Math, Grade 1(IMRA)

Subject: Mathematics
Grade: 01
Expectations: 50
Breakouts: 174

(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 computational thinking, mathematical 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 describe ways in which students are expected to engage in the content. The placement of the process standards at the beginning of the knowledge and skills listed for each grade and course is intentional. The process standards weave the other knowledge and skills together so that students may be successful problem solvers and use mathematics efficiently and effectively in daily life. 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 tools such as real objects, manipulatives, algorithms, paper and pencil, and technology and techniques such as mental math, estimation, number sense, and generalization and abstraction to solve problems. Students will effectively communicate mathematical ideas, reasoning, and their implications using multiple representations such as symbols, diagrams, graphs, computer programs, and language. Students will use mathematical relationships to generate solutions and make connections and predictions. Students will analyze mathematical relationships to connect and communicate mathematical ideas. Students will display, explain, or justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

3. For students to become fluent in mathematics, students must develop a robust sense of number. The National Research Council's report, "Adding It Up," defines procedural fluency as "skill in carrying out procedures flexibly, accurately, efficiently, and appropriately." As students develop procedural fluency, they must also realize that true problem solving may take time, effort, and perseverance. Students in Grade 1 are expected to perform their work without the use of calculators.

4. The primary focal areas in Grade 1 are understanding and applying place value, solving problems involving addition and subtraction, and composing and decomposing two-dimensional shapes and three-dimensional solids.

    a. Students use relationships within the numeration system to understand the sequential order of the counting numbers and their relative magnitude.

    b. Students extend their use of addition and subtraction beyond the actions of joining and separating to include comparing and combining. Students use properties of operations and the relationship between addition and subtraction to solve problems. By comparing a variety of solution strategies, students use efficient, accurate, and generalizable methods to perform operations.

    c. Students use basic shapes and spatial reasoning to model objects in their environment and construct more complex shapes. Students are able to identify, name, and describe basic two-dimensional shapes and three-dimensional solids.

5. 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 Statements

   (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;

   (i) apply mathematics to problems arising in everyday life

   (ii) apply mathematics to problems arising in society

   (iii) apply mathematics to problems arising in 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;

   (i) 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

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

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

   (i) select tools, including real objects as appropriate, to solve problems

   (ii) select tools, including manipulatives as appropriate, to solve problems

   (iii) select tools, including paper and pencil as appropriate, to solve problems

   (iv) select tools, including technology as appropriate, to solve problems

   (v) select techniques, including mental math as appropriate, to solve problems

   (vi) select techniques, including estimation as appropriate, to solve problems

   (vii) select techniques, including 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;

   (i) communicate mathematical ideas using multiple representations, including symbols as appropriate

   (ii) communicate mathematical ideas using multiple representations, including diagrams as appropriate

   (iii) communicate mathematical ideas using multiple representations, including graphs as appropriate

   (iv) communicate mathematical ideas using multiple representations, including language as appropriate

   (v) communicate mathematical reasoning using multiple representations, including symbols as appropriate

   (vi) communicate mathematical reasoning using multiple representations, including diagrams as appropriate

   (vii) communicate mathematical reasoning using multiple representations, including graphs as appropriate

   (viii) communicate mathematical reasoning using multiple representations, including language as appropriate

   (ix) communicate [mathematical ideas'] implications using multiple representations, including symbols as appropriate

(x)   communicate [mathematical ideas'] implications using multiple representations, including diagrams as appropriate

(xi)   communicate [mathematical ideas'] implications using multiple representations, including graphs as appropriate

(xii)   communicate [mathematical ideas'] implications using multiple representations, including language as appropriate

(xiii)   communicate [mathematical reasoning's] implications using multiple representations, including symbols as appropriate

(xiv)   communicate [mathematical reasoning's] implications using multiple representations, including diagrams as appropriate

(xv)   communicate [mathematical reasoning's] implications using multiple representations, including graphs as appropriate

(xvi)   communicate [mathematical reasoning's] implications using multiple representations, including language as appropriate

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

    (i)   create representations to organize mathematical ideas

    (ii)   use representations to organize mathematical ideas

    (iii)   create representations to record mathematical ideas

    (iv)   use representations to record mathematical ideas

    (v)   create representations to communicate mathematical ideas

    (vi)   use representations to communicate mathematical ideas

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

    (i)   analyze mathematical relationships to connect mathematical ideas

    (ii)   analyze mathematical relationships to communicate mathematical ideas

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

    (i)   display mathematical ideas using precise mathematical language in written or oral communication

    (ii)   display mathematical arguments using precise mathematical language in written or oral communication

    (iii)   explain mathematical ideas using precise mathematical language in written or oral communication

    (iv)   explain mathematical arguments using precise mathematical language in written or oral communication

    (v)   justify mathematical ideas using precise mathematical language in written or oral communication

    (vi)   justify mathematical 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;

    (i)   recognize instantly the quantity of structured arrangements

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

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

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

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

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

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

    (i) use objects to represent numbers up to 120

    (ii) use pictures to represent numbers up to 120

    (iii) use expanded form to represent numbers up to 120

    (iv) use standard form to represent numbers up to 120

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

    (i) 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 up to 120 using comparative language;

    (i) use place value to compare whole numbers up to 120 using comparative language

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

    (i) order whole numbers up to 120 using place value

    (ii) order whole numbers up to 120 using open number lines

(G) represent the comparison of two numbers to 100 using the symbols >,

    (i) represent the comparison of two numbers to 100 using the symbols >, <, or =

(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 10 and a one-digit number in problems up to 99;

    (i) use concrete models to determine the sum of a multiple of 10 and a one-digit number in problems up to 99

    (ii) use pictorial models to determine the sum of a multiple of 10 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 = [ ]; 3 + [ ] = 7; and 5 = [ ] - 3;

    (i) use objects to solve word problems involving joining sets within 20 and unknowns as any one of the terms in the problem

      (ii)   use objects to solve word problems involving separating sets within 20 and unknowns as any one of the terms in the problem

      (iii)   use objects to solve word problems involving comparing sets within 20 and unknowns as any one of the terms in the problem

      (iv)   use pictorial models to solve word problems involving joining sets within 20 and unknowns as any one of the terms in the problem

      (v)   use pictorial models to solve word problems involving separating sets within 20 and unknowns as any one of the terms in the problem

      (vi)   use pictorial models to solve word problems involving comparing sets within 20 and unknowns as any one of the terms in the problem

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

      (i)   compose 10 with two or more addends with concrete objects

      (ii)   compose 10 with two or more addends without concrete objects

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

      (i)   apply basic fact strategies to add within 20, including making 10

      (ii)   apply basic fact strategies to add within 20, including decomposing a number leading to a 10

      (iii)   apply basic fact strategies to subtract within 20, including making 10

      (iv)   apply basic fact strategies to subtract within 20, including 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

      (i)   explain strategies used to solve addition problems up to 20 using spoken words

      (ii)   explain strategies used to solve addition problems up to 20 using objects

      (iii)   explain strategies used to solve addition problems up to 20 using pictorial models

      (iv)   explain strategies used to solve addition problems up to 20 using number sentences

      (v)   explain strategies used to solve subtraction problems up to 20 using spoken words

      (vi)   explain strategies used to solve subtraction problems up to 20 using objects

      (vii)   explain strategies used to solve subtraction problems up to 20 using pictorial models

      (viii) explain strategies used to solve subtraction problems up to 20 using number sentences

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

      (i)   generate problem situations when given a number sentence involving addition or subtraction of numbers within 20

      (ii)   solve problem situations when given a number sentence involving addition or subtraction of numbers within 20

(4) Number and operations. The student applies mathematical process standards to identify coins, their values, and the relationships among them in order to recognize the need for monetary transactions. The student is expected to:

(A) identify U.S. coins, including pennies, nickels, dimes, and quarters, by value and describe the relationships among them;

    (i)   identify U.S. coins, including pennies, by value

    (ii)   identify U.S. coins, including nickels, by value

    (iii)   identify U.S. coins, including dimes, by value

    (iv)   identify U.S. coins, including quarters, by value

    (v)   describe the relationships among [U.S. coins, including pennies, nickels, dimes, and quarters]

(B) write a number with the cent symbol to describe the value of a coin; and

    (i)   write a number with the cent symbol to describe the value of a coin

(C) use relationships to count by twos, fives, and tens to determine the value of a collection of pennies, nickels, and/or dimes.

    (i)   use relationships to count by twos to determine the value of a collection of pennies, nickels, and/or dimes

    (ii)   use relationships to count by fives to determine the value of a collection of pennies, nickels, and/or dimes

    (iii)   use relationships to count by tens to determine the value of a collection of pennies, nickels, and/or dimes

(5) 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) recite numbers forward and backward from any given number between 1 and 120;

    (i)   recite numbers forward from any given number between 1 and 120

    (ii)   recite numbers backward from any given number between 1 and 120

(B) skip count by twos, fives, and tens to determine the total number of objects up to 120 in a set;

    (i)   skip count by twos to determine the total number of objects up to 120 in a set

    (ii)   skip count by fives to determine the total number of objects up to 120 in a set

    (iii)   skip count by tens to determine the total number of objects up to 120 in a set

(C) use relationships to determine the number that is 10 more and 10 less than a given number up to 120;

    (i)   use relationships to determine the number that is 10 more than a given number up to 120

    (ii)   use relationships to determine the number that is 10 less than a given number up to 120

(D) represent word problems involving addition and subtraction of whole numbers up to 20 using concrete and pictorial models and number sentences;

    (i)   represent word problems involving addition of whole numbers up to 20 using concrete models

    (ii)   represent word problems involving addition of whole numbers up to 20 using pictorial models

    (iii)   represent word problems involving addition of whole numbers up to 20 using number sentences

    (iv)   represent word problems involving subtraction of whole numbers up to 20 using concrete models

    (v)   represent word problems involving subtraction of whole numbers up to 20 using pictorial models

    (vi)   represent word problems involving subtraction of whole numbers up to 20 using number sentences

(E) understand that the equal sign represents a relationship where expressions on each side of the equal sign represent the same value(s);

    (i) understand that the equal sign represents a relationship where expressions on each side of the equal sign represent the same value(s)

(F) determine the unknown whole number in an addition or subtraction equation when the unknown may be any one of the three or four terms in the equation; and

    (i) determine the unknown whole number in an addition or subtraction equation when the unknown may be any one of the three or four terms in the equation

(G) apply properties of operations to add and subtract two or three numbers.

    (i) apply properties of operations to add two or three numbers

    (ii) apply properties of operations subtract two or three numbers

(6) Geometry and measurement. The student applies mathematical process standards to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalizations about their properties. The student is expected to:

(A) classify and sort regular and irregular two-dimensional shapes based on attributes using informal geometric language;

    (i) classify regular two-dimensional shapes based on attributes using informal geometric language

    (ii) classify irregular two-dimensional shapes based on attributes using informal geometric language

    (iii) sort regular two-dimensional shapes based on attributes using informal geometric language

    (iv) sort irregular two-dimensional shapes based on attributes using informal geometric language

(B) distinguish between attributes that define a two-dimensional or three-dimensional figure and attributes that do not define the shape;

    (i) distinguish between attributes that define a two-dimensional or three-dimensional figure and attributes that do not define the shape

(C) create two-dimensional figures, including circles, triangles, rectangles, and squares, as special rectangles, rhombuses, and hexagons;

    (i) create two-dimensional figures, including circles

    (ii) create two-dimensional figures, including triangles

    (iii) create two-dimensional figures, including rectangles

    (iv) create two-dimensional figures, including squares, as special rectangles

    (v) create two-dimensional figures, including rhombuses

    (vi) create two-dimensional figures, including hexagons

(D) identify two-dimensional shapes, including circles, triangles, rectangles, and squares, as special rectangles, rhombuses, and hexagons and describe their attributes using formal geometric language;

    (i) identify two-dimensional shapes, including circles

    (ii) describe [circles'] attributes using formal geometric language

    (iii) identify two-dimensional shapes, including triangles

    (iv) describe [triangles'] attributes using formal geometric language

    (v)   identify two-dimensional shapes, including rectangles

    (vi)   describe [rectangle'] attributes using formal geometric language

    (vii)   identify two-dimensional shapes, including squares, as special rectangles

    (viii) describe [squares'] attributes using formal geometric language

    (ix)   identify two-dimensional shapes, including rhombuses

    (x)   describe [rhombuses'] attributes using formal geometric language

    (xi)   identify two-dimensional shapes, including hexagons

    (xii)   describe [hexagons'] attributes using formal geometric language

(E) identify three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes), and triangular prisms, and describe their attributes using formal geometric language;

    (i)   identify three-dimensional solids, including spheres

    (ii)   describe [spheres'] attributes using formal geometric language

    (iii)   identify three-dimensional solids, including cones

    (iv)   describe [cones'] attributes using formal geometric language

    (v)   identify three-dimensional solids, including cylinders

    (vi)   describe [cylinders'] attributes using formal geometric language

    (vii)   identify three-dimensional solids, including rectangular prisms (including cubes)

    (viii) describe [rectangular prisms' (including cubes)] attributes using formal geometric language

    (ix)   identify three-dimensional solids, including triangular prisms

    (x)   describe [triangular prisms'] attributes using formal geometric language

(F) compose two-dimensional shapes by joining two, three, or four figures to produce a target shape in more than one way if possible;

    (i)   compose two-dimensional shapes by joining two, three, or four figures to produce a target shape in more than one way if possible

(G) partition two-dimensional figures into two and four fair shares or equal parts and describe the parts using words; and

    (i)   partition two-dimensional figures into two fair shares or equal parts

    (ii)   partition two-dimensional figures into four fair shares or equal parts

    (iii)   describe the [two equal] parts using words

    (iv)   describe the [four equal] parts using words

(H) identify examples and non-examples of halves and fourths.

    (i)   identify examples of halves

    (ii)   identify examples of fourths

    (iii)   identify non-examples of halves

(iv)   identify non-examples of fourths

(7) Geometry and measurement. The student applies mathematical process standards to select and use units to describe length and time. The student is expected to:

    (A) use measuring tools to measure the length of objects to reinforce the continuous nature of linear measurement;

        (i)   use measuring tools to measure the length of objects to reinforce the continuous nature of linear measurement

    (B) illustrate that the length of an object is the number of same-size units of length that, when laid end-to-end with no gaps or overlaps, reach from one end of the object to the other;

        (i)   illustrate that the length of an object is the number of same-size units of length that, when laid end-to-end with no gaps or overlaps, reach from one end of the object to the other

    (C) measure the same object/distance with units of two different lengths and describe how and why the measurements differ;

        (i)   measure the same object/distance with units of two different lengths

        (ii)   describe how the measurements differ

        (iii)   describe why the measurements differ

    (D) describe a length to the nearest whole unit using a number and a unit; and

        (i)   describe a length to the nearest whole unit using a number and a unit

    (E) tell time to the hour and half hour using analog and digital clocks.

        (i)   tell time to the hour using analog clocks

        (ii)   tell time to the hour using digital clocks

        (iii)   tell time to half hour using analog clocks

        (iv)   tell time to the half hour using digital clocks

(8) 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) collect, sort, and organize data in up to three categories using models/representations such as tally marks or T-charts;

        (i)   collect data in up to three categories using models/representations

        (ii)   sort data in up to three categories using models/representations

        (iii)   organize data in up to three categories using models/representations

    (B) use data to create picture and bar-type graphs; and

        (i)   use data to create picture graphs

        (ii)   use data to create bar-type graphs

    (C) draw conclusions and generate and answer questions using information from picture and bar-type graphs.

        (i)   draw conclusions using information from picture graphs

        (ii)   draw conclusions using information from bar-type graphs

        (iii)   generate questions using information from picture graphs

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(iv)   generate questions using information from bar-type graphs

(v)   answer questions using information from picture graphs

(vi)   answer questions using information from bar-type graphs

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(9) Personal financial literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:

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(A) define money earned as income;

    (i)   define money earned as income

(B) identify income as a means of obtaining goods and services, oftentimes making choices between wants and needs;

    (i)   identify income as a means of obtaining goods, oftentimes making choices between wants and needs

    (ii)   identify income as a means of obtaining services, oftentimes making choices between wants and needs

(C) distinguish between spending and saving; and

    (i)   distinguish between spending and saving

(D) consider charitable giving.

    (i)   consider charitable giving

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