Overview of NC Math 1-3

Algebra, Functions & Function Families

NC Math 1	NC Math 2	NC Math 3
Functions represented as graphs, tables or verbal descriptions in context		
Focus on comparing properties of linear function to *specific* non-linear functions and rate of change. • Linear • Exponential • Quadratic	**Focus on properties of quadratic functions and an introduction to inverse functions through the inverse relationship between quadratic and square root functions.** • Quadratic • Square Root • Inverse Variation	**A focus on more complex functions** • Exponential • Logarithm • Rational functions w/ linear denominator • Polynomial w/ degree $\leq$ three • Absolute Value and Piecewise • Intro to Trigonometric Functions
A Progression of Learning of Functions through Algebraic Reasoning		
The conceptual categories of Algebra and Functions are inter-related. Functions describe situations in which one quantity varies with another. The difference between the Function standards and the Algebra standards is that the Function standards focus more on the characteristics of functions (e.g. domain/range or max/min points), function definition, etc. whereas the Algebra standards provide the computational tools and understandings that students need to explore specific instances of functions. As students progress through high school, the coursework with specific families of functions and algebraic manipulation evolve. Rewriting algebraic expressions to create equivalent expressions relates to how the symbolic representation can be manipulated to reveal features of the graphical representation of a function. **Note:** The Numbers conceptual category also relates to the Algebra and Functions conceptual categories. As students become more fluent with their work within particular function families, they explore more of the number system. For example, as students continue the study of quadratic equations and functions in Math 2, they begin to explore the complex solutions. Additionally, algebraic manipulation within the real number system is an important skill to creating equivalent expressions from existing functions.		

Overview of NC Math 1-3

Geometry

NC Math 1	NC Math 2	NC Math 3
Analytic & Euclidean		
Focus on coordinate geometry • Distance on the coordinate plane • Midpoint of line segments • Slopes of parallel and perpendicular lines • Prove geometric theorems algebraically	**Focus on triangles** • Congruence • Similarity • Right triangle trigonometry ○ Special right triangles	**Focus on circles and continuing the work with triangles** • Introduce the concept of radian • Angles and segments in circles • Centers of triangles • Parallelograms
A Progression of Learning		
Integration of Algebra and Geometry • Building off of what students know from 5^{th} – 8^{th} grade with work in the coordinate plane, the Pythagorean theorem and functions. • Students will integrate the work of algebra and functions to prove geometric theorems algebraically. • Algebraic reasoning as a means of proof will help students to build a foundation to prepare them for further work with geometric proofs.	**Geometric proof and SMP3** • An extension of transformational geometry concepts, lines, angles, and triangles from 7^{th} and 8^{th} grade mathematics. • Connecting proportional reasoning from 7^{th} grade to work with right triangle trigonometry. • Students should use geometric reasoning to prove theorems related to lines, angles, and triangles. *It is important to note that proofs here are not limited to the traditional two-column proof. Paragraph, flow proofs and other forms of argumentation should be encouraged.*	**Geometric Modeling** • Connecting analytic geometry, algebra, functions, and geometric measurement to modeling. • Building from the study of triangles in Math 2, students will verify the properties of the centers of triangles and parallelograms.

Overview of NC Math 1-3

Statistics & Probability

A statistical process is a problem-solving process consisting of four steps:

1. Formulating a statistical question that anticipates variability and can be answered by data.
2. Designing and implementing a plan that collects appropriate data.
3. Analyzing the data by graphical and/or numerical methods.
4. Interpreting the analysis in the context of the original question.

NC Math 1	NC Math 2	NC Math 3
Focus on analysis of univariate and bivariate data • Use of technology to represent, analyze and interpret data • Shape, center and spread of univariate numerical data • Scatter plots of bivariate data • Linear and exponential regression • Interpreting linear models in context.	**Focus on probability** • Categorical data and two-way tables • Understanding and application of the Addition and Multiplication Rules of Probability • Conditional Probabilities • Independent Events • Experimental vs. theoretical probability	**Focus on the use of sample data to represent a population** • Random sampling • Simulation as it relates to sampling and randomization • Sample statistics • Introduction to inference
A Progression of Learning		
• A continuation of the work from middle grades mathematics on summarizing and describing quantitative data distributions of univariate (6^{th} grade) and bivariate (8^{th} grade) data.	• A continuation of the work from 7^{th} grade where students are introduced to the concept of probability models, chance processes and sample space; and 8^{th} grade where students create and interpret relative frequency tables. • The work of MS probability is extended to develop understanding of conditional probability, independence and rules of probability to determine probabilities of compound events.	• Bringing it all back together • Sampling and variability • Collecting unbiased samples • Decision making based on analysis of data