

## Chapter 111. Texas Essential Knowledge and Skills for Mathematics

### Subchapter A. Elementary

#### §111.5. Grade 3

(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, and 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 3 are expected to perform their work without the use of calculators.

(4) The ***primary focal areas*** in Grade 3 are

- place value,
- operations of whole numbers,
- and understanding fractional units.

These focal areas are supported throughout the mathematical strands of number and operations, algebraic reasoning, geometry and measurement, and data analysis. In Grades 3-5, the number set is limited to positive rational numbers. In number and operations, students will focus on applying place value, comparing and ordering whole numbers, connecting multiplication and division, and understanding and representing fractions as numbers and equivalent fractions. In algebraic reasoning, students will use multiple representations of problem situations, determine missing values in number sentences, and represent real-world relationships using number pairs in a table and verbal descriptions. In geometry and measurement, students will identify and classify two-dimensional figures according to common attributes, decompose composite figures formed by rectangles to determine area, determine the perimeter of polygons, solve problems involving time, and measure liquid volume (capacity) or weight. In data analysis, students will represent and interpret data.

(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.

Mathematical Process Standards	Reporting Category 1: Numerical Representations and Relationships	Reporting Category 2: Computations and Algebraic Relationships	Reporting Category 3: Geometry and Measurement	Reporting Category 4: Data Analysis and Personal Financial Literacy
<p>These student expectations will NOT be listed under a separate reporting category. Instead, they will be incorporated into test questions across reporting categories since the application of mathematical process standards is part of each knowledge statement.</p> <p><b>3.1</b> The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p> <p>(A) <u>apply</u> mathematics to problems arising in everyday life, society, and the workplace;</p> <p>(B) <u>use</u> a problem-solving model that incorporates <u>analyzing</u> given information, <u>formulating</u> a plan or strategy, <u>determining</u> a solution, <u>justifying</u> the solution, and <u>evaluating</u> the problem-solving process and the reasonableness of the solution;</p> <p>(C) <u>select</u> tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to <u>solve</u> problems;</p> <p>(D) <u>communicate</u> mathematical ideas, reasoning, and their implications <u>using</u> multiple representations,</p>	<p>The student will demonstrate an understanding of how to represent and manipulate numbers and expressions.</p> <p><b>3.2</b> The student applies mathematical process standards to represent and compare whole numbers and understand relationships related to place value. The student is expected to:</p> <p>(A) <u>compose and decompose</u> numbers up to 100,000 as a sum of so many ten thousands, so many thousands, so many hundreds, so many tens, and so many ones using objects, pictorial models, and numbers, including expanded notation as appropriate;</p> <p>(B) <u>describe</u> the mathematical relationships found in the base-10 place value system through the hundred thousands place;</p> <p>(C) <u>represent</u> a number on a number line as being between two consecutive multiples of 10; 100; 1,000; or 10,000 and use words to describe relative size of numbers in order to round whole numbers; and</p> <p>(D) <u>compare and order</u> whole numbers up to 100,000 and <u>represent</u> comparisons using the symbols <math>&gt;</math>, <math>&lt;</math>, or <math>=</math>.</p> <p><b>3.3</b> The student applies mathematical process standards to represent and explain fractional units. The student is expected to:</p> <p>(A) <u>represent</u> fractions greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 <u>using</u> concrete objects and pictorial models, including strip diagrams and number lines;</p> <p>(B) <u>determine</u> the corresponding fraction greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 given a specified point on a number line;</p>	<p>The student will demonstrate an understanding of how to perform operations and represent algebraic relationships.</p> <p><b>3.4</b> 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:</p> <p>(A) <u>solve with fluency</u> one-step and two-step problems involving addition and subtraction within 1,000 using strategies based on place value, properties of operations, and the relationship between addition and subtraction;</p> <p>(B) <u>round</u> to the nearest 10 or 100 or <u>use</u> compatible numbers, to estimate solutions to addition and subtraction problems;</p> <p>(D) <u>determine</u> the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10;</p> <p>(E) <u>represent</u> multiplication facts by using a variety of approaches such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line, and skip counting;</p> <p>(F) <u>recall</u> facts to multiply up to 10 by 10 with automaticity and <u>recall</u> the corresponding division facts;</p> <p>(G) <u>use</u> strategies and algorithms, including the standard algorithm, to <u>multiply</u> a two-digit number by a one-</p>	<p>The student will demonstrate an understanding of how to represent and apply geometry and measurement concepts.</p> <p><b>3.6</b> 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:</p> <p>(A) <u>classify and sort</u> two- and three-dimensional solids, including cones, cylinders, spheres, triangular and rectangular prisms, and cubes, based on attributes using formal geometric language;</p> <p>(B) <u>use</u> attributes <u>to recognize</u> rhombuses, parallelograms, trapezoids, rectangles, and squares as examples of quadrilaterals and draw examples of quadrilaterals that do not belong to any of these subcategories;</p> <p>(C) <u>determine</u> the area of rectangles with whole number side lengths in problems <u>using</u> multiplication related to the number of rows times the number of unit squares in each row;</p>	<p>The student will demonstrate an understanding of how to represent and analyze data and how to describe and apply personal financial concepts.</p> <p><b>3.4</b> 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:</p> <p>(C) <u>determine</u> the value of a collection of coins and bills;</p> <p><b>3.8</b> The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:</p> <p>(A) <u>summarize</u> a data set with multiple categories <u>using</u> a frequency table, dot plot, pictograph, or bar graph with scaled intervals; and</p> <p>(B) <u>solve</u> one- and two-step problems <u>using</u> categorical</p>

<p>including symbols, diagrams, graphs, and language as appropriate;</p> <p>(E) <i>create and use</i> representations to organize, record, and communicate mathematical ideas;</p> <p>(F) <i>analyze</i> mathematical relationships to connect and communicate mathematical ideas; and</p> <p>(G) <i>display, explain, and justify</i> mathematical ideas and arguments <i>using</i> precise mathematical language in written or oral communication.</p>	<p>(C) <i>explain</i> that the unit fraction <math>1/b</math> represents the quantity formed by one part of a whole that has been partitioned into <math>b</math> equal parts where <math>b</math> is a non-zero whole number;</p> <p>(D) <i>compose and decompose</i> a fraction <math>a/b</math> with a numerator greater than zero and less than or equal to <math>b</math> as a sum of parts <math>1/b</math>;</p> <p>(E) <i>solve</i> problems involving partitioning an object or a set of objects among two or more recipients using pictorial representations of fractions with denominators of 2, 3, 4, 6, and 8;</p> <p>(F) <i>represent</i> equivalent fractions with denominators of 2, 3, 4, 6, and 8 using a variety of objects and pictorial models, including number lines;</p> <p>(G) <i>explain</i> that two fractions are equivalent if and only if they are both represented by the same point on the number line or represent the same portion of a same size whole for an area model; and</p> <p>(H) <i>compare</i> two fractions having the same numerator or denominator in problems by reasoning about their sizes and <i>justifying</i> the conclusion using symbols, words, objects, and pictorial models.</p> <p><b>3.4</b> 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:</p> <p>(I) <i>determine</i> if a number is even or odd using divisibility rules;</p> <p><b>3.7</b> The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving customary and metric measurement. The student is expected to:</p>	<p>digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties;</p> <p>(H) <i>determine</i> the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally;</p> <p>(J) <i>determine</i> a quotient using the relationship between multiplication and division; and</p> <p>(K) <i>solve one-step and two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recall of facts.</i></p> <p><b>3.5</b> The student applies mathematical process standards to analyze and create patterns and relationships. The student is expected to:</p> <p>(A) <i>represent</i> one- and two-step problems involving addition and subtraction of whole numbers to 1,000 using pictorial models, number lines, and equations;</p> <p>(B) <i>represent and solve</i> one- and two-step multiplication and division problems within 100 using arrays, strip diagrams, and equations;</p> <p>(C) <i>describe</i> a multiplication expression as a comparison such as <math>3 \times 24</math> represents 3 times as much as 24;</p> <p>(D) <i>determine</i> the unknown whole number in a multiplication or division equation relating three whole numbers</p>	<p>(D) <i>decompose</i> composite figures formed by rectangles into non-overlapping rectangles to determine the area of the original figure <i>using</i> the additive property of area; and</p> <p>(E) <i>decompose</i> two congruent two-dimensional figures into parts with equal areas and <i>express</i> 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.</p> <p><b>3.7</b> The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving customary and metric measurement. The student is expected to:</p> <p>(B) <i>determine</i> the perimeter of a polygon or a missing length when given perimeter and remaining side lengths in problems;</p> <p>(C) <i>determine</i> the solutions to problems involving addition and subtraction of time intervals in minutes <i>using</i> pictorial models or tools such as a 15-minute event plus a 30-minute event equals 45 minutes;</p> <p>(D) <i>determine</i> when it is appropriate to use measurements of liquid</p>	<p>data represented with a frequency table, dot plot, pictograph, or bar graph with scaled intervals.</p> <p><b>3.9</b> The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:</p> <p>(A) <i>explain</i> the connection between human capital/labor and income;</p> <p>(B) <i>describe</i> the relationship between the availability or scarcity of resources and how that impacts cost;</p> <p>(C) <i>identify</i> the costs and benefits of planned and unplanned spending decisions;</p> <p>(D) <i>explain</i> that credit is used when wants or needs exceed the ability to pay and that it is the borrower's responsibility to pay it back to the lender, usually with interest;</p> <p>(E) <i>list</i> reasons to save and explain the benefit of a savings plan, including for college; and</p> <p>(F) <i>identify</i> decisions involving income, spending, saving, credit, and charitable giving.</p>
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	(A) <i>represent</i> fractions of halves, fourths, and eighths as distances from zero on a number line.	when the unknown is either a missing factor or product; and  (E) <i>represent</i> real-world relationships using number pairs in a table and verbal descriptions.	volume (capacity) or weight; and  (E) <i>determine</i> liquid volume (capacity) or weight using appropriate units and tools.	
<b>Mathematical Process Standards</b>	<b>Reporting Category 1:</b> Numerical Representations and Relationships	<b>Reporting Category 2:</b> Computations and Algebraic Reasoning	<b>Reporting Category 3:</b> Geometry and Measurement	<b>Reporting Category 4:</b> Data Analysis and Personal Financial Literacy
These student expectations will NOT be listed under a separate reporting category. Instead, they will be incorporated into test questions across reporting categories since the application of mathematical process standards is part of each knowledge statement.	<b>Readiness Standards 4</b>	<b>Readiness Standards 5</b>	<b>Readiness Standards 3</b>	<b>Readiness Standards 1</b>
	<b>Supporting Standards 10</b>	<b>Supporting Standards 9</b>	<b>Supporting Standards 6</b>	<b>Supporting Standards 6</b>
	<b>Total Assessment Questions 7-9</b>	<b>Total Assessment Questions 11-13</b>	<b>Total Assessment Questions 5-7</b>	<b>Total Assessment Questions 3-5</b>
	<b>Number of Points 10-12</b>	<b>Number of Points 13-17</b>	<b>Number of Points 6-10</b>	<b>Number of Points 3-6</b>
<b>ITEM TYPES BY POINT</b>	<b>1-point questions (multiple choice and non-multiple choice)</b>		<b>23 questions</b>	<b>23 points</b>
	<b>2-point questions (non-multiple choice)</b>		<b>7 questions</b>	<b>14 points</b>
	<b>TOTAL</b>		<b>30 questions</b>	<b>37 points</b>

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