# Click-On TEKS

A simple approach to understanding the Texas Essential Knowledge and Skills



## GRADE 2 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** | |
|---|---|
| **2.1** | Mathematical Process Standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to: |

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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**

2.1 Mathematical Process Standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(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 second 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 2.1A. [Grade Level second grade, Knowledge and Skills statement (1), Student Expectation (A)]

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| **2.4** | Number and operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve addition and subtraction problems with efficiency and accuracy. The student is expected to: |
| **2.4A** | recall basic facts to add and subtract within 20 with automaticity. |
| **2.4B** | add up to four two-digit numbers and subtract two-digit numbers using mental strategies and algorithms based on knowledge of place value and properties of operations. |
| **2.4C** | solve one-step and multi-step word problems involving addition and subtraction within 1,000 using a variety of strategies based on place value, including algorithms. |
| **2.4D** | generate and solve problem situations for a given mathematical number sentence involving addition and subtraction of whole numbers within 1,000. |
| **2.5** | Number and operations. The student applies mathematical process standards to determine the value of coins in order to solve monetary transactions. The student is expected to: |
| **2.5A** | determine the value of a collection of coins up to one dollar. |
| **2.5B** | use the cent symbol, dollar sign, and the decimal point to name the value of a collection of coins. |
| **2.6** | Number and operations. The student applies mathematical process standards to connect repeated addition and subtraction to multiplication and division situations that involve equal grouping and shares. The student is expected to: |
| **2.6A** | model, create, and describe contextual multiplication situations in which equivalent sets of concrete objects are joined. |
| **2.6B** | model, create, and describe contextual division situations in which a set of concrete objects is separated into equivalent sets. |

**Strand 3: Algebraic Reasoning**

| | |
|---|---|
| **2.7** | Algebraic reasoning. The student applies mathematical process standards to identify and apply number patterns within properties of numbers and operations in order to describe relationships. The student is expected to: |
| **2.7A** | determine whether a number up to 40 is even or odd using pairings of objects to represent the number. |
| **2.7B** | use an understanding of place value to determine the number that is 10 or 100 more or less than a given number up to 1,200. |
| **2.7C** | represent and solve addition and subtraction word problems where unknowns may be any one of the terms in the problem. |

**Strand 4: Geometry and Measurement**

| | |
|---|---|
| **2.8** | Geometry and measurement. The student applies mathematical process standards to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalizations about their properties. The student is expected to: |
| **2.8A** | create two-dimensional shapes based on given attributes, including number of sides and vertices. |
| **2.8B** | classify and sort three-dimensional solids, including spheres, cones, cylinders, rectangular prisms including cubes, as special rectangular prisms, and triangular prisms based on attributes using formal geometric language. |

| | |
|---|---|
| **2.8C** | classify and sort polygons with 12 or fewer sides according to attributes, including identifying the number of sides and number of vertices. |
| **2.8D** | compose two-dimensional shapes and three-dimensional solids with given properties or attributes. |
| **2.8E** | decompose two-dimensional shapes such as cutting out a square from a rectangle, dividing a shape in half, or partitioning a rectangle into identical triangles and identify the resulting geometric parts. |
| **2.9** | Geometry and measurement. The student applies mathematical process standards to select and use units to describe length, area, and time. |
| **2.9A** | find the length of objects using concrete models for standard units of length. |
| **2.9B** | describe the inverse relationship between the size of the unit and the number of units needed to equal the length of an object. |
| **2.9C** | represent whole numbers as distances from any given location on a number line. |
| **2.9D** | determine the length of an object to the nearest marked unit using rulers, yardsticks, meter sticks, or measuring tapes. |
| **2.9E** | determine a solution to a problem involving length, including estimating lengths. |
| **2.9F** | use concrete models of square units to find the area of a rectangle by covering it with no gaps or overlaps, counting to find the total number of square units, and describing the measurement using a number and the unit. |
| **2.9G** | read and write time to the nearest one-minute increment using analog and digital clocks and distinguish between a.m. and p.m. |

## Strand 5: Data Analysis

| | |
|---|---|
| **2.10** | Data analysis. The student applies mathematical process standards to organize data to make it useful for interpreting information and solving problems. |
| **2.10A** | explain that the length of a bar in a bar graph or the number of pictures in a pictograph represents the number of data points for a given category. |
| **2.10B** | organize a collection of data with up to four categories using pictographs and bar graphs with intervals of one or more. |
| **2.10C** | write and solve one-step word problems involving addition or subtraction using data represented within pictographs and bar graphs with intervals of one. |
| **2.10D** | draw conclusions and make predictions from information in a graph. |

## Strand 6: Personal Financial Literacy

| | |
|---|---|
| **2.11** | Personal financial literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. |
| **2.11A** | calculate how money saved can accumulate into a larger amount over time. |
| **2.11B** | explain that saving is an alternative to spending. |
| **2.11C** | distinguish between a deposit and a withdrawal. |
| **2.11D** | identify examples of borrowing and distinguish between responsible and irresponsible borrowing. |
| **2.11E** | identify examples of lending and use concepts of benefits and costs to evaluate lending decisions. |
| **2.11F** | differentiate between producer and consumers and calculate the cost to produce a simple item. |

## 2.2 Number and Operations. The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numeration system related to place value. The student is expected to:

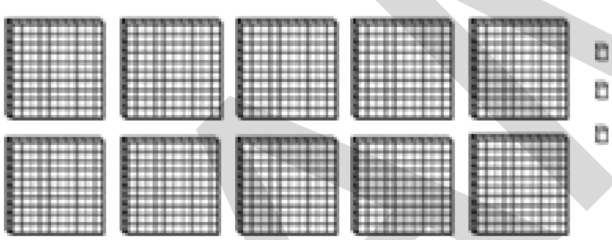
### 2.2A use concrete and pictorial models to compose and decompose numbers up to 1,200 in more than one way as a sum of so many thousands, hundreds, tens and ones.

2.2A continues to provide a critical foundation for numerical fluency and flexibility with numbers that was begun with 1.2B. It also continues the foundation for understanding place value.

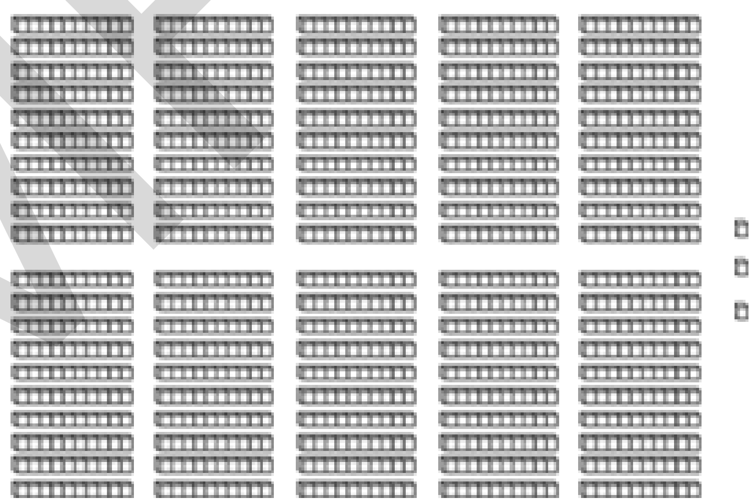
*Compose*: Sets of objects may be joined together to make a larger group. The two sets are the parts and the whole is the larger set that is created.
*Decompose*: Sets of objects can also be broken into smaller subsets and still contain the total amount.

**Example/Activity**

Students should be able to think of numbers in many different ways. Students should realize that, for example, the number 1,003 may be thought of in more ways than 1 one thousand and 3 ones. Here are two examples based on the place value system.



10 groups of 100 and 3 ones
or
10 flats and 3 units



100 groups of 10 and 3 ones
or
100 longs and 3 units

The more flexible students are with numbers, the more easily they will be able to recall their math facts and perform operations.

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To bring in the concept of place value, teachers should ask:

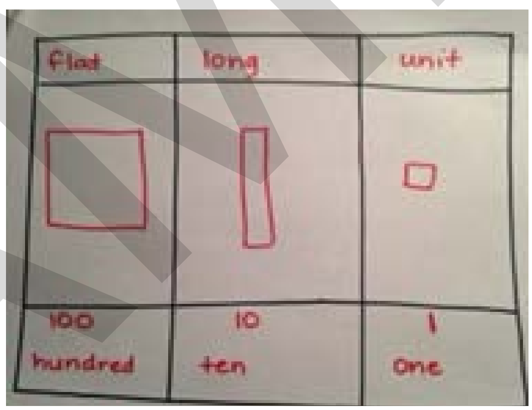
- "How many thousands are in 1,003?" "What number is in the thousands place?" The answer to both of these questions is the same: 1.
- "How many hundreds are in 1,003?" "What number is in the hundreds place?" The answer to these questions is different: 10 and 0. In order to answer the first question, students need to understand that there are 10 hundreds in a thousand. The second question only asks for identification, as it does not build on students' understanding of place value.
- "How many tens are in 1,003?" "What number is in the tens place?" The answer to these questions is different: 100 and 0. In order to answer the first question, students need to understand that there are 10 tens in every hundred and 10 hundreds in every thousand. This means that there are 100 tens in 1,000. The second question only asks for identification; it does not build on students' understanding of place value.

The state standard says that students are required to use concrete and pictorial models. Common manipulatives are base-ten blocks. If this is the students' first exposure to base-ten blocks, they will need to explore the relationships between each of the blocks. Rather than telling students how much each piece is worth, students should be guided to discover the answer on their own. They need to use units to build the longs, and then the longs and units to build the flat. While investigating, they should find that:

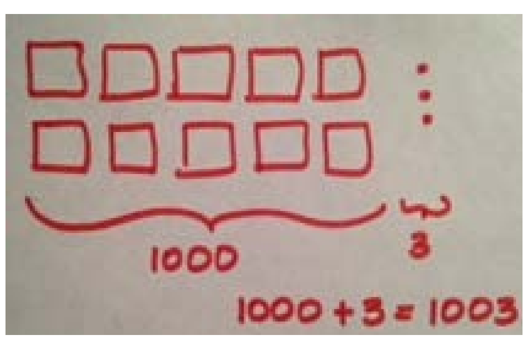
- 1 flat = 10 longs
- 1 flat = 100 units
- 1 long = 10 units

They should begin to exchange groups of 10 units for a long and groups of 10 longs for a flat.

As they discover these understandings, it is appropriate to create an anchor chart for the wall for their reference. But building and understanding should come before the anchor chart is displayed. Anchor charts for base-ten blocks are readily available in teacher supply stores. However, it is much more powerful if the chart that is displayed comes from student discovery, instead of a pre-made chart. Here is an example of a simple anchor chart. Students should also draw this in their math journals.




Grid paper is the most commonly used pictorial model. If the numbers are large, students can draw the base-ten blocks freehand as shown below.




This standard provides the concrete and pictorial models that are critical to understanding expanded forms of numbers in TEKS expectation 2.2B.

## 2.2 Number and Operations. The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numeration system related to place value. The student is expected to:

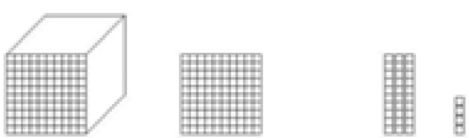
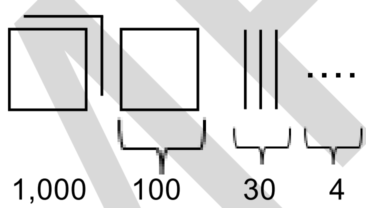
### 2.2B use standard, word, and expanded forms to represent numbers up to 1,200.

This state standard has students using concrete and pictorial models of numbers to understand abstract forms of numbers, such as expanded and standard notation. The concrete and pictorial models used should lead to understanding expanded notation through the way that the models are created and drawn.

Through student experiences of composing and decomposing numbers, making concrete models, and drawing pictorial models, students gain an in-depth understanding of how numbers work together to create other numbers, and this paves the way for fluency with operations.

**Example/Activity**

In the table below, notice how the concrete model shown exactly mirrors the pictorial model. As students are learning to write expanded notation, they should write the numbers below the pictorial model so that the more abstract expanded notation is merely an extension of the pictorial model that the student drew.

| Concrete Model | Pictorial Model | Expanded Notation | Standard Form and Word Form |
|---|---|---|---|
|  |   | 1,000 + 100 + 30 + 4 | 1,134<br>One thousand, one hundred thirty-four |



## 2.2 Number and Operations. The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numeration system related to place value. The student is expected to:

### 2.2C generate a number that is greater than or less than a given whole number up to 1,200.

This standard is an easy extension of 2.2B. The following example shows how the teacher can help students build the idea of numbers that are “more than” or “less than.”

Note: Generating numbers that are larger or smaller than each other is specifically separated in the state standards from telling which numbers are larger or smaller and ordering numbers (TEKS 2.2D) so that students have plenty of opportunities to reason about the magnitude of numbers.

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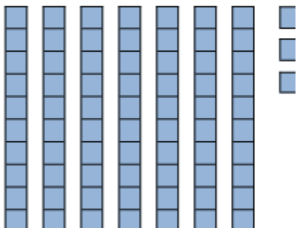
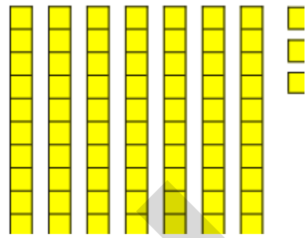
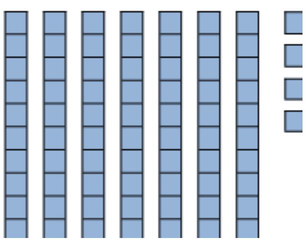
**Example/Activity**

**Understanding "More Than"**

**Follow this same process to help students understand "less than."**

| Teacher Directions and/or Actions | Student Actions and/or Statements |
|---|---|
| 1. Teacher creates a number using base-ten blocks and asks the students to create the same number with their own base-ten blocks.<br> | Students create the same number.<br> |
| 2. Teacher asks, "Are the sets equal? Why or why not?" | Students say that the sets are equal because there are 7 blue longs and 7 yellow longs. There are 3 blue units and 7 yellow units. |
| 3. Teacher asks, "What number does this represent?" | Students respond, "This is the number 73." |
| 4. Teacher adds one unit to her base-ten blocks. Teacher asks, "Do we still have the same number? Why or why not? What number do I have now?"<br> | Students respond that the numbers are different because the teacher has one more unit than they do and that the teacher has 74. |
| 5. Teacher asks, "Which number is larger, 73 or 74? Why?" | Students respond that 74 is larger because 73 has 7 longs and 3 units, while 74 has 7 longs and 4 units.<br>Note: In students' responses, prompt them to talk about the longs and the units, not just the units.<br>Sentence stems may be helpful in teaching children to verbalize their thoughts.<br>*_______ is larger than (smaller than) ______. I know this because _______ has _______hundreds,______ tens, and _______ ones. _______ has _______ hundreds, _______ has _______ tens and _______ ones.* |
| 6. Teacher asks students to create more numbers that are larger than 73. While students are creating their numbers, teacher monitors and asks questions about the numbers they have created. Possible questions are:<br>• What number did you create?<br>• Is it larger or smaller than 73?<br>• How do you know? | |

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## 2.2 Number and Operations. The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numeration system related to place value. The student is expected to:

### 2.2D use place value to compare and order whole numbers up to 1,200 using comparative language, numbers, and symbols (>, <, or =).

2.2D branches off of the experiences from 2.2C. To show mastery of this standard, students should be able to do the following:

- verbalize their comparison of two sets of objects using the academic language “greater than,” “less than,” and “equal 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.

**Example/Activity**

**Comparative Language**
An example of using comparative language with place value is “1,045 and 1,102 both have a 1 thousand-cube. But 1,045 doesn’t have any hundreds and 1,102 has 1 hundred-cube. So that means that 1,045 is less than 1,102 and 1,102, is greater than 1,045.”

Another example is “707 and 770 both have 7 hundreds. But 770 also has 7 tens. 707 does not have any tens. Therefore, 770 is larger than 707, and 707 is small than 770. For this example, students might also say that 770 is closer to 800 than 707 is. Therefore, 770 is larger than 707. Both of these explanations build on place value to tell which number is larger or smaller.

Like the examples above, students should have opportunities to compare numbers that have digits that are the same, such as 700, 707, 770, 70, 7, and 77. While comparing these numbers at first grade might be fairly simple, in second and third grades, where there are more digits, place value begins to get tangled in students’ heads. Comparisons at this level may help mitigate those at the upper grades.



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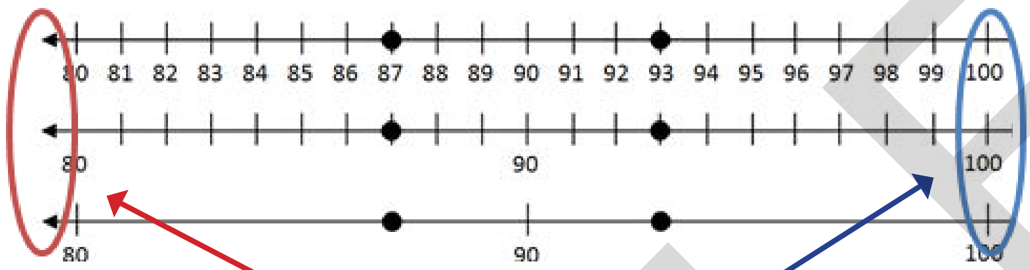
**Symbols**
Students use the traditional greater than, less than, and equals symbols to show the comparison that they have made. This state standard is the most abstract of the comparing standards. It should be taught after students have mastered the other comparison standards. 2.2D the is students' first introduction to the comparison symbols.

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…



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