High School

K 1 2 3 4 5 6 7 8
## Critical Areas of Focus in Mathematics

<table>
<thead>
<tr>
<th>Grade</th>
<th>Focus Areas for Conceptual Understanding and Fluency</th>
</tr>
</thead>
<tbody>
<tr>
<td>K–2</td>
<td>Addition and subtraction – concepts, skills, and problem solving and place value</td>
</tr>
<tr>
<td>3–5</td>
<td>Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving</td>
</tr>
<tr>
<td>6</td>
<td>Ratios and proportional reasoning; early expressions and equations</td>
</tr>
<tr>
<td>7</td>
<td>Ratios and proportional reasoning; arithmetic of rational numbers</td>
</tr>
<tr>
<td>8</td>
<td>Linear algebra and linear functions</td>
</tr>
</tbody>
</table>
A Note on Fluency

The concept of computational fluency is much more complex than rote memorization of basic facts.

“A student cannot be fluent without conceptual understanding and flexible thinking.”

(NCTM, Principles and Standards for School Mathematics, p.152)
Mathematical Standards for High School

6 conceptual categories

- Number and Quantity Algebra
- Functions
- Modeling
- Geometry
- Statistics
- Probability

College and Career Readiness

- Use mathematical modeling to analyze empirical situations
- Develop a depth of understanding to apply mathematics to novel situations
- Apply mathematical ways of thinking to real world issues and challenges
Common Core Standards: Mathematics

- Content Standards (Domains/Concepts)
- Standards for Mathematical Practice (Habits of Mind)

What?
How?
Standards for Mathematics Practice

1. Make sense of problems and persevere in solving them.
6. Attend to precision.

2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.

4. Model with mathematics.
5. Use appropriate tools strategically.

7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Reasoning and explaining
Modeling and using tools
Seeing structure and generalizing
Resources for Building Foundational Knowledge

Learning Progressions
http://ime.math.arizona.edu/progressions/

Mathematical Practice
http://achievethecore.org/content/upload/Standards%20for%20Mathematical%20Practice.pdf
http://www.insidemathematics.org/

Mathematical Professional Development Modules

IllustrativeMathematics.org:
http://www.illustrativemathematics.org/standards/k8
Pause Point: Building Knowledge

Take time with 1-2 tablemates to:

1. Reflect upon your district’s strengths and needs to build teacher and leader knowledge of CCCS-Math

2. Record questions on CCSS-Math
   - For us
   - For your school/district team

3. Determine one or two priority actions steps for your school/district
Improving Student Performance by Enhancing Teacher and Leader:

Knowledge

Capacity

Outcomes

- Developing Teacher and Leader Capacity
- Defining Outcomes and Monitoring Progress
- Building Foundational Knowledge
Our West Hartford Plan: 2011-2012

**Year of Study**
- Individual leaders attend CCSS workshops
- Determine curriculum framework/model
- Involve Curriculum Professional Development Committee to anticipate changes

**Stakeholders**
- Design and offer PD with district-wide information
- Provide overview of CCSS and Rigorous Curriculum Design (RCD) for leadership and Board of Education

**Curriculum Design**
- Provide overview for leadership and 9-day intensive workshop on Ainsworth’s Rigorous Curriculum Design for curriculum teams
- “Unwrap” standards and begin revising curricula
- Summer Curriculum writing
Our West Hartford Plan: 2012-2013

**Implementation**
Implement curricular changes in Grades 1, 3, 5 (math only)

**Support**
Provide townwide and dept professional development on revised/new units of study and related content and performance tasks
Utilize early release time, faculty meeting and team time to monitor and refine curriculum implementation

**Curriculum Review**
Continue curriculum design/re-design in all grades and utilize teams to extend unit design
Monitor revisions
Summer Curriculum writing
Our West Hartford Plan: 2013-2014

**Implementation**
Implement curricular changes for *new* units in Grades K, 2, 4 and revised units in Grades 1, 3, 5
Integrate technology within new and revised units of study
Begin piloting of test items per requests by CSDE

**Support**
Provide townwide and dept professional development on revised/new units of study and related content and performance tasks
Utilize early release time, faculty meeting and team time to monitor and refine curriculum implementation

**Curriculum Review**
Continue curriculum design/re-design and utilize teams to extend unit design
Monitor revisions
Summer Curriculum writing
Evaluate/use any available testing resources
Unit Design and Review Process

• **Grade Level/Course Writing Teams**
  - Curriculum Specialists/Department Supervisor + 3 grade level teachers
  - 1-2 days per unit x 6 units

• **Review Teams**
  - 3-4 grade level teachers
  - Library-Media & Technology
  - 1-2 week feedback window

• **Posting to District Curriculum Website**
• **Grade level teacher feedback on each unit**

30 teachers + 25 teachers = 55 teachers
≈ 90 days
Core Instructional Resources

- Equity of access to materials
- Additional resources welcome!
- Developing web-based teacher sharing site
- Continue to assess/inventory math manipulatives

- http://www.illustrativemathematics.org/
- http://www.k-5mathteachingresources.com/
Professional Learning Structures: Teachers

- Curriculum Writing/Revision Teams
- Grade Level Content Session (District)
- Unit Feedback
- Team Grade Level Meetings (School-Based)
- Team Grade Level Meetings (School-Based)
- Grade Level Collaborative Session (District)

Web-based Learning and Sharing Forum
Professional Learning Structures: Leaders

**Teacher-Leaders**
- Math content focus
- Curriculum writing teams
- PreK-12 Math Vertical Team
- Regular meetings
- District Coaches Network
- State focus groups
- Webinars

**Principals**
- Math content focus
- PreK-12 Math Vertical Team
- Monthly meetings
- Webinars
Fullan (2011) reminds leaders that during implementation, they will not likely be the most loved person in the organization. 

Change is difficult as it requires people to step out of their comfort zones and take risks.
Stages of Change

Know it

Try it

Own it, Believe it

Spread it, Make it better

Advocacy/Innovation

Ownership

Application & Experimentation

Awareness

AchievetheCore.org
Teacher & Leader Resources

- Connecticut State Dept of Education

- Math Practices Tool for Observing
  http://math.serpmedia.org/tools_5x8.html
  http://achievethecore.org/content/upload/Instructi
tionalPracticeGuide_MATH_K8_D_09192013.pdf
Teacher & Leader Resources

▶ Classroom lesson videos
http://www.insidemathematics.org/index.php/classroom-video-visits
https://www.teachingchannel.org/videos?default=1

▶ Resources for Leadership and Change: Building a School Culture of Mathematical Thinking
Pause Point: Developing Capacity

Take time with 1-2 tablemates to:

1. Reflect upon your district’s strengths and needs to develop teacher and leader capacity

2. Record questions on CCSS-Math
   - For us
   - For your school/district team

3. Determine one or two priority actions steps for your school/district
“A combination of resolute leadership and empathy enables leaders to find alternative ways when they get stuck. They demonstrate persistence with flexibility but never stray from the core purpose.”

Motion Leadership: The Skinny on Becoming Change Savvy (2009), p.23

Bring the “jazz” on for your young mathematicians!