Mathematics TEKS

SUPPORTING INFORMATION

GRADE 3

Texas Education Agency

For information contact

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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 Grade 3 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 + 3 or to identify rapidly a closed figure with 3 sides and 3 vertices. 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 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.	This paragraph highlights more specifics about grade 3 mathematics content and follows paragraphs about the mathematical process standards and mathematical fluency. This supports the notion that the TEKS are expected to be learned in a way that integrates the mathematical process standards to develop fluency. The 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 of Education 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

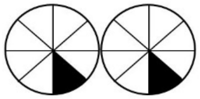
- Interactive Mathematics Glossary
- Vertical Alignment Charts
- Texas Response to the Curriculum Focal Points, Revised 2013
- Texas Mathematics Resource Page

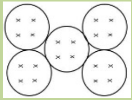
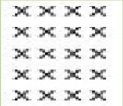
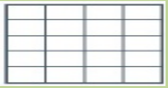
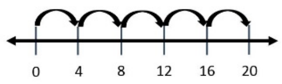
TEKS: Mathematical Process Standards.	Supporting Information
3(1)(A) **Mathematical process standards** The student uses mathematical processes to acquire and demonstrate mathematical understanding. **The student is expected to apply mathematics to problems arising in everyday life, society, and the 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.
3(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.
3(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 included in the list of tools that still includes real objects, manipulatives, and technology.
3(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.
3(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.
3(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.
3(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: Number and Operations.	Supporting Information
3(2)(A) **Number and operations.** The student applies mathematical process standards to represent and compare whole numbers and understand relationships related to place value. **The student is expected to compose and decompose 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.**	This SE builds on 2(2)(A), where students are expected to use concrete and pictorial models to compose and decompose numbers up to 1,200 in more than one way and builds to 4(2)(B), where students are expected to represent the value of the digit in whole numbers through 1,000,000,000 and decimals to the hundredths. Composing and decomposing whole numbers may focus on place value such as the relationship between standard notation and expanded notation. The number 789 may be decomposed into the sum of 500, 200, 50, 30, and 9 to prepare for work with compatible numbers when adding whole numbers with fluency. Please note: Expanded notation for 12,905 is (1 × 10,000) + (2 × 1,000) + (9 × 100) + (5 × 1), while expanded form is 10,000 + 2,000 + 900 + 5. Decomposition of whole numbers does not involve carrying digits to the next place holder. Each addend of the decomposition should only have one non-zero digit. For example, 789 may not be decomposed into the sum of 600, 90, 90, and 9 or the sum of 600, 180 and 9.
3(2)(B) **Number and operations.** The student applies mathematical process standards to represent and compare whole numbers and understand relationships related to place value. **The student is expected to describe the mathematical relationships found in the base-10 place value system through the hundred thousands place.**	The mathematical relationships include interpreting the value of each place-value position as ten times the position to the right. For example, 3,000 is 10 times 300 or 100,000 is 100 times 1,000. This SE builds to 4(2)(A), where students are expected to interpret the value of each place-value position as 10 times the position to its right and as one tenth the value of the place to its left.
3(2)(C) **Number and operations.** The student applies mathematical process standards to represent and compare whole numbers and understand relationships related to place value. **The student is expected to represent 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.**	This builds on number line understandings from grade 2 with 2(2)(E), where students are expected to locate the position of a given whole number on an open number line, and 2(2)(F), where students are expected to name the whole number that corresponds to a specific point on a number line and builds to 4(2)(H), where students are expected to determine the corresponding decimal to the tenths or hundredths place of a specified point on a number line. Words may include phrases such as "closer to," "is about," or "is nearly." For example, 18,352 is between 10,000 and 20,000 on the number line. 18,352 is closer to 20,000.
3(2)(D) **Number and operations.** The student applies mathematical process standards to represent and compare whole numbers and understand relationships related to place value. **The student is expected to compare and order whole numbers up to 100,000 and represent comparisons using the symbols >, <, or =.**	This SE builds on 2(2)(D), where students are expected to use place value to compare and order whole numbers up to 1,200 using comparative language, numbers, and symbols and builds to 4(2)(C), where students are expected to compare and order whole numbers to 1,000,000,000 and represent comparisons using the symbols >, <, or =.

TEKS: Number and Operations.	Supporting Information
3(3)(A) **Number and operations.** The student applies mathematical process standards to represent and explain fractional units. **The student is expected to represent fractions greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 using concrete objects and pictorial models, including strip diagrams and number lines.**	The denominators may be 2, 3, 4, 6, or 8. The limitation of denominators in this SE does not limit denominators of other SEs. Concrete models may include linear models to build to the use of strip diagrams and number lines.
3(3)(B) **Number and operations.** The student applies mathematical process standards to represent and explain fractional units. **The student is expected to determine 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.**	The limitations placed on denominators in this SE do not limit the denominators in other SEs. The focus of this SE is on the part to whole representations using tick marks on a number line.
3(3)(C) **Number and operations.** The student applies mathematical process standards to represent and explain fractional units. **The student is expected to explain that the unit fraction 1/*b* represents the quantity formed by one part of a whole that has been partitioned into *b* equal parts where *b* is a non-zero whole number.**	This SE focuses on unit fractions. Fractions may have denominators of 2, 3, 4, 6, or 8 and are not limited to these values. Students are expected to describe or explain the fraction 1/*b*. For example, 1/4 is the quantity formed by one part of a whole that has been partitioned, or divided, into 4 equal parts. A fraction may be part of a whole object or part of a whole set of objects.
3(3)(D) **Number and operations.** The student applies mathematical process standards to represent and explain fractional units. **The student is expected to compose and decompose a fraction *a/b* with a numerator greater than zero and less than or equal to *b* as a sum of parts 1/*b*.**	This SE focuses on non-unit fractions greater than zero and less than or equivalent to one. Students may be expected to describe fractional parts of whole objects. Students are expected to compose and decompose fractions. For example, 3/5 = 1/5 + 1/5 + 1/5. Fractions may have denominators of 2, 3, 4, 6, or 8 and are not limited to these values. A fraction may be part of a whole object or part of a set of objects to build to 3(3)(E). This SE builds to 4(3)(A), where students represent a fraction *a*/*b* as a sum of fractions 1/*b*, where *a* and *b* are whole numbers and *b* > 0, including when *a* > *b*.
3(3)(E) **Number and operations** The student applies mathematical process standards to represent and explain fractional units. **The student is expected to solve 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.**	This SE focuses on solving problems with fractional parts of whole objects or sets of objects. Fractions should have denominators of 2, 3, 4, 6, or 8. The limitation of denominators in this SE does not limit denominators of other SEs. A fraction may be a part of a whole object or part of a whole set of objects. Fractions are not limited to being between 0 and 1. In this way, the SE is an extension of 2(3)(C), where students are expected to count beyond one whole. Examples of problems include situations such as 2 children sharing 5 cookies.

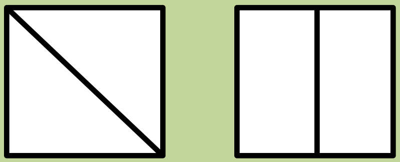
TEKS: Number and Operations.	Supporting Information
3(3)(F) **Number and operations.** The student applies mathematical process standards to represent and explain fractional units. **The student is expected to represent equivalent fractions with denominators of 2, 3, 4, 6, and 8 using a variety of objects and pictorial models, including number lines.**	Fractions are greater than zero and less than or equal to one. The limitation of denominators in this SE does not limit denominators of other SEs.
3(3)(G) **Number and operations.** The student applies mathematical process standards to represent and explain fractional units. **The student is expected to explain 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.**	The emphasis with this SE is on the understanding that equivalent fractions must be describing the same whole. 6/8 does not equal 3/4 when the 6/8 is part of a candy bar and the 3/4 is part of a pizza. While they both describe 3/4 of their respective wholes, the amounts described by 6/8 and 3/4 are not the same.
3(3)(H) **Number and operations.** The student applies mathematical process standards to represent and explain fractional units. **The student is expected to compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models.**	Fractions may have denominators of 2, 3, 4, 6, or 8 and are not limited to these values. Examples include situations such as comparing the size of one piece when sharing a candy bar equally among four people or equally among three people.

TEKS: Number and Operations.	Supporting Information
3(4)(A) **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 solve with fluency 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.**	Two-step problems may include addition, subtraction, or a combination of the two. The SE specifies that the numbers to be added or subtracted must be "whole numbers within 1,000." The SE includes specific approaches to solving the one-step and two-step problems: strategies based on place value, properties of operations, and the relationship between addition and subtraction. The one-step problem prompts students to add numbers such as 237 and 547. If using strategies based on place value, a student might add the hundreds to get 700, the tens to get 70, and the ones to get 14 and then combine 700, 70, and 14 to have a sum of 784. If using a strategy based on properties of operations, a student may consider that 237 + 547 is equivalent to 237 + (500 + 47) = (237 + 500) + 47 = 737 + 47 = 784. If using a strategy based on the relationship between addition and subtraction, a student might subtract 63 from 547 and add it to 237 to have 300 and 484, which add to 784. "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, pg. 121).
3(4)(B) **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 round to the nearest 10 or 100 or use compatible numbers to estimate solutions to addition and subtraction problems.**	The choice of rounding or using compatible numbers belongs to the student.
3(4)(C) **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 determine the value of a collection of coins and bills.**	Building upon 2(5)(A) and 2(5)(B), students may be asked to record the value of a collection of coins using a cent symbol or a dollar sign with a decimal.
3(4)(D) **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 determine the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10.**	Arrays should reflect the combination of equally-sized groups of objects. An example of a group of objects might include 2 groups of pizza slices with 7 slices in each group.  When paired with 3(1)(D) or 3(1)(E), students may be expected to represent the solution using a number sentence. For example, 2 × 7 = 14.

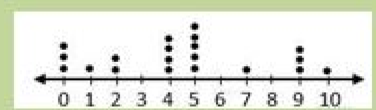
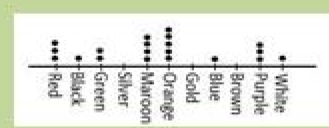
TEKS: Number and Operations.	Supporting Information
3(4)(E) **Number and operations.** The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. **The student is expected to represent 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.**	Examples of 5 × 4 using the listed strategies: Repeated Addition: 4 + 4 + 4 + 4 + 4 Equal-sized groups:  Arrays:  Area Models:  Equal jumps on a number line:  Skip counting: 4, 8, 12, 16, 20 An array is used to organize objects enabling student to link skip-counting and multiplication. There is no mathematical requirement for 5 x 4 to be modelled as 5 rows and 4 columns.
3(4)(F) **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 recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division facts.**	The level of skill with “automaticity” requires recall of basic multiplication facts up to 10 × 10 with speed and accuracy at an unconscious level. Automaticity is part of procedural fluency. As such, it should not be overly emphasized as an isolated skill. When paired with 3(1)(A), students may be asked to recall these facts when solving problems. The unknown may be determined using the relationship between multiplication and division.
3(4)(G) **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 use strategies and algorithms, including the standard algorithm, to multiply a two-digit number by a one-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties.**	Strategies and algorithms include mental math; partial products; the commutative, associative, and distributive properties; and the standard algorithm. For example, when prompted to multiply 97 x 3, a student may determine the product by multiplying 90 x 3 and 7 x 3 and adding 270 and 21 for an answer of 291. A student may also think of 97 x 3 as (100-3) x 3, multiplying 100 x 3 to get 300 and then subtracting 3 x 3 or 9 for an answer of 291.
3(4)(H) **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 determine 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.**	Students are expected to think with both forms of division: partitioning into equal shares (determining the number of groups with a given number of objects in each group) and sharing equally (determining the number of items in each group when the objects are shared equally among a given number). When paired with 3(1)(D) and 3(1)(E), students may be asked to use number sentences to record the solutions.
3(4)(I) **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 determine if a number is even or odd using divisibility rules.**	To determine if a number is even, one may apply the divisibility rule for 2: A number is divisible by 2 if the ones digit is even (0, 2, 4, 6, or 8). This SE builds on 2(7)(A) where students determine whether a number up to 40 is even or odd using pairings of objects to represent the number.
3(4)(J) **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 determine a quotient using the relationship between multiplication and division.**	The identification of the relationship between multiplication and division lays the foundation for determining a quotient based on this relationship. For example, the quotient of 40 ÷ 8 can be found by determining what factor makes 40 when multiplied by 8.

TEKS: Number and Operations.	Supporting Information
3(4)(K) **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 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.**	This SE builds to 3(5)(B). The focus of 3(4)(K) is on developing number-based strategies to solve multiplication and division problems within 100. This may include multiplying a two-digit number by a one-digit number. As this SE lists "properties of operations" and "recall of facts" as potential strategies, a model is not necessarily required. The product and dividend may be less 100, but no operand (i.e. factor, divisor, or quotient) is limited to the multiplication/division facts. This may include addition or subtraction, but any problem doing so should clearly indicate the order in which the operations should be performed.

TEKS: Algebraic Reasoning.	Supporting Information
3(5)(A) **Algebraic reasoning.** The student applies mathematical process standards to analyze and create patterns and relationships. **The student is expected to represent one- and two-step problems involving addition and subtraction of whole numbers to 1,000 using pictorial models, number lines, and equations.**	The SE includes the use of number lines and equations to represent the problems.
3(5)(B) **Algebraic reasoning.** The student applies mathematical process standards to analyze and create patterns and relationships. **The student is expected to represent and solve one- and two-step multiplication and division problems within 100 using arrays, strip diagrams, and equations.**	This SE is an extension of 3(4)(K). The focus of 3(5)(B) is on developing representations that build to numeric equations for multiplication and division situations by connecting arrays to strip diagrams.
3(5)(C) **Algebraic reasoning.** The student applies mathematical process standards to analyze and create patterns and relationships. **The student is expected to describe a multiplication expression as a comparison such as 3 x 24 represents 3 times as much as 24.**	This SE builds on 2(6)(A) where multiplication is represented as repeated addition, 3 x 24 may be described as 3 groups of 24. The focus of this SE is on the numerical relationship between 24 and the product of 3 x 24. The product of 3 x 24 will be 3 times as much as 24. This lays the foundation for future work in grade 5 with fraction multiplication and determining part of a number.
3(5)(D) **Algebraic reasoning.** The student applies mathematical process standards to analyze and create patterns and relationships. **The student is expected to 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.**	If the multiplication or division equation relates to multiplication facts up to 10 x 10, students may apply their knowledge of facts and the relationship between multiplication and division to determine the unknown number. Students may be expected to use the relationship between multiplication and division for a problem such as 12 = [] ÷ 6. The student knows that if 12 = [] ÷ 6, then 12 x 6= [], so [] = 72. Students may also be expected to solve problems where they state that the value 4 makes 3 x [] = 12 a true equation.
3(5)(E) **Algebraic reasoning.** The student applies mathematical process standards to analyze and create patterns and relationships. **The student is expected to represent real-world relationships using number pairs in a table and verbal descriptions.**	When paired with 3(1)(A), the expectation is that students apply this skill in a problem arising in everyday life, society, and the workplace. When paired with 3(1)(D), the expectation is that students extend the relationship represented in a table to explore and communicate the implications of the relationship. This SE builds to 4(5)(B) where students represent problems using an input-output table and numerical expressions to generate a number pattern that follows a given rule representing the relationship of the values in the resulting sequence and their position in the sequence. Real-world relationships include situations such as the following: 1 insect has 6 legs, 2 insects have 12 legs, 3 insects have 18 legs, 4 insects have 24 legs, etc.

TEKS: Geometry and Measurement.	Supporting Information
3(6)(A) **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 classify and sort two- and three-dimensional figures, including cones, cylinders, spheres, triangular and rectangular prisms, and cubes, based on attributes using formal geometric language.**	Formal geometric language includes terms such as "base," "vertex," "edge," and "face." Figures may be classified by either attributes or their names. Scalene, Isosceles, and equilateral triangles may be included here or left to grade 4 [4(6)(D)]. Pyramids and other forms of prisms may also be included.
3(6)(B) **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 use attributes to recognize rhombuses, parallelograms, trapezoids, rectangles, and squares as examples of quadrilaterals and draw examples of quadrilaterals that do not belong to any of these subcategories.**	This SE includes the identification or recognition of quadrilaterals as a subcategory of 2-D figures. This SE builds on 2(8)(C) where students were expected to classify and sort polygons. Parallel may be defined with this student expectation or may be left to grade 4 [4(6)(A) and (D)]. Similarly, right angles may be formally defined here or left to grade 4 [4(6)(C)]. Additionally, the symbols for parallel (||), perpendicular (⊥), angle (∠), and right angle may be introduced here or left to grade 4 [4(6)(A), (C), and (D)].
3(6)(C) **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 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.**	The SE limits the two-dimensional surfaces to rectangles with whole-number side lengths. Students may use concrete or pictorial models of square units to represent the number of rows and the number of unit squares in each row. Units of area may be square inches, square centimeters, square feet, square meters, etc. To build on 2(9)(F), students may be expected to use multiplication to determine the area of a rectangle instead of counting squares.
3(6)(D) **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 decompose composite figures formed by rectangles into non-overlapping rectangles to determine the area of the original figure using the additive property of area.**	Composite figures should be comprised of rectangles, including squares as special cases of rectangles.
3(6)(E) **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 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.**	Students may be expected to separate two congruent squares in half in two different ways.  Students may be expected to identify that the smaller parts represent one half of each of the original squares even though the halves from one square are not congruent to the halves in the other square.

TEKS: Geometry and Measurement.	Supporting Information
3(7)(A) **Geometry and measurement.** 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 represent fractions of halves, fourths, and eighths as distances from zero on a number line**.	The focus of this SE is on the length of the portion of a number between 0 and the location of the point. This SE builds to 4(3)(G) where any fraction or decimals to tenths or hundredths may be represented as distances from zero on a number line. This SE extends 2(3)(C), where students use words and concrete models to count fractional parts beyond one whole and recognize how many parts it takes to equal one whole, including fractions greater than one.
3(7)(B) **Geometry and measurement.** 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 determine the perimeter of a polygon or a missing length when given perimeter and remaining side lengths in problems.**	For example, students may measure the side lengths of a polygon to determine its perimeter using inches or centimeters. Side lengths should be whole numbers. Students may also be expected to determine a missing side length of a polygon when given the perimeter of the polygon and the remaining side lengths.
3(7)(C) **Geometry and measurement.** 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 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.**	When paired with 3(1)(C), students may be asked to use tools such as analog and digital clocks to solve problems related to the addition and subtraction of intervals of time in minutes. This SE builds to 4(8)(C), where students solve problems that deal with measurements of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate. Problems may include a start time with an interval or end time with an interval. Intervals may be less than or greater than 1 hour. For example, "Gia has practiced soccer for the last 45 minutes. She will practice for another half hour before going inside. How long will Gia practice?" As a second example, "Larry starts studying at 5:30 each day and studies for 45 minutes. When does Larry stop?" Problems may not include a start time and an end time as elapsed time is addressed in 4(8)(C).
3(7)(D) **Geometry and measurement.** 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 determine when it is appropriate to use measurements of liquid volume (capacity) or weight.**	In addition to metric units, students are expected to distinguish between liquid ounces and ounces that measure weight. The metric units for mass (kilograms and grams) are not included in this SE as mass is not the same as weight (pounds and ounces).
3(7)(E) **Geometry and measurement.** 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 determine liquid volume (capacity) or weight using appropriate units and tools.**	Students are expected to use appropriate units and tools to determine liquid volume (capacity) in the customary and metric systems. Students may measure liquid volume (capacity). Students may measure weight. Students are expected to use appropriate units and tools to determine weight in the customary system. The metric units for mass (kilograms and grams) are not included in this SE as mass is not the same as weight (pounds and ounces).

TEKS: Data Analysis.	Supporting Information
3(8)(A) **Data analysis.** The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. **The student is expected to summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals.**	A frequency table shows how often an item, a number, or a range of numbers occurs. Tally marks and counts may be used to record frequencies. Students begin work with frequency tables in grade 3. This builds upon 1(8)(A) where students collect, sort, and organize data in up to three categories using models/representations such as tally marks or T-charts. A dot plot may be used to represent frequencies. A number line may be used for counts related numbers. A line labeled with categories may be used as well if the context requires. Dots are recorded vertically above the number line to indicate frequencies. Dots may represent one count or multiple counts if so noted. 
3(8)(B) **Data analysis.** The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. **The student is expected to solve one- and two-step problems using categorical data represented with a frequency table, dot plot, pictograph, or bar graph with scaled intervals.**	Students begin work with pictographs in grade K and bar graphs in grade 1. Students begin work with frequency tables and dot plots in grade 3. This SE builds upon 2(10)(C), where students solve one-step problems with intervals of one.

TEKS: Personal Financial Literacy.	Supporting Information
3(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 explain the connection between human capital/labor and income.**	This SE relates work with income, including the relationship of both education and effort to income on the individual level and the relationship between the number of people working together and the amount of product/income created. Human capital can be on the individual level, including the skills, abilities, and characteristics in which an individual can provide benefit to his employer or the marketplace at large.
3(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 describe the relationship between the availability or scarcity of resources and how that impacts cost.**	This SE relates a fundamental rule of economics: The rarer an object is, the more expensive it tends to be. The more common an object is, the less expensive it is.
3(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 identify the costs and benefits of planned and unplanned spending decisions.**	This SE builds upon 2(11)(B), where students are expected to explain that saving is an alternative to spending.
3(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 explain 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.**	This SE builds to 4(10)(C), where students compare the advantages and disadvantages of various saving options; 5(10)(C), where students identify advantages and disadvantages of different methods of payment; and the discussion of credit in grade 6.
3(9)(E) **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 reasons to save and explain the benefit of a savings plan, including for college.**	Specificity is expected through a list of reasons to save and students being able to explain the benefits of saving. This can be used in conjunction with 3(9)(A) as saving for college may improve an individual's skills, abilities, and characteristics. Students are not expected to calculate the savings at this level.
3(9)(F) **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 decisions involving income, spending, saving, credit, and charitable giving.**	This SE builds upon 1(9)(D) where students are first asked to consider charitable giving.