TEXAS Response to Curriculum Focal Points

for Kindergarten through Grade 8 Mathematics

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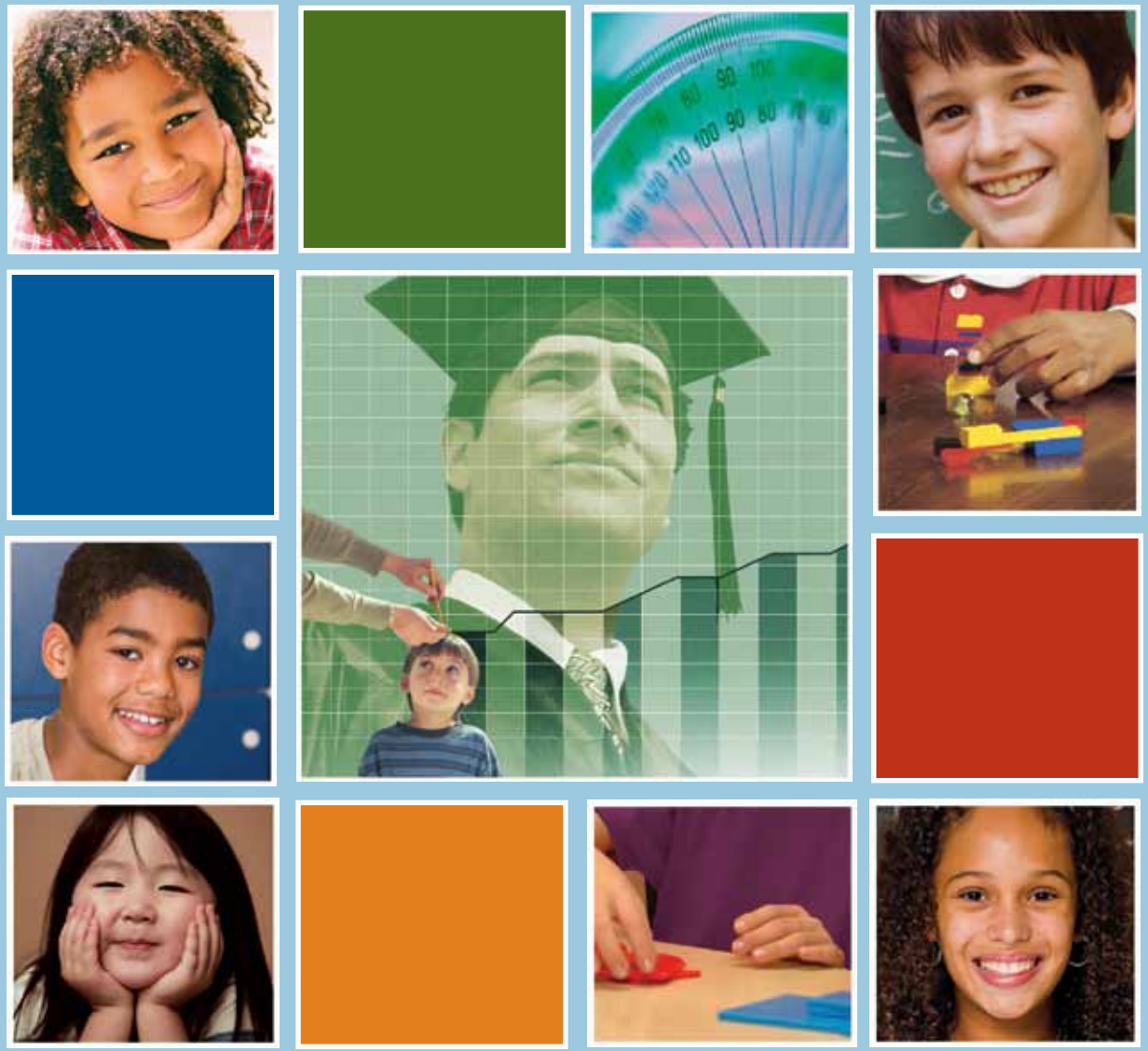

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CONTENTS

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PREFACE

For more than 2 decades, the National Council for Teachers of Mathematics' (NCTM) *Principles and Standards for School Mathematics* [2] provided our field with standards for teaching and learning mathematics that became the model for state standards in all curriculum areas.
More recently, NCTM supplemented its standards with *Curriculum Focal Points* [1], descriptions of the most significant mathematical concepts and skills at each grade level. The NCTM focal points were organized to lend coherence to the lengthy lists of standards teachers were expected to address each year and to assist teachers in identifying the highest-priority knowledge, skills, and strategies taught at each grade level.

In 2006, the President created the National Mathematics Advisory Panel "with the responsibilities of relying upon the 'best available scientific evidence' and recommending ways '…to foster greater knowledge of and improved performance in mathematics among American students'" [3, p. xiii]. In their report, the Panel included several main findings, including one that particularly addressed focus in curricular content as an important aspect of preparing students for Algebra, saying, "A focused, coherent progression of mathematics learning, with an emphasis on proficiency with key topics, should become the norm in elementary and middle school mathematics curricula" [3, p. xvi]. In addition, the Panel provided *Benchmarks for the Critical Foundations* for success in Algebra [3, p. 20] as guideposts for state frameworks and district-level curricula.

"A focused, coherent progression of mathematics learning, with an emphasis on proficiency with key topics, should become the norm in elementary and middle school mathematics curricula" [3, p. xvi].

Why Should Texas Respond to Curriculum Focal Points?

College and workforce readiness are essential educational objectives. To achieve these objectives, recent changes in education policy require that courses offered to Texas students include rigorous content and high expectations for achievement in core disciplines such as mathematics. Limited proficiency with these important mathematical knowledge and skills jeopardizes students' preparation to tackle the mathematical demands associated with college and workforce readiness. Thus, students need focused mathematics instruction across the grades that prepares them in critical areas for overall mathematics success.

The Texas Response to Curriculum Focal Points was created from the Texas Essential Knowledge and Skills (TEKS) and identifies critical areas for mathematics instruction at each grade level. Clear, consistent instructional grade-level priorities can help teachers understand at what point in the curriculum which important mathematical topics must be taught in depth at each grade level, thus providing the foundation for connections across grade levels. Providing instruction based on the focal points supports cumulative mathematics learning, with work in the later grades building on and deepening what students have learned in the earlier grades.

Based on their reviews of the existing research, the National Mathematics Advisory Panel made the following recommendation: "Proficiency with whole numbers, fractions, and particular aspects of geometry and measurement should be understood as the Critical Foundations of Algebra. Emphasis on these essential concepts and skills must be provided at the elementary and middle grade levels" [3, p. 18]. The Panel also acknowledged that "to prepare students for Algebra, the curriculum must simultaneously develop conceptual understanding, computational fluency, and problem-solving skills" [3, p. 19]. When instruction each year focuses on a small number of critical areas that can be built upon in later years, such experiences can more adequately prepare students to meet the demands of a rigorous mathematics curriculum at the secondary level. For example, knowledge of multiplication facts supports students' abilities to work with equivalent fractions, understanding fractions in depth supports students' abilities to use fractions meaningfully to represent ratios, fluency with ratio representations connects to concepts in prealgebra, and facility with arithmetic word problems provides the context for developing proficiency with algebraic equations. This focus can also increase the likelihood that Texas students have gained the knowledge and skills that are needed for success in mathematics courses in college and the wide array of courses that require knowledge of mathematics, such as accounting, business, and science courses.

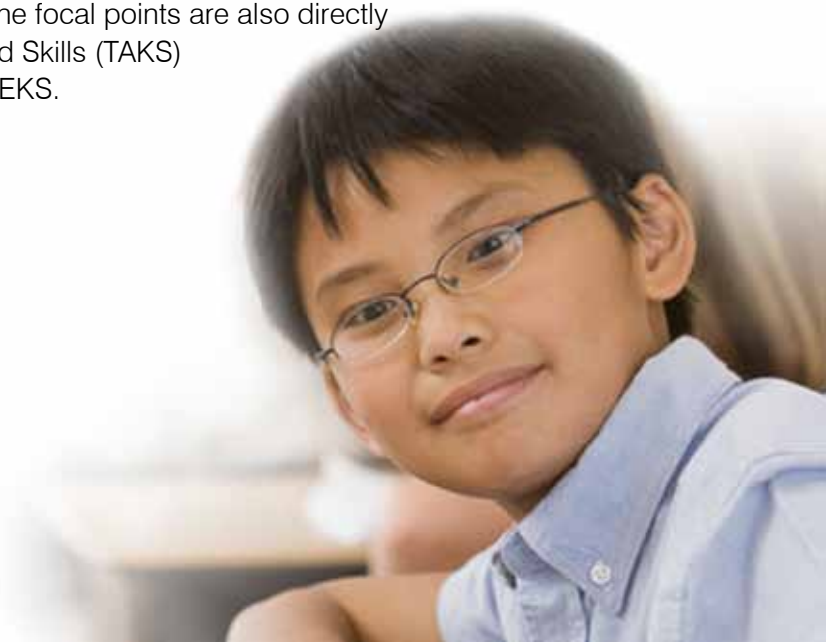
How was the Texas Response to Curriculum Focal Points for K-8 Mathematics Created?

The Texas Response to Curriculum Focal Points was created directly from the TEKS for K–8 mathematics. The TEKS at each grade level were sorted into three or four categories, each category based on a common mathematical idea to which all the TEKS in that group were related. The Texas Response to Curriculum Focal Points includes a descriptive title with a brief explanatory paragraph for each focal point, followed by the related TEKS from that grade level. Each curriculum focal point also includes all of the TEKS for the underlying processes in that grade, to emphasize the use of these mathematical processes throughout the curriculum.

All TEKS statements that did not fit into one of the three or four categories in a grade level were skills that either introduced material that would become a focus in a later grade or continued or extended material from a previous grade. These TEKS are listed at the end of each grade-level section and are labeled accordingly. This placement does not indicate that these TEKS should be ignored; however, they are not meant to be the focus of instruction for that year.

How is the Texas Response to Curriculum Focal Points for K-8 Mathematics Related to TEKS and TAKS?

Although the presentation of the TEKS at each grade level in this document looks very different from the strand organization in the basic TEKS document, the Texas Response to Curriculum Focal Points is *not* a revision of the TEKS. These curriculum focal points for K–8 mathematics present an organization of the TEKS at each grade level that provides direction for making decisions related to instructional time, choice of instructional materials, and depth of questioning. Consequently, the focal points are also directly aligned with the Texas Assessment of Knowledge and Skills (TAKS) objectives through their equivalence to the existing TEKS.



How Can the Texas Response to Curriculum Focal Points for K-8 Mathematics Be Used?

The Texas Response to Curriculum Focal Points identifies critical areas across grade levels, kindergarten through grade 8, that connect and integrate mathematical proficiency and understanding. These focal points are intended to serve as an impetus for state- and district-level endeavors to develop and refine mathematics curricula, instruction, and assessment. For curriculum developers, these focal points provide a concise framework for developing and sequencing mathematics curricula for each grade level.

Preparation at the in-service and pre-service level is important to ensure that educators understand and can implement the curriculum focal points as part of their daily mathematics instruction. At the in-service level, such preparation is critical to help teachers obtain the best results when teaching for the depth, understanding, and proficiency emphasized by these curriculum focal points. School district and education service center mathematics specialists will need to ensure that educators are prepared to implement the focal points and to monitor students' mathematics learning. Professional development efforts should include activities that help teachers with classroom application of the curriculum focal points. These professional development efforts should ensure that teachers are aware of the advanced mathematics that underlies the mathematics they teach at their grade level. At the pre-service level, coursework and field-based experiences need to enable teachers to gain the knowledge and skill to implement the focal points with ease and confidence. Current and future instructional leaders (e.g., principals, specialists, coaches, curriculum developers) must understand how to design, deliver, and evaluate instruction based on the focal points.

"Current and future instructional leaders (e.g., principals, specialists, coaches, curriculum developers) must understand how to design, deliver, and evaluate instruction based on the focal points."

Finally, mathematics professional organizations have the responsibility of communicating with their membership about the Texas Response to Curriculum Focal Points. The focal points should be highly visible in conference presentations and in electronic and print material for members. Through a united network, Texas educators can learn more about the Texas Response to Curriculum Focal Points in meaningful ways that facilitate effective and efficient mathematics instruction.

What Are Possible Impacts of Implementing the Texas Response to Curriculum Focal Points for K-8 Mathematics?

The most immediate impact of implementing the Texas Response to Curriculum Focal Points will be seen in the design of mathematics instruction in K–8. Since the TEKS were first developed, decisions regarding instructional time have challenged administrators and teachers. Questions such as the following have been asked during the years: "Since we don't have enough time to treat each of the TEKS equally in terms of time, which of the TEKS are the most important?" "Which of the strands should we spend the most time on?" "When during the year should we do certain strands or TEKS?" Time management for effective and efficient instruction must be based on mathematical ideas, or themes, that are built from groups of TEKS that cut across strands and cannot stand alone in a meaningful way. In other words, 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.

In terms of time management, each of the focal points at a grade level does not call for an equal amount of time. The focal points that address the National Mathematics Advisory Panel's critical foundations of Algebra (i.e. proficiency with whole numbers, fractions, and particular aspects of geometry and measurement) are highly important. Other focal points may not need the same level of instructional attention.

"...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."

In addition to effective use of instructional time, building instruction around curriculum focal points also involves judicious selection of instructional materials and activities. Certain materials and activities that do not support a curriculum focal point for a given year may need to be delegated to the teachers of the grade level in which these materials and activities do contribute to the curriculum focal points. Budgets for instructional materials can be allocated based on what is needed to address the identified focal points at each grade level, rather than providing all resources to all grades.

The Texas Response to Curriculum Focal Points has the potential to affect future curriculum development. At the district level, this impact can happen fairly quickly. Districts can use the focal points to guide the organization of their instructional units from short bursts focusing on isolated TEKS to sustained involvement with groups of TEKS that support a common, bigger idea or theme. As the scheduled revision of the state-level curriculum approaches, the Texas Response to Curriculum Focal Points can provide insight into a focused curriculum as a way to address mathematics achievement issues for all students.

A more long-term impact, and a highly desired one, is the impact that curriculum focal points can have on assessment, both at the local and state levels. The Texas Response to Curriculum Focal Points can provide a structure within which districts can design meaningful measures that are rich in terms of depth and complexity and provide information about students' abilities to connect to the next year's set of focal points, rather than providing only limited information about a student's ability to perform isolated skills. At the state level, the Texas Response to Curriculum Focal Points can provide guidance for important discussions about the next steps in assessment—for example, how to build assessment around the most important topics at each grade level to make the resulting information more useful for identifying important problems and predicting future academic success.

"The Texas Response to Curriculum Focal Points can provide a structure within which districts can design meaningful measures that are rich in terms of depth and complexity and provide information about students' abilities to connect to the next year's set of focal points, rather than providing only limited information about a student's ability to perform isolated skills."

TEXAS Response to Curriculum Focal Points

for Kindergarten through Grade 8 Mathematics

Texas Essential Knowledge & Skills (TEKS)

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR KINDERGARTEN MATHEMATICS

Developing knowledge of and applying numbers and number relationships

Students develop and apply understanding of whole numbers by counting, comparing, and ordering collections and develop meaning for whole number words and symbols. Students select and apply effective strategies to answer questions involving numbers.

Related Kindergarten TEKS:

K.1 (A)	The student is expected to use one-to-one correspondence and language such as more than, same number as, or two less than to describe relative sizes of sets of concrete objects.
K.1 (B)	The student is expected to use sets of concrete objects to represent quantities given in verbal or written form (through 20).
K.1 (C)	The student is expected to use numbers to describe how many objects are in a set (through 20) using verbal and symbolic descriptions.
K.2 (A)	The student is expected to use language such as before or after to describe relative position in a sequence of events or objects.
K.2 (B)	The student is expected to name the ordinal positions in a sequence such as first, second, third, etc.
K.4 (A)	The student is expected to model and create addition and subtraction problems in real situations with concrete objects.
K.6 (B)	The student is expected to count by ones to 100.
K.7 (A)	The student is expected to describe one object in relation to another using informal language such as over, under, above, and below.
K.7 (B)	The student is expected to place an object in a specified position.
K.12 (A)	The student is expected to construct graphs using real objects or pictures in order to answer questions.
K.12 (B)	The student is expected to use information from a graph of real objects or pictures in order to answer questions.
K.13 (all)	The student applies Kindergarten mathematics to solve problems connected to everyday experiences and activities in and outside of school.
K.14 (all)	The student communicates about Kindergarten mathematics using informal language.
K.15 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR KINDERGARTEN MATHEMATICS

Developing an understanding of attributes of two- and three-dimensional objects

Students name, describe, compare, and contrast the attributes of two- and three-dimensional objects. Students identify, describe, and sort a variety of shapes presented in various ways.

Related Kindergarten TEKS:

K.5 (A)	The student is expected to identify, extend, and create patterns of sounds, physical movement, and concrete objects.
K.7 (A)	The student is expected to describe one object in relation to another using informal language such as over, under, above, and below.
K.7 (B)	The student is expected to place an object in a specified position.
K.8 (A)	The student is expected to describe and identify an object by its attributes using informal language.
K.8 (B)	The student is expected to compare two objects based on their attributes.
K.8 (C)	The student is expected to sort a variety of objects including two- and three-dimensional geometric figures according to their attributes and describe how the objects are sorted.
K.9 (A)	The student is expected to describe and compare the attributes of real-life objects such as balls, boxes, cans, and cones or models of three-dimensional geometric figures.
K.9 (B)	The student is expected to recognize shapes in real-life three-dimensional geometric figures or models of three-dimensional geometric figures.
K.9 (C)	The student is expected to describe, identify, and compare circles, triangles, rectangles, and squares (a special type of rectangle).
K.12 (A)	The student is expected to construct graphs using real objects or pictures in order to answer questions.
K.12 (B)	The student is expected to use information from a graph of real objects or pictures in order to answer questions.
K.13 (all)	The student applies Kindergarten mathematics to solve problems connected to everyday experiences and activities in and outside of school.
K.14 (all)	The student communicates about Kindergarten mathematics using informal language.
K.15 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR KINDERGARTEN MATHEMATICS

Using attributes and time to compare and order

Students identify and use measurable attributes of length, area, weight/mass, temperature, and capacity to make comparisons. Students describe, compare, and sequence events and read a calendar using days, weeks, and months.

Related Kindergarten TEKS:

K.2 (A)	The student is expected to use language such as before or after to describe relative position in a sequence of events or objects.
K.2 (B)	The student is expected to name the ordinal positions in a sequence such as first, second, third, etc.
K.3 (A)	The student is expected to share a whole by separating it into two equal parts.
K.3 (B)	The student is expected to explain why a given part is half of the whole.
K.6 (A)	The student is expected to use patterns to predict what comes next, including cause-and-effect relationships.
K.7 (A)	The student is expected to describe one object in relation to another using informal language such as over, under, above, and below.
K.7 (B)	The student is expected to place an object in a specified position.
K.8 (A)	The student is expected to describe and identify an object by its attributes using informal language.
K.8 (B)	The student is expected to compare two objects based on their attributes.
K.10 (A)	The student is expected to compare and order two or three concrete objects according to length (longer/shorter than, or the same).
K.10 (B)	The student is expected to compare the areas of two flat surfaces of two-dimensional figures (covers more, covers less, or covers the same).
K.10 (C)	The student is expected to compare two containers according to capacity (holds more, holds less, or holds the same).
K.10 (D)	The student is expected to compare two objects according to weight/mass (heavier than, lighter than, or equal to).
K.10 (E)	The student is expected to compare situations or objects according to relative temperature (hotter/colder than, or the same as).

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR KINDERGARTEN MATHEMATICS

Using attributes and time to compare and order (continued)
Students identify and use measurable attributes of length, area, weight/mass, temperature, and capacity to make comparisons. Students describe, compare, and sequence events and read a calendar using days, weeks, and months.

Related Kindergarten TEKS:

K.11 (A)	The student is expected to compare events according to duration such as more time than or less time than.
K.11 (B)	The student is expected to sequence events (up to three).
K.11 (C)	The student is expected to read a calendar using days, weeks, and months.
K.12 (A)	The student is expected to construct graphs using real objects or pictures in order to answer questions.
K.12 (B)	The student is expected to use information from a graph of real objects or pictures in order to answer questions.
K.13 (all)	The student applies Kindergarten mathematics to solve problems connected to everyday experiences and activities in and outside of school.
K.14 (all)	The student communicates about Kindergarten mathematics using informal language.
K.15 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 1 MATHEMATICS

Developing an understanding of whole-number relationships, including grouping by tens and ones
Students identify, compare, and order whole numbers using a variety of models (e.g., concrete objects, hundreds charts, number lines, graphs). Students are introduced to base 10 place value and interpret two-digit numbers as groups of tens and ones.

Related Grade 1 TEKS:

1.1 (A)	The student is expected to compare and order whole numbers up to 99 (less than, greater than, or equal to) using sets of concrete objects and pictorial models.
1.1 (B)	The student is expected to create sets of tens and ones using concrete objects to describe, compare, and order whole numbers.
1.1 (C)	The student is expected to identify individual coins by name and value and describe relationships among them.
1.1 (D)	The student is expected to read and write numbers to 99 to describe sets of concrete objects.
1.5 (A)	The student is expected to use patterns to skip count by twos, fives, and tens.
1.5 (B)	The student is expected to find patterns in numbers, including odd and even.
1.5 (C)	The student is expected to compare and order whole numbers using place value.
1.8 (B)	The student is expected to read time to the hour and half-hour using analog and digital clocks.
1.9 (B)	The student is expected to use organized data to construct real-object graphs, picture graphs, and bar-type graphs.
1.10 (A)	The student is expected to draw conclusions and answer questions using information organized in real-object graphs, picture graphs, and bar-type graphs.
1.11 (all)	The student applies Grade 1 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
1.12 (all)	The student communicates about Grade 1 mathematics using informal language.
1.13 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 1 MATHEMATICS

Developing an understanding of addition and subtraction

Students develop an understanding of the meanings of addition and subtraction by using a variety of models (e.g., such as discrete objects, length-based models, and number lines) to represent and solve part-part-whole, joining, separating, and comparing problems. Students develop an understanding of the properties of addition, including the inverse relationship between addition and subtraction. Students translate visual representations into abstract symbols and effectively use strategies to record and solve basic addition and subtraction word problems. [1, p. 13]

Related Grade 1 TEKS:

1.3 (A)	The student is expected to model and create addition and subtraction problem situations with concrete objects and write corresponding number sentences.
1.3 (B)	The student is expected to use concrete and pictorial models to apply basic addition and subtraction facts (up to $9 + 9 = 18$ and $18 - 9 = 9$).
1.4 (A)	The student is expected to identify, describe, and extend concrete and pictorial patterns in order to make predictions and solve problems.
1.5 (D)	The student is expected to use patterns to develop strategies to solve basic addition and basic subtraction problems.
1.5 (E)	The student is expected to identify patterns in related addition and subtraction sentences (fact families for sums to 18) such as $2 + 3 = 5$, $3 + 2 = 5$, $5 - 2 = 3$, and $5 - 3 = 2$.
1.10 (A)	The student is expected to draw conclusions and answer questions using information organized in real-object graphs, picture graphs, and bar-type graphs.
1.11 (all)	The student applies Grade 1 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
1.12 (all)	The student communicates about Grade 1 mathematics using informal language.
1.13 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 1 MATHEMATICS

Identifying and comparing attributes

Students identify, compare, and contrast attributes of shapes and objects.

Related Grade 1 TEKS:

1.4 (A)	The student is expected to identify, describe, and extend concrete and pictorial patterns in order to make predictions and solve problems.
1.6 (A)	The student is expected to describe and identify two-dimensional geometric figures, including circles, triangles, rectangles, and squares (a special type of rectangle).
1.6 (B)	The student is expected to describe and identify three-dimensional geometric figures, including spheres, rectangular prisms (including cubes), cylinders, and cones.
1.6 (C)	The student is expected to describe and identify two- and three-dimensional geometric figures in order to sort them according to a given attribute using informal and formal language.
1.6 (D)	The student is expected to use concrete models to combine two-dimensional geometric figures to make new geometric figures.
1.7 (A)	The student is expected to estimate and measure length using nonstandard units such as paper clips or sides of color tiles.
1.7 (B)	The student is expected to compare and order two or more concrete objects according to length (from longest to shortest).
1.7 (C)	The student is expected to describe the relationship between the size of the unit and the number of units needed to measure the length of an object.
1.7 (D)	The student is expected to compare and order the area of two or more two-dimensional surfaces (from covers the most to covers the least).
1.7 (E)	The student is expected to compare and order two or more containers according to capacity (from holds the most to holds the least).
1.7 (F)	The student is expected to compare and order two or more objects according to weight/mass (from heaviest to lightest).
1.7 (G)	The student is expected to compare and order two or more objects according to relative temperature (from hottest to coldest).
1.9 (A)	The student is expected to collect and sort data.
1.9 (B)	The student is expected to use organized data to construct real-object graphs, picture graphs, and bar-type graphs.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 1 MATHEMATICS

Identifying and comparing attributes (continued)
Students identify, compare, and contrast attributes of shapes and objects.

Related Grade 1 TEKS:

1.10 (A)	The student is expected to draw conclusions and answer questions using information organized in real-object graphs, picture graphs, and bar-type graphs.
1.11 (all)	The student applies Grade 1 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
1.12 (all)	The student communicates about Grade 1 mathematics using informal language.
1.13 (all)	The student uses logical reasoning.

Continuing Experiences - Grade 1 TEKS:

1.8 (A)	The student is expected to order three or more events according to duration.

Introductory Experiences - Grade 1 TEKS:

1.2 (A)	The student is expected to separate a whole into two, three, or four equal parts and use appropriate language to describe the parts such as three out of four equal parts.
1.2 (B)	The student is expected to use appropriate language to describe part of a set such as three out of the eight crayons are red.
1.10 (B)	The student is expected to identify events as certain or impossible, such as drawing a red crayon from a bag of green crayons.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 2 MATHEMATICS

Developing an understanding of and proficiency in the use of the base-ten numeration system

Students use the number line, place value, and properties of numbers to read, write, compare, and order whole numbers. Students create equivalent representations of numbers and compose and decompose multidigit numbers.

Related Grade 2 TEKS:

2.1 (A)	The student is expected to use concrete models of hundreds, tens, and ones to represent a given whole number (up to 999) in various ways.
2.1 (B)	The student is expected to use place value to read, write, and describe the value of whole numbers to 999.
2.1 (C)	The student is expected to use place value to compare and order whole numbers to 999 and record the comparisons using numbers and symbols (<, =, >).
2.5 (A)	The student is expected to find patterns in numbers such as in a 100s chart.
2.5 (B)	The student is expected to use patterns in place value to compare and order whole numbers through 999.
2.8 (A)	The student is expected to use whole numbers to locate and name points on a number line.
2.10 (B)	The student is expected to read and write times shown on analog and digital clocks using five-minute increments.
2.11 (A)	The student is expected to construct picture graphs and bar-type graphs.
2.11 (B)	The student is expected to draw conclusions and answer questions based on picture graphs and bar-type graphs.
2.12 (all)	The student applies Grade 2 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
2.13 (all)	The student communicates about Grade 2 mathematics using informal language.
2.14 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 2 MATHEMATICS

Developing quick retrieval of addition facts and related subtraction facts and proficient use of standard addition and subtraction algorithms

Students apply their understanding of addition and subtraction, properties of addition (e.g., commutativity and associativity), and strategies to quickly recall addition facts and related subtraction facts. Students develop and use efficient procedures, including standard algorithms based on place value concepts, to solve multidigit addition and subtraction problems.

Related Grade 2 TEKS:

2.3 (A)	The student is expected to recall and apply basic addition and subtraction facts (to 18).
2.3 (B)	The student is expected to model addition and subtraction of two-digit numbers with objects, pictures, words, and numbers.
2.3 (C)	The student is expected to select addition or subtraction to solve problems using two-digit numbers, whether or not regrouping is necessary.
2.3 (D)	The student is expected to determine the value of a collection of coins up to one dollar.
2.5 (C)	The student is expected to use patterns and relationships to develop strategies to remember basic addition and subtraction facts. [The student is expected to] determine patterns in related addition and subtraction number sentences (including fact families) such as $8 + 9 = 17$, $9 + 8 = 17$, $17 - 8 = 9$, and $17 - 9 = 8$.
2.6 (A)	The student is expected to generate a list of paired numbers based on a real-life situation such as number of tricycles related to number of wheels.
2.6 (B)	The student is expected to identify patterns in a list of related number pairs based on a real-life situation and extend the list.
2.6 (C)	The student is expected to identify, describe, and extend repeating and additive patterns to make predictions and solve problems.
2.8 (A)	The student is expected to use whole numbers to locate and name points on a number line.
2.11 (B)	The student is expected to draw conclusions and answer questions based on picture graphs and bar-type graphs.
2.12 (all)	The student applies Grade 2 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
2.13 (all)	The student communicates about Grade 2 mathematics using informal language.
2.14 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 2 MATHEMATICS

Developing an understanding of linear measurement

Students use units of measure and measurement tools to develop an understanding of measurement concepts, including partitioning and transitivity. Students estimate, measure, and compute lengths to solve problems involving data and space.

Related Grade 2 TEKS:

2.2 (A)	The student is expected to use concrete models to represent and name fractional parts of a whole object (with denominators of 12 or less).
2.2 (C)	The student is expected to use concrete models to determine if a fractional part of a whole is closer to 0, 1/2, or 1.
2.7 (B)	The student is expected to use attributes to describe how 2 two-dimensional figures or 2 three-dimensional geometric figures are alike or different. (The focus here is on linear attributes.)
2.9 (A)	The student is expected to identify concrete models that approximate standard units of length and use them to measure length.
2.9 (B)	The student is expected to select a non-standard unit of measure such as square tiles to determine the area of a two-dimensional surface.
2.11 (A)	The student is expected to construct picture graphs and bar-type graphs.
2.11 (B)	The student is expected to draw conclusions and answer questions based on picture graphs and bar-type graphs.
2.12 (all)	The student applies Grade 2 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
2.13 (all)	The student communicates about Grade 2 mathematics using informal language.
2.14 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 2 MATHEMATICS

Continuing Experiences - Grade 2 TEKS:

2.9 (C)	The student is expected to select a non-standard unit of measure such as a bathroom cup or a jar to determine the capacity of a given container.
2.9 (D)	The student is expected to select a non-standard unit of measure such as beans or marbles to determine the weight/mass of a given object.

Introductory Experiences - Grade 2 TEKS:

2.2 (B)	The student is expected to use concrete models to represent and name fractional parts of a set of objects (with denominators of 12 or less).
2.3 (E)	The student is expected to describe how the cent symbol, dollar symbol, and the decimal point are used to name the value of a collection of coins.
2.4 (A)	The student is expected to model, create, and describe multiplication situations in which equivalent sets of concrete objects are joined.
2.4 (B)	The student is expected to model, create, and describe division situations in which a set of concrete objects is separated into equivalent sets.
2.7 (A)	The student is expected to describe attributes (the number of vertices, faces, edges, sides) of two- and three-dimensional geometric figures such as circles, polygons, spheres, cones, cylinders, prisms, and pyramids, etc.
2.7 (C)	The student is expected to cut two-dimensional geometric figures apart and identify the new geometric figures formed.
2.10 (A)	The student is expected to read a thermometer to gather data.
2.10 (C)	The student is expected to describe activities that take approximately one second, one minute, and one hour.
2.11 (C)	The student is expected to use data to describe events as more likely or less likely such as drawing a certain color crayon from a bag of seven red crayons and three green crayons.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 3 MATHEMATICS

Developing an understanding of multiplication and division

Students understand the meanings of multiplication and division of whole numbers through the use of representations (e.g., equal-sized groups, arrays, area models, and equal "jumps" on number lines for multiplication, and successive subtraction, partitioning, and sharing for division). Students use properties of addition and multiplication to multiply whole numbers and apply increasingly sophisticated strategies based on these properties to solve multiplication and division problems. Students relate multiplication and division as inverse operations. [1, p. 15]

Related Grade 3 TEKS:

3.4 (A)	The student is expected to learn and apply multiplication facts through 12 x 12 using concrete models and objects.
3.4 (B)	The student is expected to solve and record multiplication problems (up to two digits times one digit).
3.4 (C)	The student is expected to use models to solve division problems and use number sentences to record the solutions.
3.6 (B)	The student is expected to identify patterns in multiplication facts using concrete objects, pictorial models, or technology.
3.6 (C)	The student is expected to identify patterns in related multiplication and division sentences (fact families) such as $2 \times 3 = 6$, $3 \times 2 = 6$, $6 \div 2 = 3$, $6 \div 3 = 2$.
3.7 (A)	The student is expected to generate a table of paired numbers based on a real-life situation such as insects and legs.
3.13 (A)	The student is expected to collect, organize, record, and display data in pictographs and bar graphs where each picture or cell might represent more than one piece of data.
3.14 (all)	The student applies Grade 3 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
3.15 (all)	The student communicates about Grade 3 mathematics using informal language.
3.16 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 3 MATHEMATICS

Using fractions to describe parts of wholes and parts of sets

Students use models to develop an understanding of fractions. Students use fractions to represent parts of a whole, parts of a set, or points or distances on a number line. Students use fraction names and symbols to describe fractional parts of whole objects or sets of objects. Students compare fractional parts of whole objects or sets of objects using concrete models and construct models of equivalent fractions.

Related Grade 3 TEKS:

3.2 (A)	The student is expected to construct concrete models of fractions.
3.2 (B)	The student is expected to compare fractional parts of whole objects or sets of objects in a problem situation using concrete models.
3.2 (C)	The student is expected to use fraction names and symbols to describe fractional parts of whole objects or sets of objects.
3.2 (D)	The student is expected to construct concrete models of equivalent fractions for fractional parts of whole objects.
3.10 (A)	The student is expected to locate and name points on a number line using whole numbers and fractions, including halves and fourths.
3.14 (all)	The student applies Grade 3 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
3.15 (all)	The student communicates about Grade 3 mathematics using informal language.
3.16 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 3 MATHEMATICS

Describing and analyzing properties of two- and three-dimensional geometric figures

Students identify, classify, and describe two- and three-dimensional geometric figures. Students investigate, describe, and reason about decomposing and combining polygons to make other polygons. Through building, drawing, and analyzing two-dimensional shapes, students understand properties of two-dimensional figures and the use of those properties in solving problems, including applications involving congruence and symmetry. [1, p. 15]

Related Grade 3 TEKS:

3.8 (A)	The student is expected to identify, classify, and describe two- and three-dimensional geometric figures by their attributes. The student compares two- dimensional figures, three-dimensional figures, or both by their attributes using formal geometry vocabulary.
3.9 (A)	The student is expected to identify congruent two-dimensional figures.
3.9 (B)	The student is expected to create two-dimensional figures with lines of symmetry using concrete models and technology.
3.9 (C)	The student is expected to identify lines of symmetry in two-dimensional geometric figures.
3.14 (all)	The student applies Grade 3 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
3.15 (all)	The student communicates about Grade 3 mathematics using informal language.
3.16 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 3 MATHEMATICS

Applying measurement concepts to solve problems

Students compare the attributes of length, area, weight/mass, and capacity to solve problems and answer questions. Students select tools that use standard units to describe length, area, capacity/volume, weight/mass, time, and temperature. Students solve problems involving perimeter of two-dimensional figures. Students collect, organize, record, display, and interpret data from measurement activities.

Related Grade 3 TEKS:

3.3 (A)	The student is expected to model addition and subtraction using pictures, words, and numbers.
3.3 (B)	The student is expected to select addition or subtraction and use the operation to solve problems involving whole numbers through 999.
3.7 (A)	The student is expected to generate a table of paired numbers based on a real-life situation such as insects and legs.
3.7 (B)	The student is expected to identify and describe patterns in a table of related number pairs based on a meaningful problem and extend the table.
3.11 (A)	The student is expected to use linear measurement tools to estimate and measure lengths using standard units.
3.11 (B)	The student is expected to use standard units to find the perimeter of a shape.
3.11 (C)	The student is expected to use concrete and pictorial models of square units to determine the area of two-dimensional surfaces.
3.11 (D)	The student is expected to identify concrete models that approximate standard units of weight/mass and use them to measure weight/mass.
3.11 (E)	The student is expected to identify concrete models that approximate standard units for capacity and use them to measure capacity.
3.11 (F)	The student is expected to use concrete models that approximate cubic units to determine the volume of a given container or other three-dimensional geometric figure.
3.12 (A)	The student is expected to use a thermometer to measure temperature.
3.12 (B)	The student is expected to tell and write time shown on analog and digital clocks.
3.14 (all)	The student applies Grade 3 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
3.15 (all)	The student communicates about Grade 3 mathematics using informal language.
3.16 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 3 MATHEMATICS

Continuing Experiences - Grade 3 TEKS:	
3.1 (all)	The student uses place value to communicate about increasingly large whole numbers in verbal and written form, including money.
3.3 (A)	The student is expected to model addition and subtraction using pictures, words, and numbers.
3.3 (B)	The student is expected to select addition or subtraction and use the operation to solve problems involving whole numbers through 999.
3.6 (A)	The student is expected to identify and extend whole-number and geometric patterns to make predictions and solve problems.
3.13 (B)	The student is expected to interpret information from pictographs and bar graphs.
Introductory Experiences - Grade 3 TEKS:	
3.5 (A)	The student is expected to round whole numbers to the nearest ten or hundred to approximate reasonable results in problem situations.
3.5 (B)	The student is expected to use strategies including rounding and compatible numbers to estimate solutions to addition and subtraction problems.
3.13 (C)	The student is expected to use data to describe events as more likely than, less likely than, or equally likely as.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 4 MATHEMATICS

Developing quick retrieval of basic multiplication facts and related division facts and proficient use of multiplication and division algorithms

Students develop fluency with efficient procedures for multiplying and dividing whole numbers, justify these procedures, and use them to solve problems. Students demonstrate quick recall of the basic multiplication and related division facts. Students apply their understanding of models for multiplication (e.g., equal-sized groups, arrays, area models, equal intervals on the number line), place value, and properties of operations (e.g., distributive property of multiplication over addition) as students develop and discuss generalizable methods to multiply and divide multidigit whole numbers.

Related Grade 4 TEKS:

4.4 (A)	The student is expected to model factors and products using arrays and area models.
4.4 (B)	The student is expected to represent multiplication and division situations in picture, word, and number form.
4.4 (C)	The student is expected to recall and apply multiplication facts through 12 x 12.
4.4 (D)	The student is expected to use multiplication to solve problems (no more than two digits times two digits without technology).
4.4 (E)	The student is expected to use division to solve problems (no more than one-digit divisors and three-digit dividends without technology).
4.5 (B)	The student is expected to use strategies including rounding and compatible numbers to estimate solutions to multiplication and division problems.
4.6 (A)	The student is expected to use patterns and relationships to develop strategies to remember basic multiplication and division facts (such as the patterns in related multiplication and division number sentences (fact families) such as 9 x 9 = 81 and 81 ÷ 9 = 9).
4.6 (B)	The student is expected to use patterns to multiply by 10 and 100.
4.11 (B)	The student is expected to perform simple conversions between different units of lengths, between different units of capacity, and between different units of weight within the customary measurement system.
4.14 (all)	The student applies Grade 4 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
4.15 (all)	The student communicates about Grade 4 mathematics using informal language.
4.16 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 4 MATHEMATICS

Using fractions and decimals to describe parts of wholes and parts of sets

Students locate and name points on a number line using whole numbers, fractions, and decimals. Students use models to develop understanding of decimal notation as an extension of the base-ten system of writing whole numbers that is useful for representing more numbers, including numbers between 0 and 1, between 1 and 2, and so on. Students relate their understanding of fractions to reading and writing decimals that are greater than or less than 1. Students connect equivalent fractions and decimals with multiple representations. [1, p. 16]

Related Grade 4 TEKS:

4.1 (A)	The student is expected to use place value to read, write, compare, and order whole numbers through 999,999,999.
4.1 (B)	The student is expected to use place value to read, write, compare, and order decimals involving tenths and hundredths, including money, using concrete objects and pictorial models.
4.2 (A)	The student is expected to use concrete objects and pictorial models to generate equivalent fractions.
4.2 (B)	The student is expected to model fraction quantities greater than one using concrete objects and pictorial models.
4.2 (C)	The student is expected to compare and order fractions using concrete objects and pictorial models.
4.2 (D)	The student is expected to relate decimals to fractions that name tenths and hundredths using concrete objects and pictorial models.
4.10 (A)	The student is expected to locate and name points on a number line using whole numbers, fractions such as halves and fourths, and decimals such as tenths.
4.14 (all)	The student applies Grade 4 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
4.15 (all)	The student communicates about Grade 4 mathematics using informal language.
4.16 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 4 MATHEMATICS

Describing properties of geometric figures and applying transformations

Students identify and describe geometric figures, including angles, lines, and two- and three-dimensional figures using formal language and essential attributes. Students build on their earlier work with symmetry and congruence in Grade 3 to encompass transformations, including reflections, translations, and rotations. By using hands-on, real life experiences to model transformations such as designing simple tilings and tessellations, students deepen their understanding of two-dimensional space. [1, p. 16]

Related Grade 4 TEKS:

4.8 (A)	The student is expected to identify and describe right, acute, and obtuse angles.
4.8 (B)	The student is expected to identify and describe parallel and intersecting (including perpendicular) lines using concrete objects and pictorial models.
4.8 (C)	The student is expected to use essential attributes to define two- and three-dimensional geometric figures.
4.9 (A)	The student is expected to demonstrate translations, reflections, and rotations using concrete models.
4.9 (B)	The student is expected to use translations, reflections, and rotations to verify that two shapes are congruent.
4.9 (C)	The student is expected to use reflections to verify that a shape has symmetry.
4.14 (all)	The student applies Grade 4 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
4.15 (all)	The student communicates about Grade 4 mathematics using informal language.
4.16 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 4 MATHEMATICS

Using measurement tools to solve problems

Students use measurement tools to determine length, area, volume, capacity, and weight/mass. Students understand that a square that is 1 unit per side is the standard unit for measuring area. Students select appropriate units, strategies, and tools for solving problems that involve estimating measurements or measuring various attributes. Students use concrete models of standard cubic units to estimate and measure volume. Students use tools to measure temperature, temperature change, and time change.

Related Grade 4 TEKS:

4.7 (A)	The student is expected to describe the relationship between two sets of related data such as ordered pairs in a table.
4.11 (A)	The student is expected to estimate and use measurement tools to determine length (including perimeter), area, capacity, and weight/mass using standard units SI (metric) and customary.
4.11 (B)	The student is expected to perform simple conversions between different units of length, between different units of capacity, and between different units of weight within the customary measurement system.
4.11 (C)	The student is expected to use concrete models of standard cubic units to measure volume.
4.11 (D)	The student is expected to estimate volume in cubic units.
4.11 (E)	The student is expected to explain the difference between weight and mass.
4.12 (A)	The student is expected to use a thermometer to measure temperature and changes in temperature.
4.14 (all)	The student applies Grade 4 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
4.15 (all)	The student communicates about Grade 4 mathematics using informal language.
4.16 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 4 MATHEMATICS

Continuing Experiences - Grade 4 TEKS:	
4.3 (A)	The student is expected to use addition and subtraction to solve problems involving whole numbers.
4.5 (A)	The student is expected to round whole numbers to the nearest ten, hundred, or thousand to approximate reasonable results in problem situations.
4.13 (B)	The student is expected to interpret bar graphs.
Introductory Experiences - Grade 4 TEKS:	
4.3 (B)	The student is expected to add and subtract decimals to the hundredths place using concrete objects and pictorial models.
4.12 (B)	The student is expected to use tools such as a clock with gears or a stopwatch to solve problems involving elapsed time.
4.13 (A)	The student is expected to use concrete objects or pictures to make generalizations about determining all possible combinations of a given set of data or of objects in a problem situation.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 5 MATHEMATICS

Using fractions and decimals to represent and compare quantities

Students generate a fraction equivalent to given fractions, including fractions less than, equal to, and greater than one. Students compare fractional quantities with and without common denominators. Students use models to relate decimal place value to fractions that name tenths, hundredths, and thousandths. Students use concrete objects, pictures (including number line), words, and numbers to model situations involving addition and/or subtraction of fractions with like denominators. Students use the models to develop addition and subtraction procedures to solve problems.

Related Grade 5 TEKS:

5.1 (A)	The student is expected to use place value to read, write, compare, and order whole numbers through 999,999,999,999.
5.1 (B)	The student is expected to use place value to read, write, compare, and order decimals through the thousandths place.
5.2 (A)	The student is expected to generate a fraction equivalent to a given fraction such as 1/2 and 3/6 or 4/12 and 1/3.
5.2 (B)	The student is expected to generate a mixed number equivalent to a given improper fraction or generate an improper fraction equivalent to a given mixed number.
5.2 (C)	The student is expected to compare two fractional quantities in problem-solving situations using a variety of methods, including common denominators.
5.2 (D)	The student is expected to use models to relate decimals to fractions that name tenths, hundredths, and thousandths.
5.3 (A)	The student is expected to use addition and subtraction to solve problems involving whole numbers and decimals.
5.3 (E)	The student is expected to model situations using addition and/or subtraction involving fractions with like denominators using concrete objects, pictures, words, and numbers.
5.12 (A)	The student is expected to use fractions to describe the results of an experiment.
5.14 (all)	The student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
5.15 (all)	The student communicates about Grade 5 mathematics using informal language.
5.16 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 5 MATHEMATICS

Developing proficient use of whole-number division algorithms

Students apply their understanding of division, place value, properties, and the relationship of division to multiplication as they develop, discuss, and use efficient procedures to find quotients involving up to three-digit dividends. Students select appropriate methods and apply them accurately to estimate quotients or calculate quotients mentally, depending on the context and numbers involved. Students develop an efficient algorithm for dividing whole numbers, understand why the procedures work (on the basis of place value and properties of operations), and use the procedures to solve problems. Students consider the context in which a problem is situated to select the most useful form of the quotient for the solution, and they interpret it appropriately. [1, p. 17]

Related Grade 5 TEKS:

5.3 (B)	The student is expected to use multiplication to solve problems involving whole numbers (no more than three digits times two digits without technology).
5.3 (C)	The student is expected to use division to solve problems involving whole numbers (no more than two-digit divisors and three-digit dividends without technology), including interpreting the remainder within a given context.
5.3 (D)	The student is expected to identify common factors of a set of whole numbers.
5.4 (A)	The student is expected to use strategies, including rounding and compatible numbers to estimate solutions to addition, subtraction, multiplication, and division problems.
5.5 (B)	The student is expected to identify prime and composite numbers using concrete objects, pictorial models, and patterns in factor pairs.
5.14 (all)	The student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
5.15 (all)	The student communicates about Grade 5 mathematics using informal language.
5.16 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 5 MATHEMATICS

Connecting measurement concepts to the use of measurement formulas to solve problems

Students apply their understanding of measurement to select appropriate units for measuring length, perimeter, area, and volume in specific problem contexts. Students use a variety of representations to build connections between direct measurement of perimeter, area, and volume to the use of related formulas.

Related Grade 5 TEKS:

5.5 (A)	The student is expected to describe the relationship between sets of data in graphic organizers such as lists, tables, charts, and diagrams.
5.10 (B)	The student is expected to connect models for perimeter, area, and volume with their respective formulas.
5.10 (C)	The student is expected to select and use appropriate units and formulas to measure length, perimeter, area, and volume.
5.14 (all)	The student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
5.15 (all)	The student communicates about Grade 5 mathematics using informal language.
5.16 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 5 MATHEMATICS

Collecting, organizing, displaying, and interpreting sets of data to solve problems

Students use graphic displays (e.g., tables, graphs) to describe data (e.g., data derived from a probability experiment). Students also describe characteristics of data presented in tables and graphs using range, median, and mode. Students use an appropriate graphic based on the attributes of a particular set of data. Students conduct probability experiments, describe their outcomes, and make predictions based on their results.

Related Grade 5 TEKS:

5.5 (A)	The student is expected to describe the relationship between sets of data in graphic organizers such as lists, tables, charts, and diagrams.
5.12 (B)	The student is expected to use experimental results to make predictions.
5.12 (C)	The student is expected to list all possible outcomes of a probability experiment such as tossing a coin.
5.13 (A)	The student is expected to use tables of related number pairs to make line graphs.
5.13 (B)	The student is expected to describe characteristics of data presented in tables and graphs including median, mode, and range.
5.13 (C)	The student is expected to graph a given set of data using an appropriate graphical representation such as a picture or line graph.
5.14 (all)	The student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
5.15 (all)	The student communicates about Grade 5 mathematics using informal language.
5.16 (all)	The student uses logical reasoning.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 5 MATHEMATICS

Continuing Experiences - Grade 5 TEKS:	
5.4 (A)	The student is expected to use strategies, including rounding and compatible numbers to estimate solutions to addition, subtraction, multiplication, and division problems.
5.7 (A)	The student is expected to identify essential attributes including parallel, perpendicular and congruent parts of two- and three-dimensional geometric figures.
5.8 (A)	The student is expected to sketch the results of translations, rotations, and reflections on a Quadrant I coordinate grid.
5.8 (B)	The student is expected to identify the transformation that generates one figure from the other when given two congruent figures on a Quadrant I coordinate grid.
5.10 (A)	The student is expected to perform simple conversions within the same measurement system (SI (metric) or customary).
5.11 (A)	The student is expected to solve problems involving changes in temperature.
Introductory Experiences - Grade 5 TEKS:	
5.6 (A)	The student is expected to select from and use diagrams and equations such as $y = 5 + 3$ to represent meaningful problem situations.
5.9 (A)	The student is expected to locate and name points on a coordinate grid using ordered pairs of whole numbers.
5.11 (B)	The student is expected to solve problems involving elapsed time.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 6 MATHEMATICS

Connecting ratio and rate to multiplication and division and using equivalent ratios to represent proportional relationships
Students use components of multiplication and division (including common factors and multiples) and their knowledge of fractions to understand and solve ratio and rate problems. Students apply their understanding of equivalent fractions to create equivalent ratios that describe situations that involve proportionality and use various representations (e.g., graphs, tables, equations) to solve proportionality problems.

Related Grade 6 TEKS:

6.1 (B)	The student is expected to generate equivalent forms of rational numbers including whole numbers, fractions, and decimals.
6.1 (D)	The student is expected to write prime factorizations using exponents.
6.1 (E)	The student is expected to identify factors of a positive integer, common factors, and the greatest common factor of a set of positive integers.
6.1 (F)	The student is expected to identify multiples of a positive integer and common multiples and the least common multiple of a set of positive integers.
6.2 (C)	The student is expected to use multiplication and division of whole numbers to solve problems including situations involving equivalent ratios and rates.
6.3 (A)	The student is expected to use ratios to describe proportional situations.
6.3 (B)	The student is expected to represent ratios and percents with concrete models, fractions, and decimals.
6.3 (C)	The student is expected to use ratios to make predictions in proportional situations.
6.4 (A)	The student is expected to use tables and symbols to represent and describe proportional and other relationships such as those involving conversions, arithmetic sequences (with a constant rate of change), perimeter, and area.
6.5 (A)	The student is expected to formulate equations from problem situations described by linear relationships.
6.6 (C)	The student is expected to describe the relationship between radius, diameter, and circumference of a circle.
6.8 (D)	The student is expected to convert measures within the same measurement system (customary and metric) based on relationships between units.
6.11 (all)	The student applies Grade 6 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.
6.12 (all)	The student communicates about Grade 6 mathematics through informal and mathematical language, representations, and models.
6.13 (all)	The student uses logical reasoning to make conjectures and verify conclusions.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 6 MATHEMATICS

Developing an understanding of and fluency with addition and subtraction of fractions and decimals

Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. Students apply their understanding of decimal models, place value, and properties to add and subtract decimals. Students make reasonable estimates of fraction and decimal sums and differences and add and subtract fractions and decimals to solve problems. [1, p.17]

Related Grade 6 TEKS:

6.1 (B)	The student is expected to generate equivalent forms of rational numbers including whole numbers, fractions, and decimals.
6.2 (A)	The student is expected to model addition and subtraction situations involving fractions with objects, pictures, words, and numbers.
6.2 (B)	The student is expected to use addition and subtraction to solve problems involving fractions and decimals.
6.2 (D)	The student is expected to estimate and round to approximate reasonable results and to solve problems where exact answers are not required.
6.9 (B)	The student is expected to find the probabilities of a simple event and its complement and describe the relationship between the two.
6.11 (all)	The student applies Grade 6 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.
6.12 (all)	The student communicates about Grade 6 mathematics through informal and mathematical language, representations, and models.
6.13 (all)	The student uses logical reasoning to make conjectures and verify conclusions.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 6 MATHEMATICS

Applying measurement to geometric figures

Students identify characteristics of two- and three-dimensional figures or objects that can be measured, either directly or indirectly, including angle measure, perimeter, circumference, area, volume, capacity, and weight. Students select appropriate units, tools, and formulas to estimate and measure or calculate these characteristics and use them to solve problems.

Related Grade 6 TEKS:

6.6 (A)	The student is expected to use angle measurements to classify angles as acute, obtuse, or right.
6.6 (B)	The student is expected to identify relationships involving angles in triangles and quadrilaterals.
6.6 (C)	The student is expected to describe the relationship between radius, diameter, and circumference of a circle.
6.8 (A)	The student is expected to estimate measurements (including circumference) and evaluate reasonableness of results.
6.8 (B)	The student is expected to select and use appropriate units, tools, or formulas to measure and to solve problems involving length (including perimeter), area, time, temperature, volume, and weight.
6.8 (C)	The student is expected to measure angles.
6.11 (all)	The student applies Grade 6 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.
6.12 (all)	The student communicates about Grade 6 mathematics through informal and mathematical language, representations, and models.
6.13 (all)	The student uses logical reasoning to make conjectures and verify conclusions.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 6 MATHEMATICS

Using algebraic notation to represent situations involving rational numbers

Students use expressions and equations to represent patterns and relationships in a variety of contexts. Students use mathematical symbols to represent linear relationships, measurement formulas, and characteristics of data sets.

Related Grade 6 TEKS:

6.1 (C)	The student is expected to use integers to represent real-life situations.
6.2 (E)	The student is expected to use order of operations to simplify whole number expressions (without exponents) in problem solving situations.
6.4 (A)	The student is expected to use tables and symbols to represent and describe proportional and other relationships such as those involving conversions, arithmetic sequences (with a constant rate of change), perimeter, and area.
6.4 (B)	The student is expected to use tables of data to generate formulas representing relationships involving perimeter, area, volume of a rectangular prism, etc.
6.5 (A)	The student is expected to formulate equations from problem situations described by linear relationships.
6.7 (A)	The student is expected to locate and name points on a coordinate plane using ordered pairs of non-negative rational numbers.
6.8 (B)	The student is expected to select and use appropriate units, tools, or formulas to measure and to solve problems involving length (including perimeter), area, time, temperature, volume, and weight.
6.10 (A)	The student is expected to select and use an appropriate representation for presenting and displaying different graphical representations of the same data including line plot, line graph, bar graph, and stem and leaf plot.
6.10 (B)	The student is expected to identify mean (using concrete objects and pictorial models), median, mode, and range of a set of data.
6.10 (C)	The student is expected to sketch circle graphs to display data.
6.10 (D)	The student is expected to solve problems by collecting, organizing, displaying, and interpreting data.
6.11 (all)	The student applies Grade 6 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.
6.12 (all)	The student communicates about Grade 6 mathematics through informal and mathematical language, representations, and models.
6.13 (all)	The student uses logical reasoning to make conjectures and verify conclusions.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 6 MATHEMATICS

Continuing Experiences - Grade 6 TEKS:	
6.1 (A)	The student is expected to compare and order non-negative rational numbers.
Introductory Experiences - Grade 6 TEKS:	
6.9 (A)	The student is expected to construct sample spaces using lists and tree diagrams.
6.9 (B)	The student is expected to find the probabilities of a simple event and its complement and describe the relationship between the two.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 7 MATHEMATICS

Representing and applying proportionality
Students use reasoning about rates, ratios, proportionality, and percent to solve problems in a variety of contexts.

Related Grade 7 TEKS:

7.2 (A)	The student is expected to represent multiplication and division situations involving fractions and decimals with models, including concrete objects, pictures, words, and numbers.
7.2 (D)	The student is expected to use division to find unit rates and ratios in proportional relationships such as speed, density, price, recipes, and student-teacher ratio.
7.3 (A)	The student is expected to estimate and find solutions to application problems involving percent.
7.3 (B)	The student is expected to estimate and find solutions to application problems involving proportional relationships such as similarity, scaling, unit costs, and related measurement units.
7.6 (D)	The student is expected to use critical attributes to define similarity.
7.13 (all)	The student applies Grade 7 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.
7.14 (all)	The student communicates about Grade 7 mathematics through informal and mathematical language, representations, and models.
7.15 (all)	The student uses logical reasoning to make conjectures and verify conclusions.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 7 MATHEMATICS

Using rational numbers and operations in a variety of contexts to solve problems

Students extend understanding of and develop procedures for addition, subtraction, multiplication, and division of all integers and positive rational numbers.

Related Grade 7 TEKS:

7.1 (A)	The student is expected to compare and order integers and positive rational numbers.
7.1 (B)	The student is expected to convert between fractions, decimals, whole numbers, and percents mentally, on paper, or with a calculator.
7.1 (C)	The student is expected to represent squares and square roots using geometric models.
7.2 (A)	The student is expected to represent multiplication and division situations involving fractions and decimals with models, including concrete objects, pictures, words, and numbers.
7.2 (B)	The student is expected to use addition, subtraction, multiplication, and division to solve problems involving fractions and decimals.
7.2 (C)	The student is expected to use models, such as concrete objects, pictorial models, and number lines, to add, subtract, multiply, and divide integers and connect the actions to algorithms.
7.2 (E)	The student is expected to simplify numerical expressions involving order of operations and exponents.
7.2 (F)	The student is expected to select and use appropriate operations to solve problems and justify the selections.
7.2 (G)	The student is expected to determine the reasonableness of a solution to a problem.
7.13 (all)	The student applies Grade 7 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.
7.14 (all)	The student communicates about Grade 7 mathematics through informal and mathematical language, representations, and models.
7.15 (all)	The student uses logical reasoning to make conjectures and verify conclusions.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 7 MATHEMATICS

Using geometric characteristics and properties to classify figures and solve problems

Students classify two- and three-dimensional figures based on their shared characteristics and properties. Students select appropriate two- and three-dimensional figures to model real-world situations and use the characteristics and properties of these figures to solve problems in a variety of contexts.

Related Grade 7 TEKS:

7.6 (A)	The student is expected to use angle measurements to classify pairs of angles as complementary or supplementary.
7.6 (B)	The student is expected to use properties to classify triangles and quadrilaterals.
7.6 (C)	The student is expected to use properties to classify three-dimensional figures, including pyramids, cones, prisms, and cylinders.
7.7 (B)	The student is expected to graph reflections across the horizontal or vertical axis and graph translations on a coordinate plane.
7.8 (A)	The student is expected to sketch three-dimensional figures when given the top, side, and front views.
7.8 (B)	The student is expected to make a net (two-dimensional model) of the surface area of a three-dimensional figure.
7.8 (C)	The student is expected to use geometric concepts and properties to solve problems in fields such as art and architecture.
7.9 (A)	The student is expected to estimate measurements and solve application problems involving length (including perimeter and circumference) and area of polygons and other shapes.
7.9 (B)	The student is expected to connect models for volume of prisms (triangular and rectangular) and cylinders to formulas of prisms (triangular and rectangular) and cylinders.
7.9 (C)	The student is expected to estimate measurements and solve application problems involving volume of prisms (rectangular and triangular) and cylinders.
7.13 (all)	The student applies Grade 7 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.
7.14 (all)	The student communicates about Grade 7 mathematics through informal and mathematical language, representations, and models.
7.15 (all)	The student uses logical reasoning to make conjectures and verify conclusions.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 7 MATHEMATICS

Using algebraic notation and rational numbers in a variety of contexts, including measurement conversions, probability, and data analysis

Students select, justify, and use appropriate symbolic representations for given situations. Students extend their application of rational numbers to include converting measurement units, describing probability, and describing arithmetic sequences. Students use models to formulate and solve linear equations in one variable.

Related Grade 7 TEKS:

7.2 (E)	The student is expected to simplify numerical expressions involving order of operations and exponents.
7.4 (A)	The student is expected to generate formulas involving unit conversions within the same system (customary and metric), perimeter, area, circumference, volume, and scaling.
7.4 (B)	The student is expected to graph data to demonstrate relationships in familiar concepts such as conversions, perimeter, area, circumference, volume, and scaling.
7.4 (C)	The student is expected to use words and symbols to describe the relationship between the terms in an arithmetic sequence (with a constant rate of change) and their positions.
7.5 (A)	The student is expected to use concrete and pictorial models to solve equations and use symbols to record the actions.
7.5 (B)	The student is expected to formulate problem situations when given a simple equation and formulate an equation when given a problem situation.
7.7 (A)	The student is expected to locate and name points on a coordinate plane using ordered pairs of integers.
7.10 (A)	The student is expected to construct sample spaces for simple or composite experiments.
7.10 (B)	The student is expected to find the probability of independent events.
7.11 (A)	The student is expected to select and use an appropriate representation for presenting and displaying relationships among collected data, including line plot, line graph, bar graph, stem and leaf plot, circle graph, and Venn diagrams, and justify the selection.
7.11 (B)	The student is expected to make inferences and convincing arguments based on an analysis of given or collected data.
7.12 (B)	The student is expected to choose among mean, median, mode, or range to describe a set of data and justify the choice for a particular situation.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 7 MATHEMATICS

Using algebraic notation and rational numbers in a variety of contexts, including measurement conversions, probability, and data analysis (continued)

Students select, justify, and use appropriate symbolic representations for given situations. Students extend their application of rational numbers to include converting measurement units, describing probability, and describing arithmetic sequences. Students use models to formulate and solve linear equations in one variable.

Related Grade 7 TEKS:

7.13 (all)	The student applies Grade 7 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.
7.14 (all)	The student communicates about Grade 7 mathematics through informal and mathematical language, representations, and models.
7.15 (all)	The student uses logical reasoning to make conjectures and verify conclusions.

Continuing Experiences - Grade 7 TEKS:

7.12 (A)	The student is expected to describe a set of data using mean, median, mode, and range.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 8 MATHEMATICS

Representing, applying, and analyzing proportionality

Students extend their understanding of proportionality to include representations on a coordinate plane and applications, including proportional changes.

Related Grade 8 TEKS:

8.1 (B)	The student is expected to select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships.
8.2 (D)	The student is expected to use multiplication by a given constant factor (including unit rate) to represent and solve problems involving proportional relationships including conversions between measurement systems.
8.3 (A)	The student is expected to compare and contrast proportional and non-proportional linear relationships.
8.3 (B)	The student is expected to estimate and find solutions to application problems involving percents and other proportional relationships such as similarity and rates.
8.6 (A)	The student is expected to generate similar figures using dilations including enlargements and reductions.
8.9 (B)	The student is expected to use proportional relationships in similar two-dimensional figures or similar three-dimensional figures to find missing measurements.
8.10 (A)	The student is expected to describe the resulting effects on perimeter and area when dimensions of a shape are changed proportionally.
8.10 (B)	The student is expected to describe the resulting effect on volume when dimensions of a solid are changed proportionally.
8.14 (all)	The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.
8.15 (all)	The student communicates about Grade 8 mathematics through informal and mathematical language, representations, and models.
8.16 (all)	The student uses logical reasoning to make conjectures and verify conclusions.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 8 MATHEMATICS

Using algebraic notation and the rational number system to represent and solve problems in a variety of contexts

Students select and use expressions and equations used to represent and solve problems involving rational numbers. Students use words, numbers, tables and graphs to justify their symbolic representations and their solution strategies.

Related Grade 8 TEKS:

8.1 (A)	The student is expected to compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals.
8.1 (B)	The student is expected to select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships.
8.1 (C)	The student is expected to approximate (mentally and with calculators) the value of irrational numbers as they arise from problem situations (such as π, $\sqrt{2}$).
8.1 (D)	The student is expected to express numbers in scientific notation, including negative exponents, in appropriate problem situations.
8.1 (E)	A student is expected to compare and order real numbers with a calculator.
8.2 (A)	The student is expected to select appropriate operations to solve problems involving rational numbers and justify the selections.
8.2 (B)	The student is expected to use appropriate operations to solve problems involving rational numbers in problem situations.
8.2 (C)	The student is expected to evaluate a solution for reasonableness.
8.4 (A)	The student is expected to generate a different representation of data given another representation of data (such as a table, graph, equation, or verbal description).
8.5 (A)	The student is expected to predict, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations.
8.5 (B)	The student is expected to find and evaluate an algebraic expression to determine any term in an arithmetic sequence (with a constant rate of change).
8.14 (all)	The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.
8.15 (all)	The student communicates about Grade 8 mathematics through informal and mathematical language, representations, and models.
8.16 (all)	The student uses logical reasoning to make conjectures and verify conclusions.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 8 MATHEMATICS

Using geometric characteristics and properties to solve problems

Students extend their understanding of the characteristics and properties of two- and three-dimensional figures. Students use geometric characteristics and properties, including the Pythagorean Theorem, to solve problems in a variety of contexts.

Related Grade 8 TEKS:

8.6 (B)	The student is expected to graph dilations, reflections, and translations on a coordinate plane.
8.7 (A)	The student is expected to draw three-dimensional figures from different perspectives.
8.7 (B)	The student is expected to use geometric concepts and properties to solve problems in fields such as art and architecture.
8.7 (C)	The student is expected to use pictures or models to demonstrate the Pythagorean Theorem.
8.7 (D)	The student is expected to locate and name points on a coordinate plane using ordered pairs of rational numbers.
8.8 (A)	The student is expected to find lateral and total surface area of prisms, pyramids, and cylinders using concrete models and nets (two-dimensional models).
8.8 (B)	The student is expected to connect models of prisms, cylinders, pyramids, spheres, and cones to formulas for volume of these objects.
8.8 (C)	The student is expected to estimate measurements and use formulas to solve application problems involving lateral and total surface area and volume.
8.9 (A)	The student is expected to use the Pythagorean Theorem to solve real-life problems.
8.14 (all)	The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.
8.15 (all)	The student communicates about Grade 8 mathematics through informal and mathematical language, representations, and models.
8.16 (all)	The student uses logical reasoning to make conjectures and verify conclusions.

TEXAS RESPONSE TO CURRICULUM FOCAL POINTS FOR GRADE 8 MATHEMATICS

Using statistics and probability to analyze and summarize data sets

Students select and use appropriate representations and accompanying descriptive statistics to present, summarize, and compare data sets. Students use experimental results and theoretical probabilities, when possible, along with proportions to make approximate predictions of the occurrences of certain events. Students use their knowledge of data representation and analysis to evaluate presentations of information and the validity of conclusions drawn from that information.

Related Grade 8 TEKS:

8.4 (A)	The student is expected to generate a different representation of data given another representation of data (such as a table, graph, equation, or verbal description).
8.5 (A)	The student is expected to predict, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations.
8.11 (A)	The student is expected to find the probabilities of dependent and independent events.
8.11 (B)	The student is expected to use theoretical probabilities and experimental results to make predictions and decisions.
8.11 (C)	The student is expected to select and use different models to simulate an event.
8.12 (A)	The student is expected to use variability (range, including interquartile range (IQR)) and select the appropriate measure of central tendency to describe a set of data and justify the choice for a particular situation.
8.12 (B)	The student is expected to draw conclusions and make predictions by analyzing trends in scatterplots.
8.12 (C)	The student is expected to select and use an appropriate representation for presenting and displaying relationships among collected data, including line plots, line graphs, stem and leaf plots, circle graphs, bar graphs, box and whisker plots, histograms, and Venn diagrams, with and without the use of technology.
8.13 (A)	The student is expected to evaluate methods of sampling to determine validity of an inference made from a set of data.
8.13 (B)	The student is expected to recognize misuses of graphical or numerical information and evaluate predictions and conclusions based on data analysis.
8.14 (all)	The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.
8.15 (all)	The student communicates about Grade 8 mathematics through informal and mathematical language, representations, and models.
8.16 (all)	The student uses logical reasoning to make conjectures and verify conclusions.

REFERENCES

1. National Council of Teachers of Mathematics (NCTM). (2006). *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics*. Reston, VA: NCTM.

2. National Council of Teachers of Mathematics (NCTM). (2000). *Principles and Standards for School Mathematics*. Reston, VA: NCTM.

3. National Mathematics Advisory Panel. (2008). Foundations for Success: *The Final Report of the National Mathematics Advisory Panel.* Washington, DC: U.S. Department of Education.