Mathematics TEKS

SUPPORTING INFORMATION

GRADE 4

TEA
Texas Education Agency

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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, preceding the content descriptions. This highlights the emphasis of student use of the mathematical process standards to acquire and demonstrate mathematical understanding. This introductory paragraph includes generalization and abstraction in the text from (1)(B). This introductory paragraph includes computer programs in the text from (1)(C). This introductory paragraph states, “Students will use mathematical relationships to generate solutions and make connections and predictions,” instead of 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 4 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 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 4 are use of operations, fractions, and decimals and describing and analyzing geometry and measurement. 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 apply place value and represent points on a number line that correspond to a given fraction or terminating decimal. In algebraic reasoning, students will represent and solve multi-step problems involving the four operations with whole numbers with expressions and equations and generate and analyze patterns. In geometry and measurement, students will classify two-dimensional figures, measure angles, and convert units of measure. In data analysis, students will represent and interpret data.	The paragraph that highlights more specifics about grade 4 mathematics content 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
4(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.
4(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.
4(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.
4(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.
4(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.
4(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.
4(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 set the expectation for 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
4(2)(A) **Number and operations.** The student applies mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. **The student is expected to interpret the value of each place-value position as 10 times the position to the right and as one-tenth of the value of the place to its left.**	The place-value positions address whole numbers through (less than or equal to) 1,000,000,000 and decimals to the hundredths (greater than or equal to 0.01).
4(2)(B) The student applies mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. **The student is expected to represent the value of the digit in whole numbers through 1,000,000,000 and decimals to the hundredths using expanded notation and numerals.**	The SE reflects the representing of whole numbers through (less than or equal to) 1,000,000,000 and decimals to the hundredths (greater than or equal to 0.01). For the number 3.94, the 3 in the ones place is 3; the 9 in the tenths place is 0.9; and the 4 in the hundredths place is 0.04; and 3.94 is the sum of 3 ones, 9 tenths, and 4 hundredths. The expanded notation for 3.94 may be represented as 3.94 = 3 × 1 + 9 × 0.1 + 4 × 0.01; 3.94 = 3 × 1 + 9 × 1/10 + 4 × 1/100; 3.94 = (3 x 1) + (9 x 0.1) + (4 x 0.01); or 3.94 = (3 x 1) + (9 x 1/10) + (4 x 1/100).
4(2)(C) **Number and operations.** The student applies mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. **The student is expected to compare and order whole numbers to 1,000,000,000 and represent comparisons using the symbols >, <, or =.**	Specificity regarding notation is included with the inclusion of the symbols >, <, or =.
4(2)(D) **Number and operations.** The student applies mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. **The student is expected to round whole numbers to a given place value through the hundred thousands place.**	The phrase "to a given place value through the hundred thousands place" is more precise than "to the nearest ten, hundred, or thousand." Student can be expected to round the same number to different place values.
4(2)(E) **Number and operations.** The student applies mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. **The student is expected to represent decimals, including tenths and hundredths, using concrete and visual models and money.**	The SE separates the representations of decimals, including tenths and hundredths, from other skills with decimals. Students are not expected to represent decimals smaller than hundredths.
4(2)(F) **Number and operations.** The student applies mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. **The student is expected to compare and order decimals using concrete and visual models to the hundredths.**	The SE separates the comparing and ordering of decimals to the hundredths using concrete and visual models from other skills with decimals. Students can but are not expected to use the symbols >, <, or = with these comparisons.
4(2)(G) **Number and operations.** The student applies mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. **The student is expected to relate decimals to fractions that name tenths and hundredths.**	When paired with 4(1)(D), students may relate decimals to fractions that name tenths and hundredths using concrete and pictorial models. Fractions can be both mixed and improper, such as 3.6 is the same as 36/10 or 3 6/10.
4(2)(H) **Number and operations.** The student applies mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. **The student is expected to determine the corresponding decimal to the tenths or hundredths place of a specified point on a number line.**	When paired with 4(3)(C), decimals can be developed from fractions that have equivalent fractions only with denominators of ten or one hundred, such as 0.25 from ¼ or 0.4 from 2/5.

TEKS: Number and Operations.	Supporting Information
4(3)(A) **Number and operations.** The student applies mathematical process standards to represent and generate fractions to solve problems. **The student is expected to 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*.**	When paired with 4(1)(D), students may represent *a*/*b* as a sum of fractions 1/*b* using concrete and pictorial models, which includes improper fractions when *a* > *b*. The sum of fractions, such as 1/5 + 1/5 + 1/5, may be referenced as an expression.
4(3)(B) **Number and operations.** The student applies mathematical process standards to represent and generate fractions to solve problems. **The student is expected to decompose a fraction in more than one way into a sum of fractions with the same denominator using concrete and pictorial models and recording results with symbolic representations.**	This SE expects students to describe fractions as a sum of unit fractions, such as 5/2 = 1/2 + 1/2 + 1/2 + 1/2 + 1/2 In this SE, students are also expected to express 5/2 = 3/2 + 2/2; 5/2 = 1/2 + 4/2; 5/2 = 2/2 + 2/2 + 1/2; and 2 1/2 = 1 + 1 + 1/2. Students are expected to use concrete models such as fraction strips or fractions bars and pictorial models such as strip diagrams and to record the appropriate number sentences.
4(3)(C) **Number and operations.** The student applies mathematical process standards to represent and generate fractions to solve problems. **The student is expected to determine if two given fractions are equivalent using a variety of methods.**	Methods may include concrete models, such as fraction strips and fraction bars, and pictorial models, such as strip diagrams. Methods also include numeric approaches. Students are expected to use methods that prove that the multiplicative relationship between the numerators is the same as the multiplicative relationship between the denominators or prove that the multiplicative relationship between the numerator and denominator in each fraction is the same. Simplifying each fraction would be another approach. For example, 3/4 and 9/12 are equivalent because each fourth is separated into 3 equal parts to make 9/12, and 6/8 and 9/12 are equivalent because they both simplify to 3/4. Methods may also include multiplying by a fraction equivalent to one.
4(3)(D) **Number and operations.** The student applies mathematical process standards to represent and generate fractions to solve problems. **The student is expected to compare two fractions with different numerators and different denominators and represent the comparison using the symbols >, =, or <.**	The SE includes specificity for the number of fractions a student compares. When paired with 4(1)(D), students may compare fractions using concrete and pictorial models. This SE may include improper fractions and mixed numbers. The SE builds on 3(3)(H) where students compare two fractions having the same numerator or denominator.
4(3)(E) **Number and operations.** The student applies mathematical process standards to represent and generate fractions to solve problems. **The student is expected to represent and solve addition and subtraction of fractions with equal denominators using objects and pictorial models that build to the number line and properties of operations.**	Objects that build to the number line include fraction strips and fraction bars and other linear fraction models. Pictorial models include sketches of the linear fraction models and strip diagrams. Properties of operations with the addition and subtraction of fractions with equal denominators connects to the decomposing of fractions included in 4(3)(B). Improper fractions and mixed numbers may be included. For example, 7/8 + 11/8 could be thought of as 7/8 + (1/8 + 10/8) = (7/8 + 1/8) + (8/8 + 2/8) = 8/8 + 8/8 + 2/8 = 2 2/8 = 2 1/4.
4(3)(F) **Number and operations.** The student applies mathematical process standards to represent and generate fractions to solve problems. **The student is expected to evaluate the reasonableness of sums and differences of fractions using benchmark fractions 0, 1/4, 1/2, 3/4, and 1, referring to the same whole.**	For example, when estimating 8/9 + 2/8, one might estimate 8/9 as 1 and 2/8 as 1/4. The estimated sum would be 1 1/4.
4(3)(G) **Number and operations.** The student applies mathematical process standards to represent and generate fractions to solve problems. **The student is expected to represent fractions and decimals to the tenths or hundredths as distances from zero on a number line.**	The fractions that may be represented are of the form *a*/*b*, where *a* and *b* are whole numbers and *b*>0, including when *a* > *b*. This aligns to 4(3)(A). When used in conjunction with 4(3)(C), decimals can be developed from fractions that have equivalent fractions only with denominators of ten or one hundred such as 1/4 = 0.25 or 2/5 = 0.4.

TEKS: Number and Operations.	Supporting Information
4(4)(A) **Number and operations.** The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. **The student is expected to add and subtract whole numbers and decimals to the hundredths place using the standard algorithm.**	The SE includes the addition and subtraction of decimals to the hundredths place using the standard algorithm. Problems may include both whole numbers and decimal values. When paired with 4(1)(D), students may be expected to add decimals to the hundredths using concrete and pictorial models with connections to the standard algorithm.
4(4)(B) **Number and operations.** The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. **The student is expected to determine products of a number and 10 or 100 using properties of operations and place value understandings.**	Students are to use properties of operations and place-value understandings to multiply a number by 10 or 100. Because place value in grade 4 extends from the hundredths to the one billions place, students may be expected to determine the product of a pair of numbers such as 4,000 and 10. The product is 10 times larger than 4,000, so the place value of the 4 increases from 1,000 to 10,000. When multiplying numbers such as 324 and 10, a student is expected to use the properties of operations and place value. Multiplying 324 by 10 means that each value from expanded notation is being multiplied by 10, so 10 x 324 = 10 x (300 + 20 + 4) = 10 x (300) + 10 x (20) + 10 x (4) = 3000 + 200 + 40 = 3240. Students are not expected to use the standard algorithm to determine the result of multiplying a number by 10 or 100.
4(4)(C) **Number and operations.** The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. **The student is expected to represent the product of 2 two-digit numbers using arrays, area models, or equations, including perfect squares through 15 by 15.**	This SE specifies that the factors may be 2 two-digit numbers and that perfect squares through 15x15 are included. This SE includes equations as representations for the product of 2 two-digit numbers. A student may be expected to describe an array or an area model with an equation that includes the factors as lengths and the product as the area. When paired with 4(1)(A), students solve real-world problems. The intent of this SE is not a sole focus on computation. When paired with 4(1)(G), students may be expected to explain situations in word form. This SE complements the development of area formulas in 4(5)(C) and 4(5)(D).
4(4)(D) **Number and operations.** The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. **The student is expected to use strategies and algorithms, including the standard algorithm, to multiply up to a four-digit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties.**	This SE allows students to develop their own thinking strategies and experiment with alternative algorithms as students construct an understanding of the standard algorithm. Using the associative and distributive property provides a foundation for decomposing and composing numbers.
4(4)(E) **Number and operations.** The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. **The student is expected to represent the quotient of up to a four-digit whole number divided by a one-digit whole number using arrays, area models, or equations.**	The SE adds specificity to the picture forms as “arrays” and “area models” and the number form as “equations.” It also adds specificity to the division situations as they have “up to a four-digit whole number divided by a one-digit whole number.” When paired with 4(1)(A), students solve real-world problems. The intent of this SE is not a sole focus on computation. When paired with 4(1)(G), students explain situations in word form.

TEKS: Number and Operations.	Supporting Information
4(4)(F) **Number and operations.** The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. **The student is expected to use strategies and algorithms, including the standard algorithm, to divide up to a four-digit dividend by a one-digit divisor.**	This SE allows students to develop their own thinking strategies and experiment with alternative algorithms as students construct an understanding of the standard algorithm.
4(4)(G) **Number and operations.** The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. **The student is expected to round to the nearest 10, 100, or 1,000 or use compatible numbers to estimate solutions involving whole numbers.**	This SE includes addition and subtraction as well as multiplication and division. The use of compatible numbers refers to numbers that make calculation easier. For example, 103 ÷ 28 estimation using compatible numbers would give us 100 ÷ 25 rather than estimation using rounding rules, which would give us 100 ÷ 30. When asked to estimate without specific direction to rounding, it is up to the student to decide whether to round or use compatible numbers.
4(4)(H) **Number and operations.** The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. **The student is expected to solve with fluency one- and two-step problems involving multiplication and division, including interpreting remainders.**	"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). For example, Ann Marie baked 52 cookies to give to 5 friends. She will give each friend the same amount and eat the leftovers. If she gives her friends as many as she can, how many will she get to eat?

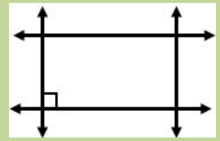
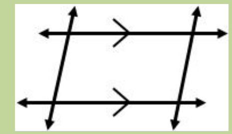
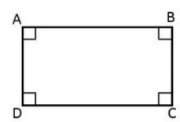
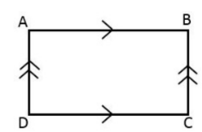
TEKS: Algebraic Reasoning.	Supporting Information
4(5)(A) **Algebraic reasoning.** The student applies mathematical process standards to develop concepts of expressions and equations. **The student is expected to represent multi-step problems involving the four operations with whole numbers using strip diagrams and equations with a letter standing for the unknown quantity.**	Strip diagrams may include a letter representing the unknown quantity, which can appear in any position of the equation. When paired with 4(1)(G), students may explain situations in word form.
4(5)(B) **Algebraic reasoning.** The student applies mathematical process standards to develop concepts of expressions and equations. **The student is expected to 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.**	The "input" can be the position in the sequence. The "output" can be the value in the position. For example, the sequence 4, 8, 12, 16 . . . can be listed in table format where the "input" can be the position of the value in the sequence. In this case, the first position has a value of four, the second position has a value of eight, etc. (see table 1 below) However, the "output" can be the position in the sequence. The "input" can be the value in the position. For example, the sequence 12, 16, 20, 24 . . . can be listed in table format where the "output" can be the position of the value in the sequence. The third position has a value of twelve, the fourth position has a value of sixteen, etc. (see table 2 below) The output is four times the input. The value of the position is four times the position number. A problem might ask for the value of the 23rd position for this relationship. Students would be expected to determine that the input is 23, the numerical expression is 4 × 23 and the output is 92. Students may be expected to work with problems that reflect the addition or subtraction of a whole number to the input or the multiplication or division of the input by a whole number. The values used with multiplication and division should align to 4(4)(D) and 4(4)(F). The "rule" or the description of the operation that is applied to the input could be given to the students. Alternately, students could determine the rule. Students are not expected to represent relationships that use more than one operation.
4(5)(C) **Algebraic reasoning.** The student applies mathematical process standards to develop concepts of expressions and equations. **The student is expected to use models to determine the formulas for the perimeter of a rectangle ($l + w + l + w$ or $2l + 2w$), including the special form for perimeter of a square ($4s$) and the area of a rectangle ($l \times w$).**	Models may include manipulatives and grids.
4(5)(D) **Algebraic reasoning.** The student applies mathematical process standards to develop concepts of expressions and equations. **The student is expected to solve problems related to perimeter and area of rectangles where dimensions are whole numbers.**	Problems may include situations where perimeter or area is known and the student is asked to determine a missing dimension.

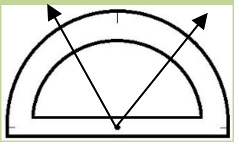
Table 1:

Input, Position	Numerical Expression	Output, Value
1	4 × 1	4
2	4 × 2	8
3	4 × 3	12
4	4 × 4	16

Table 2:

Input, Value	Numerical Expression	Output, Position
12	12 ÷ 4	3
16	16 ÷ 4	4
20	20 ÷ 4	5
24	24 ÷ 4	6

TEKS: Geometry and Measurement.	Supporting Information
4(6)(A) **Geometry and measurement.** The student applies mathematical process standards to analyze geometric attributes in order to develop generalizations about their properties. **The student is expected to identify points, lines, line segments, rays, angles, and perpendicular and parallel lines.**	Students are expected to identify points, lines, line segments, rays, angles, and parallel and perpendicular lines.  Students may indicate that two lines are perpendicular with the symbol for a right angle.  Students may indicate that two lines are parallel using chevrons or arrows. If two sets of lines are present, students may differentiate based on the number of chevrons or arrows. When paired with 4(1)(D), students describe these figures using concrete and pictorial models.
4(6)(B) **Geometry and measurement.** The student applies mathematical process standards to analyze geometric attributes in order to develop generalizations about their properties. **The student is expected to identify and draw one or more lines of symmetry, if they exist, for a two-dimensional figure.**	To verify symmetry with a reflection, one must first identify the line(s) of symmetry. The revised SE addresses the identification of the lines of symmetry. When paired with 4(1)(E) and 4(1)(F), students use the line(s) of symmetry as line(s) of reflection to verify the placement of the line of symmetry.
4(6)(C) **Geometry and measurement.** The student applies mathematical process standards to analyze geometric attributes in order to develop generalizations about their properties. **The student is expected to apply knowledge of right angles to identify acute, right, and obtuse triangles.**	Students are expected to use a right, or 90°, angle as a benchmark to identify acute, right, and obtuse angles. Triangles are named according to their largest angle.
4(6)(D) **Geometry and measurement.** The student applies mathematical process standards to analyze geometric attributes in order to develop generalizations about their properties. **The student is expected to classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size.**	Classification is part of defining the essential attributes of a geometric figure. Students are expected to classify all 4-sided figures with opposite sides parallel and four right angles from adjacent sides that are perpendicular as rectangles. Isosceles is an adjective that indicates that at least two sides of a polygon have the same measure. Examples include isosceles triangles and isosceles trapezoids. Right is an adjective that indicates that a polygon has a ninety-degree angle. Examples include right triangles and right trapezoids. Equilateral is an adjective that indicates that all sides of a polygon have the same length. Equiangular is an adjective that indicates that all angles in a polygon have the same measure.  Students may indicate that two lines are perpendicular with the symbol for a right angle. Line segment $\overline{AB}$ is perpendicular to line segment $\overline{BC}$ ($\overline{AB} \perp \overline{BC}$).  Students may indicate that two lines are parallel using chevrons or arrows. If two sets of lines are present, students may differentiate based on the number of chevrons or arrows. Line segments $\overline{AD}$ and $\overline{BC}$ are parallel ($\overline{AD} \parallel \overline{BC}$). Line segments AB and $\overline{DC}$ are parallel ($\overline{AB} \parallel \overline{DC}$).

TEKS: Geometry and Measurement.	Supporting Information
4(7)(A) **Geometry and measurement.** The student applies mathematical process standards to solve problems involving angles less than or equal to 180 degrees. **The student is expected to illustrate the measure of an angle as the part of a circle whose center is at the vertex of the angle that is "cut out" by the rays of the angle. Angle measures are limited to whole numbers.**	This SE lays the foundation for work with central angles in Geometry [G(12)(D)] and radian measures in Precalculus [P(4)(B)].
4(7)(B) **Geometry and measurement.** The student applies mathematical process standards to solve problems involving angles less than or equal to 180 degrees. **The student is expected to illustrate degrees as the units used to measure an angle, where 1/360 of any circle is one degree and an angle that "cuts" *n*/360 out of any circle whose center is at the angle's vertex has a measure of *n* degrees. Angle measures are limited to whole numbers.**	This SE leads to the development of radian measures in Precalculus P(4)(B).
4(7)(C) **Geometry and measurement.** The student applies mathematical process standards to solve problems involving angles less than or equal to 180 degrees. **The student is expected to determine the approximate measures of angles in degrees to the nearest whole number using a protractor.**	The angle measurements do not necessarily have to begin with 0°. For example:  The traditional representation of an angle formed by the intersecting rays AB and BC is ∠ABC where *B* is the vertex of the angle.
4(7)(D) **Geometry and measurement.** The student applies mathematical process standards to solve problems involving angles less than or equal to 180 degrees. **The student is expected to draw an angle with a given measure.**	When paired with 4(1)(C), students may use tools such as protractors to solve problems related to the measurement of angles.
4(7)(E) **Geometry and measurement.** The student applies mathematical process standards to solve problems involving angles less than or equal to 180 degrees. **The student is expected to determine the measure of an unknown angle formed by two non-overlapping adjacent angles given one or both angle measures.**	The two non-overlapping angles may include complementary angles, which means angles whose sum is 90 degrees and supplementary angles, which means angles whose sum is 180 degrees.

TEKS: Geometry and Measurement.	Supporting Information
4(8)(A) **Geometry and measurement.** The student applies mathematical process standards to select appropriate customary and metric units, strategies, and tools to solve problems involving measurement. **The student is expected to identify relative sizes of measurement units within the customary and metric systems.**	When paired with 4(1)(C), students may use tools such as rulers to solve problems related to identifying relative sizes of measurement units. In this SE, measurement units include units of length, capacity, and weight within the customary system. In this SE, measurement units include units of length, capacity, and mass within the metric system. Mass and weight are related but do not have the same measurements. Mass is the quantity of matter, and is measured in grams in the metric system. Weight is the amount of force exerted by gravity for a given amount of mass, and in the customary system, it is measured in tons, pounds, and ounces.
4(8)(B) **Geometry and measurement.** The student applies mathematical process standards to select appropriate customary and metric units, strategies, and tools to solve problems involving measurement. **The student is expected to convert measurements within the same measurement system, customary or metric, from a smaller unit into a larger unit or a larger unit into a smaller unit when given other equivalent measures represented in a table.**	Within this SE, the conversions will be "one-step" conversions from a smaller unit to a larger unit or from a larger unit to a smaller unit when students are provided other equivalent measures represented in a table as shown in the example below. Number of Feet / Number of inches: 2 / 24; 3 / 36; 4 / 48; 6 / 72 Based on the information in the table, how many inches are in 7 feet? Students are not expected to divide by a two-digit divisor as there are other ways to solve conversions including following the pattern of a table. Meters / Kilometers: 3000 / 3; 4000 / 4; 5000 / 5; 6000 / 6
4(8)(C) **Geometry and measurement.** The student applies mathematical process standards to select appropriate customary and metric units, strategies, and tools to solve problems involving measurement. **The student is expected to solve problems that deal with measurements of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate.**	When paired with 4(1)(C), students may use tools such as a clock with gears or a stopwatch to solve problems related to intervals of time. Students are also expected to solve problems involving intervals of time, or elapsed time, without tools. This SE builds on 3(7)(C), where students 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. Specificity has been added for capacity to be measures of liquid volume, fluid ounces for customary, and liters for metric. Mass is typically taught with the metric system. The customary unit for mass is the "stone," although this is rarely taught. Weight is not part of this SE. Students may be asked to solve problems to combined or separate measures of mass in grams. Students are not expected to calculate weight. Multiplication or division problems that deal with money are limited to amounts expressed as cents or dollars with no decimal values as decimal multiplication and division are in the TEKS for grade 5. Students may be required to re-group to the next larger unit of measure such as 1 foot 6 inches added to 1 foot 7 inches is 3 feet and 1 inch.

Number of Feet	Number of inches
2	24
3	36
4	48
6	72

Meters	Kilometers
3000	3
4000	4
5000	5
6000	6

TEKS: Data Analysis	Supporting Information

4(9)(A) **Data analysis.** The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data.

The student is expected to represent data on a frequency table, dot plot, or stem-and-leaf plot marked with whole numbers and fractions.

Supporting Information

A dot plot may be used to represent frequencies. A number line may be used for counts related to 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. Students begin work with dot plots in grade 3.

A stem-and-leaf plot organizes data in numerical order according to place value. The stem represents the place values preceding the last digit(s). The leaves provide the frequency counts for the range of numbers included in that row of the stem-and-leaf plot.

Stem	Leaves
7	1 1 2 3 4 4
8	
9	4 4 4 7 8
10	0
11	0 1 3

The use of stem-and-leaf plots begins in grade 4. Data may be in the form of whole numbers and/or fractions.

The fractions 1, $1^1/_4$, $1^1/_4$, $1^1/_2$, could be represented 1| $^0/_4$ $^1/_4$ $^1/_4$ $^1/_2$.
Stem values should be consecutive values. It is possible to have stem values without associated leaf values.

4(9)(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 data in whole number, decimal, and fraction form in a frequency table, dot plot, or stem-and-leaf plot.

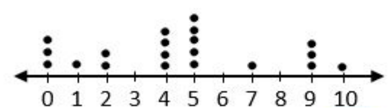
Supporting Information

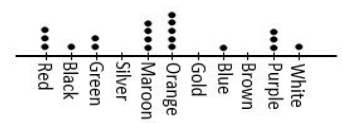
A frequency table shows how often an item, a number, or a range of numbers occurs. Tallies and counts are used to record frequencies. Students begin work with frequency tables in grade 3.

Students begin work with dot plots in grade 3.

Students begin work with stem-and-leaf plots in grade 4.

Arrows are only required when a number line is used for a dot plot.





TEKS: Personal Financial Literacy.	Supporting Information
4(10)(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 distinguish between fixed and variable expenses.**	Fixed and variable expenses depend upon the situation. Fixed expenses are a set amount consistent from month to month. Variable expenses vary in cost from month to month.
4(10)(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 calculate profit in a given situation.**	Profit = revenue – cost. For example, the lemonade stand charges $0.50 a cup and sells 200 cups, bringing in revenue of $100. The cost to make the lemonade and purchase the cups was $25. The profit of the lemonade stand is $75.
4(10)(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 compare the advantages and disadvantages of various savings options.**	Saving options may include a piggy bank, an interest-bearing account, certificates of deposits, and bonds, but are not limited to these examples.
4(10)(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 describe how to allocate a weekly allowance among spending; saving, including for college; and sharing.**	When paired with 4(1)(G), the expectation is that students explain the value of the allocation options. This SE eventually builds to 8(12)(G), where students estimate the cost of a two-year and four-year college education, including family contribution, and devise a periodic savings plan for accumulating the money needed to contribute to the total cost of attendance for at least the first year of college.
4(10)(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 describe the basic purpose of financial institutions, including keeping money safe, borrowing money, and lending.**	When paired with 4(1)(G), the expectation is that students explain the nature of financial institutions. Financial institutions may include banks, savings and loans, credit unions, or some other similar organization.