



Math Operations (Whole Numbers and Numeration)	
Skill Developed	Lesson/ Materials
<p>Math Operations (Whole Numbers and Numeration)</p> <ul style="list-style-type: none"> • Abstraction of all whole number operations • Use place value to the millions place in different formats • Solve word problems with all operations • Use estimation to solve problems 	<p>Whole Numbers and Numerations</p> <ul style="list-style-type: none"> • Stamp Game • Checkerboard • Cabinet Cards (Twin Towers) • Test Prep Material • Rounding/Estimation • Problem Solving Strategy Cards • Word Problem Sample Cards? • Math Facts • Hand on Equations • Squaring and cubing
State Standards Alignment	
<p><u>NUMBERS AND OPERATIONS IN BASE 10</u> <u>Represent and solve problems involving multiplication and division.</u> 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.</p> <p><u>Use the four operations with whole numbers to solve problems.</u> NC .4.OA .3 Solve two-step word problems involving the four operations with whole numbers.</p> <ul style="list-style-type: none"> • Use estimation strategies to assess the reasonableness of answers. • Interpret remainders in word problems . • Represent problems using equations with a letter standing for the unknown quantity. <p><u>Generalize place value understanding for multi-digit whole numbers.</u> NC .4 .NBT .1 NC .4 .NBT .2 NC .4 .NBT .7</p> <ul style="list-style-type: none"> • 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 . • Read and write multi-digit whole numbers up to and including 100,000 using numerals, number names, and expanded form. • 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. <p><u>Use place value understanding and properties of operations to perform multi-digit arithmetic.</u> NC .4 .NBT .4 NC .4 .NBT .5 NC .4 .NBT .6</p> <ul style="list-style-type: none"> • Add and subtract multi-digit whole numbers up to and including 100,000 using the standard algorithm with place value understanding . • 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. • 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. <p><u>Write and interpret numerical expressions.</u> NC.5.OA.2 Write, explain, and evaluate numerical expressions involving the four operations to solve up to two-step problems. Include expressions involving:</p> <ul style="list-style-type: none"> • Parentheses, using the order of operations. • Commutative, associative and distributive properties. 	

Factors and Multiples	
Skill Developed	Lesson/ Materials
<ul style="list-style-type: none"> ● Exposure to Greatest Common Factor ● Lowest Common Multiple ● Prime and composite numbers 	<ul style="list-style-type: none"> ● Pegboard ● Sieve of Eratosthenes ● Tables ABC ● Common Multiples ● Prime Factorization ● GCF ● LCM ● Cabinet Cards ● Squaring
State Standards Alignment	
<p>NC .4.OA .4 Find all factor pairs for whole numbers up to and including 50 to:</p> <ul style="list-style-type: none"> ● 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 <p>NC.6.NS.4 Understand and use prime factorization and the relationships between factors to</p> <ul style="list-style-type: none"> ● 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. 	

Properties	
Skill Developed	Lesson/ Materials
<ul style="list-style-type: none"> • Commutative • Associative • Distributive properties • Divisibility 	<ul style="list-style-type: none"> • Golden beads • Peg Board • Tables A/B/C • Decanomial • Squaring/cubing • Associative, Distributive Laws /Order of Operations
State Standards Alignment	
<ul style="list-style-type: none"> • To be able to choose and use the correct property abstractly to solve numeric expressions using all four operations • Analyze patterns and relationships • Apply and extend previous understandings of arithmetic to algebraic expressions 	

Fractions and Decimals	
Skill Developed	Lesson/ Materials
<ul style="list-style-type: none"> ● Equivalent fractions ● Proper/improper, mixed fractions ● Reducing fractions ● Operations with fractions ● Decimal Equivalency ● Renaming Fractions as Decimals ● Abstract use of all operations with decimals 	<ul style="list-style-type: none"> ● Common Fractions ● Fraction Insets and Skittles ● Use GCF raise and reduce fractions ● LCD ● Cabinet cards/Word Problems ● Decimal Fractions ● Decimal board....numeration (all 4 ops) ● Decimal Felt Squares ● Decimal Checkerboard ● WHM Multiplying and dividing by powers of 10 ● Division with skittles ● Conversion ● Rounding and estimating
State Standards Alignment	
<p>NUMBERS AND OPERATIONS - FRACTIONS</p> <p><u>Extend understanding of fractions.</u></p> <p>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.</p> <p>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:</p> <ul style="list-style-type: none"> ● Reasoning about their size and using area and length models. ● Using benchmark fractions 0, $\frac{1}{2}$, and a whole. ● Comparing common numerator or common denominators. <p><u>Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.</u></p> <p>NC.4.NF.3 Understand and justify decompositions of fractions with denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100.</p> <ul style="list-style-type: none"> ● 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. <p><u>Use unit fractions to understand the operations of fractions.</u></p> <p>NC.4.NF.4 Apply and extend previous understandings of multiplication to:</p> <ul style="list-style-type: none"> ● 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. <p><u>Use equivalent fractions as a strategy to add and subtract fractions.</u></p> <p>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.</p> <ul style="list-style-type: none"> ● 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 with an equation. <p><u>Apply and extend previous understandings of multiplication and division to multiply and divide fractions.</u></p> <p>NC.5.NF.3 Use fractions to model and solve division problems.</p> <ul style="list-style-type: none"> ● 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.

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.

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.

Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

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.

NC.6.NS.2 Fluently divide using long division with a minimum of a four-digit dividend and interpret the quotient and remainder in context.

NC.6.NS.3 Apply and extend previous understandings of decimals to develop and fluently use the standard algorithms for addition, subtraction, multiplication and division of decimals.

NC.6.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.

Fractions and Decimals	
Skill Developed	Lesson/ Materials
	Decimal Board Fractions Material Centesimal Frame Decimal checkerboard
State Standards Alignment	
<p><u>Understand the place value system.</u></p> <p>NC.5.NBT.1 Explain the patterns in the place value system from one million to the thousandths place.</p> <ul style="list-style-type: none"> ● 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. ● 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. Perform operations with multi-digit whole numbers. <p>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.</p> <p>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.</p> <p><u>Use models to make connections and develop the algorithm.</u></p> <p><u>Perform operations with decimals.</u></p> <p>NC.5.NBT.7 Compute and solve real-world problems with multi-digit whole numbers and decimal numbers.</p> <ul style="list-style-type: none"> ● Add and subtract decimals to thousandths using models, drawings or strategies based on place value. ● Multiply decimals with a product to thousandths using models, drawings, or strategies based on place value. ● Divide a whole number by a decimal and divide a decimal by a whole number, using repeated subtraction or area models. Decimals should be limited to hundredths. ● Use estimation strategies to assess the reasonableness of answers. <p><u>Understand the place value system.</u></p> <p>NC.5.NBT.1 Explain the patterns in the place value system from one million to the thousandths place.</p> <ul style="list-style-type: none"> ● 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. <p>NC.5.NBT.3 Read, write, and compare decimals to thousandths.</p> <ul style="list-style-type: none"> ● 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. <p><u>Perform operations with multi-digit whole numbers.</u></p> <p>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.</p> <p>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. <u>Use models</u> to make connections and develop the algorithm.</p> <p>Perform operations with decimals.</p> <p>NC.5.NBT.7 Compute and solve real-world problems with multi-digit whole numbers and decimal numbers.</p> <ul style="list-style-type: none"> ● Add and subtract decimals to thousandths using models, drawings or strategies based on place value. ● Multiply decimals with a product to thousandths using models, drawings, or strategies based on place value. ● Divide a whole number by a decimal and divide a decimal by a whole number, using repeated subtraction or area models. Decimals should be limited to hundredths. ● Use estimation strategies to assess the reasonableness of answers. 	

Ration and Percent	
Skill Developed	Lesson/ Materials
<ul style="list-style-type: none"> • Ratios as fractions, decimals, percents • Percents as a number • Proportion 	<ul style="list-style-type: none"> • Centesimal Frame • Pegboard • Skittles • Circle Graphs • Ratio - teacher made
State Standards Alignment	
<p><u>Understand ratio concepts and use ratio reasoning to solve problems</u></p> <p>NC.6.RP.1 Understand the concept of a ratio and use ratio language to:</p> <ul style="list-style-type: none"> • Describe a ratio as a multiplicative relationship between two quantities. • Model a ratio relationship using a variety of representations. <p>NC.6.RP.2 Understand that ratios can be expressed as equivalent unit ratios by finding and interpreting both unit ratios in context.</p> <p>NC.6.RP.3 Use ratio reasoning with equivalent whole-number ratios to solve real-world and mathematical problems by:</p> <ul style="list-style-type: none"> • 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. <p>NC.6.RP.4 Use ratio reasoning to solve real-world and mathematical problems with percents by:</p> <ul style="list-style-type: none"> • 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. 	

Statistics and Probability	
Skill Developed	Lesson/ Materials
<ul style="list-style-type: none"> • Construct, read and interpret: tables, graphs of all kinds • Mean/Median/Mode/Range • Frequency and tree diagrams 	<ul style="list-style-type: none"> • Word problems • Cabinet drawers • Mean, median, and mode, range • Graphing <ul style="list-style-type: none"> ○ Types of Graphs ○ Cartesian Plane ○ Ordered Pairs • ETC or Teacher made materials • Probability box
State Standards Alignment	
<p><u>Represent and interpret data.</u> NC .4.MD .4 Represent and interpret data using whole numbers .</p> <ul style="list-style-type: none"> • 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 <p><u>Convert like measurement units within a given measurement system.</u> NC.5.MD.1 Given a conversion chart, use multiplicative reasoning to solve one-step conversion problems within a given measurement system.</p> <p><u>Represent and interpret data.</u> NC.5.MD.2 Represent and interpret data.</p> <ul style="list-style-type: none"> • 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. <p>STATISTICS AND PROBABILITY <u>Develop understanding of statistical variability.</u> NC.6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. NC.6.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.3 Understand that both a measure of center and a description of variability should be considered when describing a numerical data set.</p> <ol style="list-style-type: none"> 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. – 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. – 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. <p>NC.6.SP.4 Display numerical data in plots on a number line.</p> <ul style="list-style-type: none"> • Use dot plots, histograms, and box plots to represent data. • Compare the attributes of different representations of the same data. NC.6.SP.5 Summarize numerical data sets in relation to their context. <ol style="list-style-type: none"> a. Describe the collected data by – Reporting the number of observations in dot plots and histograms. – Communicating the nature of the attribute under investigation, how it was measured, and the units of measurement. b. Analyze center and variability by – Giving quantitative measures of center, describing variability, and an overall pattern, and noting any striking deviations. – Justifying the appropriate choice of measures of center using the shape of the data distribution. 	

Algebraic Concepts		
Skill Developed	Lesson/ Materials	
<ul style="list-style-type: none"> ● Powers of Numbers ● Squares and Cubing ● Exploration of other number bases ● Squaring and cubing of binomials ● Squaring and cubing of trinomials ● Pre-Algebra ● Square roots ● Integers: scientific notation and rational numbers ● Problem solving and logical reasoning ● Negative numbers ● Patterns leading to division 	<ul style="list-style-type: none"> ● squaring <ul style="list-style-type: none"> ○ distributive and numerical decanomial ○ fixed squares (1-9) ○ squaring a sum ○ pegboard ○ algebraic passages on graph paper ● Cabinet cards ● cubing <ul style="list-style-type: none"> ○ decanomial to tower of jewels ○ fixed cubes (1-9) ○ white volume cubes ○ wooden cubing material ○ binomial cube ○ trinomial cube ○ three rulers and hierarchical cube 	<ul style="list-style-type: none"> ● square root <ul style="list-style-type: none"> ○ beadboard ○ golden beads ○ pegboard ○ using graph paper ● powers of numbers <ul style="list-style-type: none"> ○ wooden hierarchical materials ○ powers of two ○ scientific notation ○ expanded notation ● hands on equations ● order of operations ● exploration of other numbers and bases ● operations with signed numbers <ul style="list-style-type: none"> ○ negative snake game
State Standards Alignment		
<p><u>Understand the coordinate plane.</u> 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.</p> <p><u>Analyze patterns and relationships.</u> NC.5.OA.3 Generate two numerical patterns using two given rules.</p> <ul style="list-style-type: none"> ● 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. <p>EXPRESSIONS AND EQUATIONS <u>Apply and extend previous understandings of arithmetic to algebraic expressions.</u></p> <p>NC.6.EE.1 Write and evaluate numerical expressions, with and without grouping symbols, involving whole-number exponents. NC.6.EE.2 Write, read, and evaluate algebraic expressions.</p> <ul style="list-style-type: none"> ● 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. <p>NC.6.EE.3 Apply the properties of operations to generate equivalent expressions without exponents. NC.6.EE.4 Identify when two expressions are equivalent and justify with mathematical reasoning. Reason about and solve one-variable equations. NC.6.EE.5 Use substitution to determine whether a given number in a specified set makes an equation true. NC.6.EE.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem. NC.6.EE.7 Solve real-world and mathematical problems by writing and solving equations of the form:</p> <ul style="list-style-type: none"> ● $x + p = q$ 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. Reason about one variable inequalities. <p>NC.6.EE.8 Reason about inequalities by:</p> <ul style="list-style-type: none"> ● 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. <p><u>Represent and analyze quantitative relationships between dependent and independent variables.</u> NC.6.EE.9 Represent and analyze quantitative relationships by:</p> <ul style="list-style-type: none"> ● 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). 		

Apply and extend previous understandings of numbers to the system of rational numbers.

NC.6.NS.5 Understand and use rational numbers to:

- Describe quantities having opposite directions or values.
- Represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
- Understand the absolute value of a rational number as its distance from 0 on the number line to:
 - Interpret absolute value as magnitude for a positive or negative quantity in a real-world context.
 - Distinguish comparisons of absolute value from statements about order

NC.6.NS.6 Understand rational numbers as points on the number line and as ordered pairs on a coordinate plane.

- a. On a number line: – Recognize opposite signs of numbers as indicating locations on opposite sides of 0 and that the opposite of a number is the number itself. – Find and position rational numbers on a horizontal or vertical number line.
- b. On a coordinate plane: – Understand signs of numbers in ordered pairs as indicating locations in quadrants. – Recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. – Find and position pairs of rational numbers on a coordinate plane.

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.

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. Apply and extend previous understandings of addition and subtraction.

NC.6.NS.9 Understand additive inverses when adding and subtracting integers.

- 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.

Geometry	
Skill Developed	Lesson/ Materials
<ul style="list-style-type: none"> ● Translations, slides, reflections, symmetry, tessellations, graphs and other displays, coordination of graphs and equations ● Identify prefixes that label polygons ● Understands similar, congruent and equivalent ● Interpret movements of figures on coordinate planes ● Applies knowledge about polygons to derive perimeter ● Area formulas for polygons ● Derive pi, circumference and area for circles ● Applies knowledge of area to derive volume ● Understand Pythagorean theorem 	<ul style="list-style-type: none"> ● Story of Geometry ● Congruence, Similarity and Equivalence <ul style="list-style-type: none"> ○ Metal Insets ○ Constructive Triangles ○ Box of Blue Triangles ● Polygons <ul style="list-style-type: none"> ○ Types of Plane Figures (with IBox of Sticks) ● Types of Regular Polygons (According to Number of Sides) with Geometry Cabinet ● Circle <ul style="list-style-type: none"> ○ Parts of a Circle ○ Relative Positions ○ Circumference of the Circle ○ Derivation of Formula for Area of Circle ● Lines <ul style="list-style-type: none"> ○ Definition of a Line ○ Position of Straight Line (Horizontal, Vertical, Oblique) ○ Parts of a (Straight) Line (Ray, Line Segment) ○ Position of Two (Straight) Lines ● Angles (with Box of Sticks) <ul style="list-style-type: none"> ○ Definition ○ Parts of an Angle ○ Variety of Angles ○ Complementary, Supplementary, Vertical Angles ○ Angles Made by a Transversal ○ Measure of Angle in Degrees ○ Story of Babylonians and Montessori Protractor ○ Protractor ○ Adding and Subtracting Angles ● Equivalence and Area <ul style="list-style-type: none"> ○ Study of Equivalent Figures with Metal Inset Plates ○ All Triangles Having the Same Base and Altitude Are Equivalent ○ Pythagorean Theorem ○ Euclid's Plate ● Solids and Volume <ul style="list-style-type: none"> ○ Geometric Solids ○ Nomenclature, Etymology ○ Basic Concepts ○ Transformations ○ Polyhedrons and Platonic Solids ○ Lateral and Total Surface Area ● Volume of Solids <ul style="list-style-type: none"> ○ Concept of Volume with 2 cm cubes ○ Volume of Right Rectangular Prisms ○ Volume of Non-Rectangular Prisms ○ Story of Archimedes ● Geometry: Classified Nomenclature ● Presentation of Reference Material for Independence Reference and Research ● Geometry Activity Cards ● Independent Work in Geometry ● Using Metal Insets ● Using Compass and Ruler
State Standards Alignment	
<p>MEASUREMENT AND DATA <u>Classify shapes based on lines and angles in two-dimensional figures.</u> NC .4 .G .1 NC .4 .G .2 NC .4 .G .3</p> <ul style="list-style-type: none"> ● Draw and identify points, lines, line segments, rays, angles, and perpendicular and parallel lines . ● Classify quadrilaterals and triangles based on angle measure, side lengths, and the presence or absence of parallel or perpendicular lines. ● Recognize symmetry in a two-dimensional figure, and identify and draw lines of symmetry. 	

Understand concepts of angle and measure angles.

NC .4.MD.6

- Develop an understanding of angles and angle measurement.
- Understand angles as geometric shapes that are formed wherever two rays share a common endpoint and are measured in degrees.
- Measure and sketch angles in whole-number degrees using a protractor.
- Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems.

Classify quadrilaterals.

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.

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

Understand concepts of volume.

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.

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 an understanding of the volume formula for rectangular prisms with whole-number edge lengths in the context of solving problems.
- Find the volume of solid figures with one-digit dimensions composed of two non-overlapping rectangular prisms.

Solve real-world and mathematical problems involving area, surface area, and volume.

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 them into right triangles.
- Find the area of special quadrilaterals and polygons by decomposing into triangles or rectangles.

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.

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. 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

Measurement	
Skill Developed	Lesson/ Materials
<ul style="list-style-type: none"> ● Story of Measurement ● Non-Standard Units of Measurements ● Standard Units of Measurement <ul style="list-style-type: none"> ○ Imperial System` ○ Metric System ● Conversion ● Other Units of Measurement <ul style="list-style-type: none"> ○ Area ○ Volume ○ Mass (grams) vs. Weight/Force (Newtons) ● Temperature 	<ul style="list-style-type: none"> ● Measuring with non-standard units of measurement ● Yellow Area Material ● Volume box ● Decimal Board ● Stick Box ● Geometric Solids ● Scale ● Balance Scale ● Triple Beam Balance Scale ● Spring Scale ● Thermometer ● Liquid containers ● ETC or teacher made ● Integration with Research
State Standards Alignment	
<p><u>Solve problems involving measurement.</u></p> <p>NC .4 .MD .1</p> <p>NC .4 .MD .2 NC .4 .MD .8</p> <p>Know relative sizes of measurement units . Solve problems involving metric measurement .</p> <ul style="list-style-type: none"> ● 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. <ul style="list-style-type: none"> 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. <p>Solve word problems involving addition and subtraction of time intervals that cross the hour.</p>	