Implementing the Common Core State Standards

Naperville School District
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Note: ELA slides are adapted, with permission, from a presentation by Susan Pimentel .

Overview

- Rationale for the Common Core State Standards
- A look inside the Common Core State Standards
- Renewing programs for all students
- Implementation suggestions and resources

Major Themes

- All students means ALL students
- The work is about improving instruction, which requires that teachers collaborate to reach more students more of the time
- Commonalities across mathematics and ELA

Underlying Principle

- "*Everyone is good at mathematics because everyone can think. And mathematics is about thinking.*"
  - Yeap Ban Har, National Institute of Education, Singapore.
- Corollary 1: Strategies that attempt to remove thinking from learning are bound to fail in the long run.
- Corollary 2: When learning is effective, "getting the right answer" is but a small piece of the work.

Rationale for the Common Core State Standards

What's New with the CCSS?

- Internationally benchmarked standards
- Common across 40+ states
- Focus and coherence
- College and career readiness for all
- And all students means ALL students

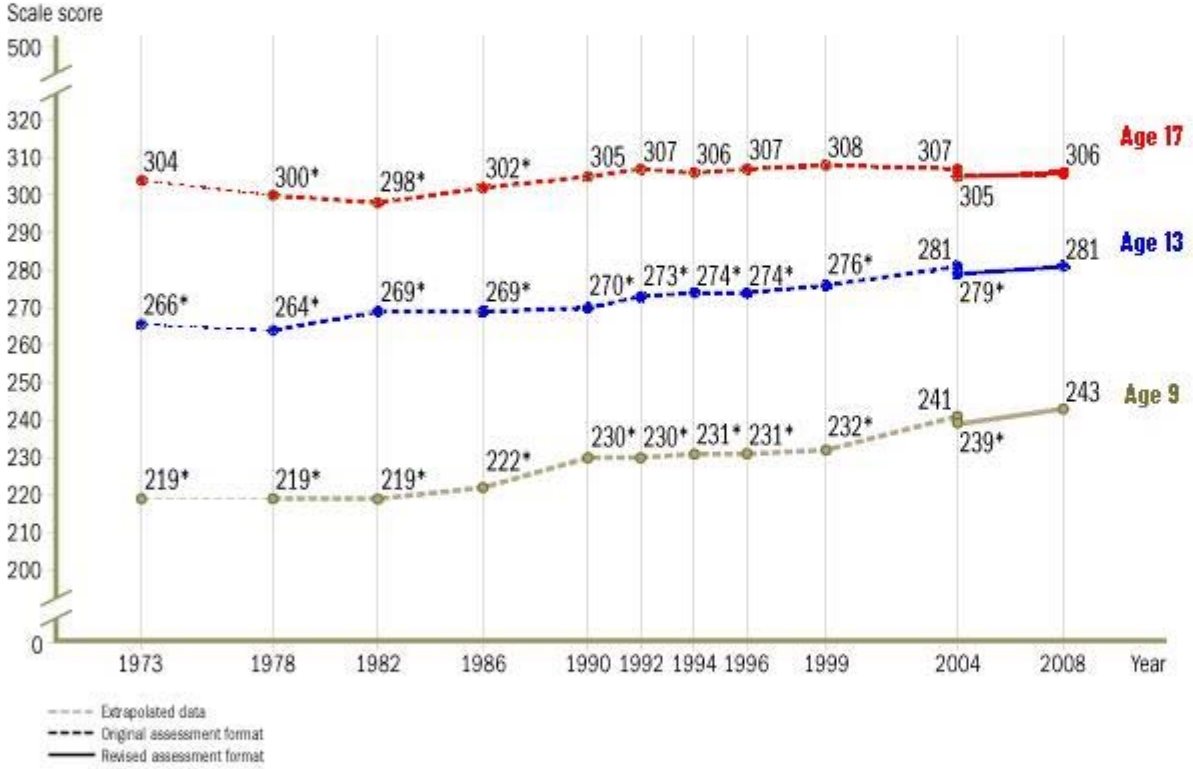
Trends in National Average Reading Scores

Since 1971	Since 2004
↔	↑ 3 points
↑ 4 points	↑ 3 points
↑ 12 points	↑ 4 points

↑ Indicates the score was higher in 2008.
↔ Indicates there was no significant change in the score in 2008.

* Significantly different ($p < .05$) from 2008.
NOTE: The score-point change is based on the difference between unrounded scores.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), various years, 1971–2008 Long-Term Trend Reading Assessments.

Trends in National Average Mathematics Scores



Since 1973	Since 2004
↔	↔
↑ 15 points	↑ 3 points
↑ 24 points	↑ 4 points

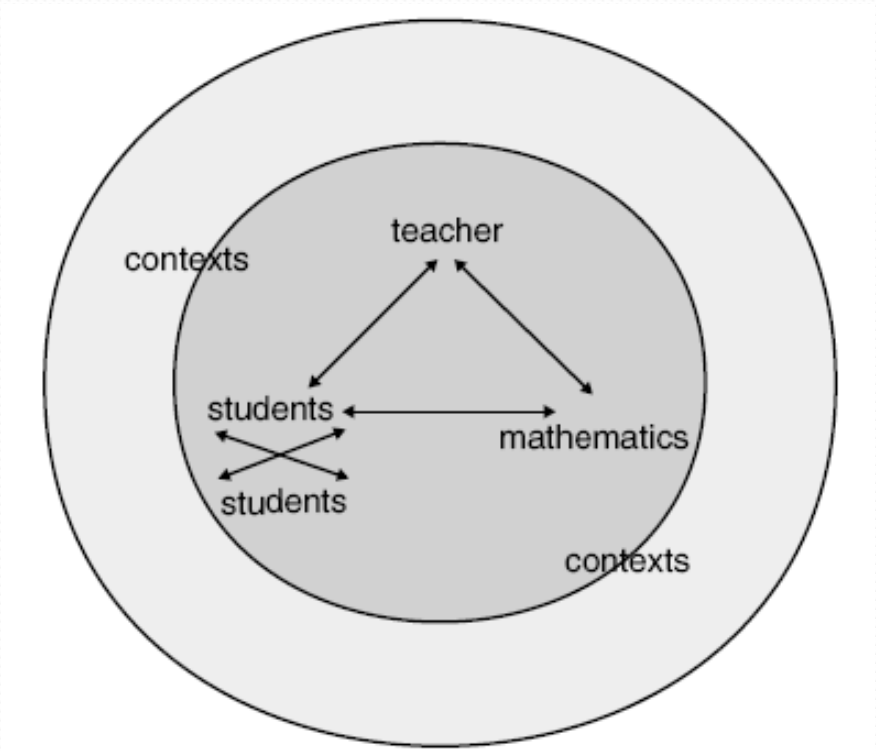
↑ Indicates the score was higher in 2008.
↔ Indicates there was no significant change in the score in 2008.

Achievement Trends

- Achievement is up by many indicators
  - Significant growth in grades 4 and 8
  - High school diploma, math course taking
  - College attendance, college completion
- High school achievement is flat
  - U.S. 15-year-olds lag in applying math
  - Poor results on H.S. end-of-course exams
  - College remediation rates remain high
- **Today's world demands more**

Instruction as Interaction

What matters are the interactions, in classrooms, among the teacher, the students, and the mathematical ideas



Source: Cohen & Ball, 1999, 2000, as cited in NRC, 2001.

(Secondary Mathematics) Problems

- Three ways to improve achievement
  - Invest in the knowledge and skill of teacher
  - Change the level of content
  - Change the role of the student in the instructional process.

- Problem of *access*
- Problem of *teaching quality*

- Both of these problems are perpetuated and exacerbated by pervasive myths

Myth: Basic Skills First

- Myth: Students cannot engage in high-level thinking until they have mastered basic skills
- View is pervasive in high schools, which function primarily as sorting mechanisms
- Students are denied access to quality instruction because of adult judgments
- High schools and their curricula were not designed to teach high-level content to all students

Myth: Natural Teachers Are Born

- Myth: Teaching ability is a natural predisposition
  - Teaching is an art that cannot be learned
  - The system does not learn; we rarely refine the wisdom of practice
- Teaching is a mass profession
  - Ordinary people doing extraordinary things (Japan)
- Teaching is a skill that can be learned—and it has a knowledge base

College and Career Readiness

- Text complexity is a key issue
- Gap between college texts and high school texts large
- Only half of high school graduates are able to read CCR texts
- *Too* many students reading at *too* low a level for *too* much of the time…. They are relegated to leveled texts and getting stuck

Deficiencies are not equal opportunity. . .

College and Career Readiness

- Algebra is a key issue
- More states require Algebra 2 or its equivalent (A2E)
  - A proxy for college and career readiness
- CCSS definition of college and career readiness:
  - All standards not indicated by (+)
- We need to make A2E rigorous, relevant, and attainable
  - Your parents' Algebra 2 will not do

- *But many teachers do not support this goal*

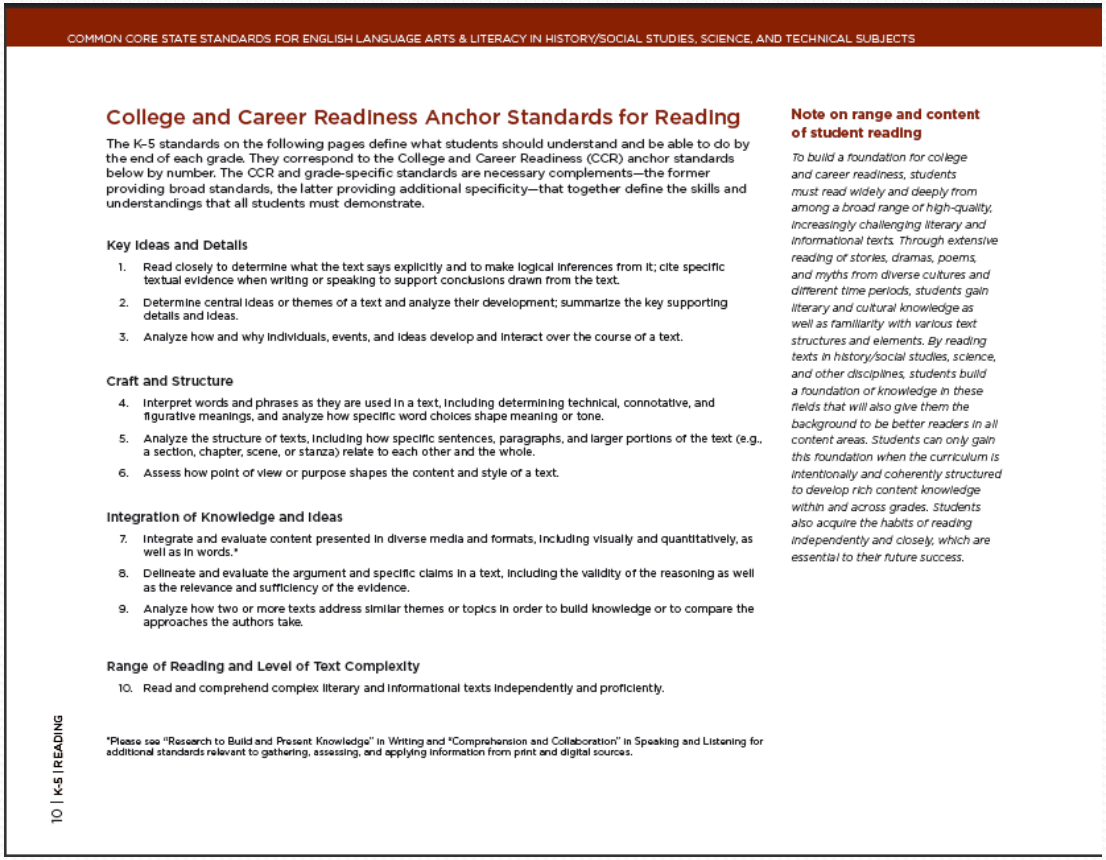
A Look Inside the Common Core State Standards

CCSS Principles

- Focus
  - Identifies key ideas, understandings, and skills for each grade or course
  - Stresses deep learning, which means applying concepts and skills within the same grade or course
- Coherence
  - Articulates a progression of topics across grades and connects to other topics
  - Vertical growth that reflects the nature of the discipline

ELA CCSS Design and Organization

College and Career Readiness (CCR) Anchor Standards provide *focus* and *coherence*



College and Career Readiness Anchor Standards for Reading

The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.*
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Range of Reading and Level of Text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

*Please see "Research to Build and Present Knowledge" in Writing and "Comprehension and Collaboration" in Speaking and Listening for additional standards relevant to gathering, assessing, and applying information from print and digital sources.

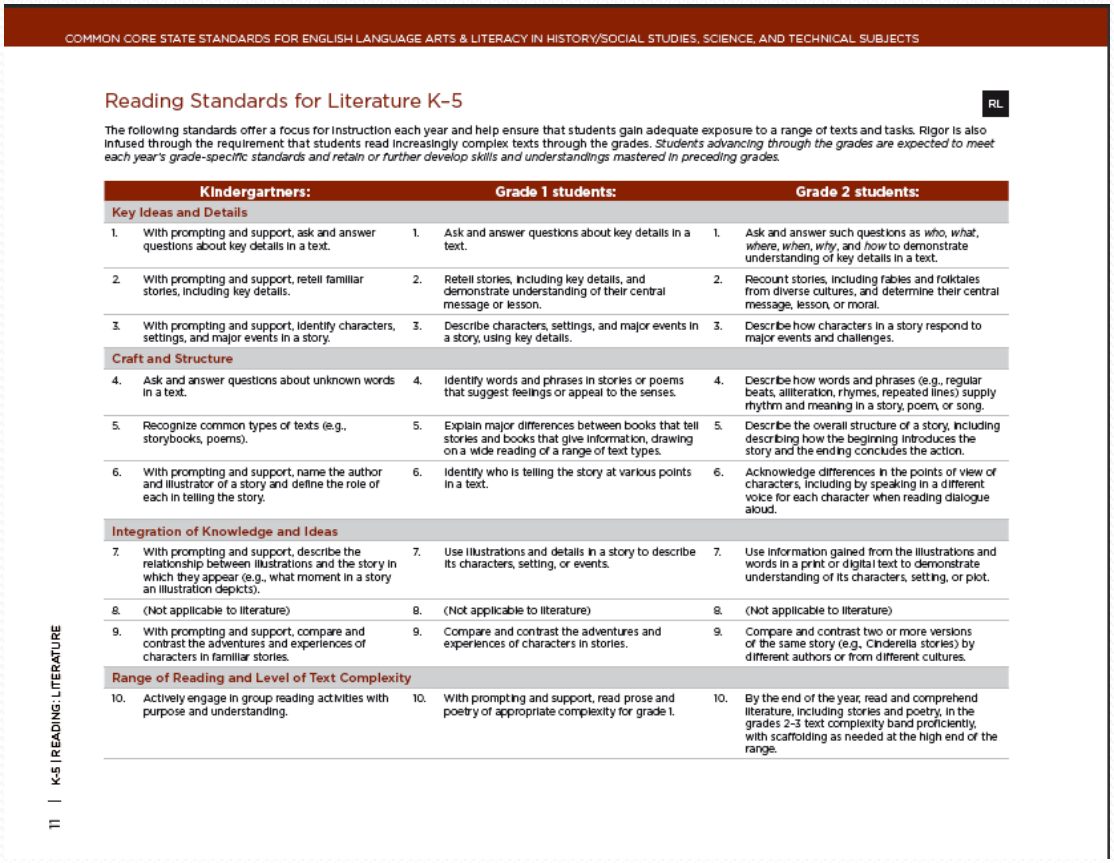
Note on range and content of student reading

To build a foundation for college and career readiness, students must read widely and deeply from among a broad range of high-quality, increasingly challenging literary and informational texts. Through extensive reading of stories, dramas, poems, and myths from diverse cultures and different time periods, students gain literary and cultural knowledge as well as familiarity with various text structures and elements. By reading texts in history/social studies, science, and other disciplines, students build a foundation of knowledge in these fields that will also give them the background to be better readers in all content areas. Students can only gain this foundation when the curriculum is intentionally and coherently structured to develop rich content knowledge within and across grades. Students also acquire the habits of reading independently and closely, which are essential to their future success.

ELA CCSS Design and Organization

K–12 standards

- Grade-specific end-of-year expectations
- Cumulative progression of skills and understandings
- One-to-one correspondence with CCR standards



COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY IN HISTORY/SOCIAL STUDIES, SCIENCE, AND TECHNICAL SUBJECTS

Reading Standards for Literature K–5

RL

The following standards offer a focus for instruction each year and help ensure that students gain adequate exposure to a range of texts and tasks. Rigor is also infused through the requirement that students read increasingly complex texts through the grades. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.*

	Kindergartners:		Grade 1 students:		Grade 2 students:
Key Ideas and Details					
1.	With prompting and support, ask and answer questions about key details in a text.	1.	Ask and answer questions about key details in a text.	1.	Ask and answer such questions as *who, what, where, when, why,* and *how* to demonstrate understanding of key details in a text.
2.	With prompting and support, retell familiar stories, including key details.	2.	Retell stories, including key details, and demonstrate understanding of their central message or lesson.	2.	Recount stories, including fables and folktales from diverse cultures, and determine their central message, lesson, or moral.
3.	With prompting and support, identify characters, settings, and major events in a story.	3.	Describe characters, settings, and major events in a story, using key details.	3.	Describe how characters in a story respond to major events and challenges.
Craft and Structure					
4.	Ask and answer questions about unknown words in a text.	4.	Identify words and phrases in stories or poems that suggest feelings or appeal to the senses.	4.	Describe how words and phrases (e.g., regular beats, alliteration, rhymes, repeated lines) supply rhythm and meaning in a story, poem, or song.
5.	Recognize common types of texts (e.g., storybooks, poems).	5.	Explain major differences between books that tell stories and books that give information, drawing on a wide reading of a range of text types.	5.	Describe the overall structure of a story, including describing how the beginning introduces the story and the ending concludes the action.
6.	With prompting and support, name the author and illustrator of a story and define the role of each in telling the story.	6.	Identify who is telling the story at various points in a text.	6.	Acknowledge differences in the points of view of characters, including by speaking in a different voice for each character when reading dialogue aloud.
Integration of Knowledge and Ideas					
7.	With prompting and support, describe the relationship between illustrations and the story in which they appear (e.g., what moment in a story an illustration depicts).	7.	Use illustrations and details in a story to describe its characters, setting, or events.	7.	Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot.
8.	(Not applicable to literature)	8.	(Not applicable to literature)	8.	(Not applicable to literature)
9.	With prompting and support, compare and contrast the adventures and experiences of characters in familiar stories.	9.	Compare and contrast the adventures and experiences of characters in stories.	9.	Compare and contrast two or more versions of the same story (e.g., Cinderella stories) by different authors or from different cultures.
Range of Reading and Level of Text Complexity					
10.	Actively engage in group reading activities with purpose and understanding.	10.	With prompting and support, read prose and poetry of appropriate complexity for grade 1.	10.	By the end of the year, read and comprehend literature, including stories and poetry, in the grades 2–3 text complexity band proficiently, with scaffolding as needed at the high end of the range.

ELA CCSS Highlights

1. Text complexity
2. Text-dependent questions
3. Informational text
4. Writing to sources
5. Academic vocabulary
6. Marshaling arguments

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

Grade Level Overview

Cross-cutting themes

Mathematics | Grade 2

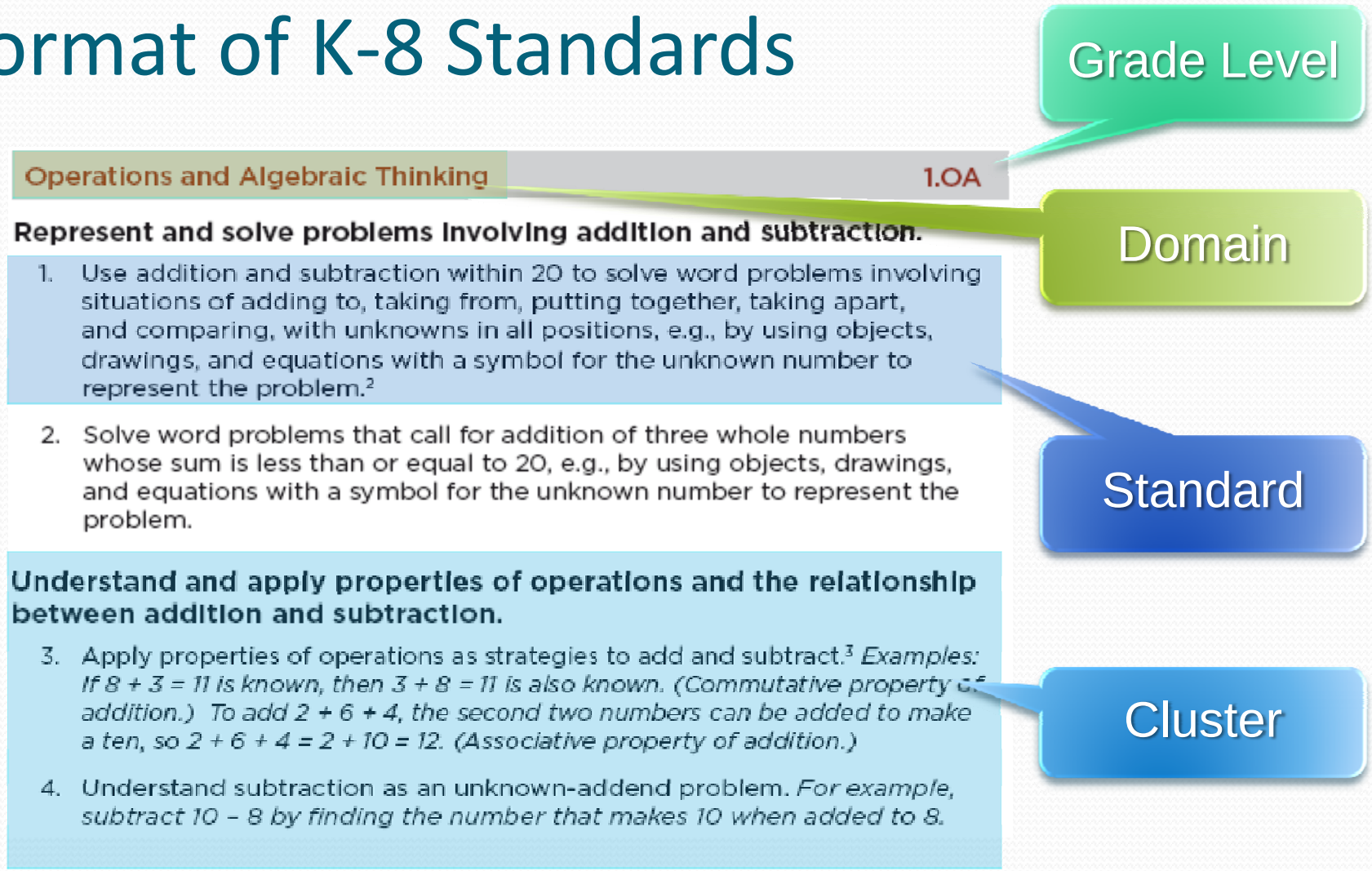
In Grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes.

Critical Area of Focus

(1) Students extend their understanding of the base-ten system. T
includes ideas of counting in fives, tens, and multiples of hundreds, t
and ones, as well as number relationships involving these units, in
comparing. Students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones).

(2) Students use their understanding of addition to develop fluency with addition and subtraction within 100. They solve problems within 1000

Format of K-8 Standards



K-8 CCSS Changing Content Emphases

- Primary focus on number in grades K-5
- Fractions as numbers on the number line, beginning with unit fractions
- Fluency with standard algorithms, supported by strategies based in place value
- Much statistics in grade 6-8
- Much algebra and geometry in grades 7-8

CCSS for High School Mathematics

- Organized in "Conceptual Categories"
  - Number and Quantity
  - Algebra
  - Functions
  - Modeling
  - Geometry
  - Statistics and Probability
- Conceptual categories are not courses
- Additional mathematics for advanced courses indicated by (+)
- Standards with connections to modeling indicated by (★)

Conceptual Category Introduction

Mathematics | High School—Geometry

An understanding of the attributes and relationships of geometric objects can be applied in diverse contexts—interpreting a schematic drawing, estimating the amount of wood needed to frame a sloping roof, rendering computer graphics, or designing a sewing pattern for the most efficient use of material.

Although there are many types of geometry, school mathematics is devoted primarily to plane Euclidean geometry, studied both synthetically (without coordinates) and analytically (with coordinates). Euclidean geometry is characterized most importantly by the Parallel Postulate, that through a point not on a given line there is exactly one parallel line. (Spherical geometry, in contrast, has no parallel lines.)

During high school, students begin to formalize their geometry experiences from elementary and middle school, using more precise definitions and developing careful proofs. Later in college some students develop Euclidean and other geometries carefully from a small set of axioms.

The concepts of congruence, similarity, and symmetry can be understood from the perspective of geometric transformation. Fundamental are the rigid motions: translations, rotations, reflections, and combinations of these, all of which are here

Conceptual Category Overview

Statistics and Probability Overview

Interpreting Categorical and Quantitative Data

- Summarize, represent, and interpret data on a single count or measurement variable
- Summarize, represent, and interpret data on two categorical and quantitative variables
- Interpret linear models

Domain

Making Inferences and Justifying Conclusions

Cluster

- Understand and evaluate random processes underlying statistical experiments
- Make inferences and justify conclusions from sample surveys, experiments and observational studies

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.

Format of High School Standards

Domain

Cluster

Standard

Advanced

The Complex Number System **N-CN**

Perform arithmetic operations with complex numbers.

1. Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.
2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.
3. (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

Represent complex numbers and their operations on the complex plane.

4. (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number

High School Mathematics Today

- Algebra 1 and Geometry courses typically
  - Reteach much middle grades content
- Algebra 2 courses typically
  - Reteach Algebra 1
  - Include some statistics and probability
  - Include optional topics
  - Pre-teach Precalculus content
- ***Algebra 2 is two miles wide***
  - *And a quarter inch deep*

HS CCSS Changing Content Emphases

- 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

CCSS Domain Progression

<table>
<tr><th>K</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>HS</th></tr>
<tr><td>Counting & Cardinality</td><td colspan="9"></td></tr>
<tr><td colspan="6">Number and Operations in Base Ten</td><td colspan="2">Ratios and Proportional Relationships</td><td></td><td rowspan="2">Number & Quantity</td></tr>
<tr><td colspan="3"></td><td colspan="3">Number and Operations – Fractions</td><td colspan="3">The Number System</td></tr>
<tr><td colspan="6" rowspan="2">Operations and Algebraic Thinking</td><td colspan="3">Expressions and Equations</td><td>Algebra</td></tr>
<tr><td colspan="2"></td><td>Functions</td><td>Functions</td></tr>
<tr><td colspan="9">Geometry</td><td>Geometry</td></tr>
<tr><td colspan="6">Measurement and Data</td><td colspan="3">Statistics and Probability</td><td>Statistics & Probability</td></tr>
</table>

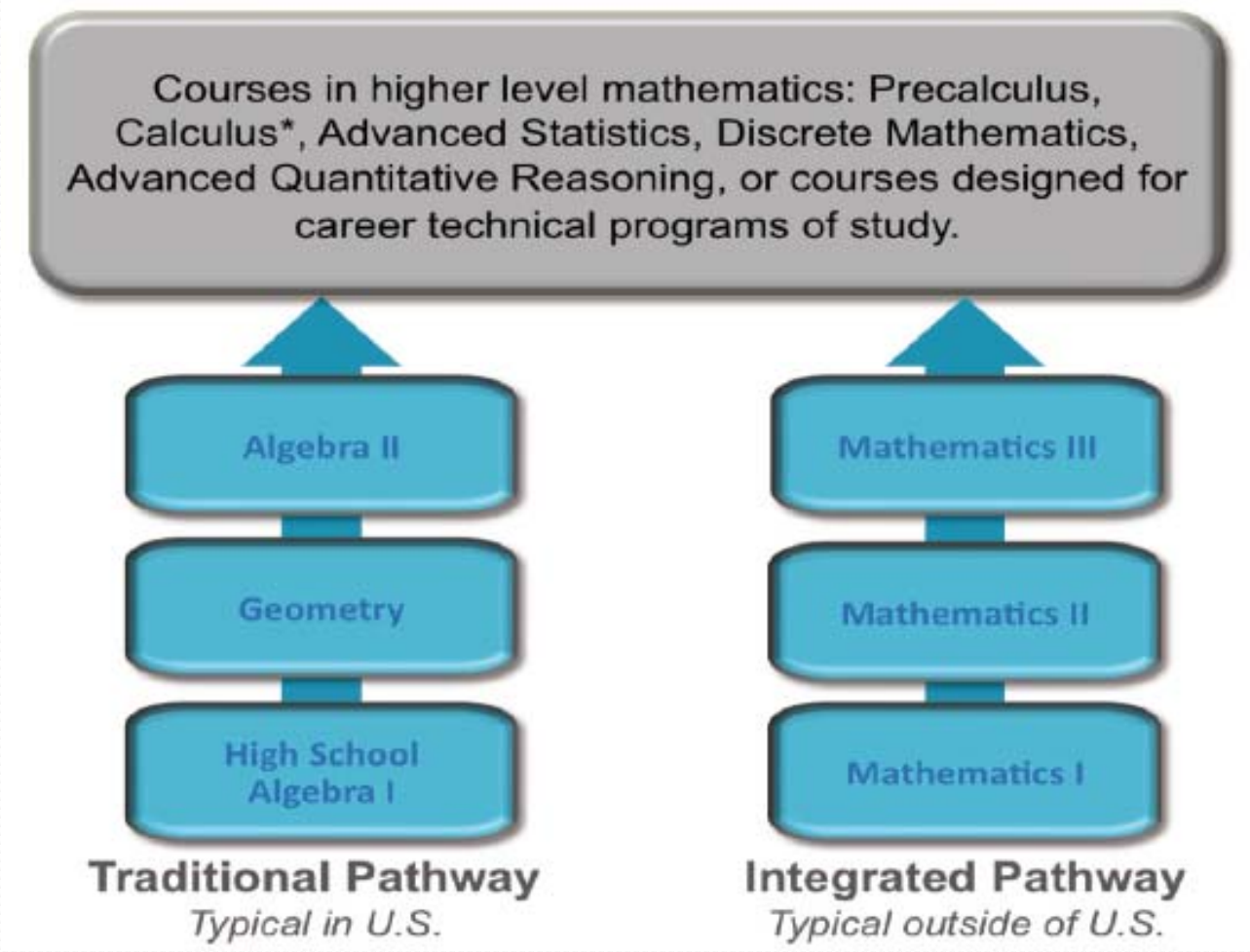
High School Mathematics Pathways

- CCSS Appendix A, developed by Achieve
- Two main pathways:
  - Traditional: Two algebra courses and a geometry course, with statistics and probability in each
  - Integrated: Three courses, each of which includes algebra, geometry, statistics, and probability
- Both pathways:
  - Complete the Core in the third year
  - Include the same "critical areas"
  - Require rethinking high school mathematics
  - Prepare students for a menu of fourth-year courses

Typical in U.S.

Typical outside U.S.

Two Main Pathways



CCSSM and Acceleration

- The CCSS for Mathematics represent significant curricular acceleration in grades K-8
  - Much of Algebra 1 and Geometry 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
- *So we need to rethink mathematics, grades 6-12*

Algebra 1 in Eighth Grade?

- This is the wrong question
- The Grade 8 CCSS includes much of Algebra 1 *for all students*
- Model Pathway H.S. Algebra 1 builds on Grade 8
  - So *do not skip* the Grade 8 CCSS
- Two "compacted" pathways complete grades 7-9 math in two years to provide paths to Calculus in high school
- Offer "compacted" courses to students who are willing to do the extra work
  - And make sure students succeed

CCSS Assessment Elements

- Grades 3-8 and high school, mostly on-line
- College- and career-readiness assessment aimed at 11th grade
- Full implementation in 2014-15
- Interim and summative components
- Item Types
  - Multiple choice
  - Extended response
  - Technology-enhanced
  - Performance assessments
- Rapid reporting system to inform instruction
- Teachers involved in developing and scoring tests

Renewing Programs for All Students

All Students Means ALL Students

- How well are you serving the following groups?
  - High-achieving students
  - Middle-achieving students
  - Low-achieving students
- District goals sometimes consider only the state assessments
  - Consider also course-taking patterns in high school
  - Consider college remediation rates of your graduates
- Spend some time considering the progress of and projections for individual students (not just percentages)

Low-Achieving Students

- How many of your seniors are taking low-level mathematics?
- Does your program help low-achieving students get back on track?
  - You can't help students catch up by slowing them down
- A guiding principle for intervention:
  - Give all students access to the regular curriculum, and provide differentiated instruction and support
- Provide extra time in the middle grades and earlier

Prealgebra at High School?

- Prealgebra should not count as high school mathematics
  - Preparation for current HS graduation tests
  - College admissions requirements (and NCAA)
  - Reaching college and career readiness
- When students are behind
  - Give them access to the regular curriculum *and* extra support (*a la* Response to Intervention)

Why Not Use Simplified Texts?

- Simplified texts are often restricted, limited, and thin in meaning
- Academic vocabulary can be learned only from complex texts
- Mature language skills can be gained only by working with demanding materials
- No evidence that struggling readers—especially at middle and high school—catch up by gradually increasing the complexity of simpler texts

What Can Teachers Do?

- Allow students to engage with complex texts while strengthening their skills
  - Bust the myth that reading skills must be sequential
- Practice with lots of short texts
- Slow down, read and re-read
- Use sequences of engaging questions (not explanations)
- Place a premium on stamina and persistence

Middle-Achieving Students

- How many of your seniors are taking significant (non-remedial) mathematics?
- Do you have fourth-year alternatives to Precalculus?
  - AP Statistics
  - Advanced Quantitative Reasoning
  - National work:

    http://math.arizona.edu/~ime/2008-09/1018_retreat.html
- Does your program provide support as soon as students begin to struggle?

High-Achieving Students

- What percentage of your students take AP and IB courses?
- How successful are your calculus offerings?
  - Calculus in high school should be college-level calculus
- What happens to accelerated students?
  - Do they take mathematics every year?
  - If not, why not?
  - Are they successful?
- What about radically accelerated students?

Implementation Suggestions, Challenges, and Resources

Research-Based Principles

- Implementation matters
  - Variation within a model is greater than the variation between models
  - Adoption of standards, programs, or textbooks merely opens the door
- High-quality professional development
  - Focuses on the content the teachers are teaching
  - Draws on curricular materials teachers are using
  - Involves analyzing student work
  - Takes time

Maintain Focus and Coherence

- Implementation plans may miss the point
  - Readers might not see focus and coherence
  - Strategies may be counterproductive
- The goal is coherence in curriculum, instruction, and learning
  - Standards are taken as atoms, but the power is in the bonds (Jason Zimba)
  - Think in chapters, not lessons (Phil Daro)

Challenges and Responses

- Crosswalk documents may encourage rearrangements of low-quality curricular materials and frameworks
  - Aim for focused, forward-thinking crosswalk documents at the level of clusters or big ideas
- Unpacking standards (*a la* backwards design) may perpetuate the atomized check-list mentality
  - Unpack clusters of standards via descriptive paragraphs
- Response to Intervention may be misused to sort students into groups that receive fundamentally different instruction
  - Begin with high-quality, Tier 1 instruction for all students
- Data-driven decision making may remain only about numbers
  - Use data to provoke targeted discussions about instruction

Challenges and Responses

- Formative assessment may be misconstrued as a task bank
  - Formative assessment must provide insight into student thinking
- Professional development may be largely generic and unfocused
  - Develop strategies for content-based professional learning communities
- Publishers may merely add chapters to existing materials
  - Insist on materials with focus and coherence
- Local control and limited resources may create excuses
  - Share and borrow materials
  - Leverage resources
  - Take advantage of the assessment consortia

What Can Districts Do Now?

- Get to know the CCSS through Professional Learning Communities
  - Use the "critical areas of focus"
  - Take a "progressions view"
  - Use Ohio's model curriculum for math and ELA
- Begin developing the Mathematical Practices
- Develop support structures for struggling students
- Identify transitional changes for 2012-13
- Be skeptical of easy alignment and quick fixes
- Watch for new opportunities and resources

What Can Districts Do Now?

- Focus!
- Take a *complexity inventory* of what students are reading in each grade and make adjustments
- As much as possible use on-grade-level texts for instruction for *all* students (with supports)
  - Do not deny students *access to complexity*—ask students to stretch to read short texts (with supports)
- Adjust balance of texts so students are exposed to *more informational texts* k-12 in and out of English classes

What Can Districts Do Now?

- Teach students to *read closely*, to slow down to understand key points, and to re-read passages
- Attend systematically to *building general academic vocabulary* across the board
  - Make word learning part of the school culture!
- Give frequent formative assessments that present students with standards-based tasks and provide no direct teacher support (*writing to sources*)
- Beware of publishers who claim their materials are already aligned or simply add chapters/material—*more is not better*

Resources for Implementation

- Standards Progressions
  - Describes how ideas connect and grow across grades
  - Technical appendix (Zimba) highlights structural features that are not highly visible in the document
  - See http://commoncoretools.wordpress.com
- Illustrative Mathematics Project
  - Review board and task vetting process
  - See http://www.illustrativemathematics.org/
- Curriculum analysis toolkit
  - Partnership between CCSSO and NCSM, led by Bill Bush

Organizations Developing Resources

- Smarter Balanced Assessment Consortium
- Partnership for Assessment of Readiness for College and Careers
- National Council of Teachers of Mathematics
- National Council of Supervisors of Mathematics
- Association of Mathematics Teacher Educators
- Association of State Supervisors of Mathematics
- Council of Chief State School Officers
- National Governors Association

- *These organizations are collaborating as the Mathematics Common Core Coalition*

Implementation Questions for You

- Can we empower teachers to make necessary changes?
  - Curriculum, instruction, support, programs, …
- Can we get the incentives right?
  - So that teachers will regularly work together to reach more students more of the time
  - So that we all learn from and with our best teachers
- Can we bring mathematics and ELA leadership to the decision-making table?
  - So that school-improvement efforts focus on long-term improvements not short-term fixes

Closing Thought

- “These Standards are not intended to be new names for old ways of doing business. They are a call to take the next step. It is time for states to work together to build on lessons learned from two decades of standards based reforms. It is time to recognize that standards are not just promises to our children, but promises we intend to keep.”

  (CCSS, 2010, p. 5)