

Kindergarten

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Kindergarten Mathematics Crosswalk

The purpose of this document is to provide a general comparison of the 2017 Kindergarten Grade Math Standard Course of Study and the 2026 Kindergarten Grade Math Standard Course of Study. It provides initial insight into similarities and differences between these two sets of standards. As this is an initial comparison, the document does not address every difference or nuance between the draft standards and the current standards.

Draft 3 Domains	2017 Domains
Algebraic and Numerical Reasoning (ANR)	Operations and Algebraic Thinking (OA) Number and Operations in Base Ten (NBT)
Spatial, Geometric, and Measurement Reasoning (SGMR)	Measurement and Data (MD) Geometry (G)
Reasoning with Data (RD)	Measurement and Data (MD)

Algebraic and Numerical Reasoning (ANR)

Draft 3 Standards	2017 Standard Course of Study
K.ANR.1 Understand the relationship between numbers and quantities when counting objects within 20.	Domain: Counting and Cardinality Cluster Headings: - Know number names and the counting sequence. - Count to tell the number of objects.
K.ANR.1.1 Count a collection of objects using the correct number sequence within 20.	NC.K.CC.4 Understand the relationship between numbers and quantities. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object (one-to-one correspondence).

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	• Recognize that the last number named tells the number of objects counted, regardless of their arrangement (cardinality). • State the number of objects in a group of up to 5 objects, without counting the objects (perceptual subitizing). NC.K.CC.5 Count to answer “How many?” in the following situations: • Given a number from 1–20, count out that many objects. • Given up to 20 objects, name the next successive number when an object is added, recognizing the quantity is one more/greater. • Given 20 objects arranged in a line, a rectangular array, and a circle, identify how many. • Given 10 objects in a scattered arrangement, identify how many.
K.ANR.1.2 Demonstrate one-to-one correspondence by matching each object to one spoken number word while keeping track of objects without skipping or double-counting.	NC.K.CC.4 Understand the relationship between numbers and quantities. • When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object (one-to-one correspondence). • Recognize that the last number named tells the number of objects counted, regardless of their arrangement (cardinality). • State the number of objects in a group of up to 5 objects, without counting the objects (perceptual subitizing).
K.ANR.1.3 Recognize that the last number said when counting is the total number of objects in the set (cardinality).	NC.K.CC.4 Understand the relationship between numbers and quantities. • When counting objects, say the number names in the

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	standard order, pairing each object with one and only one number name and each number name with one and only one object (one-to-one correspondence). • Recognize that the last number named tells the number of objects counted, regardless of their arrangement (cardinality). • State the number of objects in a group of up to 5 objects, without counting the objects (perceptual subitizing).
K.ANR.1.4 Represent a counted set of objects with a written numeral 0-20, with 0 representing a count of no objects.	NC.K.CC.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20, with 0 representing a count of no objects.
K.ANR.1.5 Produce a set of objects that represents the quantity when given a number 0-20.	NC.K.CC.5 Count to answer “How many?” in the following situations: • Given a number from 1–20, count out that many objects. • Given up to 20 objects, name the next successive number when an object is added, recognizing the quantity is one more/greater. • Given 20 objects arranged in a line, a rectangular array, and a circle, identify how many. • Given 10 objects in a scattered arrangement, identify how many.
K.ANR.1.6 Identify the next successive number when an object is added, recognizing the quantity is one more/greater.	NC.K.CC.5 Count to answer “How many?” in the following situations: • Given a number from 1–20, count out that many objects. • Given up to 20 objects, name the next successive number when an object is added, recognizing the quantity is one more/greater. • Given 20 objects arranged in a line, a rectangular array, and a circle, identify how many. • Given 10 objects in a scattered arrangement, identify

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	how many.
K.ANR.1.7 Write numbers 0-20.	NC.K.CC.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20, with 0 representing a count of no objects.
K.ANR.1.8 State the number of objects in a group within 5, without counting the objects (perceptual subitizing).	NC.K.CC.4 Understand the relationship between numbers and quantities. • When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object (one-to-one correspondence). • Recognize that the last number named tells the number of objects counted, regardless of their arrangement (cardinality). • State the number of objects in a group of up to 5 objects, without counting the objects (perceptual subitizing).
K.ANR.2 Make use of structure in the number system to count within 100.	Domain: Counting and Cardinality Cluster Heading: Know number names and the counting sequence.
K.ANR.2.1 Count to 100 by ones.	NC.K.CC.1 Know number names and recognize patterns in the counting sequence by: • Counting to 100 by ones. • Counting to 100 by tens.
K.ANR.2.2 Count forward by ones from any given number within 100.	NC.K.CC.2 Count forward beginning from a given number within the known sequence, instead of having to begin at 1.
K.ANR.2.3 Count backward by ones from any given number within 10.	New
K.ANR.2.4 Count to 100 by tens.	NC.K.CC.1 Know number names and recognize patterns in the

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	counting sequence by: - Counting to 100 by ones. - Counting to 100 by tens.
K.ANR.3 Reason abstractly and quantitatively to describe relationships between two quantities within 20.	Domain: Counting and Cardinality Cluster Heading: Compare numbers.
K.ANR.3.1 Compare two sets of objects to determine which has more, fewer, or the same (equal) number of objects within 20.	NC.K.CC.6 Identify whether the number of objects, within 10, in one group is greater than, less than, or equal to the number of objects in another group, by using matching and counting strategies.
K.ANR.3.2 Produce a set of objects that has more, fewer, or the same (equal) number of objects as a given set within 20.	New
K.ANR.3.3 Compare two numerals to determine which is greater than, less than, or has the same value (equal) within 20.	NC.K.CC.7 Compare two numbers, within 10, presented as written numerals.
K.ANR.3.4 Produce a set of objects that has more, fewer, or the same (equal) number of objects as a given numeral within 20.	New
K.ANR.4 Make sense of addition and subtraction within 10 using objects and drawings.	Domain: Operations and Algebraic Thinking Cluster Heading: Understand addition and subtraction.
K.ANR.4.1 Recognize the combination of small groups with totals within 10 without counting (conceptual subitizing).	NC.K.OA.6 Recognize and combine groups with totals up to 5 (conceptual subitizing).
K.ANR.4.2 Demonstrate addition and subtraction situations within 10 using objects by: - Joining/adding to quantities - Separating/taking from quantities	NC.K.OA.1 Represent addition and subtraction, within 10: - Use a variety of representations such as objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, or expressions. - Demonstrate understanding of addition and subtraction by making connections among representations.
K.ANR.4.3 Apply appropriate strategies to add and subtract within 10 using objects or drawings, including:	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

- Counting all - Counting on - Counting back - One more, one less - Combinations of 10	
K.ANR.4.4 Represent addition and subtraction word problems within 10, using objects or drawings, including the following problem types: - Add To/Take From (Result Unknown) - Put Together/Take Apart (Total Unknown and Two Addends Unknown)	NC.K.OA.2 Solve addition and subtraction word problems, within 10, using objects or drawings to represent the problem, when solving: - Add to/Take From-Result Unknown - Put Together/ Take Apart (Total Unknown and Two Addends Unknown)
K.ANR.4.5 Solve addition and subtraction word problems within 10, using drawings, numbers, and/or words, including the following problem types: - Add To/Take From (Result Unknown) - Put Together/Take Apart (Total Unknown and Two Addends Unknown)	NC.K.OA.2 Solve addition and subtraction word problems, within 10, using objects or drawings to represent the problem, when solving: - Add to/Take From-Result Unknown - Put Together/ Take Apart (Total Unknown and Two Addends Unknown)
K.ANR.4.6 Connect composition and decomposition to addition and subtraction by recording written expressions with (+) as a symbol for addition and (-) as a symbol for subtraction.	NC.K.OA.1 Represent addition and subtraction, within 10: - Use a variety of representations such as objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, or expressions. - Demonstrate understanding of addition and subtraction by making connections among representations.
K.ANR.4.7 Apply part-part-whole relationships to compose and decompose numbers within 10 in more than one way using objects or drawings.	NC.K.OA.3 Decompose numbers less than or equal to 10 into pairs in more than one way using objects or drawings, and record each decomposition by a drawing or expression.
K.ANR.4.8 Find the number that makes 10 when added to a given number using objects or drawings.	NC.K.OA.4 For any number from 0 to 10, find the number that makes 10 when added to the given number using objects or drawings, and record the answer with a drawing or expression.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

K.ANR.5 Use repeated reasoning to develop fluency with addition and subtraction.	Domain: Operations and Algebraic Thinking Cluster Heading: Understand addition and subtraction.
K.ANR.5.1 Demonstrate fluency with addition and subtraction of 0 or 1 within 10.	New
K.ANR.5.2 Demonstrate fluency with addition and subtraction within 5.	NC.K.OA.5 Demonstrate fluency with addition and subtraction within 5.
K.ANR.6 Make sense of the structure of teen numbers (11-19).	Domain: Number and Operations in Base Ten Cluster Heading: Build foundation for place value.
K.ANR.6.1 Compose numbers as a group of ten ones and additional ones using objects and/or drawings.	NC.K.NBT.1 Compose and decompose numbers from 11 to 19 into ten ones and some further ones by: • Using objects or drawings. • Recording each composition or decomposition by a drawing or expression. • Understanding that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.
K.ANR.6.2 Decompose numbers as a group of ten ones and additional ones using objects and/or drawings.	NC.K.NBT.1 Compose and decompose numbers from 11 to 19 into ten ones and some further ones by: • Using objects or drawings. • Recording each composition or decomposition by a drawing or expression. • Understanding that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.
K.ANR.6.3 Represent the composition and decomposition of teen numbers as a group of ten ones and additional ones with numbers or expressions.	NC.K.NBT.1 Compose and decompose numbers from 11 to 19 into ten ones and some further ones by: • Using objects or drawings. • Recording each composition or decomposition by a drawing or expression.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	Understanding that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.
K.ANR.7 Use repeated reasoning to make sense of repeating patterns with colors, shapes, sounds, movements, pictures, or objects.	New
K.ANR.7.1 Identify the core unit in a repeating pattern (AB, AAB, ABB, ABC).	New
K.ANR.7.2 Extend a repeating pattern (AB, AAB, ABB, ABC) by repeating the core unit two additional times.	New
K.ANR.7.3 Create a repeating pattern (AB, AAB, ABB, ABC).	New

Spatial, Geometric, and Measurement Reasoning (SGMR)

Draft 3 Standards	2017 Standard Course of Study
K.SGMR.1 Describe shapes and their attributes.	Domain: Geometry Cluster Headings: - Identify and describe shapes. - Analyze, compare, create, and compose shapes.
K.SGMR.1.1 Name two-dimensional and three-dimensional shapes, regardless of their orientations or overall size, including triangles, squares, rectangles, hexagons, circles, cubes, cones, cylinders, and spheres.	NC.K.G.2 Correctly name squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres regardless of their orientations or overall size.
K.SGMR.1.2 Classify shapes as two-dimensional or three-dimensional.	NC.K.G.3 Identify squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres as two-dimensional or three-dimensional.
K.SGMR.1.3 Compare two-dimensional shapes in different sizes and orientations based on their attributes.	NC.K.G.4 Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	language to describe their similarities, differences, attributes and other properties.
K.SGMR.2 Create two-dimensional shapes.	Domain: Geometry Cluster Heading: Analyze, compare, create, and compose shapes.
K.SGMR.2.1 Draw triangles, rectangles, squares, and circles.	NC.K.G.5 Model shapes in the world by: • Building and drawing triangles, rectangles, squares, hexagons, circles. • Building cubes, cones, spheres, and cylinders.
K.SGMR.2.2 Build triangles, rectangles, squares, and circles.	NC.K.G.5 Model shapes in the world by: • Building and drawing triangles, rectangles, squares, hexagons, circles. • Building cubes, cones, spheres, and cylinders.
K.SGMR.2.3 Compose two-dimensional figures by combining triangles, rectangles, and/or squares.	NC.K.G.6 Compose larger shapes from simple shapes.
K.SGMR.3 Compare the measurable attributes of two objects.	Domain: Measurement and Data Cluster Heading: Describe and compare measurable attributes.
K.SGMR.3.1 Describe measurable attributes of objects, including length, height, and weight.	NC.K.MD.1 Describe measurable attributes of objects; and describe several different measurable attributes of a single object.
K.SGMR.3.2 Compare two objects using the same measurable attribute, including length, height, and weight, using comparative language.	NC.K.MD.2 Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference.

Notes:

- **Moved to 1st Grade:** **NC.K.G.5** Model shapes in the world by: Building cubes, cones, spheres, and cylinders.
 - Build three-dimensional shapes, including cubes, rectangular prisms, spheres, cones, and cylinders is addressed in **1.SGMR.1.5**.



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

- **Moved to 1st Grade: NC.K.G.4** Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, attributes and other properties.
 - Three-dimensional shapes are addressed in **1.SGMR.1.6**.
- **Removed: NC.K.G.1** Describe objects in the environment using names of shapes, and describe the relative positions of objects using positional terms.
 - Addressed in the North Carolina Kindergarten Science Standard Course of Study. **PS.K.2.1** Use models to compare the relative position of various objects observed in the classroom and outside using position words such as: in front of, behind, between, on top of, under, above, below, beside.

Reasoning with Data (RD)

Draft 3 Standards	2017 Standard Course of Study
K.RD.1 Use repeated reasoning to sort and classify based on attributes.	Domain: Measurement and Data Cluster Headings: Classify objects and count the number of objects in each category.
K.RD.1.1 Sort up to 20 pictures and/or objects based on one attribute.	NC.K.MD.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.
K.RD.1.2 Describe the attribute used to sort a set of objects.	NC.K.MD.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.
K.RD.2 Apply the data cycle with a focus on simple object graphs and picture graphs.	New
K.RD.2.1 Determine the data needed to answer a question posed by the teacher with up to 20 data points within three categories.	New
K.RD.2.2 Collect categorical data based on a question posed by the teacher.	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

K.RD.2.3 Represent a data set (vertically or horizontally) by organizing and structuring collected data on an object graph and/or a picture graph.	New
K.RD.2.4 Count to determine how many are in each category and the total number of data points.	New
K.RD.2.5 Compare the counts in each category using comparison language, such as more than, less than, and the same (equal) amount.	New
K.RD.2.6 Communicate observations, conclusions, and/or decisions based on the question posed and data collected.	New

First Grade

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

1st Grade Mathematics Crosswalk

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Algebraic and Numerical Reasoning (ANR)	Operations and Algebraic Thinking (OA) Number and Operations in Base Ten (NBT)
Spatial, Geometric, and Measurement Reasoning (SGMR)	Measurement and Data (MD) Geometry (G)
Reasoning with Data (RD)	Measurement and Data (MD)

Algebraic and Numerical Reasoning (ANR)

Draft 3 Standards	2017 Standard Course of Study
1.ANR.1 Make use of structure in the number system to count within 120.	Domain: Number and Operations in Base Ten Cluster Heading: Extend and recognize patterns in the counting sequence.
1.ANR.1.1 Count forward from any given number by ones within 120 and by tens within 100.	NC.1.NBT.1 Count to 150, starting at any number less than 150.
1.ANR.1.2 Count backward from any given number by ones within 120 and by tens within 100.	New
1.ANR.1.3 Count forward by 5s from any multiple of 5 within 100.	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

1.ANR.1.4 Analyze numerical patterns of skip counting sequences by 5s and 10s within 100 to describe how the numbers increase by a constant amount.	New
1.ANR.2 Make use of structure to count objects within 120.	Domain: Number and Operations in Base Ten Cluster Headings: Extend and recognize patterns in the counting sequence.
1.ANR.2.1 Count a collection of objects using grouping strategies to determine the total.	New
1.ANR.2.2 Represent a set of objects with a written numeral.	NC.1.NBT.7 Read and write numerals, and represent a number of objects with a written numeral, to 100.
1.ANR.3 Make use of structure to develop place value understanding for two-digit numbers.	Domain: Number and Operations in Base Ten Cluster Headings: - Extend and recognize patterns in the counting sequence. - Understand Place Value
1.ANR.3.1 Unitize a collection of ten ones into a group of ten.	NC.1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. - Unitize by making a ten from a collection of ten ones. - Model the numbers from 11 to 19 as composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. - Demonstrate that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens, with 0 ones.
1.ANR.3.2 Represent the composition and decomposition of two-digit numbers as groups of tens and additional ones.	NC.1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. - Unitize by making a ten from a collection of ten ones. - Model the numbers from 11 to 19 as composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	Demonstrate that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens, with 0 ones.
1.ANR.3.3 Apply place value understanding to read and write numbers in standard and expanded form.	NC.1.NBT.7 Read and write numerals, and represent a number of objects with a written numeral, to 100.
1.ANR.4 Make use of place value structure to reason about the magnitude of whole numbers within 100.	Domain: Number and Operations in Base Ten Cluster Headings: Understand place value.
1.ANR.4.1 Represent whole numbers as distances from 0 on a pre-marked number line within 20.	New
1.ANR.4.2 Compare numbers within 100 by reasoning about the values of tens and ones digits, the location of the numbers on a number line, and using symbols ($>$, $<$, $=$).	NC.1.NBT.3 Compare two two-digit numbers based on the value of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.
1.ANR.4.3 Estimate the location of numbers within 100 on a number line by reasoning about their relationship to benchmark numbers.	New
1.ANR.5 Make sense of addition and subtraction within 20.	Domain: Operations and Algebraic Thinking Cluster Heading: - Represent and solve problems. - Understand and apply the properties of operations. - Add and subtract within 20.
1.ANR.5.1 Apply appropriate strategies to add and subtract within 20, including: - Counting on/back - Using doubles/near doubles - Making ten/decomposing a number leading to a ten - Using the relationship between addition and subtraction - Creating equivalent sums or differences, using the commutative property	NC.1.OA.6 Add and subtract, within 20, using strategies such as: - Counting on - Making ten - Decomposing a number leading to a ten - Using the relationship between addition and subtraction - Using a number line - Creating equivalent but simpler or known sums

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

1.ANR.5.2 Represent addition and subtraction word problems within 20, using equations with a symbol for the unknown number, including the following problem types: • Add To/Take From (Change Unknown) • Put Together/Take Apart (Addend Unknown) • Compare (Difference Unknown)	NC.1.OA.1 Represent and solve addition and subtraction word problems, within 20, with unknowns, by using objects, drawings, and equations with a symbol for the unknown number to represent the problem, when solving: • Add to/Take from-Change Unknown • Put together/Take Apart-Addend Unknown • Compare-Difference Unknown
1.ANR.5.3 Solve addition and subtraction word problems within 20, using representations, including the following problem types: • Add To/Take From (Change Unknown) • Put Together/Take Apart (Addend Unknown) • Compare (Difference Unknown)	NC.1.OA.1 Represent and solve addition and subtraction word problems, within 20, with unknowns, by using objects, drawings, and equations with a symbol for the unknown number to represent the problem, when solving: • Add to/Take from-Change Unknown • Put together/Take Apart-Addend Unknown • Compare-Difference Unknown
1.ANR.5.4 Apply the commutative and associative properties to solve addition problems within 20 involving three addends with and without context.	NC.1.OA.2 Represent and solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, by using objects, drawings, and equations with a symbol for the unknown number. NC.1.OA.3 Apply the commutative and associative properties as strategies for solving addition problems.
1.ANR.6 Use repeated reasoning to develop fluency with addition and subtraction foundational facts.	Domain: Operations and Algebraic Thinking Cluster Heading: Add and subtract within 20.
1.ANR.6.1 Demonstrate fluency with addition and subtraction within 10.	NC.1.OA.9 Demonstrate fluency with addition and subtraction within 10.
1.ANR.6.2 Demonstrate fluency with 10 plus ($10 + \underline{\hspace{1cm}}$) facts and doubles within 20.	New
1.ANR.7 Apply understanding of the equal sign to explain the relationship between quantities within 20 by reasoning abstractly and quantitatively.	Domain: Operations and Algebraic Thinking Cluster Heading:

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	• Understand and apply the properties of operations. • Analyze addition and subtraction equations within 20.
1.ANR.7.1 Describe the equal sign (=) as showing the quantities on both sides have the same value.	NC.1.OA.7 Apply understanding of the equal sign to determine if equations involving addition and subtraction are true.
1.ANR.7.2 Justify whether two addition and/or subtraction expressions within 20 are equal or not equal using representations.	NC.1.OA.7 Apply understanding of the equal sign to determine if equations involving addition and subtraction are true.
1.ANR.7.3 Determine the unknown whole number in an addition or subtraction equation with the unknown in all positions.	NC.1.OA.4 Solve an unknown-addend problem, within 20, by using addition strategies and/or changing it to a subtraction problem. NC.1.OA.8 Determine the unknown whole number in an addition or subtraction equation involving three whole numbers.
1.ANR.8 Make use of place value structure to add and subtract within 100 with and without context.	Domain: Number and Operations in Base Ten Cluster Heading: Use place value understanding and properties of operations.
1.ANR.8.1 Apply place value strategies and/or properties of operations using representations to add and subtract a two-digit number and a one-digit number.	NC.1.NBT.4 Using concrete models or drawings, strategies based on place value, properties of operations, and explaining the reasoning used, add, within 100, in the following situations: • A two-digit number and a one-digit number • A two-digit number and a multiple of 10
1.ANR.8.2 Apply place value strategies and/or properties of operations using representations to add and subtract a two-digit number and a multiple of 10.	NC.1.NBT.4 Using concrete models or drawings, strategies based on place value, properties of operations, and explaining the reasoning used, add, within 100, in the following situations: • A two-digit number and a one-digit number • A two-digit number and a multiple of 10 NC.1.NBT.6 Subtract multiples of 10 in the range 10-90 from

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	multiples of 10 in the range 10-90, explaining the reasoning, using: • Concrete models and drawings • Number lines • Strategies based on place value • Properties of operations • The relationship between addition and subtraction
1.ANR.8.3 Explain why addition and subtraction strategies work based on place value and/or number relationships within 100.	NC.1.NBT.4 Using concrete models or drawings, strategies based on place value, properties of operations, and explaining the reasoning used, add, within 100, in the following situations: • A two-digit number and a one-digit number • A two-digit number and a multiple of 10 NC.1.NBT.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90, explaining the reasoning, using: • Concrete models and drawings • Number lines • Strategies based on place value • Properties of operations • The relationship between addition and subtraction
1.ANR.8.4 Apply place value understanding to mentally determine 10 more or 10 less than a two-digit number, without having to count.	NC.1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

Notes:

- **New Content in 1.ANR.8.1** Apply place value strategies and/or properties of operations using representations to add and subtract a two-digit number and a one-digit number.
 - Subtracting a two-digit and one-digit number is new.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Spatial, Geometric, and Measurement Reasoning (SGMR)

Draft 3 Standards	2017 Standard Course of Study
1.SGMR.1 Make use of structure to describe and create shapes based on their defining attributes.	Domain: Geometry Cluster Heading: Reason with shapes and their attributes.
1.SGMR.1.1 Distinguish between defining and non-defining attributes of triangles, rectangles, squares, hexagons, and circles.	NC.1.G.1 Distinguish between defining and non-defining attributes and create shapes with defining attributes by: • Building and drawing triangles, rectangles, squares, trapezoids, hexagons, circles. • Building cubes, right rectangular prisms, right circular cones, spheres, and right circular cylinders.
1.SGMR.1.2 Describe triangles, rectangles, squares, hexagons, and circles based on their defining attributes, including the number of sides, vertices, and angles.	NC.1.G.1 Distinguish between defining and non-defining attributes and create shapes with defining attributes by: • Building and drawing triangles, rectangles, squares, trapezoids, hexagons, circles. • Building cubes, right rectangular prisms, right circular cones, spheres, and right circular cylinders.
1.SGMR.1.3 Draw triangles, rectangles, squares, hexagons, and circles.	NC.1.G.1 Distinguish between defining and non-defining attributes and create shapes with defining attributes by: • Building and drawing triangles, rectangles, squares, trapezoids, hexagons, circles. • Building cubes, right rectangular prisms, right circular cones, spheres, and right circular cylinders.
1.SGMR.1.4 Name three-dimensional shapes, including cubes, rectangular prisms, spheres, cones, and cylinders, using the shapes of their faces and whether their surfaces are flat or curved as defining attributes.	NC.1.G.1 Distinguish between defining and non-defining attributes and create shapes with defining attributes by: • Building and drawing triangles, rectangles, squares, trapezoids, hexagons, circles. • Building cubes, right rectangular prisms, right circular cones, spheres, and right circular cylinders.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

1.SGMR.1.5 Build three-dimensional shapes, including cubes, rectangular prisms, spheres, cones, and cylinders.	NC.1.G.1 Distinguish between defining and non-defining attributes and create shapes with defining attributes by: • Building and drawing triangles, rectangles, squares, trapezoids, hexagons, circles. • Building cubes, right rectangular prisms, right circular cones, spheres, and right circular cylinders.
1.SGMR.1.6 Compare cubes, rectangular prisms, spheres, cones, and cylinders by describing the shapes of their faces and whether their surfaces are flat or curved.	New
1.SGMR.2 Make sense of the relationship between a whole and its equal shares (halves and fourths) in real-world situations.	Domain: Geometry Cluster Heading: Reason with shapes and their attributes.
1.SGMR.2.1 Partition circles and rectangles into two and four equal shares.	NC.1.G.3 Partition circles and rectangles into two and four equal shares. • Describe the shares as halves and fourths, as half of and fourth of. • Describe the whole as two of, or four of the shares. • Explain that decomposing into more equal shares creates smaller shares.
1.SGMR.2.2 Describe equal shares of circles and rectangles as halves and fourths, using the language “half of” and “fourth of.”	NC.1.G.3 Partition circles and rectangles into two and four equal shares. • Describe the shares as halves and fourths, as half of and fourth of. • Describe the whole as two of, or four of the shares. • Explain that decomposing into more equal shares creates smaller shares.
1.SGMR.2.3 Describe a whole as two halves or four fourths.	NC.1.G.3 Partition circles and rectangles into two and four equal shares. • Describe the shares as halves and fourths, as half of and fourth of.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	- Describe the whole as two of, or four of the shares. - Explain that decomposing into more equal shares creates smaller shares.
1.SGMR.2.4 Explain why partitioning the same whole into four equal parts creates smaller pieces than partitioning it into two equal parts.	NC.1.G.3 Partition circles and rectangles into two and four equal shares. - Describe the shares as halves and fourths, as half of and fourth of. - Describe the whole as two of, or four of the shares. - Explain that decomposing into more equal shares creates smaller shares.
1.SGMR.3 Reason about length using non-standard units.	Domain: Measurement and Data Cluster Heading: Measuring lengths.
1.SGMR.3.1 Order three objects by length.	NC.1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.
1.SGMR.3.2 Compare the lengths of two objects indirectly by using a third object.	NC.1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.
1.SGMR.4 Measure lengths using non-standard units.	Domain: Measurement and Data Cluster Heading: Measure lengths.
1.SGMR.4.1 Express the length of an object as a whole number of non-standard length units.	NC.1.MD.2 Measure lengths with non-standard units. - Express the length of an object as a whole number of non-standard length units. - Measure by laying multiple copies of a shorter object (the length unit) end to end (iterating) with no gaps or overlaps.
1.SGMR.4.2 Measure by laying multiple copies of a shorter object (the length unit) end to end (iterating) with no gaps or overlaps.	NC.1.MD.2 Measure lengths with non-standard units. - Express the length of an object as a whole number of non-standard length units. - Measure by laying multiple copies of a shorter object

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	(the length unit) end to end (iterating) with no gaps or overlaps.
1.SGMR.5 Tell time to the nearest hour and half-hour.	Domain: Measurement and Data Cluster Heading: Build understanding of time and money.
1.SGMR.5.1 Describe units of time represented on a clock as minutes and hours.	NC.1.MD.3 Tell and write time in hours and half-hours using analog and digital clocks.
1.SGMR.5.2 Determine time to the nearest hour and half-hour using analog and digital clocks.	NC.1.MD.3 Tell and write time in hours and half-hours using analog and digital clocks.
1.SGMR.6 Develop an understanding of the value of coins.	Domain: Measurement and Data Cluster Heading: Build understanding of time and money.
1.SGMR.6.1 Identify quarters, dimes, nickels, and pennies.	NC.1.MD.5 Identify quarters, dimes, and nickels and relate their values to pennies.
1.SGMR.6.2 Determine the value of quarters, dimes, nickels, and pennies.	NC.1.MD.5 Identify quarters, dimes, and nickels and relate their values to pennies.
1.SGMR.6.3 Count by 1s, 5s, or 10s to determine the value of a collection of like coins (pennies, nickels, or dimes) up to 100 cents.	New

Notes:

- **Moved to 2nd Grade: NC.1.G.2** Create composite shapes by:
 - Making a two-dimensional composite shape using rectangles, squares, trapezoids, triangles, and half-circles naming the components of the new shape addressed in **2.SGMR.1.2**.
- **Removed: NC.1.G.2** Create composite shapes by:
 - Making a three-dimensional composite shape using cubes, rectangular prisms, cones, and cylinders, naming the components of the new shape.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Reasoning with Data (RD)

Draft 3 Standards	2017 Standard Course of Study
1.RD.1 Use repeated reasoning to sort and classify objects based on similarities and differences.	New
1.RD.1.1 Sort up to 20 pictures and/or objects based on one or two attributes.	New
1.RD.1.2 Describe the attribute(s) used to sort a set of objects.	New
1.RD.2 Apply the data cycle with a focus on object graphs and picture graphs.	Domain: Measurement and Data Cluster Headings: Represent and interpret data.
1.RD.2.1 Generate questions, within a given context, that require the collection of categorical data.	NC.1.MD.4 Organize, represent, and interpret data with up to three categories. - Ask and answer questions about the total number of data points. - Ask and answer questions about how many in each category. - Ask and answer questions about how many more or less are in one category than in another.
1.RD.2.2 Determine the data needed to answer a posed question with up to 20 data points within four categories.	NC.1.MD.4 Organize, represent, and interpret data with up to three categories. - Ask and answer questions about the total number of data points. - Ask and answer questions about how many in each category. - Ask and answer questions about how many more or less are in one category than in another.
1.RD.2.3 Collect categorical data using various methods to answer a question.	NC.1.MD.4 Organize, represent, and interpret data with up to three categories.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	• Ask and answer questions about the total number of data points. • Ask and answer questions about how many in each category. • Ask and answer questions about how many more or less are in one category than in another.
1.RD.2.4 Represent a data set (vertically or horizontally) by organizing and structuring collected data on an object graph and/or picture graph.	NC.1.MD.4 Organize, represent, and interpret data with up to three categories. • Ask and answer questions about the total number of data points. • Ask and answer questions about how many in each category. • Ask and answer questions about how many more or less are in one category than in another.
1.RD.2.5 Analyze categorical data to describe, compare, and draw conclusions.	NC.1.MD.4 Organize, represent, and interpret data with up to three categories. • Ask and answer questions about the total number of data points. • Ask and answer questions about how many in each category. • Ask and answer questions about how many more or less are in one category than in another.
1.RD.2.6 Communicate observations, conclusions, and/or decisions based on the question posed and data collected.	NC.1.MD.4 Organize, represent, and interpret data with up to three categories. • Ask and answer questions about the total number of data points. • Ask and answer questions about how many in each category. • Ask and answer questions about how many more or less are in one category than in another.

Second Grade

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

2nd Grade Mathematics Crosswalk

The purpose of this document is to provide a general comparison of the 2017 2nd Grade Math Standard Course of Study and the 2026 2nd Grade Math Standard Course of Study. It provides initial insight into similarities and differences between these two sets of standards. As this is an initial comparison, the document does not address every difference or nuance between the draft standards and the current standards.

Draft 3 Domains	2017 Domains
Algebraic and Numerical Reasoning (ANR)	Operations and Algebraic Thinking (OA) Number and Operations in Base Ten (NBT)
Spatial, Geometric, and Measurement Reasoning (SGMR)	Measurement and Data (MD) Geometry (G)
Reasoning with Data (RD)	Measurement and Data (MD)

Algebraic and Numerical Reasoning (ANR)

Draft 3 Standards	2017 Standard Course of Study
2.ANR.1 Apply patterns and structure in numbers to reason about quantities.	Domains: - Operations and Algebraic Thinking - Number and Operations in Base Ten Cluster Headings: - Work with equal groups. - Understand place value
2.ANR.1.1 Solve problems, with and without context, by counting forward and backward by 1s, 2s, 5s, 10s, and 100s from any given number within 1,000.	NC.2.NBT.2 Count within 1,000; skip-count by 5s, 10s, and 100s.
2.ANR.1.2 Determine whether a group within 20 has an odd or	NC.2.OA.3 Determine whether a group of objects, within 20, has

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

even number of objects using strategies such as pairing objects and counting by 2s, forming two equal groups, and/or expressing an even number as a sum of two equal addends in an equation.	an odd or even number of members by: ● Pairing objects, then counting them by 2s. ● Determining whether objects can be placed into two equal groups. ● Writing an equation to express an even number as a sum of two equal addends.
2.ANR.1.3 Determine the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns using skip-counting and/or repeated addition.	NC.2.OA.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.
2.ANR.2 Make use of structure to develop place value understanding for three-digit numbers.	Domain: Number and Operations in Base Ten Cluster Headings: Understand place value.
2.ANR.2.1 Unitize a collection of ten tens into a group of a hundred.	NC.2.NBT.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones. ● Unitize by making a hundred from a collection of ten tens. ● Demonstrate that the numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds, with 0 tens and 0 ones. ● Compose and decompose numbers using various groupings of hundreds, tens, and ones.
2.ANR.2.2 Represent the composition and decomposition of three-digit numbers as groups of hundreds, groups of tens, and additional ones.	NC.2.NBT.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones. ● Unitize by making a hundred from a collection of ten tens. ● Demonstrate that the numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds, with 0 tens and 0 ones. ● Compose and decompose numbers using various groupings of hundreds, tens, and ones.
2.ANR.2.3 Apply place value understanding to determine the value of each digit in a three-digit number.	NC.2.NBT.1 Understand that the three digits of a three-digit

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	number represent amounts of hundreds, tens, and ones. • Unitize by making a hundred from a collection of ten tens. • Demonstrate that the numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds, with 0 tens and 0 ones. • Compose and decompose numbers using various groupings of hundreds, tens, and ones.
2.ANR.2.4 Apply place value reasoning to compose and decompose numbers within 200 to show equivalent forms using representations.	NC.2.NBT.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones. • Unitize by making a hundred from a collection of ten tens. • Demonstrate that the numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds, with 0 tens and 0 ones. • Compose and decompose numbers using various groupings of hundreds, tens, and ones.
2.ANR.2.5 Apply place value understanding to read and write numbers within 1,000 in standard, expanded, and word form.	NC.2.NBT.3 Read and write numbers, within 1,000, using base-ten numerals, number names, and expanded form.
2.ANR.3 Make use of place value structure to reason about magnitude of whole numbers within 1,000.	Domain: Number and Operations in Base Ten Cluster Headings: Understand place value.
2.ANR.3.1 Apply place value understanding to compare and order numbers within 1,000, by: • Reasoning about the values of hundreds, tens, and ones digits • Reasoning about the location of the numbers on a number line • Representing comparisons using symbols ($>$, $<$, $=$)	NC.2.NBT.4 Compare two three-digit numbers based on the value of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.
2.ANR.3.2 Estimate the location of numbers within 1,000 on a number line by reasoning about their relationship to benchmark numbers.	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

2.ANR.4 Use repeated reasoning to develop fluency with addition and subtraction using mental strategies.	Domains: • Operations and Algebraic Thinking • Number and Operations in Base Ten Cluster Headings: • Add and subtract within 20. • Use place value understanding and properties of operations.
2.ANR.4.1 Demonstrate fluency with addition and subtraction within 20.	NC.2.OA.2 Demonstrate fluency with addition and subtraction, within 20, using mental strategies.
2.ANR.4.2 Apply place value understanding within 1,000, to add 10 or 100 and subtract 10 or 100.	NC.2.NBT.8 Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
2.ANR.5 Make use of place value structure and properties of operations to fluently add and subtract within 100.	Domains: • Operations and Algebraic Thinking • Numbers and Operations in Base Ten Cluster Headings: • Represent and solve problems. • Use place value understanding and properties of operations.
2.ANR.5.1 Apply appropriate strategies to fluently add and subtract within 100, including: • Composing and decomposing numbers based on place value • Commutative and associative properties • Relationship between addition and subtraction • Creating equivalent sums or differences	NC.2.NBT.5 Demonstrate fluency with addition and subtraction, within 100, by: • Flexibly using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. • Comparing addition and subtraction strategies, and explaining why they work. • Selecting an appropriate strategy in order to efficiently compute sums and differences.
2.ANR.5.2 Represent one-step addition and subtraction word problems within 100, using equations with a symbol for the unknown number, including the following problem types:	NC.2.OA.1 Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

• Add To/Take From (Start Unknown) • Compare (Bigger Unknown) • Compare (Smaller Unknown)	representations and equations with a symbol for the unknown number to represent the problem, when solving: • One-Step problems: ◦ Add to/Take from-Start Unknown ◦ Compare-Bigger Unknown ◦ Compare-Smaller Unknown • Two-Step problems involving single digits: ◦ Add to/Take from- Change Unknown ◦ Add to/Take From- Result Unknown
2.ANR.5.3 Represent two-step addition and subtraction word problems within 100, using equations with a symbol for the unknown number, including the following problem types: • Add To/Take From (Change Unknown) • Add To/Take From (Result Unknown)	NC.2.OA.1 Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using representations and equations with a symbol for the unknown number to represent the problem, when solving: • One-Step problems: ◦ Add to/Take from-Start Unknown ◦ Compare-Bigger Unknown ◦ Compare-Smaller Unknown • Two-Step problems involving single digits: ◦ Add to/Take from- Change Unknown ◦ Add to/Take From- Result Unknown
2.ANR.5.4 Solve one- and two-step addition and subtraction word problems within 100, using place value understanding, commutative and associative properties of addition, and/or the relationship between addition and subtraction.	NC.2.OA.1 Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using representations and equations with a symbol for the unknown number to represent the problem, when solving: • One-Step problems: ◦ Add to/Take from-Start Unknown ◦ Compare-Bigger Unknown ◦ Compare-Smaller Unknown • Two-Step problems involving single digits: ◦ Add to/Take from- Change Unknown ◦ Add to/Take From- Result Unknown

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

2.ANR.5.5 Analyze number relationships to justify efficient strategy selection for addition and subtraction.	NC.2.NBT.5 Demonstrate fluency with addition and subtraction, within 100, by: • Flexibly using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. • Comparing addition and subtraction strategies, and explaining why they work. • Selecting an appropriate strategy in order to efficiently compute sums and differences.
2.ANR.6 Apply understanding of the equal sign to explain the relationship between quantities and expressions as equal or not equal within 100.	New
2.ANR.6.1 Justify whether two addition and/or subtraction expressions within 100 are equal or not equal using representations.	New
2.ANR.6.2 Determine the unknown whole number in addition or subtraction equations within 100 with the unknown in all positions.	New
2.ANR.7 Make use of place value structure and properties of operations to add and subtract within 1,000 with and without context.	Domain: Number and Operations in Base Ten Cluster Heading: Use place value understanding and properties of operations.
2.ANR.7.1 Apply place value strategies and/or properties of operations using representations to add three two-digit numbers by: • Composing and decomposing numbers • Using the commutative and associative properties of addition • Creating equivalent sums	NC.2.NBT.6 Add up to three two-digit numbers using strategies based on place value and properties of operations.
2.ANR.7.2 Apply place value strategies and/or properties of operations using representations to add and subtract within 1,000 by: • Composing and decomposing numbers	NC.2.NBT.7 Add and subtract, within 1,000, relating the strategy to a written method, using: • Concrete models or drawings

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

- Using the commutative and associative properties of addition - Using the relationship between addition and subtraction - Creating equivalent sums and differences	- Strategies based on place value - Properties of operations - Relationship between addition and subtraction
2.ANR.7.3 Explain why addition and subtraction strategies work based on place value and/or number relationships within 1,000.	NC.2.NBT.7 Add and subtract, within 1,000, relating the strategy to a written method, using: - Concrete models or drawings - Strategies based on place value - Properties of operations - Relationship between addition and subtraction

Spatial, Geometric, and Measurement Reasoning (SGMR)

Draft 3 Standards	2017 Standard Course of Study
2.SGMR.1 Reason with two-dimensional shapes and their attributes.	Domain: Geometry Cluster Heading: Reason with shapes and their attributes.
2.SGMR.1.1 Compare triangles, quadrilaterals, pentagons, hexagons, octagons, and circles based on the number of sides, vertices, and angles.	NC.2.G.1 Recognize and draw triangles, quadrilaterals, pentagons, and hexagons, having specified attributes; recognize and describe attributes of rectangular prisms and cubes.
2.SGMR.1.2 Describe the attributes of the new shape when composing three or more two-dimensional shapes.	New Content Incorporated from NC.3.G.1
2.SGMR.1.3 Identify the individual shapes created when decomposing a two-dimensional figure.	New Content Incorporated from NC.3.G.1
2.SGMR.1.4 Justify whether a shape or composite figure has a line of symmetry.	New Content Incorporated from NC.4.G.3

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

2.SGMR.2 Make sense of the relationship between a whole and its equal shares (halves, thirds, fourths) in real-world situations.	Domain: Geometry Cluster Heading: Reason with shapes and their attributes.
2.SGMR.2.1 Partition circles and rectangles into two, three, and four equal shares.	NC.2.G.3 Partition circles and rectangles into two, three, or four equal shares. • Describe the shares using the words halves, thirds, half of, a third of, fourths, fourth of, quarter of. • Describe the whole as two halves, three thirds, four fourths. • Explain that equal shares of identical wholes need not have the same shape.
2.SGMR.2.2 Describe equal shares of circles and rectangles as halves, thirds, and fourths, using the language “half of,” “third of,” “fourth of,” and “quarter of.”	NC.2.G.3 Partition circles and rectangles into two, three, or four equal shares. • Describe the shares using the words halves, thirds, half of, a third of, fourths, fourth of, quarter of. • Describe the whole as two halves, three thirds, four fourths. • Explain that equal shares of identical wholes need not have the same shape.
2.SGMR.2.3 Describe a whole as two halves, three thirds, or four fourths.	NC.2.G.3 Partition circles and rectangles into two, three, or four equal shares. • Describe the shares using the words halves, thirds, half of, a third of, fourths, fourth of, quarter of. • Describe the whole as two halves, three thirds, four fourths. • Explain that equal shares of identical wholes need not have the same shape.
2.SGMR.2.4 Explain why equal shares of the same whole may look different but represent equal amounts.	NC.2.G.3 Partition circles and rectangles into two, three, or four equal shares. • Describe the shares using the words halves, thirds, half of, a third of, fourths, fourth of, quarter of.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	- Describe the whole as two halves, three thirds, four fourths. - Explain that equal shares of identical wholes need not have the same shape.
2.SGMR.2.5 Explain why partitioning the same whole into more equal shares results in smaller shares.	NC.2.G.3 Partition circles and rectangles into two, three, or four equal shares. - Describe the shares using the words halves, thirds, half of, a third of, fourths, fourth of, quarter of. - Describe the whole as two halves, three thirds, four fourths. - Explain that equal shares of identical wholes need not have the same shape.
2.SGMR.3 Apply understanding of customary and metric units to reason about length.	Domain: Measurement and Data Cluster Heading: Measure and estimate lengths.
2.SGMR.3.1 Measure object length to the nearest customary unit (inch, foot, yard) and metric unit (centimeter, meter) using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.	NC.2.MD.1 Measure the length of an object in standard units by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
2.SGMR.3.2 Measure the same object with two different units within the same system (customary or metric) to explain how the size of the unit chosen relates to the length measurement of the object.	NC.2.MD.2 Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
2.SGMR.3.3 Choose an appropriate customary unit (inch, foot, yard) or metric unit (centimeter, meter) to measure the length of an object.	NC.2.MD.1 Measure the length of an object in standard units by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
2.SGMR.3.4 Estimate length with customary units (inches, feet, yards) or metric units (centimeters, meters) using measurement benchmarks.	NC.2.MD.3 Estimate lengths in using standard units of inches, feet, yards, centimeters, and meters.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

2.SGMR.3.5 Measure to compare the lengths of two objects.	NC.2.MD.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
2.SGMR.4 Develop an understanding of time to the nearest minute.	Domain: Measurement and Data Cluster Heading: Build understanding of time and money.
2.SGMR.4.1 Tell time to the nearest 5 minutes and 1 minute on analog and digital clocks, using a.m. and p.m. appropriately.	NC.2.MD.7 Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. Content Incorporated from NC.3.MD.1
2.SGMR.4.2 Write times shown on analog and digital clocks to the nearest 5 minutes and 1 minute, using a.m. and p.m. appropriately.	NC.2.MD.7 Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. Content Incorporated from NC.3.MD.1
2.SGMR.5 Apply understanding of the value of money using coins.	Domain: Measurement and Data Cluster Heading: Build understanding of time and money.
2.SGMR.5.1 Compose a set of coins to match a given amount within 100 cents (\$1.00).	NC.2.MD.8 Solve word problems involving: • Quarters, dimes, nickels, and pennies within 99¢, using ¢ symbols appropriately. • Whole dollar amounts, using the \$ symbol appropriately.
2.SGMR.5.2 Determine the value of a given combination of quarters, dimes, nickels, and pennies within 100 cents (\$1.00).	NC.2.MD.8 Solve word problems involving: • Quarters, dimes, nickels, and pennies within 99¢, using ¢ symbols appropriately. • Whole dollar amounts, using the \$ symbol appropriately.

Notes:

- **Addressed in 1st Grade: NC.2.G.1** Recognize and draw triangles, quadrilaterals, pentagons, and hexagons, having specified attributes; recognize and describe attributes of rectangular prisms and cubes.
 - Recognize and describe attributes of rectangular prisms and cubes are addressed in **1.SGMR.1**.
- **Incorporated into 2nd Grade ANR Standard: NC.2.MD.5** Use addition and subtraction, within 100, to solve word problems involving lengths that are given in the same units, using equations with a symbol for the unknown number to represent the

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

problem.

- Solving word problems involving lengths will be incorporated into **2.ANR.5.2** and **2.ANR.5.4**.
- **Incorporated into 1st and 2nd Grade: NC.2.MD.6** Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points and represent whole-number sums and differences, within 100, on a number line diagram.
 - Representing whole numbers on a number line within 20 will be incorporated into **1.ANR.4.1**.
 - Representing whole-number sums and differences, within 100, on a number line will be incorporated into **2.ANR.5.2** and **2.ANR.5.4**.

Reasoning with Data (RD)

Draft 3 Standards	2017 Standard Course of Study
2.RD.1 Use repeated reasoning to sort and classify objects based on one or two attributes.	New
2.RD.1.1 Sort up to 30 pictures and/or objects based on one or two attributes.	New
2.RD.1.2 Describe the attribute(s) used to sort a set of objects.	New
2.RD.2 Apply the data cycle with a focus on single-scaled picture and bar graphs.	Domain: Measurement and Data Cluster Headings: Represent and interpret data.
2.RD.2.1 Generate questions, within a given context, that require the collection of categorical data.	NC.2.MD.10 Organize, represent, and interpret data with up to four categories. ● Draw a picture graph and a bar graph with a single-unit scale to represent a data set. ● Solve simple put-together, take-apart, and compare problems using information presented in a picture and a bar graph.
2.RD.2.2 Determine the data needed to answer a posed question with up to 30 data points within four categories.	NC.2.MD.10 Organize, represent, and interpret data with up to four categories. ● Draw a picture graph and a bar graph with a single-unit scale to represent a data set.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	Solve simple put-together, take-apart, and compare problems using information presented in a picture and a bar graph.
2.RD.2.3 Collect categorical data using various methods to answer a question.	NC.2.MD.10 Organize, represent, and interpret data with up to four categories. - Draw a picture graph and a bar graph with a single-unit scale to represent a data set. - Solve simple put-together, take-apart, and compare problems using information presented in a picture and a bar graph.
2.RD.2.4 Represent a data set (vertically or horizontally) by organizing and structuring collected data on a picture graph and/or bar graph.	NC.2.MD.10 Organize, represent, and interpret data with up to four categories. - Draw a picture graph and a bar graph with a single-unit scale to represent a data set. - Solve simple put-together, take-apart, and compare problems using information presented in a picture and a bar graph.
2.RD.2.5 Analyze categorical data to describe, compare, and draw conclusions.	NC.2.MD.10 Organize, represent, and interpret data with up to four categories. - Draw a picture graph and a bar graph with a single-unit scale to represent a data set. - Solve simple put-together, take-apart, and compare problems using information presented in a picture and a bar graph.
2.RD.2.6 Communicate observations, conclusions, and/or decisions based on the question posed and data collected.	NC.2.MD.10 Organize, represent, and interpret data with up to four categories. - Draw a picture graph and a bar graph with a single-unit scale to represent a data set. - Solve simple put-together, take-apart, and compare problems using information presented in a picture and a

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	bar graph.
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Third Grade

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

3rd Grade Mathematics Crosswalk

The purpose of this document is to provide a general comparison of the 2017 3rd Grade Math Standard Course of Study and the 2026 3rd Grade Math Standard Course of Study. It provides initial insight into similarities and differences between these two sets of standards. As this is an initial comparison, the document does not address every difference or nuance between the draft standards and the current standards.

Draft 3 Domains	2017 Domains
Algebraic and Numerical Reasoning (ANR)	Operations and Algebraic Thinking (OA) Number and Operations in Base Ten (NBT) Number and Operations - Fractions (NF)
Spatial, Geometric, and Measurement Reasoning (SGMR)	Measurement and Data (MD) Geometry (G)
Reasoning with Data (RD)	Measurement and Data (MD)

Algebraic and Numerical Reasoning (ANR)

Draft 3 Standards	2017 Standard Course of Study
3.ANR.1 Make use of structure to extend and apply place value.	New
3.ANR.1.1 Apply place value understanding to read, write, and determine the place and value of each digit in a whole number within 10,000.	New
3.ANR.1.2 Make connections between different forms, including standard, expanded, and word forms of whole numbers within 10,000.	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

3.ANR.1.3 Apply place value reasoning to compose and decompose numbers within 1,000 to show equivalent forms using representations.	New
3.ANR.1.4 Apply place value reasoning to fluently add or subtract multiples of 10, 100, or 1,000 to a given number within 10,000 using mental strategies.	New
3.ANR.1.5 Apply place value understanding to compare and order whole numbers within 10,000 with representations using symbols ($>$, $<$, $=$, $\neq$) and/or words to record the results of comparisons.	New
3.ANR.2 Make sense of whole number addition and subtraction within 1,000.	Domain: Number and Operations in Base Ten Cluster Headings: Use place value to add and subtract.
3.ANR.2.1 Apply addition and subtraction strategies to represent and solve one-step problems in context with whole numbers within 1,000.	NC.3.NBT.2 Add and subtract whole numbers up to and including 1,000. • Use estimation strategies to assess reasonableness of answers. • Model and explain how the relationship between addition and subtraction can be applied to solve addition and subtraction problems. • Use expanded form to decompose numbers and then find sums and differences.
3.ANR.2.2 Apply reasoning strategies to add and subtract within 1,000, including expanded form, properties of operations, and/or the relationship between addition and subtraction.	NC.3.NBT.2 Add and subtract whole numbers up to and including 1,000. • Use estimation strategies to assess reasonableness of answers. • Model and explain how the relationship between addition and subtraction can be applied to solve addition and subtraction problems. • Use expanded form to decompose numbers and then find sums and differences.
3.ANR.2.3 Analyze addition and subtraction strategies to develop	NC.3.NBT.2 Add and subtract whole numbers up to and

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

procedural fluency.	including 1,000. • Use estimation strategies to assess reasonableness of answers. • Model and explain how the relationship between addition and subtraction can be applied to solve addition and subtraction problems. • Use expanded form to decompose numbers and then find sums and differences.
3.ANR.3 Make sense of multiplication with whole numbers.	Domains: • Operations and Algebraic Thinking • Number and Operations in Base Ten Cluster Headings: • Represent and solve problems involving multiplication and division. • Explore patterns of numbers. • Generalize place value understanding for multi-digit numbers.
3.ANR.3.1 Interpret factors as representing the number of equal groups and the number of objects in each group for products of whole numbers with two factors within 10.	NC.3.OA.1 For products of whole numbers with two factors up to and including 10: • Interpret the factors as representing the number of equal groups and the number of objects in each group. • Illustrate and explain strategies including arrays, repeated addition, decomposing a factor, and applying the commutative and associative properties.
3.ANR.3.2 Represent strategies, including repeated addition, skip-counting, decomposing a factor, and commutative property, for products of whole numbers with two factors within 10.	NC.3.OA.1 For products of whole numbers with two factors up to and including 10: • Interpret the factors as representing the number of equal groups and the number of objects in each group. • Illustrate and explain strategies including arrays,

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	repeated addition, decomposing a factor, and applying the commutative and associative properties.
3.ANR.3.3 Apply multiplication strategies using representations to solve one-step multiplication word problems with factors within 10, including the following problem types: • Equal Groups • Arrays & Area	NC.3.OA.3 Represent, interpret, and solve one-step problems involving multiplication and division. • Solve multiplication word problems with factors up to and including 10. Represent the problem using arrays, pictures, and/or equations with a symbol for the unknown number to represent the problem. • Solve division word problems with a divisor and quotient up to and including 10. Represent the problem using arrays, pictures, repeated subtraction and/or equations with a symbol for the unknown number to represent the problem.
3.ANR.3.4 Connect multiplication problems in context with equations using a symbol for the unknown number.	NC.3.OA.3 Represent, interpret, and solve one-step problems involving multiplication and division. • Solve multiplication word problems with factors up to and including 10. Represent the problem using arrays, pictures, and/or equations with a symbol for the unknown number to represent the problem. • Solve division word problems with a divisor and quotient up to and including 10. Represent the problem using arrays, pictures, repeated subtraction and/or equations with a symbol for the unknown number to represent the problem.
3.ANR.3.5 Describe patterns of multiplication using visual tools such as hundred boards, multiplication tables, two-column tables, and number lines.	NC.3.OA.9 Interpret patterns of multiplication on a hundreds board and/or multiplication table.
3.ANR.3.6 Find the product of a one-digit whole number by a multiple of 10 in the range 10–90 by using representations, based on place value and the properties of operations.	NC.3.NBT.3 Use concrete and pictorial models, based on place value and the properties of operations, to find the product of a one-digit whole number by a multiple of 10 in the range 10–90.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

3.ANR.4 Make sense of division with whole numbers.	Domain: Operations and Algebraic Thinking Cluster Headings: Represent and solve problems involving multiplication and division.
3.ANR.4.1 Interpret the divisor and quotient within 10 in a division equation as representing the number of equal groups and the number of objects in each group.	NC.3.OA.2 For whole-number quotients of whole numbers with a one-digit divisor and a one-digit quotient: • Interpret the divisor and quotient in a division equation as representing the number of equal groups and the number of objects in each group. • Illustrate and explain strategies including arrays, repeated addition or subtraction, and decomposing a factor.
3.ANR.4.2 Represent strategies, including repeated addition or subtraction, skip-counting, and decomposing a factor, for division with a divisor and quotient within 10.	NC.3.OA.2 For whole-number quotients of whole numbers with a one-digit divisor and a one-digit quotient: • Interpret the divisor and quotient in a division equation as representing the number of equal groups and the number of objects in each group. • Illustrate and explain strategies including arrays, repeated addition or subtraction, and decomposing a factor.
3.ANR.4.3 Apply division strategies using representations to solve one-step division word problems involving a divisor and quotient within 10, including the following problem types: • Equal Groups • Arrays & Area	NC.3.OA.3 Represent, interpret, and solve one-step problems involving multiplication and division. • Solve multiplication word problems with factors up to and including 10. Represent the problem using arrays, pictures, and/or equations with a symbol for the unknown number to represent the problem. • Solve division word problems with a divisor and quotient up to and including 10. Represent the problem using arrays, pictures, repeated subtraction and/or equations with a symbol for the unknown number to represent the problem.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

3.ANR.4.4 Connect division problems in context with equations using a symbol for the unknown number.	NC.3.OA.3 Represent, interpret, and solve one-step problems involving multiplication and division. • Solve multiplication word problems with factors up to and including 10. Represent the problem using arrays, pictures, and/or equations with a symbol for the unknown number to represent the problem. • Solve division word problems with a divisor and quotient up to and including 10. Represent the problem using arrays, pictures, repeated subtraction and/or equations with a symbol for the unknown number to represent the problem.
3.ANR.5 Reason quantitatively to make connections between multiplication and division with whole numbers.	Domain: Operations and Algebraic Thinking Cluster Headings: • Understand properties of multiplication and the relationship between multiplication and division. • Multiply and divide within 100.
3.ANR.5.1 Construct an argument to explain the connection of a multiplication or division problem in context to the meaning of the operations.	NC.3.OA.3 Represent, interpret, and solve one-step problems involving multiplication and division. • Solve multiplication word problems with factors up to and including 10. Represent the problem using arrays, pictures, and/or equations with a symbol for the unknown number to represent the problem. • Solve division word problems with a divisor and quotient up to and including 10. Represent the problem using arrays, pictures, repeated subtraction and/or equations with a symbol for the unknown number to represent the problem.
3.ANR.5.2 Apply the inverse relationship between multiplication and division.	NC.3.OA.6 Solve an unknown-factor problem, by using division strategies and/or changing it to a multiplication problem.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	NC.3.OA.7 Demonstrate fluency with multiplication and division with factors, quotients and divisors up to and including 10. • Know from memory all products with factors up to and including 10. • Illustrate and explain using the relationship between multiplication and division. • Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
3.ANR.5.3 Justify whether two multiplication and/or division expressions within 100 are equal or not equal using representations.	New
3.ANR.5.4 Develop fluency with multiplication facts through 10×10 and the corresponding division facts by applying reasoning strategies (e.g., doubling, add-a-group, subtract-a-group, near squares, and inverse relationships).	NC.3.OA.7 Demonstrate fluency with multiplication and division with factors, quotients and divisors up to and including 10. • Know from memory all products with factors up to and including 10. • Illustrate and explain using the relationship between multiplication and division. • Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
3.ANR.5.5 Recall foundational multiplication facts (0s, 1s, 2s, 5s, and 10s) with automaticity.	NC.3.OA.7 Demonstrate fluency with multiplication and division with factors, quotients and divisors up to and including 10. • Know from memory all products with factors up to and including 10. • Illustrate and explain using the relationship between multiplication and division. • Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
3.ANR.6 Make sense and persevere in solving problems involving whole-number operations.	Domain: Operations and Algebraic Thinking Cluster Heading: Solve two-step problems.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

3.ANR.6.1 Apply addition, subtraction, and multiplication strategies to represent and solve two-step problems in context.	NC.3.OA.8 Solve two-step word problems using addition, subtraction, and multiplication, representing problems using equations with a symbol for the unknown number.
3.ANR.6.2 Estimate sums, differences, products, and quotients in one- and two-step problems in context.	New
3.ANR.7 Make sense of fractions.	Domain: Numbers and Operations - Fractions Cluster Heading: Understand fractions as numbers.
3.ANR.7.1 Explain that a unit fraction is one part formed when a whole is partitioned into equal parts using denominators 2, 3, 4, 6, and 8.	NC.3.NF.1 Interpret unit fractions with denominators of 2, 3, 4, 6, and 8 as quantities formed when a whole is partitioned into equal parts; • Explain that a unit fraction is one of those parts. • Represent and identify unit fractions using area and length models.
3.ANR.7.2 Identify unit fractions using area and length models with denominators 2, 3, 4, 6, and 8.	NC.3.NF.1 Interpret unit fractions with denominators of 2, 3, 4, 6, and 8 as quantities formed when a whole is partitioned into equal parts; • Explain that a unit fraction is one of those parts. • Represent and identify unit fractions using area and length models.
3.ANR.7.3 Explain with an area model that the numerator of a fraction represents the number of equal parts of the unit fraction using fractions with denominators 2, 3, 4, 6, and 8.	NC.3.NF.2 Interpret fractions with denominators of 2, 3, 4, 6, and 8 using area and length models. • Using an area model, explain that the numerator of a fraction represents the number of equal parts of the unit fraction. • Using a number line, explain that the numerator of a fraction represents the number of lengths of the unit fraction from 0.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

3.ANR.7.4 Explain with a number line that the numerator of a fraction represents the number of lengths of the unit fraction from 0 using fractions with denominators 2, 3, 4, 6, and 8.	NC.3.NF.2 Interpret fractions with denominators of 2, 3, 4, 6, and 8 using area and length models. • Using an area model, explain that the numerator of a fraction represents the number of equal parts of the unit fraction. • Using a number line, explain that the numerator of a fraction represents the number of lengths of the unit fraction from 0.
3.ANR.7.5 Determine equivalent fractions by composing and decomposing with area and length models using related fractions: halves, fourths, and eighths; thirds and sixths.	NC.3.NF.3 Represent equivalent fractions with area and length models by: • Composing and decomposing fractions into equivalent fractions using related fractions: halves, fourths and eighths; thirds and sixths. • Explaining that a fraction with the same numerator and denominator equals one whole. • Expressing whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.
3.ANR.7.6 Explain that a fraction with the same numerator and denominator equals one whole using fractions with denominators 2, 3, 4, 6, and 8.	NC.3.NF.3 Represent equivalent fractions with area and length models by: • Composing and decomposing fractions into equivalent fractions using related fractions: halves, fourths and eighths; thirds and sixths. • Explaining that a fraction with the same numerator and denominator equals one whole. • Expressing whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.
3.ANR.7.7 Demonstrate equivalency of whole numbers up to 4 using fractions greater than 1 with denominators 2, 3, 4, 6, and 8.	NC.3.NF.3 Represent equivalent fractions with area and length models by: • Composing and decomposing fractions into equivalent

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	fractions using related fractions: halves, fourths and eighths; thirds and sixths. • Explaining that a fraction with the same numerator and denominator equals one whole. • Expressing whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.
3.ANR.7.8 Recognize that comparisons are valid only when the two fractions refer to the same whole using related fractions: halves, fourths, and eighths; thirds and sixths.	NC.3.NF.4 Compare two fractions with the same numerator or the same denominator by reasoning about their size, using area and length models, and using the $>$, $<$, and $=$ symbols. Recognize that comparisons are valid only when the two fractions refer to the same whole with denominators: halves, fourths and eighths; thirds and sixths.
3.ANR.7.9 Reason about the size of fractions to compare and order fractions with the same numerator or the same denominator using area and length models, and using symbols ($>$, $<$, $=$) with denominators 2, 3, 4, 6, and 8.	NC.3.NF.4 Compare two fractions with the same numerator or the same denominator by reasoning about their size, using area and length models, and using the $>$, $<$, and $=$ symbols. Recognize that comparisons are valid only when the two fractions refer to the same whole with denominators: halves, fourths and eighths; thirds and sixths.

Notes:

- **Content partially incorporated into 4th Grade: NC.3.OA.7** Demonstrate fluency with multiplication and division with factors, quotients and divisors up to and including 10. Know from memory all products with factors up to and including 10.
 - **4.ANR.3.6** Recall multiplication facts through 10×10 with automaticity.

Spatial, Geometric, and Measurement Reasoning (SGMR)

Draft 3 Standards	2017 Standard Course of Study
3.SGMR.1 Reason with quadrilaterals and their attributes.	Domain: Geometry Cluster Heading: Reason with shapes and their attributes.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

3.SGMR.1.1 Construct points, lines, line segments, and perpendicular and parallel lines.	New Content Incorporated from NC.4.G.1
3.SGMR.1.2 Identify points, lines, line segments, and perpendicular and parallel lines within two-dimensional figures and in context.	New Content Incorporated from NC.4.G.1
3.SGMR.1.3 Describe angles as geometric shapes that are formed when two rays share a common endpoint.	New Content Incorporated from NC.4.MD.6
3.SGMR.1.4 Identify angles as acute, obtuse, right, or straight based on the relationship to perpendicular or straight lines.	New Content Incorporated from NC.4.MD.6
3.SGMR.1.5 Construct examples and non-examples of quadrilaterals.	NC.3.G.1 Reason with two-dimensional shapes and their attributes. - Investigate, describe, and reason about composing triangles and quadrilaterals and decomposing quadrilaterals. - Recognize and draw examples and non-examples of types of quadrilaterals including rhombuses, rectangles, squares, parallelograms, and trapezoids.
3.SGMR.1.6 Identify types of quadrilaterals, including parallelograms, rhombuses, rectangles, squares, and trapezoids based on their attributes.	NC.3.G.1 Reason with two-dimensional shapes and their attributes. - Investigate, describe, and reason about composing triangles and quadrilaterals and decomposing quadrilaterals. - Recognize and draw examples and non-examples of types of quadrilaterals including rhombuses, rectangles, squares, parallelograms, and trapezoids.
3.SGMR.2 Make sense of time and customary measurement.	Domain: Measurement and Data

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	Cluster Heading: Solve problems involving measurement.
3.SGMR.2.1 Solve problems in context involving addition and subtraction of time intervals within the same hour to find an end time, amount of time passed, or a start time.	NC.3.MD.1 Tell and write time to the nearest minute. Solve word problems involving addition and subtraction of time intervals within the same hour.
3.SGMR.2.2 Estimate customary measurements of length, capacity, and weight using measurement benchmarks.	NC.3.MD.2 Solve problems involving customary measurement. • Estimate and measure lengths in customary units to the quarter-inch and half-inch, and feet and yards to the whole unit. • Estimate and measure capacity and weight in customary units to a whole number: cups, pints, quarts, gallons, ounces, and pounds. • Add, subtract, multiply, or divide to solve one-step word problems involving whole number measurements of length, weight, and capacity in the same customary units.
3.SGMR.2.3 Measure lengths in customary units to the quarter-inch and half-inch, and feet and yards to the whole unit.	NC.3.MD.2 Solve problems involving customary measurement. • Estimate and measure lengths in customary units to the quarter-inch and half-inch, and feet and yards to the whole unit. • Estimate and measure capacity and weight in customary units to a whole number: cups, pints, quarts, gallons, ounces, and pounds. • Add, subtract, multiply, or divide to solve one-step word problems involving whole number measurements of length, weight, and capacity in the same customary units.
3.SGMR.2.4 Measure capacity in customary units with cups, pints, quarts, and gallons.	NC.3.MD.2 Solve problems involving customary measurement. • Estimate and measure lengths in customary units to the quarter-inch and half-inch, and feet and yards to the whole unit.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	• Estimate and measure capacity and weight in customary units to a whole number: cups, pints, quarts, gallons, ounces, and pounds. • Add, subtract, multiply, or divide to solve one-step word problems involving whole number measurements of length, weight, and capacity in the same customary units.
3.SGMR.2.5 Measure weight in customary units with ounces and pounds.	NC.3.MD.2 Solve problems involving customary measurement. • Estimate and measure lengths in customary units to the quarter-inch and half-inch, and feet and yards to the whole unit. • Estimate and measure capacity and weight in customary units to a whole number: cups, pints, quarts, gallons, ounces, and pounds. • Add, subtract, multiply, or divide to solve one-step word problems involving whole number measurements of length, weight, and capacity in the same customary units.
3.SGMR.2.6 Solve one-step problems in context involving whole-number measurements of length, weight, and capacity within the same customary units using the four operations.	NC.3.MD.2 Solve problems involving customary measurement. • Estimate and measure lengths in customary units to the quarter-inch and half-inch, and feet and yards to the whole unit. • Estimate and measure capacity and weight in customary units to a whole number: cups, pints, quarts, gallons, ounces, and pounds. • Add, subtract, multiply, or divide to solve one-step word problems involving whole number measurements of length, weight, and capacity in the same customary units.
3.SGMR.3 Make sense of area and perimeter.	Domain: Measurement and Data Cluster Headings:

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	• Understand the concept of area. • Understand the concept of perimeter.
3.SGMR.3.1 Measure the area of a rectangle with whole-number side lengths by tiling without gaps or overlaps and counting unit squares.	NC.3.MD.5 Find the area of a rectangle with whole-number side lengths by tiling without gaps or overlaps and counting unit squares.
3.SGMR.3.2 Find the area of rectangles with whole-number side lengths, including problems in context.	NC.3.MD.7 Relate area to the operations of multiplication and addition. • Find the area of a rectangle with whole-number side lengths by tiling it and show that the area is the same as would be found by multiplying the side lengths. • Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving problems and represent whole-number products as rectangular areas in mathematical reasoning. • Use tiles and/or arrays to illustrate and explain that the area of a rectangle can be found by partitioning it into two smaller rectangles, and that the area of the large rectangle is the sum of the two smaller rectangles.
3.SGMR.3.3 Find the area of a rectangle by partitioning it into two smaller rectangles where the area of the large rectangle is the sum of the two smaller rectangles by using tiles and/or arrays.	NC.3.MD.7 Relate area to the operations of multiplication and addition. • Find the area of a rectangle with whole-number side lengths by tiling it and show that the area is the same as would be found by multiplying the side lengths. • Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving problems and represent whole-number products as rectangular areas in mathematical reasoning. • Use tiles and/or arrays to illustrate and explain that the area of a rectangle can be found by partitioning it into two smaller rectangles, and that the area of the large rectangle is the sum of the two smaller rectangles.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

3.SGMR.3.4 Find the perimeter of polygons with no more than 8 sides, including problems in context, by measuring the distance around a shape in length units.	NC.3.MD.8 Solve problems involving perimeters of polygons, including finding the perimeter given the side lengths, and finding an unknown side length.
3.SGMR.3.5 Apply understandings of the attributes of quadrilaterals and regular polygons to find the length of an unknown side when given the perimeter.	NC.3.MD.8 Solve problems involving perimeters of polygons, including finding the perimeter given the side lengths, and finding an unknown side length.

Notes:

- **Moved to 2nd Grade: NC.3.MD.1** Tell and write time to the nearest minute. Solve word problems involving addition and subtraction of time intervals within the same hour.
 - Tell and write time to the nearest minute was moved to **2.SGMR.4**.
- **Moved to 2nd Grade: NC.3.G.1** Reason with two-dimensional shapes and their attributes.
 - Investigate, describe, and reason about composing triangles and quadrilaterals and decomposing quadrilaterals was moved to **2.SGMR.1.2** and **2.SGMR.1.3**.

Reasoning with Data (RD)

Draft 3 Standards	2017 Standard Course of Study
3.RD.1 Apply the data cycle with a focus on frequency tables, scaled bar graphs, and picture graphs.	Domain: Measurement and Data Cluster Headings: Represent and interpret data.
3.RD.1.1 Generate questions that require the collection of categorical data.	NC.3.MD.3 Represent and interpret scaled picture and bar graphs: • Collect data by asking a question that yields data in up to four categories. • Make a representation of data and interpret data in a frequency table, scaled picture graph, and/or scaled bar graph with axes provided. • Solve one and two-step “how many more” and “how many less” problems using information from these graphs.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

3.RD.1.2 Determine the data needed to answer a posed question with up to 5 categories.	NC.3.MD.3 Represent and interpret scaled picture and bar graphs: • Collect data by asking a question that yields data in up to four categories. • Make a representation of data and interpret data in a frequency table, scaled picture graph, and/or scaled bar graph with axes provided. • Solve one and two-step “how many more” and “how many less” problems using information from these graphs.
3.RD.1.3 Design a plan to collect categorical data to answer a question.	NC.3.MD.3 Represent and interpret scaled picture and bar graphs: • Collect data by asking a question that yields data in up to four categories. • Make a representation of data and interpret data in a frequency table, scaled picture graph, and/or scaled bar graph with axes provided. • Solve one and two-step “how many more” and “how many less” problems using information from these graphs.
3.RD.1.4 Collect categorical data using various methods to answer a question.	NC.3.MD.3 Represent and interpret scaled picture and bar graphs: • Collect data by asking a question that yields data in up to four categories. • Make a representation of data and interpret data in a frequency table, scaled picture graph, and/or scaled bar graph with axes provided. • Solve one and two-step “how many more” and “how many less” problems using information from these graphs.
3.RD.1.5 Represent a data set (vertically or horizontally) by	NC.3.MD.3 Represent and interpret scaled picture and bar

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

organizing and structuring collected data on a frequency table, scaled bar graph, and/or picture graph.	graphs: • Collect data by asking a question that yields data in up to four categories. • Make a representation of data and interpret data in a frequency table, scaled picture graph, and/or scaled bar graph with axes provided. • Solve one and two-step “how many more” and “how many less” problems using information from these graphs.
3.RD.1.6 Analyze categorical data to describe, compare, draw conclusions, and construct arguments supported by evidence from the data.	NC.3.MD.3 Represent and interpret scaled picture and bar graphs: • Collect data by asking a question that yields data in up to four categories. • Make a representation of data and interpret data in a frequency table, scaled picture graph, and/or scaled bar graph with axes provided. • Solve one and two-step “how many more” and “how many less” problems using information from these graphs.
3.RD.1.7 Look for and express regularity in repeated reasoning to generalize and make predictions based on patterns in the data.	New

Fourth Grade

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

4th Grade Mathematics Crosswalk

The purpose of this document is to provide a general comparison of the 2017 4th Grade Math Standard Course of Study and the 2026 4th Grade Math Standard Course of Study. It provides initial insight into similarities and differences between these two sets of standards. As this is an initial comparison, the document does not address every difference or nuance between the draft standards and the current standards.

Draft 3 Domains	2017 Domains
Algebraic and Numerical Reasoning (ANR)	Operations and Algebraic Thinking (OA) Number and Operations in Base Ten (NBT) Number and Operations - Fractions (NF)
Spatial, Geometric, and Measurement Reasoning (SGMR)	Measurement and Data (MD) Geometry (G)
Reasoning with Data (RD)	Measurement and Data (MD)

Algebraic and Numerical Reasoning (ANR)

Draft 3 Standards	2017 Standard Course of Study
4.ANR.1 Make use of structure to extend and apply place value.	Domain: Number and Operations in Base Ten Cluster Headings: Generalize place value understanding for multi-digit numbers whole numbers.
4.ANR.1.1 Apply place value understanding to read, write, and determine the place and value of each digit in a whole number within 100,000.	NC.4.NBT.2 Read and write multi-digit whole numbers up to and including 100,000 using numerals, number names, and expanded form.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

4.ANR.1.2 Make connections between equivalent forms of whole numbers, including non-traditional, standard, expanded, and word forms within 100,000.	NC.4.NBT.2 Read and write multi-digit whole numbers up to and including 100,000 using numerals, number names, and expanded form.
4.ANR.1.3 Apply the patterns of the base-ten system to explain that in a multi-digit whole number, a digit in one place represents 10 times as much as it represents in the place to its right within 100,000.	NC.4.NBT.1 Explain that in a multi-digit whole number, a digit in one place represents 10 times as much as it represents in the place to its right, up to 100,000.
4.ANR.1.4 Apply place value understanding to compare and order whole numbers within 100,000 using symbols ($>$, $<$, $=$, $\neq$) and/or words to record the results of comparisons.	NC.4.NBT. 7 Compare two multi-digit numbers up to and including 100,000 based on the values of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
4.ANR.2 Use repeated reasoning to make sense of whole number addition and subtraction within 100,000.	Domain: Operations and Algebraic Thinking Cluster Headings: Use place value understanding and properties of operations to perform multi-digit arithmetic.
4.ANR.2.1 Connect addition and subtraction strategies within 1,000, including expanded form, properties of operations, and/or the relationship between addition and subtraction to the standard algorithm.	NC.4.NBT.4 Add and subtract multi-digit whole numbers up to and including 100,000 using the standard algorithm with place value understanding.
4.ANR.2.2 Apply place value understanding of the standard algorithm to add and subtract multi-digit whole numbers within 100,000.	NC.4.NBT.4 Add and subtract multi-digit whole numbers up to and including 100,000 using the standard algorithm with place value understanding.
4.ANR.3 Make sense of multiplication and division with whole numbers.	Domain: - Operations and Algebraic Thinking - Number and Operations in Base Ten Cluster Headings: - Represent and solve problems involving multiplication and division. - Use the four operations with whole numbers to solve problems.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	• Gain familiarity with factors and multiples. • Use place value understanding and properties of operations to perform multi-digit arithmetic.
4.ANR.3.1 Generate factor pairs for a whole number within 50 using representations.	NC.4.OA.4 Find all factor pairs for whole numbers up to and including 50 to: • Recognize that a whole number is a multiple of each of its factors. • Determine whether a given whole number is a multiple of a given one-digit number. • Determine if the number is prime or composite.
4.ANR.3.2 Determine whether a whole number within 50 is prime, composite, or neither.	NC.4.OA.4 Find all factor pairs for whole numbers up to and including 50 to: • Recognize that a whole number is a multiple of each of its factors. • Determine whether a given whole number is a multiple of a given one-digit number. • Determine if the number is prime or composite.
4.ANR.3.3 Recognize that a whole number is a multiple of each of its factors.	NC.4.OA.4 Find all factor pairs for whole numbers up to and including 50 to: • Recognize that a whole number is a multiple of each of its factors. • Determine whether a given whole number is a multiple of a given one-digit number. • Determine if the number is prime or composite.
4.ANR.3.4 Determine whether a given whole number is a multiple of a given one-digit number.	NC.4.OA.4 Find all factor pairs for whole numbers up to and including 50 to: • Recognize that a whole number is a multiple of each of its factors. • Determine whether a given whole number is a multiple of



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	a given one-digit number. Determine if the number is prime or composite.
4.ANR.3.5 Demonstrate fluency with multiplication facts through 10 x 10 with reasoning strategies.	New Content Incorporated from NC.3.OA.7
4.ANR.3.6 Recall multiplication facts through 10 x 10 with automaticity.	New Content Incorporated from NC.3.OA.7
4.ANR.3.7 Distinguish multiplicative comparison from additive comparison.	NC.4.OA.1 Interpret a multiplication equation as a comparison. Multiply or divide to solve word problems involving multiplicative comparisons using models and equations with a symbol for the unknown number. Distinguish multiplicative comparison from additive comparison.
4.ANR.3.8 Apply multiplication and division strategies using representations to solve one-step multiplication and division word problems with factors within 10, including the following problem types: Compare	NC.4.OA.1 Interpret a multiplication equation as a comparison. Multiply or divide to solve word problems involving multiplicative comparisons using models and equations with a symbol for the unknown number. Distinguish multiplicative comparison from additive comparison.
4.ANR.3.9 Apply place value strategies and/or the properties of multiplication, to multiply a whole number of up to three digits by a one-digit whole number or up to two two-digit whole numbers using visual and/or symbolic representations, including the area model.	NC.4.NBT.5 Multiply a whole number of up to three digits by a one-digit whole number, and multiply up to two two-digit numbers with place value understanding using area models, partial products, and the properties of operations. Use models to make connections and develop the algorithm.
4.ANR.3.10 Apply place value strategies, properties of operations, and/or the relationship between multiplication and division to find whole-number quotients and remainders with up to three-digit dividends and one-digit divisors using visual and/or symbolic representations.	NC.4.NBT.6 Find whole-number quotients and remainders with up to three-digit dividends and one-digit divisors with place value understanding using rectangular arrays, area models, repeated subtraction, partial quotients, properties of operations, and/or the relationship

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	between multiplication and division.
4.ANR.3.11 Interpret the meaning of the remainder when solving up to three-digit by one-digit division problems in context.	NC.4.OA.3 Solve two-step word problems involving the four operations with whole numbers. • Use estimation strategies to assess reasonableness of answers. • Interpret remainders in word problems. • Represent problems using equations with a letter standing for the unknown quantity.
4.ANR.4 Make sense and persevere in solving two-step problems involving operations with whole numbers.	Domain: Operations and Algebraic Thinking Cluster Headings: • Use the four operations with whole numbers to solve problems.
4.ANR.4.1 Solve two-step problems in context involving the four operations using a variety of representations, including equations with a letter standing for the unknown quantity.	NC.4.OA.3 Solve two-step word problems involving the four operations with whole numbers. • Use estimation strategies to assess reasonableness of answers. • Interpret remainders in word problems. • Represent problems using equations with a letter standing for the unknown quantity.
4.ANR.4.2 Justify that an answer is reasonable using estimation strategies.	NC.4.OA.3 Solve two-step word problems involving the four operations with whole numbers. • Use estimation strategies to assess reasonableness of answers. • Interpret remainders in word problems. • Represent problems using equations with a letter standing for the unknown quantity.
4.ANR.5 Make sense of fractions and decimals.	Domain: Numbers and Operations - Fractions Cluster Heading:

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	• Extend understanding of fractions. • Understand decimal notation for fractions, and compare decimal fractions.
4.ANR.5.1 Explain why a fraction is equivalent to another fraction using area and length models with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.	NC.4.NF.1 Explain why a fraction is equivalent to another fraction by using area and length fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size.
4.ANR.5.2 Apply reasoning about the size of fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100 to compare and order fractions using area and length models, and using symbols ($>$, $<$, $=$).	NC.4.NF.2 Compare two fractions with different numerators and different denominators, using the denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. 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 by: • Reasoning about their size and using area and length models. • Using benchmark fractions 0, $\frac{1}{2}$, and a whole. • Comparing common numerator or common denominators.
4.ANR.5.3 Apply reasoning about benchmark fractions 0, $\frac{1}{2}$, and one whole to compare and order fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100 using symbols ($>$, $<$, $=$).	NC.4.NF.2 Compare two fractions with different numerators and different denominators, using the denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. 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 by: • Reasoning about their size and using area and length models. • Using benchmark fractions 0, $\frac{1}{2}$, and a whole. • Comparing common numerator or common denominators.
4.ANR.5.4 Apply reasoning about equivalent fractions using related fractions: halves, fourths, and eighths; thirds, sixths, and	NC.4.NF.2 Compare two fractions with different numerators and different denominators, using the denominators 2, 3, 4, 5, 6, 8,

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

twelfths; fifths, tenths, and hundredths to compare and order fractions using symbols ($>$, $<$, $=$).	10, 12, and 100. 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 by: - Reasoning about their size and using area and length models. - Using benchmark fractions 0, $\frac{1}{2}$, and a whole. - Comparing common numerator or common denominators.
4.ANR.5.5 Represent decimals less than 2 wholes using tenths and hundredths with visual and/or symbolic representations, making connections between fractions and decimals.	NC.4.NF.6 Use decimal notation to represent fractions. - Express, model and explain the equivalence between fractions with denominators of 10 and 100. - Use equivalent fractions to add two fractions with denominators of 10 or 100. - Represent tenths and hundredths with models, making connections between fractions and decimals.
4.ANR.5.6 Recognize that comparisons are valid only when the two decimals refer to the same whole.	NC.4.NF.7 Compare two decimals to hundredths by reasoning about their size using area and length models, and recording the results of comparisons with the symbols $>$, $=$, or $<$. Recognize that comparisons are valid only when the two decimals refer to the same whole.
4.ANR.5.7 Apply place value reasoning to compare and order decimals to the hundredths place using area and length models and symbols ($>$, $<$, $=$).	NC.4.NF.7 Compare two decimals to hundredths by reasoning about their size using area and length models, and recording the results of comparisons with the symbols $>$, $=$, or $<$. Recognize that comparisons are valid only when the two decimals refer to the same whole.
4.ANR.6 Make sense of operations with fractions.	Domain: Numbers and Operations - Fractions Cluster Heading: Build fractions from unit fractions by applying and

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	extending previous understandings of operations on whole numbers. • Use unit fractions to understand operations of fractions.
4.ANR.6.1 Apply area models, length models, and equations to represent the addition and subtraction of fractions with like denominators as joining and separating parts referring to the same whole using fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.	NC.4.NF.3 Understand and justify decompositions of fractions with denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. • Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. • Decompose a fraction into a sum of unit fractions and a sum of fractions with the same denominator in more than one way using area models, length models, and equations. • Add and subtract fractions, including mixed numbers with like denominators, by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. • Solve word problems involving addition and subtraction of fractions, including mixed numbers by writing equations from a visual representation of the problem.
4.ANR.6.2 Decompose a fraction into a sum of unit fractions and a sum of fractions with the same denominator in more than one way using area models, length models, and equations using fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.	NC.4.NF.3 Understand and justify decompositions of fractions with denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. • Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. • Decompose a fraction into a sum of unit fractions and a sum of fractions with the same denominator in more than one way using area models, length models, and equations. • Add and subtract fractions, including mixed numbers with like denominators, by replacing each mixed number with



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. • Solve word problems involving addition and subtraction of fractions, including mixed numbers by writing equations from a visual representation of the problem.
4.ANR.6.3 Apply understanding of properties of operations and the relationship between addition and subtraction to add and subtract fractions, including mixed numbers, with like denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100.	NC.4.NF.3 Understand and justify decompositions of fractions with denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. • Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. • Decompose a fraction into a sum of unit fractions and a sum of fractions with the same denominator in more than one way using area models, length models, and equations. • Add and subtract fractions, including mixed numbers with like denominators, by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. • Solve word problems involving addition and subtraction of fractions, including mixed numbers by writing equations from a visual representation of the problem.
4.ANR.6.4 Solve one- and two-step problems in context involving addition and subtraction of fractions, including mixed numbers, with like denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100.	NC.4.NF.3 Understand and justify decompositions of fractions with denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. • Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. • Decompose a fraction into a sum of unit fractions and a sum of fractions with the same denominator in more than one way using area models, length models, and



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	equations. • Add and subtract fractions, including mixed numbers with like denominators, by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. • Solve word problems involving addition and subtraction of fractions, including mixed numbers by writing equations from a visual representation of the problem.
4.ANR.6.5 Explain using area and length models that fractions can be represented by multiplying a whole number within 12 by a unit fraction with denominators of 2, 3, 4, 5, 6, 8, 10, and 12.	NC.4.NF.4 Apply and extend previous understandings of multiplication to: • Model and explain how fractions can be represented by multiplying a whole number by a unit fraction, using this understanding to multiply a whole number by any fraction less than one. • Solve word problems involving multiplication of a fraction by a whole number.
4.ANR.6.6 Apply understanding of multiplying a whole number within 12 by a unit fraction to multiplying a whole number by any fraction less than one with denominators of 2, 3, 4, 5, 6, 8, 10, and 12.	NC.4.NF.4 Apply and extend previous understandings of multiplication to: • Model and explain how fractions can be represented by multiplying a whole number by a unit fraction, using this understanding to multiply a whole number by any fraction less than one. • Solve word problems involving multiplication of a fraction by a whole number.
4.ANR.6.7 Determine a fraction of a set using set models and arrays by multiplying a fraction with denominators of 2, 3, 4, 5, 6, 8, 10, and 12 by a whole number within 12.	NC.4.NF.4 Apply and extend previous understandings of multiplication to: • Model and explain how fractions can be represented by multiplying a whole number by a unit fraction, using this understanding to multiply a whole number by any



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	fraction less than one. Solve word problems involving multiplication of a fraction by a whole number.
4.ANR.6.8 Solve one-step problems in context involving multiplication of fractions and whole numbers, with whole numbers within 12 and denominators 2, 3, 4, 5, 6, 8, 10, and 12.	NC.4.NF.4 Apply and extend previous understandings of multiplication to: - Model and explain how fractions can be represented by multiplying a whole number by a unit fraction, using this understanding to multiply a whole number by any fraction less than one. - Solve word problems involving multiplication of a fraction by a whole number.
4.ANR.7 Reason about patterns.	Domain: Operations and Algebraic Thinking Cluster Heading: Generate and analyze patterns.
4.ANR.7.1 Generate a shape or number pattern that follows a given rule.	NC.4.OA.5 Generate and analyze a number or shape pattern that follows a given rule.
4.ANR.7.2 Analyze the relationships in a shape or number pattern to determine the rule.	NC.4.OA.5 Generate and analyze a number or shape pattern that follows a given rule.
4.ANR.7.3 Analyze a pattern to determine if it is a growing or a repeating pattern to extend the pattern, including problems in context.	NC.4.OA.5 Generate and analyze a number or shape pattern that follows a given rule.

Notes:

- Elements of NC.4.NF.6 incorporated into 4th and 5th grade objectives:**
 - Equivalence between fractions with denominators of 10 and 100 is incorporated in **4.ANR.5**.
 - Adding fractions with like denominators of 10 or 100 is incorporated in **4.ANR.6**.
 - Adding fractions with unlike denominators of 10 or 100 is incorporated in **5.ANR.5**.



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Spatial, Geometric, and Measurement Reasoning (SGMR)

Draft 3 Standards	2017 Standard Course of Study
4.SGMR.1 Reason about angles and their measurement.	Domains: Measurement and Data Cluster Heading: Understand concepts of angle and measure angles.
4.SGMR.1.1 Demonstrate an understanding that angles are measured in degrees with reference to the degrees of a circle.	NC.4.MD.6 Develop an understanding of angles and angle measurement. - Understand angles as geometric shapes that are formed wherever two rays share a common endpoint, and are measured in degrees. - Measure and sketch angles in whole-number degrees using a protractor. - Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems.
4.SGMR.1.2 Estimate angle measurements using types of angles (acute, obtuse, right, or straight) and angle benchmarks.	NC.4.MD.6 Develop an understanding of angles and angle measurement. - Understand angles as geometric shapes that are formed wherever two rays share a common endpoint, and are measured in degrees. - Measure and sketch angles in whole-number degrees using a protractor. - Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems.
4.SGMR.1.3 Use a protractor to measure angles in whole-number degrees.	NC.4.MD.6 Develop an understanding of angles and angle measurement. Understand angles as geometric shapes that are

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	formed wherever two rays share a common endpoint, and are measured in degrees. • Measure and sketch angles in whole-number degrees using a protractor. • Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems.
4.SGMR.1.4 Solve addition and subtraction problems to find unknown angles on a diagram or in one- or two-step problems in context.	NC.4.MD.6 Develop an understanding of angles and angle measurement. • Understand angles as geometric shapes that are formed wherever two rays share a common endpoint, and are measured in degrees. • Measure and sketch angles in whole-number degrees using a protractor. • Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems.
4.SGMR.2 Reason with triangles and quadrilaterals and their attributes.	Domain: Geometry Cluster Heading: Classify shapes based on lines and angles in two-dimensional figures.
4.SGMR.2.1 Construct points, lines, rays, angles, and parallel and perpendicular lines using symbolic notation within two-dimensional figures and in context.	NC.4.G.1 Draw and identify points, lines, line segments, rays, angles, and perpendicular and parallel lines.
4.SGMR.2.2 Construct examples of triangles based on angle types (obtuse, right, acute) and side lengths (equilateral, isosceles, scalene), including cross-classifying.	NC.4.G.2 Classify quadrilaterals and triangles based on angle measure, side lengths, and the presence or absence of parallel or perpendicular lines.
4.SGMR.2.3 Name triangles based on angle types (obtuse, right, acute) and side lengths (equilateral, isosceles, scalene), including cross-classifying.	NC.4.G.2 Classify quadrilaterals and triangles based on angle measure, side lengths, and the presence or absence of parallel or perpendicular lines.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

4.SGMR.2.4 Classify quadrilaterals and triangles based on angle measure, side lengths, and the presence or absence of parallel or perpendicular lines.	NC.4.G.2 Classify quadrilaterals and triangles based on angle measure, side lengths, and the presence or absence of parallel or perpendicular lines.
4.SGMR.3 Make sense of time and metric measurement.	Domain: Measurement and Data Cluster Heading: Solve problems involving measurement.
4.SGMR.3.1 Solve problems in context involving addition and subtraction of time intervals that cross over the hour to find an end time, amount of time passed, or a start time.	NC.4.MD.8 Solve word problems involving addition and subtraction of time intervals that cross the hour.
4.SGMR.3.2 Estimate metric measurements of length, capacity, and weight using measurement benchmarks.	NC.4.MD.1 Know relative sizes of measurement units. Solve problems involving metric measurement. • Measure to solve problems involving metric units:, centimeter, meter, gram, kilogram, Liter, milliliter. • Add, subtract, multiply, and divide to solve one-step word problems involving whole-number measurements of length, mass, and capacity that are given in metric units.
4.SGMR.3.3 Measure lengths in metric units with centimeters and meters.	NC.4.MD.1 Know relative sizes of measurement units. Solve problems involving metric measurement. • Measure to solve problems involving metric units:, centimeter, meter, gram, kilogram, Liter, milliliter. • Add, subtract, multiply, and divide to solve one-step word problems involving whole-number measurements of length, mass, and capacity that are given in metric units.
4.SGMR.3.4 Measure capacity in metric units with liters and milliliters.	NC.4.MD.1 Know relative sizes of measurement units. Solve problems involving metric measurement. • Measure to solve problems involving metric units:, centimeter, meter, gram, kilogram, Liter, milliliter. • Add, subtract, multiply, and divide to solve one-step word problems involving whole-number measurements of

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	length, mass, and capacity that are given in metric units.
4.SGMR.3.5 Measure weight in metric units with grams and kilograms.	NC.4.MD.1 Know relative sizes of measurement units. Solve problems involving metric measurement. • Measure to solve problems involving metric units:, centimeter, meter, gram, kilogram, Liter, milliliter. • Add, subtract, multiply, and divide to solve one-step word problems involving whole-number measurements of length, mass, and capacity that are given in metric units.
4.SGMR.3.6 Solve one-step problems in context involving whole-number measurements of length, weight, and capacity that are given within the same metric unit using the four operations.	NC.4.MD.1 Know relative sizes of measurement units. Solve problems involving metric measurement. • Measure to solve problems involving metric units:, centimeter, meter, gram, kilogram, Liter, milliliter. • Add, subtract, multiply, and divide to solve one-step word problems involving whole-number measurements of length, mass, and capacity that are given in metric units.
4.SGMR.3.7 Use place value understanding and representations, including tables, to apply multiplicative reasoning to convert metric measurements from a larger unit to a smaller unit with a given conversion chart.	NC.4.MD.2 Use multiplicative reasoning to convert metric measurements from a larger unit to a smaller unit using place value understanding, two-column tables, and length models.
4.SGMR.4 Reason abstractly and quantitatively to apply understandings of area and perimeter.	Domain: Measurement and Data Cluster Heading: <i>Solve problems involving area and perimeter.</i>
4.SGMR.4.1 Apply the area and perimeter formulas of rectangles to solve problems in context.	NC.4.MD.3 Solve problems with area and perimeter. • Find areas of rectilinear figures with known side lengths. • Solve problems involving a fixed area and varying perimeters and a fixed perimeter and varying areas. • Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

4.SGMR.4.2 Find the area of rectilinear figures with known side lengths composed of two or three non-overlapping rectangles.	NC.4.MD.3 Solve problems with area and perimeter. - Find areas of rectilinear figures with known side lengths. - Solve problems involving a fixed area and varying perimeters and a fixed perimeter and varying areas. - Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
4.SGMR.4.3 Solve problems in context involving a fixed area and varying perimeters or a fixed perimeter and varying areas of rectangles.	NC.4.MD.3 Solve problems with area and perimeter. - Find areas of rectilinear figures with known side lengths. - Solve problems involving a fixed area and varying perimeters and a fixed perimeter and varying areas. - Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Note:

- Moved to 3rd Grade: NC.4.MD.6** Develop an understanding of angles and angle measurement.
 Understand angles as geometric shapes that are formed wherever two rays share a common endpoint, and are measured in degrees.
 - Understand angles as geometric shapes that are formed wherever two rays share a common endpoint is addressed in **3.SGMR.1.3**.
- Moved to 3rd Grade: NC.4.G.1** Draw and identify points, lines, line segments, rays, angles, and perpendicular and parallel lines.
 - Construct and identify points, lines, line segments, and perpendicular and parallel lines are addressed in **3.SGMR.1.1** and **3.SGMR.1.2**.
- Moved to 2nd Grade: NC.4.G.3** Recognize symmetry in a two-dimensional figure, and identify and draw lines of symmetry.
 - Symmetry is addressed in **2.SGMR.1.4**.

Reasoning with Data (RD)

Draft 3 Standards	2017 Standard Course of Study
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NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

4.RD.1 Apply the data cycle with a focus on frequency tables, line plots, and single and double bar graphs.	Domain: Measurement and Data Cluster Headings: Represent and interpret data.
4.RD.1.1 Generate questions that require the collection of categorical or numerical data.	NC.4.MD.4 Represent and interpret data using whole numbers. • Collect data by asking a question that yields numerical data. • Make a representation of data and interpret data in a frequency table, scaled bar graph, and/or line plot. • Determine whether a survey question will yield categorical or numerical data.
4.RD.1.2 Determine whether a question will yield categorical or numerical data.	NC.4.MD.4 Represent and interpret data using whole numbers. • Collect data by asking a question that yields numerical data. • Make a representation of data and interpret data in a frequency table, scaled bar graph, and/or line plot. • Determine whether a survey question will yield categorical or numerical data.
4.RD.1.3 Design a plan to collect categorical or numerical data to answer a question.	NC.4.MD.4 Represent and interpret data using whole numbers. • Collect data by asking a question that yields numerical data. • Make a representation of data and interpret data in a frequency table, scaled bar graph, and/or line plot. • Determine whether a survey question will yield categorical or numerical data.
4.RD.1.4 Collect categorical or numerical data using various methods to answer a question.	NC.4.MD.4 Represent and interpret data using whole numbers. • Collect data by asking a question that yields numerical data.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	• Make a representation of data and interpret data in a frequency table, scaled bar graph, and/or line plot. • Determine whether a survey question will yield categorical or numerical data.
4.RD.1.5 Represent a data set by organizing and structuring collected data on a frequency table, line plot, or single and double bar graph.	NC.4.MD.4 Represent and interpret data using whole numbers. • Collect data by asking a question that yields numerical data. • Make a representation of data and interpret data in a frequency table, scaled bar graph, and/or line plot. • Determine whether a survey question will yield categorical or numerical data.
4.RD.1.6 Make sense of the range as a measure of spread and the mode as the most common value in a data set.	New Content Incorporated from NC.6.SP.2
4.RD.1.7 Make sense of the median as the middle value of the data set.	New Content Incorporated from NC.6.SP.3
4.RD.1.8 Analyze categorical or numerical data to describe, compare, draw conclusions, and construct arguments supported by evidence from the data.	NC.4.MD.4 Represent and interpret data using whole numbers. • Collect data by asking a question that yields numerical data. • Make a representation of data and interpret data in a frequency table, scaled bar graph, and/or line plot. • Determine whether a survey question will yield categorical or numerical data.
4.RD.1.9 Look for and express regularity in repeated reasoning to generalize and make predictions based on patterns in the	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

data.	
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Fifth Grade

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

5th Grade Mathematics Crosswalk

The purpose of this document is to provide a general comparison of the 2017 5th Grade Math Standard Course of Study and the 2026 5th Grade Math Standard Course of Study. It provides initial insight into similarities and differences between these two sets of standards. As this is an initial comparison, the document does not address every difference or nuance between the draft standards and the current standards.

Draft 3 Domains	2017 Domains
Algebraic and Numerical Reasoning (ANR)	Operations and Algebraic Thinking (OA) Number and Operations in Base Ten (NBT) Number and Operations - Fractions (NF)
Spatial, Geometric, and Measurement Reasoning (SGMR)	Measurement and Data (MD) Geometry (G)
Reasoning with Data (RD)	Measurement and Data (MD)

Algebraic and Numerical Reasoning (ANR)

Draft 3 Standards	2017 Standard Course of Study
5.ANR.1 Make sense of numerical expressions.	Domain: Operations and Algebraic Thinking Cluster Headings: Write and interpret numerical expressions.
5.ANR.1.1 Evaluate two-step numerical expressions by applying the order of operations.	NC.5.OA.2 Write, explain, and evaluate numerical expressions involving the four operations to solve up to two-step problems. Include expressions involving: - Parentheses, using the order of operations - Commutative, associative and distributive properties

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

5.ANR.1.2 Explain numerical expressions by relating them to the commutative, associative, and distributive properties.	NC.5.OA.2 Write, explain, and evaluate numerical expressions involving the four operations to solve up to two-step problems. Include expressions involving: • Parentheses, using the order of operations • Commutative, associative and distributive properties
5.ANR.1.3 Connect numerical expressions to a variety of representations.	NC.5.OA.2 Write, explain, and evaluate numerical expressions involving the four operations to solve up to two-step problems. Include expressions involving: • Parentheses, using the order of operations • Commutative, associative and distributive properties
5.ANR.2 Make use of structure to extend and apply place value.	Domain: Number and Operations in Base Ten Cluster Headings: Understand the place value system.
5.ANR.2.1 Apply place value understanding to read, write, and determine the place and value of each digit in a whole number within one million.	New
5.ANR.2.2 Apply place value understanding to read, write, and determine the place and value of each digit in decimal numbers to the thousandths place.	NC.5.NBT.3 Read, write, and compare decimals to thousandths. • Write decimals using base-ten numerals, number names, and expanded form. • Compare two decimals to thousandths based on the value of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
5.ANR.2.3 Make connections between equivalent forms, including standard, expanded, and word forms of decimal numbers to the thousandths place.	NC.5.NBT.3 Read, write, and compare decimals to thousandths. • Write decimals using base-ten numerals, number names, and expanded form. • Compare two decimals to thousandths based on the value of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

5.ANR.2.4 Explain patterns in products and quotients when numbers are multiplied by 1,000, 100, 10, 0.1, and 0.01 and/or divided by 10 and 100.	NC.5.NBT.1 Explain the patterns in the place value system from one million to the thousandths place. • Explain that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left. • Explain patterns in products and quotients when numbers are multiplied by 1,000, 100, 10, 0.1, and 0.01 and/or divided by 10 and 100.
5.ANR.2.5 Apply the patterns within the base-ten system from the thousandth place through one million to explain that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.	NC.5.NBT.1 Explain the patterns in the place value system from one million to the thousandths place. • Explain that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left. • Explain patterns in products and quotients when numbers are multiplied by 1,000, 100, 10, 0.1, and 0.01 and/or divided by 10 and 100.
5.ANR.2.6 Apply place value understanding to compare and order decimal numbers to the thousandths, using symbols ($>$, $<$, $=$, $\neq$) and/or words to record the results of comparisons.	NC.5.NBT.3 Read, write, and compare decimals to thousandths. • Write decimals using base-ten numerals, number names, and expanded form. • Compare two decimals to thousandths based on the value of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
5.ANR.3 Use repeated reasoning to operate with multi-digit numbers.	Domain: Number and Operations in Base Ten Cluster Headings: Perform operations with multi-digit whole numbers.
5.ANR.3.1 Apply place value reasoning and/or the properties of multiplication to multiply up to a three-digit by a two-digit whole	NC.5.NBT.5 Demonstrate fluency with the multiplication of two whole numbers up to a three-digit number by a two-digit

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

number using symbolic and/or visual representations, including the area model and the standard algorithm.	number using the standard algorithm.
5.ANR.3.2 Apply place value strategies, properties of operations, and/or the relationship between multiplication and division to find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors using visual and/or symbolic representations.	NC.5.NBT.6 Find quotients with remainders when dividing whole numbers with up to four-digit dividends and two-digit divisors using rectangular arrays, area models, repeated subtraction, partial quotients, and/or the relationship between multiplication and division. Use models to make connections and develop the algorithm.
5.ANR.3.3 Connect previous understandings and strategies to develop the algorithm, including long division, to divide whole numbers up to a four-digit dividend with a one-digit divisor.	NC.5.NBT.6 Find quotients with remainders when dividing whole numbers with up to four-digit dividends and two-digit divisors using rectangular arrays, area models, repeated subtraction, partial quotients, and/or the relationship between multiplication and division. Use models to make connections and develop the algorithm. Content Incorporated from NC.6.NS.2
5.ANR.3.4 Interpret the meaning of the remainder when solving up to four-digit by one-digit division problems in context.	NC.5.NBT.6 Find quotients with remainders when dividing whole numbers with up to four-digit dividends and two-digit divisors using rectangular arrays, area models, repeated subtraction, partial quotients, and/or the relationship between multiplication and division. Use models to make connections and develop the algorithm.
5.ANR.3.5 Solve multi-step problems in context involving the four operations using whole numbers.	New
5.ANR.3.6 Justify that an answer is reasonable using estimation strategies.	New
5.ANR.4 Make sense of operations with decimal numbers.	Domain: Number and Operations in Base Ten Cluster Headings: Perform Operations with Decimals

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

5.ANR.4.1 Solve addition and subtraction problems up to six total digits and numbers to the thousandths place using visual and symbolic representations.	NC.5.NBT.7 Compute and solve real-world problems with multi-digit whole numbers and decimal numbers. • Add and subtract decimals to thousandths using models, drawings or strategies based on place value. • Multiply decimals with a product to thousandths using models, drawings, or strategies based on place value. • Divide a whole number by a decimal and divide a decimal by a whole number, using repeated subtraction or area models. Decimals should be limited to hundredths. • Use estimation strategies to assess reasonableness of answers.
5.ANR.4.2 Multiply a whole number within 4 and a decimal to the hundredths place using visual and symbolic representations.	NC.5.NBT.7 Compute and solve real-world problems with multi-digit whole numbers and decimal numbers. • Add and subtract decimals to thousandths using models, drawings or strategies based on place value. • Multiply decimals with a product to thousandths using models, drawings, or strategies based on place value. • Divide a whole number by a decimal and divide a decimal by a whole number, using repeated subtraction or area models. Decimals should be limited to hundredths. • Use estimation strategies to assess reasonableness of answers.
5.ANR.4.3 Divide a whole number within 4 and a decimal to the hundredths place using visual and symbolic representations.	NC.5.NBT.7 Compute and solve real-world problems with multi-digit whole numbers and decimal numbers. • Add and subtract decimals to thousandths using models, drawings or strategies based on place value. • Multiply decimals with a product to thousandths



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	using models, drawings, or strategies based on place value. • Divide a whole number by a decimal and divide a decimal by a whole number, using repeated subtraction or area models. Decimals should be limited to hundredths. • Use estimation strategies to assess reasonableness of answers.
5.ANR.4.4 Solve two-step problems in context involving two operations with decimal numbers.	NC.5.NBT.7 Compute and solve real-world problems with multi-digit whole numbers and decimal numbers. • Add and subtract decimals to thousandths using models, drawings or strategies based on place value. • Multiply decimals with a product to thousandths using models, drawings, or strategies based on place value. • Divide a whole number by a decimal and divide a decimal by a whole number, using repeated subtraction or area models. Decimals should be limited to hundredths. • Use estimation strategies to assess reasonableness of answers.
5.ANR.4.5 Justify an answer is reasonable using estimation strategies.	NC.5.NBT.7 Compute and solve real-world problems with multi-digit whole numbers and decimal numbers. • Add and subtract decimals to thousandths using models, drawings or strategies based on place value. • Multiply decimals with a product to thousandths using models, drawings, or strategies based on place value. • Divide a whole number by a decimal and divide a decimal by a whole number, using repeated subtraction or area models. Decimals should be



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	limited to hundredths. Use estimation strategies to assess reasonableness of answers.
5.ANR.5 Make sense of operations with fractions.	Domain: Numbers and Operations - Fractions Cluster Heading: - Use equivalent fractions as a strategy to add and subtract fractions. - Apply and extend previous understandings of multiplication and division to multiply and divide fractions
5.ANR.5.1 Apply understanding of equivalent fractions, properties of operations, and the relationship between addition and subtraction to add and subtract fractions using representations, including mixed numbers, with unlike denominators using related fractions: halves, fourths, and eighths; thirds, sixths, and twelfths; fifths, tenths, and hundredths.	NC.5.NF.1 Add and subtract fractions, including mixed numbers, with unlike denominators using related fractions: halves, fourths and eighths; thirds, sixths, and twelfths; fifths, tenths, and hundredths. - Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. - Solve one- and two-step word problems in context using area and length models to develop the algorithm. Represent the word problem in an equation.
5.ANR.5.2 Solve one- and two-step problems in context involving addition and subtraction of fractions, including mixed numbers, with unlike denominators using related fractions: halves, fourths, and eighths; thirds, sixths, and twelfths; fifths, tenths, and hundredths.	NC.5.NF.1 Add and subtract fractions, including mixed numbers, with unlike denominators using related fractions: halves, fourths and eighths; thirds, sixths, and twelfths; fifths, tenths, and hundredths. - Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. - Solve one- and two-step word problems in context using area and length models to develop the algorithm. Represent the word problem in an equation.



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

5.ANR.5.3 Interpret a fraction as the division of the numerator by the denominator with denominators 2, 3, 4, 5, 6, 8, 10, and 12, using area, length, and set models, equal sharing contexts, and equations.	NC.5.NF.3 Use fractions to model and solve division problems. • Interpret a fraction as an equal sharing context, where a quantity is divided into equal parts. • Model and interpret a fraction as the division of the numerator by the denominator. • Solve one-step word problems involving division of whole numbers leading to answers in the form of fractions and mixed numbers, with denominators of 2, 3, 4, 5, 6, 8, 10, and 12, using area, length, and set models or equations.
5.ANR.5.4 Multiply a whole number within 12 by a fraction or a mixed number with denominators 2, 3, 4, 5, 6, 8, 10, and 12 using representations.	NC.5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction, including mixed numbers. • Use area and length models to multiply two fractions, with the denominators 2, 3, 4. • Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number and when multiplying a given number by a fraction less than 1 results in a product smaller than the given number. • Solve one-step word problems involving multiplication of fractions using models to develop the algorithm.
5.ANR.5.5 Multiply two fractions or mixed numbers within 12 with denominators 2, 3, and 4 using representations.	NC.5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction, including mixed numbers. • Use area and length models to multiply two fractions, with the denominators 2, 3, 4. • Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number and when multiplying a given number by a fraction less than 1 results in a product smaller than the



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	given number. Solve one-step word problems involving multiplication of fractions using models to develop the algorithm.
5.ANR.5.6 Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number and when multiplying a given number by a fraction less than 1 results in a product smaller than the given number.	NC.5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction, including mixed numbers. - Use area and length models to multiply two fractions, with the denominators 2, 3, 4. - Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number and when multiplying a given number by a fraction less than 1 results in a product smaller than the given number. - Solve one-step word problems involving multiplication of fractions using models to develop the algorithm.
5.ANR.5.7 Divide unit fractions by non-zero whole numbers and divide whole numbers within 10 by unit fractions that include denominators of 2, 3, 4, 5, 6, 8, 10, and 12, using area and/or length models and equations.	NC.5.NF.7 Solve one-step word problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions using area and length models, and equations to represent the problem.
5.ANR.6 Reason with patterns and relationships.	Domain: Operations and Algebraic Thinking Cluster Heading: Analyze patterns and relationships.
5.ANR.6.1 Generate two numerical patterns using two given rules.	NC.5.OA.3 Generate two numerical patterns using two given rules. - Identify apparent relationships between corresponding terms. - Form ordered pairs consisting of corresponding terms from the two patterns. - Graph the ordered pairs on a coordinate plane.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

5.ANR.6.2 Analyze the relationships between corresponding terms in two patterns using words and numerical expressions.	NC.5.OA.3 Generate two numerical patterns using two given rules. • Identify apparent relationships between corresponding terms. • Form ordered pairs consisting of corresponding terms from the two patterns. • Graph the ordered pairs on a coordinate plane.
5.ANR.6.3 Analyze the relationships between terms and patterns in problems in context.	NC.5.OA.3 Generate two numerical patterns using two given rules. • Identify apparent relationships between corresponding terms. • Form ordered pairs consisting of corresponding terms from the two patterns. • Graph the ordered pairs on a coordinate plane.

Spatial, Geometric, and Measurement Reasoning (SGMR)

Draft 3 Standards	2017 Standard Course of Study
5.SGMR.1 Reason with shapes and their attributes.	Domain: Geometry Cluster Heading: Classify quadrilaterals.
5.SGMR.1.1 Classify quadrilaterals in a hierarchy based on properties.	NC.5.G.3 Classify quadrilaterals into categories based on their properties. • Explain that attributes belonging to a category of quadrilaterals also belong to all subcategories of that category. • Classify quadrilaterals in a hierarchy based on properties.
5.SGMR.1.2 Explain that attributes belonging to a category of quadrilaterals also belong to all subcategories of that category.	NC.5.G.3 Classify quadrilaterals into categories based on their properties.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	• Explain that attributes belonging to a category of quadrilaterals also belong to all subcategories of that category. • Classify quadrilaterals in a hierarchy based on properties.
5.SGMR.2 Reason about location and patterns in the first quadrant of the coordinate plane.	Domains: • Operations and Algebraic Thinking • Geometry Cluster Headings: • Analyze patterns and relationships. • Understand the coordinate plane.
5.SGMR.2.1 Graph points on a coordinate plane.	NC.5.G.1 Graph points in the first quadrant of a coordinate plane, and identify and interpret the x and y coordinates to solve problems.
5.SGMR.2.2 Solve problems on a coordinate plane, including traveling from one point to another and identifying the coordinates of missing points in geometric figures.	NC.5.G.1 Graph points in the first quadrant of a coordinate plane, and identify and interpret the x and y coordinates to solve problems.
5.SGMR.2.3 Create ordered pairs using corresponding terms that follow given rules to graph points on a coordinate plane.	NC.5.OA.3 Generate two numerical patterns using two given rules. • Identify apparent relationships between corresponding terms. • Form ordered pairs consisting of corresponding terms from the two patterns. • Graph the ordered pairs on a coordinate plane.
5.SGMR.2.4 Solve problems in context using the patterns graphed on a coordinate plane.	NC.5.OA.3 Generate two numerical patterns using two given rules. • Identify apparent relationships between corresponding terms. • Form ordered pairs consisting of corresponding terms

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	from the two patterns. Graph the ordered pairs on a coordinate plane. NC.5.G.1 Graph points in the first quadrant of a coordinate plane, and identify and interpret the x and y coordinates to solve problems.
5.SGMR.3 Reason abstractly and quantitatively to apply understandings of customary and metric measurement.	Domain: Measurement and Data Cluster Heading: Convert like measurement units within a given measurement system.
5.SGMR.3.1 Justify the reasonableness of metric and customary unit conversions within a given measurement system in context.	New
5.SGMR.3.2 Apply multiplicative reasoning to solve one- or two-step problems in context involving conversions between two units within the customary system (inches, feet, yards, ounces, pounds, fluid ounces, cups, pints, quarts, gallons, minutes, hours) with a given conversion and technology.	NC.5.MD.1 Given a conversion chart, use multiplicative reasoning to solve one-step conversion problems within a given measurement system.
5.SGMR.3.3 Apply multiplicative reasoning to solve one- or two-step problems in context involving conversions between two units within the metric system (millimeters, centimeters, meters, kilometers, milligram, gram, kilogram, milliliter, liter) with a given conversion and technology.	NC.5.MD.1 Given a conversion chart, use multiplicative reasoning to solve one-step conversion problems within a given measurement system.
5.SGMR.4 Reason abstractly and quantitatively to apply understandings of volume of rectangular prisms.	Domain: Measurement and Data Cluster Heading: Understand concepts of volume.
5.SGMR.4.1 Recognize volume as an attribute of solid figures by filling rectangular prisms using cubic units, cubic centimeters, cubic inches, and cubic feet.	NC.5.MD.4 Recognize volume as an attribute of solid figures and measure volume by counting unit cubes, using cubic centimeters, cubic inches, cubic feet, and improvised units.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

5.SGMR.4.2 Find the volume of a rectangular prism with whole-number side lengths by packing it with unit cubes.	NC.5.MD.5 Relate volume to the operations of multiplication and addition. - Find the volume of a rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths. - Build understanding of the volume formula for rectangular prisms with whole-number edge lengths in the context of solving problems. - Find volume of solid figures with one-digit dimensions composed of two non-overlapping rectangular prisms.
5.SGMR.4.3 Connect the operations of multiplication and addition to the volume formula for a rectangular prism, by modeling that volume can be found by multiplying the edge lengths or by multiplying the area of the base by the height.	NC.5.MD.5 Relate volume to the operations of multiplication and addition. - Find the volume of a rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths. - Build understanding of the volume formula for rectangular prisms with whole-number edge lengths in the context of solving problems. - Find volume of solid figures with one-digit dimensions composed of two non-overlapping rectangular prisms.
5.SGMR.4.4 Apply understanding of the volume formula for rectangular prisms with whole-number edge lengths in figures and in context.	NC.5.MD.5 Relate volume to the operations of multiplication and addition. - Find the volume of a rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths. - Build understanding of the volume formula for

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	rectangular prisms with whole-number edge lengths in the context of solving problems. Find volume of solid figures with one-digit dimensions composed of two non-overlapping rectangular prisms.
5.SGMR.4.5 Apply understanding of the attributes of rectangular prisms to find an unknown dimension when given the volume.	NC.5.MD.5 Relate volume to the operations of multiplication and addition. - Find the volume of a rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths. - Build understanding of the volume formula for rectangular prisms with whole-number edge lengths in the context of solving problems. - Find volume of solid figures with one-digit dimensions composed of two non-overlapping rectangular prisms.
5.SGMR.4.6 Find the volume of solid figures with one-digit dimensions composed of two non-overlapping rectangular prisms in context.	NC.5.MD.5 Relate volume to the operations of multiplication and addition. - Find the volume of a rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths. - Build understanding of the volume formula for rectangular prisms with whole-number edge lengths in the context of solving problems. - Find volume of solid figures with one-digit dimensions composed of two non-overlapping rectangular prisms.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Reasoning with Data (RD)

Draft 3 Standards	2017 Standard Course of Study
5.RD.1 Apply the data cycle with a focus on line graphs, line plots, and bar graphs.	Domain: Measurement and Data Cluster Headings: Represent and interpret data.
5.RD.1.1 Generate questions that require the collection of categorical or numerical data, including numerical data that change over time.	NC.5.MD.2 Represent and interpret data. • Collect data by asking a question that yields data that changes over time. • Make and interpret a representation of data using a line graph. • Determine whether a survey question will yield categorical or numerical data, or data that changes over time.
5.RD.1.2 Determine whether a question will yield categorical or numerical data, including numerical data that change over time.	NC.5.MD.2 Represent and interpret data. • Collect data by asking a question that yields data that changes over time. • Make and interpret a representation of data using a line graph. • Determine whether a survey question will yield categorical or numerical data, or data that changes over time.
5.RD.1.3 Design a plan to collect categorical or numerical data, including numerical data that change over time, to answer a question.	NC.5.MD.2 Represent and interpret data. • Collect data by asking a question that yields data that changes over time. • Make and interpret a representation of data using a line graph. • Determine whether a survey question will yield categorical or numerical data, or data that changes over time.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

5.RD.1.4 Collect categorical or numerical data, including numerical data that change over time, using various methods to answer a question.	NC.5.MD.2 Represent and interpret data. • Collect data by asking a question that yields data that changes over time. • Make and interpret a representation of data using a line graph. • Determine whether a survey question will yield categorical or numerical data, or data that changes over time.
5.RD.1.5 Represent a data set by organizing and structuring collected data on a line graph, line plot, or bar graph.	NC.5.MD.2 Represent and interpret data. • Collect data by asking a question that yields data that changes over time. • Make and interpret a representation of data using a line graph. • Determine whether a survey question will yield categorical or numerical data, or data that changes over time.
5.RD.1.6 Analyze categorical or numerical data to describe, compare, draw conclusions, and construct arguments supported by evidence from the data.	NC.5.MD.2 Represent and interpret data. • Collect data by asking a question that yields data that changes over time. • Make and interpret a representation of data using a line graph. • Determine whether a survey question will yield categorical or numerical data, or data that changes over time.
5.RD.1.7 Look for and express regularity in repeated reasoning to generalize and make predictions based on patterns and trends in the data.	New

Sixth Grade

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

6th Grade Mathematics Crosswalk

The purpose of this document is to provide a general comparison of the 2017 6th Grade Math Standard Course of Study and the 2026 6th Grade Math Standard Course of Study. It provides initial insight into similarities and differences between these two sets of standards. As this is an initial comparison, the document does not address every difference or nuance between the draft standards and the current standards.

Draft 3 Domains	2017 Domains
Ratio and Proportional Reasoning (RPR)	Ratio and Proportional Relationships (RP)
Algebraic and Numerical Reasoning (ANR)	Expressions & Equations (EE) The Number System (NS)
Spatial, Geometric, and Measurement Reasoning (SGMR)	Geometry (G)
Reasoning with Data (RD)	Statistics & Probability (SP)

Ratio and Proportional Reasoning (RPR)

Draft 3 Standards	2017 Standards
NC.6.RPR.1 Understand the concept of equivalent ratios.	
NC.6.RPR.1.1 Make use of structure to describe the multiplicative relationships between the two quantities of a ratio, including part-to-part and part-to-whole relationships, using ratio language in context.	NC.6.RP.1 Understand the concept of a ratio and use ratio language to: - Describe a ratio as a multiplicative relationship between two quantities. - Model a ratio relationship using a variety of representations.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.6.RPR.1.2 Represent a ratio relationship using ratio language, written expressions, colon, ratio tables, and fraction notation.	NC.6.RP.1 Understand the concept of a ratio and use ratio language to: - Describe a ratio as a multiplicative relationship between two quantities - Model a ratio relationship using a variety of representations.
NC.6.RPR.1.3 Reason quantitatively to determine the two distinct unit ratios that relate two quantities with reciprocal relationships.	NC.6.RP.2 Understand that ratios can be expressed as equivalent unit ratios by finding and interpreting both unit ratios in context.
NC.6.RPR.1.4 Make sense of the two distinct unit ratios that relate two quantities in context.	NC.6.RP.2 Understand that ratios can be expressed as equivalent unit ratios by finding and interpreting both unit ratios in context.
NC.6.RPR.2 Apply ratio reasoning to represent and solve problems involving ratios and percentages using multiple representations.	
NC.6.RPR.2.1 Construct tables and graphs to compare ratios composed of whole numbers.	NC.6.RP.3 Use ratio reasoning with equivalent whole-number ratios to solve real-world and mathematical problems by: - Creating and using a table to compare ratios. - Finding missing values in the tables. - Using a unit ratio. - Converting and manipulating measurements using given ratios. - Plotting the pairs of values on the coordinate plane.
NC.6.RPR.2.2 Reason with patterns within ratio tables, double number lines, tape diagrams, contexts, and coordinate graphs to determine unknown values.	NC.6.RP.3 Use ratio reasoning with equivalent whole-number ratios to solve real-world and mathematical problems by: - Creating and using a table to compare ratios. - Finding missing values in the tables. - Using a unit ratio. - Converting and manipulating measurements using given ratios. - Plotting the pairs of values on the coordinate plane. NC.6.EE.9 Represent and analyze quantitative relationships by: - Using variables to represent two quantities in a real-world or mathematical context that change in relationship to one another. - Analyze the relationship between quantities in different representations (context, equations, tables, and graphs).

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.6.RPR.2.3 Reason quantitatively to manipulate measurements using given ratios for single unit conversions within the same measurement system.	NC.6.RP.3 Use ratio reasoning with equivalent whole-number ratios to solve real-world and mathematical problems by: • Creating and using a table to compare ratios. • Finding missing values in the tables. • Using a unit ratio. • Converting and manipulating measurements using given ratios. • Plotting the pairs of values on the coordinate plane.
NC.6.RPR.2.4 Reason quantitatively to connect multiplicative relationships between independent and dependent variables in multiple representations.	NC.6.EE.9 Represent and analyze quantitative relationships by: • Using variables to represent two quantities in a real-world or mathematical context that change in relationship to one another. • Analyze the relationship between quantities in different representations (context, equations, tables, and graphs).
NC.6.RPR.2.5 Represent multiplicative relationships to solve problems with independent and dependent variables, using multiple representations.	NC.6.RP.3 Use ratio reasoning with equivalent whole-number ratios to solve real-world and mathematical problems by: • Creating and using a table to compare ratios. • Finding missing values in the tables. • Using a unit ratio. • Converting and manipulating measurements using given ratios. • Plotting the pairs of values on the coordinate plane.
NC.6.RPR.2.6 Demonstrate an understanding of a percent as a ratio per 100 by expressing percents, using multiple representations.	NC.6.RP.4 Use ratio reasoning to solve real-world and mathematical problems with percents by: • Understanding and finding a percent of a quantity as a ratio per 100. • Using equivalent ratios, such as benchmark percents (50%, 25%, 10%, 5%, 1%), to determine a part of any given quantity. • Finding the whole, given a part and the percent.
NC.6.RPR.2.7 Solve one-step problems determining an unknown part, whole, or percent of a given quantity, reasoning quantitatively with benchmark percentages or equivalent ratios.	NC.6.RP.4 Use ratio reasoning to solve real-world and mathematical problems with percents by: • Understanding and finding a percent of a quantity as a

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	ratio per 100. - Using equivalent ratios, such as benchmark percents (50%, 25%, 10%, 5%, 1%), to determine a part of any given quantity. - Finding the whole, given a part and the percent.
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Algebraic and Numerical Reasoning (ANR)

Draft 3 Standards	2017 Standards
NC.6.ANR.1 Determine the relationships between factors and multiples for mathematical problems.	
NC.6.ANR.1.1 Reason quantitatively to determine the least common multiple of two whole numbers less than or equal to 12 for mathematical problems.	NC.6.NS.4 Understand and use prime factorization and the relationships between factors to: - Find the unique prime factorization for a whole number. - Find the greatest common factor of two whole numbers less than or equal to 100. - Use the greatest common factor and the distributive property to rewrite the sum of two whole numbers, each less than or equal to 100. - Find the least common multiple of two whole numbers less than or equal to 12 to add and subtract fractions with unlike denominators.
NC.6.ANR.1.2 Make use of structure to rewrite whole numbers as products of their unique prime factors using exponential form when applicable.	NC.6.NS.4 Understand and use prime factorization and the relationships between factors to: - Find the unique prime factorization for a whole number. - Find the greatest common factor of two whole numbers less than or equal to 100. - Use the greatest common factor and the distributive property to rewrite the sum of two whole numbers, each less than or equal to 100.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	Find the least common multiple of two whole numbers less than or equal to 12 to add and subtract fractions with unlike denominators.
NC.6.ANR.1.3 Reason quantitatively to determine the greatest common factor of two whole numbers using strategies, including prime factorization, for mathematical problems.	NC.6.NS.4 Understand and use prime factorization and the relationships between factors to: - Find the unique prime factorization for a whole number. - Find the greatest common factor of two whole numbers less than or equal to 100. - Use the greatest common factor and the distributive property to rewrite the sum of two whole numbers, each less than or equal to 100. - Find the least common multiple of two whole numbers less than or equal to 12 to add and subtract fractions with unlike denominators.
NC.6.ANR.1.4 Make use of structure to rewrite the sum of two whole numbers by using the distributive property and common factors.	NC.6.NS.4 Understand and use prime factorization and the relationships between factors to: - Find the unique prime factorization for a whole number. - Find the greatest common factor of two whole numbers less than or equal to 100. - Use the greatest common factor and the distributive property to rewrite the sum of two whole numbers, each less than or equal to 100. - Find the least common multiple of two whole numbers less than or equal to 12 to add and subtract fractions with unlike denominators.
NC.6.ANR.2 Apply numerical reasoning to perform operations with fractions with denominators 12 or less.	
NC.6.ANR.2.1 Represent the sum, difference, and quotient of two positive fractions and mixed numbers, using physical and visual models, and common denominators.	NC.6.NS.1 Use visual models and common denominators to: - Interpret and compute quotients of fractions. - Solve real-world and mathematical problems involving division of fractions.
NC.6.ANR.2.2 Express repeated reasoning to evaluate the product of two positive fractions and mixed numbers using an algorithm.	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.6.ANR.2.3 Make sense of quotients and remainders of positive fractions and mixed numbers in terms of their context and relation to the divisor and dividend.	NC.6.NS.1 Use visual models and common denominators to: • Interpret and compute quotients of fractions. • Solve real-world and mathematical problems involving division of fractions.
NC.6.ANR.2.4 Solve problems by reasoning quantitatively with positive fractions and mixed numbers with the four operations.	NC.6.NS.1 Use visual models and common denominators to: • Interpret and compute quotients of fractions. • Solve real-world and mathematical problems involving division of fractions.
NC.6.ANR.2.5 Construct a viable argument for the reasonableness of solutions to contextual problems involving positive fractions and mixed numbers using estimation, mental math, and understanding of the context.	New
NC.6.ANR.3 Apply numerical reasoning to perform operations with positive decimals.	
NC.6.ANR.3.1 Express repeated reasoning to evaluate the sum and difference of two decimals to the thousandths place, extending previous understandings to develop and fluently use an algorithm.	NC.6.NS.3 Apply and extend previous understandings of decimals to develop and fluently use the standard algorithms for addition, subtraction, multiplication and division of decimals.
NC.6.ANR.3.2 Express repeated reasoning to evaluate the product and quotient of two decimals to the hundredths place, extending previous understandings to develop and fluently use an algorithm.	NC.6.NS.3 Apply and extend previous understandings of decimals to develop and fluently use the standard algorithms for addition, subtraction, multiplication and division of decimals.
NC.6.ANR.3.3 Construct a viable argument for the reasonableness of a sum, difference, product, or quotient of two decimals using strategies to extend previous understandings, including estimation, mental math, and understanding of the context.	New
NC.6.ANR.3.4 Solve problems involving decimals, reasoning quantitatively with the four operations.	NC.6.NS.3 Apply and extend previous understandings of decimals to develop and fluently use the standard algorithms for addition, subtraction, multiplication and division of decimals.
NC.6.ANR.3.5 Construct a viable argument for the reasonableness of solutions to contextual problems involving positive decimals using estimation, mental math, and understanding of the context.	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.6.ANR.4 Apply numerical reasoning to perform operations with integers within -20 and 20.	
NC.6.ANR.4.1 Reason abstractly to describe situations in which opposite quantities combine to make zero, conveying that a number and its additive inverse create a zero pair.	NC.6.NS.9 Apply and extend previous understandings of addition and subtraction. - o Describe situations in which opposite quantities combine to make 0. - o Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on the sign of q. Show that a number and its additive inverse create a zero pair. - o Understand subtraction of integers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two integers on the number line is the absolute value of their difference. - o Use models to add and subtract integers from -20 to 20 and describe real-world contexts using sums and differences.
NC.6.ANR.4.2 Make use of structure to represent the inverse relationship between addition and subtraction using multiple strategies, including physical and visual models. If p and q are integers, then $p - q = p + (-q)$ and $p + q = p - (-q)$.	NC.6.NS.9 Apply and extend previous understandings of addition and subtraction. - o Describe situations in which opposite quantities combine to make 0. - o Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on the sign of q. Show that a number and its additive inverse create a zero pair. - o Understand subtraction of integers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two integers on the number line is the absolute value of their difference. - o Use models to add and subtract integers from -20 to 20 and describe real-world contexts using sums and differences.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.6.ANR.4.3 Express repeated reasoning to represent addition and subtraction of two integers using models.	NC.6.NS.9 Apply and extend previous understandings of addition and subtraction. - o Describe situations in which opposite quantities combine to make 0. - o Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on the sign of q. Show that a number and its additive inverse create a zero pair. - o Understand subtraction of integers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two integers on the number line is the absolute value of their difference. - o Use models to add and subtract integers from -20 to 20 and describe real-world contexts using sums and differences.
NC.6.ANR.4.4 Express repeated reasoning to represent multiplication and division of two integers using models.	Moved from 7th grade NC.7.NS.2 Apply and extend previous understandings of multiplication and division. b. Apply properties of operations as strategies, including the standard algorithms, to multiply and divide rational numbers and describe the product and quotient in real-world contexts
NC.6.ANR.4.5 Evaluate the sum, difference, product, and quotient of two integers.	NC.6.NS.9 Apply and extend previous understandings of addition and subtraction. - o Describe situations in which opposite quantities combine to make 0. - o Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on the sign of q. Show that a number and its additive inverse create a zero pair. - o Understand subtraction of integers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two integers on the number line is the absolute value of their difference.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	o Use models to add and subtract integers from -20 to 20 and describe real-world contexts using sums and differences. Moved from 7th grade NC.7.NS.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers, using the properties of operations, and describing real-world contexts using sums and differences. NC.7.NS.2 Apply and extend previous understandings of multiplication and division. b. Apply properties of operations as strategies, including the standard algorithms, to multiply and divide rational numbers and describe the product and quotient in real-world contexts.
NC.6.ANR.4.6 Construct a viable argument for the reasonableness of a sum, difference, product, or quotient of two integers in mathematical problems, using strategies including estimation and mental math.	New
NC.6.ANR.4.7 Solve contextual problems reasoning quantitatively with the four operations involving integers, using efficient and flexible strategies.	NC.6.NS.9 Apply and extend previous understandings of addition and subtraction. - o Describe situations in which opposite quantities combine to make 0. - o Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on the sign of q. Show that a number and its additive inverse create a zero pair. - o Understand subtraction of integers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two integers on the number line is the absolute value of their difference. - o Use models to add and subtract integers from -20 to 20 and describe real-world contexts using sums and differences. Moved from 7th grade

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	NC.7.NS.2 Apply and extend previous understandings of multiplication and division. b. Apply properties of operations as strategies, including the standard algorithms, to multiply and divide rational numbers and describe the product and quotient in real-world contexts
NC.6.ANR.4.8 Construct a viable argument for the reasonableness of solutions to contextual problems involving integers using estimation, mental math, and understanding of the context.	New
	Moved to 5th grade NC.6.NS.2 Fluently divide using long division with a minimum of a four-digit dividend and interpret the quotient and remainder in context.
NC.6.ANR.5 Apply numerical reasoning to compare and order integers, fractions, mixed numbers, and decimals.	
NC.6.ANR.5.1 Reason about the equivalence between rational numbers, using models and place value.	NC.6.NS.7 Understand ordering of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
NC.6.ANR.5.2 Make use of structure to locate and position rational numbers on a number line.	NC.6.NS.6 Understand rational numbers as points on the number line and as ordered pairs on a coordinate plane. a. On a number line: - Recognize opposite signs of numbers as indicating locations on opposite sides of 0 and that the opposite of the opposite of a number is the number itself. - Find and position rational numbers on a horizontal or vertical number line.
NC.6.ANR.5.3 Make sense of statements of inequality as statements about the relative position of two rational numbers on a number line.	NC.6.NS.7 Understand ordering of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	number line diagram.
NC.6.ANR.5.4 Make sense of statements of order for rational numbers in context.	NC.6.NS.7 Understand ordering of rational numbers. b. Write, interpret, and explain statements of order for rational numbers in real-world contexts.
NC.6.ANR.5.5 Reason abstractly to describe rational numbers having opposite directions or values in real-world context.	NC.6.NS.5 Understand and use rational numbers to: • Describe quantities having opposite directions or values. • Represent quantities in real-world contexts, explaining the meaning of 0 in each situation. • Understand the absolute value of a rational number as its distance from 0 on the number line to: ◦ Interpret absolute value as magnitude for a positive or negative quantity in a real-world context. ◦ Distinguish comparisons of absolute value from statements about order.
NC.6.ANR.5.6 Demonstrate an understanding of the opposite signs of numbers as indicating locations on the opposite sides of zero, that the opposite of the opposite of a number is the number itself, and that zero is its own opposite.	NC.6.NS.6 Understand rational numbers as points on the number line and as ordered pairs on a coordinate plane. a. On a number line: • Recognize opposite signs of numbers as indicating locations on opposite sides of 0 and that the opposite of the opposite of a number is the number itself. • Find and position rational numbers on a horizontal or vertical number line.
NC.6.ANR.5.7 Represent rational numbers in the real-world context, explaining the meaning of zero in each situation.	NC.6.NS.5 Understand and use rational numbers to: • Describe quantities having opposite directions or values. • Represent quantities in real-world contexts, explaining the meaning of 0 in each situation. • Understand the absolute value of a rational number as its distance from 0 on the number line to: ◦ Interpret absolute value as magnitude for a positive or negative quantity in a real-world context.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	○ Distinguish comparisons of absolute value from statements about order.
NC.6.ANR.5.8 Make sense of the absolute value of rational numbers as magnitude for a positive or negative quantity in context.	NC.6.NS.5 Understand and use rational numbers to: ● Describe quantities having opposite directions or values. ● Represent quantities in real-world contexts, explaining the meaning of 0 in each situation. ● Understand the absolute value of a rational number as its distance from 0 on the number line to: ○ Interpret absolute value as magnitude for a positive or negative quantity in a real-world context. ○ Distinguish comparisons of absolute value from statements about order.
NC.6.ANR.6 Create and evaluate numerical and algebraic expressions.	
NC.6.ANR.6.1 Demonstrate an understanding of whole-number exponents greater than zero.	NC.6.EE.1 Write and evaluate numerical expressions, with and without grouping symbols, involving whole-number exponents.
NC.6.ANR.6.2 Reason quantitatively to evaluate numerical expressions that may include whole-number exponents greater than zero, using the order of operations with and without grouping symbols.	NC.6.EE.1 Write and evaluate numerical expressions, with and without grouping symbols, involving whole-number exponents.
NC.6.ANR.6.3 Construct numerical and algebraic expressions that may include whole-number exponents greater than zero to solve problems.	NC.6.EE.1 Write and evaluate numerical expressions, with and without grouping symbols, involving whole-number exponents. NC.6.EE.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem.
NC.6.ANR.6.4 Make use of structure to translate between mathematical expressions and written representations, with and	NC.6.EE.2 Write, read, and evaluate algebraic expressions. ● Write expressions that record operations with numbers

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

without whole-number exponents.	and with letters standing for numbers. • Identify parts of an expression using mathematical terms and view one or more of those parts as a single entity. • Evaluate expressions at specific values of their variables using expressions that arise from formulas used in real-world problems.
NC.6.ANR.6.5 Make use of structure to identify parts of an algebraic expression, with and without whole-number exponents, using mathematical terms.	NC.6.EE.2 Write, read, and evaluate algebraic expressions. • Write expressions that record operations with numbers and with letters standing for numbers. • Identify parts of an expression using mathematical terms and view one or more of those parts as a single entity. • Evaluate expressions at specific values of their variables using expressions that arise from formulas used in real-world problems.
NC.6.ANR.6.6 Reason quantitatively to evaluate algebraic expressions, with or without whole number exponents, derived from problems.	NC.6.EE.2 Write, read, and evaluate algebraic expressions. • Write expressions that record operations with numbers and with letters standing for numbers. • Identify parts of an expression using mathematical terms and view one or more of those parts as a single entity. • Evaluate expressions at specific values of their variables using expressions that arise from formulas used in real-world problems.
NC.6.ANR.6.7 Make use of structure to generate equivalent expressions, without exponents, using combining like terms and mathematical properties.	NC.6.EE.3 Apply the properties of operations to generate equivalent expressions without exponents.
NC.6.ANR.6.8 Construct a viable argument for the equivalence of two algebraic expressions using mathematical reasoning, combining like terms, and the commutative, associative, identity, and distributive properties.	NC.6.EE.4 Identify when two expressions are equivalent and justify with mathematical reasoning.
NC.6.ANR.7 Apply algebraic reasoning to represent one-variable equations and inequalities and solve	

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

one-variable equations using the four operations with positive fractions, positive decimals, and integers within -20 and 20.	
6.ANR.7.1 Construct a viable argument to determine whether a given number in a specified set makes an equation true, using substitution.	NC.6.EE.5 Use substitution to determine whether a given number in a specified set makes an equation true.
6.ANR.7.2 Reason quantitatively to represent one-step equations to solve contextual problems.	NC.6.EE.7 Solve real-world and mathematical problems by writing and solving equations of the form: • $x+p=q$ in which p, q and x are all nonnegative rational numbers; and, • $p \cdot x=q$ for cases in which p, q and x are all nonnegative rational numbers.
6.ANR.7.3 Make use of structure and properties of equality to solve one-step equations.	NC.6.EE.7 Solve real-world and mathematical problems by writing and solving equations of the form: • $x+p=q$ in which p, q and x are all nonnegative rational numbers; and, • $p \cdot x=q$ for cases in which p, q and x are all nonnegative rational numbers.
6.ANR.7.4 Construct a viable argument for the reasonableness of the solution of one-step equations using estimation, mental math, and understanding of the context.	New
6.ANR.7.5 Construct a viable argument to determine whether a given number in a specified set makes an inequality true, using substitution.	NC.6.EE.8 Reason about inequalities by: • Using substitution to determine whether a given number in a specified set makes an inequality true. • Writing an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. • Recognizing that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions. • Representing solutions of inequalities on number line diagrams.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

6.ANR.7.6 Make use of structure to translate between verbal descriptions and mathematical representations of inequalities of the form $x > c$, $x \geq c$, $x < c$, or $x \leq c$, given a constraint or condition.	NC.6.EE.8 Reason about inequalities by: • Using substitution to determine whether a given number in a specified set makes an inequality true. • Writing an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. • Recognizing that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions. • Representing solutions of inequalities on number line diagrams. *NOTE: Included $x \geq c$ and $x \leq c$ as they were previously an expectation but were not explicitly stated.
6.ANR.7.7 Make use of structure to recognize that inequalities of the form $x > c$, $x \geq c$, $x < c$, or $x \leq c$ have infinitely many solutions.	NC.6.EE.8 Reason about inequalities by: • Recognizing that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions. *NOTE: Included $x \geq c$ and $x \leq c$ as they were previously an expectation but were not explicitly stated.
6.ANR.7.8 Represent solutions of inequalities of the form $x > c$, $x \geq c$, $x < c$ or $x \leq c$ on number line diagrams.	NC.6.EE.8 Reason about inequalities by: • Representing solutions of inequalities on number line diagrams. *NOTE: Included $x \geq c$ and $x \leq c$ as they were previously an expectation but were not explicitly stated.
6.ANR.7.9 Construct a viable argument for the reasonableness of solutions of inequalities on number line diagrams.	New

Spatial, Geometric, and Measurement Reasoning (SGMR)

Draft 3 Standards	2017 Standards
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NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.6.SGMR.1 Apply geometric reasoning to represent and solve real-world and mathematical problems involving the area of two-dimensional figures.	
NC.6.SGMR.1.1 Construct a model to find the area of a triangle using composition and decomposition of parallelograms.	NC.6.G.1 Create geometric models to solve real-world and mathematical problems to: Find the area of triangles by composing into rectangles and decomposing into right triangles.
NC.6.SGMR.1.2 Construct a model to find the area of a triangle using decomposition of special quadrilaterals and polygons.	NC.6.G.1 Create geometric models to solve real-world and mathematical problems to: Find the area of triangles by composing into rectangles and decomposing into right triangles.
NC.6.SGMR.1.3 Construct models to find the area of special quadrilaterals and polygons by decomposing them into triangles or rectangles.	NC.6.G.1 Create geometric models to solve real-world and mathematical problems to: Find the area of special quadrilaterals and polygons by decomposing into triangles or rectangles.
NC.6.SGMR.1.4 Solve problems by extending structural understanding of areas of triangles, special quadrilaterals, and polygons using efficient and flexible strategies.	NC.6.G.1 Create geometric models to solve real-world and mathematical problems to: Find the area of special quadrilaterals and polygons by decomposing into triangles or rectangles.
NC.6.SGMR.1.5 Construct a viable argument for the solutions of contextual problems involving areas of two-dimensional figures by comparing different geometric representations, estimating or checking for reasonableness, and explaining how the result applies to the context.	New
NC.6.SGMR.2 Apply geometric reasoning to represent and solve real-world and mathematical problems using the coordinate plane.	

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.6.SGMR.2.1 Make use of structure to identify the location of a point given as an ordered pair.	NC.6.NS.6 Understand rational numbers as points on the number line and as ordered pairs on a coordinate plane. b. On a coordinate plane: - Understand signs of numbers in ordered pairs as indicating locations in quadrants.
NC.6.SGMR.2.2 Make use of structure to graph ordered pairs in all four quadrants and axes of a coordinate plane to solve problems.	NC.6.NS.6 Understand rational numbers as points on the number line and as ordered pairs on a coordinate plane. b. On a coordinate plane: - Find and position pairs of rational numbers on a coordinate plane. NC.6.NS.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
NC.6.SGMR.2.3 Make use of structure in recognizing that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes on a coordinate plane.	NC.6.NS.6 Understand rational numbers as points on the number line and as ordered pairs on a coordinate plane. b. On a 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.
NC.6.SGMR.2.4 Reason quantitatively to determine the distances between points with the same x-coordinate or same y-coordinate using coordinates and the absolute value of numbers.	NC.6.G.3 Use the coordinate plane to solve real-world and mathematical problems by: • Drawing polygons in the coordinate plane given coordinates for the vertices.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.6.SGMR.2.5 Make use of structure to recognize and represent polygons in the coordinate plane, given coordinates for the vertices, to solve problems.	NC.6.G.3 Use the coordinate plane to solve real-world and mathematical problems by: Using coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate.
NC.6.SGMR.2.6 Determine the lengths of segments or the sides of a triangle or a quadrilateral on a coordinate plane, with the same x-coordinate or the same y-coordinate, to solve problems involving perimeter and area.	New
NC.6.SGMR.3 Apply geometric reasoning to represent and solve problems involving surface area and volume of three-dimensional figures.	
NC.6.SGMR.3.1 Construct geometric nets, using rectangles and triangles, to build, recognize, and represent right prisms and right pyramids.	NC.6.G.4 Represent right prisms and right pyramids using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
NC.6.SGMR.3.2 Solve problems involving the surface area of right rectangular and triangular prisms using nets, efficiently and flexibly.	NC.6.G.4 Represent right prisms and right pyramids using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
NC.6.SGMR.3.3 Construct a viable argument for the solutions of contextual problems involving surface area of right rectangular and triangular prisms by comparing different geometric representations, estimating or checking for reasonableness, and explaining how the result applies to the context.	New
NC.6.SGMR.3.4 Solve problems by extending structural understanding of the volume of right rectangular prisms with rational edge lengths, efficiently and flexibly.	NC.6.G.2 Apply and extend previous understandings of the volume of a right rectangular prism to find the volume of right rectangular prisms with fractional edge lengths. Apply this understanding to the context of solving real-world and

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	mathematical problems
NC.6.SGMR.3.5 Construct a viable argument for the solutions of contextual problems involving volume of right rectangular prisms with rational edge lengths by comparing different geometric representations, estimating or checking for reasonableness, and explaining how the result applies to the context.	New

Reasoning with Data (RD)

Draft 3 Standards	2017 Standards
NC.6.RD.1 Investigate chance processes and evaluate their probabilities for simple events and uniform (equally likely) probabilities.	
NC.6.RD.1.1 Construct a viable argument to describe the likelihood of a chance event using appropriate probability language and values from zero to one.	Moved from 7th grade: NC.7.SP.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.
NC.6.RD.1.2 Reason quantitatively to determine the theoretical probability of a simple event with equally likely probabilities, comparing the number of favorable outcomes to the total number of outcomes.	Moved from 7th grade: NC.7.SP.7 Develop a probability model and use it to find probabilities of simple events. a. Develop a uniform probability model by assigning equal probability to all outcomes and use the model to determine probabilities of events.
NC.6.RD.1.3 Conduct experiments with simple events that have equally likely probabilities to compare the experimental results with the theoretical probabilities.	Moved from 7th grade: NC.7.SP.7 Develop a probability model and use it to find probabilities of simple events. b. Develop a probability model (which may not be uniform) by repeatedly performing a chance process and observing frequencies in the data generated.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	c. Compare theoretical and experimental probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy
NC.6.RD.2 Formulate and investigate statistical questions to make inferences about univariate data for a population.	
NC.6.RD.2.1 Categorize statistical and non-statistical questions to investigate a topic of interest given a context for univariate data.	NC.6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers
NC.6.RD.2.2 Construct a viable argument to determine whether a question is statistical or non-statistical by analyzing the presence of anticipated variability in the data and accounting for this variability in the answer.	NC.6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers
NC.6.RD.2.3 Evaluate statistical questions and their results for potential bias when investigating univariate data in a single population.	New
NC.6.RD.2.4 Collect data on a single variable for a representative sample of a population.	New
NC.6.RD.2.5 Organize univariate data for a representative sample of a group or population using representations, accurately and clearly, when investigating a real-world topic of interest.	NC.6.SP.4 Display numerical data in plots on a number line. • Use dot plots, histograms, and box plots to represent data. • Compare the attributes of different representations of the same data.
NC.6.RD.3 Examine a set of numerical data in plots on a number line considering center and spread.	
NC.6.RD.3.1 Make use of structure to describe the key features in line plots, histograms, and box plots.	NC.6.SP.5 Summarize numerical data sets in relation to their context. a. Describe the collected data by: • Reporting the number of observations in dot plots and histograms. • Communicating the nature of the attribute under investigation,

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	how it was measured, and the units of measurement.
NC.6.RD.3.2 Reason quantitatively to describe what information can be deduced from line plots, histograms, and box plots examining the center, spread, and shape.	NC.6.SP.2 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.
NC.6.RD.3.3 Construct line plots, histograms, and box plots to represent a distribution of univariate data, by hand within 10 values and using technology within 25 values.	NC.6.SP.4 Display numerical data in plots on a number line. • Use dot plots, histograms, and box plots to represent data. • Compare the attributes of different representations of the same data.
NC.6.RD.3.4 Make use of structure to describe measures of center represented in line plots, histograms, and box plots.	NC.6.SP.3 Understand that both a measure of center and a description of variability should be considered when describing a numerical data set. a. Determine the measure of center of a data set and understand that it is a single number that summarizes all the values of that data set. - o Understand that a mean is a measure of center that represents a balance point or fair share of a data set and can be influenced by the presence of extreme values within the data set. - o Understand the median as a measure of center that is the numerical middle of an ordered data set.
NC.6.RD.3.5 Make use of structure to describe variability represented in line plots, histograms, and box plots.	NC.6.SP.3 Understand that both a measure of center and a description of variability should be considered when describing a numerical data set. b. Understand that describing the variability of a data set is needed to distinguish between data sets in the same scale, by comparing graphical representations of different data sets in the same scale that have similar measures of center, but different spreads.
NC.6.RD.3.6 Make sense of non-standard data visualizations describing univariate data in a single population from real-world	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

sources describing what information is shown and what conclusions can be drawn.	
NC.6.RD.4 Model and analyze a set of numerical data considering center and spread.	
NC.6.RD.4.1 Represent the mean as the balance point of data distributions using visual representations and physical models.	NC.6.SP.3 Understand that both a measure of center and a description of variability should be considered when describing a numerical data set. a. Determine the measure of center of a data set and understand that it is a single number that summarizes all the values of that data set. o Understand that a mean is a measure of center that represents a balance point or fair share of a data set and can be influenced by the presence of extreme values within the data set. o Understand the median as a measure of center that is the numerical middle of an ordered data set.
NC.6.RD.4.2 Determine mean and median for data distributions, by hand within 10 values and using technology within 25 values.	NC.6.SP.3 Understand that both a measure of center and a description of variability should be considered when describing a numerical data set. a. Determine the measure of center of a data set and understand that it is a single number that summarizes all the values of that data set. o Understand that a mean is a measure of center that represents a balance point or fair share of a data set and can be influenced by the presence of extreme values within the data set. o Understand the median as a measure of center that is the numerical middle of an ordered data set.
NC.6.RD.4.3 Make use of structure to compare line plots, histograms, and box plots of different data distributions displayed on the same scale with similar measures of center and different spreads to describe and interpret differences in variability.	NC.6.SP.3 Understand that both a measure of center and a description of variability should be considered when describing a numerical data set. b. Understand that describing the variability of a data set is needed

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	to distinguish between data sets in the same scale, by comparing graphical representations of different data sets in the same scale that have similar measures of center, but different spreads.
NC.6.RD.4.4 Compare different representations of the same data distribution by analyzing their center, spread, and shape.	NC.6.SP.4 Display numerical data in plots on a number line. • Use dot plots, histograms, and box plots to represent data. • Compare the attributes of different representations of the same data
NC.6.RD.4.5 Construct a viable argument about which measure of center best represents a data distribution based on its shape and the context in which the data were gathered.	NC.6.SP.5 Summarize numerical data sets in relation to their context. b. Analyze center and variability by: • Giving quantitative measures of center, describing variability, and any overall pattern, and noting any striking deviations. • Justifying the appropriate choice of measures of center using the shape of the data distribution.
NC.6.RD.5 Summarize and interpret results from an investigation (data cycle) of univariate data to make predictions and draw conclusions.	
NC.6.RD.5.1 Draw inferences about the overall pattern of a data distribution based on its measures of center and variability, its representation, and the context in which the data were gathered.	NC.6.SP.5 Summarize numerical data sets in relation to their context. b. Analyze center and variability by: • Giving quantitative measures of center, describing variability, and any overall pattern, and noting any striking deviations. • Justifying the appropriate choice of measures of center using the shape of the data distribution.
NC.6.RD.5.2 Summarize the distribution of univariate data by describing measures of center and variability, identifying overall patterns, and noting any striking deviations from the pattern.	NC.6.SP.5 Summarize numerical data sets in relation to their context. b. Analyze center and variability by: • Giving quantitative measures of center, describing variability, and

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	any overall pattern, and noting any striking deviations. • Justifying the appropriate choice of measures of center using the shape of the data distribution.
NC.6.RD.5.3 Communicate findings using quantitative measures of center and variability, describing patterns, and noting how the findings relate to the context.	New
NC.6.RD.5.4 Reflect on findings to evaluate whether the original question and methods were appropriate, refining the investigative question, data collection plan, or analysis approach based on results.	New

Seventh Grade

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

7th Grade Mathematics Crosswalk

The purpose of this document is to provide a general comparison of the 2017 7th Grade Math Standard Course of Study and the 2026 7th Grade Math Standard Course of Study. It provides initial insight into similarities and differences between these two sets of standards. As this is an initial comparison, the document does not address every difference or nuance between the draft standards and the current standards.

Draft 3 Domains	2017 Domains
Ratio and Proportional Reasoning (RPR)	Ratio and Proportional Relationships (RP)
Algebraic and Numerical Reasoning (ANR)	Expressions & Equations (EE) The Number System (NS)
Spatial, Geometric, and Measurement Reasoning (SGMR)	Geometry (G)
Reasoning with Data (RD)	Statistics & Probability (SP)

Ratio and Proportional Reasoning (RPR)

Draft 3 Standards	2017 Standards
NC.7.RPR.1 Analyze proportional relationships and use them to solve real-world and mathematical problems.	
NC.7.RPR.1.1 Reason quantitatively to determine invariant relationship(s) present in a problem.	New
NC.7.RPR.1.2 Solve problems by reasoning quantitatively with unit rates, including those with ratios of fractions, using mathematical models and written descriptions.	NC.7.RP.1 Compute unit rates associated with ratios of fractions to solve real-world and mathematical problems. NC.7.RP.2.b Recognize and represent proportional relationships between quantities

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	b. Identify the unit rate (constant of proportionality) within two quantities in a proportional relationship using tables, graphs, equations, and verbal descriptions.
NC.7.RPR.1.3 Construct a viable argument for determining whether two quantities are in a proportional relationship, given a situation involving unit rate (constant of proportionality), using multiple representations.	NC.7.RP.2.a Recognize and represent proportional relationships between quantities. a. Understand that a proportion is a relationship of equality between ratios. • Represent proportional relationships using tables and graphs. • Recognize whether ratios are in a proportional relationship using tables and graphs. • Compare two different proportional relationships using tables, graphs, equations, and verbal descriptions.
NC.7.RPR.1.4 Represent proportional relationships using multiple representations.	NC.7.RP.2.b Recognize and represent proportional relationships between quantities. b. Identify the unit rate (constant of proportionality) within two quantities in a proportional relationship using tables, graphs, equations, and verbal descriptions.
NC.7.RPR.1.5 Compare two different proportional relationships using multiple representations.	NC.7.RP.2.a Recognize and represent proportional relationships between quantities. a. Understand that a proportion is a relationship of equality between ratios. • Represent proportional relationships using tables and graphs. • Recognize whether ratios are in a proportional relationship using tables and graphs. • Compare two different proportional relationships using tables, graphs, equations, and verbal descriptions.
NC.7.RPR.1.6 Make sense of any coordinate point of a proportional relationship in context.	NC.7.RP.2.c/d Recognize and represent proportional relationships between quantities.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	a. Create equations and graphs to represent proportional relationships. b. Use a graphical representation of a proportional relationship in context to: • Explain the meaning of any point (x, y). • Explain the meaning of $(0, 0)$ and why it is included. • Understand that the y-coordinate of the ordered pair $(1, r)$ corresponds to the unit rate and explain its meaning.
NC.7.RPR.2 Analyze proportional relationships and use them to solve real-world and mathematical problems.	
NC.7.RPR.2.1 Solve problems by converting one or both units reasoning quantitatively with unit rates or scale factors given the conversion ratios.	NC.7.RP.3 Use scale factors and unit rates in proportional relationships to solve ratio and percent problems.
NC.7.RPR.2.2 Construct scale drawings and models from actual lengths to determine that corresponding side lengths are proportional and corresponding angle measures are the same.	NC.7.G.1 Solve problems involving scale drawings of geometric figures by: • Building an understanding that angle measures remain the same and side lengths are proportional.
NC.7.RPR.2.3 Solve problems with scale drawings of geometric figures by computing actual lengths and areas or constructing a scale drawing at a different scale.	NC.7.G.1 Solve problems involving scale drawings of geometric figures by: • Building an understanding that angle measures remain the same and side lengths are proportional.
NC.7.RPR.2.4 Express repeated reasoning to determine the effect of scale factor on the area of scaled geometric figures.	New
NC.7.RPR.2.5 Solve ratio and percent problems involving one or more steps by reasoning quantitatively with tax, markups/markdowns, tips, commissions, and percent increase/decrease.	NC.7.RP.3 Use scale factors and unit rates in proportional relationships to solve ratio and percent problems.
NC.7.RPR.3 Analyze proportional relationships and use them to solve real-world and mathematical problems.	

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.7.RPR.3.1 Make sense of the part to whole relationships in circle graphs to relate degree measures in multiples of 30 and 45, benchmark fractional parts of circles in multiples of $\frac{1}{4}$ and $\frac{1}{3}$, and benchmark percents.	New
NC.7.RPR.3.2 Solve problems by reasoning quantitatively to connect degree measures with portions of the whole in circle graphs.	New
NC.7.RPR.3.3 Reason quantitatively to demonstrate an understanding of the ratio relationship between circumference, pi (π), and diameter of a circle, using informal reasoning, visual models and physical models.	NC.7.G.4 Understand area and circumference of a circle. Understand the relationships between the radius, diameter, circumference, and area.
NC.7.RPR.3.4 Solve problems involving the relationships between radius, diameter, and/or circumference of circles.	NC.7.G.4 Understand area and circumference of a circle. Understand the relationships between the radius, diameter, circumference, and area.

Algebraic and Numerical Reasoning (ANR)

Draft 3 Standards	2017 Standards
NC.7.ANR.1 Apply numerical reasoning to perform operations with integers, fractions and decimals.	
NC.7.ANR.1.1 Construct a viable argument demonstrating a rational number can be expressed as a quotient of two integers and as a decimal that either terminates or repeats.	NC.7.NS.2 Apply and extend previous understandings of multiplication and division. a. Understand that a rational number is any number that can be written as a quotient of integers with a non-zero divisor.
NC.7.ANR.1.2 Express repeated reasoning to fluently evaluate the sum, difference, product, or quotient of rational numbers and/or absolute values of rational numbers, using the properties of operations by extending previous understandings of integer operations.	NC.7.NS.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers, using the properties of operations, and describing real-world contexts using sums and differences.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	NC.7.NS.2 Apply and extend previous understandings of multiplication and division. a. Apply properties of operations as strategies, including the standard algorithms, to multiply and divide rational numbers and describe the product and quotient in real-world contexts. NC.7.NS.3 Solve real-world and mathematical problems involving numerical expressions with rational numbers using the four operations.
NC.7.ANR.1.3 Construct a viable argument for the reasonableness of sums, differences, products, and quotients involving rational numbers and/or absolute values of rational numbers by using estimation, contextual reasoning, and previous understandings of integer operations.	New
NC.7.ANR.1.4 Make use of structure to convert fractions to decimals to the thousandths place, extending previous understanding of division.	NC.7.NS.2.c Use division and previous understandings of fractions and decimals. • Convert a fraction to a decimal using long division. • Understand that the decimal form of a rational number terminates in 0s or eventually repeats.
NC.7.ANR.2 Apply algebraic reasoning to generate equivalent linear expressions using properties of operations.	
NC.7.ANR.2.1 Make use of structure to generate equivalent linear expressions with rational coefficients by factoring, combining like terms, and using the distributive property and area model.	NC.7.EE.1 Apply properties of operations as strategies to: • Add, subtract, and expand linear expressions with rational coefficients. • Factor linear expression with an integer GCF.
NC.7.ANR.2.2 Construct a viable argument to demonstrate that equivalent expressions can represent and reveal mathematical and real-world relationships.	NC.7.EE.2 Understand that equivalent expressions can reveal real-world and mathematical relationships. Interpret the meaning of the parts of each expression in context.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.7.ANR.2.3 Make sense of the meaning of the parts of equivalent expressions in context to reveal real-world and mathematical relationships.	NC.7.EE.2 Understand that equivalent expressions can reveal real-world and mathematical relationships. Interpret the meaning of the parts of each expression in context.
NC.7.ANR.3 Apply numeric and algebraic reasoning to solve problems involving expressions, equations, and inequalities with integers, fractions, and decimals.	
NC.7.ANR.3.1 Reason quantitatively to fluently solve multi-step problems, using properties of operations of algebraic expressions to justify your solution process.	NC.7.EE.3 Solve multi-step real-world and mathematical problems posed with rational numbers in algebraic expressions. • Apply properties of operations to calculate with positive and negative numbers in any form. • Convert between different forms of a number and equivalent forms of the expression as appropriate.
NC.7.ANR.3.2 Construct multi-step equations with the same variable on one side of the equation to represent quantities and relationships in real-world problems.	NC.7.EE.4 Use variables to represent quantities to solve real-world or mathematical problems. a. Construct equations to solve problems by reasoning about the quantities. • Fluently solve multistep equations with the variable on one side, including those generated by word problems. • Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. • Interpret the solution in context.
NC.7.ANR.3.2 Make use of structure to compare arithmetic and algebraic solution processes when solving multi-step equations	7.EE.4 Use variables to represent quantities to solve real-world or

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

with variables on one side.	mathematical problems. a. Construct equations to solve problems by reasoning about the quantities. • Fluently solve multistep equations with the variable on one side, including those generated by word problems. • Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. • Interpret the solution in context.
NC.7.ANR.3.4 Convert between rational numbers in different forms and equivalent forms of expressions when solving multi-step problems, using flexible and efficient strategies.	NC.7.NS.3 Solve real-world and mathematical problems involving numerical expressions with rational numbers using the four operations.
NC.7.ANR.3.5 Make use of structure and the properties of equality to solve multi-step equations with variables on one side of the equation, using flexible and efficient strategies.	NC.7.EE.4 Use variables to represent quantities to solve real-world or mathematical problems. a. Construct equations to solve problems by reasoning about the quantities. • Fluently solve multistep equations with the variable on one side, including those generated by word problems. • Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. • Interpret the solution in context.
NC.7.ANR.3.6 Construct a viable argument for the reasonableness of the solutions of multi-step equations.	7.EE.4 Use variables to represent quantities to solve real-world or mathematical problems. a. Construct equations to solve problems by reasoning about the quantities. • Fluently solve multistep equations with the variable on one side, including those generated by word problems.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	• Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. • Interpret the solution in context.
NC.7.ANR.3.7 Construct one-step inequalities to represent quantities and relationships in real-world problems.	NC.7.EE.4 Use variables to represent quantities to solve real-world or mathematical problems. b. Construct inequalities to solve problems by reasoning about the quantities. • Fluently solve multi-step inequalities with the variable on one side, including those generated by word problems. • Compare an algebraic solution process for equations and an algebraic solution process for inequalities. • Graph the solution set of the inequality and interpret in context.
NC.7.ANR.3.8 Make use of structure and the properties of inequalities to solve one-step inequalities, using flexible and efficient strategies.	NC.7.EE.4 Use variables to represent quantities to solve real-world or mathematical problems. b. Construct inequalities to solve problems by reasoning about the quantities. • Fluently solve multi-step inequalities with the variable on one side, including those generated by word problems. • Compare an algebraic solution process for equations and an algebraic solution process for inequalities. • Graph the solution set of the inequality and interpret in context.
NC.7.ANR.3.9 Construct multi-step inequalities using the same variable on one side of the inequality to represent quantities and relationships in real-world problems.	NC.7.EE.4 Use variables to represent quantities to solve real-world or mathematical problems. b. Construct inequalities to solve problems by reasoning about the

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	quantities. • Fluently solve multi-step inequalities with the variable on one side, including those generated by word problems. • Compare an algebraic solution process for equations and an algebraic solution process for inequalities. • Graph the solution set of the inequality and interpret in context.
NC.7.ANR.3.10 Make use of structure and the properties of equality to solve multi-step inequalities with the variable on one side of the inequality.	NC.7.EE.4 Use variables to represent quantities to solve real-world or mathematical problems. b. Construct inequalities to solve problems by reasoning about the quantities. • Fluently solve multi-step inequalities with the variable on one side, including those generated by word problems. • Compare an algebraic solution process for equations and an algebraic solution process for inequalities. • Graph the solution set of the inequality and interpret in context.
NC.7.ANR.3.11 Make use of structure and properties of equality to compare the solution processes for equations and inequalities.	NC.7.EE.4 Use variables to represent quantities to solve real-world or mathematical problems. b. Construct inequalities to solve problems by reasoning about the quantities. • Fluently solve multi-step inequalities with the variable on one side, including those generated by word problems. • Compare an algebraic solution process for equations and an algebraic solution process for inequalities. • Graph the solution set of the inequality and interpret in context.
NC.7.ANR.3.12 Make use of structure to represent solutions of inequalities with the same variable on one side of the inequality	NC.7.EE.4 Use variables to represent quantities to solve real-world

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

on number line diagrams.	or mathematical problems. b. Construct inequalities to solve problems by reasoning about the quantities. • Fluently solve multi-step inequalities with the variable on one side, including those generated by word problems. • Compare an algebraic solution process for equations and an algebraic solution process for inequalities. • Graph the solution set of the inequality and interpret in context.
NC.7.ANR.3.13 Construct a viable argument for the reasonableness of the solution set of an inequality.	NC.7.EE.4 Use variables to represent quantities to solve real-world or mathematical problems. b. Construct inequalities to solve problems by reasoning about the quantities. • Fluently solve multi-step inequalities with the variable on one side, including those generated by word problems. • Compare an algebraic solution process for equations and an algebraic solution process for inequalities. • Graph the solution set of the inequality and interpret in context.
NC.7.ANR.3.14 Construct a viable argument for determining whether an equation or inequality best represents the relationship between quantities in a contextual situation.	New

Spatial, Geometric, and Measurement Reasoning (SGMR)

Draft 3 Standards	2017 Standards
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NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.7.SGMR.1 Apply geometric reasoning to solve problems involving areas of two-dimensional figures composed of triangles, quadrilaterals, circles, and polygons.	
NC.7.SGMR.1.1 Make use of structure to understand the relationships between circumference, pi (π), diameter, and area of a circle, using informal reasoning, visual and physical models.	NC.7.G.4 Understand area and circumference of a circle. - Understand the relationships between the radius, diameter, circumference, and area. - Apply the formulas for area and circumference of a circle to solve problems.
NC.7.SGMR.1.2 Solve problems by reasoning quantitatively about the area of a circle when given the radius, diameter, or circumference.	NC.7.G.4 Understand area and circumference of a circle. - Understand the relationships between the radius, diameter, circumference, and area. - Apply the formulas for area and circumference of a circle to solve problems.
NC.7.SGMR.1.3 Solve problems by reasoning quantitatively about the perimeter and area of two-dimensional figures composed of triangles, rectangles, and circles.	NC.7.G.6 Solve real-world and mathematical problems involving: - Area and perimeter of two-dimensional objects composed of triangles, quadrilaterals, and polygons. - Volume and surface area of pyramids, prisms, or three-dimensional objects composed of cubes, pyramids, and right prisms.
NC.7.SGMR.1.4 Construct a viable argument for the solutions of contextual problems involving area and perimeter of two-dimensional figures by comparing different geometric representations, estimating or checking for reasonableness, and explaining how the result applies to the context.	New
NC.7.SGMR.2 Apply geometric reasoning to solve real-world and mathematical problems involving volume and surface area of three-dimensional figures.	
NC.7.SGMR.2.1 Make use of structure to demonstrate an understanding of the surface area of right prisms and cylinders as the sum of the areas of the faces using models.	NC.7.G.6 Solve real-world and mathematical problems involving: - Area and perimeter of two-dimensional objects composed of triangles, quadrilaterals, and polygons. - Volume and surface area of pyramids, prisms, or three-dimensional objects composed of cubes, pyramids, and right prisms.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	New: The surface area of a cylinder is new content. *Note: The surface area of pyramids was moved to 8th grade: • NC.8.SGMR.6.2 Solve problems by reasoning quantitatively about the surface area of pyramids or three-dimensional objects composed of cubes, cylinders, prisms, and right pyramids, efficiently and flexibly.
NC.7.SGMR.2.2 Solve problems by reasoning quantitatively about the surface area of right prisms, cylinders, or three-dimensional objects composed of cubes, cylinders, and right prisms, efficiently and flexibly.	NC.7.G.6 Solve real-world and mathematical problems involving: • Area and perimeter of two-dimensional objects composed of triangles, quadrilaterals, and polygons. • Volume and surface area of pyramids, prisms, or three-dimensional objects composed of cubes, pyramids, and right prisms. New: The surface area of a cylinder is new content. *Note: The surface area of pyramids was moved to 8th grade: • NC.8.SGMR.6.2 Solve problems by reasoning quantitatively about the surface area of pyramids or three-dimensional objects composed of cubes, cylinders, prisms, and right pyramids, efficiently and flexibly.
NC.7.SGMR.2.3 Construct a viable argument for the solutions of contextual problems involving surface area of right prisms and cylinders by comparing different geometric representations, estimating or checking for reasonableness, and explaining how the result applies to the context.	New
NC.7.SGMR.2.4 Make use of structure to demonstrate an understanding of the volume of right prisms and cylinders as multiple layers of the base using models.	NC.7.G.6 Solve real-world and mathematical problems involving: • Area and perimeter of two-dimensional objects composed

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	of triangles, quadrilaterals, and polygons. • Volume and surface area of pyramids, prisms, or three-dimensional objects composed of cubes, pyramids, and right prisms. *NOTE: The volume of pyramids was moved from 7th grade to 8th grade. Moved from 8th grade NC.8.G.9 Understand how the formulas for the volumes of cones, cylinders, and spheres are related and use the relationship to solve real-world and mathematical problems. *NOTE: The volume of cylinders was moved from 8th grade to 7th grade.
NC.7.SGMR.2.5 Solve problems involving the volume of right prisms and cylinders using appropriate tools and/or technology, efficiently and flexibly.	NC.7.G.6 Solve real-world and mathematical problems involving: • Area and perimeter of two-dimensional objects composed of triangles, quadrilaterals, and polygons. • Volume and surface area of pyramids, prisms, or three-dimensional objects composed of cubes, pyramids, and right prisms. Moved from 8th grade: NC.8.G.9 Understand how the formulas for the volumes of cones, cylinders, and spheres are related and use the relationship to solve real-world and mathematical problems. *NOTE: • The volume of cylinders was moved from 8th grade to 7th grade. The volume of cones and spheres remain in 8th grade. • The surface area of pyramids was moved to 8th grade: ○ NC.8.SGMR.6.2 Solve problems by

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	reasoning quantitatively about the surface area of pyramids or three-dimensional objects composed of cubes, cylinders, prisms, and right pyramids, efficiently and flexibly.
NC.7.SGMR.2.6 Construct a viable argument for the solutions of contextual problems involving volume of right prisms and cylinders comparing different geometric representations, estimating or checking for reasonableness, and explaining how the result applies to the context.	New
NC.7.SGMR.3 Apply geometric reasoning based on angle relationships to determine unknown angles.	
NC.7.SGMR.3.1 Make use of structure to describe relationships among pairs of angles that are vertical, adjacent, supplementary, or complementary.	NC.7.G.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve equations for an unknown angle in a figure.
NC.7.SGMR.3.2 Reason quantitatively to determine an unknown angle in a figure using the relationships between supplementary, complementary, vertical, and adjacent angles efficiently and flexibly.	NC.7.G.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve equations for an unknown angle in a figure.
NC.7.SGMR.3.3 Construct multi-step equations to determine an unknown angle in a figure using the relationships between complementary, supplementary, vertical, and adjacent angles efficiently and flexibly.	NC.7.G.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve equations for an unknown angle in a figure.
NC.7.SGMR.3.4 Solve multi-step problems with unknown angles formed by intersecting lines, reasoning quantitatively about the relationships between vertical, adjacent, complementary, and supplementary angles.	NC.7.G.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve equations for an unknown angle in a figure.

Reasoning with Data (RD)

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Draft 3 Standards	2017 Standards
NC.7.RD.1 Investigate chance processes and evaluate their probabilities for compound events and unequally likely probabilities.	
NC.7.RD.1.1 Reason quantitatively to determine the theoretical probability of simple events with unequally likely outcomes as the ratio of favorable outcomes to total outcomes.	NC.7.SP.7 Develop a probability model and use it to find probabilities of simple events. b. Develop a probability model (which may not be uniform) by repeatedly performing a chance process and observing frequencies in the data generated.
NC.7.RD.1.2 Conduct experiments of compound events that have equally likely probabilities to compare the experimental results with the theoretical probabilities.	NC.7.SP.8 Determine probabilities of compound events using organized lists, tables, tree diagrams, and simulation. c. Design and use a simulation to generate frequencies for compound events.
NC.7.RD.1.3 Make use of structure to determine probabilities of compound events using organized lists, tables, tree diagrams, and simulations.	NC.7.SP.8 Determine probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
NC.7.RD.1.4 Make use of structure to identify outcomes in a sample space for compound events in context, using organized lists, tables, and tree diagrams.	NC.7.SP.8 Determine probabilities of compound events using organized lists, tables, tree diagrams, and simulation. b. For an event described in everyday language, identify the outcomes in the sample space which compose the event, when the sample space is represented using organized lists, tables, and tree diagrams.
NC.7.RD.1.5 Design simulations to collect data for the frequencies of compound events to approximate probabilities.	NC.7.SP.8 Determine probabilities of compound events using organized lists, tables, tree diagrams, and simulation. c. Design and use a simulation to generate frequencies for compound events.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.7.RD.1.6 Predict theoretical probabilities based on relative frequencies from experiments, using proportional reasoning.	NC.7.SP.6 Collect data to calculate the experimental probability of a chance event, observing its long-run relative frequency. Use this experimental probability to predict the approximate relative frequency.
NC.7.RD.1.7 Predict approximate relative frequencies based on theoretical probabilities, using proportional reasoning.	NC.7.SP.6 Collect data to calculate the experimental probability of a chance event, observing its long-run relative frequency. Use this experimental probability to predict the approximate relative frequency.
NC.7.RD.1.8 Express repeated reasoning to determine that the experimental probability of a chance event gets closer to the theoretical probability as the number of trials increases.	NC.7.SP.6 Collect data to calculate the experimental probability of a chance event, observing its long-run relative frequency. Use this experimental probability to predict the approximate relative frequency.
NC.7.RD.1.9 Construct a viable argument for the similarities and differences between experimental results and theoretical probabilities from physical and visual models.	NC.7.SP.7 Develop a probability model and use it to find probabilities of simple events. c. Compare theoretical and experimental probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
NC.7.RD.2 Formulate and investigate statistical questions to make inferences about univariate data from two groups or populations.	
NC.7.RD.2.1 Categorize statistical or non-statistical questions to investigate a topic of interest given a context for univariate data across two groups or populations.	NC.6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers *NOTE: Added to align content across grades 6-8
NC.7.RD.2.2 Create statistical questions to consider numerical or categorical data that explores variability between two groups or populations.	NC.6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers *NOTE: Added to align content across grades 6-8

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.7.RD.2.3 Construct a viable argument to determine the validity of a sample representing a population.	NC.7.SP.1 Understand that statistics can be used to gain information about a population by: • Recognizing that generalizations about a population from a sample are valid only if the sample is representative of that population. • Using random sampling to produce representative samples to support valid inferences
NC.7.RD.2.4 Evaluate statistical questions for biases in the data and responses from two groups or populations.	NC.7.SP.1 Understand that statistics can be used to gain information about a population by: • Recognizing that generalizations about a population from a sample are valid only if the sample is representative of that population. • Using random sampling to produce representative samples to support valid inferences
NC.7.RD.2.5 Construct a viable argument for how a random sample increases the likelihood that the sample represents the population.	NC.7.SP.1 Understand that statistics can be used to gain information about a population by: • Recognizing that generalizations about a population from a sample are valid only if the sample is representative of that population. • Using random sampling to produce representative samples to support valid inferences
NC.7.RD.2.6 Use simulations to create random, representative samples to make predictions or estimates about a population parameter.	NC.7.SP.2 Generate multiple random samples (or simulated samples) of the same size to gauge the variation in estimates or predictions, and use this data to draw inferences about a population with an unknown characteristic of interest.
NC.7.RD.2.7 Collect data on a single variable for representative samples of two groups or populations.	New
NC.7.RD.2.8 Generate multiple random samples of the same size to evaluate the validity of inferences about a population with an unknown characteristic of interest.	NC.7.SP.2 Generate multiple random samples (or simulated samples) of the same size to gauge the variation in estimates or predictions, and use this data to draw inferences about a population with an unknown characteristic

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	of interest.
NC.7.RD.2.9 Organize univariate data for representative samples of two groups or populations using representations, accurately and clearly, when investigating a real-world topic of interest.	NC.6.SP.4 Display numerical data in plots on a number line. • Use dot plots, histograms, and box plots to represent data. • Compare the attributes of different representations of the same data. *NOTE: Added to align content across grades 6-8
NC.7.RD.3 Examine two sets of numerical data in plots on a number line considering the center and spread of univariate data.	
NC.7.RD.3.1 Make use of structure to compare two distributions of univariate data, informally examining the shape, center, and variability seen in given line plots, box plots, and/or histograms.	NC.7.SP.3 Recognize the role of variability when comparing two populations. b. Informally assess the difference between two data sets by examining the overlap and separation between the graphical representations of two data sets.
NC.7.RD.3.2 Construct line plots, histograms, and box plots to represent two distributions of univariate data on one plot, by hand within 10 values and using technology within 25 values.	NC.6.SP.4 Display numerical data in plots on a number line. • Use dot plots, histograms, and box plots to represent data. • Compare the attributes of different representations of the same data. *NOTE: Added to align content across grades 6-8
NC.7.RD.3.3 Make sense of non-standard data visualizations describing two groups or populations from real-world sources, such as infographics and media-based displays, describing what information is shown and what conclusions can be drawn.	New
NC.7.RD.4 Model and analyze the center and spread of up to two sets of numerical data.	
NC.7.RD.4.1 Represent range, interquartile range (IQR), and mean absolute deviation (MAD) as measures that describe the spread of data using visual representations and physical models.	NC.7.SP.3 Recognize the role of variability when comparing two populations. b. Informally assess the difference between two data sets by examining the overlap and separation between the graphical representations of two data sets.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.7.RD.4.2 Determine the range, interquartile range (IQR), and mean absolute deviation (MAD) for data distributions, by hand within 10 values and using technology within 25 values.	NC.7.SP.3 Recognize the role of variability when comparing two populations. a. Calculate the measure of variability of a data set and understand that it describes how the values of the data set vary with a single number. - o Understand the mean absolute deviation of a data set is a measure of variability that describes the average distance that points within a data set are from the mean of the data set. - o Understand that the range describes the spread of the entire data set. - o Understand that the interquartile range describes the spread of the middle 50% of the data.
NC.7.RD.4.3 Construct a viable argument expressing why both a measure of center and variability are necessary to describe or compare distributions of data.	New
NC.7.RD.4.4 Construct a viable argument for the use of the appropriate measure(s) of variability (range, interquartile range (IQR), and mean absolute deviation (MAD)) based on the shape of a data distribution.	NC.7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw comparative inferences about two populations. *NOTE: Added to align content across grades 6-8
NC.7.RD.4.5 Compare two data distributions considering their measures of center (mean and median) using technology and visual representations.	NC.7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw comparative inferences about two populations.
NC.7.RD.4.6 Compare two data distributions considering their measures of variability (range, IQR, and MAD), using technology and visual representations.	NC.7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw comparative inferences about two populations.
NC.7.RD.4.7 Reason quantitatively to describe the effect of an extreme value on the measures of center and variability of a	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

data distribution.	
NC.7.RD.4.8 Reason quantitatively to determine which representation (line plot, box plot, histogram) most accurately represents certain characteristics of a data distribution.	New
NC.7.RD.5 Summarize and interpret results from an investigation (data cycle) of univariate data to make predictions and draw conclusions.	
NC.7.RD.5.1 Draw comparative inferences between two groups or populations based on their measures of center and spread, their representations, and the context in which the data were gathered.	NC.7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw comparative inferences about two populations.
NC.7.RD.5.2 Summarize the distribution of univariate data between two groups or populations by comparing measures of center and variability, identifying overall patterns, and noting any striking deviations from the pattern.	NC.7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw comparative inferences about two populations.
NC.7.RD.5.3 Communicate findings using qualitative and quantitative measures of center and variability, describing patterns, and noting how the findings relate to the context.	New
NC.7.RD.5.4 Reflect on findings to evaluate whether the original question and methods were appropriate, refining the investigative question, data collection plan, or analysis approach based on results.	New

Eighth Grade

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

8th Grade Mathematics Crosswalk

The purpose of this document is to provide a general comparison of the 2017 8th Grade Math Standard Course of Study and the 2026 8th Grade Math Standard Course of Study. It provides initial insight into similarities and differences between these two sets of standards. As this is an initial comparison, the document does not address every difference or nuance between the draft standards and the current standards.

Draft 3 Domains	2017 Domains
Algebraic, Numerical, and Functional Reasoning (ANFR)	Expressions & Equations (EE) The Number System (NS) Functions (F)
Spatial, Geometric, and Measurement Reasoning (SGMR)	Geometry (G)
Reasoning with Data (RD)	Statistics & Probability (SP)

Algebraic, Numerical, and Functional Reasoning (ANFR)

Draft 3 Standards	2017 Standards
NC.8.ANFR.1 Apply properties of operations to solve real-world and mathematical problems using equations and inequalities in one variable.	
NC.8.ANFR.1.1 Construct linear equations with the same variable on both sides of the equation to represent quantities and relationships from a given context.	NC.8.EE.7 Solve real-world and mathematical problems by writing and solving equations and inequalities in one variable. - Recognize linear equations in one variable as having one solution, infinitely many solutions, or no solutions. - Solve linear equations and inequalities, including multi-step equations and inequalities with the same variable on both sides.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.8.ANFR.1.2 Make use of structure and properties of equality to solve linear equations with the same variable on both sides of the equation, using flexible and efficient strategies.	NC.8.EE.7 Solve real-world and mathematical problems by writing and solving equations and inequalities in one variable. • Recognize linear equations in one variable as having one solution, infinitely many solutions, or no solutions. • Solve linear equations and inequalities, including multi-step equations and inequalities with the same variable on both sides.
NC.8.ANFR.1.3 Construct a viable argument demonstrating whether one-variable equations have one solution, infinitely many solutions, or no solutions in a real-world context.	NC.8.EE.7 Solve real-world and mathematical problems by writing and solving equations and inequalities in one variable. • Recognize linear equations in one variable as having one solution, infinitely many solutions, or no solutions. • Solve linear equations and inequalities, including multi-step equations and inequalities with the same variable on both sides.
NC.8.ANFR.1.4 Construct linear inequalities with the same variable on both sides of the inequality to represent quantities and relationships from a given context.	NC.8.EE.7 Solve real-world and mathematical problems by writing and solving equations and inequalities in one variable. • Recognize linear equations in one variable as having one solution, infinitely many solutions, or no solutions. • Solve linear equations and inequalities, including multi-step equations and inequalities with the same variable on both sides.
NC.8.ANFR.1.5 Make use of structure and properties of equality to solve linear inequalities with the same variable on both sides of the inequality, using flexible and efficient strategies.	NC.8.EE.7 Solve real-world and mathematical problems by writing and solving equations and inequalities in one variable. • Recognize linear equations in one variable as having one solution, infinitely many solutions, or no solutions. • Solve linear equations and inequalities, including multi-step equations and inequalities with the same variable on both sides.



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.8.ANFR.1.6 Construct a viable argument for the reasonableness of the solutions of equations and inequalities with the same variables on both sides of the equation or inequality in context.	New
NC.8.ANFR.2 Analyze patterns of change across different function types to make use of structure.	
NC.8.ANFR.2.1 Make use of structure to recognize a function as a rule that assigns to each input in the domain exactly one output in the range, when represented as a graph, table, or set of ordered pairs.	NC.8.F.1 Understand that a function is a rule that assigns to each input exactly one output.
NC.8.ANFR.2.2 Make use of structure to determine where a function is increasing or decreasing and linear or non-linear when represented in a graph, table, or set of ordered pairs.	NC.8.F.5 Qualitatively analyze the functional relationship between two quantities. - Analyze a graph determining where the function is increasing or decreasing; linear or non-linear. - Sketch a graph that exhibits the qualitative features of a real-world function
NC.8.ANFR.2.3 Represent the qualitative features of a real-world function on a coordinate plane.	NC.8.F.5 Qualitatively analyze the functional relationship between two quantities. - Analyze a graph determining where the function is increasing or decreasing; linear or non-linear. - Sketch a graph that exhibits the qualitative features of a real-world function.
NC.8.ANFR.3 Analyze linear functions and their key characteristics to represent and solve problems in mathematical and real-world contexts.	
NC.8.ANFR.3.1 Make use of structure to identify linear functions represented in tables, equations, graphs, or in context.	NC.8.F.3 Identify linear functions from tables, equations, and graphs.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	NC.8.F.4 Analyze functions that model linear relationships. • Understand that a linear relationship can be generalized by $y = mx + b$. • Write an equation in slope-intercept form to model a linear relationship by determining the rate of change and the initial value, given at least two (x, y) values or a graph. • Construct a graph of a linear relationship given an equation in slope-intercept form. • Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of the slope and y-intercept of its graph or a table of values.
NC.8.ANFR.3.2 Construct an equation in slope-intercept form to represent a linear relationship given a graph, at least two coordinates, or written context.	NC.8.F.4 Analyze functions that model linear relationships. • Understand that a linear relationship can be generalized by $y = mx + b$. • Write an equation in slope-intercept form to model a linear relationship by determining the rate of change and the initial value, given at least two (x, y) values or a graph. • Construct a graph of a linear relationship given an equation in slope-intercept form. • Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of the slope and y-intercept of its graph or a table of values.
NC.8.ANFR.3.3 Construct a graph of a linear relationship given an equation in slope-intercept form.	NC.8.F.4 Analyze functions that model linear relationships. • Understand that a linear relationship can be generalized by $y = mx + b$. • Write an equation in slope-intercept form to model a linear relationship by determining the rate of change and the initial value, given at least two (x, y) values or a graph. • Construct a graph of a linear relationship given an equation in slope-intercept form.



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of the slope and y-intercept of its graph or a table of values.
NC.8.ANFR.3.4 Make sense of the rate of change (slope) and initial value (y-intercept) of a linear function in terms of the situation it models represented by a graph, table, equation, or written context.	NC.8.F.4 Analyze functions that model linear relationships. - Understand that a linear relationship can be generalized by $y = mx + b$. - Write an equation in slope-intercept form to model a linear relationship by determining the rate of change and the initial value, given at least two (x, y) values or a graph. - Construct a graph of a linear relationship given an equation in slope-intercept form. - Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of the slope and y-intercept of its graph or a table of values.
NC.8.ANFR.3.5 Construct viable arguments in comparing properties of two linear functions each represented in a different way.	NC.8.F.2 Compare properties of two linear functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
NC.8.ANFR.4 Describe and represent the relationships among the subsets of the real number system.	
NC.8.ANFR.4.1 Reason quantitatively to categorize a number as irrational when it cannot be expressed as the ratio of two integers and its decimal expansion neither terminates nor repeats.	NC.8.NS.1 Understand that every number has a decimal expansion. Building upon the definition of a rational number, know that an irrational number is defined as a non-repeating, non-terminating decimal.
NC.8.ANFR.4.2 Reason quantitatively to compare irrational numbers on a number line, estimating their values between consecutive integers and approximating their values to the nearest whole number.	NC.8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers and locate them approximately on a number line.
NC.8.ANFR.4.3 Make use of structure to approximate the value of expressions involving pi (π) to the nearest hundredth.	NC.8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers and locate them approximately on a number line. Estimate the value of expressions



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	involving: • Square roots and cube roots to the tenths. • π to the hundredths.
NC.8.ANFR.5 Develop and apply properties of radicals and integer exponents.	
NC.8.ANFR.5.1 Express repeated reasoning to generate equivalent numerical expressions using the properties of integer exponents.	NC.8.EE.1 Develop and apply the properties of integer exponents to generate equivalent numerical expressions.
NC.8.ANFR.5.2 Evaluate square roots of perfect squares and cube roots of perfect cubes for positive numbers within 400.	NC.8.EE.2 Use square root and cube root symbols to: • Represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. • Evaluate square roots of perfect squares and cube roots of perfect cubes for positive numbers less than or equal to 400.
NC.8.ANFR.5.3 Make use of structure to approximate the value of expressions involving square roots and cube roots to the nearest whole number.	NC.8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers and locate them approximately on a number line. Estimate the value of expressions involving: • Square roots and cube roots to the tenths. • π to the hundredths.
NC.8.ANFR.5.4 Make use of structure and properties of equality to solve one-step equations written in the form $x^2 = p$ and $x^3 = p$, where p is a positive, whole number.	NC.8.EE.2 Use square root and cube root symbols to: • Represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. • Evaluate square roots of perfect squares and cube roots of perfect cubes for positive numbers less than or equal to 400.
NC.8.ANFR.5.5 Make use of structure to represent and approximate very large or very small quantities using scientific notation.	NC.8.EE.3 Use numbers expressed in scientific notation to estimate very large or very small quantities and to express how many times as much one is than the other.



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.8.ANFR.5.6 Construct viable arguments to determine how many times greater or less one number, written in scientific notation, is compared to another based on properties of exponents and other algebraic properties.	NC.8.EE.3 Use numbers expressed in scientific notation to estimate very large or very small quantities and to express how many times as much one is than the other.
	Removed NC.8.EE.4 Perform multiplication and division with numbers expressed in scientific notation to solve real-world problems, including problems where both decimal and scientific notation are used.
	Moved to Math 1 NC.8.EE.7 Analyze and solve a system of two linear equations in two variables in slope-intercept form. • Understand that solutions to a system of two linear equations correspond to the points of intersection of their graphs because the point of intersection satisfies both equations simultaneously. • Solve real-world and mathematical problems leading to systems of linear equations by graphing the equations. Solve simple cases by inspection.

Spatial, Geometric, and Measurement Reasoning (SGMR)

Draft 3 Standards	2017 Standards
NC.8.SGMR.1 Understand congruence and similarity using physical models, transparencies, or geometry software.	
NC.8.SGMR.1.1 Make use of structure to describe up to two rigid transformations - translations, reflections across the x- or y-axis,	NC.8.G.3 Describe the effect of dilations about the origin, translations, rotations about the origin in 90 degree increments,



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

and 90° rotations about the origin - of triangles and quadrilaterals, revealing the relationship between a preimage and its image.	and reflections across the x-axis and y-axis on two-dimensional figures using coordinates.
NC.8.SGMR.1.2 Represent up to two rigid transformations - translations, reflections across the x- or y-axis, and 90° rotations about the origin - of triangles and quadrilaterals, revealing the relationship between a preimage and its image.	NC.8.G.3 Describe the effect of dilations about the origin, translations, rotations about the origin in 90 degree increments, and reflections across the x-axis and y-axis on two-dimensional figures using coordinates.
NC.8.SGMR.2 Describe nonrigid transformations between two triangles or two quadrilaterals.	
NC.8.SGMR.2.1 Investigate dilations using a geometric model and applying a scale factor from a center of dilation, demonstrating that corresponding points remain on the same rays and distances are proportional, revealing the relationship between the preimage and image.	NC.8.G.3 Describe the effect of dilations about the origin, translations, rotations about the origin in 90 degree increments, and reflections across the x-axis and y-axis on two-dimensional figures using coordinates.
NC.8.SGMR.2.2 Make use of structure to determine the scale factor of the preimage and image after a dilation about the origin for mathematical problems.	NC.8.G.3 Describe the effect of dilations about the origin, translations, rotations about the origin in 90 degree increments, and reflections across the x-axis and y-axis on two-dimensional figures using coordinates.
NC.8.SGMR.2.3 Make use of structure to describe a dilation about the origin, revealing the relationship of a preimage and its image in context.	NC.8.G.3 Describe the effect of dilations about the origin, translations, rotations about the origin in 90 degree increments, and reflections across the x-axis and y-axis on two-dimensional figures using coordinates.
NC.8.SGMR.2.4 Represent a dilation about the origin on a coordinate plane, revealing the relationship of a preimage and its image.	NC.8.G.3 Describe the effect of dilations about the origin, translations, rotations about the origin in 90 degree increments, and reflections across the x-axis and y-axis on two-dimensional figures using coordinates.
NC.8.SGMR.3 Investigate characteristics of triangles that determine a unique triangle, more than one triangle, or no triangle.	



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.8.SGMR.3.1 Make use of structure to determine whether a unique triangle, more than one triangle, or no triangle can be formed when given combinations of side lengths.	Moved from 7th grade NC.7.G.2 Understand the characteristics of angles and side lengths that create a unique triangle, more than one triangle or no triangle. Build triangles from three measures of angles and/or sides.
NC.8.SGMR.3.2 Construct a viable argument verifying that the sum of the interior angles of a triangle is 180 degrees.	New
NC.8.SGMR.3.3 Construct a viable argument for the combinations of sides and angles that create a unique triangle, more than one triangle, or no triangle, using visual and physical models.	NC.8.G.5 Use informal arguments to analyze angle relationships. • Recognize relationships between interior and exterior angles of a triangle. • Recognize the relationships between the angles created when parallel lines are cut by a transversal. • Recognize the angle-angle criterion for similarity of triangles. • Solve real-world and mathematical problems involving angles.
NC.8.SGMR.4 Apply geometric reasoning based on angle relationships to solve problems.	
NC.8.SGMR.4.1 Make use of structure to describe relationships between interior and exterior angles in triangles.	NC.8.G.5 Use informal arguments to analyze angle relationships. • Recognize relationships between interior and exterior angles of a triangle. • Recognize the relationships between the angles created when parallel lines are cut by a transversal. • Recognize the angle-angle criterion for similarity of triangles. • Solve real-world and mathematical problems involving angles.
NC.8.SGMR.4.2 Reason quantitatively to determine missing interior or exterior angle measures of a triangle using their relationships.	NC.8.G.5 Use informal arguments to analyze angle relationships. • Recognize relationships between interior and exterior angles of a triangle. • Recognize the relationships between the angles



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	created when parallel lines are cut by a transversal. - Recognize the angle-angle criterion for similarity of triangles. - Solve real-world and mathematical problems involving angles.
NC.8.SGMR.4.3 Make use of structure, extending previous understanding of angle relationships, to identify angles based on their relationship between angles formed when parallel lines are cut by a transversal.	NC.8.G.5 Use informal arguments to analyze angle relationships. - Recognize relationships between interior and exterior angles of a triangle. - Recognize the relationships between the angles created when parallel lines are cut by a transversal. - Recognize the angle-angle criterion for similarity of triangles. - Solve real-world and mathematical problems involving angles.
NC.8.SGMR.4.4 Reason quantitatively to determine missing angle measures, using angle relationships formed when parallel lines are cut by a transversal.	NC.8.G.5 Use informal arguments to analyze angle relationships. - Recognize relationships between interior and exterior angles of a triangle. - Recognize the relationships between the angles created when parallel lines are cut by a transversal. - Recognize the angle-angle criterion for similarity of triangles. - Solve real-world and mathematical problems involving angles.
NC.8.SGMR.4.5 Solve multi-step problems reasoning quantitatively about angle relationships formed by parallel lines, transversals, triangles, and intersecting lines.	NC.8.G.5 Use informal arguments to analyze angle relationships. - Recognize relationships between interior and exterior angles of a triangle. - Recognize the relationships between the angles created when parallel lines are cut by a transversal. - Recognize the angle-angle criterion for similarity of triangles. - Solve real-world and mathematical problems involving angles.



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.8.SGMR.5 Apply the Pythagorean Theorem and its converse to solve real-world and mathematical problems.	
NC.8.SGMR.5.1 Construct a viable argument verifying the Pythagorean Theorem using diagrams, concrete objects, and measurement.	NC.8.G.6 Explain the Pythagorean Theorem and its converse.
NC.8.SGMR.5.2 Solve problems by reasoning quantitatively about the Pythagorean Theorem and its converse, using efficient and flexible strategies.	NC.8.G.7 Apply the Pythagorean Theorem and its converse to solve real-world and mathematical problems.
NC.8.SGMR.5.3 Make use of structure to determine the distance between two points on the coordinate plane using the Pythagorean Theorem.	NC.8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
NC.8.SGMR.6 Apply geometric reasoning to solve real-world and mathematical problems involving volume and surface area of three-dimensional figures.	
NC.8.SGMR.6.1 Make use of structure to demonstrate an understanding of the surface area of right pyramids as the sum of the areas of the faces, using visual and physical models and formulas.	Moved from 7th grade: NC.7.G.6 Solve real-world and mathematical problems involving: • Area and perimeter of two-dimensional objects composed of triangles, quadrilaterals, and polygons. • Volume and surface area of pyramids, prisms, or three-dimensional objects composed of cubes, pyramids, and right prisms. *NOTE: Only the surface area of pyramids content was moved from 7th to 8th grade.
NC.8.SGMR.6.2 Solve problems by reasoning quantitatively involving the surface area of right pyramids or three-dimensional objects composed of cubes, cylinders, prisms, and right pyramids, efficiently and flexibly.	Moved from 7th grade: NC.7.G.6 Solve real-world and mathematical problems involving: • Area and perimeter of two-dimensional objects composed of triangles, quadrilaterals, and polygons. • Volume and surface area of pyramids, prisms, or three-dimensional objects composed of cubes, pyramids, and right prisms. *NOTE: Only the surface area of pyramids content was moved from 7th to 8th grade.
NC.8.SGMR.6.3 Construct a viable argument for the solutions of	New



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

contextual problems involving surface area of right pyramids by comparing different geometric representations, estimating or checking for reasonableness, and explaining how the result applies to the context.	
NC.8.SGMR.6.4 Represent the relationship between the volumes of cylinders and cones with the same base area and height, using visual and physical models.	NC.8.G.9 Understand how the formulas for the volumes of cones, cylinders, and spheres are related and use the relationship to solve real-world and mathematical problems.
NC.8.SGMR.6.5 Represent the relationship between the volumes of cylinders and spheres with the same radius and height, using visual and physical models.	NC.8.G.9 Understand how the formulas for the volumes of cones, cylinders, and spheres are related and use the relationship to solve real-world and mathematical problems.
NC.8.SGMR.6.6 Represent the relationship between the volumes of pyramids and prisms with the same base area and height, using visual and physical models.	NC.8.G.9 Understand how the formulas for the volumes of cones, cylinders, and spheres are related and use the relationship to solve real-world and mathematical problems.
NC.8.SGMR.6.7 Solve problems by reasoning quantitatively about the volume of pyramids, cones, spheres, or three-dimensional objects composed of pyramids, cones, and/or spheres.	NC.8.G.9 Understand how the formulas for the volumes of cones, cylinders, and spheres are related and use the relationship to solve real-world and mathematical problems. *NOTE: Only the volume of cylinders content was moved from 8th grade to 7th grade. Moved from 7th grade: NC.7.G.6 Solve real-world and mathematical problems involving: • Area and perimeter of two-dimensional objects composed of triangles, quadrilaterals, and polygons. • Volume and surface area of pyramids, prisms, or three-dimensional objects composed of cubes, pyramids, and right prisms. *NOTE: Only the volume of pyramids content was moved from 7th to 8th grade.
NC.8.SGMR.6.8 Construct a viable argument for the solutions of contextual problems involving volume of pyramids, cones, and spheres by comparing different geometric representations,	New



NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

estimating or checking for reasonableness, and explaining how the result applies to the context.	
	Moved to Math 1 NC.8.G.2 Use transformations to define congruence. • Verify experimentally the properties of rotations, reflections, and translations that create congruent figures. • Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations. • Given two congruent figures, describe a sequence that exhibits the congruence between them.
	Moved to Math 1 NC.8.G.4 Use transformations to define similarity. • Verify experimentally the properties of dilations that create similar figures. • Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations. • Given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

Reasoning with Data (RD)

Draft 3 Standards	2017 Standards
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NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.8.RD.1 Investigate mutually exclusive and inclusive events to determine probability.	Moved from Math 1
NC.8.RD.1.1 Determine whether two events are mutually exclusive or inclusive.	Moved from Math 1
NC.8.RD.1.2 Construct a viable argument for the probabilities discovered in mutually exclusive events using models.	Moved from Math 1
NC.8.RD.1.3 Construct a viable argument for the probabilities discovered in mutually inclusive events using models.	Moved from Math 1
NC.8.RD.2 Formulate and investigate statistical questions to make inferences about univariate data from three or four populations.	
NC.8.RD.2.1 Categorize statistical or non-statistical questions to investigate a topic of interest given a context for univariate data across three or four populations.	NC.6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers *NOTE: Added to align content across grades 6-8
NC.8.RD.2.2 Create statistical questions to consider numerical or categorical data that explores variability within multiple populations.	NC.6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers *NOTE: Added to align content across grades 6-8
NC.8.RD.2.3 Evaluate statistical questions and their results for potential bias when comparing three or four populations.	New
NC.8.RD.2.4 Use simulations to create random, representative samples to make predictions or estimates about a population parameter.	NC.7.SP.2 Generate multiple random samples (or simulated samples) of the same size to gauge the variation in estimates or predictions, and use this data to draw inferences about a population with an unknown characteristic of interest. *NOTE: Added to align content across grades 6-8

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.8.RD.2.5 Construct a viable argument to determine the validity of a sample representing a population.	NC.7.SP.1 Understand that statistics can be used to gain information about a population by: • Recognizing that generalizations about a population from a sample are valid only if the sample is representative of that population. • Using random sampling to produce representative samples to support valid inferences *NOTE: Added to align content across grades 6-8
NC.8.RD.2.6 Collect data on a single variable for representative samples of three or four groups or populations.	New
NC.8.RD.2.7 Generate multiple random samples of the same size to evaluate the validity of inferences about three or four populations with an unknown characteristic of interest.	NC.7.SP.2 Generate multiple random samples (or simulated samples) of the same size to gauge the variation in estimates or predictions, and use this data to draw inferences about a population with an unknown characteristic of interest. *NOTE: Added to align content across grades 6-8
NC.8.RD.2.8 Organize univariate data for representative samples of three or four populations using representations, accurately and clearly, when investigating a real-world topic of interest.	NC.6.SP.4 Display numerical data in plots on a number line. • Use dot plots, histograms, and box plots to represent data. • Compare the attributes of different representations of the same data. *NOTE: Added to align content across grades 6-8
NC.8.RD.3 Examine three or four sets of numerical data in plots on a number line considering the center and spread of univariate data.	
NC.8.RD.3.1 Make use of structure to compare the distribution of a single variable within four different populations, informally examining the shape, center, and variability seen in given line plots, box plots, and histograms.	NC.7.SP.3 Recognize the role of variability when comparing two populations. b. Informally assess the difference between two data sets by examining the overlap and separation between the graphical representations of two data sets. *NOTE: Added to align content across grades 6-8

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.8.RD.3.2 Construct line plots, histograms, and box plots to represent multiple distributions of univariate data on one plot.	NC.6.SP.4 Display numerical data in plots on a number line. • Use dot plots, histograms, and box plots to represent data. • Compare the attributes of different representations of the same data. *NOTE: Added to align content across grades 6-8
NC.8.RD.3.3 Make sense of non-standard data visualizations describing three or four populations from real-world sources, such as infographics and media-based displays, describing what information is shown and what conclusions can be drawn.	New
NC.8.RD.4 Analyze the center and spread of three or four sets of numerical data.	
NC.8.RD.4.1 Make sense of standard deviation as a measure of variability that describes a set of univariate data, recognizing that it is the square root of the variance.	Moved from Math 1
NC.8.RD.4.2 Determine the standard deviation using technology for data distributions containing up to 25 values.	Moved from Math 1
NC.8.RD.4.3 Compare three or four numerical data distributions considering their measures of center (mean and median) and spread (interquartile range, MAD, standard deviation), using technology and visual representations.	NC.7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw comparative inferences about two populations. *NOTE: Added to align content across grades 6-8

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.8.RD.4.4 Reason quantitatively to analyze the effects of outliers on the shape, center, and spread of a data distribution in context.	New
NC.8.RD.4.5 Reason quantitatively to compare the shape, center, and spread of three or four data sets using multiple representations in context.	New
NC.8.RD.4.6 Construct a viable argument for determining which measure of variability best describes the spread (interquartile range, MAD, standard deviation) of a distribution.	New
NC.8.RD.5 Summarize and interpret results from an investigation (data cycle) to make predictions and draw conclusions about the data.	
NC.8.RD.5.1 Draw comparative inferences between three or four populations based on their measures of center and spread, their representations, and the context in which the data were gathered.	NC.7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw comparative inferences about two populations. *NOTE: Added to align content across grades 6-8
NC.8.RD.5.2 Summarize the distribution of univariate data between three or four groups or populations by comparing measures of center and variability, identifying overall patterns, and noting any striking deviations from the pattern.	NC.7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw comparative inferences about two populations. *NOTE: Added to align content across grades 6-8
NC.8.RD.5.3 Communicate findings using qualitative and quantitative measures of center and variability, describing patterns, and recommending a data collection plan or analysis approach based on the results.	New
NC.8.RD.5.4 Reflect on findings to evaluate whether the original question and methods were appropriate, refining the investigative question, data collection plan, or analysis approach based on results.	New
	Moved to Math 1 Investigate patterns of association in bivariate data.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	NC.8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Investigate and describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
	NC.8.SP.2 Model the relationship between bivariate quantitative data to: • Informally fit a straight line for a scatter plot that suggests a linear association. • Informally assess the model fit by judging the closeness of the data points to the line.
	NC.8.SP.3 Use the equation of a linear model to solve problems in the context of bivariate quantitative data, interpreting the slope and y-intercept.
	NC.8.SP.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. • Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. • Use relative frequencies calculated for rows or columns to describe possible association between the two variables.

NC Math 1

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC Math 1 Crosswalk

The purpose of this document is to provide a general comparison of the 2016 NC Math 1 Standard Course of Study and the 2026 NC Math 1 Standard Course of Study. It provides initial insight into similarities and differences between these two sets of standards. As this is an initial comparison, the document does not address every difference or nuance between the draft standards and the current standards.

Draft 3 Domains	2016 Conceptual Categories
Algebraic, Numerical, and Functional Reasoning (ANFR)	The Number System (NS), Algebra (A), and Functions (F)
Reasoning with Mathematical Modeling (RMM)	New
Spatial, Geometric, and Measurement Reasoning (SGMR)	Geometry (G)
Statistics and Data Science Reasoning (SDSR)	Statistics & Probability (SP)

Algebraic, Numerical and Functional Reasoning (ANFR)

Draft 3 Standards	2016 Standard Course of Study
NCM1.ANFR.1 Apply the properties of operations to rewrite algebraic expressions into equivalent forms.	
NCM1.ANFR.1.1 Look for and make use of structure to rewrite algebraic expressions with integer exponents using the properties of exponents.	NC.M1.N-RN.2 Rewrite algebraic expressions with integer exponents using the properties of exponents.
NCM1.ANFR.1.2 Compare the polynomial operations of addition, subtraction, and multiplication with the corresponding integer operations.	NC.M1.A-APR.1 Build an understanding that operations with polynomials are comparable to operations with integers by adding and subtracting quadratic expressions and by adding, subtracting, and multiplying linear expressions.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	Moved from NC Math 2 NC.M2.A-APR.1 Extend the understanding that operations with polynomials are comparable to operations with integers by adding, subtracting, and multiplying polynomials.
NCM1.ANFR.1.3 Look for and make use of structure to rewrite polynomial expressions into equivalent forms using addition, subtraction, and multiplication.	NC.M1.A-APR.1 Build an understanding that operations with polynomials are comparable to operations with integers by adding and subtracting quadratic expressions and by adding, subtracting, and multiplying linear expressions. NC.M1.F-BF.1b Write a function that describes a relationship between two quantities. b. Build a function that models a relationship between two quantities by combining linear, exponential, or quadratic functions with addition and subtraction or two linear functions with multiplication.
NCM1.ANFR.1.4 Represent the distributive property using an area model to multiply two linear expressions.	New
NCM1.ANFR.2 Look for and make use of structure to analyze patterns of change across different function types.	
NCM1.ANFR.2.1 Distinguish between linear and exponential relationships by examining patterns of change in various representations.	NC.M1.F-LE.1 Identify situations that can be modeled with linear and exponential functions, and justify the most appropriate model for a situation based on the rate of change over equal intervals.
NCM1.ANFR.2.2 Construct a viable argument that distinguishes linear and exponential relationships from other types of relationships (e.g., quadratic, cubic, absolute value).	NC.M1.F-LE.1 Identify situations that can be modeled with linear and exponential functions, and justify the most appropriate model for a situation based on the rate of change over equal intervals.
NCM1.ANFR.2.3 Construct a viable argument to identify a pattern as arithmetic or geometric.	NC.M1.F-IF.3 Recognize that recursively and explicitly defined sequences are functions whose domain is a subset of the integers, the terms of an arithmetic sequence are a subset of the range of a linear function, and the terms of a geometric sequence are a subset of the range of an exponential function.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NCM1.ANFR.2.4 Predict the values and behavior of linear and exponential functions represented in graphs and tables based on patterns.	New
NCM1.ANFR.3 Analyze linear and exponential functions to interpret their key features.	
NCM1.ANFR.3.1 Use technology to investigate the parameters of exponential functions.	NC.M1.A-SSE.1 Interpret expressions that represent a quantity in terms of its context. a. Identify and interpret parts of a linear, exponential, or quadratic expression, including terms, factors, coefficients, and exponents. b. Interpret a linear, exponential, or quadratic expression made of multiple parts as a combination of entities to give meaning to an expression. NC.M1.F-LE.5 Interpret the parameters a and b in a linear function $f(x) = ax + b$ or an exponential function $g(x) = abx$ in terms of a context.
NCM1.ANFR.3.2 Represent relationships between quantities using function notation.	NC.M1.F-IF.1 Build an understanding that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range by recognizing that: ○ if f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. ○ the graph of f is the graph of the equation $y = f(x)$.
NCM1.ANFR.3.3 Interpret the inputs and outputs of linear and exponential functions in context using function notation.	NC.M1.F-IF.2 Use function notation to evaluate linear, quadratic, and exponential functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
NCM1.ANFR.3.4 Evaluate functions in context using function notation.	NC.M1.F-IF.2 Use function notation to evaluate linear, quadratic, and exponential functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NCM1.ANFR.3.5 Determine a reasonable domain and range for a linear or exponential function based on its context.	NC.M1.F-IF.5 Interpret a function in terms of the context by relating its domain and range to its graph and, where applicable, to the quantitative relationship it describes.
NCM1.ANFR.3.6 Justify whether a linear or exponential relationship should be represented by a discrete or continuous function.	New
NCM1.ANFR.3.7 Interpret the initial value, growth and decay rates, intercepts, domain and range of exponential functions presented in various representations.	NC.M1.A-SSE.1 Interpret expressions that represent a quantity in terms of its context. a. Identify and interpret parts of a linear, exponential, or quadratic expression, including terms, factors, coefficients, and exponents. b. Interpret a linear, exponential, or quadratic expression made of multiple parts as a combination of entities to give meaning to an expression. NC.M1.F-IF.4 Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities, including: intercepts; intervals where the function is increasing, decreasing, positive, or negative; and maximums and minimums. NC.M1.F-IF.7 Analyze linear, exponential, and quadratic functions by generating different representations, by hand in simple cases and using technology for more complicated cases, to show key features, including: domain and range; rate of change; intercepts; intervals where the function is increasing, decreasing, positive, or negative; maximums and minimums; and end behavior. NC.M1.F-IF.8 Use equivalent expressions to reveal and explain different properties of a function. b. Interpret and explain growth and decay rates for an exponential function.
NCM1.ANFR.3.8 Interpret the average rate of change over an interval for an exponential function.	NC.M1.F-IF.6 Calculate and interpret the average rate of change over a specified interval for a function presented numerically,

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	graphically, and/or symbolically.
NCM1.ANFR.3.9 Compare key features of an exponential function with other linear and/or exponential functions presented in various representations in context.	NC.M1.F-IF.9 Compare key features of two functions (linear, quadratic, or exponential) each with a different representation (symbolically, graphically, numerically in tables, or by verbal descriptions).
NCM1.ANFR.4 Use representations of linear and exponential functions to examine multiple math points of view.	
NCM1.ANFR.4.1 Look for and make use of structure to write a recursive function in function notation to represent arithmetic and geometric sequences.	NC.M1.F-BF.1 Write a function that describes a relationship between two quantities. a. Build linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two ordered pairs (include reading these from a table).
NCM1.ANFR.4.2 Decontextualize a mathematical situation to write linear and exponential functions.	NC.M1.A-CED.2 Create and graph equations in two variables to represent linear, exponential, and quadratic relationships between quantities. NC.M1.F-BF.1 Write a function that describes a relationship between two quantities. a. Build linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two ordered pairs (include reading these from a table).
NCM1.ANFR.4.3 Rewrite linear functions in slope-intercept form to reveal key features.	NC.M1.A-CED.4 Solve for a quantity of interest in formulas used in science and mathematics using the same reasoning as in solving equations.
NCM1.ANFR.4.4 Construct a viable argument that a context is best represented by a linear or exponential function.	NC.M1.F-LE.1 Identify situations that can be modeled with linear and exponential functions, and justify the most appropriate model for a situation based on the rate of change over equal intervals.
NCM1.ANFR.5 Reason with one-variable linear and exponential equations and linear inequalities in context.	

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NCM1.ANFR.5.1 Construct viable arguments and critique the reasoning of others that support the chosen solution method and each step used to solve linear equations and inequalities.	NC.M1.A-REI.1 Justify a chosen solution method and each step of the solving process for linear and quadratic equations using mathematical reasoning.
NCM1.ANFR.5.2 Solve for a desired quantity in mathematical and scientific formulas using the properties of equality.	NC.M1.A-CED.4 Solve for a quantity of interest in formulas used in science and mathematics using the same reasoning as in solving equations.
NCM1.ANFR.5.3 Decontextualize a mathematical situation to write a one-variable equation that represents an exponential relationship.	NC.M1.A-CED.1 Create equations and inequalities in one variable that represent linear, exponential, and quadratic relationships and use them to solve problems.
NCM1.ANFR.5.4 Determine the number of real solutions of an exponential equation by analyzing graphs.	New
NCM1.ANFR.5.5 Solve exponential equations with technology.	NC.M1.A-CED.1 Create equations and inequalities in one variable that represent linear, exponential, and quadratic relationships and use them to solve problems.
NCM1.ANFR.5.6 Recontextualize the solutions to an exponential equation.	New
NCM1.ANFR.6 Represent a mathematical situation using linear inequalities in two variables.	
NCM1.ANFR.6.1 Decontextualize a mathematical situation involving two variables to write a linear inequality.	NC.M1.A-CED.2 Create and graph equations in two variables to represent linear, exponential, and quadratic relationships between quantities.
NCM1.ANFR.6.2 Graph a solution to a linear inequality in two variables with technology.	New
NCM1.ANFR.6.3 Recontextualize the solutions to linear inequalities in two variables.	New
NCM1.ANFR.7 Reason with systems of equations and inequalities in context.	

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NCM1.ANFR.7.1 Decontextualize a mathematical situation to build a system of linear equations or inequalities.	NC.M1.A-CED.3 Create systems of linear equations and inequalities to model situations in context.
NCM1.ANFR.7.2 Use technology to identify the solution to a system of linear equations or inequalities by graphing.	NC.M1.A-REI.6 Use tables, graphs, or algebraic methods (substitution and elimination) to find approximate or exact solutions to systems of linear equations and interpret solutions in terms of a context. NC.M1.A-REI.11 Build an understanding of why the x-coordinates of the points where the graphs of two linear, exponential, and/or quadratic equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$ and approximate solutions using graphing technology or successive approximations with a table of values. NC.M1.A-REI.12 Represent the solutions of a linear inequality or a system of linear inequalities graphically as a region of the plane.
NCM1.ANFR.7.3 Determine the number of solutions to a system of linear equations.	New
NCM1.ANFR.7.4 Solve systems of linear equations using substitution.	NC.M1.A-REI.6 Use tables, graphs, or algebraic methods (substitution and elimination) to find approximate or exact solutions to systems of linear equations and interpret solutions in terms of a context.
NCM1.ANFR.7.5 Recontextualize the solution(s) to a system of linear equations or inequalities.	New
	Moved to 8th Grade NC.M1.A-REI.3 Solve linear equations and inequalities in one variable.
	Moved to NC Math 2 NC.M1.A-SSE.3 Write an equivalent form of a quadratic expression $ax^2 + bx + c$, where a is an integer, by factoring to reveal the solutions of the equation or the zeros of the function the expression defines.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.M1.A-APR.3 Understand the relationships among the factors of a quadratic expression, the solutions of a quadratic equation, and the zeros of a quadratic function.

NC.M1.A-REI.4 Solve for the real solutions of quadratic equations in one variable by taking square roots and factoring.

NC.M1.F-IF.8 Use equivalent expressions to reveal and explain different properties of a function.

- Rewrite a quadratic function to reveal and explain different key features of the function.

Removed

NC.M1.A-REI.5 Explain why replacing one equation in a system of linear equations by the sum of that equation and a multiple of the other produces a system with the same solutions.

NC.M1.A-REI.10 Understand that the graph of a two variable equation represents the set of all solutions to the equation.

NC.M1.F-IF.3 Recognize that recursively and explicitly defined sequences are functions whose domain is a subset of the integers, the terms of an arithmetic sequence are a subset of the range of a linear function, and the terms of a geometric sequence are a subset of the range of an exponential function.

NC.M1.F-BF.1 Write a function that describes a relationship between two quantities.

- Build a function that models a relationship between two quantities by combining linear, exponential, or quadratic functions with addition and subtraction or two linear functions with multiplication.

NC.M1.F-BF.2 Translate between explicit and recursive forms of arithmetic and geometric sequences and use both to model situations.

NC.M1.F-LE.3 Compare the end behavior of linear, exponential, and quadratic functions using graphs and tables to show that a quantity increasing exponentially eventually exceeds a quantity increasing linearly or quadratically.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Reasoning with Mathematical Modeling (RMM)

Draft 3 Standards	2016 Standards
NCM1.RMM.1 Find and defend solutions to real-world scenarios using the mathematical modeling process.	New
NCM1.RMM.1.1 Identify a real-world scenario that requires analysis.	New
NCM1.RMM.1.2 Describe essential quantities, relationships, assumptions, constraints, and questions in a mathematical situation.	New
NCM1.RMM.1.3 Decontextualize the mathematical situation to construct a model.	New
NCM1.RMM.1.4 Use appropriate tools to analyze the model.	New
NCM1.RMM.1.5 Make conjectures and explore their validity using mathematics.	New
NCM1.RMM.1.6 Recontextualize the conclusions to determine appropriateness and to modify the model as needed.	New
NCM1.RMM.1.7 Construct a viable argument that details the steps for creating and modifying the model and drawing conclusions.	New
NCM1.RMM.1.8 Critique the reasoning used in another's modeling process and solution.	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Spatial, Geometric, and Measurement Reasoning (SGMR)

Draft 3 Standards	2016 Standard Course of Study
NCM1.SGMR.1 Apply rigid transformations to figures on the coordinate plane.	
NCM1.SGMR.1.1 Use technology to experimentally verify the properties of rotations, reflections, and translations.	Moved from Math 2 NC.M2.G-CO.2 Experiment with transformations in the plane. • Represent transformations in the plane. • Compare rigid motions that preserve distance and angle measure (translations, reflections, rotations) to transformations that do not preserve both distance and angle measure (e.g., stretches, dilations). • Understand that rigid motions produce congruent figures while dilations produce similar figures. NC.M2.G-CO.4 Verify experimentally properties of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
NCM1.SGMR.1.2 Represent rigid transformations that map a preimage to its image using function notation.	Moved from Math 2 NC.M2.F-IF.1 Extend the concept of a function to include geometric transformations in the plane by recognizing that: • the domain and range of a transformation function f are sets of points in the plane; • the image of a transformation is a function of its pre-image. NC.M2.F-IF.2 Extend the use of function notation to express the image of a geometric figure in the plane resulting from a translation, rotation by multiples of 90 degrees about the origin, reflection across an axis, or dilation as a function of its pre-image.
NCM1.SGMR.1.3 Find the image or preimage of a figure on the coordinate plane given a reflection about a line, a rotation by multiples of 90 degrees about the origin, or a translation.	Moved from Math 2 NC.M2.G-CO.5 Given a geometric figure and a rigid motion, find the image of the figure. Given a geometric figure and its image, specify a rigid motion or sequence of rigid motions that will transform the pre-image to its image.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NCM1.SGMR.1.4 Describe the center of rotation, angle of rotation, and/or line of reflection of a preimage and its image.	Moved from Math 2 NC.M2.G-CO.3 Given a triangle, quadrilateral, or regular polygon, describe any reflection or rotation symmetry i.e., actions that carry the figure onto itself. Identify center and angle(s) of rotation symmetry. Identify line(s) of reflection symmetry.
NCM1.SGMR.1.5 Construct a viable argument that two figures are congruent by specifying a sequence of rigid motions that transforms one figure onto the other on the coordinate plane.	Moved from Math 2 NC.M2.G-CO.6 Determine whether two figures are congruent by specifying a rigid motion or sequence of rigid motions that will transform one figure onto the other.
NCM1.SGMR.2 Apply the properties of triangle congruence.	
NCM1.SGMR.2.1 Use appropriate tools to develop criteria for triangle congruence in terms of rigid motions.	Moved from Math 2 NC.M2.G-CO.7 Use the properties of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. NC.M2.G-CO.8 Use congruence in terms of rigid motion. Justify the ASA, SAS, and SSS criteria for triangle congruence. Use criteria for triangle congruence (ASA, SAS, SSS, HL) to determine whether two triangles are congruent.
NCM1.SGMR.2.2 Construct a viable argument that two triangles are congruent or not congruent.	Moved from Math 2 NC.M2.G-CO.8 Use congruence in terms of rigid motion. Justify the ASA, SAS, and SSS criteria for triangle congruence. Use criteria for triangle congruence (ASA, SAS, SSS, HL) to determine whether two triangles are congruent.
NCM1.SGMR.3 Analyze geometric figures on the coordinate plane by applying properties of points, lines, and shapes.	
NCM1.SGMR.3.1 Construct a viable argument classifying lines and line segments as parallel, perpendicular, or intersecting using coordinates.	NC.M1.G-GPE.5 Use coordinates to prove the slope criteria for parallel and perpendicular lines and use them to solve problems. • Determine if two lines are parallel, perpendicular, or neither. • Find the equation of a line parallel or perpendicular to a given line that passes through a given point.
NCM1.SGMR.3.2 Find the equation of a line parallel or	NC.M1.G-GPE.5 Use coordinates to prove the slope criteria for parallel and perpendicular lines and use them to solve problems.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

perpendicular to a given line that passes through a given point.	• Determine if two lines are parallel, perpendicular, or neither. • Find the equation of a line parallel or perpendicular to a given line that passes through a given point.
NCM1.SGMR.3.3 Construct a viable argument classifying triangles and quadrilaterals using the relationships among their sides on the coordinate plane.	NC.M1.G-GPE.4 Use coordinates to solve geometric problems involving polygons algebraically • Use coordinates to compute perimeters of polygons and areas of triangles and rectangles. • Use coordinates to verify algebraically that a given set of points produces a particular type of triangle or quadrilateral.
NCM1.SGMR.3.4 Find the midpoint or endpoint of a segment using coordinates.	NC.M1.G-GPE.6 Use coordinates to find the midpoint or endpoint of a line segment.
NCM1.SGMR.3.5 Construct a viable argument classifying parallelograms on the coordinate plane using their diagonals.	Moved from NC Math 3 NC.M3.G-CO.11 Prove theorems about parallelograms. • Opposite sides of a parallelogram are congruent. • Opposite angles of a parallelogram are congruent. • Diagonals of a parallelogram bisect each other. • If the diagonals of a parallelogram are congruent, then the parallelogram is a rectangle.
NCM1.SGMR.3.6 Find the perimeter and area of triangles and quadrilaterals using coordinates.	NC.M1.G-GPE.4 Use coordinates to solve geometric problems involving polygons algebraically • Use coordinates to compute perimeters of polygons and areas of triangles and rectangles. • Use coordinates to verify algebraically that a given set of points produces a particular type of triangle or quadrilateral.

Statistics and Data Science Reasoning (SDSR)

Draft 3 Standards	2016 Standard Course of Study
NCM1.SDSR.1 Investigate probability using contingency tables and sample spaces.	

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NCM1.SDSR.1.1 Summarize data in a contingency table with two or three categorical variables collected from the same subjects.	Moved from 8th grade NC.8.SP.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. • Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. • Use relative frequencies calculated for rows or columns to describe possible association between the two variables.
NCM1.SDSR.1.2 Use the structure of contingency tables to find missing elements.	Moved from 8th grade NC.8.SP.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. • Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. • Use relative frequencies calculated for rows or columns to describe possible association between the two variables.
NCM1.SDSR.1.3 Represent events as subsets of a sample space, including unions, intersections, and complements.	Moved from NC Math 2 NC.M2.S-CP.1 Describe events as subsets of the outcomes in a sample space using characteristics of the outcomes or as unions, intersections and complements of other events.
NCM1.SDSR.1.4 Calculate joint and marginal probabilities from contingency tables.	Moved from 8th grade and NC Math 2 NC.8.SP.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. • Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. • Use relative frequencies calculated for rows or columns to

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	describe possible association between the two variables. NC.M2.S-CP.4 Represent data on two categorical variables by constructing a two-way frequency table of data. Interpret the two-way table as a sample space to calculate conditional, joint and marginal probabilities. Use the table to decide if events are independent.
NCM1.SDSR.1.5 Interpret joint and marginal probabilities in context to draw conclusions about a population or sample.	Moved from Math 2 NC.M2.S-CP.4 Represent data on two categorical variables by constructing a two-way frequency table of data. Interpret the two-way table as a sample space to calculate conditional, joint and marginal probabilities. Use the table to decide if events are independent.
NCM1.SDSR.2 Formulate statistical questions about real-world issues to make inferences about multivariate data.	New
NCM1.SDSR.2.1 Generate statistical questions about a topic of interest from a multivariate dataset.	New
NCM1.SDSR.2.2 Construct a viable argument to determine whether a question is statistical or non-statistical.	New
NCM1.SDSR.2.3 Evaluate statistical questions for potential sources of bias in data collection or response.	New
NCM1.SDSR.3 Explore and evaluate multivariate datasets to investigate a statistical question.	New
NCM1.SDSR.3.1 Evaluate the credibility of a data source by considering how the data were collected, who collected them, and what potential biases or limitations exist.	New
NCM1.SDSR.3.2 Select relevant variables from a multivariate dataset to investigate a statistical question.	New
NCM1.SDSR.3.3 Examine whether separating data by a third	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

categorical variable produces models with better fit and predictability.	
NCM1.SDSR.4 Create and interpret standard and non-standard visualizations of multivariate data from real-world sources and media.	New
NCM1.SDSR.4.1 Create scatter plots of multivariate data using technology.	New
NCM1.SDSR.4.2 Describe the form, direction, and strength of the relationship between two quantitative variables displayed in a scatter plot.	New
NCM1.SDSR.4.3 Make predictions using a sketch of an informal line of best fit for a given scatter plot.	New
NCM1.SDSR.4.4 Interpret non-standard data visualizations from real-world sources, such as heat maps, infographics, and media-based displays, describing what information is shown and what conclusions can be drawn.	New
NCM1.SDSR.4.5 Critique real-world data visualizations, including non-standard forms, by evaluating data collection, display choices, potential bias, and how the visualization supports or misleads an argument.	New
NCM1.SDSR.5 Analyze relationships in multivariate quantitative data using linear and exponential regression.	
NCM1.SDSR.5.1 Find a least-squares regression line for data using technology.	NC.M1.S-ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. b. Fit a least squares regression line to linear data using technology. Use the fitted function to solve problems.
NCM1.SDSR.5.2 Find an exponential regression model for data in context using technology.	NC.M1.S-ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	c. Fit a function to exponential data using technology. Use the fitted function to solve problems.
NCM1.SDSR.5.3 Determine the strength and direction of a linear relationship using the correlation coefficient.	NC.M1.S-ID.8 Analyze patterns and describe relationships between two variables in context. Using technology, determine the correlation coefficient of bivariate data and interpret it as a measure of the strength and direction of a linear relationship. Use a scatter plot, correlation coefficient, and a residual plot to determine the appropriateness of using a linear function to model a relationship between two variables.
NCM1.SDSR.5.4 Compare the fit of linear and exponential models by analyzing residual plots to select the most appropriate model.	NC.M1.S-ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. d. Assess the fit of a linear function by analyzing residuals.
NCM1.SDSR.5.5 Identify outliers in data from an identified relationship.	NC.M1.S-ID.3 Examine the effects of extreme data points (outliers) on shape, center, and/or spread.
NCM1.SDSR.5.6 Describe how outliers affect the form, direction, and strength of an identified relationship in context.	NC.M1.S-ID.3 Examine the effects of extreme data points (outliers) on shape, center, and/or spread.
NCM1.SDSR.5.7 Distinguish between correlation and causation, including identifying potential confounding variables.	NC.M1.S-ID.9 Distinguish between association and causation.
NCM1.SDSR.5.8 Interpret the key features of linear and exponential regression models.	NC.M1.S-ID.7 Interpret in context the rate of change and the intercept of a linear model. Use the linear model to interpolate and extrapolate predicted values. Assess the validity of a predicted value.
NCM1.SDSR.5.9 Make predictions using linear and exponential regression models by interpolating and extrapolating, and assess the validity of predicted values	NC.M1.S-ID.7 Interpret in context the rate of change and the intercept of a linear model. Use the linear model to interpolate and extrapolate predicted values. Assess the validity of a predicted value.
NCM1.SDSR.6 Communicate the application of the statistical modeling process, conclusions, and limitations of a multivariate data investigation.	New
NCM1.SDSR.6.1 Evaluate the application of the statistical	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

modeling process used to investigate multivariate data.	
NCM1.SDSR.6.2 Communicate conclusions about multivariate data through narratives and presentations that describe the statistical modeling process conducted.	New
NCM1.SDSR.6.3 Critique claims in the media by analyzing the statistical modeling process used.	New
	Moved to 8th Grade NC.M1.S-ID.1 Use technology to represent data with plots on the real number line (histograms, and box plots). NC.M1.S-ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. Interpret differences in shape, center, and spread in the context of the data sets.

NC Math 2

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC Math 2 Crosswalk

The purpose of this document is to provide a general comparison of the 2016 NC Math 2 Standard Course of Study and the 2026 NC Math 2 Standard Course of Study. It provides initial insight into similarities and differences between these two sets of standards. As this is an initial comparison, the document does not address every difference or nuance between the draft standards and the current standards.

Draft 3 Domains	2016 Conceptual Categories
Algebraic, Numerical, and Functional Reasoning (ANFR)	The Number System (NS), Algebra (A), and Functions (F)
Reasoning with Mathematical Modeling (RMM)	New
Spatial, Geometric, and Measurement Reasoning (SGMR)	Geometry (G)
Statistics and Data Science Reasoning (SDSR)	Statistics & Probability (SP)

Algebraic, Numerical and Functional Reasoning (ANFR)

Draft 3 Standards	2016 Standard Course of Study
NCM2.ANFR.1 Apply the properties of operations to rewrite polynomial expressions into equivalent forms.	
NCM2.ANFR.1.1 Look for and make use of structure to rewrite quadratic expressions in factored form using the area model when the leading coefficient is 1 or prime.	Moved from NC Math 1 NC.M1.A-SSE.3 Write an equivalent form of a quadratic expression $ax^2 + bx + c$, where a is an integer, by factoring to reveal the solutions of the equation or the zeros of the function the expression defines.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	NC.M2.A-SSE.3 Write an equivalent form of a quadratic expression by completing the square, where a is an integer of a quadratic expression, $ax^2 + bx + c$, to reveal the maximum or minimum value of the function the expression defines.
NCM2.ANFR.1.2 Use repeated reasoning to develop the process of “completing the square” using the area model.	NC.M2.F-IF.8 Use equivalent expressions to reveal and explain different properties of a function by developing and using the process of completing the square to identify the zeros, extreme values, and symmetry in graphs and tables representing quadratic functions, and interpret these in terms of a context.
NCM2.ANFR.1.3 Describe the relationship between factoring and polynomial multiplication.	New
NCM2.ANFR.2 Look for and make use of structure to analyze patterns of change across different function types.	
NCM2.ANFR.2.1 Distinguish between linear, exponential, quadratic, and reciprocal relationships by examining patterns of change in various representations.	New
NCM2.ANFR.2.2 Construct a viable argument that distinguishes linear, exponential, quadratic, and reciprocal relationships from other types of relationships (e.g., cubic, absolute value, sinusoidal).	New
NCM2.ANFR.2.3 Predict the values and behavior of quadratic and reciprocal functions represented in graphs and tables based on patterns.	New
NCM2.ANFR.3 Analyze exponential, quadratic, and reciprocal functions to interpret their key features.	
NCM2.ANFR.3.1 Use technology to investigate the parameters of quadratic and reciprocal functions.	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NCM2.ANFR.3.2 Interpret the inputs and outputs of quadratic and reciprocal functions in context.	Moved from NC Math 1 NC.M1.F-IF.2 NC.M1.F-IF.2 Use function notation to evaluate linear, quadratic, and exponential functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
NCM2.ANFR.3.3 Determine a reasonable domain and range for a quadratic or reciprocal function based on its context.	Moved from NC Math 1 NC.M1.F-IF.5 NC.M1.F-IF.5 Interpret a function in terms of the context by relating its domain and range to its graph and, where applicable, to the quantitative relationship it describes.
NCM2.ANFR.3.4 Justify whether a quadratic or reciprocal relationship should be represented by a discrete or continuous function.	New
NCM2.ANFR.3.5 Interpret the maximum, minimum, line of symmetry, intercepts, zeros, domain, and range of quadratic and reciprocal functions presented in various representations.	NC.M2.A-SSE.1 Interpret expressions that represent a quantity in terms of its context. NC.M2.A-SSE.1a Identify and interpret parts of a quadratic, square root, inverse variation, or right triangle trigonometric expression, including terms, factors, coefficients, radicands, and exponents. NC.M2.A-SSE.1b Interpret quadratic and square root expressions made of multiple parts as a combination of single entities to give meaning in terms of a context. NC.M2.F-IF.4 Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities, including: domain and range, rate of change, symmetries, and end behavior. NC.M2.F-IF.7 Analyze quadratic, square root, and inverse variation functions by generating different representations, by hand in simple cases and using technology for more complicated cases, to show key features, including: domain and range; intercepts; intervals where the function is increasing, decreasing, positive, or

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	negative; rate of change; maximums and minimums; symmetries; and end behavior.
NCM2.ANFR.3.6 Interpret the average rate of change over an interval for a quadratic function.	Moved from NC Math 1 NC.M1.F-IF.6 Calculate and interpret the average rate of change over a specified interval for a function presented numerically, graphically, and/or symbolically.
NCM2.ANFR.3.7 Compare the key features of linear, exponential, quadratic, and reciprocal functions presented in various representations in context.	NC.M2.F-IF.9 Compare key features of two functions (linear, quadratic, square root, or inverse variation functions) each with a different representation (symbolically, graphically, numerically in tables, or by verbal descriptions).
NCM2.ANFR.4 Use representations of quadratic and reciprocal functions to examine multiple math points of view.	
NCM2.ANFR.4.1 Look for and make use of structure to write a recursive function in function notation to represent quadratic sequences across multiple representations.	New
NCM2.ANFR.4.2 Decontextualize a mathematical situation to write quadratic and reciprocal functions.	NC.M2.A-CED.2 Create and graph equations in two variables to represent quadratic, square root and inverse variation relationships between quantities. NC.M2.F-BF.1 Write a function that describes a relationship between two quantities by building quadratic functions with real solution(s) and inverse variation functions given a graph, a description of a relationship, or ordered pairs (include reading these from a table).
NCM2.ANFR.4.3 Rewrite quadratic functions in factored form to reveal key features.	Moved from NC Math 1 NC.M1.A-SSE.3 Write an equivalent form of a quadratic expression $+bx+c$, where a is an integer, by factoring to reveal the solutions of the equation or the zeros of the function the expression defines.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	NC.M1.F-IF.8 Use equivalent expressions to reveal and explain different properties of a function. a. Rewrite a quadratic function to reveal and explain different key features of the function.
NCM2.ANFR.4.4 Explain how the linear factors of a quadratic function relate to its zeros.	Moved from NC Math 1 NC.M1.A-APR.3 Understand the relationships among the factors of a quadratic expression, the solutions of a quadratic equation, and the zeros of a quadratic function.
NCM2.ANFR.4.5 Rewrite quadratic functions in vertex form to reveal key features using the area model.	NC.M2.A-SSE.3 Write an equivalent form of a quadratic expression by completing the square, where a is an integer of a quadratic expression, $ax^2 + bx + c$, to reveal the maximum or minimum value of the function the expression defines. NC.M2.F-IF.8 Use equivalent expressions to reveal and explain different properties of a function by developing and using the process of completing the square to identify the zeros, extreme values, and symmetry in graphs and tables representing quadratic functions, and interpret these in terms of a context.
NCM2.ANFR.4.6 Build a function by transforming an exponential, quadratic, or reciprocal parent function.	NC.M2.F-BF.3 Understand the effects of the graphical and tabular representations of a linear, quadratic, square root, and inverse variation function f with $k \cdot f(x)$, $f(x) + k$, $f(x + k)$ for specific values of k (both positive and negative).
NCM2.ANFR.5 Reason with one-variable quadratic and reciprocal equations and quadratic inequalities in context.	
NCM2.ANFR.5.1 Construct viable arguments and critique the reasoning of others that support the chosen solution method and each step used to solve quadratic equations.	NC.M2.A-REI.1 Justify a chosen solution method and each step of the solving process for quadratic, square root and inverse variation equations using mathematical reasoning.
NCM2.ANFR.5.2 Decontextualize a mathematical situation to write one-variable equations that represent quadratic and reciprocal	NC.M2.A-CED.1 Create equations and inequalities in one variable that represent quadratic, square root, inverse variation, and right

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

relationships.	triangle trigonometric relationships and use them to solve problems. NC.M2.A-REI.2 Solve and interpret one variable inverse variation and square root equations arising from a context, and explain how extraneous solutions may be produced.
NCM2.ANFR.5.3 Decontextualize a mathematical situation to write one-variable inequalities that represent quadratic relationships.	NC.M2.A-CED.1 Create equations and inequalities in one variable that represent quadratic, square root, inverse variation, and right triangle trigonometric relationships and use them to solve problems.
NCM2.ANFR.5.4 Determine the number of real solutions to quadratic and reciprocal equations by analyzing graphs.	New
NCM2.ANFR.5.5 Solve quadratic equations by taking square roots, factoring, or completing the square.	Moved from NC Math 1 NC.M1.A-REI.4 Solve for the real solutions of quadratic equations in one variable by taking square roots and factoring. NC.M2.A-CED.1 Create equations and inequalities in one variable that represent quadratic, square root, inverse variation, and right triangle trigonometric relationships and use them to solve problems.
NCM2.ANFR.5.6 Explain how the linear factors of a quadratic expression relate to the solutions of the corresponding quadratic equation.	Moved from NC Math 1 NC.M1.A-APR.3 Understand the relationships among the factors of a quadratic expression, the solutions of a quadratic equation, and the zeros of a quadratic function.
NCM2.ANFR.5.7 Solve quadratic and reciprocal equations using technology.	NC.M2.A-CED.1 Create equations and inequalities in one variable that represent quadratic, square root, inverse variation, and right triangle trigonometric relationships and use them to solve problems. NC.M2.A-REI.2 Solve and interpret one variable inverse variation and square root equations arising from a context, and explain how

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	extraneous solutions may be produced.
NCM2.ANFR.5.8 Graph one-variable quadratic inequalities with technology to represent solutions.	NC.M2.A-CED.1 Create equations and inequalities in one variable that represent quadratic, square root, inverse variation, and right triangle trigonometric relationships and use them to solve problems.
NCM2.ANFR.5.9 Recontextualize the solutions to one-variable quadratic and reciprocal equations and quadratic inequalities.	New
NCM2.ANFR.6 Reason with systems of linear and quadratic equations in context.	
NCM2.ANFR.6.1 Decontextualize a mathematical situation to build a system of linear and quadratic equations.	NC.M2.A-CED.3 Create systems of linear, quadratic, square root, and inverse variation equations to model situations in context.
NCM2.ANFR.6.2 Use technology to identify the solution to a system involving linear and quadratic equations.	NC.M2.A-REI.7 Use tables, graphs, and algebraic methods to approximate or find exact solutions of systems of linear and quadratic equations, and interpret the solutions in terms of a context. NC.M2.A-REI.11 Extend the understanding that the x-coordinates of the points where the graphs of two square root and/or inverse variation equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$ and approximate solutions using graphing technology or successive approximations with a table of values.
NCM2.ANFR.6.3 Determine the number of real solutions to a system of linear and quadratic equations.	New
NCM2.ANFR.6.4 Recontextualize the solutions to a system of linear and quadratic equations.	NC.M2.A-REI.7 Use tables, graphs, and algebraic methods to approximate or find exact solutions of systems of linear and quadratic equations, and interpret the solutions in terms of a context.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	Moved to NC Math 1 NC.M2.A-APR.1 Extend the understanding that operations with polynomials are comparable to operations with integers by adding, subtracting, and multiplying polynomials.
	Removed NC.M2.N-RN.1 Explain how expressions with rational exponents can be rewritten as radical expressions. NC.M2.N-RN.2 Rewrite expressions with radicals and rational exponents into equivalent expressions using the properties of exponents. NC.M2.N-RN.3 Use the properties of rational and irrational numbers to explain why: • the sum or product of two rational numbers is rational; • the sum of a rational number and an irrational number is irrational; • the product of a nonzero rational number and an irrational number is irrational. NC.M2.N-CN.1 Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ where a and b are real numbers. NC.M2.A-REI.4 Solve for all solutions of quadratic equations in one variable. NC.M2.A-REI.4a Understand that the quadratic formula is the generalization of solving $ax^2 + bx + c$ by using the process of completing the square. NC.M2.A-REI.4b Explain when quadratic equations will have non-real solutions and express complex solutions as $a \pm bi$ for real numbers a and b.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Reasoning with Mathematical Modeling (RMM)

Draft 3 Standards	2016 Standard Course of Study
NCM2.RMM.1 Find and defend solutions to real-world scenarios using the mathematical modeling process.	New
NCM2.RMM.1.1 Identify a real-world scenario that requires analysis.	New
NCM2.RMM.1.2 Describe essential quantities, relationships, assumptions, constraints, and questions in a mathematical situation.	New
NCM2.RMM.1.3 Decontextualize the mathematical situation to construct a model.	New
NCM2.RMM.1.4 Use appropriate tools to analyze the model.	New
NCM2.RMM.1.5 Make conjectures and explore their validity using mathematics.	New
NCM2.RMM.1.6 Recontextualize the conclusions to determine appropriateness and to modify the model as needed.	New
NCM2.RMM.1.7 Construct a viable argument that details the steps for creating and modifying the model and drawing conclusions.	New
NCM2.RMM.1.8 Critique the reasoning used in another's modeling process and solution.	New

Spatial, Geometric, and Measurement Reasoning (SGMR)

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Draft 3 Standards	2016 Standard Course of Study
NCM2.SGMR.1 Apply rigid and non-rigid transformations to figures on the coordinate plane.	
NCM2.SGMR.1.1 Use technology to compare the effects of a rigid transformation with those of a non-rigid transformation on the same geometric figure.	NC.M2.G-CO.2 Experiment with transformations in the plane. • Represent transformations in the plane. • Compare rigid motions that preserve distance and angle measure (translations, reflections, rotations) to transformations that do not preserve both distance and angle measure (e.g. stretches, dilations). • Understand that rigid motions produce congruent figures while dilations produce similar figures.
NCM2.SGMR.1.2 Use technology to experimentally verify the properties of dilations given a center and scale factor.	NC.M2.G-SRT.1 Verify experimentally the properties of dilations with given center and scale factor: - When a line segment passes through the center of dilation, the line segment and its image lie on the same line. When a line segment does not pass through the center of dilation, the line segment and its image are parallel. - The length of the image of a line segment is equal to the length of the line segment multiplied by the scale factor. - The distance between the center of a dilation and any point on the image is equal to the scale factor multiplied by the distance between the dilation center and the corresponding point on the pre-image. - Dilations preserve angle measure.
NCM2.SGMR.1.3 Represent transformations that map a preimage to its image using function notation.	NC.M2.F-IF.1 Extend the concept of a function to include geometric transformations in the plane by recognizing that: the domain and range of a transformation function f are sets of points

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	in the plane; the image of a transformation is a function of its pre-image. NC.M2.F-IF.2 Extend the use of function notation to express the image of a geometric figure in the plane resulting from a translation, rotation by multiples of 90 degrees about the origin, reflection across an axis, or dilation as a function of its pre-image.
NCM2.SGMR.1.4 Find the image or preimage of a figure on the coordinate plane given a dilation about a point.	New
NCM2.SGMR.1.5 Describe the center and scale factor of a dilation of a preimage and its image.	New
NCM2.SGMR.1.6 Construct a viable argument by specifying a sequence of rigid and/or non-rigid transformations that transforms one figure onto the other on the coordinate plane.	NC.M2.G-SRT.2 Understand similarity in terms of transformations. a. Determine whether two figures are similar by specifying a sequence of transformations that will transform one figure into the other
NCM2.SGMR.2 Apply properties of congruence and similarity to solve problems.	
NCM2.SGMR.2.1 Use appropriate tools to develop criteria for triangle similarity in terms of non-rigid transformations.	NC.M2.G-SRT.2 Understand similarity in terms of transformations. b. Use the properties of dilations to show that two triangles are similar when all corresponding pairs of sides are proportional and all corresponding pairs of angles are congruent. NC.M2.G-SRT.3 Use transformations (rigid motions and dilations) to justify the AA criterion for triangle similarity.
NCM2.SGMR.2.2 Construct a viable argument that two triangles are congruent, similar, or neither.	New
NCM2.SGMR.2.3 Solve problems using similar and congruent figures.	NC.M2.G-SRT.4 Use similarity to solve problems and to prove theorems about triangles. Use theorems about triangles to prove relationships in geometric figures.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	• A line parallel to one side of a triangle divides the other two sides proportionally and its converse. • The Pythagorean Theorem
NCM2.SGMR.3 Apply proportional relationships in right triangles.	
NCM2.SGMR.3.1 Develop properties of special right triangles using the Pythagorean Theorem.	NC.M2.G-SRT.12 Develop properties of special right triangles (45-45-90 and 30-60-90) and use them to solve problems.
NCM2.SGMR.3.2 Develop the trigonometric ratios for acute angles in right triangles using proportional reasoning.	NC.M2.G-SRT.6 Verify experimentally that the side ratios in similar right triangles are properties of the angle measures in the triangle, due to the preservation of angle measure in similarity. Use this discovery to develop definitions of the trigonometric ratios for acute angles.
NCM2.SGMR.3.3 Describe the relationships among the trigonometric ratios in a right triangle using multiple representations in context.	New
NCM2.SGMR.3.4 Write an equation using an appropriate trigonometric ratio to represent a relationship in a right triangle.	NC.M2.A-CED.1 Create equations and inequalities in one variable that represent quadratic, square root, inverse variation, and right triangle trigonometric relationships and use them to solve problems.
NCM2.SGMR.4 Solve problems involving right triangles.	
NCM2.SGMR.4.1 Find missing sides in right triangles using trigonometric ratios.	NC.M2.G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve problems involving right triangles in context.
NCM2.SGMR.4.2 Find missing angles in right triangles using trigonometric ratios.	NC.M2.G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve problems involving right triangles in context.
NCM2.SGMR.4.3 Solve problems using the properties of special right triangles.	NC.M2.G-SRT.12 Develop properties of special right triangles (45-45-90 and 30-60-90) and use them to solve problems.
NCM2.SGMR.4.4 Solve real-world problems using trigonometric	NC.M2.G-SRT.8 Use trigonometric ratios and the Pythagorean

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

ratios, the Pythagorean Theorem, and angles of elevation or depression.	Theorem to solve problems involving right triangles in context.
	Moved to NC Math 1 NC.M2.G-CO.2 Experiment with transformations in the plane. • Represent transformations in the plane. • Compare rigid motions that preserve distance and angle measure (translations, reflections, rotations) to transformations that do not preserve both distance and angle measure (e.g. stretches, dilations). • Understand that rigid motions produce congruent figures while dilations produce similar figures. NC.M2.G-CO.3 Given a triangle, quadrilateral, or regular polygon, describe any reflection or rotation symmetry i.e., actions that carry the figure onto itself. Identify center and angle(s) of rotation symmetry. Identify line(s) of reflection symmetry. NC.M2.G-CO.4 Verify experimentally properties of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. NC.M2.G-CO.5 Given a geometric figure and a rigid motion, find the image of the figure. Given a geometric figure and its image, specify a rigid motion or sequence of rigid motions that will transform the pre-image to its image. NC.M2.G-CO.6 Determine whether two figures are congruent by specifying a rigid motion or sequence of rigid motions that will transform one figure onto the other. NC.M2.G-CO.7 Use the properties of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. NC.M2.G-CO.8 Use congruence in terms of rigid motion. Justify the ASA, SAS, and SSS criteria for triangle congruence. Use criteria for triangle congruence (ASA, SAS, SSS, HL) to determine whether two triangles are congruent.
	Removed

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NC.M2.G-CO.9 Prove theorems about lines and angles and use them to prove relationships in geometric figures including:

- Vertical angles are congruent.
- When a transversal crosses parallel lines, alternate interior angles are congruent.
- When a transversal crosses parallel lines, corresponding angles are congruent.
- Points are on a perpendicular bisector of a line segment if and only if they are equidistant from the endpoints of the segment.
- Use congruent triangles to justify why the bisector of an angle is equidistant from the sides of the angle

NC.M2.G-CO.10 Prove theorems about triangles and use them to prove relationships in geometric figures including:

- The sum of the measures of the interior angles of a triangle is 180° .
- An exterior angle of a triangle is equal to the sum of its remote interior angles.
- The base angles of an isosceles triangle are congruent.
- The segment joining the midpoints of two sides of a triangle is parallel to the third side and half the length.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Statistics and Data Science Reasoning (SDSR)

Draft 3 Standards	2016 Standard Course of Study
NCM2.SDSR.1 Investigate conditional probability and independence using contingency tables, Venn diagrams, and probability rules.	
NCM2.SDSR.1.1 Find the conditional probability of an event using a contingency table or other representation.	NC.M2.S-CP.3a Develop and understand independence and conditional probability. a. Use a 2-way table to develop understanding of the conditional probability of A given B (written $P(A B)$) as the likelihood that A will occur given that B has occurred. That is, $P(A B)$ is the fraction of event B's outcomes that also belong to event A. NC.M2.S-CP.6 Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in context.
NCM2.SDSR.1.2 Interpret conditional probability in context.	NC.M2.S-CP.6 Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in context.
NCM2.SDSR.1.3 Construct a viable argument about whether events in context are independent or dependent.	NC.M2.S-CP.3b Develop and understand independence and conditional probability. b. Understand that event A is independent from event B if the probability of event A does not change in response to the occurrence of event B. That is $P(A B)=P(A)$. NC.M2.S-CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. NC.M2.S-CP.8 Apply the general Multiplication Rule $P(A \text{ and } B) =$

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

	$P(A)P(B A) = P(B)P(A B)$, and interpret the answer in context. Include the case where A and B are independent: $P(A \text{ and } B) = P(A) P(B)$.
NCM2.SDSR.2 Formulate and investigate statistical questions about real-world issues to make inferences about multivariate data.	
NCM2.SDSR.2.1 Generate statistical questions about a topic of interest from a multivariate dataset.	New
NCM2.SDSR.2.2 Construct a viable argument to determine whether a question is statistical or non-statistical.	New
NCM2.SDSR.2.3 Evaluate statistical questions for potential sources of bias in data collection or response.	New
NCM2.SDSR.3 Explore and evaluate multivariate datasets to investigate a statistical question.	
NCM2.SDSR.3.1 Evaluate the credibility of a data source by considering how the data were collected, who collected them, and what potential biases or limitations exist.	New
NCM2.SDSR.3.2 Select relevant variables from a multivariate dataset to investigate a statistical question.	New
NCM2.SDSR.3.3 Examine whether separating data by a third categorical variable produces models with better fit and predictability.	New
NCM2.SDSR.4 Create and interpret standard and non-standard visualizations of multivariate data from real-world sources and media.	
NCM2.SDSR.4.1 Create and select appropriate visualizations for multivariate data, including scatter plots, using technology.	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

NCM2.SDSR.4.2 Describe the form, direction, and strength of a relationship between two quantitative variables in a scatter plot, including non-linear patterns.	New
NCM2.SDSR.4.3 Interpret non-standard data visualizations from real-world sources, such as heat maps, infographics, and media-based displays, describing what information is shown and what conclusions can be drawn.	New
NCM2.SDSR.4.4 Critique real-world data visualizations, including non-standard forms, by evaluating data collection, display choices, potential bias, and how the visualization supports or misleads an argument.	New
NCM2.SDSR.5 Analyze relationships in multivariate quantitative data using statistical measures and linear, exponential, and quadratic regression models.	
NCM2.SDSR.5.1 Find a quadratic regression model for data using technology.	New
NCM2.SDSR.5.2 Construct a viable argument for using the correlation coefficient (r) and/or the coefficient of determination (r^2) when evaluating and comparing the fit of statistical models.	New
NCM2.SDSR.5.3 Compare the fit of linear, exponential, and quadratic models by analyzing residual plots and the coefficient of determination to select the most appropriate model.	New
NCM2.SDSR.5.4 Identify outliers in data from an identified relationship.	New
NCM2.SDSR.5.5 Describe how outliers affect the form, direction, and strength of the identified relationship in context.	New
NCM2.SDSR.5.6 Distinguish between correlation and causation,	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

including identifying potential confounding variables.	
NCM2.SDSR.5.7 Interpret the key features of linear, quadratic, and exponential regression models.	New
NCM2.SDSR.5.8 Make predictions using linear, exponential, and quadratic regression models by interpolating and extrapolating, and assess the validity of predicted values.	New
NCM2.SDSR.6 Communicate the application of the statistical modeling process, conclusions, and limitations of a multivariate data investigation.	
NCM2.SDSR.6.1 Evaluate the application of the statistical modeling process used to investigate multivariate data.	New
NCM2.SDSR.6.2 Communicate conclusions about multivariate data through narratives and presentations that describe the statistical modeling process conducted.	New
NCM2.SDSR.6.3 Critique claims in the media by analyzing the statistical modeling process used.	New
	Removed NC.M2.S-CP.7 Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in context.
	Moved to Math 1 NC.M2.S-CP.1 Describe events as subsets of the outcomes in a sample space using characteristics of the outcomes or as unions, intersections and complements of other events

Applied Logic and Reasoning -ALR

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Applied Logic and Reasoning Crosswalk

The purpose of this document is to provide a general comparison of the 2019 Discrete Mathematics with Computer Science Standard Course of Study and the 2026 Applied Logic and Reasoning Standard Course of Study. It provides initial insight into similarities and differences between these two sets of standards. As this is an initial comparison, the document does not address every difference or nuance between the draft standards and the current standards.

Draft 3 Domains	2019 Domains
Number and Quantity (NQ)	Number and Quantity (NQ)
Graph Theory (GT)	Graph Theory (GT)
Logic (L)	Logic (L)
Modeling Decision Making and Fairness (MDMF)	New
	Removed: Functions and Statistics & Probability

Number and Quantity (NQ)

Draft 3 Standards	2019 Standard Course of Study
ALR.NQ.1 Apply operations with matrices and vectors.	DCS.N.1 Apply operations with matrices and vectors.
ALR.NQ.1.1 Use appropriate tools strategically to implement procedures of addition, subtraction, multiplication, and scalar multiplication on matrices.	DCS.N.1.1 Implement procedures of addition, subtraction, multiplication, and scalar multiplication on matrices.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

ALR.NQ.1.2 Justify the conditions under which matrix addition, subtraction, multiplication, and scalar multiplication are defined using examples.	New
ALR.NQ.1.3 Use appropriate tools strategically to implement procedures of addition, subtraction, scalar multiplication, and the dot product of vectors.	DCS.N.1.2 Implement procedures of addition, subtraction, and scalar multiplication on vectors.
ALR.NQ.1.4 Use appropriate tools strategically to implement procedures to find the inverse of invertible matrices.	DCS.N.1.3 Implement procedures to find the inverse of a matrix.
ALR.NQ.2 Understand matrices in context.	DCS.N.2 Understand matrices to solve problems.
ALR.NQ.2.1 Decontextualize a real-world situation by representing it with matrices.	DCS.N.2.1 Organize data into matrices to solve problems. DCS.N.2.3 Represent a system of equations as a matrix equation.
ALR.NQ.2.2 Use appropriate tools to solve a system of equations using an inverse matrix.	DCS.N.2.4 Use inverse matrices to solve a system of equations with technology.
ALR.NQ.2.3 Recontextualize the results of matrix operations.	DCS.N.2.2 Interpret solutions found using matrix operations including Leslie Models and Markov Chains, in context.
ALR.NQ.2.45 Assess the reasonableness of matrix-generated predictions in Leslie models and Markov chains by interpreting population distributions, growth trends, and state probabilities in the context of a given problem.	DCS.N.2.2 Interpret solutions found using matrix operations including Leslie Models and Markov Chains, in context.
ALR.NQ.3 Understand set theory to model and solve problems.	DCS.N.3 Understand set theory to solve problems.
ALR.NQ.3.1 Identify a collection of numbers as sets, subsets, or proper subsets.	DCS.N.3.1 Recognize sets, subsets, and proper subsets.
ALR.NQ.3.2 Implement set operations to find unions,	DCS.N.3.2 Implement set operations to find unions, intersections, complements and set differences with multiple sets.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

intersections, complements, and set differences with multiple sets.	
ALR.NQ.3.3 Represent properties and relationships among sets using Venn diagrams.	DCS.N.3.3 Represent properties and relationships among sets using Venn diagrams.
ALR.NQ.3.4 Make use of the structure of Venn diagrams to solve problems.	DCS.N.3.4 Interpret Venn diagrams to solve problems.
ALR.NQ.4 Understand statements related to number theory and set theory.	DCS.N. 4 Understand statements related to number theory and set theory.
ALR.NQ.4.1 Find the greatest common factor (GCF) and least common multiple (LCM) of two integers using the Euclidean algorithm.	DCS.N.4.1 Use the Euclidean Algorithm to determine greatest common factor and least common multiple.
ALR.NQ.4.2 Solve problems using the Fundamental Theorem of Arithmetic.	DCS.N.4.2 Use the Fundamental Theorem of Arithmetic to solve problems.
ALR.NQ.4.3 Determine set equality using properties of set operations.	DCS.N.4.3 Conclude that sets are equal using the properties of set operations.
ALR.NQ.4.4 Construct viable arguments about the greatest common factor, least common multiple, even and odd numbers, and prime and composite numbers using algebraic reasoning or visual models.	DCS.N.4.4 Explain theorems related to greatest common factor, least common multiple, even numbers, odd numbers, prime numbers, and composite numbers.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Graph Theory (GT)

Draft 3 Standards	2019 Standard Course of Study
ALR.GT.1 Understand graph theory to model relationships and solve problems.	DCS.GT.1 Understand graph theory to model relationships and solve problems.
ALR.GT.1.1 Decontextualize real-world situations by representing them with a vertex-edge graph, adjacency matrix, and vertex-edge table.	DCS.GT.1.1 Represent real world situations using a vertex-edge graph, adjacency matrix, and vertex-edge table.
ALR.GT.1.2 Test graphs and digraphs for Euler paths, Euler circuits, Hamiltonian paths, or Hamiltonian circuits.	DCS.GT.1.2 Test graphs and digraphs for Euler paths, Euler circuits, Hamiltonian paths, or Hamiltonian circuits.
ALR.GT.1.3 Interpret a complete digraph to determine vertex rank.	DCS.GT.1.3 Interpret a complete digraph to determine rank.
ALR.GT.2 Apply graph theory to solve problems.	DCS.GT.2 Apply graph theory to solve problems.
ALR.GT.2.1 Implement critical path analysis algorithms to determine the minimum project time.	DCS.GT.2.1 Implement critical path analysis algorithms to determine the minimum project time.
ALR.GT.2.2 Implement the brute-force method, the nearest-neighbor algorithm, and the cheapest-link algorithm to solve the Traveling Salesperson Problem.	DCS.GT.2.2 Implement the brute force method, the nearest-neighbor algorithm, and the cheapest-link algorithm to find solutions to a Traveling Salesperson Problem.
ALR.GT.2.3 Implement vertex-coloring techniques to solve problems.	DCS.GT.2.3 Implement vertex-coloring techniques to solve problems.
ALR.GT.2.4 Implement Kruskal's and Prim's algorithms to determine the weight of a minimum spanning tree of a connected graph.	DCS.GT.2.4 Implement Kruskal and Prim's algorithms to determine the weight of the minimum spanning tree of a connected graph.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Logic (L)

Draft 3 Standards	2019 Standard Course of Study
ALR.L.1 Evaluate mathematical logic to model and solve problems.	DCS.L.1 Evaluate mathematical logic to model and solve problems.
ALR.L.1.1 Construct truth tables that represent the truth values of two or more statements.	DCS.L.1.1 Construct truth tables that encode the truth and falsity of two or more statements.
ALR.L.1.2 Analyze logical arguments to determine their validity.	DCS.L.1.2 Critique logic arguments (e.g., determine if a statement is valid or whether an argument is a tautology or contradiction).
ALR.L.1.3 Identify whether statements are tautologies, contradictions, or contingencies.	DCS.L.1.2 Critique logic arguments (e.g., determine if a statement is valid or whether an argument is a tautology or contradiction).
ALR.L.1.4 Determine the truth value of Boolean logic circuits using 1s and 0s (true and false).	DCS.L.1.3 Check 1s and 0s to determine whether a statement is true or false using Boolean logic circuits.
ALR.L.1.5 Construct a viable argument about whether two statements are logically equivalent using truth tables.	DCS.L.1.4 Judge whether two statements are logically equivalent using truth tables.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Modeling Decision Making and Fairness (MDMF)

Draft 3 Standards	2019 Standard Course of Study
ALR.MDMF.1 Apply and analyze voting methods.	New
ALR.MDMF.1.1 Determine election outcomes using voting methods: plurality, Borda count, pairwise comparisons, and plurality-with-elimination.	New
ALR.MDMF.1.2 Construct a viable argument supporting the voting method used to determine an election outcome.	New
ALR.MDMF.1.3 Analyze the fairness criteria of different voting methods.	New
ALR.MDMF.1.4 Assess the implications of Arrow's Impossibility Theorem by analyzing how different voting systems can fail to satisfy fairness criteria in democratic decision-making.	New
ALR.MDMF.2 Evaluate weighted voting systems.	New
ALR.MDMF.2.1 Analyze weighted voting systems using the Banzhaf and Shapley-Shubik power indices.	New
ALR.MDMF.2.2 Analyze voting coalitions using subsets and permutations.	New
ALR.MDMF.2.3 Critique the fairness and effectiveness of weighted voting systems in real-world contexts.	New
ALR.MDMF.3 Analyze fair-division methods to solve problems.	New
ALR.MDMF.3.1 Determine equitable outcomes using fair-division strategies: divider-chooser, lone-divider, lone-chooser, sealed bids, and markers.	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

ALR.MDMF.3.2 Assess the advantages, limitations, and fairness of various division methods, such as divider-chooser, lone-divider, lone-chooser, sealed bids, and markers, in context.	New
ALR.MDMF.4 Evaluate apportionment methods.	New
ALR.MDMF.4.1 Analyze the distribution of seats among groups using the Hamilton, Jefferson, Adams, Webster, and Huntington-Hill apportionment methods.	New
ALR.MDMF.4.2 Critique the fairness and effectiveness of apportionment methods in real-world contexts.	New

	Removed Functions DCS.F.1 Apply recursively-defined relationships to solve problems. • DCS.F.1.1 Implement procedures to find the nth term in an arithmetic or geometric sequence using spreadsheets. • DCS.F.1.2 Represent the sum of a sequence using sigma notation. • DCS.F.1.3 Implement procedures to find the sum of a finite sequence. • DCS.F.1.4 Implement procedures to find the sum of an infinite sequence and determine if the series converges or diverges. • DCS.F.1.5 Interpret the solutions to arithmetic and geometric sequences and series problems, in context. Statistics and Probability DCS.SP.1 Apply combinatorics concepts to solve problems. • DCS.SP.1.1 Implement the Fundamental Counting Principle to solve problems.
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NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

- **DCS.SP.1.2** Implement procedures to calculate a permutation or combination.

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Applied Statistics and Data Science

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Applied Statistics and Data Science Crosswalk

The proposed standards for the Applied Statistics and Data Science course were developed using multiple research-based sources and existing North Carolina-specific sources. These included, but were not limited to, the [GAISE II Report](#), relevant courses offered through the North Carolina Community College System, and the current NC Math 3 and NC Math 4 Standard Courses of Study.

The purpose of this document is to provide an initial overview of how the draft Applied Statistics and Data Science standards connect to the current NC Math 3 and NC Math 4 standards. It is intended to highlight key areas of alignment and provide context for understanding the proposed course. As this is an initial comparison, the document does not address every difference or nuance between the draft standards and the current standards.

Draft 3 Domains
Framing Statistical Problems – FSP
Collecting and Creating Data – CCD
Data Visualizations – DV
Analyzing and Modeling Data – AMD
Drawing Conclusions and Communicating – DCC

Framing Statistical Problems (FSP)

Draft 3 Standards	Associated NC Math 3 and NC Math 4 Standards
ASDS.FSP.1 Formulate and refine statistical questions that can be addressed with data by connecting context, purpose, and variability. • ASDS.FSP.1.1 Distinguish between statistical and non-statistical questions.	NC.M4.SP.1.1 Construct statistical questions to guide explorations of data in context.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

- **ASDS.FSP.1.2** Formulate investigable statistical questions that anticipate variability in data.
- **ASDS.FSP.1.3** Refine questions iteratively to align with data availability, context, and intended audience.
- **ASDS.FSP.1.4** Explain how the way a statistical question is framed influences the variables studied, the type of data collected, and the conclusions that can be drawn from the investigation.

Collecting and Creating Data (CCD)

Draft 3 Standards	Associated NC Math 3 and NC Math 4 Standards
ASDS.CCD.1 Design and carry out data collection plans that use randomization, limit bias, and support valid conclusions that address a statistical question. • ASDS.CCD.1.1 Design observational studies and surveys using random sampling to minimize bias. • ASDS.CCD.1.2 Design experiments with random assignment to control for confounding variables and minimize bias. • ASDS.CCD.1.3 Justify choices in study design by considering ethical principles, including informed consent, fair representation of groups, and the avoidance of unfair treatment. • ASDS.CCD.1.4 Create data collection instruments (e.g., survey questions and observational tools) with neutral wording, structure, and visuals that minimize bias and support data validity. • ASDS.CCD.1.5 Use technology to collect data efficiently.	NC.M4.SP.1.2 Design sample surveys and comparative experiments using sampling methods to collect and analyze data to answer a statistical question.
ASDS.CCD.2 Understand that different sampling methods affect how well a sample represents a population and contribute to a valid conclusion.	NC.M3.S-IC.1 Understand the process of making inferences about a population based on a random sample from that population.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

• ASDS.CCD.2.1 Explain the difference between populations and samples. • ASDS.CCD.2.2 Describe the purpose of sampling when drawing conclusions about the population. • ASDS.CCD.2.3 Use random sampling to select a representative sample from a population. • ASDS.CCD.2.4 Construct a viable argument for using a sampling method for a given situation. • ASDS.CCD.2.5 Explain how randomization and sampling bias affect the validity of the results of a study.	NC.M3.S-IC.3 Recognize the purposes of and differences between sample surveys, experiments, and observational studies and understand how randomization should be used in each.
ASDS.CCD.3 Collect and process original and secondary data so they are ready for analysis and interpretation. • ASDS.CCD.3.1 Generate original data using designed surveys, observational tools, experiments, and simulations. • ASDS.CCD.3.2 Compile secondary data from pre-existing data sources. • ASDS.CCD.3.3 Organize secondary data into appropriate structures. • ASDS.CCD.3.4 Clean collected datasets (original and secondary) for analysis by addressing missing values, combining datasets, and creating new variables when appropriate. • ASDS.CCD.3.5 Critique the assumptions and limitations of original and secondary data and note possible sources of error, bias, or misrepresentation.	NC.M3.S-IC.3 Recognize the purposes of and differences between sample surveys, experiments, and observational studies and understand how randomization should be used in each. NC.M4.SP.1.3 Organize large datasets of real-world contexts (i.e. datasets that include 3 or more measures and have sample sizes >200) using technology (e.g., spreadsheets, dynamic data analysis tools) to determine: types of variables in the data set, possible outcomes for each variable, statistical questions that could be asked of the data, and types of numerical and graphical summaries could be used to make sense of the data.
ASDS.CCD.4 Apply principles of fairness, consent, and representation when creating and collecting data. • ASDS.CCD.4.1 Explain the principles of informed consent, voluntary participation, and the right to withdraw. • ASDS.CCD.4.2 Analyze risks of misrepresentation and bias introduced through collection practices. • ASDS.CCD.4.3 Justify decisions about data creation and collection in light of ethical and civic responsibilities.	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

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NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Data Visualizations (DV)

Draft 3 Standards	Associated NC Math 3 and NC Math 4 Standards
ASDS.DV.1 Create visualizations of multivariate data to identify patterns, compare distributions, and support analysis. • ASDS.DV.1.1 Select appropriate visualizations based on data type, context, and audience. • ASDS.DV.1.2 Construct visualizations of multivariate data using technology. • ASDS.DV.1.3 Interpret the key features of data visualizations.	NC.M4.SP.1.4 Interpret non-standard data visualizations from the media or scientific papers to make sense of real-world phenomena.
ASDS.DV.2 Critique and refine visualizations for accuracy, clarity, and appropriateness. • ASDS.DV.2.1 Analyze how design decisions affect the interpretation of data, including scales, axes, ordering, color, and aggregation. • ASDS.DV.2.2 Explain how different data visualizations highlight varying aspects of a data narrative. • ASDS.DV.2.3 Revise visualizations to improve clarity, transparency, and accessibility. • ASDS.DV.2.4 Evaluate visualizations in the media and research for accuracy and fairness.	NC.M4.SP.1.4 Interpret non-standard data visualizations from the media or scientific papers to make sense of real-world phenomena.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Analyzing and Modeling Data (AMD)

Draft 3 Standards	Associated NC Math 3 and NC Math 4 Standards
ASDS.AMD.1 Summarize, analyze, and compare multivariate distributions using descriptive statistics. • ASDS.AMD.1.1 Summarize a data set with appropriate numerical measures that describe the distribution. • ASDS.AMD.1.2 Interpret measures of multivariate distributions in context. • ASDS.AMD.1.3 Compare measures of centrality, shape, and spread for two or more multivariate distributions in context. • ASDS.AMD.1.4 Interpret measures of relative standing.	New
ASDS.AMD.2 Build mathematical and probabilistic models that describe data and interpret them in context. • ASDS.AMD.2.1 Create linear, exponential, quadratic, and logistic models using technology. • ASDS.AMD.2.2 Interpret model parameters in context. • ASDS.AMD.2.3 Evaluate the goodness of fit of nonlinear models by analyzing residual plots. • ASDS.AMD.2.4 Justify model selection based on purpose and context. • ASDS.AMD.2.5 Determine when it is appropriate to model datasets with a binomial or normal distribution. • ASDS.AMD.2.6 Calculate probabilities of events modeled by a binomial distribution. • ASDS.AMD.2.7 Calculate probabilities of events modeled by a normal distribution using technology. • ASDS.AMD.2.8 Compare data points from normal distributions that have different means and standard deviations using z-scores.	NC.M4.SP.3.1 Implement discrete probability distributions to model random phenomena and make decisions (e.g., expected value of playing a game, etc.). NC.M4.SP.3.2 Implement the binomial distribution to model situations and make decisions. NC.M4.SP.3.3 Recognize from simulations of sampling distributions of sample means and proportions that a normal distribution can be used as an approximate model in certain situations. NC.M4.SP.3.4 Implement the normal distribution as a probability distribution to determine the likelihood of events occurring.
ASDS.AMD.3 Understand the role of randomness in data by	NC.M3.S-IC.4 Use simulation to understand how samples can be

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

applying probability and random processes as models of uncertainty.

- **ASDS.AMD.3.1** Explain the role of probability in modeling randomness and uncertainty.
- **ASDS.AMD.3.2** Explain how simulation can be used to estimate a population mean or proportion and to determine a margin of error for the estimate.
- **ASDS.AMD.3.3** Determine, using simulation, whether observed differences between samples from two populations provide evidence that the populations differ with respect to a parameter of interest.

used to estimate a population mean or proportion and how to determine a margin of error for the estimate.

NC.M3.S-IC.5 Use simulation to determine whether observed differences between samples from two distinct populations indicate that the two populations are actually different in terms of a parameter of interest.

NC.M4.SP.2.1 Design a simulation to make a sampling distribution that can be used in making informal statistical inferences.

Drawing Conclusions and Communicating (DCC)

Draft 3 Standards	Associated NC Math 3 and NC Math 4 Standards
ASDS.DCC.1 Communicate insights using data visualizations through narratives and presentations tailored to varied audiences. • ASDS.DCC.1.1 Develop data presentations that integrate visualizations with narrative explanations that include probabilistic and contextual language. • ASDS.DCC.1.2 Adapt communication to a specific audience by highlighting relevant context.	New
ASDS.DCC.2 Draw and justify inferences from sample data about a population by using probabilistic reasoning. • ASDS.DCC.2.1 Explain how limitations in sampling influence the extent to which results can be generalized. • ASDS.DCC.2.2 Make informal inferences, using randomization and simulation, about population parameters.	NC.M3.S-IC.1 Understand the process of making inferences about a population based on a random sample from that population.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

• ASDS.DCC.2.3 Interpret margins of error as measures of uncertainty when making inferences about population parameters. • ASDS.DCC.2.4 Assess the validity of a predicted value.	
ASDS.DCC.3 Evaluate and critique claims based on data, recognizing the limitations of statistical inference. • ASDS.DCC.3.1 Evaluate the strength and limitations of evidence from observational studies versus experiments. • ASDS.DCC.3.2 Critique claims in the media, research, and policy by analyzing data sources, study design, and reasoning.	NC.M3.S-IC.6 Evaluate articles and websites that report data by identifying the source of the data, the design of the study, and the way the data are graphically displayed.

Mathematical and Statistical Modeling

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

Mathematical and Statistical Modeling Crosswalk

The proposed standards for the Mathematical and Statistical Modeling course were developed using multiple research-based sources and existing North Carolina-specific sources. These included, but were not limited to, the [GAISE II Report](#), the [GAIME Report](#), relevant courses offered through the North Carolina Community College System, and the current NC Math 3 and NC Math 4 Standard Courses of Study.

The purpose of this document is to provide an initial overview of how the draft Mathematical and Statistical Modeling standards connect to the current NC Math 3 and NC Math 4 standards. It is intended to highlight key areas of alignment and provide context for understanding the proposed course. As this is an initial comparison, the document does not address every difference or nuance between the draft standards and the current standards.

Draft 3 Domains
Reasoning with Mathematical Modeling - RMM
Reasoning with Statistical Modeling

Reasoning with Mathematical Modeling (RMM)

Draft 3 Standards	Associated NC Math 3 and NC Math 4 Standards
MSM.RMM.1 Find and defend solutions to real-world scenarios using the mathematical modeling process. • MSM.RMM.1.1 Identify a real-world scenario that requires analysis. • MSM.RMM.1.2 Describe the essential quantities, relationships, assumptions, constraints, and questions in a mathematical situation. • MSM.RMM.1.3 Decontextualize the mathematical situation to construct a model.	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

• MSM.RMM.1.4 Use appropriate tools to analyze the model. • MSM.RMM.1.5 Make conjectures and explore their validity using mathematics. • MSM.RMM.1.6 Recontextualize the conclusion to determine appropriateness and to modify the model as needed. • MSM.RMM.1.7 Construct a viable argument that details the steps for creating and modifying the model and drawing conclusions. • MSM.RMM.1.8 Critique the reasoning used in another's modeling process and solution.	
MSM.RMM.2 Look for and make use of structure to analyze patterns of change across different function types. • MSM.RMM.2.1 Identify the appropriate function type to model in a context based on patterns of change. • MSM.RMM.2.2 Identify and define independent variables, dependent variables, and constant parameters within real-world scenarios. • MSM.RMM.2.3 Determine a reasonable domain and range for a function in context.	New
MSM.RMM.3 Decontextualize a mathematical situation by representing it with a polynomial, exponential, reciprocal, piecewise, or logarithmic function as part of the mathematical modeling process. • MSM.RMM.3.1 Use appropriate tools to build a polynomial function that models the key features of a real-world scenario. • MSM.RMM.3.2 Build a piecewise function from a situation or graph. • MSM.RMM.3.3 Use technology to build polynomial and logarithmic regression models.	NC.M3.A-CED.1 Create equations and inequalities in one variable that represent absolute value, polynomial, exponential, and rational relationships and use them to solve problems algebraically and graphically. NC.M3.A-CED.2 Create and graph equations in two variables to represent absolute value, polynomial, exponential and rational relationships between quantities. NC.M3.F-BF.1a Write a function that describes a relationship between two quantities. a. Build polynomial and exponential functions with real solution(s) given a graph, a description of a relationship, or

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

• MSM.RMM.3.4 Use appropriate representations to highlight key features of and solutions to a mathematical situation. • MSM.RMM.3.5 Justify the model selected to represent a mathematical situation.	ordered pairs (include reading these from a table). NC.M4.AF.4.1 Translate between algebraic and graphical representations of piecewise functions (linear, exponential, quadratic, polynomial, square root) NC.M4.AF.4.2 Construct piecewise functions to model a contextual situation.
MSM.RMM.4 Recontextualize the key features of and the solutions to equations and inequalities from a model as part of the mathematical modeling process. • MSM.RMM.4.1 Interpret the inputs and outputs of functions in context. • MSM.RMM.4.2 Solve equations from a function model using appropriate technology. • MSM.RMM.4.3 Solve inequalities from a model using appropriate technology. • MSM.RMM.4.4 Interpret the key features of polynomial, exponential, reciprocal, piecewise, and logarithmic functions. • MSM.RMM.4.5 Interpret solutions to equations and inequalities in context.	NC.M3.A-APR.3 Understand the relationship among factors of a polynomial expression, the solutions of a polynomial equation and the zeros of a polynomial function. NC.M3.A-CED.1 Create equations and inequalities in one variable that represent absolute value, polynomial, exponential, and rational relationships and use them to solve problems algebraically and graphically. NC.M3.F-IF.2 Use function notation to evaluate piecewise defined functions for inputs in their domains, and interpret statements that use function notation in terms of a context. NC.M3.F-IF.4 Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities to include periodicity and discontinuities. NC.M3.F-IF.7 Analyze piecewise, absolute value, polynomials, exponential, rational, and trigonometric functions (sine and cosine) using different representations to show key features of the graph, by hand in simple cases and using technology for more complicated cases, including: domain and range; intercepts; intervals where the function is increasing, decreasing, positive, or negative; rate of change; relative maximums and minimums; symmetries; end behavior; period; and discontinuities. NC.M3.F-IF.9 Compare key features of two functions using different representations by comparing properties of two different

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

functions, each with a different representation (symbolically, graphically, numerically in tables, or by verbal descriptions).
NC.M4.AF.3.3 Interpret key features of a logarithmic function using multiple representations.

Reasoning with Statistical Modeling (RSM)

Draft 3 Standards	Associated NC Math 3 and NC Math 4 Standards
MSM.RSM.1 Formulate and investigate statistical questions about real-world issues to make inferences about data as part of the statistical modeling process. • MSM.RSM.1.1 Construct statistical questions to guide explorations of data in context. • MSM.RSM.1.2 Design surveys using sampling methods to collect data aligned with a statistical question. • MSM.RSM.1.3 Use informal or theoretical probability to anticipate possible outcomes and variability. • MSM.RSM.1.4 Implement plans to collect and curate original and/or existing data. • MSM.RSM.1.5 Explain the limitations and uncertainty associated with the collected data. • MSM.RSM.1.6 Evaluate statistical questions for potential sources of bias in data collection or response.	NC.M4.SP.1.1 Construct statistical questions to guide explorations of data in context. NC.M4.SP.1.2 Design sample surveys and comparative experiments using sampling methods to collect and analyze data to answer a statistical question. NC.M4.SP.1.3 Organize large datasets of real-world contexts (i.e. datasets that include 3 or more measures and have sample sizes >200) using technology (e.g., spreadsheets, dynamic data analysis tools) to determine: types of variables in the data set, possible outcomes for each variable, statistical questions that could be asked of the data, and types of numerical and graphical summaries could be used to make sense of the data.
MSM.RSM.2 Explore and evaluate collected data to investigate a statistical question as part of the statistical modeling process. • MSM.RSM.2.1 Create data visualizations using technology to represent quantitative and categorical data.	New

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

• MSM.RSM.2.2 Interpret key features of graphical representations of data. • MSM.RSM.2.3 Calculate numerical summaries of quantitative and categorical data. • MSM.RSM.2.4 Interpret numerical summaries of quantitative and categorical data. • MSM.RSM.2.5 Recognize when observed patterns align with or differ from expected probabilistic behavior.	
MSM.RSM.3 Apply probability distributions to make decisions under uncertainty as part of the statistical modeling process. • MSM.RSM.3.1 Create probability models using discrete, binomial, and normal distributions. • MSM.RSM.3.2 Determine the likelihood of events occurring using discrete, binomial, and normal distributions. • MSM.RSM.3.3 Make decisions using probability models. • MSM.RSM.3.4 Construct a viable argument to support decisions using probabilistic reasoning.	NC.M4.SP.3.1 Implement discrete probability distributions to model random phenomena and make decisions (e.g., expected value of playing a game, etc.). NC.M4.SP.3.2 Implement the binomial distribution to model situations and make decisions. NC.M4.SP.3.4 Implement the normal distribution as a probability distribution to determine the likelihood of events occurring.
MSM.RSM.4 Analyze relationships in multivariate datasets using statistical measures as part of the statistical modeling process. • MSM.RSM.4.1 Construct polynomial, exponential, and logarithmic regression models for bivariate data using technology to model data and solve problems. • MSM.RSM.4.2 Compare residuals, residual plots, the correlation coefficient, and the coefficient of determination for nonlinear models to assess model goodness of fit. • MSM.RSM.4.3 Draw conclusions that answer the statistical question using evidence based on the analysis of the statistical model.	New
MSM.RSM.5 Summarize findings from the statistical modeling process and communicate the workflow and conclusions.	NC.M3.S-IC.6 Evaluate articles and websites that report data by identifying the source of the data, the design of the study, and the way the data are graphically displayed.

NORTH CAROLINA STANDARD COURSE OF STUDY - DRAFT

- **MSM.RSM.5.1** Evaluate the appropriateness of the investigative questions, data collection plan, or analysis approach based on results.
- **MSM.RSM.5.2** Communicate conclusions about data through narratives and presentations that describe the statistical modeling process used, including discussion of the limitations of the data, potential sources of bias, and additional questions that emerged.
- **MSM.RSM.5.3** Evaluate the appropriateness of probability models used to represent the situation.
- **MSM.RSM.5.4** Critique the workflow, conclusions, and potential sources of bias in data investigations by analyzing data sources, sampling design, and reasoning.