Click-On TEKS

A simple approach to understanding
the Texas Essential Knowledge and Skills

GRADE 5 MATH

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	
5.1	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

5.1 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 fifth 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 5.1A. [Grade Level fifth grade, Knowledge and Skills statement (1), Student Expectation (A)]

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5.3G	solve for quotients of decimals to the hundredths, up to four-digit dividends and two-digit whole number divisors, using strategies and algorithms, including the standard algorithm. **RC2, Readiness Standard**
5.3H	represent and solve addition and subtraction of fractions with unequal denominators referring to the same whole using objects and pictorial models and properties of operations. **RC2, Supporting Standard**
5.3I	represent and solve multiplication of a whole number and a fraction that refers to the same whole using objects and pictorial models, including area models. **RC2, Supporting Standard**
5.3J	represent division of a unit fraction by a whole number and the division of a whole number by a unit fraction such as 1/3 ÷ 7 and 7 ÷ 1/3 using objects and pictorial models, including area models. **RC2, Supporting Standard**
5.3K	add and subtract positive rational numbers fluently. **RC2, Readiness Standard**
5.3L	divide whole numbers by unit fractions and unit fractions by whole numbers. **RC2, Readiness Standard**

Algebraic Reasoning	
5.4	Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:
5.4A	identify prime and composite numbers. **RC1, Supporting Standard**
5.4B	represent and solve multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity. **RC2, Readiness Standard**
5.4C	generate a numerical pattern when given a rule in the form y = ax or y = x + a and graph. **RC2, Readiness Standard**
5.4D	recognize the difference between additive and multiplicative numerical patterns given in a table or graph. **RC2, Supporting Standard**
5.4E	describe the meaning of parentheses and brackets in a numeric expression. **RC1, Supporting Standard**
5.4F	simplify numerical expressions that do not involve exponents, including up to two levels of grouping. **RC1, Readiness Standard**
5.4G	use concrete objects and pictorial models to develop the formulas for the volume of a rectangular prisms, including the special form for a cube (V = l × w × h, V = s × s × s, and V = Bh).
5.4H	represent and solve problems related to perimeter and/or area and related to volume. **RC3, Readiness Standard**

Geometry and Measurment	
5.5	Geometry and measurement. The student applies mathematical process standards to classify two-dimensional figures by attributes and properties. The student is expected to classify two-dimensional figures in a hierarchy of sets and subsets using graphic organizers based on their attributes and properties. **RC3, Readiness Standard**
5.6	Geometry and measurement. The student applies mathematical process standards to understand, recognize, and quantify volume. The student is expected to:
5.6A	recognize a cube with side length of one unit as a unit cube having one cubic unit or volume and the volume of a three-dimensional figure as the number of unit cubes (n cubic units) needed to fill it with no gaps or overlays if possible. **RC3, Supporting Standard**

RC = Reporting Category

5.6B	determine the volume of a rectangular prism with whole number side lengths in problems related to the number of layers times the number of unit cubes in the area of the base. **RC3, Supporting Standard**
5.7	Geometry and measurement. The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving measurement. The student is expected to solve problems by calculating conversion within a measurement system, customary or metric. **RC3, Supporting Standard**
5.8	Geometry and measurement. The student applies mathematical process standards to identify locations on a coordinate plate. The student is expected to:
5.8A	describe the key attributes of the coordinate plane, including perpendicular number lines (axes) where the intersection (origin) of the two lines coincides with zero on each number line and the given point (0,0); the x-coordinate, the first number in an ordered pair, indicates movement parallel to the x-axis starting at the origin; and the y-coordinate, the second number, indicates movement parallel to the y-axis starting at the origin. **RC3, Supporting Standard**
5.8B	describe the process for graphing ordered pairs of numbers in the first quadrant of the coordinate plane. **RC3, Supporting Standard**
5.8C	graph in the first quadrant of the coordinate plane ordered pairs of numbers arising from mathematical and real-world problems, including those generated by number patterns or found in an input-output table. **RC3, Readiness Standard**

Data Analysis	
5.9	Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:
5.9A	represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots. **RC4, Supporting Standard**
5.9B	represent discrete paired data on a scatterplot. **RC4, Supporting Standard**
5.9C	represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots. **RC4, Readiness Standard**

Personal Financial Literacy	
5.10	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:
5.10A	define income tax, payroll tax, sales tax, and property tax. **RC4, Supporting Standard**
5.10B	explain the difference between gross income and net income. **RC4, Supporting Standard**
5.10C	identify the advantages and disadvantages of different methods of payment, including check, credit card, debit card, and electronic payments.
5.10D	develop a system for keeping and using financial records.
5.10E	describe actions that might be taken to balance a budget when expenses exceed income. **RC4, Supporting Standard**
5.10F	balance a simple budget. **RC4, Supporting Standard**

RC = Reporting Category

Strand 2: Numbers and Operations

5.2 Number and operations. The student applies mathematical process standards to represent, compare, and order positive rational numbers and understand relationships as related to place value. The student is expected to:

5.2A represent the value of the digit in decimals through the thousandths using expanded notation and numerals. (RC1, Supporting Standard)

In 4th grade, students extend place value to finding the value of a digit in numbers with decimals to the hundredths place. In 5th grade, students work with decimals to the thousandths place. They write the decimals in expanded notation and find the numeral for numbers that are written in expanded notation.

Example/Activity

The following number will be used as an example.

8,203.174

Expanded Notation with a focus on place value relationships:

$$(8\times1{,}000) + (2\times100) + (3\times1) + (1\times0.1) + (7\times0.01) + (4\times0.001)$$

It may also be written like this:

$$8{,}000 + 200 + 3 + 0.1 + 0.07 + 0.004$$

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!

5.2 Number and operations. The student applies mathematical process standards to represent, compare, and order positive rational numbers and understand relationships as related to place value. The student is expected to:

5.2B compare and order two decimals to thousandths and represent comparisons using the symbols >, <, or =. (RC1, Readiness Standard)

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

- place two decimals 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

Understanding of the value of numbers is based on the place value of the digits. For example, 0.05 and 0.005 look almost the same. There’s just an extra 0. But that 0 makes a huge difference in the value of the number! Comparing these two numbers, 0.005 is one-tenth the value of 0.05. In other words, ten groups of 0.005 makes 0.05. Think about it a different way. 0.05 is the same as 5 cents. If you divide 5 cents into ten equal-sized parts, each part is the size of 0.005. It’s the difference between the size of a grain of sand and an amoeba. On the surface, the numbers look similar, at least to 5th graders, but there is a big difference between the two.

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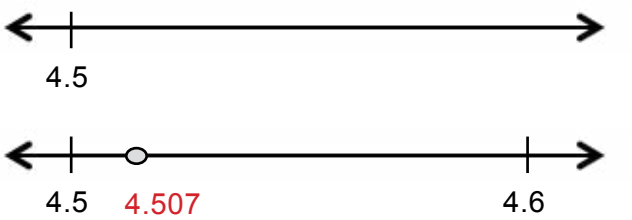
Examples:

Comparing and Ordering Decimals

Explanation	Problem
Comparing Decimals Find the largest place value in each number. Work from left to right comparing the digits until you find one that is different.	Both of these numbers have digits in the ones place and the digits are the same. 4.507 4.561 The first digit that is different is in the tenths place. 6 is larger than 0. This means that 4.507 is smaller than 4.561. 4.507 < 4.561 4.561 > 4.507
Connecting Decimals to Money Tenths are like dimes. (It takes 10 dimes to make another "whole" (dollar).) Hundredths are like pennies. (It takes 100 pennies to make another "whole" (dollar) or 10 pennies to make another dime (tenth).)	Thinking of money, students could say: 4.507 is just a little over $4.50. 4.561 is a little over $4.56. Which is greater, $4.50 or $4.56?
Ordering Decimals Although students in 5th grade are not required to place numbers on number lines, students put decimals on a number line in 4th grade. So this scaffold is available to 5th graders to help them order numbers. Have students create an open number that is reasonable for the numbers in the problem. This is a sketch rather than a formal number line. Ask students where the two numbers fit on the number line in relation to 4.5. The students will likely know that 4.507 is closer to 4.5 than 4.561. These numbers can be added to the number line. 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. Greatest to least: Write the numbers from right to left because the larger numbers on a number line are on the right. 4.561 4.507 Least to greatest: Write the numbers from left to right because the smaller numbers on the number line are on the left. 4.507 4.561	 Thinking Money: 4.507 is almost $4.51. 4.561 is close to $4.56. When students think of it this way, it is easier to place the numbers correctly between $4.50 and $4.60.

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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…

5.2 Number and operations. The student applies mathematical process standards to represent, compare, and order positive rational numbers and understand relationships as related to place value. The student is expected to:

5.2C round decimals to tenths or hundredths. (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 as related to place value." Rather than relying on rules, rounding numbers teaches students to estimate the value of a number based on place value.

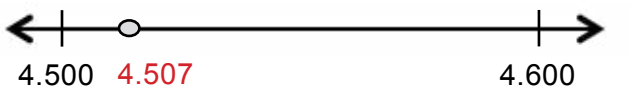
Example/Activity

Students in 3rd grade learn to use open number lines to round numbers. Students in 5th grade may use them, but they are not required to do so. These will be shown here, too, as number lines provide a great scaffold for students to understand rounding.

The two open number lines below show the number 4.507. The first number line shows how the number 4.507 is rounded to the nearest tenth (or dime). 4.507 is graphed between 4.5 and 4.6. Since 4.507 is closer to the number 4.5 than 4.6 on the number line, then 4.507 rounds to 4.5, not 4.6.

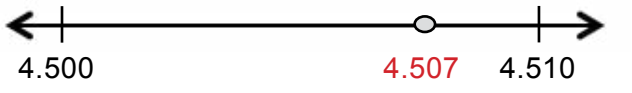
Another way to look at this is 4.507 is close to $4.51. $4.51 is closer to $4.50 than it is to $4.60. Therefore, 4.507 rounded to the nearest tenth is 4.5

Students may need to add zeroes as place holders to help them make comparisons.



The second number line shows the number 4.507 rounded to the nearest hundredth (or penny). In other words, is 4.507 closer to $4.50 or $4.51?

4.507 is graphed between 4.50 and 4.51. Since 4.507 is closer to 4.51 than 4.50, 4.507 rounds to 4.51, not 4.50. Students may need to add zeroes as place holders to help them make comparisons.



Compare the two number lines. Doesn't it look like 4.507 is graphed in two different places on the number lines? Why is that? It has to do with the scale of the graphs. The top graph has a scale of tenths, or 0.1. The bottom graph has a scale of hundredths, or 0.01. The 4.507 didn't change; its placement based on the scale of the graph changed. This discussion is an excellent lesson for 5th graders. See 4.5B for more about the importance of scale.

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