MATHEMATICS

Kindergarten – Areas of Focus:

Counting and Cardinality

- Know number names and the count sequence. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: number words (zero - one hundred).
- Count to tell the number of objects. Students use numbers, including written numerals, to represent quantities and to solve quantitative problems such as counting objects in a set, counting out a given number of objects, and comparing sets or numerals.
- Compare numbers. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: greater, more, less, fewer, equal, same amount.

Operations and Algebraic Thinking

- Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from. For numbers 0 – 10, Kindergarten students choose, combine, and apply strategies for answering quantitative questions. This includes quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away. Objects, pictures, actions, and explanations are used to solve problems and represent thinking.

Number and Operations in Base 10

- Work with numbers 11–19 to gain foundations for place value. Rather than unitizing a ten (recognizing that a set of 10 objects is a unit called a “ten”), which is a standard for First Grade (1.NBT.1a), kindergarteners keep each count as a single unit as they explore a set of 10 objects and leftovers.

Measurement and Data

- Describe and compare measureable attributes. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: length, weight, heavy, long, more of, less of, longer, taller, shorter.
- Classify objects and count the number of objects in categories. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: color words (e.g., blue, green, red, etc.), descriptive words (e.g., small, big, rough, smooth, bumpy, round, flat, etc.), more, less, same amount.

Geometry

- Identify and describe shapes e.g., squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres.
- Analyze, compare, create, and compose shapes.

Fluency by the end of Kindergarten

- Add and subtract within 5

First Grade – Areas of Focus:

Operations and Algebraic Thinking

- Represent and solve problems involving addition and subtraction. Students develop strategies for adding and subtracting whole numbers based on their prior work with small numbers. They use a variety of models, including discrete objects and length-based models (e.g., cubes connected to form lengths), to model add-to, take-from, put-together, take-apart, and compare situations to develop meaning for the operations of addition and subtraction, and to develop strategies to solve arithmetic problems with these operations.
- Understand and apply properties of operations and the relationship between addition and subtraction. Students understand connections between counting and addition and subtraction (e.g., adding two is the same as counting on two). They use properties of addition to add whole numbers and to create and use increasingly sophisticated strategies based on these properties (e.g., "making tens") to solve addition and subtraction problems within 20. By comparing a variety of solution strategies, children build their understanding of the relationship between addition and subtraction.
- Add and subtract within 20. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: addition, subtraction, counting all, counting on, counting back.
- Work with addition and subtraction equations. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: equations, equal, the same amount/quantity as, true, false.

Number and Operations in Base 10

- Extending the counting sequence. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: number words 0-120.
- Understand place value. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: tens, ones, bundle, left-overs, singles, groups, greater/less than, equal to.
- Use place value understanding and properties of operations to add and subtract. Students develop, discuss, and use efficient, accurate, and generalizable methods to add within 100 and subtract multiples of 10. They compare whole numbers (at least to 100) to develop understanding of and solve problems involving their relative sizes. They think of whole numbers between 10 and 100 in terms of tens and ones (especially recognizing the numbers 11 to 19 as composed of a ten and some ones).

Measurement and Data

- Measure lengths indirectly and by iterating length units. Students develop an understanding of the meaning and processes of measurement, including underlying concepts such as iterating (the mental activity of building up the length of an object with equal-sized units) and the transitivity principle for indirect measurement(students should apply the principle of transitivity of measurement to make indirect comparisons, but they need not use this technical term).

- Tell and write time. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: time, hour, half-hour, about, o'clock, past, "six"-thirty.
- Represent and interpret data. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: data, more, most, less, least, same, different, category, question, collect.

Geometry

- Reason with shapes and their attributes. Students compose and decompose plane or solid figures (e.g., put two triangles together to make a quadrilateral) and build understanding of part-whole relationships as well as the properties of the original and composite shapes. As they combine shapes, they recognize them from different perspectives and orientations, describe their geometric attributes, and determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.

Fluency by the end of First Grade

- Add and subtract within 10.

Second Grade – Areas of Focus:

Operations and Algebraic Thinking

- Represent and solve problems involving addition and subtraction. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: add, subtract, more, less, equal, equation, putting together, taking from, taking apart, addend.
- Add and subtract within 20. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: add, subtract, sum, more, less, equal, equation, putting together, taking from, taking apart, addend.
- Work with equal groups of objects to gain foundations for multiplication. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: odd, even, row, column, rectangular array, equal, addend.

Number and Operations in Base 10

- Understand place value. Students extend their understanding of the base-ten system. This includes ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing. Students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones).
- Use place value understanding and properties of operations to add and subtract. Students use their understanding of addition to develop fluency with addition and subtraction within 100. They solve problems within 1000 by applying their understanding of models for addition and

subtraction, and they develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations.

Measurement and Data

- Measure and estimate lengths in standard units. Students recognize the need for standard units of measure (centimeter and inch) and they use rulers and other measurement tools with the understanding that linear measure involves an iteration of units. They recognize that the smaller the unit, the more iterations they need to cover a given length.
- Relate addition and subtraction to length. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: inch, foot, yard, centimeter, meter, ruler, yardstick, meter stick, measuring tape, estimate, length, equation, number line, equally spaced, point.
- Work with time and money. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: clocks, hand, hour hand, minute hand, hour, minute, a.m., p.m., o'clock, multiples of 5 (e.g., five, ten, fifteen, etc.), analog clock, digital clock, quarter 'til, quarter after, half past, quarter hour, half hour, thirty minutes before, 30 minutes after, 30 minutes until, 30 minutes past, quarter, dime, nickel, dollar, cent(s), $, ¢, heads, tails.
- Represent and interpret data. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: collect, organize, display, show, data, attribute, sort, line plot, picture graph, bar graph, question, category, chart, table, most, least, more than, less than, about, same, different, measure, inch, foot, yard, centimeter, meter, length.

Geometry

- Reason with shapes and their attributes. Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.

Fluency by the end of Second Grade

- Add and subtract within 100.
- Single digit sums and differences.

Third Grade – Areas of Focus:

Operations and Algebraic Thinking

- Represent and solve problems involving multiplication and division. Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size.

- Understand properties of multiplication and the relationship between multiplication and division. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division.
- Multiply and divide within 100. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: operation, multiply, divide, factor, product, quotient, unknown, strategies, reasonableness, mental computation, property.
- Solve problems involving the four operations, and identify and explain patterns in arithmetic. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: operation, multiply, divide, factor, product, quotient, subtract, add, addend, sum, difference, equation, unknown, strategies, reasonableness, mental computation, estimation, rounding, patterns, (properties)-rules about how numbers work.

<u>Number and Operations in Base 10</u>

- Use place value understanding and properties of operations to perform multi-digit arithmetic. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: place value, round, addition, add, addend, sum, subtraction, subtract, difference, strategies, (properties)-rules about how numbers work.

<u>Number and Operations - Fractions</u>

- Develop understanding of fractions as numbers. 1 Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, 8. Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole.

<u>Measurement and Data</u>

- Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: estimate, time, time intervals, minute, hour, elapsed time, measure, liquid volume, mass, standard units, metric, gram (g), kilogram (kg), liter (L)
- Represent and interpret data. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: scale, scaled picture graph, scaled bar graph, line plot, data.
- Geometric measurement: understand concepts of area and relate area to multiplication and to addition. Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares,

students connect area to multiplication, and justify using multiplication to determine the area of a rectangle.

- Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: attribute, perimeter, plane figure, linear, area, polygon, side length.

Geometry

- Reason with shapes and their attributes. Students describe, analyze, and compare properties of two dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.

Fluency by the end of Third Grade

- Add and subtract within 1000.
- Single digit products and quotients.