The July Revision of the Texas Math Standards

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Overall, I find these standards very disappointing, and feel that there are sufficient problems with them that the best course would be to simply adopt the new Core Standards which, in spite of their many problems, are far better and much more mathematically literate and coherent than this document.

However, I have looked over quite a number of the explicit standards, and I include my comments below, though these are by no means all the standards that I had difficulty with.

I have also prepared careful discussions of how the high achieving countries handle the key issues in K - 6, particularly place-value, computational facility and standard algorithms, replete with sample pages from their books. Hopefully, these discussions will help with the extensive revisions of the current document that are necessary.

Kindergarten:

KN01 The first two lines are just vocabulary, and have no more content for students than reciting the alphabet. Useful for beginning reading, but not useful for mathematics. The third line "count verbally to 130 by fives and tens" does have mathematical content - or can have. But rote learning, or "pattern" learning of this is without mathematical content. The next few lines do have mathematical content and should be the focus here.

KN03 Again, the direction "without having to count from 1" shows the danger of this standard. It can be satisfied strictly by memorization and then will have no more content than learning different ways of saying the alphabet. Rather, it should focus on the notion of bigger or smaller. If a number comes after another it represents a bigger set.

KN-6 More appropriate in first grade.

KN10 The comment "Kindergarten children need to see addition and subtraction represented by ... joining and separating" is far from evident.

KN12 I would delete the phrase "using concrete and pictorial models." Also, my inclination would be that it asks too much. What is the justification for "unknowns in all positions?"

KN13 Not necessary.

KG03 What is the point of the phrase "using informal and formal language. Probably, it is not a good idea to require formal language in Kindergarten.

KG05 Delete everything after "squares."

KG07 What is the point of specifying popsicle sticks, straws, etc?

KG08 Too many concepts. What are important here are "above, below, in front of, in back of, and maybe between."

KM02 Again, too many concepts.

KM03 "Shape" is very vague.

KM04 Too advanced.

First Grade

1N01 Line 2, "verbally count backwards" suffers from the same issue as the corresponding Kindergarten standard. It is nothing more than learning the alphabet backwards. Might help with aspects of reading, but has little to do with math. The next line is ok, but "subitizing" is hardly standard English. It is always better to phrase things so that they can be read by parents.

1N02 There is a tendency to treat place value as names and vocabulary: hundreds place, tens place, which in and of themselves have no mathematical content. Students will just count from the right to find the appropriate "position" and then READ the numeral they see there. They do not gain any understanding of what the significance of the numeral is. What should be emphasized is that the standard way of writing numbers is nothing but a SHORT-HAND notation for the expanded form, and great attention needs to be paid to making sure students understand the expanded form.

1N09 I cannot figure out what this standard is trying to say.

1N10 IBID.

1N11 IBID

Expressions First line, I am dubious about quarters. pennies and dimes for sure, nickles are more advanced, involving skip counting, So great care needs to be taken here.

Use relationships to determine. I think you have to be more specific. What kinds of relationships, or which relationships?

1A02 It is not all that easy to give the meaning for the equal sign. I'm not at all sure this is an appropriate first grade standard. Bluntly, if I were to talk with a representative group of first grade teachers and I asked them to explain the equal sign, what I would

expect would be dead silence.

1A03 If subtraction is defined correctly as is done in the high achieving countries, $A - B$ is that number C, if it exists, so that $B + C = A$, then this makes sense. But otherwise, it is far to vague.

1A03b **identify relationships** is too vague as stated. It is important to give some idea of what kind of relationship you are looking for.

1G03 Part two, "partition two dimensional" It is far from clear to first graders what two and four fair shares mean. For example one can look at the answers they provide for breaking a circle into three fair shares. They usually do not see that the sections should have the same area. So be very careful here.

1M01 How can one demonstrate this? It is more like a DEFINITION of length, at least for certain figures.

1M03 "a unit such as 5 Popsicle sticks" is very awkward. One would not generally assume that such a unit is a unit of length. The popsicle sticks could be piled one on top of the other for example.

1M06 The total number of objects should be limited, maybe no more than 15.

1M07 I would judge this to be too complex for first grade.

Second Grade

1N01 Part b "demonstrate conceptual subitizing" As before, the term "subitizing" should be replaced. Also, this is not something I would not think of as a mathematics standard of any importance.

2N02 Why 999? Why is 2N03 up to 9,999. I would prefer more focus on the expanded form.

2N06 As before, the division of things into equal parts is something that needs to be handled with real care.

2N08 If not carefully treated the students will simply learn vocabulary.

2N08b "Justify that fractional" Where did halves and fourths come from?

2N10 What is the point of "fluently" here? If you mean "learn the basic addition and subtraction facts to 20 to automaticity" then say so.

2A03 Needs to be rephrased.

2G01 Specify that the shapes only have a small number of vertices, edges and faces

2M01 "inch tiles" are usually areas, not lengths. The same for centimeter cubes. "Describe the inverse relationships" is probably too difficult for second grade.

2M05 What is "a linear model?" If you mean the number line, then say so, and INTRODUCE it somewhere.

2M06 I am pretty sure that "represent the point" is not appropriate. Same for 2M07.

2M08 I don't see any reason to replace "bar graph" by "bar type graph."

Third Grade

3N01 "decompose the number represented in base 10 place value notation up to 10,000 as a sum ..."

3N01.5 Too vague. I don't know what "the mathematical relationships" is likely to mean.

3N12 It is usual and necessary to make a definition of greater or less for fractions. Usually this is given as follows. "If the point representing the first fraction is to the right of the point representing the second, the the first is greater than the second, and conversely." Once one has a definition then it is possible to "reason." Otherwise, it isn't. It is only possible to make noise.

3N By this time there should have been some mention of explicit algorithms for addition and subtraction, and some mention of the necessity for students to become fluent with some accurate, efficient addition and subtraction algorithms that is based on properties of base 10 place-value notation. There is none. Such standards are required by NCTM in their important work on Focus Standards, and by the National Math Panel. There are many other reasons that students must have control of such algorithms, and preferably the STANDARD ALGORITHMS. Such standards are strongly present even in Core Standards. See my further comments in the appendix Key Core Standards, Place-Value that show how such content is developed in the high achieving countries.

3M02 What happens when one has a pair of times 1:25PM and 7:35AM?

Fourth Grade

4N04 I have already discussed to problems with standards like this in my comments on K - 3. Without extreme attention to the ACTUAL meaning of the digits - representing a SPECIFIC summand in the expanded form - such standards are meaningless. I cannot tell you the number of classes I have attended where teachers routinely make this mistake. When they do, students typically never get any feeling for the magnitude

of numbers when they are written in base-ten place-value notation.

4N06 Of what earthly use is this standard?

4N12 What is the point of this standard? It just seems like makework to me. Moreover, the end-result would likely be more confusion for students.

4N13 One needs a DEFINITION of equivalent fractions before one can explain that a/b is "equivalent" to na/nb. Without such a definition a standard like this is circular. The usual definition, as is given in Core Standards, is that two fractions are equivalent if and only if they are represented by THE SAME POINT on the number-line. Hence, it seems to me that this standard is EXACTLY BACKWARDS.

4N20 If the product of the whole number represented in base-10 place-value notation by the sequence $a_1a_2 \ldots a_m$ by 10 is $a_1a_2 \ldots a_m0$, then this iterates to show that the product of $a_1a_2 \ldots a_m$ by 10×10 is $a_1a_2 \ldots a_m00$ and so on. Thus, one needs ONLY the behavior of multiplication by 10. However, it will be impossible to explain this property unless students (and teachers) are fluent with the expanded form.

4N21 Generally, such standards are mathematically worthless.

4N There should be serious preparation for the standard multiplication and division algorithms by now. I very much doubt that 4N21 - 4N25 are up to this as they are stated. Again, I recomment that you check my comments on place value.

4M05 Be careful with "additive properto of angle measure," since, for example, 320 degrees + 60 degrees is 20 degrees, and this is quite a different form of addition.

Fifth Grade

Generally the standards here are more reasonable than those in the lower grades, but it is far too late for most of them. These topics should have been covered much earlier. Moreover, there remains no indication that students should be fluent with ANY algorithms for addition, subtraction, multiplication and division. Such students will have, as we are currently observing, much more trouble with more advanced mathematics, and consequently, both obtaining high level jobs after high school or being able to major in any technical area in college.