§111.xx. Kindergarten, Beginning with School Year 2013-2014.

(a)   Introduction.

    (1)   The desire to achieve educational excellence is the driving force behind the Texas Essential Knowledge and Skills for mathematics, guided by the College and Career Readiness Standards. By embedding statistics, probability, and finance, while focusing on fluency and solid understanding, Texas will lead the way in mathematics education and prepare all Texas students for the challenges they will face in the 21st century.

    (2)   The process standards are integrated at every grade level and course. When possible, students will apply mathematics to problems arising in everyday life, society, and the workplace. Students will use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution. Students will select appropriate

(A)   apply mathematics to problems arising in everyday life, society, and the workplace;

(B)   use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C)   select tools, including real objects, manipulatives, paper/pencil, and technology, as appropriate and techniques, including mental math, estimation, and number sense, as appropriate to solve problems;

(D)   communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E)   create and use representations to organize, record, and communicate mathematical ideas;

(F)   analyze mathematical relationships to connect and communicate mathematical ideas; and

(G)   display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communications.

(2)   Number and Operations. The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numeration system. The student is expected to:

(A)   count forward and backward to at least 20 with and without objects;

(B)   read, write, and represent whole numbers from 0 to at least 20 with and without objects or pictures;

(C)   count a set of objects up to at least 20 and demonstrate that (a)4(t)-2(ib(nt)-2-12(r)3(a)4(pr

(3)   Number and Operations. The student applies mathematical process standards to develop an understanding of addition and subtraction situations in order to solve problems. The student is expected to:

    (A)   model the action of joining to represent addition and the action of separating to represent subtraction;

    (B)

(B)   compare two objects with a common measureable attribute to see which object has more of/less of the attribute and describe the difference.

(8)   Data Analysis. The student applies mathematical process standards to collect and organize data to make it useful for interpreting information. The student is expected to:

(A)

(b) Knowledge and skills.

(1) Mathematical Process Standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(A) apply mathematics to problems arising in everyday life, society, and the workplace;

(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C) select tools, including real objects, manipulatives, paper/pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E) create and use representations to organize, record, and communicate mathematical ideas;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

(2) Number and Operations. The student applies mathematical process standards to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numeration system related to place value. The student is expected to:

(A) recognize instantly the quantity of structured arrangements such as seen on a die or a tenframe;

(B) use concrete and pictorial models to compose and decompose numbers up to 120 as so many hundreds, so many tens, and so many ones in more than one way;

(C) use objects, pictures, and expanded and standard forms to represent numbers up to 120;

(D) generate a number that is greater than or less than a given whole number up to 120;

(E) use place value to compare whole numbers to 120 using comparative language; and

(F) order whole numbers to 120 using place value and open number lines.

(3) Number and Operations. The student applies mathematical process standards to develop and use strategies for whole number addition and subtraction computations in order to solve problems. The student is expected to:

(A)   use concrete and pictorial models to determine the sum of a multiple of ten and a one-digit number in problems up to 99;

(B)   use objects and pictorial models to solve word problems involving joining, separating and comparing sets within 20 and unknowns as any one of the terms in the problem such as $2 + 4 = \underline{\quad}$; $3 + \underline{\quad} = 7$; and $5 = \underline{\quad} - 3$;

(C)   compose 10 with two or more addends with and without concrete objects;

(D)   apply basic fact strategies to add and subtract within 20 using strategies, including making 10 and decomposing a number leading to a 10;

(E)   explain strategies used to solve addition and subtraction problems up to 20 using spoken words, objects, pictorial models, and number sentences; and

(F)   generate and solve problem situations when given a number sentence involving addition and subtraction of-numbers within 20.

(4)   Number and Operations. The student applies mathematical process standards to (C)

(8)

(1)   Mathematical Process Standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

   (A)   apply mathematics to problems arising in everyday life, society, and the workplace;

(A) partition objects such as strips, lines, regular polygons, and circles into equal parts and name the parts, including halves, fourths and eighths, using words such as "one-half," "three-fourths;"

(B) explain that the more fractional parts used to make a whole, the smaller the part; and the fewer the fractional parts, the larger the part;

(C) use concrete models to count fractional parts beyond one whole using words such as "one-fourth," "two-fourths," "three-fourths," "four-fourths," "five-fourths," or "one and one-fourth," and recognize how many parts it takes to equal one whole such as four-fourths equals one whole; and

(D) identify examples and non-examples of halves, fourths, and eighths.

(4) Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve addition and subtraction problems with efficiency and accuracy. The student is expected to:

(A) recall basic facts to add and subtract within 20 with automaticity;

(B) use mental strategies, flexible methods, and algorithms based on knowledge of place value and equality to add and subtract two-digit numbers;

(C) solve one-step and multistep word problems involving addition and subtraction of two-digit numbers using a variety of strategies based on place value, including algorithms; and

(D) generate and solve problem situations for a given mathematical number sentence involving addition and subtraction of whole numbers within 100.

(5) Number and Operations. The student applies mathematical process standards to determine the value of coins in order to solve monetary transactions. The student is expected to:

(A) determine the value of a collection of coins up to one dollar; and

(B) use the cent symbol, dollar sign, and the decimal point to name the value of a collection of coins.

(6) Number and Operations. The student applies mathematical process standards to connect repeated addition and subtraction to multiplication and division situations that involve equal groupings and shares. The student is expected to:

(A) model, create, and describe contextual multiplication situations in which equivalent sets of concrete objects are joined; and

(B) model, create, and describe contextual division situations in which a set of concrete objects is separated into equivalent sets.

(7) Algebraic Reasoning. The student applies mathematical process standards to identify and apply number patterns within properties of numbers and operations in order to describe relationships. The student is expected to:

(A)   use relationships and objects to determine whether a number up to 40 is even or odd;

(B)   use relationships to determine the number that is 10 or 100 more or less than a given number up to 1,200; and

(C)   represent and solve addition and subtraction word problems where unknowns may be any one of the terms in the problem.

(8)   Geometry and Measurement. The student applies mathematical process standards to analyze attributes of two- and three-dimensional geometric figures to develop generalizations about their properties. The student is expected to:

(A)   create two-dimensional shapes based on given attributes, including number of sides and vertices;

(B)   identify attributes of a quadrilateral, a pentagon, and an octagon;

(C)   identify three-dimensional solids including spheres, cones, cylinders, rectangular prisms including cubes, and triangular prisms, and describe their attributes using formal language such as vertex, edge, and face;

(D)   classify polygons with 12 or fewer sides according to attributes, including identifying the number of sides and number of vertices

(E)   compose two-dimensional shapes and three-dimensional solids with given properties or attributes such as build a rectangle out of unit squares; build a rectangular prism out of unit cubes; and

(F)   decompose two-dimensional shapes such as cutting out a square from this rectangle, dividing this shape in half, or partitioning a rectangle into identical triangles and identify the resulting geometric parts.

(9)   Geometry and Measurement. The student applies mathematical process standards to select and use units to describe length, area, and time. The student is expected to:

(A)   find the length of objects using concrete models for standard units of length such as the edges of inch tiles and centimeter cubes;

(B)   describe the inverse relationship between the size of the unit and the number of units needed to equal the length of an object such as the longer the unit, the fewer needed; the shorter the unit, the more needed;

(C)   represent whole numbers as distances from any given location on a number line;

(D)   determine the length of an object to the nearest half unit using rulers, yardsticks, meter sticks, or measuring tapes;

(E)   determine a solution to a problem involving length, including estimating lengths;

(F)   use concrete models of square units to find the area of a rectangle by covering it with no gaps or overlaps, counting to find the total number of

square units, and describing the measurement using a number and the unit such as 24 square units; and

    (G)   read and write time to the nearest five- and one-minute increments using analog and digital clocks and distinguish between a.m. and p.m.

(9)   Data Analysis. The student applies mathematical process standards to organize data to make it useful for interpreting information and solving problems. The student is expected to:

    (A)   explain that the length of a bar in a bar graph or the number of pictures in a pictograph represents the number of data points for a given category;

    (B)   organize a collection of data with up to four categories using pictographs and bar graphs with intervals of one or more;

    (C)   write and solve one-step word problems involving addition or subtraction using data represented within pictographs and bar graphs with intervals of one; and

    (D)   draw conclusions and make predictions from information in a graph.

§111.xx. Grade 3, Beginning with School Year 2013-2014.

(a)   Introduction.

   (1)

(A)   compose and decompose numbers to 100,000 as a sum of so many ten thousands, so many thousands, so many hundreds, so many tens, and so many ones, in more than one way, using objects, pictorial models, and numbers, including expanded notation as appropriate;

(B)   describe the mathematical relationships found in the base ten place value system through the 100,000th place;

(C)   represent a number on a number line as being between two consecutive multiples of 10, 100, 1000, or10,000 and use words to describe relative size of numbers such as closer to, is about, or is nearly, in order to round whole numbers; and

(D)   compare and order whole numbers up to 100,000 and represent comparisons using the symbols >, <, or =.

(3)   Number and Operations.

(4)   Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to:

   (A)   solve one-step and multistep problems involving addition and subtraction within 1,000 using strategies based on place value, properties of operations, and the relationship between addition and subtraction with fluency;

   (B)   use

(B)   represent and solve one- and two-step multiplication and division problems within 100 using arrays, strip diagrams, and equations;

(C)   describe a multiplication expression as a comparison such as 3 x 24 represents 3 times as much as 24;

(D)   determine the unknown whole number in a multiplication or division equation relating three whole numbers when the unknown is either a missing factor or product, such as the value 4 for [ ] makes 3 x [ ] = 12 a true equation; and

(E)   represent real-world relationships using number pairs in a table and verbal descriptions, such as 1 insect has 6 legs, 2 insects have 12 legs, and so forth.

(6)   Geometry and Measurement. The student applies mathematical process standards to analyze attributes of two-dimensional geometric figures to develop generalizations about their properties. The student is expected to:

    (A)   classify and sort two- and three-dimensional solids, including cones, cylinders, spheres, triangular and rectangular prisms, and cubes, based on attributes using formal geometric language such as faces, edges and vertices;

    (B)   determine the area of rectangles with whole number side lengths in problems using multiplication related to the number of rows times the number of unit squares in each row;

    (C)   decompose composite figures formed by rectangles into non-overlapping rectangles to determine the area of the original figure using the additive property of area; and

    (D)   decompose two congruent two-dimensional figures into parts with equal areas and express the area of each part as a unit fraction of the whole and recognize that equal shares of identical wholes need not have the same shape.

(7)   Geometry and Measurement. The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving customary measurement. The student is expected to:

    (A)   represent fractions of halves, fourths, and eighths as distances from zero on a number line

    (B)   determine the perimeter of a polygon or a missing length when given perimeter and remaining side lengths in problems;

    (C)   determine the solutions to problems involving addition and subtraction of time intervals in minutes, using pictorial models or tools such as a 15-minute event plus a 30-minute event equals 45 minutes;

dimensional figures, measure angles, and convert units of measure. In Data Analysis students will represent and interpret data.

(6)   Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible

(C)   represent the product of 2 two-digit numbers using arrays, area models, or equations, including perfect squares through 15 x 15;

(D)   use strategies and algorithms, including the standard algorithm, to multiply up to a four-digit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties;

(E)   represent the quotient of up to a four-digit whole number divided by a one-digit whole number using arrays, area models, or equations;

(F)   use strategies and algorithms, including the standard algorithm, to divide up to a four-digit dividend by a one-digit divisor;

(G)   use strategies, including rounding to the nearest 10, 100 or 1,000 and compatible numbers, to estimate solutions; and

(H)   solve one- and two-step problems involving multiplication and division, including interpreting remainders with fluency.

(5)   Algebraic Reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

(A)   represent multistep problems involving the four operations with whole numbers using strip diagrams and equations with a letter standing for the unknown quantity;

(B)   represent problems using an input-output table and numerical expressions to generate a number pattern that follows a given rule such as given the rule "Add 3" and the starting number 1, use the expressions 1 + 3, 2 + 3, 3 + 3, and so forth to generate a table to represent the relationship of the values in the resulting sequence and their position in the sequence;

(C)   use models to determine the formulas for the perimeter of a rectangle (l + w + l + w or 2l + 2w), including the special form for perimeter of a square(4s) and the area of a rectangle (l x w); and

(D)   solve problems related to perimeter and area of rectangles where dimensions are whole numbers.

(6)   Geometry and Measurement. The student applies mathematical process standards to analyze geometric attributes in order to develop generalizations about their properties. The student is expected to:

(A)   identify points, lines, line segments, rays, angles, and perpendicular and parallel lines;

(B)   identify and draw one or more lines of symmetry, if they exist, for a two-dimensional figure;

(C)   apply knowledge of right angles to identify acute, right and obtuse triangles;

(D)   use attributes to

of functions through patterning, identify prime and composite numbers, and use the order of operations. In Geometry and Measurement, students will classify two-dimensional figures, connect geometric attributes to the measures of three-dimensional figures, use units of measure, and represent location using a coordinate plane. In Data Analysis, students will represent and interpret data.

(6) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(b) Knowledge and skills.

(1) Mathematical Process Standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(A) apply mathematics to problems arising in everyday life, society. and the workplace;

(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C) select tools, including real objects, manipulatives, paper/pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E) create and use representations to organize, record, and communicate mathematical ideas;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

(G) ronh display, explain, 2(odh) stl(fy)4(d) ghomhte 2(odbat) a2(s)4(g) e2(onh(e)4(nt)-2(s)-1(us)-1(i)-2 precise mathematical language in written or oral communications.

(2) Number and Operations. The student applies mathematical process standards to represent, compare, and order positive rational numbers and unde(be)4(r)3siTJ -0.01 Tc 0.004 Tv

(3)   Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:

    (A)   estimate to determine solutions to mathematical and real-world problems involving addition, subtraction, multiplication, or division;

    (B)   use strategies and algorithms, including the standard algorithm, to multiply a three-digit number by a two-digit number with fluency;

    (C)   use strategies and algorithms, including the standard algorithm, to solve for quotients of up to a four-digit dividend and a two-digit divisor with fluency;

    (D)   represent multiplication of decimals with products to the hundredths using objects and pictorial models, including area models;

    (E)   solve for products of decimals to hundredths, including situations involving money, using strategies based on place-value understandings, properties of operations, and the relationship to the multiplication of whole numbers;

    (F)   represent quotients to hundredths, up to four-digit dividends and two-digit whole number divisors, using objects and pictorial models, including area models;

    (G)   solve for quotients to hundredths, up to four-digit dividends and two-digit whole number divisors, using strategies and algorithms, including the standard algorithm;

    (H)   represent and solve addition and subtraction of fractions with unequal denominators referring to the same whole using objects and pictorial models such as strip diagrams and properties of operations;

    (I)   represent and solve multiplication of a whole number and a fraction that refers to the same whole using objects and pictorial models, including area models; and

    (J)   represent division of a unit fraction by a whole number and the division of a whole number by a unit fraction such as $1/3 \div 7$ and $7 \div (1/3)$ using objects and pictorial models, including area models.

(4)   Algebraic Reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

    (A)   identify prime and composite numbers using patterns in factor pairs;

    (B)   represent and solve multistep problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity;

    (C)   recognize the difference between additive and multiplicative numerical patterns given in a table or graph;

(D) describe the meaning of parentheses and brackets in a numeric expression such as 4 (14 + 5) is 4 times as large as (14 + 5);

(E) simplify numerical expressions, including up to two levels of grouping excluding exponents such as (3 + 7) / (5 - 3);

(F) use concrete objects and pictorial models to develop the formulas for the volume of a rectangular prism, including the special form for a cube ($V = l$ x w x h, $V = s$ x s x s, and $V = Bh$);

(G) represent and solve problems related to perimeter and/or area such as for rectangles and composite figures formed by rectangles, and related to volume, such as for rectangular prisms.

(5) Geometry and Measurement. The student applies mathematical process standards to classify two-dimensional figures by attributes and properties. The student is expected to classify two-dimensional figures in a hierarchy of sets and subsets using graphic organizers based on their attributes and properties such as all rectangles have the property that opposite sides are parallel; therefore, every rectangle is a parallelogram.

(6) Geometry and Measurement. The student applies mathematical process standards to understand, recognize and quantify volume. The student is expected to:

(A) recognize a cube with side length of 1 unit as a "unit cube" having "one cubic unit of volume" and the volume of a three-dimensional figure as the number of unit cubes "n cubic units" needed to fill it with no gaps or overlaps if possible; and

(B) determine the volume of a rectangular prism with whole number side lengths in problems related to the number of layers times the number of unit cubes in the area of the base.

(7) Geometry and Measurement. The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving measurement. The student is expected to solve problems by calculating conversions within a measurement system, customary or metric.

(8) Geometry and Measurement. The student applies mathematical process standards to identify locations on a coordinate plane. The student is expected to:

(A) describe the key attributes of the coordinate plane and the process for graphing ordered pairs of numbers in the first quadrant; and

(B) graph ordered pairs of numbers arising from mathematical and real-world problems in the first quadrant of the coordinate plane, including those generated by number patterns or found in an input-output table.

(9) Data Analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:

(A)   represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem and leaf plots;

(B)   represent discrete paired data on a scatter plot; and

(C)   solve one- and two-step problems using data from a frequency table, dot plot, bar graph, stem and leaf plot, or scatter plot.

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