MATHEMATICS TEKS REVISIONS
Math Course/Grade Level: Kindergarten
J. Weilmuenster

(See below for specifics by focal areas)

1. **Is a complete and logical development of mathematics concepts followed for this grade level or course? What recommendations do you have for improvement?**

2. **Have the correct vocabulary and terminology been used? Where can changes be made for accuracy and/or clarity?**
Formal geometric language should be *modeled* by teachers, but informal geometric language is more appropriate for Kinder.
See additional suggestions on specific standards in the grade level tables below.

3. **Are there specific areas that need to be updated or reworked? Give specifics.**
See specific standards in the grade level tables below.

4. **Are the mathematics concepts/content statements grade-level appropriate? Are important concepts missing at this grade level?**
The concepts of composing and decomposing numbers are appropriate for Kinder because they comprise ways for children to conceptualize numbers and builds a strong foundation for thinking of numbers as made up of smaller parts—an important prerequisite for combining and separating groups. However, these ideas could be clarified without losing mathematical precision so that parents/community members/students may more easily understand the student expectations (see KN08-9.)

5. **Are the Student Expectations clear and specific? What are suggested changes?**
See specific standards in the grade level tables below.

6. **Is the subject area aligned horizontally and vertically? Where are there areas for improvement?**
It is important for Kindergartners to know the sequence of counting words by ones and tens to build a conceptual understanding of the patterns within our number system. Beginning with any number & counting by tens requires an understanding of place value and is more appropriate for first graders (see KN01.)
By end of K, it's appropriate for children to generate a set up to 20. The quantity 40 is more appropriate for Grade 1. If Kindergartners are expected to count, represent, compare, and create sets of objects to at least 40, there will be less time to spend on other important conceptual understandings that must be developed to support math concepts in 1st grade and beyond. Spending appropriate time to develop these foundational ideas will make the Texas Essential Knowledge and Skills much stronger.

Kindergarten	Number and Operations	Two-Dimensional and Three-Dimensional Figures	Measurement and Data
Process Standards: ADD: Organize work in order to look for patterns; use patterns to generate solutions, and make connections/predictions.	KN02-07 Rewrite 40 as 20. KN08-10 Rewrite for clarity. KN11 This standard is appropriate for Kindergarten because it specifies the use of concrete objects and builds an important foundation for later conceptualization of place value. KN12 Part/part/whole language provides clarity to this student expectation while also maintaining mathematical precision. KN13 Within 10 is an appropriate goal for Kinder. Children are still conceptualizing the "teen" numbers. Analyzing joining & separating situations while using numbers they have not yet conceptualized gets in the way of developing a strong foundational understanding of the process of adding and subtracting & may prevent students from developing fluency with math facts and their application in problem solving later on.	KG03-04 Formal geometric language should be *modeled* by teachers, but informal geometric language is more appropriate for Kinder. KG05 Not all rhombuses are rectangles; only those with 90° angles. KG01, 06 Formal geometric language should be *modeled* by teachers—who should know the mathematical definitions of geometric figures, but informal geometric language is more appropriate for Kinder as they learn the names of the figures. KG07 Popsicle sticks, straws, & modeling clay are difficult & time-consuming for Kinder children to manipulate, making this task more appropriate for art centers. This will save time for putting together building blocks and/or composing and decomposing 2-D figures with models of 2-D shapes (such as pattern blocks) which will accomplish the same thing.	KM01-02 Include comparative language here for each measureable attribute: longer/shorter than, or the same length; holds more/less, or holds the same; covers more/less or the same; takes more/less /same time; heavier/lighter than, or equal to; hotter/colder than, or the same as. KM04 Language such as, "collect information, sort into groups, and construct graphs using real objects or pictures in order to ask and answer questions" will make this standard more understandable to parents & students.

(See below for specifics by focal areas)

1. **Is a complete and logical development of mathematics concepts followed for this grade level or course? What recommendations do you have for improvement?**
   The progression of development for rational numbers and integers is satisfactory, overall. There are several changes to the current TEKS that are positive additions.

2. **Have the correct vocabulary and terminology been used? Where can changes be made for accuracy and/or clarity?**
   See specific standards in table below.

3. **Are there specific areas that need to be updated or reworked? Give specifics.**
   Equality is such an important concept, it must be deliberately included wherever possible (see 1A02.)

4. **Are the mathematics concepts/content statements grade-level appropriate? Are important concepts missing at this grade level?**
   Some standards would be better suited to 2nd graders (see specific standards in table below.) There is no mention of developing fraction concepts in Grade 1. If operations with fractions are to be mastered as early as 4th and 5th grade, fraction meanings must be conceptualized earlier also. Rather than using pairs of whole numbers to describe fractional parts of whole numbers (a ratio idea), it is beneficial for children to think of fractions as names that represent equal parts or fair shares.

5. **Are the Student Expectations clear and specific? What are suggested changes?**
   See specific standards in table below.

6. **Is the subject area aligned horizontally and vertically? Where are there areas for improvement?**
   First graders are just beginning to recognize that numbers are composed of smaller numbers and still use counting to figure out number relationships. When asked to come up with a number that is 10 more or 10 less than a given number, most will count on or count back. Sufficient time and experiences with concrete objects will enable students to form a strong base on which to build more abstract mathematics to come. It will be important to give first graders time to use concrete objects to consolidate their place value understanding to prepare them to apply this concept in Grade 2.

   The concept of the relationship of the size of the unit of measure and the number of units associated is important but takes time and repeated experiences measuring the same length using different sized units of length. Having it become a 2nd grade expectation should strengthen the Texas Math TEKS and give 1st graders the time they need. Replace 1M02 with a first grade student expectation to build this important foundational understanding.

1st Grade Math	Number and Operations	Expressions, Equations, and Relationships	Two-Dimensional and Three-Dimensional Figures	Measurement and Data
Process Standards: **ADD:** Organize work in order to look for patterns; use patterns to generate solutions, and make connections/predictions.	**1N02** Standard and non-standard partitioning of two-digit numbers into tens and ones (i.e. representing 64 as 6 tens, 4 ones; 5 tens, 14 ones, 4 tens, 24 ones, etc.) requires a solid understanding of place value, a concept that is still being developed in 1st grade. Move the non-standard partitioning to 2nd grade. **1N03** This student expectation can be clarified without losing its mathematical precision. Rewrite as: use objects, pictures, and expanded notation to indicate the values represented by the digits in a two-digit number. For example, 93 is the sum of 9 tens & 3 ones or 90 + 3. **1N04** It might clarify this standard for parents/community members/students to say: generate a two-digit number that is greater than, less than, or equal to a given whole number less than 100.	**1A01** Rewrite as: use concrete objects and/or strip diagrams to solve addition and subtraction problems (up to 20) and use number sentences (equations) to represent the solution. **1A02** Add: understand the meaning of the equal sign *and determine if a number sentence for addition or subtraction is true.*	ADD: Decompose 2-dimensional figures (such as circles and rectangles) into two and four fair shares and describe the shares as halves, half of, fourths or quarters. Rationale: There is no mention of developing fraction concepts in Grade 1. If operations with fractions are to be mastered as early as 4th and 5th grade, fraction meanings must be conceptualized earlier also. Rather than using pairs of whole numbers to describe fractional parts of whole numbers (a ratio idea), it is beneficial for children to think of fractions as names that represent equal parts or fair shares.	**1M02** Change to: Measure the same object/distance with units of two different lengths. Notice how the measurements differ. **1M04** This also provides a nice connection to geometry and fractions (halves and wholes). **1M06** Three categories are more appropriate for Grade 1. Clarify as: collect and sort data with up to - three categories, and use tallies or a picture graph to summarize it.
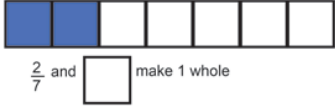
1st Grade Math	Number and Operations	Expressions, Equations, and Relationships	Two-Dimensional and Three-Dimensional Figures	Measurement and Data
	1N07 As it is written, this may not be appropriate for Grade 1 **1N08** This is right on target for Grade 1. **1N09** Considered more appropriate for Grade 2 as originally written. Appropriate for Grade 1 as rewritten: use concrete and visual models to determine the sum of a multiple of 10 (such as 50) & a one-digit number in mathematical & real-world problems, within 100.**1N13** This seems to be a reiteration of **1N10, 11, and 12**. If it is NOT, it should be rewritten so its meaning is clarified. **1N16** Excellent! **ADD:** Decompose 2-dimensional figures (such as circles and rectangles) into two and four fair shares and describe the shares as halves, half of, fourths or quarters.		**1G01** Students at this level DO need to describe these 2-dimensional figures but may not have the fine motor skills to DRAW them with precision. **1G02** Excellent!	**1M07** This language can be clarified without losing its mathematical precision. Instead, rewrite as: draw conclusions, generate, & answer questions using information organized in real-object graphs, picture graphs, & bar-type graphs

MATHEMATICS TEKS REVISIONS
Math Course/Grade Level: 2nd Grade
J. Weilmuenster

(See below for specifics by focal areas)

1. **Is a complete and logical development of mathematics concepts followed for this grade level or course? What recommendations do you have for improvement?**

2. **Have the correct vocabulary and terminology been used? Where can changes be made for accuracy and/or clarity?**

3. **Are there specific areas that need to be updated or reworked? Give specifics.**

4. **Are the mathematics concepts/content statements grade-level appropriate? Are important concepts missing at this grade level?**

5. **Are the Student Expectations clear and specific? What are suggested changes?**

6. **Is the subject area aligned horizontally and vertically? Where are there areas for improvement?**

2nd Grade Math	Number and Operations	Expressions, Equations, and Relationships	Two-Dimensional and Three-Dimensional Figures	Measurement and Data
Process Standards: ADD: Organize work in order to look for patterns; use patterns to generate solutions, and make connections and predictions.	2N02 Clarifying this student expectation will communicate better to parents and students. For example: use objects, pictures, and expanded notation to indicate the values represented by the digits in a three-digit number. For example, 493 is the sum of 4 hundreds, 9 tens and 3 ones, 493 = 400 + 90 + 3. 2N03 To clarify the wording without sacrificing its mathematical precision, how about: generate a three-digit number that is greater than, less than, or equal to a given whole number that is less than 1,000. ADD or replace 2N06: Decompose shapes such as strips, regular polygons, circles, and rectangles into equal parts and name the parts (halves, fourths, eighths, etc.) Recognize that the more fractional parts used to make a whole, the smaller the parts.	2A01 See comment below regarding the similarity between this standard and 2N11 and 12. 2A02 Students benefit from using a variety of models to visualize multiplication situations: represent mathematical and real-world problems for multiplication to a product up to 25 using equal sets of objects (arrays and strip diagrams), and writing number sentences (equations).	2G02 Include trapezoids	2M06 This is a nice connection to understanding models of place value and measurement of length. 2M06 and 2M07 need clarification to show how they differ. ADD (from 1st grade): describe the inverse relationship between the size of the unit and the number of units needed to equal the length of an object (i.e. the longer the unit, the fewer needed; the shorter the unit, the fewer needed). 2M08 . Second graders need lots of experience with linear measurement before they use the length of a bar in a graph to represent data. 2M09-10 This language can be clarified without losing its mathematical precision:

2nd Grade Math	Number and Operations	Expressions, Equations, and Relationships	Two-Dimensional and Three-Dimensional Figures	Measurement and Data
	2N08 As a transition between recognizing that fractions are fair shares or equal pieces called thirds or fourths (from 1st grade), we recommend that this student expectation move to 3rd to be replaced by: recognize that it takes seven sevenths or three thirds to equal one whole. Count the fractional parts: one-seventh, two-sevenths, three-sevenths, etc. $\frac{2}{7}$ and ☐ make 1 whole This will provide the conceptual understanding needed for 3rd graders to manipulate fractions using pictures and fraction notation. 2N10 This is such an important student expectation to our stakeholders that it must be stated in a clear way to communicate better to parents, community members, and students: fluently add and subtract with sums to 20 and differences from 20.			2M09 organize a collection of data with up to four categories, using a frequency table, a dot plot, a picture graph, or a bar graph with the vertical axis scaled in increments of one. 2M10 write and solve one-step mathematical and real-world problems involving addition or subtraction using organized data

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2nd Grade Math	Number and Operations	Expressions, Equations, and Relationships	Two-Dimensional and Three-Dimensional Figures	Measurement and Data
	2N11 and 12 How are these two student expectations different—other than the number of digits used? <mark>.</mark> Students who are learning and applying a variety of strategies to add and subtract (such as using mental math, place value patterns, & properties of operations) should deal with smaller numbers before they are expected to generalize the strategies to greater numbers. See 2A01. Aren't these very similar?			

(See below for specifics by focal areas)

1. **Is a complete and logical development of mathematics concepts followed for this grade level or course? What recommendations do you have for improvement?**
   Overall, the progression is very satisfactory.

2. **Have the correct vocabulary and terminology been used? Where can changes are made for accuracy and/or clarity?**
   The development of fraction concepts using models and number lines is well done, but there is a need for clarity on strip diagrams (referring to fraction bars or part-part-whole models or something else?).

3. **Are there specific areas that need to be updated or reworked? Give specifics.**
   The fraction standards in grades 3 – 5 address fractional parts of a whole well, but there are no standards addressing fractional parts of a set, a concept worthy of inclusion.

4. **Are the mathematics concepts/content statements grade-level appropriate? Are important concepts missing at this grade level?**
   The progression of the fraction development is at an appropriate level of rigor.

5. **Are the Student Expectations clear and specific? What are suggested changes?**
   The language in some of the standards needs to be clarified or examples provided, particularly in the fraction standards statements (see 3N08 and 3N09).

6. **Is the subject area aligned horizontally and vertically? Where are there areas for improvement?**

3rd Grade Math	Number and Operations	Expressions, Equations, and Relationships	Two-Dimensional and Three-Dimensional Figures	Measurement and Data
Process Standards: ADD: Organize work in order to look for patterns; use patterns to generate solutions, and make connections and predictions.	**3N01** It is good that composing and decomposing numbers are included in the SE – not just introductions as in current TEKS **3N08-09** The wording for 8 and 9 could be problematic for elementary teachers. Instead of saying "where *b* is a non-zero whole number", substitute with "where *b* is a counting number". Should the term "unit fraction" also be used in 8? Is the emphasis to understand fraction symbols or that it is mathematically incorrect to use 0 as a denominator? Also, an example needs to be given especially for 9 to clarify its intent. **3N11** It's good that number lines are being used as one way to represent equivalent fractions. **3N12 The** comparison with common numerators as well as common denominators. is a good addition	**3A01** Remove the words "single and" : represent one- and two-step mathematical and real-world problems involving *single and* addition and subtraction of whole numbers to 1000 using strip diagrams and number sentences (equations).	The descriptor for this strand states "Two-Dimensional and Three-Dimensional Figures." Three dimensional figures are not addressed in the SEs provided; however, the fact that it is not included gives students more time to focus on classification and attributes of two dimensional figures. **3G01 This** is a good approach to classifying 2-dimensional figures. **3G03 The** rigor of this standard is good related to decomposing the figures and is appropriate in that it stays within the confines of rectangles.	

3rd Grade Math	Number and Operations	Expressions, Equations, and Relationships	Two-Dimensional and Three-Dimensional Figures	Measurement and Data
	3N13 It's a welcome addition that multi-step problem solving is emphasized. **3N14 Including** the word "arrays" and the example provided is good. **3N15 There** needs to be a vertical alignment to second grade. Jumping from concrete models to using 3 factors in one grade level is not a good transition. Also, would this be mistakenly interpreted that the students would need to match the name of a property with an example? **3N20 Clarification** is needed on the facts that could be included with products and dividends through 100. For example, would 20 x 5 be included in the set of facts? So, should it be stated that the factors will not be more than 10?			

(See below for specifics by focal areas)

1. **Is a complete and logical development of mathematics concepts followed for this grade level or course? What recommendations do you have for improvement?**
   The progression of fraction development is at an appropriate level of rigor. Moving into addition and subtraction of decimals requires that students must rely heavily on understanding place value. The fluency with whole number addition and subtraction should include an efficient algorithm or the introduction of addition and subtraction of decimals stay at a conceptual level and be limited to modeling. Perhaps standard 4N16 should be separated accordingly.

2. **Have the correct vocabulary and terminology been used? Where can changes be made for accuracy and/or clarity?**
   The language of decomposing in regards to the addition of fractions with like denominators is a good change, but there is a concern with the removal of concrete models when developing this concept (see standard 4N12) The language in some of the standards needs to be clarified or examples provided (see standard 4N26: clarify what is meant by scalar comparisons.) Avoid redundancies, such as having positive sums and differences when the fractions are already restricted as positive (see standard 4N18.)

3. **Are there specific areas that need to be updated or reworked? Give specifics.**
   The progression of decimal operations seems a little premature at places in grades 4 and 5 (e.g., comparing and ordering decimals should be done as addition and subtraction are modeled, but these concepts don't surface until 5th grade.)

4. **Are the mathematics concepts/content statements grade-level appropriate? Are important concepts missing at this grade level?**
   The fraction standards in grades 3 – 5 address fractional parts of a whole well, but there are no standards addressing fractional parts of a set, a concept worthy of inclusion. Also, the restriction on *a* and *b* in standard 4N13 should be counting numbers, not integers, for this grade level.
   Factors, factor pairs, multiples, prime and composite are all missing from 4th grade but would support the work in generating equivalent fractions.

5. **Are the Student Expectations clear and specific? What are suggested changes?**
   The student expectations are bundled nicely, but placing the "bundles" of related standards under a "statement of understanding" (similar to current Knowledge Statements for Student Expectations) would be helpful.

6. **Is the subject area aligned horizontally and vertically? Where are there areas for improvement?**

4th Grade Math	Number and Operations	Expressions, Equations, and Relationships	Two-Dimensional and Three-Dimensional Figures	Measurement and Data
Process Standards: ADD: Organize work in order to look for patterns; use patterns to generate solutions, and make connections and predictions. *Informal language and generalizations from examples and non- examples has been removed. Removing informal language is good because that supports the use of academic language, however we would like generalizations to be considered since generalizing is cross-curricular and adds rigor. The inclusion of mental math and number sense is a great addition.*	**4N10** This leaves it open to any fraction or decimal (no limits.). The standard should be explicated limited to a set of fractions per grade level (e.g. 4th grade would include halves, fourths, and eighths.) **4N12** Add concrete models at this level. **4N16** Suggest the change: …with whole number, using an efficient algorithm, and with decimals, using pictorial models, concepts of place value, and properties of addition. **4N26** More explicit information is needed to clarify scalar comparisons. What are students expected to know and be able to do?	**4A02** This is an opportunity to add some clarifying language that would lead students to notice the relationship of the numbers in a data table (input values compared with output values) **4A03** Will there be pictorial models when assessing this standard?		**4M05** Clarify standard. This does not seem grade appropriate. **4M06 and 7** Examples would help to clarify the extent to which students are expected to perform the expectation. **4M08** Would formulas and conversions be provided on state tests? Will there be pictorial representations? Will students be expected to multiply and divide money as decimals? **4M08** This standard does not seem grade appropriate.

MATHEMATICS TEKS REVISIONS
Math Course/Grade Level: 5th Grade
J. Weilmuenster

(See below for specifics by focal areas)

1. **Is a complete and logical development of mathematics concepts followed for this grade level or course? What recommendations do you have for improvement?**
   The progression of fraction development is at an appropriate level of rigor. Moving into multiplication and division of decimals requires that students must rely heavily on understanding place value. The fluency with whole number multiplication and division should include an efficient algorithm and the introduction of multiplication and division of decimals stay at a conceptual level and be limited to modeling. It's advisable that division with decimals should wait until 6th grade (standard 5N15.)

2. **Have the correct vocabulary and terminology been used? Where can changes be made for accuracy and/or clarity?**
   See specific standards in table below.

3. **Are there specific areas that need to be updated or reworked? Give specifics.**
   The progression of decimal operations seems a little premature at places in grades 4 and 5 (e.g., comparing and ordering decimals should be done before addition and subtraction are modeled, but these concepts don't surface until 5th grade.)

4. **Are the mathematics concepts/content statements grade-level appropriate? Are important concepts missing at this grade level?**
   The changes in the Expressions, Equations, and Relationships are appropriate. Staff development will be required for teachers in K-5 to prepare for the transition.
   Greatest common factors and least common multiples are not addressed, nor is the idea of relatively prime.

5. **Are the Student Expectations clear and specific? What are suggested changes?**
   See specific standards in table below.

6. **Is the subject area aligned horizontally and vertically? Where are there areas for improvement?**

5th Grade Math	Number and Operations	Expressions, Equations, and Relationships	Two-Dimensional and Three-Dimensional Figures	Measurement and Data
Process Standards: ADD: Organize work in order to look for patterns; use patterns to generate solutions, and make connections and predictions. *Informal language and generalizations from examples and non- examples have been removed. Removing informal language is good because that supports the use of academic language, however generalizations should be considered since generalizing is cross-curricular and adds rigor. The inclusion of mental math and number sense is a great addition.*	**5N07 and 5N23** Avoid redundancies, such as having positive sums and differences and quotients when the rational numbers involved are already restricted to being positive. **5N11, 5N14, and 5N17** How will these be assessed? Can they be combined with 5N12, 5N15, and 5N18? **5N22 and 23 Please** include pictorial models stated in the standard and in assessment.	Statement concerning all of the Algebra strand: It is a major step up and there will need to be massive teacher training. **5A07** This standard should be in the Meas. and Data strand.	**5G01** The attributes and properties need to be made specific.	**5M01** How would this be assessed?

(See below for specifics by focal areas)

1. **Is a complete and logical development of mathematics concepts followed for this grade level or course? What recommendations do you have for improvement?**
   The progression of development for rational numbers and integers is satisfactory, overall. Sixth grade should be the level at which division with decimals and fractions is given more attention and efficient algorithms are finalized.

2. **Have the correct vocabulary and terminology been used? Where can changes be made for accuracy and/or clarity?**
   See specific standards in the grade level tables below.

3. **Are there specific areas that need to be updated or reworked? Give specifics.**
   The Expressions, Equations, and Relationships strand in all three grade levels needs some attention. Under the Apply and Extend Arithmetic to Expressions and Equations sections, a rearrangement would allow for developmental readiness and alleviate the overload in 6th grade. Conceptually, inequalities are more difficult for students and might be better addressed at 7th grade. Under the Apply and Extend Arithmetic to Geometric Formulas sections, the "illustrate and explain" in 6th grade works well, but in 7th and 8th grade, the verbs should change to "demonstrate and relate the formulas for…" The rigor of instruction and assessment will depend largely on the stated intent of these standards. Under the "Represent and Solve Equations and Inequalities" section in 8th grade, the standards dealing with systems of equations is a way for students to see the rationale for learning algebraic skills of applying properties of operations to manipulate equations and inequalities. However, these might be better placed in 9th grade to give more time for thorough concrete and pictorial development of the skills at 8th grade.

4. **Are the mathematics concepts/content statements grade-level appropriate? Are important concepts missing at this grade level?**
   The changes in the Expressions, Equations, and Relationships are appropriate overall. Staff development will be required for teachers in grades 6-8 to prepare for the transition, in algebraic concepts but even more so in the data and statistics changes.

5. **Are the Student Expectations clear and specific? What are suggested changes?**
   See specific standards in table below.

6. **Is the subject area aligned horizontally and vertically? Where are there areas for improvement?**
   For the most part, the middle school grade band is well aligned. There seems to be more in each grade level, continuing the "mile wide, inch deep" coverage instead of learning at a greater depth. The data and statistics work will take time away from Number, Proportionality, and Expressions. This trade-off should be analyzed and debated.

6th Grade Math	Number and Operations	Proportionality	Expressions, Equations, and Relationships	Measurement and Data
Process Standards: ADD: Organize work in order to look for patterns; use patterns to generate solutions, and make connections and predictions.	**6N05** Omit "For example" **6N08** Substitute "determine solutions to mathematical and real-world problems involving multiplication and division of positive rational numbers with fluency" **6N09** Substitute "determine solutions to mathematical and real-world problems involving addition, subtraction, multiplication, and division of integers with fluency"	**6P01** Add "in mathematical and real-world situations" **6P05** Clarify the intent and extent of qualitative reasoning in this standard **6P08** Change "numbers" to "numerical expressions" **6P10** Wait until 7th grade for percent problems.	**6A02** Omit **6A03** This standard subsumes 6A02 and should include "equation" with "rule" **6A04** Replace "key aspects" with "numerical relationships" **6A10** The description is confusing. Does this standard include parallelograms, trapezoids, and triangles or does it include oblique triangles and parallelograms? **6A11** Equations might mean formulas unless they are numerical sentences with the dimensions of the particular figure in the problem. This needs to be clarified, especially how it will be assessed. **6A13-16** Omit inequalities and move to 7th grade	**6M01** Rewrite to parallel 5M06: graph ordered pairs of numbers arising from mathematical and real-world problems, including all four quadrants **6M04** Is the intent to use graphical representations or to describe the data distribution? **6M05** This standard seems trivial **6M06 and 7** Staff development and clarifying examples will be needed for these standards. How will they be assessed?

7th Grade Math	Number and Operations	Proportionality	Expressions, Equations, and Relationships	Two-Dimensional and Three-Dimensional Figures	Measurement and Data
Process Standards: ADD: Organize work in order to look for patterns; use patterns to generate solutions, and make connections and predictions.	**7N01** Add "both positive and negative" to add emphasis. **7N02** Add "including solutions requiring applying the order of operations within the context of the problem"	**7P03** An example is needed for clarification. Add **6P10** to 7th grade **7P08** A restating of the standard is needed **7P13** Clarify the intent and extent of qualitative reasoning in this standard **7P11, 13, and 15** These standards seem to overlap and might be combined	**7A01** Rewrite to "represent the numerical relationships in mathematical…" **7A02 and 3** The "for example" is not needed. Is the intent in these standards to have the student explain the relationships in the formulas verbally and draw pictures to illustrate these relationships? How will these standards be assessed? **7A06** There should be a limit of two or three figures making up the composite figure. **7A07** Rewrite the standard to parallel **6A13**: write a one-variable (one-step) equation or inequality given a real-world or mathematical problem (including one modeled on a number line)		**7M02and 3** How will these standards be assessed?

8th Grade Math	Number and Operations	Proportionality	Expressions, Equations, and Relationships	Two-Dimensional and Three-Dimensional Figures	Measurement and Data
Process Standards: ADD: Organize work in order to look for patterns; use patterns to generate solutions, and make connections and predictions.	8N01 How will illustrating the rational approximation be assessed? Also, why were cube roots restricted for numbers less than 225? Either limit them to 125 or 1000. Reorder 8N02 to precede 8N05. Combine 8N03 and 8N04 unless there is a particular way 8N03 is to be assessed.	8P01 How important is the distinction between the distance between two points and the length of the segment with those points as endpoints? 8P02 It would be helpful to include the specific attributes that will be assessed. 8P03 There should be a specified restriction on the scale factor (positive rational number, any rational number) to know the intent of the standard and what will be assessed. 8P04 Specify similar right triangles for clarity 8P06 Are any restriction on k needed?	8A02-4 Is the intent in these standards to have the student explain the relationships in the formulas verbally and draw pictures to illustrate these relationships? How will these standards be assessed? 8A09 Rewrite to parallel 8A11: write a corresponding one-step equation with variables on both sides, including rational number coefficients and constants, when given a mathematical or real-world problem 8A10 and 13 Limit this to tables and graphs for conceptual foundation, and move algebraic methods to 9th grade	8G01 Should 8P03 be included here as dilations, considering the property of orientation when the scale factor is negative? 8G02 Again, dilations need to be included so that the standard is not trivial. 8G03 Again, dilations should be included	8M03 This standard will require staff development 8M04 Omit for the sake of investing more time in the algebraic concepts new to the grade level

8th Grade Math	Number and Operations	Proportionality	Expressions, Equations, and Relationships	Two-Dimensional and Three-Dimensional Figures	Measurement and Data
		8P08 Clarification is needed regarding the criteria used to determine linearity of the data **8P10 and 11** There seems to be an overlap in these standards			

MATHEMATICS TEKS REVISIONS
Math Course/Grade Level: Algebra 1
J. Weilmuenster

(See below for specifics by focal areas)

1. **Is a complete and logical development of mathematics concepts followed for this grade level or course? What recommendations do you have for improvement?**
   The development is highly dependent upon concepts moved to 8th grade, creating the critical need for staff development of middle school teachers. This course of Algebra 1 takes in some of the concepts currently taught in Algebra 2 and will require special attention be paid to vertical alignment.

2. **Have the correct vocabulary and terminology been used? Where can changes be made for accuracy and/or clarity?**
   See specific standards in the table below.

3. **Are there specific areas that need to be updated or reworked? Give specifics.**
   Standards A1L12 and 13, correlation and causation, should be reconsidered, at least in the clarity of the descriptions.

4. **Are the mathematics concepts/content statements grade-level appropriate? Are important concepts missing at this grade level?**
   For the most part, the content is grade-level appropriate but will be challenging to many students. It is notable that the language of parent functions has been dropped. It is regrettable that technology is not mentioned as an appropriate tool in several places.

5. **Are the Student Expectations clear and specific? What are suggested changes?**
   See specific standards in table below.

6. **Is the subject area aligned horizontally and vertically? Where are there areas for improvement?**
   Overall, the alignment is good with 8th grade and Algebra 2. There seems to be more content than can be mastered in a school year calendar. Consideration might be given to waiting until Geometry to deal with radical expressions and until Algebra 2 for some of the quadratics transformations and the Remainder Theorem.

Algebra 1	Linear Functions, Equations, and Inequalities	Quadratics	Other Functions, Equations, and Inequalities	Number and Algebraic Methods
Process Standards: ADD: Organize work in order to look for patterns; use patterns to generate solutions, and make connections and predictions.	**A1L12 and 14** Although this is an important concept, it would be better to continue the approach beginning in 8th grade, certainly using technology, but bringing in the terminology of linear regression and combining the two standards. **A1L13** This is a rather subjective distinction. How will it be assessed? **A1L18** As this does not refer to a system of inequalities, and to be consistent with **A1L16**, rewrite as: …to an inequality…	**A1Q02** This has no foundation in the development of multiplication and division in 3rd, 4th and 5th grade, where the concept and terminology of *factor* is absent **A1Q03** Give example of the form as provided in **A2Q05**. Is it consistent with the h, k? **A1Q04** Is the absence of parentheses intentional? If there is horizontal shift, this is new. What is intended to change needs clarification. **A1Q05** Clarify with an example. The connection to intercepts is not made clear.	**A1O02** Include the meaning of the variable *x* as well as the values of *a* and *b*	**A1A01 A1A01** Clarification is needed about the level of complexity of the radical expressions involved **A1A03** Would the terminology of piece-wise functions help clarify the intent of the standard? **A1A05** Please clarify the standard form specified (what are the restrictions on the coefficient *a*?) **A1A14** Please clarify what is meant by *simple* trinomials **A1A11** If the intent is to combine like terms, just keep addition and subtraction in the standard. The product of two or more polynomials will involve the properties of exponents. Perhaps the standard needs to be separated for the purposes of assessment.

(See below for specifics by focal areas)

1. **Is a complete and logical development of mathematics concepts followed for this grade level or course? What recommendations do you have for improvement?**
   The development of additional functions in Algebra 2 is logical and appropriate. Recommendations would be to focus on multiple representations as the functions are studied individually and also to keep the connection to parent functions as a theme throughout the course.

2. **Have the correct vocabulary and terminology been used? Where can changes be made for accuracy and/or clarity?**
   The more specific language is a welcome change. However, specific language including the multiple representations and parent functions should be added for emphasis and clarity. See specific standards in the table below.

3. **Are there specific areas that need to be updated or reworked? Give specifics.**
   See specific standards in the table below.

4. **Are the mathematics concepts/content statements grade-level appropriate? Are important concepts missing at this grade level?**
   It is good to bring back polynomials to Algebra 2 for college readiness rather than waiting until Precalculus. Moving conics to Precalculus will provide enough time to develop polynomials and matrices in Algebra 2.

5. **Are the Student Expectations clear and specific? What are suggested changes?**
   Wording is clearer in many areas. See specific standards in table below.

6. **Is the subject area aligned horizontally and vertically? Where are there areas for improvement?**
   Algebra 1, Algebra 2, and Precalculus is better aligned in the draft. This is also better aligned to Statistics. Many concepts, such as polynomials, matrices, operations with and simplifying expressions, are brought in that were in Precalculus that should have been introduced earlier in Algebra 2 and extended or deepened in Precalculus for much needed fluency by the time students would be college and career ready.

Algebra 2					
Features of Functions	Systems of Linear Functions, Equations, and Inequalities	Quadratics, square root, cubic and cube root functions, equations, and inequalities	Other Functions, Equations, and Inequalities	Number and Algebraic Methods	Data Analysis
A2F01 It is interesting to note that linear and quadratic functions are missing from the list. The base is missing from the logarithmic functions although the last sentence seems to indicate they should have base b. Cubic and cube root functions have been added, and given the draft standards this is a positive change. **A2F03** Rewrite as: Describe and analyze…	**A2L01** Although our current TEKS does not explicitly state that systems should be linear, often teachers have taken it that way, not teaching students to solve non-linear systems at all. The specificity of this new standard makes clear what is implicit in our current TEKS. **A2L08** This language makes clear that we are not restricted only to systems of linear equations.	**A2Q01** This language indicates a more overt connection to use of matrices to determine a quadratic function. **A2Q07** This should go with conic sections, but it does not fit in the language of any of the current Algebra 2 SE's related to conic sections. **A2Q08** It is interesting that complex roots of square root equations are addressed here. **A2Q09** The specific language about extraneous solutions is good, but it doesn't relate to "quadratic equations". It fits better with radical and rational equations. **A2Q10** Rewrite as: generate cubic equations (not solve)	**A2E05** Will Algebra 2 students no longer address domain and range? **A2E11** The function f(x) = a/x probably needs to be replaced with f(x) = k/x so that the parameter a is not confused with the constant a. **A2E13** This is nice language including a focus on appropriate units. It is similar to the current TEKS language but leaves out determining reasonable domain and range values which is should be included. **A2E14** Having specific language regarding extraneous solutions may be helpful for teachers. Keep the language about connections among multiple representations.	**A2A08** Teachers do this concurrently with the solving of exponential and logarithmic equations. This specific language is helpful as a standard. **A2A10** It is appropriate to specifically include sum and difference of two cubes. In light of this, it might be helpful for teachers to have a complete list of all methods that are intended here.	

(See below for specifics by focal areas)

1. **Is a complete and logical development of mathematics concepts followed for this grade level or course? What recommendations do you have for improvement?**
   The development overall is very good, although there is too little use of technology and too much emphasis on formal proof.

2. **Have the correct vocabulary and terminology been used? Where can changes be made for accuracy and/or clarity?**
   See specific standards in the table below.

3. **Are there specific areas that need to be updated or reworked? Give specifics.**
   The standards that are concerned with probability are misplaced in geometry. Although probability and statistics are an important part of math learning, they don't need to be just stuck on at the end of geometry.

4. **Are the mathematics concepts/content statements grade-level appropriate? Are important concepts missing at this grade level?**
   Missing: Use of technology and problems in context
   Not grade-level appropriate: radian measure should be in PreCalculus; GA04 and GC04 should be in Algebra 2

5. **Are the Student Expectations clear and specific? What are suggested changes?**
   See specific standards in table below.

6. **Is the subject area aligned horizontally and vertically? Where are there areas for improvement?**
   If a topic is added to a grade level, then topics must be taken out to allow time for the depth of understanding. The TIMMS study was very emphatic that the United States teaches too many topics with very little depth at every level.

Geometry					
Representations connecting algebra and geometry	Logical argument, proof, congruence and constructions	Similarity and trigonometry	Measurement	Basic theorems about circles	Probability
GA01 "spherical" is a better descriptor than "non-Euclidean" **GA02** Omit *with graph* **GA04** This is more appropriate for Algebra 2 **GA05** Does not need a separate objective. This should be included in all objectives.	**GG04** Change *represent* to *make* **GG07** Change *identify* to describe and *giving* to *generating* **GG10** Change *motions* to *transformations* for consistency with other standards in the section **GG11** Avoid acronyms and spell out the words *angles* and *sides* **GG12** Rewrite as: solve mathematical and real-world problems using the Triangle Inequality Theorem (the sum of the lengths of any two sides of a triangle is greater than the length of the third side) **GG13** Replace first part with "Prove theorems about angles formed by the intersection of lines and line segments choosing from..." **GG14** Omit *angle* to include the other relationships listed in the standard	**GS02** Rewrite as: apply the angle-angle criterion to verify similar triangles and apply the proportionality of corresponding sides to solve mathematical and real-world problems **GS05** Rewrite as: determine the lengths of sides…	**GM02** This standard doesn't seem to fit in the measurement strand. However, it may fit here as well as anywhere	**GC02** Radian measure of angles is more appropriate for Precalculus **GC04** This is more appropriate for Algebra 2	**GD01** This is the only probability standard that belongs to Geometry