	Mathematics – Mastery Expectations Grade 5
	Number Sense & Operations
5N1	Demonstrate an understanding of powers of ten up to 10
5N2	Demonstrate an understanding of place value to billions and thousandths.
5N3	Represent and compare very large (billions) and very small (thousandths) positive numbers in various forms, e.g., expanded notation for whole numbers without exponents, 9724 = 9 x 1000 + 7 x 100 + 2 x 10 + 4; and word form, 7,340,455 = seven million, three hundred forty thousand, four hundred fifty-five.
5N4	Demonstrate an understanding of fractions as a ratio of whole numbers, as parts of unit wholes, and as parts of a collection, and as locations on a number line (including a ruler).
5N5	Identify and determine common equivalent fractions, decimals, and percents, up to one hundred percent, e.g., 1/10 = 0.10 = 10%, ¾ = 0.75 = 75%, 1/3 = 0.3 = 33 1/3%
5N6	Find and position whole numbers, fractions, mixed numbers, and decimals on number line, e.g., find 3/5 and 0.8 on a number line. Arrange numbers of the same type (integers, proper and improper fractions & mixed numbers from least to greatest: 4/3, 7/9, 1/6, and 3 ½..
5N7	Compare pairs of positive integers, fractions, mixed numbers, decimals, and percents, e.g., 4/3 < 1 ½: 0.30 = 30%; and ½ > 0.4.
5N8	Apply number theory concepts – including prime and composite numbers, prime factorization, greatest common factor, least common multiple, and divisibility rules for 2, 3, 4, 5, 6, 9, and 10 – to the solution of problems.
5N9	Select and use appropriate operations to solve problems, involving addition and subtraction with positive fractions, mixed numbers, decimals, and percents. Select and use appropriate operations to solve problems involving multiplication and division with positive fractions, mixed numbers, and decimals. Problems may include money.
5N10	Use the number line to locate, represent, and compare and order positive and negative integers.
5N11	Apply the Order of Operations for expressions involving addition, subtraction, multiplication, and division with grouping symbols (+, -, x, ÷). Recognize that parentheses can affect the order of operations, e.g., 3 x (4 + 5) – (8 – 7) = 26.
5N12	Demonstrate an understanding of the inverse relationship of addition and subtraction, and use that understanding to simplify computation and solve problems, e.g., 7 + 5 + 6 – 5 + 4
5N13	Accurately and efficiently add, subtract, multiply, and divide (by double-digit whole numbers) whole numbers and positive decimals, e.g., 156.24 **÷ 12.**
5N14	Accurately and efficiently add, subtract, and multiply positive fractions and mixed numbers. Model and calculate division of a whole number by a fraction, e.g., 6 ÷ ½. Model division of a fraction by a fraction with a common denominator and compatible numerators, e.g., 4/5 ÷ 2/5. Simplify fractions.
5N15 *	Accurately and efficiently divide a fraction by a fraction.
5N17	Estimate sums and differences with whole numbers, fractions, and decimals with reasoned strategies. Estimate products and quotients with whole numbers and decimals divided by whole numbers with reasoned strategies.
	Patterns, Relations & Algebra
5P1	Analyze and determine the rules for extending symbolic, arithmetic, and geometric patterns and
	progressions, e.g., square numbers 1,4, 9, 16 … and two-dimensional shape patterns
5P2	Replace variables with given values and evaluate/simplify, e.g., 2(m) + 3 when m=4
5P3	Use the properties of equality to solve problems with whole numbers, e.g., if _+7=13, then _=13-7, therefore _=6
5P4	Represent real situations and mathematical relationships with concrete models, tables, graphs,
	and rules in words and with symbols
5P5	Solve linear equations using one variable using various methods such as concrete models, tables, graphs, "guess, check, and revise" and paper-pencil methods
5P6	Produce and interpret graphs that represent the relationship between two variables in everyday situations
	Geometry
5G1	Identify, compare, and classify types of triangles (right, scalene, and equilateral), quadrilaterals (parallelograms and trapezoids), pentagons, hexagons, and octagons. Classify triangles and quadrilaterals into their subsets, e.g., some isosceles triangles are equilateral, some rectangles are squares, and some parallelograms are rhombuses.
5G2	Identify three-dimensional shapes (e.g., cubes, prisms, spheres, and pyramids) based on their properties, such as edges, faces, vertices, and bases.
5G3	Recognize and name points, lines, and planes. Identify intersecting, parallel, perpendicular lines.
5G4	Locate, label, and graph points using ordered pairs of positive whole numbers and zero on the Cartesian coordinate plane.
5G5	Find the distance between two points on a horizontal or vertical number line as a change in measurement, e.g., degrees on a thermometer, inches, feet, centimeters, or meters on a ruler or tape measure.
5G6	Describe and perform transformations on two-dimensional shapes, e.g., reflections, rotations, and translations.

5G7	Identify multiple lines of symmetry in two-dimensional shapes.
5G8	Determine if two triangles or quadrilaterals are congruent through measurement of appropriate sides and angles.
5G9	Match three-dimensional objects and their two-dimensional representations, e.g., nets and projections.
	Measurement
5M1	Find the area of parallelograms (including rectangles) and triangles. Apply the concept of perimeter to polygons. Apply formulas where appropriate.
5M2	Identify, measure, describe, classify and construct various angles, triangles, and quadrilaterals. Measure and construct angles using appropriate tools such as protractors and compasses.
5M4	Create an irregular shape using a geoboard or dot paper and find the area of the shape.
5M5	Identify the radius and diameter of a circle. Draw a circle with a given radius and/or a given diameter. Find the circumference of a circle given the radius or diameter and the appropriate formula.
5M6	Determine volumes and surface areas of cubes.
5M7	Find the sum of the interior angles in triangles and quadrilaterals with and w/o measuring the angles, e.g., find the missing angle of a triangle if two of the angles measure 48◦ and 63◦.
	Data Analysis, Statistics and Probability
5D1	Describe a data set using the concepts of median, mean, mode, maximum and minimum, and range.
5D2	Construct and interpret line plots, line graphs, and bar graphs. Interpret and label circle graphs, e.g., given a sectioned circle graph and data, use the data to appropriately label the sections in the circle graph.
5D3	Construct and analyze two-step tree diagrams.
5D4	Determine a ratio to predict the probability of outcomes of simple experiments (e.g., tossing a coin) and test the predictions.

**** Tested at the local level!***