Common Core State Standards

At-a-Glance Transition Documents

Fourth Grade

S^{2}TEM Centers SC
www.s2temsc.org

S^{2}TEM Centers SC are a statewide system of support for improving instruction and increasing student achievement in mathematics and science. S²TEM Centers SC, like S²MART Centers before them, are an initiative of South Carolina's Coalition for Mathematics and Science. The S^{2}TEM Centers SC seek to work collaboratively with STEM-oriented partners in education, business and government.

SOUTH CAROLINA'S COALITION FOR MATHEMATICS & SCIENCE

SCCMS

- ACHIEVEMENT BY DESIGN -

Preface

The S[2]TEM Centers SC At-a-Glance Transition Documents were created in response to a request by district leaders for a quick overview of the magnitude of the changes as South Carolina moves from the 2007 SC Academic Standards for Mathematics to the Common Core State Standards for Mathematics (CCSSM). These documents do not provide a detailed analysis of the CCSSM or include all of the sub-skills that might need to be taught to ensure mastery of the standard, nor do they replace the current Support Documents for Mathematics that is available for Kindergarten through Algebra 1. More robust instructional resources will be created as SC gets closer to full implementation of the CCSSM.

In addition to the S[2]TEM Centers SC At-a-Glance Transition Documents, educators should have copies of the CCSSM from www.corestandards.org, as well as the appendices that accompany the standards. Specifically, K-8 educators will need access to the CCSSM glossary which includes tables 1, 2, and 3 to completely understand the intent of the standards.

The format of the documents is:

- Bulleted list of content that is new to the given grade level
- Bulleted list of content that is no longer included in the standards for the given grade level
- Four column table showing: Common Core State Standard, Understanding CCSS: Notes and Examples, 2007 SC Academic Standard, Major Changes

Throughout this document, the Common Core State Standards are identified by grade level, domain, and standard number. So, for example, 3.NBT.2 refers to the 3rd grade Number and Operations in Base Ten standard #2.

Please note: The CCSSM identifies a list of 8 Standards for Mathematical Practice in addition to the content standards for each grade. These mathematical practices are similar to NCTM's Process Standards. The Standards for Mathematical Practice identify the "habits of mind" used by proficient mathematics students. They are: (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.

As with any curriculum document, the S[2]TEM Center SC At-a-Glance Transition Documents are updated regularly to ensure accuracy of information. The date of the most recent edits is noted in the footer on each page of the documents. Please contact the S[2]TEM Centers SC CCSSM team at ccss.s2temsc@gmail.com with edits, refinements, and questions. Thank you.

During the period of July 1, 2009 to June 30, 2011, S2TEM Centers SC operated as S2MART Centers SC.

Common Core State Standards At-a-Glance Transition Documents

Acknowledgements

Grade 4 Overview

"In Grade 4, instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry." *Common Core State Standards for Mathematics*

Operations and Algebraic Thinking (4.OA)

- Use the four operations with whole numbers to solve problems.
- Gain familiarity with factors and multiples.
- Generate and analyze patterns.

Number and Operations in Base Ten (4.NBT)

- Generalize place value understanding for multi-digit whole numbers.
- Use place value understanding and properties of operations to perform multi-digit arithmetic.

Number and Operations—Fractions (4.NF)

- Extend understanding of fraction equivalence and ordering.
- Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
- Understand decimal notation for fractions, and compare decimal fractions.

Measurement and Data (4.MD)

- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
- Represent and interpret data.
- Geometric measurement: understand concepts of angle and measure angles.

Geometry (4.G)

- Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

FOURTH GRADE CHANGES AT-A-GLANCE

What content is NEW to 4th Grade?

- Classify a number as prime, composite or neither, find factor pairs, and multiples of a given number (4.OA.4).
- Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. (4.NBT.1)
- Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. (4.NBT.2)
- Find whole number quotients and remainders with up to four-digit dividends and one-digit divisors (4.NBT.6).
- Compare two fractions with different numerators and different denominators (4.NF.2).
- Decompose a fraction into a sum of fractions (4.NF.3)
- Understand operations with fractions (4.NF.4).
- Apply area and perimeter formulas for rectangles in real world and mathematical problems (4.MD.3).
- Make a line plot to display data measurements in fractions of a unit. Solve problems involving addition and subtraction of fractions by using information presented in line plots (4.MD.4).
- Understand concepts of angle measurement (4. MD.6, 4.MD.7).
- Analyze shapes to determine line symmetry (4.G.3).

Note: The Common Core State Standards are identified by grade level, domain, and standard number. So, for example, 4.OA.4 refers to the 4th grade Operations and Algebraic Thinking standard #4.

FOURTH GRADE CHANGES AT-A-GLANCE

What content will no longer be included in the 4th Grade Standards?*

- Apply divisibility rules for 2, 5, and 10
- Explain the effect on the product when one of the factors is changed
- Analyze the magnitude of the digits through hundredths on the basis of their place value
- Illustrate situations that show change over time as either increasing, decreasing or varying.
- Analyze the relationship between three-dimensional geometric shapes and their two-dimensional nets
- Predict the results of multiple transformations of the same type
- Represent two and three-dimensional shapes
- Use transformations to prove congruency
- Represent the location of points in the first quadrant of a coordinate grid
- Illustrate possible paths from one point to another along grid lines in the first quadrant of the coordinate plane
- Use appropriate tools to measure objects to the nearest unit
- Analyze the perimeter of a polygon
- Generate strategies to determine the area of rectangles and triangles
- Use thermometers to determine temperature changes
- Exemplify situations in which highly accurate measurements are required
- Compare how data-collection methods impact survey results
- Interpret data in tables, line graphs, and bar graphs whose scale increments are greater than or equal to 1
- Organize data in tables, line graphs, and bar graphs whose scale increments are greater than or equal to 1
- Distinguish between categorical and numerical data and match to graphs
- Predict on the basis of data whether events are likely, unlikely, certain, impossible, or equally likely to occur
- Analyze possible outcomes for a simple event

Note: Common Core standards implementation will begin in 2010-2011, with full implementation and assessment in 2014-2015.

FOURTH GRADE

OPERATIONS AND ALGEBRAIC THINKING (OA)

Common Core State Standards	Understanding CCSS: Notes and Examples	2007 S.C. Academic Standards for Mathematics	Major Changes
4.OA Use the four operations with whole numbers to solve problems.			
1. Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations.	For example, interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5.	4-3.4 Translate among, letters, symbols, and words to represent quantities in simple mathematical expressions or equations.	
2. Multiply or divide to solve word problems involving multiplicative comparison.	Use drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. See Glossary, Table 2 on page 89 in the Common Core State Standards for Mathematics.	4-3.5 Apply procedures to find the value of an unknown letter or symbol in a whole-number equation.	

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Common Core State Standards	Understanding CCSS: Notes and Examples	2007 S.C. Academic Standards for Mathematics	Major Changes
4.OA Use the four operations with whole numbers to solve problems.			
3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. **Assess the reasonableness of answers** using mental computation and estimation strategies including rounding.	Editorial Clarification: Emphasize real-world applications where remainders are "real" such as there cannot be ½ of a bus, but there could be ½ of a dollar.	4-3.4 Translate among, letters, symbols, and words to represent quantities in simple mathematical expressions or equations. 4-3.5 Apply procedures to find the value of an unknown letter or symbol in a whole-number equation.	
4.OA Gain familiarity with factors and multiples.			
4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given			This standard is new to 4th grade. (See SC 2007 5-2.6 and 5-2.7.)

whole number in the range 1–100 is prime or composite.			

4.OA Generate and analyze patterns.			
5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.	For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.	4-3.1 Analyze numeric, nonnumeric, and repeating patterns involving all operations and decimal patterns through hundredths. 4-3.2 Generalize a rule for numeric, nonnumeric, and repeating patterns involving all operations. 4-3.3 Use a rule to complete a sequence or a table.	(See SC 2007 2-3.3, 3-3.1 and 3-3.2.)

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FOURTH GRADE

Number and Operations in Base Ten (NBT)

Common Core State Standards	Understanding CCSS: Notes and Examples	2007 S.C. Academic Standards for Mathematics	Major Changes
4.NBT Generalize place value understanding for multi-digit whole numbers.			
Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.			
1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.	For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.		This standard is new to 4th grade.
2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.			This standard is new to 4th grade.
3. Use place value understanding to round multi-digit whole numbers to any place.		4-2.1 Recognize the period in the place-value structure of whole numbers: units, thousands, millions, and billions.	Continue to teach. Extend to include rounding.

4.NBT Use place value understanding and properties of operations to perform multi-digit arithmetic.

Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.

4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.	The standard algorithm is specified.		The standard algorithm is specified instead of apply **an** algorithm. (See 2007 SC 3-2.3.)
5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.		4-2.3 Apply an algorithm to multiply whole numbers fluently.	Continue to teach. Extend to include using strategies based on place value and the properties of operations; and illustrating and explaining calculations.
6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the		4-2.5 Generate strategies to divide whole numbers by single-digit divisors.	Continue to teach. Extend to include using strategies based on place value, properties, and/or the relationship between multiplication and division. Also extend to include illustrating and explaining calculations.

calculation by using equations, rectangular arrays, and/or area models.			

FOURTH GRADE

Number and Operations--Fractions (NF)

Common Core State Standards	Understanding CCSS: Notes and Examples	2007 S.C. Academic Standards for Mathematics	Major Changes
4NF. Extend understanding of fraction equivalence and ordering.			
Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.			
1. Explain why a fraction *a/b* is equivalent to a fraction (*n* × *a*)/(*n* × *b*) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.		4-2.8 Apply strategies and procedures to find equivalent forms of fractions.	
2. 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		4-2.9 Compare the relative size of fractions to the benchmarks 0, $\frac{1}{2}$, and 1.	Continue to teach. Extend to include creating common denominators or numerators. (See2007 SC 5-2.4.)

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justify the conclusions, e.g., by using a visual fraction model.			

4NF. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

3. Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.	b. Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.	4-2.11 Represent improper fractions, mixed numbers, and decimals.	Decomposing a fraction into a sum of fractions is new to 4th grade.

d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.			
4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of 1/b. b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. c. 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.	a. For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4). b. For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.) c. 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?		This standard is new to 4th grade.

4 .NF Understand decimal notation for fractions, and compare decimal fractions.

5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.	Express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100. Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.	4-2.8 Apply strategies and procedures to find equivalent forms of fractions.	Continue to teach. Extend to include adding two fractions with denominators of 10 and 100.
6. Use decimal notation for fractions with denominators 10 or 100.	For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.	4-2.10 Identify the common fraction/decimal equivalents $\frac{1}{2}$ = .5, $\frac{1}{4}$ = .25, $\frac{3}{4}$ = .75, $\frac{1}{3} \approx$ .33, $\frac{2}{3} \approx$ .67, multiples of $\frac{1}{10}$, and multiples of $\frac{1}{100}$. 4-2.11 Represent improper fractions, mixed numbers, and decimals.	This standard limits denominators to 10 and 100.
7. Compare two decimals to hundredths by reasoning	An example of a justification might be a **visual model**.	4-2.7 Compare decimals through hundredths by	Continue to teach. Extend to include justification of conclusions.

| about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions. | | using the terms *is less than, is greater than,* and *is equal to* and the symbols <, >, and =. | |

FOURTH GRADE

Measurement and Data (MD)

Common Core State Standards	Understanding CCSS: Notes and Examples	2007 S.C. Academic Standards for Mathematics	Major Changes
4.MD Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.			
1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table.	For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...	4-5.3 Use equivalencies to convert units of measure within the U.S. Customary System: converting length in inches, feet, yards, and miles; converting weight in ounces, pounds, and tons; converting liquid volume in cups, pints, quarts, and gallons; and converting time in years, months, weeks, days, hours, minutes, and seconds. 4-5.8 Recall equivalencies associated with liquid volume, time, weight, and length: 8 liquid ounces = 1 cup, 2 cups = 1 pint, 2 pints = 1 quart, 4 quarts = 1 gallon; 365 days = 1 year, 52 weeks = 1 year; 16 ounces = 1 pound, 2,000 pounds = 1 ton; and 5,280 feet = 1 mile.	Continue to teach, extend to include metric units and recording measurement equivalents in two column tables. (See 2007 SC 2-5.9, 3-5.7, 5-5.3 and 5-5.8 for reference.)
2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of	Editorial Clarification: Use of the four operations should be limited to operations that are included in the Number and Operations standards.	4-2.12 Generate strategies to add and subtract decimals through hundredths. 4-5.6 Apply strategies and	Continue to teach, extend to include problems involving measurement applications and

objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.		procedures to determine the amount of elapsed time in hours and minutes within a 12-hour period, either a.m. or p.m.	representing measurement quantities using diagrams.
3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.	For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.		This standard is new to 4th Grade. (See 2007 SC 5-5.4).
4.MD Represent and interpret data.			
4. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented	For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection. Editorial Clarification: Students		This standard is new to 4th Grade. (See 2007 SC 3-6.2, 3-6.3, and 5-2.8 for reference.)

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in line plots.	must understand that the scale of the line plot must be consistent.		
4.MD Geometric measurement: understand concepts of angle and measure angles.			
5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement. a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles. b. An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.		4-4.6 Represent points, lines, line segments, rays, angles, and polygons. 4-5.2 Compare angle measures with referent angles of 45 degrees, 90 degrees, and 180 degrees to estimate angle measures.	Continue to teach, but extend to include understanding of "one-degree angle" and "n degree" angles.
6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.			This standard is new to 4th Grade. (See 2007 SC 5-5.2 for reference.)
7. Recognize angle measure as additive. When an angle is decomposed			This standard is new to 4th Grade.

into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g. by using an equation with a symbol for the unknown angle measure.			

FOURTH GRADE

Geometry (G)

Common Core State Standards	Understanding CCSS: Notes and Examples	2007 S.C. Academic Standards for Mathematics	Major Changes
4.G Draw and identify lines and angles, and classify shapes by properties of their lines and angles.			
1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.		4-4.6 Represent points, lines, line segments, rays, angles, and polygons. 4-5.2 Compare angle measures with referent angles of 45 degrees, 90 degrees, and 180 degrees to estimate angle measures.	Continue to teach. Extend to include classifying angles as acute, obtuse, or right; parallel and perpendicular lines; and identifying geometric elements in shapes. (See 2007 SC 3-4.3, 3-4.4, 3-4.6 for reference.)
2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.		4-4.1 Analyze the quadrilaterals squares, rectangles, trapezoids, rhombuses, and parallelograms according to their properties.	Continue to teach. Extend to include parallel and perpendicular lines and classification of triangles. (See 2007 SC 3-4.5 for reference.)

Common Core State Standards	Understanding CCSS: Notes and Examples	2007 S.C. Academic Standards for Mathematics	Major Changes
4.G Draw and identify lines and angles, and classify shapes by properties of their lines and angles.			
3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.			This standard is new 4th Grade. (See 2007 SC 1-4.4, 2-4.2, 5-4.6 for reference.)