Kindergarten

Standards for Mathematical Practice	
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics.	5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

Counting and Cardinality

2010 Standard Abbreviation	2010 Standard	2017 Standard Abbreviation	2017 Standard
Know number names and the count sequence.		**Know number names and the counting sequence.**	
K.CC.1	Count to 100 by ones and by tens.	**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.CC.2	Count forward beginning from a given number within the known sequence (instead of having to begin at 1).	**NC.K.CC.2**	Count forward beginning from a given number within the known sequence, instead of having to begin at 1.
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).	**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.
Count to tell the number of objects.		**Count to tell the number of objects.**	
K.CC.4	Understand the relationship between numbers and quantities; connect counting to cardinality. a. 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. b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted. c. Understand that each successive number name refers to a quantity that is one larger.	**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.CC.5	Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.	**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.

Counting and Cardinality			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
			• 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.
Compare numbers.		**Compare numbers.**	
K.CC.6	Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.[1] (Note: Include groups with up to ten objects.)	**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.CC.7	Compare two numbers between 1 and 10 presented as written numerals.	**NC.K.CC.7**	Compare two numbers, within 10, presented as written numerals.

Operations and Algebraic Thinking			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.		**Understand addition and subtraction.**	
K.OA.1	Represent addition and subtraction with objects, fingers, mental images, drawings[1], sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. (Note: Drawings need not show details, but should show the mathematics in the problem - this applies wherever drawings are mentioned in the Standards.)	**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.OA.2	Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.	**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.OA.3	Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).	**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.OA.4	For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.	**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.
	NEW STANDARD	**NC.K.OA.6**	Recognize and combine groups with totals up to 5 (conceptual subitizing).
K.OA.5	Fluently add and subtract within 5.	**NC.K.OA.5**	Demonstrate fluency with addition and subtraction within 5.

Number and Operations in Base Ten			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Work with numbers 11-19 to gain foundations for place value.		**Build foundation for place value.**	
K.NBT.1	Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.	**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.

Measurement and Data			
Current Standard Abbreviation	**Current Standard**	**Proposed Standard Abbreviation**	**Final Draft Proposed Standard**
Describe and compare measureable attributes.		**Describe and compare measurable attributes.**	
K.MD.1	Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.	**NC.K.MD.1**	Describe measurable attributes of objects; and describe several different measurable attributes of a single object.
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. *For example, directly compare the heights of two children and describe one child as taller/shorter.*	**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.
Classify objects and count the number of objects in each category.		**Classify objects and count the number of objects in each category.**	
K.MD.3	Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. (Note: Limit category counts to be less than or equal to 10.)	**NC.K.MD.3**	Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

Geometry			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).		**Identify and describe shapes.**	
K.G.1	Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above*, *below*, *beside*, *in front of*, *behind*, and *next to*.	**NC.K.G.1**	Describe objects in the environment using names of shapes, and describe the relative positions of objects using positional terms.

Geometry			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
K.G.2	Correctly name shapes regardless of their orientations or overall size.	**NC.K.G.2**	Correctly name squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres regardless of their orientations or overall size.
K.G.3	Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").	**NC.K.G.3**	Identify squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres as two-dimensional or three-dimensional.
Analyze, compare, create, and compose shapes.		**Analyze, compare, create, and compose shapes.**	
K.G.4	Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).	**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.
K.G.5	Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.	**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.G.6	Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?"*	**NC.K.G.6**	Compose larger shapes from simple shapes.

1st Grade

Standards for Mathematical Practice	
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics.	5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

Operations and Algebraic Thinking			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Represent and solve problems involving addition and subtraction.		**Represent and solve problems.**	
1.OA.1	Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. (Note: See Glossary, Table 1).	**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.OA.2	Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	**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.
Understand and apply properties of operations and the relationship between addition and subtraction.		**Understand and apply the properties of operations.**	
1.OA.3	Apply properties of operations as strategies to add and subtract.[2] *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)*	**NC.1.OA.3**	Apply the commutative and associative properties as strategies for solving addition problems.
1.OA.4	Understand subtraction as an unknown-addend problem. *For example, subtract 10 – 8 by finding the number that makes 10 when added to 8. Add and subtract within 20.*	**NC.1.OA.4**	Solve an unknown-addend problem, within 20, by using addition strategies and/or changing it to a subtraction problem.
Add and subtract within 20.		**Add and subtract within 20.**	
1.OA.5	Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).		***STANDARD REMOVED***
	NEW STANDARD NUMBER, Concept from 1.OA.6	**NC.1.OA.9**	Demonstrate fluency with addition and subtraction within 10.

Operations and Algebraic Thinking			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
1.OA.6	Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).	**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
Work with addition and subtraction equations.		**Analyze addition and subtraction equations within 20.**	
1.OA.7	Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.	**NC.1.OA.7**	Apply understanding of the equal sign to determine if equations involving addition and subtraction are true.
1.OA.8	Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = _ – 3, 6 + 6 = _.*	**NC.1.OA.8**	Determine the unknown whole number in an addition or subtraction equation involving three whole numbers.

Number and Operations in Base Ten			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Extend the counting sequence.		**Extend and recognize patterns in the counting sequence.**	
1.NBT.1	Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.	**NC.1.NBT.1**	Count to 150, starting at any number less than 150.
	NEW STANDARD NUMBER, Concept from 1.NBT.1	**NC.1.NBT.7**	Read and write numerals, and represent a number of objects with a written numeral, to 100.
Understand place value.		**Understand place value.**	
1.NBT.2	Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: a. 10 can be thought of as a bundle of ten ones — called a "ten." b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 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. • 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.

Number and Operations in Base Ten			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
1.NBT.3	Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.	**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 <.
Use place value understanding and properties of operations to add and subtract.		**Use place value understanding and properties of operations.**	
1.NBT.4	Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.	**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.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.	**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.
1.NBT.6	Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	**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

Measurement and Data			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Measure lengths indirectly and by iterating length units.		**Measure lengths.**	
1.MD.1	Order three objects by length; 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.MD.2	Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units 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 (the length unit) end to end (iterating) with no gaps or overlaps.
Tell and write time.		**Build understanding of time and money.**	
1.MD.3	Tell and write time in hours and half-hours using analog and digital clocks.	**NC.1.MD.3**	Tell and write time in hours and half-hours using analog and digital clocks.
	NEW STANDARD	**NC.1.MD.5**	Identify quarters, dimes, and nickels and relate their values to pennies.
Represent and interpret data.		**Represent and interpret data.**	
1.MD.4	Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.	**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.

Geometry			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).		**Reason with shapes and their attributes.**	
1.G.1	Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess 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.

Geometry			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
1.G.2	Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Note: Students do not need to learn formal names such as "right rectangular prism.")	**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. • Making a three-dimensional composite shape using cubes, rectangular prisms, cones, and cylinders, naming the components of the new shape.
1.G.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller 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.

2nd Grade

Standards for Mathematical Practice	
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics.	5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

Operations and Algebraic Thinking			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Represent and solve problems involving addition and subtraction.		**Represent and solve problems.**	
2.OA.1	Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (See Glossary, Table 1.)	**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
Add and subtract within 20.		**Add and subtract within 20.**	
2.OA.2	Fluently add and subtract within 20 using mental strategies. (Note: See standard 1.0A.6 for a list of mental strategies). By end of Grade 2, know from memory all sums of two one-digit numbers.	**NC.2.OA.2**	Demonstrate fluency with addition and subtraction, within 20, using mental strategies.
Work with equal groups of objects to gain foundations for multiplication.		**Work with equal groups.**	
2.OA.3	Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.	**NC.2.OA.3**	Determine whether a group of objects, within 20, has 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.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.	**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.

Number and Operations in Base Ten			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Understand place value.		**Understand place value.**	
2.NBT.1	Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: a. 100 can be thought of as a bundle of ten tens — called a "hundred." b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 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.NBT.2	Count within 1000; skip-count by 5s, 10s, and 100s.	**NC.2.NBT.2**	Count within 1,000; skip-count by 5s, 10s, and 100s.
2.NBT.3	Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	**NC.2.NBT.3**	Read and write numbers, within 1,000, using base-ten numerals, number names, and expanded form.
2.NBT.4	Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.	**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.
Use place value understanding and properties of operations to add and subtract.		**Use place value understanding and properties of operations.**	
2.NBT.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between 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.NBT.6	Add up to four two-digit numbers using strategies based on place value and properties of operations.	**NC.2.NBT.6**	Add up to three two-digit numbers using strategies based on place value and properties of operations.
2.NBT.7	Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.	**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
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.	**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.

Number and Operations in Base Ten			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
2.NBT.9	Explain why addition and subtraction strategies work, using place value and the properties of operations. (Note: Explanations may be supported by drawings or objects.)		***INCORPORATED INTO NC.2.NBT.5***

Measurement and Data			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Measure and estimate lengths in standard units.		**Measure and estimate lengths.**	
2.MD.1	Measure the length of an object by selecting and 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.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.	**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.MD.3	Estimate lengths using units of inches, feet, centimeters, and meters.	**NC.2.MD.3**	Estimate lengths in using standard units of inches, feet, yards, centimeters, and meters.
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.	**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.
Relate addition and subtraction to length.		**Relate addition and subtraction to length.**	
2.MD.5	Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.	**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 problem.
2.MD.6	Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.	**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.
Work with time and money.		**Build understanding of time and money.**	
2.MD.7	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.	**NC.2.MD.7**	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
2.MD.8	Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?	**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.
Represent and interpret data.		**Represent and interpret data.**	
2.MD.9	Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of		***STANDARD REMOVED***

Measurement and Data			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
	the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.		
2.MD.10	Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (Note: See Glossary, Table 1.)	**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.

Geometry			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Reason with shapes and their attributes.		**Reason with shapes and their attributes.**	
2.G.1	Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (Note: Sizes are compared directly or visually, not compared by measuring.)	**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.G.2	Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.		***STANDARD REMOVED***
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, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.	**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.

3rd Grade

Standards for Mathematical Practice	
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics.	5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

Operations and Algebraic Thinking			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Represent and solve problems involving multiplication and division.		**Represent and solve problems involving multiplication and division.**	
3.OA.1	Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7.*	**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.OA.2	Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.*	**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.OA.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	**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.

Operations and Algebraic Thinking			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
3.OA.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ?*		***STANDARD INCORPORATED INTO NC.3.OA.3***
Understand properties of multiplication and the relationship between multiplication and division.		**Understand properties of multiplication and the relationship between multiplication and division.**	
3.OA.5	Apply properties of operations as strategies to multiply and divide.[2] *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)*		***STANDARD INCORPORATED INTO NC.3.OA.1***
3.OA.6	Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*	**NC.3.OA.6**	Solve an unknown-factor problem, by using division strategies and/or changing it to a multiplication problem.
Multiply and divide within 100.		**Multiply and divide within 100.**	
3.OA.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	**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.
Solve problems involving the four operations, and identify and explain patterns in arithmetic.		**Solve two-step problems.**	
3.OA.8	Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	**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.OA.9	Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*	**Explore patterns of numbers.**	
		NC.3.OA.9	Interpret patterns of multiplication on a hundreds board and/or multiplication table.

Number and Operations in Base Ten			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Use place value understanding and properties of operations to perform multi-digit arithmetic. (Note: A range of algorithms may be used.)		**Use place value to add and subtract.**	
3.NBT.1	Use place value understanding to round whole numbers to the nearest 10 or 100.		***STANDARD INCORPORATED INTO NC.3.NBT.2***
3.NBT.2	Fluently add and subtract within 1000 using strategies and algorithms based on place value, 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.NBT.3	Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.	**Generalize place value understanding for multi-digit numbers.**	
		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.

Number and Operations – Fractions			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Develop understanding of fractions as numbers.		**Understand fractions as numbers**.	
3.NF.1	Understand a fraction 1/*b* as the quantity formed by 1 part when *a* whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by a parts of size 1/*b*.	**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.NF.2	Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line. b. Represent a fraction *a*/*b* on a number line diagram by marking off a lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.	**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.

Number and Operations – Fractions			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
3.NF.3	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model. c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.* d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	**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.
	NEW STANDARD NUMBER, Concept from 3.NF.3d	**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.

Measurement and Data			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.		**Solve problems involving measurement.**	
3.MD.1	Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	**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.MD.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).[1] Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (Note: Excludes multiplicative comparison problems- problems involving notions of "times as much"; see Glossary, Table 2.)	**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.
Represent and interpret data.		**Represent and interpret data.**	
3.MD.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*	**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.MD.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.		***STANDARD INCORPORATED WITH NC.3.MD.2 AND LINE PLOTS MOVED TO 4TH GRADE***
Geometric measurement: understand concepts of area and relate area to multiplication and to addition.		**Understand the concept of area.**	
3.MD.5	Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area. b. A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.	**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.

Measurement and Data			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
3.MD.6	Measure areas by counting unit squares (square cm, square m, square in., square ft, and improvised units).		***STANDARD INCORPORATED WITH NC.3.MD.5***
3.MD.7	Relate area to the operations of multiplication and addition. a. 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. b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning. d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.	**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. ***PART D MOVED TO 4TH GRADE***
3.MD.8	Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	**Understand the concept of 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.

Geometry			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Reason with shapes and their attributes.		**Reason with shapes and their attributes.**	
3.G.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.	**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.G.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*		***STANDARD INCORPORATED INTO AREA MODELS IN NC.3.NF***

4th Grade

Standards for Mathematical Practice	
1. Make sense of problems and persevere in solving them.	5. Use appropriate tools strategically.
2. Reason abstractly and quantitatively.	6. Attend to precision.
3. Construct viable arguments and critique the reasoning of others.	7. Look for and make use of structure.
4. Model with mathematics.	8. Look for and express regularity in repeated reasoning.

Operations and Algebraic Thinking			
Current Standard Abbreviation	**Current Standard**	**Proposed Standard Abbreviation**	**Final Draft Proposed Standard**
Use the four operations with whole numbers to solve problems.		**Represent and solve problems involving multiplication and division.**	
4.OA.1	Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.	**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.OA.2	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. (Note: See Glossary, Table 2.)		***STANDARD INCORPORATED INTO NC.4.OA.1 AND NC.4.OA.3***
4.OA.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	**Use the four operations with whole numbers to solve problems.**	
		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.
Gain familiarity with factors and multiples.		**Gain familiarity with factors and multiples.**	
4.OA.4	Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	**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.

Generate and analyze patterns.		Generate and analyze patterns.	
4.OA.5	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*	**NC.4.OA.5**	Generate and analyze a number or shape pattern that follows a given rule.

Number and Operations in Base Ten			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Generalize place value understanding for multi-digit whole numbers.		**Generalize place value understanding for multi-digit numbers whole numbers.**	
4.NBT.1	Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*	**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.NBT.2	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	**NC.4.NBT.2**	Read and write multi-digit whole numbers up to and including 100,000 using numerals, number names, and expanded form.
	NEW STANDARD NUMBER, Concept from 4.NBT.2	**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.NBT.3	Use place value understanding to round multi-digit whole numbers to any place.		***STANDARD INCORPORATED INTO NC.4.OA.3***
Use place value understanding and properties of operations to perform multi-digit arithmetic.		**Use place value understanding and properties of operations to perform multi-digit arithmetic.**	
4.NBT.4	Fluently add and subtract multi-digit whole numbers using 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.NBT.5	Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	**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.NBT.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	**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 between multiplication and division.

Number and Operations – Fractions			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Extend understanding of fraction equivalence and ordering.		**Extend understanding of fractions.**	
4.NF.1	Explain why a fraction *a*/*b* is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size.	**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.NF.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	**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, ½, and a whole. • Comparing common numerator or common denominators.
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.		**Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.**	
4.NF.3	Understand a fraction *a*/*b* with *a* > 1 as a sum of fractions 1/*b*. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.* c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	**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.NF.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction *a*/*b* as a multiple of 1/*b*. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).* b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 ×*	**Use unit fractions to understand operations of fractions.**	
		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.

Number and Operations – Fractions			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
	(1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.) c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*		
Understand decimal notation for fractions, and compare decimal fractions.		**Understand decimal notation for fractions, and compare decimal fractions.**	
4.NF.5	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.[2] *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*		***STANDARD INCORPORATED INTO NC.4.NF.6***
4.NF.6	Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*	**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.NF.7	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.	**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.

Measurement and Data			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.		**Solve problems involving measurement.**	
4.MD.1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*	**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.

Measurement and Data			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
4.MD.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	**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.
	NEW STANDARD NUMBER, Concept from 4.MD.2	**NC.4.MD.8**	Solve word problems involving addition and subtraction of time intervals that cross the hour.
4.MD.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*	**Solve problems involving area and perimeter.**	
		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.
Represent and interpret data.		**Represent and interpret data.**	
4.MD.4	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*	**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.
Geometric measurement: understand concepts of area and relate area to multiplication and to addition.		**Understand concepts of angle and measure angles.**	
4.MD.5	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles. b. An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees. c.		***STANDARD INCORPORATED INTO NC.4.MD.6***
4.MD.6	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	**NC.4.MD.6**	Develop an understanding of angles and angle measurement.

Measurement and Data			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
			• 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.MD.7	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.		***STANDARD INCORPORATED INTO NC.4.MD.6***

Geometry			
Current Standard Abbreviation	**Current Standard**	**Proposed Standard Abbreviation**	**Final Draft Proposed Standard**
Draw and identify lines and angles, and classify shapes by properties of their lines and angles.		**Classify shapes based on lines and angles in two-dimensional figures.**	
4.G.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	**NC.4.G.1**	Draw and identify points, lines, line segments, rays, angles, and perpendicular and parallel lines.
4.G.2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.	**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.G.3	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.	**NC.4.G.3**	Recognize symmetry in a two-dimensional figure, and identify and draw lines of symmetry.

5th Grade

Standards for Mathematical Practice	
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics.	5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

Operations and Algebraic Thinking

2010 Standard Abbreviation	2010 Standard	2017 Standard Abbreviation	2017 Standard
Write and interpret numerical expressions.		**Write and interpret numerical expressions.**	
5.OA.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.		***STANDARD INCORPORATED IN NC.5.OA.2***
5.OA.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*	**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
Analyze patterns and relationships.		**Analyze patterns and relationships.**	
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, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*	**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.

Number and Operations in Base Ten			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Understand the place value system.		**Understand the place value system.**	
5.NBT.1	Recognize 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 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 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.NBT.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.		***STANDARD INCORPORATED INTO NC.5. NBT.1 AND NC.6.EE.1***
5.NBT.3	Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000). b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols 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.NBT.4	Use place value understanding to round decimals to any place.		***STANDARD INCORPORATED INTO NC.5.NBT.7***
Perform operations with multi-digit whole numbers and decimals to hundredths.		**Perform operations with multi-digit whole numbers.**	
5.NBT.5	Fluently multiply multi-digit whole numbers using the standard algorithm.	**NC.5.NBT.5**	Demonstrate fluency with the multiplication of two whole numbers up to a three-digit number by a two-digit number using the standard algorithm.
5.NBT.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	**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.NBT.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	**Perform operations with decimals.**	
		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.

Number and Operations in Base Ten			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
			• 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.

Number and Operations – Fractions			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Use equivalent fractions as a strategy to add and subtract fractions.		**Use equivalent fractions as a strategy to add and subtract fractions.**	
5.NF.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*	**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.NF.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*		***STANDARD INCORPORATED INTO NC.5.NF.1***
Apply and extend previous understandings of multiplication and division to multiply and divide fractions.		**Apply and extend previous understandings of multiplication and division to multiply and divide fractions.**	
5.NF.3	Interpret a fraction as the division of numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*	**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.

Number and Operations – Fractions			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
5.NF.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)* b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.	**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.NF.5	Interpret multiplication as scaling (resizing), by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.		***STANDARD INCORPORATED INTO NC.5.NF.4***
5.NF.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.		***STANDARD INCORPORATED INTO NC.5.NF.4***
5.NF.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. *(Note: Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.)* a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.*	**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.

Number and Operations – Fractions			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
	b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.* c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*		

Measurement and Data			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Convert like measurement units within a given measurement system.		**Convert like measurement units within a given measurement system.**	
5.MD.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	**NC.5MD.1**	Given a conversion chart, use multiplicative reasoning to solve one-step conversion problems within a given measurement system.
Represent and interpret data.		**Represent and interpret data.**	
5.MD.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*	**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.
Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.		**Understand concepts of volume.**	
5.MD.3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.		***STANDARD INCORPORATED INTO NC.5.MD.4***

Measurement and Data			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
5.MD.4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	**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.
5.MD.5	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. Find the volume of a right 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, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems. c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	**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.

Geometry			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Graph points on the coordinate plane to solve real-world and mathematical problems.		**Understand the coordinate plane.**	
5.G.1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).	**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.

Geometry			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
5.G.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.		***STANDARD INCORPORATED INTO NC.5.G.1***
Classify two-dimensional figures into categories based on their properties.		**Classify quadrilaterals.**	
5.G.3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.	**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.G.4	Classify two-dimensional figures in a hierarchy based on properties.		***STANDARD INCORPORATED INTO NC.5.G.3***

6th Grade

Standards for Mathematical Practice	
1. Make sense of problems and persevere in solving them.	5. Use appropriate tools strategically.
2. Reason abstractly and quantitatively.	6. Attend to precision.
3. Construct viable arguments and critique the reasoning of others.	7. Look for and make use of structure.
4. Model with mathematics.	8. Look for and express regularity in repeated reasoning.

Ratio and Proportional Relationships

2010 Standard Abbreviation	2010 Standard	2017 Standard Abbreviation	2017 Standard
Understand ratio concepts and use ratio reasoning to solve problems.		**Understand ratio concepts and use ratio reasoning to solve problems.**	
6.RP.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*	**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.
6.RP.2	Understand the concept of a unit rate a/b associated with a ratio a:b with $b \neq 0$, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."* (Note: Expectations for unit rates in this grade are limited to non-complex fractions.)	**NC.6.RP.2**	Understand that ratios can be expressed as equivalent unit ratios by finding and interpreting both unit ratios in context.
6.RP.3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.	**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. ***PART C INCORPORATED INTO NC.6.RP.4***

Ratio and Proportional Relationships			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
	d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.		
	NEW STANDARD NUMBER, Concept from 6.RP.3.c	**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.

The Number System			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**Standard**
Apply and extend previous understandings of multiplication and division to divide fractions by fractions.		**Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**	
6.NS.1	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?*	**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.
Compute fluently with multi-digit numbers and find common factors and multiples.		**Compute fluently with multi-digit numbers and find common factors and multiples.**	
6.NS.2	Fluently divide multi-digit numbers using the standard algorithm.	**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.
6.NS.3	Fluently add, subtract, multiply, & divide multi-digit decimals using the standard algorithm for each operation.	**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.

The Number System			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**Standard**
6.NS.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4 (9 + 2).*	**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.
Apply and extend previous understandings of numbers to the system of rational numbers.		**Apply and extend previous understandings of numbers to the system of rational numbers.**	
6.NS.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 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: o Interpret absolute value as magnitude for a positive or negative quantity in a real-world context. o Distinguish comparisons of absolute value from statements about order.
6.NS.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, & that 0 is its own opposite. b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and	**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: o 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. o Find and position rational numbers on a horizontal or vertical number line. b. On a coordinate plane: o Understand signs of numbers in ordered pairs as indicating locations in quadrants. o Recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. o Find and position pairs of rational numbers on a coordinate plane.

The Number System			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**Standard**
	position pairs of integers and other rational numbers on a coordinate plane.		
6.NS.7	Understand ordering and absolute value of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right.* b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write –3° C > –7° C to express the fact that –3° C is warmer than –7° C.* c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.* d. Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.	**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. b. Write, interpret, and explain statements of order for rational numbers in real-world contexts.
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.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.
	NEW STANDARD, Concepts from 7.NS.1	**NC.6.NS.9**	Apply and extend previous understandings of addition and subtraction. • Describe situations in which opposite quantities combine to make 0. • 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. • 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. • Use models to add and subtract integers from -20 to 20 and describe real-world contexts using sums and differences.

Expressions and Equations			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Apply and extend previous understandings of arithmetic to algebraic expressions.		**Apply and extend previous understandings of arithmetic to algebraic expressions.**	
6.EE.1	Write and evaluate numerical expressions involving whole-number exponents.	**NC.6.EE.1**	Write and evaluate numerical expressions, with and without grouping symbols, involving whole-number exponents.
6.EE.2	Write, read, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as $5-y$. b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms. c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length s = ½.	**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.
6.EE.3	Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.	**NC.6.EE.3**	Apply the properties of operations to generate equivalent expressions without exponents.
6.EE.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.	**NC.6.EE.4**	Identify when two expressions are equivalent and justify with mathematical reasoning.
Reason about and solve one-variable equations and inequalities.		**Reason about and solve one-variable equations.**	
6.EE.5	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine	**NC.6.EE.5**	Use substitution to determine whether a given number in a specified set makes an equation true.

Expressions and Equations			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
	whether a given number in a specified set makes an equation or inequality true.		
6.EE.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.	**NC.6.EE.6**	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem.
6.EE.7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $p \cdot x = q$ for cases in which *p*, *q* and *x* are all nonnegative rational numbers.	**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.EE.8	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.	**Reason about one variable inequalities.**	
		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.
Represent and analyze quantitative relationships between dependent and independent variables.		**Represent and analyze quantitative relationships between dependent and independent variables.**	
6.EE.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation* $d = 65t$ *to represent the relationship between distance and time.*	**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).

Geometry			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Solve real-world and mathematical problems involving area, surface area, and volume.		**Solve real-world and mathematical problems involving area, surface area, and volume.**	
6.G.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	**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. • Find the area of special quadrilaterals and polygons by decomposing into triangles or rectangles.
6.G.2	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l \cdot w \cdot h$ and $V = b \cdot h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	**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 mathematical problems.
6.G.3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.	**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. • Using coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate.
6.G.4	Represent three-dimensional figures 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.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.

Statistics and Probability			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Develop understanding of statistical variability.		**Develop understanding of statistical variability.**	
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. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.*	**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.

Statistics and Probability			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
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.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.
6.SP.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.	**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. 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.
Summarize and describe distributions.		**Summarize and describe distributions.**	
6.SP.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	**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.
6.SP.5	Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.	**NC.6.SP.5**	Summarize numerical data sets in relation to their context. a. Describe the collected data by: o Reporting the number of observations in dot plots and histograms. o Communicating the nature of the attribute under investigation, how it was measured, and the units of measurement. b. Analyze center and variability by: o Giving quantitative measures of center, describing variability, and any overall pattern, and noting any striking deviations. o Justifying the appropriate choice of measures of center using the shape of the data distribution.

Statistics and Probability			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
	d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.		

7th Grade

Standards for Mathematical Practice	
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics.	5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

Ratio and Proportional Relationships			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Proposed Standard**
Analyze proportional relationships and use them to solve real-world and mathematical problems.		**Analyze proportional relationships and use them to solve real-world and mathematical problems.**	
7.RP.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction (1/2)/(1/4) miles per hour, equivalently 2 miles per hour.*	**NC.7.RP.1**	Compute unit rates associated with ratios of fractions to solve real-world and mathematical problems.
7.RP.2	Recognize and represent proportional relationships between quantities. a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. c. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as* $t = pn$. d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.	**NC.7.RP.2**	Recognize and represent proportional relationships between quantities. a. Understand that a proportion is a relationship of equality between ratios. o Represent proportional relationships using tables and graphs. o Recognize whether ratios are in a proportional relationship using tables and graphs. o Compare two different proportional relationships using tables, graphs, equations, and verbal descriptions. b. Identify the unit rate (constant of proportionality) within two quantities in a proportional relationship using tables, graphs, equations, and verbal descriptions. c. Create equations and graphs to represent proportional relationships. d. Use a graphical representation of a proportional relationship in context to: o Explain the meaning of any point (x, y). o Explain the meaning of (0, 0) and why it is included.

Ratio and Proportional Relationships			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Proposed Standard**
			○ Understand that the y-coordinate of the ordered pair $(1, r)$ corresponds to the unit rate and explain its meaning.
7.RP.3	Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*	**NC.7.RP.3**	Use scale factors and unit rates in proportional relationships to solve ratio and percent problems.

The Number System			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.		**Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.**	
7.NS.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. a. Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.* b. Understand $p + q$ as the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. d. Apply properties of operations as strategies to add and subtract rational numbers.	**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.

7.NS.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	**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. 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. c. Use division and previous understandings of fractions and decimals. o Convert a fraction to a decimal using long division. o Understand that the decimal form of a rational number terminates in 0s or eventually repeats.
7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers. (NOTE: Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)	**NC.7.NS.3**	Solve real-world and mathematical problems involving numerical expressions with rational numbers using the four operations.

Expressions and Equations			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Use properties of operations to generate equivalent expressions.		**Use properties of operations to generate equivalent expressions.**	
7.EE.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	**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.
7.EE.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*	**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.
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.		**Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.**	
7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*	**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.

Expressions and Equations			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
7.EE.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. a. Solve word problems leading to equations of the form $px + q = r$ *and* $p(x + q) = r$, where *p*, *q*, and *r* are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where *p*, *q*, and *r* are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.*	**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. o Fluently solve multistep equations with the variable on one side, including those generated by word problems. o Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. o Interpret the solution in context. b. Construct inequalities to solve problems by reasoning about the quantities. o Fluently solve multi-step inequalities with the variable on one side, including those generated by word problems. o Compare an algebraic solution process for equations and an algebraic solution process for inequalities. o Graph the solution set of the inequality and interpret in context.

Geometry			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Draw, construct, and describe geometrical figures and describe the relationships between them.		**Draw, construct, and describe geometrical figures and describe the relationships between them.**	
7.G.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing 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. • Using a scale factor to compute actual lengths and areas from a scale drawing. • Creating a scale drawing.
7.G.2	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	**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.

Geometry			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
7.G.3	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.		***STANDARD REMOVED***
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.		**Solve real-world and mathematical problems involving angle measure, area, surface area, and volume.**	
7.G.4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	**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.
7.G.5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	**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.
7.G.6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	**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.

Statistics and Probability			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Use random sampling to draw inferences about a population.		**Use random sampling to draw inferences about a population.**	
7.SP.1	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.	**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.
7.SP.2	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly*	**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.

Statistics and Probability			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
	sampled survey data. Gauge how far off the estimate or prediction might be.		
Draw informal comparative inferences about two populations.		**Make informal inferences to compare two populations.**	
7.SP.3	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.*	**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. b. Informally assess the difference between two data sets by examining the overlap and separation between the graphical representations of two data sets.
7.SP.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.*	**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.
Investigate chance processes and develop, use, and evaluate probability models.		**Investigate chance processes and develop, use, and evaluate probability models.**	
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. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	**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.
7.SP.6	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*	**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.
7.SP.7	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.	**NC.7.SP.7**	Develop a probability model and use it to find probabilities of simple events.

Statistics and Probability			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
	a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.* b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*		a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. b. Develop a probability model (which may not be uniform) by repeatedly performing a chance process and observing frequencies in the data generated. c. Compare theoretical and experimental probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
7.SP.8	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event. c. Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*	**NC.7.SP.8**	Determine probabilities of compound events using organized lists, tables, tree diagrams, and simulation. a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. 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. c. Design and use a simulation to generate frequencies for compound events.

8th Grade

Standards for Mathematical Practice	
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics.	5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

The Number System

2010 Standard Abbreviation	2010 Standard	2017 Standard Abbreviation	2017 Proposed Standard
Know that there are numbers that are not rational, and approximate them by rational numbers.		**Know that there are numbers that are not rational, and approximate them by rational numbers.**	
8.NS.1	Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.	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.
8.NS.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *For example, by truncating the decimal expansion of* $\sqrt{2}$ *show that* $\sqrt{2}$ *is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*	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.

Expressions and Equations

2010 Standard Abbreviation	2010 Standard	2017 Standard Abbreviation	2017 Standard
Work with radicals and integer exponents.		**Work with radicals and integer exponents.**	
8.EE.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3^2 \times 3^{-5} = 3^{-3} = \frac{1}{3^3} = \frac{1}{27}$.	**NC.8.EE.1**	Develop and apply the properties of integer exponents to generate equivalent numerical expressions.
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 small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.	**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.

Expressions and Equations			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
			• Evaluate square roots of perfect squares and cube roots of perfect cubes for positive numbers less than or equal to 400.
8.EE.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9, and determine that the world population is more than 20 times larger.	**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.
8.EE.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.	**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.
Understand the connections between proportional relationships, lines, and linear equations.			
8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.*		***STANDARD INCORPORATED INTO NC.7.RP.2 AND NC.8.F.4***
8.EE.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a nonvertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.		***STANDARD INCORPORATED INTO NC.8.F.4***
Analyze and solve linear equations and pairs of simultaneous linear equations.		**Analyze and solve linear equations and inequalities.**	
8.EE.7	Solve linear equations in one variable. a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form *x = a, a = a, or a = b* results (where *a* and *b* are different numbers). b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	**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.

Expressions and Equations			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
8.EE.8	Analyze and solve pairs of simultaneous linear equations. a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.* c. Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*	**Analyze and solve pairs of simultaneous linear equations.**	
		NC.8.EE.8	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.

Functions			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Define, evaluate, and compare functions.		**Define, evaluate, and compare functions.**	
8.F.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Note: Function notation is not required in Grade 8.)	**NC.8.F.1**	Understand that a function is a rule that assigns to each input exactly one output. • Recognize functions when graphed as the set of ordered pairs consisting of an input and exactly one corresponding output. • Recognize functions given a table of values or a set of ordered pairs.
8.F.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	**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).
8.F.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.*	**NC.8.F.3**	Identify linear functions from tables, equations, and graphs.

Functions			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Use functions to model relationships between quantities.		**Use functions to model relationships between quantities.**	
8.F.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.	**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.
8.F.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	**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.

Geometry			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Understand congruence and similarity using physical models, transparencies, or geometry software.		**Understand congruence and similarity using physical models, transparencies, or geometry software.**	
8.G.1	Verify experimentally the properties of rotations, reflections, and translations: a. Lines are taken to lines, and line segments to line segments of the same length. b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines.		***STANDARD INCORPORATED IN NC.8.G.2 AND NC.8.G.4***
8.G.2	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.	**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.

Geometry			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
			• Given two congruent figures, describe a sequence that exhibits the congruence between them.
8.G.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	**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.
8.G.4	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.	**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.
8.G.5	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*	**Analyze angle 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 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.
Understand and apply the Pythagorean Theorem.		**Understand and apply the Pythagorean Theorem.**	
8.G.6	Explain a proof of the Pythagorean Theorem and its converse.	**NC.8.G.6**	Explain the Pythagorean Theorem and its converse.
8.G.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	**NC.8.G.7**	Apply the Pythagorean Theorem and its converse to solve real-world and mathematical problems.
8.G.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	**NC.8.G.8**	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.		**Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.**	
8.G.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	**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.

Statistics and Probability			
2010 Standard Abbreviation	**2010 Standard**	**2017 Standard Abbreviation**	**2017 Standard**
Investigate patterns of association in bivariate data.		**Investigate patterns of association in bivariate data.**	
8.SP.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	**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.
8.SP.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.	**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.
8.SP.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.*	**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.
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. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*	**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.