Mathematics TEKS
SUPPORTING INFORMATION

KINDERGARTEN

Texas Education Agency

TEKS	Supporting Information
(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.	The definition of a well-balanced mathematics curriculum has expanded to include the Texas College and Career Readiness Standards (CCRS). A focus on mathematical fluency and solid understanding allows for rich exploration of the primary focal points.
(a) Introduction. (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.	This paragraph occurs second in the TEKS to highlight the continued emphasis on process skills that are now included from kindergarten through high school mathematics. This introductory paragraph includes generalization and abstraction with the text from (1)(C). This introductory paragraph includes computer programs with the text from 1(D). This introductory paragraph states, “Students will use mathematical relationships to generate solutions and make connections and predictions.” instead of incorporating the text from (1)(E).
(a) Introduction. (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 Kindergarten are expected to perform their work without the use of calculators.	The TEKS include the use of the words “automaticity,” “fluency”/”fluently,” and “proficiency” with references to standard algorithms. Attention is being given to these descriptors to indicate benchmark levels of skill to inform intervention efforts at each grade level. These benchmark levels are aligned to national recommendations for the development of algebra readiness for enrollment in Algebra I. Automaticity refers to the rapid recall of facts and vocabulary. For example, we would expect a third-grade student to recall rapidly the sum of 5 and 3 or to identify rapidly a closed figure with 3 sides and 3 angles. To be mathematically proficient, students must develop conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition (National Research Council, 2001, p. 116). “Procedural fluency refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently” (National Research Council, 2001, p. 121). “Students need to see that procedures can be developed that will solve entire classes of problems, not just individual problems” (National Research Council, 2001, p. 121). Procedural fluency and conceptual understanding weave together to develop mathematical proficiency.

(a) Introduction. (4) The primary focal areas in Kindergarten are understanding counting and cardinality, understanding addition as joining and subtraction as separating, and comparing objects by measurable attributes. (A) Students develop number and operations through several fundamental concepts. Students know number names and the counting sequence. Counting and cardinality lay a solid foundation for number. Students apply the principles of counting to make the connection between numbers and quantities. (B) Students use meanings of numbers to create strategies for solving problems and responding to practical situations involving addition and subtraction. (C) Students identify characteristics of objects that can be measured and directly compare objects according to these measureable attributes.	This paragraph highlights more specifics about kindergarten mathematics content and follows paragraphs about the mathematical process standards and mathematical fluency. This supports the notion that the TEKS should be learned in a way that integrates the mathematical process standards in an effort to develop fluency. This paragraph has been updated to align to the kindergarten mathematics TEKS. This paragraph highlights focal areas or topics that receive emphasis in this grade level. These are different from focal points which are part of the *Texas Response to Curriculum Focal Points [TXRCFP]*. "[A] curriculum focal point is not a single TEKS statement; a curriculum focal point is a mathematical idea or theme that is developed through appropriate arrangements of TEKS statements at that grade level that lead into a connected grouping of TEKS at the next grade level" (TEA, 2010, p. 5). The focal areas are found within the focal points. The focal points may represent a subset of a focal area, or a focal area may represent a subset of a focal point. The focal points within the *TXRCFP* list related grade level TEKS.
(a) Introduction. (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.	The State Board approved the retention of some "such as" statements within the TEKS where needed for clarification of content. The phrases "including" and "such as" should not be considered as limiting factors for the student expectations (SEs) in which they reside.

Additional Resources are available online including

- Interactive Mathematics Glossary
- Vertical Alignment Charts
- Texas Response to the Curriculum Focal Points, Revised 2013
- Texas Mathematics Resource Page

TEKS: Mathematical Process Standards.	Supporting Information
K(1)(A) **Mathematical process standards.** The student uses mathematical processes to acquire and demonstrate mathematical understanding. **The student is expected to apply mathematics to problems arising in everyday life, society, and the workplace.**	This SE emphasizes application. The opportunities for application have been consolidated into three areas: everyday life, society, and the workplace. This SE, when paired with a content SE, allows for increased rigor through connections outside the discipline.
K(1)(B) **Mathematical process standards.** The student uses mathematical processes to acquire and demonstrate mathematical understanding. **The student is expected to 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.**	This SE describes the traditional problem-solving process used in mathematics and science. Students are expected to use this process in a grade appropriate manner when solving problems that can be considered difficult relative to mathematical maturity.
K(1)(C) **Mathematical process standards.** The student uses mathematical processes to acquire and demonstrate mathematical understanding. **The student is expected to 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.**	The phrase "as appropriate" is included in the TEKS. This implies that students are assessing which tool(s) to apply rather than trying only one or all accessible tools. "Paper and pencil" is now included in the list of tools that still includes real objects, manipulatives, and technology.
K(1)(D) **Mathematical process standards.** The student uses mathematical processes to acquire and demonstrate mathematical understanding. **The student is expected to communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.**	Communication includes reasoning and the implications of mathematical ideas and reasoning. The list of representations is summarized with "multiple representations" with specificity added for symbols, graphs, and diagrams.
K(1)(E) **Mathematical process standards.** The student uses mathematical processes to acquire and demonstrate mathematical understanding. **The student is expected to create and use representations to organize, record, and communicate mathematical ideas.**	The use of representations includes organizing and recording mathematical ideas in addition to communicating ideas. As students use and create representations, it is implied that they will evaluate the effectiveness of their representations to ensure that they are communicating mathematical ideas clearly. Students are expected to use appropriate mathematical vocabulary and phrasing when communicating mathematical ideas.
K(1)(F) **Mathematical process standards.** The student uses mathematical processes to acquire and demonstrate mathematical understanding. **The student is expected to analyze mathematical relationships to connect and communicate mathematical ideas.**	The TEKS allow for additional means to analyze relationships and to form connections with mathematical ideas past forming conjectures about generalizations and sets of examples and non-examples. Students are expected to form conjectures based on patterns or sets of examples and non-examples.
K(1)(G) **Mathematical process standards.** The student uses mathematical processes to acquire and demonstrate mathematical understanding. **The student is expected to display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.**	The TEKS expect students to validate their conclusions with displays, explanations, and justifications. The conclusions should focus on mathematical ideas and arguments. Displays could include diagrams, visual aids, written work, etc. The intention is to make one's work visible to others so that explanations and justifications may be shared in written or oral form. Precise mathematical language is expected. For example, students would use "vertex" instead of "corner" when referring to the point at which two edges intersect on a polygon.

TEKS: Mathematical Process Standards.	Supporting Information
K(2)(A) **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 count forward and backward to at least 20 with and without objects.**	Students are expected to count by ones, starting at any number with and without objects. Students are expected to count backward with and without objects.
K(2)(B) **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 read, write, and represent whole numbers from 0 to at least 20 with and without objects or pictures.**	The student is expected to read and write the numbers as numerals with emphasis on place-value rather than numeral directionality.
K(2)(C) **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 count a set of objects up to at least 20 and demonstrate that the last number said tells the number of objects in the set regardless of their arrangement or order.**	Students are expected to form connections between counting with a set of objects and the number that describes a set of objects. Once the student has determined the number of objects in the set, he or she must understand that if the objects are simply rearranged, the quantity does not change.
K(2)(D) **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 recognize instantly the quantity of a small group of objects in organized and random arrangements.**	Organized arrangements include ten frames and the arrangements of dots on random number generators, which may be computer based, number cubes, dominoes or some other tool. The number of items in a group should be ten or fewer. This SE builds to 1(2)(A), where students use this understanding to quickly decompose sets and make connections to basic facts. This SE can be considered the definition of subitizing. Students are not expected to know this term.
K(2)(E) **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 generate a set using concrete and pictorial models that represents a number that is more than, less than, and equal to a given number up to 20.**	This SE introduces students to the concepts of both equality and inequality, without the symbols. It also lays the foundation for the work students will do when solving both equations and inequalities. For example, when given a number such as 18, the student may be expected to use objects or pictures to create a set that is more than 18, less than 18, or equal to 18. This SE builds to K(2)(F), where students generate a number without models.
K(2)(F) **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 generate a number that is one more than or one less than another number up to at least 20.**	This SE allows students to apply their understandings from K(2)(E) to generate a number without the use of models. This SE builds to 1(2)(D) and 2(2)(C), where students are expected to generate a number that is more than or less than a given whole number up to 120 for grade 1 and up to 1,200 for grade 2.
K(2)(G) **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 compare sets of objects up to at least 20 in each set using comparative language.**	Students may be expected to compare two or more sets using comparative language including "more than," "same number as," and "two less than." This SE builds to K(2)(H).
K(2)(H) **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 use comparative language to describe two numbers up to 20 presented as written numerals.**	This SE builds upon K(2)(G) and builds to 1(2)(E). However, students are only asked to compare two numbers using comparative language including "more than," "greater than," "less than," or "equal to."

TEKS: Number and Operations.	Supporting Information
K(2)(I) **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 compose and decompose numbers up to 10 with objects and pictures.**	This SE provides groundwork for making ten, compatible numbers, and factoring. It also leads to the concept of subtraction in a more abstract form. For example, the objects or pictures may be arranged to show a group of 8 and a group of 2 to make 10. A student may also compose and decompose in a variety of ways such as making a group of 5 and another group of 5 or by making a group of 2, a group of 3, and a group of 5 to make 10. This SE builds to 1(2)(B).

TEKS: Number and Operations.	Supporting Information
K(3)(A) **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 model the action of joining to represent addition and the action of separating to represent subtraction.**	This SE focuses on the action of joining and separating in which the result is unknown. Therefore, addition would be the more appropriate operation to solve a joining problem, and subtraction would be the more appropriate operation to solve the separation problem.
K(3)(B) **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 solve word problems using objects and drawings to find sums up to 10 and differences within 10.**	Word problem structures include joining and separating with the result unknown, and part-part-whole relationships. Students are not expected to know this terminology. When paired with K(1)(A), students may use objects and drawings to solve problems related to real-world situations.
K(3)(C) **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 explain the strategies used to solve problems involving adding and subtracting within 10 using spoken words, concrete and pictorial models, and number sentences.**	By pairing this SE with K(1)(E), students can be expected to explain and record observations which may include strategies. Students are expected to explain their thinking using spoken words, pictorial models, and number sentences. Word problem structures include joining, separating with the result unknown, and part-part-whole relationships. In this way, this SE extends K(3)(A) and can be extended using K(8)(C). Students, however, are not expected to know this terminology.

TEKS: Number and Operations.	Supporting Information
K(4) **Number and operations.** The student applies mathematical process standards to identify coins in order to recognize the need for monetary transactions. **The student is expected to identify U.S. coins by name, including pennies, nickels, dimes, and quarters.**	This SE builds to 1(4)(A), where students are expected to describe the relationship among these coins, 1(4)(B), where students are expected to write a number with the cent symbol to describe the value of the coin, and 1(4)(C), where students may determine the value of a collection of pennies, nickels, and/or dimes.

TEKS: Algebraic Reasoning.	Supporting Information
K(5) **Algebraic reasoning.** The student applies mathematical process standards to identify the pattern in the number word list. **The student is expected to recite numbers up to at least 100 by ones and tens beginning with any given number.**	Reciting numbers should be developed through counting so that students have meaning behind the recitation. This recitation builds automaticity when counting by ones or by tens. The given number, when reciting by tens, should be a multiple of ten (50, 60, 70 . . .). This builds to 1(5)(A), where students recite numbers forwards and backwards from any given number.

TEKS: Geometry and Measurement.	Supporting Information
K(6)(A) **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 identify two-dimensional shapes, including circles, triangles, rectangles, and squares as special rectangles.**	This SE pairs with K(6)(D). Students identify two-dimensional shapes based on attributes using informal and formal language such as the number of sides or the number of corners (vertices). When paired with revised SE K(1)(D), K(1)(F), and K(1)(G), students may be expected to describe and compare the identified figures to justify their identifications.
K(6)(B) **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 identify three-dimensional solids, including cylinders, cones, spheres, and cubes, in the real world.**	Students identify three-dimensional solids based on attributes using informal and formal language such as curved, flat, surface, corners (vertices), edges, and faces.
K(6)(C) **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 identify two-dimensional components of three-dimensional objects.**	To align with this SE, the two-dimensional components include circles, triangles, rectangles, and squares. For example, the face of a tissue box is a rectangle.
K(6)(D) **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 identify attributes of two-dimensional shapes using informal and formal geometric language interchangeably.**	Students are expected to use formal geometric language such as “vertex” or “vertices” for corners and “side” to identify circles, triangles, rectangles, and squares.
K(6)(E) **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 classify and sort a variety of regular and irregular two- and three-dimensional figures regardless of orientation or size.**	A variety of regular and irregular two-dimensional figures may include a regular hexagon and a hexagon where all sides are not the same. This SE builds to 1(6)(A), where classifying and sorting is based upon attributes.  Orientation and size should not be attributes which students use to sort and classify figures as these are not related to attributes of 2-d and 3-d figures. Comparing two objects based on their attributes is included within the sorting of a variety of figures. For example, students may sort a collection of 2-d and 3-d figures based on dimension. They might compare a triangle and a triangular pyramid while sorting.
K(6)(F) **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 create two-dimensional shapes using a variety of materials and drawings.**	Students may create two-dimensional figures by using materials, sketching figures, cutting figures out of paper, etc. This SE builds to 1(6)(C), where students are expected to create two-dimensional figures and 1(6)(F), where students are expected to compose two-dimensional shapes.

TEKS: Geometry and Measurement.	Supporting Information
K(7)(A) **Geometry and measurement.** The student applies mathematical process standards to directly compare measurable attributes. **The student is expected to give an example of a measurable attribute of a given object, including length, capacity, and weight.**	While students may give many examples of measurable attributes, the concepts of length, capacity, and weight build to measurement in later grades.
K(7)(B) **Geometry and measurement.** The student applies mathematical process standards to directly compare measurable attributes. **The student is expected to compare two objects with a common measurable attribute to see which object has more of/less of the attribute and describe the difference.**	Common measurable attributes include length. To describe a difference in length, students may use language such as "longer," "shorter," or "the same." Common measurable attributes include capacity. To describe a difference in capacity, students may use language such as "holds more," "holds less," or "holds the same." Common measurable attributes include weight. To describe a difference in weight, students may use language such as "heavier than," "lighter than," or "equal to."

TEKS: Data Analysis.	Supporting Information
K(8)(A) **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 collect, sort, and organize data into two or three categories.**	The data collection takes place in response to a question. The data collected is to be sorted into two or three categories. For example, two categories may be vehicles with wheels and vehicles without wheels. A three category example may include things that are best placed on the floor, wall, or ceiling. This SE builds to 1(8)(A), where students are expected to organize data using T-charts and tally marks. When paired with K(8)(B), the student is expected to use the organized data to create real-object or picture graphs.
K(8)(B) **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 use data to create real-object and picture graphs.**	The real-object graphs and picture graphs build to 1(8)(B), where students use data to create picture and bar-type graphs. Arrangements of objects and pictures should be linear. The limitations of two or three categories found in K(8)(A) apply to this SE.
K(8)(C) **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 draw conclusions from real-object and picture graphs.**	Students should draw conclusions related to the question that led to data collection. Students may also draw conclusions about the data related to number concepts and operations in the Number and Operations strand for kindergarten.

TEKS: Personal Financial Literacy.	Supporting Information
K(9)(A) **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 identify ways to earn income.**	Ways to earn income may include selling things, jobs, or chores but are not restricted to this list. This SE builds to 1(9)(A), where money earned is defined as income.
K(9)(B) **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 differentiate between money received as income and money received as gifts.**	Ways to receive income may include selling things, jobs, or chores but are not restricted to this list. This SE builds to 1(9)(A) and 1(9)(B), where money earned is defined as income and income is identified as a means to obtain goods or services.
K(9)(C) **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 list simple skills required for jobs.**	Jobs describe work that is completed for the purpose of receiving income. This SE builds to 3(9)(A) and 6(14)(H), where students explain the connection between human capital/labor and income, and compare the annual salaries of several occupations requiring different levels of education, respectively.
K(9)(D) **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 distinguish between wants and needs and identify income as a source to meet one's wants and needs.**	Wants and needs may vary with region and culture, but should be relevant to the students. This SE can build to 1(9)(D) or 2(11)(B), where students are to consider charitable giving and explain that saving is an alternative to spending, respectively.