Kindergarten Grade Texas Mathematics: Unpacked Content

What is the purpose of this document?

To increase student achievement by ensuring educators understand specifically what the new standards mean a student must know, understand and be able to do. This document may also be used to facilitate discussion among teachers and curriculum staff and to encourage coherence in the sequence, pacing, and units of study for grade-level curricula. This document, along with on-going professional development, is one of many resources used to understand and teach the new math standards.

What is in the document?

Descriptions of what each standard means a student will know, understand, and are able to do. The "unpacking" of the standards done in this document is an effort to answer a simple question "What does this standard mean that a student must know and be able to do?" and to ensure the description is helpful, specific and comprehensive for educators.

At A Glance:

New to Kindergarten:

- Count forward and backward to 20 (K.2A)
- Read, write and represent numbers to 20 (K.2B)
- Count a set of objects up to at least 20 and demonstrate that the last number said tells the number of objects in the set (K.2C)
- Subitizing-instantly recognizing a quantity of a small group of objects (K.2D)
- Generate a set using concrete and pictorial models that represents a number (K.2E)
- Generate a number that is more than/less than another number (K.2F)
- Compose and decompose numbers (K.2I)
- Model the action of joining and separating (K.3A)
- Solving word problems using objects and drawings (K.3B)
- Explaining strategies involving adding and subtracting (K.3C)
- Identifying U.S. coins by name (K.4A)
- Counting by 10s to at least 100 and begin by any given number (K.5)
- Identifying three-dimensional solids (K.6B)
- Identifying two-dimensional components of three-dimensional objects (K.6C)
- Creating two-dimensional shapes (K.6F)
- Collect, sort and organize data into two or three categories (K.8A)
- Personal Financial Literacy (K.9A-D)

Moved from Kindergarten:

- Ordinals
- Equal Shares
- Calendar Concepts & Time
- Patterns…Repeating Patterns

Instructional Implications for 2013-14:

- Calendar has been removed it can still be implemented in (K.1A and K.1C). For example, in your calendar you can practice counting forward and backward to the day. You can tally the days, use your coins to represent the days in school, discuss more and less in a number, and using manipulatives or drawing a pictorial model to show how many days in school.
- Personal Financial Literacy discussing wants and needs and discussing ways to earn an income. For instance, having a grade level store.
- Patterns are now covered in science TEKS; This can still be part of the process TEKS - applying to real world situations.

Professional Learning Implications for 2013-14:

- Teachers will need to identify the gaps that will need to be addressed in the 2013-14 school year.
- Embed the process standards into instruction and application
- Identify academic vocabulary
- PD and resources regarding Personal Financial Literacy
- Initial learning of the teachers' grade level TEKS (teachers unpacking the TEKS at their grade level)
- Vertical study of the strands to know how the TEKS align and progress from K through 2nd grade

KindergartenPrimary Focal Areas:

The Primary Focal Areas are designed to bring focus to the standards at each grade by describing the big ideas that educators can use to build their curriculum and to guide instruction.

The primary focal areas in Kindergarten are understanding counting and cardinality, understanding addition as joining and subtraction as separating, and comparing objects by measurable attributes.

(A) Students develop number and operations through several fundamental concepts. Students know number names and the counting sequence. Counting and cardinality lay a solid foundation for number. Students apply the principles of counting to make the connection between numbers and quantities.

(B) Students use meanings of numbers to create strategies for solving problems and responding to practical situations involving addition and subtraction.

(C) Students identify characteristics of objects that can be measured and directly compare objects according to these measurable attributes.

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;

(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E) create and use representations to organize, record, and communicate mathematical ideas;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Number and Operations: TEK: K.2	**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. The student is expected to:**
K.2(A) Count forward and backward to at least 20 with and without objects.	Students begin a rote forward counting sequence from a number other than 1. Thus, given the number 4, the student would count, "4, 5, 6, 7 ..." This objective does not require recognition of numerals. It is focused on the rote number sequence 0-100. To address counting backwards, you can give a real world example of a countdown (i.e. countdown for space launch, timer, countdown to a specific event)
K.2(B) Read, write, and represent whole numbers from 0 to at least 20 with and without objects or pictures.	Students write the numerals 0-20 and use the written numerals 0-20 to represent the amount within a set. For example, if the student has counted 9 objects, then the written numeral "9" is recorded. Students can record the quantity of a set by selecting a number card/tile (numeral recognition) or writing the numeral. Students can also create a set of objects based on the numeral presented. For example, if a student picks up the number card "13",the student then creates a pile of 13 counters. While children may experiment with writing numbers beyond 20,this standard places emphasis on numbers 0-20. Due to varied development of fine motor and visual development, reversal of numerals is anticipated. While reversals should be pointed out to students and correct formation modeled in instruction, the emphasis of this standard is on the use of numerals to represent quantities rather than the correct handwriting formation of the actual numeral itself.
K.2(C) Count a set of objects up to at least 20 and demonstrate that the last number said tells the number of objects in the set regardless of their arrangement or order.	Students answer the question "How many are there?" by counting objects in a set and when counting a set (...8, 9, **10**) represents the total amount of objects: "There are **10** bears in this pile." (cardinality). Since an important goal for children is to count with meaning, it is important to have children answer the question, "How many do you have?" after they count. Often times, children who have not developed cardinality will count the amount again, not realizing

	that the **10** they stated means 10 objects in all. Young children believe what they see. Therefore, they may believe that a pile of cubes that they counted may be more if spread apart in a line. As children move towards the developmental milestone of conservation of number, they develop the understanding that the number of objects does not change when the objects are moved, rearranged, or hidden. Children need many different experiences with counting objects, as well as maturation, before they can reach this developmental milestone.
K.2(D) Recognize instantly the quantity of a small group of objects in organized and random arrangements**.**	Students apply their understanding of numerals 0-10 to compare one numeral from another. Thus, looking at the numerals 8 and 10, a student is able to recognize that the numeral 10 represents a larger amount than the numeral 8. Quantity Discrimination: Student is presented with a series 2 numbers and is asked "Which one is bigger". Subitizing the ability to "instantly see how many", helps students form a mental image of a number. Suggested Activities: recognizing dice patterns and utiltizing ten frame patterns
K.2(E) Generate a set using concrete and pictorial models that represents a number that is more than, less than, and equal to a given number up to 20.	Students use their counting ability to build an additional set of objects (0-10). They may use matching strategies (Student 1), counting strategies (Student 2) or equal shares (Student 3) to build a set that is greater than, less than, or equal to the number of objects in the first set. Give each student squares and triangles for this activity. **Student 1** The student will need 5 squares and 6 triangles. I lined up my squares first then I put a triangle with each square. Since there is one extra triangle, there are more triangles than squares. **Student 2** The student will need four squares and three triangles. I counted the squares and I got 4. Since I need to have fewer triangles than squares I counted 3 triangles. Since 3 is less than 4, there are fewer triangles than squares. **Student 3** The student will need 5 squares I have 5 squares, and I need to have an equal amount of triangles. I line up my squares and then match a triangle for each square until they are the same. My sets are now equal.

K.2(F) Generate a number that is one more than or one less than another number up to at least 20.	Students are asked to understand this concept with and without (0-20) objects. For example, after counting a set of 8 objects, students answer the question, “How many would there be if we added one more object?”; and answer a similar question when not using objects, by asking hypothetically, “What if we have 5 cubes and added one more. How many cubes would there be then?”
K.2(G) Compare sets of objects up to at least 20 in each set using comparative language.	Before or after, more or less, greater or smaller, equal, more or fewer
K.2(H) Use comparative language to describe two numbers up to 20 presented as written numerals.	Before or after, more or less, greater or smaller, equal, more or fewer
K.2(I) Compose and decompose numbers up to 10 with objects and pictures.	**Compose:** Students develop an understanding of part-whole relationships as they recognize that sets of objects can be joined together to make a larger group. In addition, this objective asks students to realize that sets of objects can be joined together in multiple ways to compose a number. (i.e.: 5 + 1 = 6, 4 + 2 = 6, 3 + 3 = 6) **Example:** “Bobby Bear has 3 red buttons and 3 blue buttons on his jacket. How many buttons does Bobby Bear have on his jacket in all? “Johnny Bear has 4 red buttons and 2 blue buttons on his jacket. How many buttons does Johnny Bear have on his jacket in all? “Jane Bear has 5 red buttons and 1 blue buttons on her jacket. How many buttons does Jane Bear have on her jacket ? **Decompose:** Students develop an understanding of part-whole relationships as they recognize that a set of objects (5) can be broken into smaller sub-sets (3 and 2) and still remain the total amount (5). In addition, this objective asks students to realize that a set of objects (5) can be broken in multiple ways (3 and 2; 4 and 1). Thus, when breaking apart a set (decompose), students use the understanding that a smaller set of objects

	exists within that larger set (inclusion). **Example:** "Bobby Bear is missing 5 buttons on his jacket. How many ways can you use blue and red buttons to finish his jacket? Draw a picture of all your ideas. Students could draw pictures of 4 blue and 1 red button 3 blue and 2 red buttons 2 blue and 3 red buttons 1 blue and 4 red buttons. In Kindergarten, students need ample experiences breaking apart numbers and using the vocabulary "and" & "same amount as" before symbols (+, =) and equations (5= 3 + 2) are introduced. If equations are used, a mathematical representation (picture, objects) needs to be present as well.

Number and Operations: TEK: K.3	**The student applies mathematical process standards to develop an understanding of addition and subtraction situations in order to solve problems. The student is expected to:**
K.3(A) Model the action of joining to represent addition and the action of separating to represent subtraction.	Represent addition and subtraction with objects, fingers, drawings (need not show details but show the mathematics in the problem), acting out situations in conjunction with verbal explanations, expressions, or equations
K.3(B) Solve word problems using objects and drawings to find sums up to 10 and differences within 10	Kindergarteners use counting to solve the four problem types by acting out the situation and/or with objects, fingers, and drawings.

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<tr><th>Add To
Result Unknown</th><th>Take From
Result Unknown</th><th>Put Together/Take
Apart Total Unknown</th><th>Put Together/Take
Apart Addend
Unknown</th></tr>
<tr><td>Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now?

2 + 3 = ?</td><td>Five apples were on the table. I ate two apples. How many apples are on the table now?

5 – 2 = ?</td><td>Three red apples and two green apples are on the table. How many apples are on the table?

3 + 2 = ?</td><td>Five apples are on the table. Three are red and the rest are green. How many apples are green?

3 + ? = 5, 5 – 3 = ?</td></tr>
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</td></tr>
<tr><td>K.3(C) Explain the strategies used to solve problems involving adding and subtracting within 10 using spoken words, concrete and pictorial models, and number sentences.</td><td>Provide contextual situations for addition and subtraction that relate to the everyday lives of kindergarteners. Students then model the addition and subtraction using a variety of representations such as drawings, acting out situations, verbal explanations and numerical expressions.

Manipulatives, such as: two-color counters, clothespins on hangers, connecting cubes and stickers can also be used for modeling these operations. Kindergarten students should see addition and subtraction equations written by the teacher. After the teacher reads the problems, student chooses their own method to model a problem and find a solution. Students discuss their solution strategies while the teacher represents the situation with an equation written under the problem.</td></tr>
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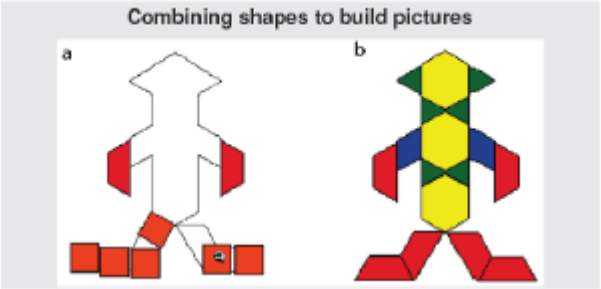
Number and Operations: TEK:K.4	**The student applies mathematical process standards to identify coins in order to recognize the need for monetary transactions. The student is expected to:**
K.4(A) Identify U.S. coins by name, including pennies, nickels, dimes, and quarters.	Introduce the penny, nickel, dime and quarter at one time. The value of money is an abstract concept that is difficult for many students to grasp. **Ask students questions such as** ● What is the name of this coin? ● What color is the coin? ● How much is the coin worth? ● What shape is the coin? ● What is on the front of the coin? ● What is on the back of the coin? ● Is the edge of the coin smooth or ridged?

	An idea is to add money to calendar time for instance: for each day of the week, add a penny then when you get to five exchange for a nickel. Discussing that five pennies equals one nickel...extend to dime and quarter. For closure of coin lesson(s), review these coins with the students by asking the following questions: ● How much is a penny? nickel? dime? quarter? Which is worth more/less? ● What color is a penny? nickel? dime? quarter?

Algebraic Reasoning: TEK:K.5	**The student applies mathematical process standards to identify the pattern in the number word list. The student is expected to:**
K.5(A) Recite numbers up to at least 100 by ones and tens beginning with any given number.	Students rote count by starting at one and counting to 100 or from a number other than 1. When students count by tens they are only expected to master counting on the decade (0, 10, 20, 30, 40 …). This objective does not require recognition of numerals. It is focused on the rote number sequence.

Geometry: TEK: K.6	**The student applies mathematical process standards to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalization about their properties. The student is expected to:**
K.6(A) Identify two-dimensional shapes, including circles, triangles, rectangles, and squares as special rectangles.	Through numerous experiences exploring and discussing shapes, students begin to understand that certain attributes define what a shape is called (number of sides, number of angles, etc.) and that other attributes do not (color, size, orientation). As the teacher facilitates discussions about shapes ("Is it still a triangle if I turn it like this?"), children question what they "see" and begin to focus on the geometric attributes. Kindergarten students typically do not yet recognize triangles that are turned upside down as triangles, since they don't "look like" triangles. Students need ample experiences manipulating shapes and looking at shapes with various typical and atypical orientations. Through these experiences, students will begin to move beyond what a shape "looks like" to identifying particular geometric attributes that define a shape.
K.6(B) Identify three-dimensional solids, including cylinders, cones, spheres, and cubes, in the real world.	Students identify objects as flat (2 dimensional) or solid (3 dimensional). As the teacher embeds the vocabulary into students' exploration of various shapes, students use the terms two-dimensional and three-dimensional as they discuss the properties of various shapes. Teachers need the physical models of cylinder, cone, sphere, and cube. Let students handle, examine and talk about physical models of geometric solids. Lead the class in generating a list of characteristics for each shape.

	Guiding Questions: ● Which of the shapes roll? ● Which ones don't roll? ● How are they different? ● Can you point to the corners (vertices), edges, and faces of each solid figure? ● What can you tell me about this shape? What else do you notice? ● Find 3-D solids within the classroom, school, and playground.
K.6(C) Identify two-dimensional components of three-dimensional objects.	Students relate one shape to another as they note similarities and differences between and among 2-D and 3-D shapes using informal language. For example, when comparing a triangle and a square, they note that they both are closed figures, have straight sides, but the triangle has 3 sides while the square has 4. Or, when building in the Block Center, they notice that the faces on the cube are all square shapes. Kindergarteners also distinguish between the most typical examples of a shape from obvious non-examples.
K.6(D) Identify attributes of two-dimensional shapes using informal and formal geometric language interchangeably.	Analyze and compare two-dimensional shapes, in different sizes and orientations, using informal and formal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length). Mathematically proficient students communicate precisely by engaging in Discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: **squares, circles, triangles, rectangles, flat, side, angle,** positional vocabulary (e.g., **above, below, beside, in front of, behind, next to, same, different,** etc.).
K.6(E) Classify and sort a variety of regular and irregular two and three-dimensional figures regardless of orientation or size.	We can recognize and classify two- and three-dimensional shapes by the number of sides, angles, curves, or vertices they have. 2-dimensional shapes—such as squares, rectangles, triangles, and circles—and three-dimensional shapes—such as cubes, cones, cylinders, and spheres—make up most of the items in our environment **Sort objects by their spatial features, with justification.**

	This means students will sort objects by selecting an attribute or attributes by which to classify items and allocating the items into groups by commonality of that attribute. Students should be able to find their own system to classify items, using attributes like shape, color, size, texture, thickness, material, purpose, etc and justify their allocation of items into categories, e.g. "all of these shapes have three sides". In doing so students should develop geometric language for attributes such as "side", "corner", "centre", "face", "edge", "curved", "straight", "larger", "smaller", etc.
K.6(F) Create two-dimensional shapes using a variety of materials and drawings.	This concept begins to develop as students move, rotate, flip, and arrange puzzle pieces to complete a puzzle. Kindergarteners use their experiences with puzzles to use simple shapes to create different shapes. For example, when using basic shapes to create a picture, a student flips and turns triangles to make a rectangular house. Students also combine shapes to build pictures. They first use trial and error (part a) and gradually consider components (part b). 

Geometry: **TEK:K.7**	**The student applies mathematical process standards to directly compare measurable attributes. The student is expected to:**
K.7(A) Give an example of a measurable attribute of a given object, including length, capacity, and weight.	It is critical for students to be able to identify and describe measureable attributes of objects. An object has different attributes that can be measured, like the height and weight of a can of food. When students compare shapes directly, the attribute becomes the focus. For example, when comparing the volume of two different boxes, ask students to discuss and justify their answers to these questions: Which box will hold the most? Least? Will they hold the same amount? Then ask students to suggest measureable attributes of their bodies that they can directly compare, such as their height, or the length of their feet.

K.7(B) Compare two objects with a common measurable attribute to see which object has more of/less of the attribute and describe the difference.	Direct comparisons are made when objects are put next to each other, such as two children, two books, two pencils. For example, a student may line up two blocks and say, “The blue block is a lot longer than the white one.”  Students are not comparing objects that cannot be moved and lined up next to each other. Similar to the development of the understanding that keeping track is important to obtain an accurate count. Kindergarten students need ample experiences with comparing objects in order to discover the importance of lining up the ends of objects in order to have an accurate measurement.

Data Analysis: TEK:K.8	**The student applies mathematical process standards to collect and organize data to make it useful for interpreting information. The student is expected to:**
K.8(A) Collect, sort, and organize data into two or three categories**.**	Example of 2 categories: Are you a boy or a girl? Example of 3 categories: How do you get to school? (bus, walk, car)
K.8(B) Use data to create real-object and picture graphs.	Use pictures of the actual items and have students make pictographs both vertically and horizontally.
K.8(C) Draw conclusions from real-object and picture graphs.	Questions for discussions using real-object and pictographs. ● What was the most common way that students arrived at school? ● Why do you think that is the most common way? ● How can we check that everyone answered the question/graph?

Personal Financial Literacy: TEK:K.9	**The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:**
K.9(A) Identify ways to earn income.	Discussion with students on how to earn income? ● How do you earn money? ● How is earning your own income beneficial to you? ● Does it provide a good or a service? ● How do your parents earn an income?
K.9(B) Differentiate between money received as income and money received as gifts.	Students discuss ways in which people receive money through earning income or receiving gifts.
K.9(C) List simple skills required for jobs.	Describe different jobs that people do and the skills they need/use for the job Students will learn about different jobs and professions of people in the community. http://financeintheclassroom.org/student/activities.shtml
K.9(D) Distinguish between wants and needs and identify income as a source to meet one's wants and needs**.**	Recognize that people have basic needs (food, shelter, and clothing) and wants (toys, games and treats) Read A Chair for My Mother, discuss wants and needs and how they saved money to buy something important for the family. Discuss how parents have to work to provide food, shelter, and clothing