



This document is designed to help North Carolina educators teach the Common Core. NCDPI staff are continually updating and improving these tools to better serve teachers.

## 6<sup>th</sup> Grade Math Curriculum Crosswalk

The following document is to be used to compare the 2003 North Carolina Mathematics Standard Course of Study and the Common Core State Standards for Mathematics.

As noted in the Common Core State Standards for Mathematics document, the instructional time in Grade 6 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.

To download the Common Core State Standards, please visit <http://www.corestandards.org/the-standards>.

**Important Note: The current SCoS will continue to be the taught and tested standards in the 2010-11 and 2011-12 school years. We expect the new Common Core standards to be taught and assessed in schools for the first time in the 2012-13 school year. That said, we are providing resources now and over the next two-years so that schools and teachers can get a head start on internalizing and planning to teach the new standards.**

NC SCOS			Common Core			
Strand	Objective	Text of objective	Domain	Standard	Cluster	Comments
					Text of objective	
Numbers & Operations	1.01	Develop number sense for negative rational numbers. a) Connect the model, number word, and number using a variety of representations, including the number line. b) Compare and order. c) Make estimates in appropriate situations.	Number System	6.NS.5	<b>Apply and extend previous understandings of numbers to the system of rational numbers.</b>	
					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, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of zero in each situation.	
	1.02	Develop meaning for percents. a) Connect the model, number word, and number using a variety of representations. b) Make estimates in appropriate situations.	Number System	6.NS.7.a	<b>Apply and extend previous understandings of numbers to the system of rational numbers.</b>	
Understand ordering and absolute value of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. <i>For example, interpret <math>-3 &gt; -7</math> as a statement that <math>-3</math> is located to the right of <math>-7</math> on a number line oriented from left to right.</i>						
		Ratio & Proportional Relationships	6.RP.3.c	<b>Understand ratio concepts and use ratio reasoning to solve problems.</b>	Recognizing equivalent fractions, decimals and percents has been removed.	
				Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.	Solving problems finding the whole, given a part and the percent is new in 6 <sup>th</sup> grade Common Core.	

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Strand	Objective	Text of objective	Domain	Standard	Cluster	Comments
					Text of objective	
	1.03	Compare and order rational numbers.	Number System	6.NS.7.a	<p><b>Apply and extend previous understandings of numbers to the system of rational numbers.</b></p> <p>Understand ordering and absolute value of rational numbers.</p> <p>a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. <i>For example, interpret <math>-3 &gt; -7</math> as a statement that <math>-3</math> is located to the right of <math>-7</math> on a number line oriented from left to right.</i></p>	
	1.04	<p>Develop fluency in addition, subtraction, multiplication, and division of nonnegative rational numbers.</p> <p>a) Analyze computational strategies.                      b) Describe the effect of operations on size.                      c) Estimate the results of computations.                      d) Judge the reasonableness of solutions.</p>			<p><b>Apply and extend previous understandings of multiplication and division to divide fractions by fractions.</b></p> <p>Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. <i>For example, create a story context for <math>(2/3) \div (3/4)</math> and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that <math>(2/3) \div (3/4) = 8/9</math> because <math>3/4</math> of <math>8/9</math> is <math>2/3</math>. (In general, <math>(a/b) \div (c/d) = ad/bc</math>.) How much chocolate will each person get if 3 people share <math>1/2</math> lb of chocolate equally? How many <math>3/4</math>-cup servings are in <math>2/3</math> of a cup of yogurt? How wide is a rectangular strip of land with length <math>3/4</math> mi and area <math>1/2</math> square mi?</i></p>	

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				6.NS.3	<p><b>Compute fluently with multi-digit numbers and find common factors and multiples.</b></p> <p>Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.</p>	The Common Core standard includes addition and subtraction of decimals which is a review from 5 <sup>th</sup> grade.	
	1.05	Develop fluency in the use of factors, multiples, exponential notation, and prime factorization.	Number System	6.NS.4	<p><b>Compute fluently with multi-digit numbers and find common factors and multiples.</b></p> <p>Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. <u>Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express <math>36 + 8</math> as <math>4(9 + 2)</math>.</u></p>	The underlined section of 6.NS.4 is new to 6 <sup>th</sup> grade.	
			Expressions & Equations	6.EE.1	<p><b>Apply and extend previous understandings of arithmetic to algebraic expressions.</b></p> <p>Write and evaluate numerical expressions involving whole-number exponents.</p>		
	1.06	Use exponential, scientific, and calculator notation to write very large and very small numbers.					Moved to 8 <sup>th</sup> grade Common Core.
	1.07	Develop flexibility in solving problems by selecting strategies and using mental computation, estimation, calculators or computers, and paper and pencil.					Problem solving is included throughout the Common Core.

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			Number System	6.NS.2	<p><b>Compute fluently with multi-digit numbers and find common factors and multiples.</b></p> <p>Fluently divide multi-digit numbers using the standard algorithm.</p>	Content previously taught in elementary school. Skill to maintain in 6 <sup>th</sup> grade.
			Number System	6.NS.6	<p><b>Apply and extend previous understandings of numbers to the system of rational numbers.</b></p> <p>Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.</p>	New to 6 <sup>th</sup> grade.
					<p>a) Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., <math>-(-3) = 3</math>, and that 0 is its own opposite.</p>	New to 6 <sup>th</sup> grade.
					<p>b) Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.</p>	New to 6 <sup>th</sup> grade.
					<p>c) Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.</p>	New to 6 <sup>th</sup> grade.

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					Text of objective	
					<b>Apply and extend previous understandings of numbers to the system of rational numbers.</b>	
					Understand ordering and absolute value of rational numbers.	
					b) Write, interpret, and explain statements of order for rational numbers in real-world contexts. <i>For example, write <math>-3^{\circ}C &gt; -7^{\circ}C</math> to express the fact that <math>-3^{\circ}C</math> is warmer than <math>-7^{\circ}C</math>.</i>	New to 6 <sup>th</sup> grade.
			Number System	6.NS.7	c) Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. <i>For example, for an account balance of <math>-30</math> dollars, write <math> -30  = 30</math> to describe the size of the debt in dollars.</i>	New to 6 <sup>th</sup> grade.
					d) Distinguish comparisons of absolute value from statements about order. <i>For example, recognize that an account balance less than <math>-30</math> dollars represent a debt greater than 30 dollars.</i>	New to 6 <sup>th</sup> grade.
Measurement	2.01	Estimate and measure length, perimeter, area, angles, weight, and mass of two- and three-dimensional figures, using appropriate tools.				
	2.02	Solve problems involving perimeter/circumference and area of plane figures.	Geometry	6.G.1	<b>Solve real-world and mathematical problems involving area, surface area, and volume.</b> Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these	Finding area and circumference of circles has been moved to 7 <sup>th</sup> grade Common Core.

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					techniques in the context of solving real-world and mathematical problems.	
			Geometry	6.G.2	<p><b>Solve real-world and mathematical problems involving area, surface area, and volume.</b></p> <p>Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas <math>V = lwh</math> and <math>V = bh</math> to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.</p>	Moved from 7 <sup>th</sup> grade NC SCOS; however, the Common Core standard is limited to finding the volume of right rectangular prisms.
					6.G.4	
Geometry	3.01	Identify and describe the intersection of figures in a plane.				
	3.02	Identify the radius, diameter, chord, center, and circumference of a circle; determine the relationships among them.				Embedded in 6.G.1. Chords are not included in Common Core.
	3.03	Transform figures in the coordinate plane and describe the transformation.				Moved to 8 <sup>th</sup> grade Common Core.

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	3.04	Solve problems involving geometric figures in the coordinate plane.	Number System	6.NS.8	<b>Apply and extend previous understandings of numbers to the system of rational numbers.</b> Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. <u>Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.</u>	The underlined section is new to 6 <sup>th</sup> grade.
					<b>Solve real-world and mathematical problems involving area, surface area, and volume.</b> Draw polygons in the coordinate plane given coordinates for the vertices; <u>use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate.</u> Apply these techniques in the context of solving real-world and mathematical problems.	
Data Analysis & probability	4.01	Develop fluency with counting strategies to determine the sample space for an event. Include lists, tree diagrams, frequency distribution tables, permutations, combinations, and the Fundamental Counting Principle.				Moved to 7 <sup>th</sup> grade Common Core.
	4.02	Use a sample space to determine the probability of an event.				Moved to 7 <sup>th</sup> grade Common Core.
	4.03	Conduct experiments involving simple and compound events.				Moved to 7 <sup>th</sup> grade Common Core.
	4.04	Determine and compare experimental and theoretical probabilities for simple and compound events.				Moved to 7 <sup>th</sup> grade Common Core.

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	4.05	Determine and compare experimental and theoretical probabilities for independent and dependent events.							Moved to 7 <sup>th</sup> grade Common Core.
	4.06	Design and conduct experiments or surveys to solve problems; report and analyze results.					Moved to 7 <sup>th</sup> grade Common Core.		
			Statistics & Probability	6.SP.1	<b>Develop understanding of statistical variability.</b>	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. <i>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.</i>	New to 6 <sup>th</sup> grade.		
					<b>Develop understanding of statistical variability.</b>			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.	New to 6 <sup>th</sup> grade.
					<b>Develop understanding of statistical variability.</b>				
			Statistics & Probability	6.SP.4	<b>Summarize and describe distributions.</b>	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	Dot plots are new. Histograms and box plots are in 7 <sup>th</sup> grade NC SCOS.		

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			Statistics & Probability	6.SP.5	<b>Summarize and describe distributions.</b> Summarize numerical data sets in relation to their context, such as by:	MAD (mean absolute deviation) is new to 6 <sup>th</sup> grade.
					a) Reporting the number of observations.	
					b) Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.	
					c) Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.	Interquartile range is in 7 <sup>th</sup> grade NC SCOS.
					d) Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	
Algebra	5.O1	Simplify algebraic expressions and verify the results using the basic properties of rational numbers. a) Identity. b) Commutative. c) Associative. d) Distributive. e) Order of operations.	Expressions & Equations	6.EE.3	<b>Apply and extend previous understandings of arithmetic to algebraic expressions.</b> Apply the properties of operations to generate equivalent expressions. <i>For example, apply the distributive property to the expression <math>3(2 + x)</math> to produce the equivalent expression <math>6 + 3x</math>; <u>apply the distributive property to the expression <math>24x + 18y</math> to produce the equivalent expression <math>6(4x + 3y)</math>; apply properties of operations to <math>y + y + y</math> to produce the equivalent expression <math>3y</math>.</u></i>	The underlined section is new to 6 <sup>th</sup> grade.  The standard does not include combining like terms. In 6 <sup>th</sup> grade students are only recognizing repeated addition of variables as multiplication.

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5.02	Use and evaluate algebraic expressions.		Expressions & Equations	6.EE.2.a	<p><b>Apply and extend previous understandings of arithmetic to algebraic expressions.</b></p> <p>Write, read, and evaluate expressions in which letters stand for numbers.</p> <p>a) Write expressions that record operations with numbers and with letters standing for numbers. <i>For example, express the calculation “Subtract y from 5” as <math>5 - y</math>.</i></p>	
				6.EE.2.c	<p><b>Apply and extend previous understandings of arithmetic to algebraic expressions.</b></p> <p>Write, read, and evaluate expressions in which letters stand for numbers.</p> <p>c) Evaluate expressions at specific values of their variables. <u>Include expressions that arise from formulas used in real-world problems.</u> Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). <i>For example, use the formulas <math>V = s^3</math> and <math>A = 6s^2</math> to find the volume and surface area of a cube with sides of length <math>s = \frac{1}{2}</math>.</i></p>	
	5.03	Solve simple (one- and two-step) equations or inequalities.			6.EE.5	<p><b>Reason about and solve one-variable equations and inequalities.</b></p> <p>Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.</p>

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			Expressions & Equations	6.EE.6	<b>Reason about and solve one-variable equations and inequalities.</b>	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
					<b>Reason about and solve one-variable equations and inequalities.</b>	
				6.EE.7	<b>Reason about and solve one-variable equations and inequalities.</b>	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which $p, q$ and $x$ are all nonnegative rational numbers.
			6.EE.8	<b>Reason about and solve one-variable equations and inequalities.</b>	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.	Solving one-step and two-step inequalities are in 7 <sup>th</sup> grade Common Core.
5.04		Use graphs, tables, and symbols to model and solve problems involving rates of change and ratios.	Ratio & Proportional Relationship	6.RP.1	<b>Understand ratio concepts and use ratio reasoning to solve problems.</b>	6.RP.1 is a prerequisite to the 2003 6 <sup>th</sup> grade standard 5.04.
					Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. <i>For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."</i>	

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			Ratio & Proportional Relationship	6.RP.2	<b>Understand ratio concepts and use ratio reasoning to solve problems.</b> Understand the concept of a unit rate $a/b$ associated with a ratio $a:b$ with $b \neq 0$ , and use rate language in the context of a ratio relationship. <i>For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger."</i> <sup>1</sup>	
					<b>Understand ratio concepts and use ratio reasoning to solve problems.</b> Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	Tape diagrams and double number line diagrams are new to 6 <sup>th</sup> grade.
				6.RP.3	a) Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.	Comparison of ratios is new to 6 <sup>th</sup> grade.
					b) Solve unit rate problems including those involving unit pricing and constant speed. <i>For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?</i>	
			Expressions & Equations	6.EE.9	<b>Represent and analyze quantitative relationships between dependent and independent variables.</b> Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an	Minimal alignment since 6.EE.9 and 5.04 addresses graphing of two quantities related to unit rate. Identification of independent and

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					equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. <i>For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation <math>d = 65t</math> to represent the relationship between distance and time.</i>	dependent variables is new.
			Ratio & Proportional Relationship	6.RP.3.d	<p><b>Understand ratio concepts and use ratio reasoning to solve problems.</b></p> <p>Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.</p> <p>d) Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.</p>	New to 6 <sup>th</sup> grade Common Core. Currently in the 5 <sup>th</sup> grade 2003 NC SCOS.
			Expressions & Equations	6.EE.2	<p><b>Apply and extend previous understandings of arithmetic to algebraic expressions.</b></p> <p>Write, read, and evaluate expressions in which letters stand for numbers.</p> <p>b) Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. <i>For example, describe the expression <math>2(8 + 7)</math> as a product of two factors; view <math>(8 + 7)</math> as both a single entity and a sum of two terms.</i></p>	New to 6 <sup>th</sup> grade.

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				6.EE.4	<p><b>Apply and extend previous understandings of arithmetic to algebraic expressions.</b></p> <p>Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). <i>For example, the expressions <math>y + y + y</math> and <math>3y</math> are equivalent because they name the same number regardless of which number <math>y</math> stands for.</i></p>	New to 6 <sup>th</sup> grade. Currently in the 7 <sup>th</sup> grade NC SCOS.