



ROE #3

Common Core Standards

Mathematics

June 2011



2

Created by:
COUNCIL OF CHIEF STATE SCHOOL
OFFICERS (CCSSO)
&
NATIONAL GOVERNORS ASSOCIATION

Standards Development Process



- College and career readiness standards developed in summer 2009
- Based on the college and career readiness standards, K-12 learning progressions developed
- Multiple rounds of feedback from states, teachers, researchers, higher education, and the general public
- Final Common Core State Standards released on June 2, 2010

What are the Common Core State Standards?



- Aligned with college and work expectations
- Focused and coherent
- Include rigorous content and application of knowledge through high-order skills
- Build upon strengths and lessons of current state standards
- Internationally benchmarked so that all students are prepared to succeed in our global economy and society
- Based on evidence and research
- State led – coordinated by NGA Center and CCSSO

Why is this important?



- Currently, every state has its own set of academic standards, meaning public education students in each state are learning to different levels
- All students must be prepared to compete with not only their American peers in the next state, but with students from around the world

More Information



www.corestandards.org

http://www.isbe.net/common_core/default.htm



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STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER



STANDARDS FOR MATHEMATICS

June 2011

Design and Organization



Standards for Mathematical Practice

- Carry across all grade levels
- Describe habits of mind of a mathematically expert student

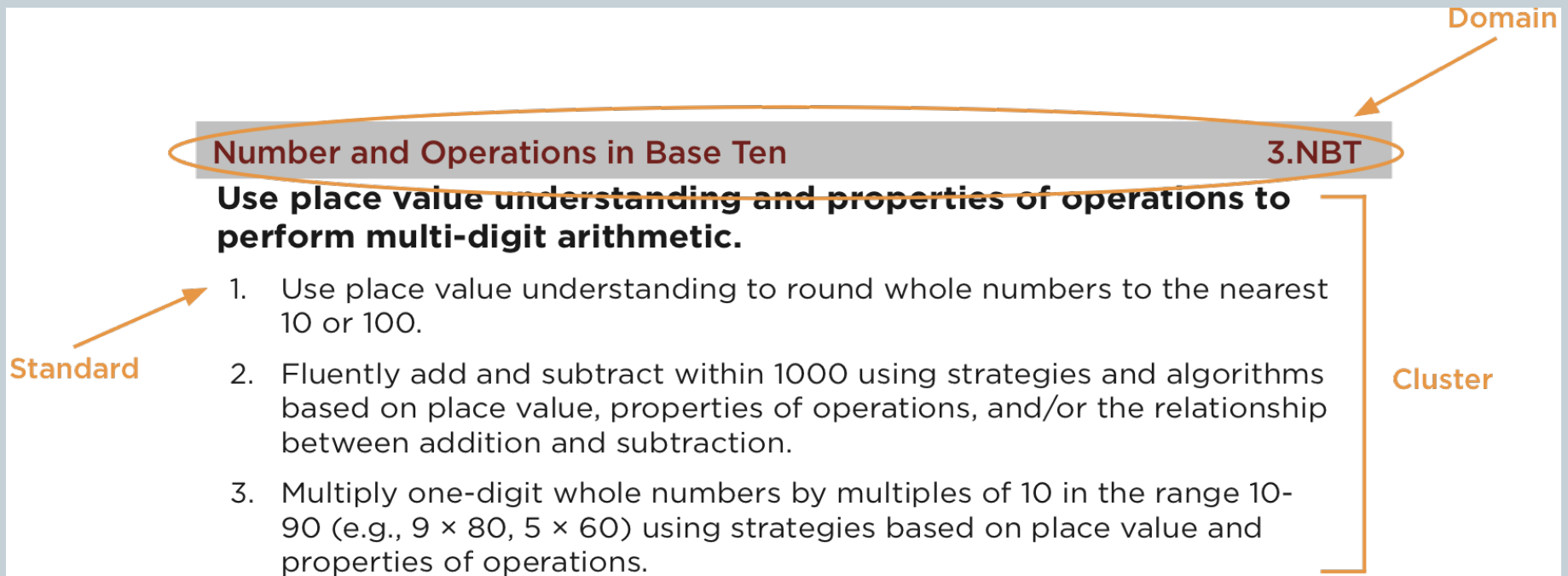
Standards for Mathematical Content

- K-8 standards presented by grade level
- Organized into domains that progress over several grades
- Grade introductions give 2–4 focal points at each grade level
- High school standards presented by conceptual theme (Number & Quantity, Algebra, Functions, Modeling, Geometry, Statistics & Probability)

Design and Organization



- *Content standards* define what students should understand and be able to do
- *Clusters* are groups of related standards
- *Domains* are larger groups that progress across grades



Design and Organization



Grade Level Overviews

Grade K Overview

Counting and Cardinality

- Know number names and the count sequence.
- Count to tell the number of objects.
- Compare numbers.

Operations and Algebraic Thinking

- Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

Number and Operations in Base Ten

- Work with numbers 11-19 to gain foundations for place value.

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.

Design and Organization



Focal points at each grade level

Mathematics | Grade 6

In Grade 6, instructional time should focus on four critical areas: (1) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.

(1) Students use reasoning about multiplication and division to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students connect their understanding of

Number and Operations, Grade 1



Number and Operations in Base Ten

- Extend the counting sequence.
- Understand place value.
- Use place value understanding and properties of operations to add and subtract.

Operations and Algebraic Thinking

- Represent and solve problems involving addition and subtraction.
- Understand and apply properties of operations and the relationship between addition and subtraction.
- Add and subtract within 20.
- Work with addition and subtraction equations.

Fractions, Grades 3–6



- 3. Develop an understanding of fractions as numbers.
- 4. Extend understanding of fraction equivalence and ordering.
- 4. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
- 4. Understand decimal notation for fractions, and compare decimal fractions.
- 5. Use equivalent fractions as a strategy to add and subtract fractions.
- 5. Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
- 6. Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

Statistics and Probability, Grade 6



Develop understanding of statistical variability

- Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.*
- Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
- Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

Algebra, Grade 8



Ramped up to Algebra in Grade 8

- Properties of operations, similarity, ratio and proportional relationships, rational number system.

Focus on linear equations and functions in Grade 8

- Expressions and Equations
 - Work with radicals and integer exponents.
 - Understand the connections between proportional relationships, lines, and linear equations.
 - Analyze and solve linear equations and pairs of simultaneous linear equations.
- Functions
 - Define, evaluate, and compare functions.
 - Use functions to model relationships between quantities.

High School



Conceptual themes in high school

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

College and career readiness threshold

- (+) standards indicate material beyond the threshold; can be in courses required for all students.

Geometry, High School



Middle school foundations

- Hands-on experience with transformations.
- Low tech (transparencies) or high tech (dynamic geometry software).

High school rigor and applications

- Properties of rotations, reflections, translations, and dilations are assumed, proofs start from there.
- Connections with algebra and modeling

Key Advances



Focus and coherence

- Focus on key topics at each grade level.
- Coherent progressions across grade levels.

Balance of concepts and skills

- Content standards require both conceptual understanding and procedural fluency.

Mathematical practices

- Foster reasoning and sense-making in mathematics.

College and career readiness

- Level is ambitious but achievable.

Conclusion



The promise of standards

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.



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Questions???

Explore the Core!



Please list the following:

1. What you know you already teach.
2. Differences that stand out.
3. Any “aha” moments you have!
4. Any questions that need further investigation.

Please choose a reporter and recorder.

Each grade level group will share.

Time to start aligning!



- **Common Core Standards Template**
 - This is a simple design to help you get started.
 - It can be done using a single lesson or an entire unit.
 - You will have more than one Common Standard per lesson, unit, week, etc.
 - Student learning targets- Students should understand what they are expected **to know** and **be able to do** up front.
 - ✦ Some might have heard of using “I can” statements for students.
 - Instructional strategies- focus on higher order.
 - Assessment
 - ✦ Formative
 - ✦ Summative

Think- Pair- Share



- Pick one lesson to align to the Common Core Standards with a partner
- Choose a lesson that you are comfortable with.
- With you partner, brainstorm how you can add application or real world connections to the lesson.
- Be prepared to share your higher order lesson with the group.

Thank you!



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