Public Schools of North Carolina
State Board of Education | Department of Public Instruction

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.

Common Core Integrated Mathematics III Curriculum Crosswalk

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

As noted in the Common Core State Standards for Mathematics document, the high school standards specify the mathematics that all students should study in order to be college and career ready. Mathematics concepts that lay the foundation for more advanced courses are indicated by a plus (+). Specific modeling standards appear throughout the high school Common Core State Standards for Mathematics and are indicated by a star (). The high school standards were developed in conceptual categories that portray a coherent view of high school mathematics that cross a number of course boundaries. These conceptual categories include:

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

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** Text of objective	Comments
Numbers & Operations	1.01	Write equivalent forms of algebraic expressions to solve problems	Seeing Structure in Expressions	A.SSE.1	**Interpret the structure of expressions** Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients.	Polynomial and rational expressions are the expectation at this level.
					Interpret the structure of expressions Interpret expressions that represent a quantity in terms of its context. *b.* Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret* $P(1+r)^n$ *as the product of P and a factor not depending on P.*	Polynomial and rational expressions are the expectation at this level.
				A.SSE.2	**Interpret the structure of expressions** Use the structure of an expression to identify ways to rewrite it. *For example, see* $x^4 - y^4$ *as* $(x^2)^2 - (y^2)^2$*, thus recognizing it as a difference of squares that can be factored as* $(x^2 - y^2)(x^2 + y^2)$.	Polynomial and rational expressions are the expectation at this level.
			Arithmetic with Polynomials and Rational Expressions	A.APR.6	**Rewrite rational expressions** Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.	

NC SCOS			Common Core			
Strand	Objective	Text of objective	Domain	Standard	**Cluster** Text of objective	Comments
	1.02	Use algebraic expressions, including iterative and recursive forms to model and solve problems.	Seeing Structure in Expressions	A.SSE.4	**Write expressions in equivalent forms to solve problems** Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. *For example, calculate mortgage payments.*	
	1.03	Simplify and perform operations with rational exponents and logarithms to solve problems.	Linear, Quadratic, and Exponential Models	F.LE.4	**Construct and compare linear, quadratic, and exponential models and solve problems** For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2,10,or e; evaluate the logarithm using technology.	Rational exponents are in Math II CCSS.
	1.04	Model and solve problems using direct, inverse, combined and joint variation.				Direct variation is in middle school CCSS. Inverse variation, joint variation and combined variation are not in the CCSS.
Geometry and Measurement	2.01	Use logic and deductive reasoning to draw conclusions and solve problems.				Logic problems are not explicit in in the 2003 NC SCOS; however, logic and deductive reasoning are addressed in the Mathematical Practices and embedded throughout the CCSS.
	2.02	Apply properties, definitions, and theorems of angles and lines to solve problems and write proofs.				Vertical and adjacent angles, and parallel lines are in the middle school CCSS. These are foundational concepts moved to Math II CCSS.

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Strand	Objective	Text of objective	Domain	Standard	**Cluster** Text of objective	Comments
	2.03	Apply the properties, definitions, and theorems of two-dimensional figures to solve problems and write proofs: a) Triangles b) Quadrilaterals c) Other polygons d) Circles				Similarity and congruence are in Math II CCSS.
	2.04	Use the law of sines and law of cosines to solve problems.	Similarity, Right Triangles and Trigonometry	G.SRT.1	**Apply trigonometry to general triangles** (+) Prove the Laws of Sines and Cosines and use them to solve problems.	
				G.SRT.11	**Apply trigonometry to general triangles** (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).	
			Similarity, Right Triangles and Trigonometry	G.SRT.9	**Apply trigonometry to general triangles** (+) Derive the formula $A = 1/2\ ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.	Moved from fourth courses in the 2003 NC SCOS.
			Trigonometric Functions	F.TF.1	**Extend the domain of trigonometric functions using the unit circle** Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	Moved from fourth courses in the 2003 NC SCOS.

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Strand	Objective	Text of objective	Domain	Standard	**Cluster** Text of objective	Comments
				F.TF.2	**Extend the domain of trigonometric functions using the unit circle** Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	Moved from fourth courses in the 2003 NC SCOS.
			Geometric Measurement and Dimension	G.GMD.4	**Visualize relationships between two-dimensional and three- dimensional objects** Identify the shapes of two-dimensional cross-sections of three- dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	Moved from fourth courses in the 2003 NC SCOS.
			Modeling with Geometry	G.MG.1	**Apply geometric concepts in modeling situations** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).▯	Not explicit in the 2003 NC SCOS.
				G.MG.2	**Apply geometric concepts in modeling situations** Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).▯	New to CCSS.
				G.MG.3	**Apply geometric concepts in modeling situations** Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).▯	New to CCSS.

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Data Analysis & Probability	3.01	Use systems of two or more equations or inequalities to model and solve problems; justify results. Solve using tables, graphs, matrix operations, and algebraic properties.	Creating Equations	A.CED.3	**Create equations that describe numbers or relationships** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non- viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*	Matrix operations are in fourth courses of the CCSS. Equations using all types of expressions including simple root functions are the expectation at this level.
	3.02	Use quadratic functions and inequalities to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants				Moved to IM I and IM II CCSS.
	3.03	Use rational equations to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants and coefficients in the context of the problem. c) Identify the asymptotes and intercepts graphically and algebraically.	Reasoning with Equations and Inequalities	A.REI.2	**Understand solving equations as a process of reasoning and explain the reasoning** Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	One-variable rational and radical equations are new to CCSS.
			Interpreting Functions	F.IF.7	**Analyze functions using different representations** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	Using technology for more difficult cases is new to CCSS. Includes rational and radical functions with a focus on using key features to guide selection of appropriate type of model function.

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Strand	Objective	Text of objective	Domain	Standard	**Cluster** Text of objective	Comments
					Analyze functions using different representations Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.	Using technology for more difficult cases is new to CCSS.
					Analyze functions using different representations Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	Using technology for more difficult cases is new to CCSS. Includes rational and radical functions with a focus on using key features to guide selection of appropriate type of model function.
	3.04	Use equations and inequalities with absolute value to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants and coefficients in the context of the problem.				Moved to IM II CCSS.

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	3.05	Transform functions in two dimensions; describe the results algebraically and geometrically.	Building Functions	F.BF.3	**Build new functions from existing functions** Identify the effect on the graph of replacing *f(x)* by *f(x) + k*, *k f(x)*, *f(kx)*, and *f(x + k)* for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.	Including simple radical, rational, and exponential functions with an emphasis on the common effect of each transformation across the function types is the expectation at this level.
			Creating Equations	A.CED.1	**Create equations that describe numbers or relationships** Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*	One-variable equations and inequalities are new to CCSS. Equations using all types of expressions including simple root functions are the expectation at this level.
			Reasoning with Equations and Inequalities	A.REI.11	**Represent and solve equations and inequalities graphically** Explain why the *x*-coordinates of the points where the graphs of the equations *y = f(x)* and *y = g(x)* intersect are the solutions of the equation *f(x) = g(x);* find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where *f(x)* and/or *g(x)* are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.	New to CCSS. Combining polynomial, rational, radical, absolute value, and exponential functions are the expectations at this level.

NC SCOS			Common Core			
Strand	Objective	Text of objective	Domain	Standard	**Cluster** Text of objective	Comments
			Interpreting Categorical and Quantitative Data	S.ID.4	**Summarize, represent, and interpret data on a single count or measurement variable** Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.	Moved from fourth courses in the 2003 NC SCOS.
			Making Inferences and Justifying Conclusions	S.IC.1	**Understand and evaluate random processes underlying statistical experiments** Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	Moved from fourth courses in the 2003 NC SCOS.
				S.IC.2	**Understand and evaluate random processes underlying statistical experiments** Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. *For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?*	Moved from fourth courses in the 2003 NC SCOS.
				S.IC.3	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies** Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	Moved from fourth courses in the 2003 NC SCOS.

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Strand	Objective	Text of objective	Domain	Standard	**Cluster** Text of objective	Comments
				S.IC.4	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies** Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.	Moved from fourth courses in the 2003 NC SCOS.
				S.IC.5	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies** Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	Moved from fourth courses in the 2003 NC SCOS.
				S.IC.6	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies** Evaluate reports based on data.	Moved from fourth courses in the 2003 NC SCOS.
			Using Probability to Make Decisions	S.MD.6	**Use probability to evaluate outcomes of decisions** (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).	Moved from fourth courses in the 2003 NC SCOS. More complex situations are the expectation at this level.
				S.MD.7	**Use probability to evaluate outcomes of decisions** (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).	Moved from fourth courses in the 2003 NC SCOS.
Algebra			The Complex Number System	N.CN.8	**Use complex numbers in polynomial identities and equations** (+) Extend polynomial identities to the complex numbers. *For example, rewrite* $x^2 + 4$ *as* $(x + 2i)(x – 2i)$.	New to CCSS. Polynomials with real number coefficients is the expectation at this level.

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Strand	Objective	Text of objective	Domain	Standard	**Cluster** Text of objective	Comments
				N.CN.9	**Use complex numbers in polynomial identities and equations** (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.	New to CCSS. Polynomials of higher degree are the expectation at this level.
			Arithmetic with Polynomials and Rational Expressions	A.APR.1	**Perform arithmetic operations on polynomials** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	Moved from 2003 IM I and IM II NC SCOS. Polynomials that simplify beyond quadratics is the expectation at this level.
				A.APR.2	**Understand the relationship between zeros and factors of polynomials** Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x – a$ is $p(a)$, so $p(a) = 0$ if and only if $(x – a)$ is a factor of $p(x)$.	Remainder theorem is not explicit in the fourth courses of the 2003 NC SCOS; therefore, it is new to CCSS.
				A.APR.3	**Understand the relationship between zeros and factors of polynomials** Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	Identifying zeros is not new to CCSS; however, using zeros to construct a rough graph is new to CCSS.
				A.APR.4	**Use polynomial identities to solve problems** Prove polynomial identities and use them to describe numerical relationships. *For example, the polynomial identity* $(x^2 + y^2)^2 = (x^2 – y^2)^2 + (2xy)^2$ *can be used to generate Pythagorean triples.*	New to CCSS.

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Strand	Objective	Text of objective	Domain	Standard	**Cluster** Text of objective	Comments
				A.APR.5	**Use polynomial identities to solve problems** (+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer *n*, where *x* and *y* are any numbers, with coefficients determined for example by Pascal's Triangle.[1] [1]The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.	Moved from fourth courses in the 2003 NC SCOS.
				A.APR.7	**Rewrite rational expressions** (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.	Not explicit in the 2003 IM III NC SCOS.
			Creating Equations[□]	A.CED.2	**Create equations that describe numbers or relationships** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Creating equations in more than two variables is new to CCSS. Equations using all types of expressions including simple root functions are the expectation at this level.
				A.CED.4	**Create equations that describe numbers or relationships** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*	Literal equations are not explicit in the 2003 NC SCOS. Equations using all types of expressions including simple root functions are the expectation at this level.

NC SCOS			Common Core			
Strand	Objective	Text of objective	Domain	Standard	**Cluster** Text of objective	Comments
			Interpreting Functions	F.IF.4	**Interpret functions that arise in applications in terms of the context** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*	New to CCSS. Rational, square root and cube root functions with an emphasis on selection of appropriate models are the expectation at this level.
				F.IF.5	**Interpret functions that arise in applications in terms of the context** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*	New to CCSS. Includes rational, square root and cube root functions with an emphasis on selection of appropriate models is the expectation at this level.
				F.IF.6	**Interpret functions that arise in applications in terms of the context** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	Moved from fourth courses in the 2003 NC SCOS. Includes rational, square root and cube root functions with an emphasis on selection of appropriate models is the expectation at this level.

NC SCOS			Common Core			
Strand	Objective	Text of objective	Domain	Standard	**Cluster** Text of objective	Comments
				F.IF.8	**Analyze functions using different representations** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	Completing the square is not explicit in the 2003 NC SCOS. Factoring has moved to IM I CCSS. Includes rational and radical functions with a focus on using key features to guide selection of appropriate type of model function.
					Analyze functions using different representations Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. b. Use the properties of exponents to interpret expressions for exponential functions. *For example, identify percent rate of change in functions such as* $y = (1.02)^{t}$, $y = (0.97)^{t}$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, *and classify them as representing exponential growth or decay.*	Moved from 2003 IM II NC SCOS. Includes rational and radical functions with a focus on using key features to guide selection of appropriate type of model function.
				F.IF.9	**Analyze functions using different representations** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*	New to CCSS. Includes rational and radical functions with a focus on using key features to guide selection of appropriate type of model function.

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Strand	Objective	Text of objective	Domain	Standard	**Cluster** Text of objective	Comments
			Trigonometric Functions	F.TF.5	**Model periodic phenomena with trigonometric functions** Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.[]	Moved from fourth courses in the 2003 NC SCOS.
			Building Functions	F.BF.1	**Build a function that models a relationship between two quantities** Write a function that describes a relationship between two quantities.[] b. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.*	Combining functions is not explicit in the 2003 NC SCOS. Including all types of functions studied is the expectation at this level.
			Building Functions	F.BF.4	**Build new functions from existing functions** Find inverse functions. a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. *For example,* $f(x) = 2x^3$ *or* $f(x) = (x+1)/(x–1)$ *for* x 1.	Moved from fourth courses in the 2003 NC SCOS. Including simple radical, rational, and exponential functions with an emphasis on the common effect of each transformation across the function types is the expectation at this level.