



The Ohio Council of Teachers of Mathematics
BECOME OCTM
Building an Energetic Community of Ohio Mathematics Educators

April 1, 2010

To the Council of Chief State School Officers, The National Governors' Association Center for Best Practices, and Achieve:

This letter is written on behalf of the Board of Directors of the Ohio Council of Teachers of Mathematics to respond to the March 10, 2010 draft of the Common Core State Standards in Mathematics. OCTM is an organization of over 3,700 mathematics educators from pre-school through higher education. We believe that every student should have full access to mathematics education that develops the understandings and skills necessary for mathematical literacy and full participation in a global society. *In addition, we are guided by a belief in policies and practices that value and emphasize the thinking of teachers and students.* This response represents input from OCTM Board members as well as many OCTM members, who submitted feedback at regional forums and online.

OCTM supports the development of a national standards framework that is focused, clear, and coherent in specifying rigorous mathematics content for all students in each grade. We believe that this draft of the Common Core State Standards does reflect a goal of focusing on several "big ideas" in each grade rather than lengthy, disjointed lists of objectives. In general, we agree that students meeting these standards will be well prepared for success in college and the workplace and that students meeting STEM standards will be well prepared for STEM majors and careers.

However, we believe that more work needs to be done to present a clear, coherent, and achievable vision of school mathematics from kindergarten through high school in the final standards document. *We urge the writing group to rely on established research about students' mathematical thinking at least as much as international benchmarks. We also urge the group to remain cognizant of the fact that classroom teachers will be primarily responsible for enacting the standards included in the final version of this document.* As such, the document must be organized and written in a format that is readable and useful in determining what understandings students need to develop relative to each big idea. The document as a whole is somewhat difficult to navigate (though we recognize that this difficulty may be alleviated if the standards are ultimately published electronically and in a dynamic environment).

On the following pages, we include the major points that our members and leaders have raised as they have collaboratively examined the document. *We hope that the writing group will be genuinely responsive to the feedback submitted by groups and individuals across the country, and we believe that the CCSSO, the NGA, and Achieve should post as much of this feedback online as possible, along with commentary to indicate how the feedback was utilized in formulating the final version of the document.* OCTM is particularly interested in seeing a response to the letter from 40 leading mathematics educators that was posted online on March 31 at <http://commoncorematheducatorsrespond.blogspot.com/>, and we echo the well-stated, research-supported concerns expressed in this letter.

K-8 Standards

Domain: Number

- Many of the standards, in the primary grades particularly, are only included once. Ideas that are very foundational should be addressed at least over two years to account for developmental readiness of students. In general, we are concerned that the standards related to base ten understanding and computation are addressed too early, and we question the rationale for these placements (what research supports them?).
- Conceptual understanding is not as apparent as procedural skill in these standards, particularly related to computation with whole numbers, fractions, and decimals.
- Strategies students are to learn seem to be limited; certain strategies are emphasized above others. One particular example of this is the over-reliance on the number line to represent fractions; students must also learn to represent fractions in regions and in sets (though fractions of sets should probably appear in grade 4, given that the whole is less apparent in a set).
- We are very disappointed, and indeed perplexed, at the use of the word “**the**” to describe a standard algorithm. If these standards are to reflect *international* instructional goals, then using the word “the” is shortsighted since there are *many* efficient, conventional algorithms for computation used around the world.
- The content in grade 5 is considerably more sophisticated and more extensive than the content in grade 4. We strongly suggest that much of the fraction and decimal arithmetic be moved to grade 6.
- The standards in Number should be more explicitly connected with those in Geometry and Measurement.
- We appreciate the examples that are provided in some of the standards; this contributes to the clarity of these statements.
- The language overall in Number is relatively clear.
- We believe the inclusion of fluency in certain skills in grades 6-8 is wise.

Domain: Geometry

- In general, the language should be clarified by providing more examples.
- Again, connections between the Geometry and Measurement standards should be more readily apparent.
- Clarification and refinement are needed in grades 1-6 for the progression of ideas and skills related to angles, plane figures, and the coordinate plane.
- We are concerned about the geometry that students will miss in grade 8 if they enroll in the first high-school course a year early. Can this be accounted for in the high school courses?

Domain: Measurement and Data

- Standards involving time and money are noticeably lacking and are disjointed when they do appear. This progression should be refined considerably, taking into account students’ developmental readiness to understand certain ideas, such as fractional parts of hours and dollars. Would it not make sense to begin the study of money with whole dollars (and landmark amounts) instead of cents?
- More effort should be made to include examples related to Data and Probability in the Number standards if Data as a domain on its own is to remain so limited.

- Graphing in these grades should routinely include dot (or line) plots, bar graphs, pictographs, and perhaps line graphs. Dot plots seem to be overemphasized currently.
- We encourage the writing group to consider combining Measurement and Geometry as a domain in grades K-5 to align with the domain in grades 6-8.

Domain: Expressions and Equations

- The standards in grades 6 through 8 seem to be relatively clear, though additional refinement of the language and additional examples would be helpful.

High School Standards

Conceptual Category: Number and Quantity

- We recommend that the standards involving matrices should be included for all students, not just students in STEM courses.

Conceptual Category: Algebra

- In general, we do *not* feel that the standards in this category are clear, focused, and appropriately rigorous.
- In any given cluster, it is difficult to tell how the ideas are to progress (or “flow”).
- Many of the statements need to be clarified, perhaps with examples.
- The references to technology are rather vague and do not indicate what mathematics is to be *learned* using certain technologies versus “done” using these technologies. Is the technology only a tool to find an answer, or is it an instructional tool?
- We believe that the standards related to complex numbers should *not* be classified as STEM standards.
- Standards involving polar and parametric equations *should* be classified as STEM standards.

Conceptual Category: Geometry

- In general, we feel that the standards in this category *are* clear, focused, and appropriately rigorous, with some exceptions.
- We recommend that more real-world applications and examples be reflected in the standards.
- The standards in this category should be more carefully sequenced to demonstrate a progression of ideas.
- Students in STEM courses need to understand the limits of Euclidean geometry.
- In general, more three-dimensional geometry should be included since we live in a three-dimensional world.

Conceptual Category: Statistics and Probability

- In general, we do *not* feel that the standards in this category are clear, focused, and appropriately rigorous.
- The standards under Summarizing and Categorizing Quantitative Data and under Conditional Probability and Laws of Probability do seem clear, specific, and focused.
- The probability models could be addressed in middle school.

- There seems to be an excessive focus on investment as an application of these standards.

General comments

In general, we encourage the writing group to consider and articulate the learning needs of high-achieving students when finalizing these standards.

The names of the clusters in grades K-8 are currently stated in somewhat vague terms and do not illustrate the development of ideas from grade to grade. Further, it would be helpful in the tables on pages 7 and 8 of the current draft to include language in the “empty” cells to indicate the informal development of ideas in grades where the clusters are not formally present (such as fraction concepts in the early grades).

Moreover, the current structure of the document, that creates a distinct separation in format between K-8 and high school, can be confusing. We recommend that the formats for the K-8 and high school standards be unified in the final document and that the high school Pathways be included in the main document instead of in an appendix.

OCTM wishes to express appreciation to the writing group for the substantial effort that each member has devoted to this important work. Again, we hope that the final document will reflect research on student thinking about mathematics and the feedback from professional organizations and individuals across the nation, as well as international benchmarks in mathematics when appropriate. We also hope that the writing group, the CCSSO, the NGA, and Achieve will strongly advocate and plan for high-quality, ongoing professional development for all teachers who will ultimately implement these standards. It is absolutely necessary, without question, to support teachers in their work so that they may be able to effectively support student learning of mathematics.

Respectfully submitted,

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