Click-On TEKS

A simple approach to understanding
the Texas Essential Knowledge and Skills

GRADE 4 MATH

REGION 13
EDUCATION SERVICE CENTER

These explanations of the new state math standards are designed to help you understand what the standards mean and how the models of teaching math help students understand mathematics more deeply. Others may interpret the standards differently and may have different ideas for how to teach them. It is the hope of the authors that this deconstruction of the Texas Essential Knowledge and Skills (TEKS) for mathematics makes teaching math more rigorous, more fun, and a little less confusing.

The goal of this document is to be responsive to the updated information about the new Mathematics TEKS. Specificity and/or activities may be adjusted over time as more information becomes available from the state.

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Strand 1: Mathematical Process Standards	
4.1	Mathematical Process Standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding.

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Structure of the TEKS

The Texas Essential Knowledge and Skills (TEKS) consists of four parts.

Part 1: The Introduction

The state standards, or TEKS, for each grade level begin with an Introduction. The Introduction gives an overview of the focal areas for each grade and provides general information about numerical fluency and the processing skills. While the Introduction has not been reprinted in this product, information from the Introduction has been included in the explanations of the TEKS where appropriate.

Part 2: Strands

The standards are broken into groups or categories called Strands. The TEKS for elementary mathematics are divided into six strands:

1. Mathematical Process Standards: This strand contains the process standards for mathematics, which are the same from Kindergarten through Pre-Cal. The process standards are the ways that students acquire math content through the use of models and tools, communication, problem solving, reasoning and analysis, and making connections. These standards should be woven consistently throughout the content strands (2–6). The dual-coded questions on STAAR will be coded with a content standard and a process standard.
2. Number and Operations
3. Algebraic Reasoning
4. Geometry and Measurement
5. Data Analysis
6. Personal Financial Literacy

Example

4.1 Mathematical Process Standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding.

(A) Apply mathematics to problems arising in everyday life, society, and the workplace.

Part 3: Knowledge and Skills Statements

Immediately following the strand is the **Knowledge and Skills** (K&S) statement. It provides the context for the student expectations that follow it.

Numbering: The first number is the grade level. The second number is the Knowledge and Skills number. The K&S statement shown is from fourth grade.

Part 4: Student Expectations

Immediately following each Knowledge and Skills statement is a list of **Student Expectations** (SE). The letters, such as (A), refer to what students are expected to do with regard to a particular Knowledge and Skills statement.

We often refer to this example as 4.1A. [Grade Level fourth grade, Knowledge and Skills statement (1), Student Expectation (A)]

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RC = Reporting Category

4.3C	determine if two given fractions are equivalent using a variety of methods. **RC1, Supporting Standard**
4.3D	compare two fractions with different numerators and different denominators and represent the comparison using the symbols >, =, or <. **RC1, Readiness Standard**
4.3E	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. **RC2, Readiness Standard**
4.3F	evaluate the reasonableness of sums and differences of fractions using benchmark fractions 0, ¼, ½, ¾, and 1, referring to the same whole. **RC2, Supporting Standard**
4.3G	represent fractions and decimals to the tenths or hundredths as distances from zero on a number line. **RC1, Supporting Standard**
4.4	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:
4.4A	add and subtract whole numbers and decimals to the hundredths place using the standard algorithm. **RC2, Readiness Standard**
4.4B	determine products of a number and 10 or 100 using properties of operations and place value understanding. **RC2, Supporting Standard**
4.4C	represent the product of 2 two-digit numbers using arrays, area models, or equations, including perfect squares through 15 by 15. **RC2, Supporting Standard**
4.4D	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. **RC2, Supporting Standard**
4.4E	represent the quotient of up to a four-digit whole number divided by a one-digit whole number using arrays, area models, or equations. **RC2, Supporting Standard**
4.4F	use strategies and algorithms, including the standard algorithm, to divide up to a four-digit dividend by a one-digit divisor. **RC2, Supporting Standard**
4.4G	round to the nearest 10, 100, or 1000 or use compatible numbers to estimate solutions involving whole numbers. **RC2, Supporting Standard**
4.4H	solve with fluency one- and two-step problems involving multiplication and division, including interpreting remainders. **RC2, Readiness Standard**

Algebraic Reasoning	
4.5	Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:
4.5A	represent multi-step problems involving the four operations with whole numbers using strip diagrams and equations with a letter standing for the unknown quantity. **RC2, Readiness Standard**
4.5B	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 value in the resulting sequence and their position in the sequence. **RC2, Readiness Standard**
4.5C	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 × w).
4.5D	solve problems related to perimeter and area of rectangles where dimensions are whole numbers. **RC3, Readiness Standard**

RC = Reporting Category

Geometry and Measurment	
4.6	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:
4.6A	identify points, lines, line segments, rays, angles, and perpendicular and parallel lines. **RC3, Supporting Standard**
4.6B	identify and draw one or more lines of symmetry, if they exist, for a two-dimensional figure. **RC3, Supporting Standard**
4.6C	apply knowledge of right angles to identify acute, right, and obtuse triangles. **RC3, Supporting Standard**
4.6D	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. **RC3, Readiness Standard**
4.7	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:
4.7A	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.
4.7B	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.
4.7C	determine the approximate measures of angles in degrees to the nearest whole number using a protractor. **RC3, Readiness Standard**
4.7D	draw an angle with a given measure. **RC3, Supporting Standard**
4.7E	determine the measure of an unknown angle formed by two-non-overlapping adjacent angles given one or both angle measures. **RC3, Supporting Standard**
4.8	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:
4.8A	identify relative sizes of measurement units within the customary and metric systems. **RC3, Supporting Standard**
4.8B	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. **RC3, Supporting Standard**
4.8C	solve problems that deal with measurements of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate. **RC3, Readiness Standard**

Data Analysis	
4.9	Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:
4.9A	represent data on a frequency table, dot plot, or stem-and-leaf plot marked with whole numbers and fractions. **RC4, Readiness Standard**
4.9B	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. **RC4, Supporting Standard**

RC = Reporting Category

Personal Financial Literacy	
4.10	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:
4.10A	distinguish between fixed and variable expenses. **RC4, Supporting Standard**
4.10B	calculate profit for given situation. **RC4, Supporting Standard**
4.10C	compare the advantages and disadvantages of various savings options.
4.10D	describe how to allocate a weekly allowance among spending, saving, including college, and sharing.
4.10E	describe the basic purpose of financial institutions, including keeping money safe, borrowing money, and lending. **RC4, Supporting Standard**

RC = Reporting Category

Strand 2: Numbers and Operations

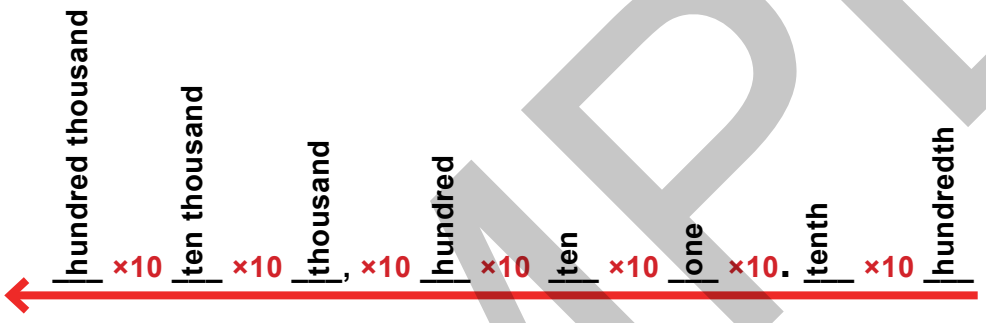
4.2 Number and operations. The student applies the mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. The student is expected to:

4.2A 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. (RC1, Supporting Standard)

Standard 4.2B goes beyond knowing what place a digit is in. It requires students to understand the relationships between the places that make up a number, such as 10 groups of 10 make 100 or 10 groups of one-tenth make 1.
In addition, students need to understand these relationships as multiplication or division.

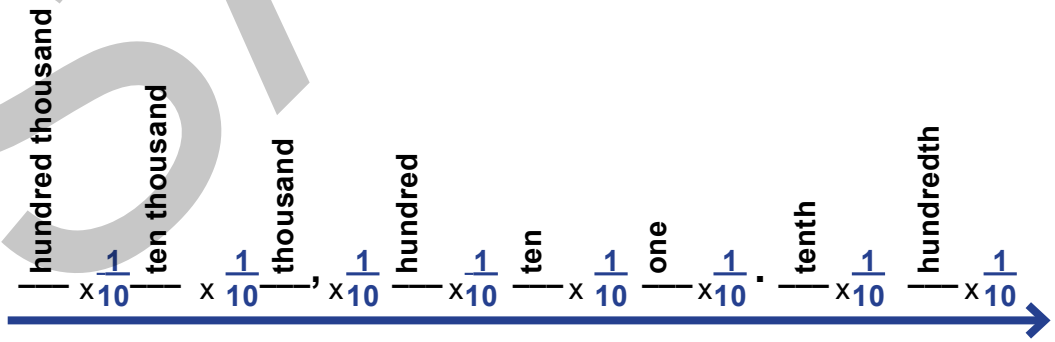
Example/Activity

The digits in our base 10 place value system have a special mathematical relationship. As the digits get larger (move from ones to tens to hundreds), each place is 10 times the value of the place to its right. This is shown in red in the diagram below.



What is the mathematical relationship between the hundreds place and the ten thousands place? The ten thousands place is 1000 times as large as the hundreds place. Why? Because moving from tens to hundreds requires multiplying by 10, and then from hundreds to thousands is ×10 more, and then from thousands to ten thousands to ×10 more. 10 × 10 × 10 = 1000.

The opposite of this is also true. As the place value gets smaller, the relationship becomes that of dividing by 10. Another way to say this is to multiply by one-tenth. Students will be more familiar with the language "dividing by 10." However, the Student Expectation (SE) specifically states that students interpret the value of each place value position as "one-tenth of the value of the place to its left." You will need to make this connection for students so that they understand that dividing by 10 is the same as multiplying by one-tenth.



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This is heavy-duty math thinking for 4th graders. Since math needs to be taught in ways that make sense to students, let's look at an example of this in the real world using distance. The activity below could be used to introduce students to the magnitude of the different places in place value.
Put these numbers on the board.

0.01 foot
0.1 foot
1 foot
10 feet
100 feet
1,000 feet
10,000 feet
100,000 feet

Students can estimate a length or distance of 1 foot and 0.1 foot. Then they can measure 10 feet. 100 feet is about 1/3 of a football field. How far apart are things that are 1,000 feet apart? 10,000 feet apart? 100,000 feet apart?
There are also videos on the Internet that illustrate this magnitude very well.
As students begin to think about these distances, they get an idea about the magnitude of numbers. This may help them understand that $\times 10$ or $\times \frac{1}{10}$ are very different from each other. Then they can discuss place value.

What is the difference between 0.05; 0.5; 5; 50; 500; 5,000; 50,000; 500,000; 5,000,000?
Other questions that you may ask are:

- How is 5 related to 0.05?
- How is 0.05 related to 5?
- How is 5,000 related to 50,000?
- How is 50,000 related to 5,000?

Other questions that are more difficult are:

- How is 5 related to 0.5? 0.05?
- How is 5 related to 500? 5,000? 50,000?

It is these kinds of relationships that are the focus of this state standard.

4.2 Number and operations. The student applies the mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. The student is expected to:

4.2B represent the value of the digit in whole numbers through 1,000,000,000 and decimals to the hundredths using expanded notation and numerals. (RC1, Readiness Standard)

4.2B extends place value to finding the value of a digit in numbers as large as the billions and in numbers as small as the hundredths place. Students must be able to identify the number in the given place, write it using expanded notation, and write it as a numeral.

Example/Activity

The following number will be used as an example.

49,658,203.17

The 9 is in the millions place.
Written in expanded notation: 9 × 1,000,000
Numeral: 9,000,000

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The 7 is in the hundredths place.
Written in expanded notation: 7 × 0.01
Numeral: 0.07

Expanded Notation: Writing a number to show the value of each digit. It is shown as a sum of each digit multiplied by its matching place value (units/ones, tens, hundreds, etc.).

Students should understand that each digit within a number can be multiplied by its place value to determine the value of the digit. This is how we determine the expanded form of the number.

For example: 24,052.73

(2 x 10,000) + (4 x 1,000) + (5 x 10) + (2 x 1) + (7 x 0.1) + (3 x 0.01)

20,000 + 4,000 + 50 + 2 + 0.7 + 0.03

Note: As students work with decimals, it is critical that the numbers are said correctly and that the "th" on the end of the place is very clear. For example, 0.67 should be read “zero and sixty-seven hundredths,” not “point sixty-seven.” When the numbers are said properly, place value is reinforced. For the "th" at the end of the place, practice your best Daffy Duck imitation to make the "th" loud and clear: zero and sixty-seven hundredthththththths!

4.2 Number and operations. The student applies the mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. The student is expected to:

4.2C compare and order whole numbers to 1,000,000,000 and represent comparisons using the symbols >, <, or =. (RC1, Supporting Standard)

To show mastery of this state standard, students should be able to:

- place numbers in order from least to greatest and greatest to least
- use >, <, or = to tell whether numbers are greater than, less than, or equal to each other.

Students use the traditional greater than, less than, and equals symbols to tell the comparison that they have made.

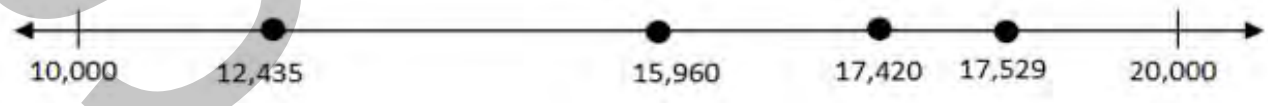
Example/Activity

While students often *know* which numbers are larger or smaller than others, many students struggle when asked to write the numbers from greatest to least or least to greatest. It may help students to graph the numbers on an open number line and then make the list of numbers.

Example: Order the numbers from greatest to least.

17,420 12,435 15,960 17,529

Since all the numbers have a value of at least 10,000 and go up to more than 17,000, students can make an open number line between 10,000 and 20,000. Once they have made the number line, they can approximate where the numbers belong. You can think about this like you’d think about estimating. An approximate location is fine as long as the location is reasonable.



Students may have trouble deciding where to place 17,420 and 17,529 on the number line. Students may be able to use place value to place the numbers. However, this may be difficult for some students. Another way for them to tell which number is larger or smaller is to ask students which number is closer to 10,000 and which number is closer to 20,000. This may make more sense to some students. After they have placed the numbers on the number line, then students can be challenged to write the list of numbers in order from greatest to least and least to greatest.

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Greatest to least: Go from the right to the left.

17,529 17,420 15,960 12,435

Least to greatest: Go from left to right.

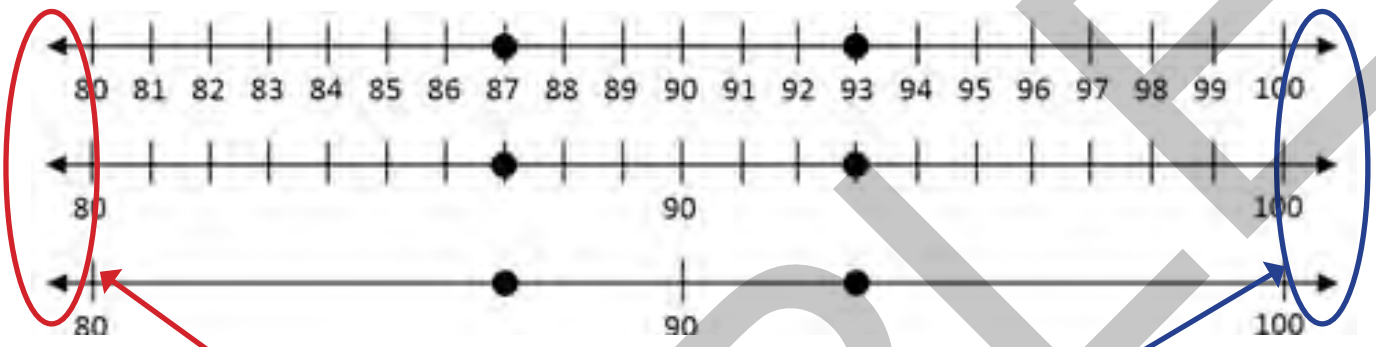
12,435 15,960 17,420 17,529

Students can also use greater than or less than symbols to compare the numbers.

17,529 > 15,960

15,960 <17,420

Note: The symbols < and > should be taught without the use of "alligators." Think of the symbols as the ends of a number line.



These arrows indicate that the numbers are getting smaller. This is like the < symbol. Therefore, the point indicates the smaller number, and the open side indicates the larger number.

These arrows indicate that the numbers are getting larger. This is like the > symbol. Therefore, the point indicates the smaller number, and the open side indicates the larger number.

Sentence Stems

Sentence stems may be helpful in teaching children to verbalize their thoughts.

_____ is more than (less than) _____. I know this because _____ has _____hundreds and _____ tens and _____ ones and, _____ has _____hundreds and _____ tens and _____ ones.

These two sets are equal. I know this because…

The _____ set is smaller (or less than) the _____ set. I know this because…

There are less (fewer) _____ than _____. I know this because…

4.2 Number and operations. The student applies the mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. The student is expected to:

4.2D round whole numbers to a given place value through the hundred thousands place. (RC1, Supporting Standard)

This Student Expectation (SE) has a goal that students learn to round numbers. Notice what the Knowledge and Skills statement says—"understand relationships related to place value." Rather than relying on rules, rounding numbers teaches students to estimate the value of a number based on place value.

Note: In 4.4G, students also round and use compatible numbers to solve problems efficiently and accurately. For 4.2D, the focus should be on relationships between the digits and place value.

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