Understanding the Common Core State Standards

What are the Common Core State Standards?

Beginning in the spring of 2009, Governors and state commissioners of education from 48 states, 2 territories and the District of Columbia committed to developing Common Core State Standards (CCSS) for K–12 English language arts (ELA) and mathematics.
Common Core Standards and Connecticut’s Education Reform Agenda

- The CCSS will support the State Board’s 5-Year Plan for improved achievement for all students and closing the achievement gap by providing clearer and higher-level standards.

- The CCSS, which are internationally benchmarked so that all students will be prepared to succeed in our global economy, support Connecticut’s Secondary School Reform (increased high school course requirements, especially in STEM, and development and implementation of end-of-course tests).

- CT joined assessment consortia to collaborate with other states on the development of new assessments aligned to the CCSS.

- The State Board of Education adopted the CCSS on July 7, 2010.

Math Standards Advances

- There is an emphasis on core conceptual understandings and procedures starting in the early grades. This enables teachers to take the time needed to teach core concepts and procedures well and give students opportunities to master them.

- In grades K–5, students gain a solid foundation in whole numbers, addition, subtraction, multiplication, division, fractions, and decimals. For example, students in Kindergarten focus on the number core (learning how numbers correspond to quantities and learning how to put together and take apart numbers) in order to prepare them for addition and subtraction.

- In the middle grades, students build upon the strong foundation in grades K–5 through hands on learning in geometry, algebra, probability, and statistics.

- The high school standards focus on applying mathematical ways of thinking to real world issues and emphasize mathematical modeling.
The CCSS for Mathematics

- Are comprised of K–12 Standards for Mathematical Practice that are based on the
  - NCTM Process Standards, and
  - NRC Strands of Mathematical Proficiency

- Are comprised of content that is organized
  - by domains in grades K–8, and
  - by conceptual categories in grades 9–12

NCTM Process Standards

- Problem Solving
- Reasoning and Proof
- Communication
- Connections
- Representation
Intertwined Strands of Proficiency

From *Adding It Up: Helping Children Learn Mathematics*, pages 115–117

CCSS K–12 Standards for Mathematical Practice

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.
# Common Core State Standards for Mathematics

## K–8 Mathematics Content

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## CCSS for Mathematics

### High School Conceptual Categories

- Number and Quantity
- Algebra
- Functions
- Modeling
- Geometry
- Statistics and Probability
Standards Comparison Study

- Content experts in CT ELA and mathematics standards used the online interactive Common Core Comparison Tool developed by Achieve, Inc. to compare standards.

- Content experts worked in teams to determine the extent to which CCSS and CT standards are aligned.

Standards Comparison Study

- CCSS were compared to CT Standards, standard by standard at the same grade level.

- CCSS were also compared to CT Standards, at the prekindergarten level, grade levels before or after the targeted CCSS and by high school grade bands.

- The comparison process determined the level of match between the CCSS and the CT Standards.
Categories of Matches

- Possible matches:
  - Exact match
    - All of the concepts and skills addressed in the CCSS also included in the CT standard(s) at the same grade level
  - Collective match
    - Parts of two or more CT standards within, beyond or below grade, together address the CCSS
  - Partial match
    - Only a portion of a compound CT state standard applies to the CCSS being addressed and part does not: a CT standard in its entirety only addresses a portion of a compound CCSS
  - No match
    - The concepts and skills in the CCSS are not addressed in the CT standard(s), or is addressed at a level far beyond the parameters being compared

Strength of Match

- Strength rating accounts for differences in wording, specificity, or performance expectation

- Strength of each match is rated:
  - 3 – Excellent: the expectations in both verb/performance and content/topic are equivalent
  - 2 – Good: minor aspects of the CCSS are missing (or addressed more broadly/generally than the CCSS)
  - 1 – Weak: major aspects of the CCSS are not addressed; standards may be related but only generally
Strength of Matches Between the CCSS and CT Mathematics Standards

- 68% of the matches were rated excellent or good;
- 24% of the matches to CT’s math standards were rated weak. These are standards that need a close side-by-side comparison to fully understand the differences and their implications.

CCSS—Mathematics

CC.4.NF.2 Extend understanding of fraction equivalence and ordering: Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

- P. 30 of the CCSS Mathematics (CCSS)
CCSS Match to CT Mathematics

Match rate – 3; as linked to the following standards in grades 3, 4 and 5

Excellent match – expectations in both performance and content are equivalent

- CT.3.1.3.5 Demonstrate understanding of equivalence as a balanced relationship of quantities by using the equals sign to relate two quantities that are equivalent and the inequality symbols, < and >, to relate two quantities that are not equivalent. \((23 \times 5 > 23 \times 2)\)
- CT.4.2.1.8 Construct and use models, pictures and number lines, including rulers to compare and order fractional parts of a whole and mixed numbers with like and unlike denominators of 2, 3, 4, 5, 6 and 8 and 10.
- CT.4.2.1.9 Construct and use models, pictures and number lines, including rulers, to identify wholes and parts of a whole (including a part of a group or groups) as simple fractions and mixed numbers.
- CT.5.2.1.7 Choose and use benchmarks to approximate locations, of fractions, mixed numbers and decimals, on number lines and coordinate grids.

Elementary Weak Match Example

- CC.2.MD.1 Measure and estimate lengths in standard units. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
- CT.2.3.3.7 Use measurement tools such as thermometers to measure temperature, basic rulers to measure length to the nearest half-inch or centimeter, and balance scales to measure weight /mass in grams.
High School Weak Match Example

- CC.9–12.G.C.1 Understand and apply theorems about circles. Prove that all circles are similar.
- CT.9–12.3.C.2.a.(3) Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.

Overall CCSS–CT Match Results

Overall, 92% of the CC Math standards were matched to CT’s Math standards. The remaining 8% were not matched. This translates to 40 CC Math standards that will be “new” for CT.
Overall, 68% of the matches between the CCSS and CT Math standards were excellent or good; 24% were weak; and 8% were unmatched.

Grade Level Comparisons

- The following graph shows where matched Common Core standards in math introduce content earlier, later or at the same grade level as CT standards.

- Although there is a 92% match between CCSS and CT standards, the CCSS tend to introduce some math content at earlier grades.

- These grade differences will have implications for the following:
  - realigning curriculum;
  - evaluating instructional materials;
  - identifying professional development needs; and
  - developing assessments.
Grade Level Comparisons Between CT Math Standards and the CCSS

It is important to note that Grades 9–12 are not included on the graph because the Mathematics Standards for High School are written for the entire 9–12 grade span rather than for each grade level.

Example of Grade Level Difference: CCSS Before CT

- CC.6.EE.3 Apply and extend previous understandings of arithmetic to algebraic expressions. Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.

- CT.7.1.3.7 Evaluate and simplify algebraic expressions, equations and formulas using algebraic properties (i.e., commutative, associative, distributive, inverse operations, and the additive and multiplicative identities) and the order of operations.
Example of Grade Level Difference: CCSS After CT

- CC.6.NS.5 Apply and extend previous understandings of numbers to the system of rational numbers. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, debits/credits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

- CT.5.2.1.4 Investigate negative integers (values less than zero) using place value models, diagrams and number lines and represent negative integers in practical applications, e.g. temperatures, money and locations below sea level.

Stakeholder Conference

- Representatives from districts, colleges and universities who attended our Stakeholder Engagement Conference on June 17, 2010 strongly supported the Common Core standards.

- The following slide highlights the responses of 90 individuals to a series of survey prompts during the stakeholders conference.
Stakeholder Conference

Percentage of individuals who “Agree” or “Strongly Agree”:

- Students meeting these core standards will be well prepared for success in college – 100%
- The CCSS are as rigorous as CT standards in terms of higher order thinking skills – 97%
- The CCSS represent a coherent progression of learning from grade-to-grade – 95%
- The CCSS are as rigorous as CT standards in terms of application of knowledge – 91%

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Stakeholder Conference

Percentage of individuals who “Agree” or “Strongly Agree”:

- The CCSS represent learning standards that are important for all students – 90%
- Students meeting these core standards will be well prepared for post–high school success in the workplace – 89%
- The CCSS embed 21st Century skills (i.e. communicating, collaborating, using technologies and solving problems creatively) – 87%
- The CCSS are developmentally appropriate for each grade – 82%
Stakeholder Conference

- The CCSS represent learning standards that are important for all students – 100% agree
- Students meeting these core standards will be well prepared for post-high school success in college and the workplace – 100% agree
- The CCSS that would be new for Connecticut are reasonable expectations for the corresponding grade level – 60% agree; 40% not sure

Sample size = 90 respondents

Stakeholder Needs

- Preschool standards aligned with CCSS
- Support with aligning district curriculum to CCSS
- Higher Ed awareness for teacher preparation
- Standards phase-in timeline
- Adequate notice of changes to state assessments
Important Considerations

- Districts will need to compare current math curriculum to CCSS. Much will stay the same, however some CCSS concepts/skills may need to be added; some current standards move to a different grade.
- Current instructional materials may need to be supplemented, enhanced or moved to a different grade.
- Practicing and pre-service teachers need to be provided support to understand the impact of the CCSS on designing learning opportunities for students.
- State assessments will remain unchanged until 2014. CT is participating in the Smarter Balanced Assessment Consortium charged with developing new assessments based on the CCSS by 2015.

CSDE Support

Timely information and ongoing support will include:

- Assessment development updates
- Standards crosswalk documents
### CCSS CT Standard Match CT Assessment Notes

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<td>CT.5.3.3.9 Use cubic inch or cubic centimeter models to find the volume of rectangular solids. CT.6.3.2.6 Use and describe concrete strategies for finding the volume of rectangular solids and cylinders. CT.7.3.3.9 Develop and use formulas to determine volumes of geometric solids (rectangular prisms and cylinders).</td>
<td>Grade 6, 7, 8: 16A. Measure and determine perimeters, areas and volumes. Explain or show how the solution was determined.</td>
<td>The Grade 5 Common Core standard progresses toward the development of a formula within Grade 5 while the CT standards move from concrete to abstract across Grades 5, 6 and 7. Volume not assessed until CMT Grade 6 and beyond.</td>
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<td>CC.5.MD.5b Apply the formulas V = (l)(w)(h) and V = (b)(h) for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real-world and mathematical problems.</td>
<td>CT.6.3.3.8 Select and use appropriate strategies, tools and units to estimate and solve measurement problems involving length, perimeter, area, volume, capacity, mass and weight. CT.7.3.3.9 Develop and use formulas to determine volumes of geometric solids (rectangular prisms and cylinders).</td>
<td>Grade 6, 7, 8: 16A. Measure and determine perimeters, areas and volumes. Explain or show how the solution was determined.</td>
<td>The development and application of volume formulas occurs more gradually in CT standards but is concentrated in Grade 5 in CC. Volume not assessed until CMT Grade 6 and beyond.</td>
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<td>CC.5.MD.5c Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.</td>
<td>CT.7.3.3.9 Develop and use formulas to determine volumes of geometric solids (rectangular prisms and cylinders). CT.8.3.3.9 Use estimation and measurement strategies, including formulas, to solve surface area and volume problems in context.</td>
<td>Grade 6, 7, 8: 16A. Measure and determine perimeters, areas and volumes. Explain or show how the solution was determined.</td>
<td>CT standards do not specify the additive nature of volume with respect to combining non-overlapping prisms. Volume not assessed until CMT Grade 6 and beyond.</td>
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Questions

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