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From: Mike Cohen

To: Achieve Board of Directors

Subject: Review of the Common Core State Standards (CCSS) in Mathematics and English Language Arts & Literacy in History/Social Studies, Science and Technical Subjects

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The Common Core State Standards (CCSS) in Mathematics and English Language Arts (ELA) & Literacy were released on June 2, 2010, and have met with a very favorable response. A wide variety of national education and business organizations have endorsed the standards. To date, eleven states[1] have adopted the standards, and we expect that number to more than double by early August as states act to meet Race to the Top commitments.

The CCSS are not without controversy, however. The math standards will be intensely debated in California, Massachusetts and Minnesota, and the ELA & Literacy standards appear headed for similar debate in Massachusetts. The debates in these states will likely spill over to others.

Achieve has reviewed both the math and ELA & Literacy standards in detail, and provides this overview to help Board members judge their rigor and quality and understand and engage in the coming debates. To foreshadow the analysis below, I am convinced that the CCSS are a significant advance over current state standards, and measure up well to standards in high performing countries. They merit adoption by every state, including those with the most rigorous standards in the country.

Summaries of these analyses will be released in the next week. What follows is a brief overview of the key attributes and advances of each set of standards, and a high level summary of the findings of the comparative analyses.

COMMON CORE STATE STANDARDS IN MATHEMATICS

The CCSS in mathematics build on and make a number of significant advances over most existing state standards. The K-5 standards provide students with a solid foundation in whole numbers, addition, subtraction, multiplication, division, fractions and decimals—which help young students build the foundation to successfully apply more demanding math concepts and procedures, and move into applications. They also provide detailed guidance to teachers on how to navigate their way through knotty topics such as fractions, negative numbers, and geometry, and do so by maintaining a continuous progression from grade to grade. Having built a strong foundation in K-5, students can do hands on learning in geometry, algebra and probability and statistics in the middle grades to gain a rich preparation for high school mathematics. Students who have completed 7th grade and mastered the content and skills through the 7th grade will be well-prepared for algebra in grade 8. The high school standards call on students to practice applying mathematical ways of thinking to real world issues and challenges; they prepare students to think and reason mathematically across the major strands of mathematics, including number, algebra, geometry, probability and statistics. Note that the CCSS promote rigor not simply by including advanced mathematical content, but by requiring a deep understanding of the content at each grade level, and providing sufficient focus to make that possible.

[1] HI, KY, MD, MI, MO, NJ, NC, OH, UT, WI and WV

Will the CCSS in mathematics prepare high school graduates for college and careers?

We compared the CCSS with the ADP Benchmarks in mathematics and found that they are as rigorous as, and in some cases extend beyond, the ADP Benchmarks in defining the knowledge and skills demanded of all students. Both the ADP Benchmarks and the CCSS identify a college- and career-ready set of standards as a subset of the high school standards, and also include standards that define more advanced content beyond that bar.[2] In both cases the intent is that all students would be required to take a high school curriculum aligned with those standards. All students, particularly those who plan to pursue advanced study in math or prepare for STEM careers, are expected to take the more advanced math as well.

The college- and career-ready standards defined in the CCSS are slightly more rigorous than the ADP Benchmarks, as they contain several additional advanced topics. To learn the material incorporated in the college- and career-ready standards, a student would have to take a course sequence of Algebra I, Geometry, and Algebra II (or a 3-year sequence of integrated math that covers the same material), the same course sequence Achieve has recommended for high school graduation requirements in the ADP Network.

The CCSS are more rigorous than the ADP benchmarks in another respect. Beyond the college- and career-ready bar, the CCSS contain content for a fourth year of additional math, intended to prepare students for college-level calculus or college-level statistics. The ADP Benchmarks were not as ambitious.

How do the CCSS in mathematics compare with the expectations of high performing countries?

When compared to the standards of high performing countries, the CCSS are equally rigorous. Furthermore, the CCSS tend to be similar in terms of focus and coherence, and sometimes even more demanding.

The secondary level standards compare favorably with those in high performing countries such as Singapore and Japan; for example the CCSS college- and career-ready standards are comparable in rigor to the "O" levels in Singapore and other Commonwealth countries (which opens the door to postsecondary technical training) and the more advanced math standards in the CCSS are as rigorous as the "A" levels through Pre-calculus content, which set the standard for university admissions. Students who meet the CCSS when they complete high school will be internationally competitive, as well as ready for postsecondary education and training.

The elementary grades standards provide unprecedented focus and coherence for U.S. standards, in contrast to the mile wide and inch deep character of the current U.S. elementary math curriculum. Like standards in high performing countries, the CCSS are highly focused in the early grades on a handful of topics, allowing the time for in-depth teaching and learning so that students can develop the conceptual understanding, procedural fluency and mathematical reasoning that provide a solid foundation for learning more advanced mathematics in middle and secondary school.

The elementary grade standards draw heavily on the standards from Japan, Hong Kong and South Korea, which provide a strong focus on teaching numbers and the properties of operations as the foundation for learning algebra and more advanced math. In contrast, most U.S. state standards (drawing heavily on the work of the National Council of Teachers of Mathematics) introduce algebra through the creation, description and extension of number patterns. While number patterns have some value in preparation for algebra, they are usually overemphasized to the detriment of instruction on number and properties of operations leaving students ill-prepared for algebra. Because of this different focus, some states that adopt the standards will

[2] Both ADP and the CCSS define "college ready" as prepared to enter and succeed in first-year, credit-bearing courses in broad access 2- and 4-year institutions, without remediation. This is most frequently a College Algebra, though there is a range of first year courses, and significant variation across institutions in what is taught in College Algebra.

experience some disruption in the early grades, as topics will be introduced at different grade levels than at present. Similarly, comparisons with standards in different high performing countries (e.g., Singapore) will also show that some topics are introduced in later grades in the CCSS than in some high performing countries.

Such grade-by-grade differences do not speak to the rigor of the CCSS. Rather, they reflect a choice about the better approach to providing a solid foundation for preparing students for algebra in 8th grade, and as such are relatively unimportant.

How do the CCSS in mathematics compare with the Massachusetts and California standards?

Both Massachusetts and California have highly regarded, rigorous mathematics standards; Achieve has used both for years as benchmarks against which to compare other state standards. The Massachusetts standards are widely credited as the foundation for the state's steady improvement and internationally competitive performance. Because leaders in both states have appropriately made clear that they will not adopt the CCSS if they are less rigorous then current state standards, the rigor of the math standards is a topic of considerable interest and debate in each.

Our analysis indicates that overall the three sets of standards are similarly rigorous, and describe substantially similar bodies of knowledge, though there are some noteworthy differences between the CCSS and the particular state standards.

Algebra is the gateway for high school mathematics and preparation for postsecondary education. California requires all students to take Algebra I in 8th grade, while Massachusetts does not. The 8th grade CCSS include a significant amount of Algebra I content, but the full coverage of Algebra I is treated as a high school level course. However, the CCSS are explicitly designed with California in mind; students who meet the standards at the end of 7th grade should be prepared for Algebra I, and the Algebra I course standards can be "moved down" to 8th grade if necessary.

We believe that the CCSS do a better job preparing students for algebra in 8th grade than either the California or Massachusetts standards. As noted above, the CCSS have incorporated the approach taken by Japan, Hong Kong and South Korea, particularly in the K-4 standards, whereas neither Massachusetts nor California use that approach. Further, the CCSS provide a precise definition of the core concepts and skills students must master in grades 5-7 to be well prepared for algebra (key aspects of rational numbers and geometry), and a very clear grade by grade progression of topics in each area. In contrast the California standards in particular are significantly less precise, and neither Massachusetts nor California nor provide a sufficiently clear progression across the grades. Therefore, students in each state must make a more abrupt transition from the concrete skills learned through 4th grade to the more abstract reasoning required for algebra, rendering them less well prepared than students who participate in the CCSS would be.[3]

One by-product of the approach taken in the CCSS is that most data, probability and statistics content is not introduced until 6th grade, while Massachusetts and California begin this work in 2nd grade. However, the strong foundation in number sense provided by the CCSS will allow students to progress quickly in middle and high school through data, probability and statistics, culminating in content that is generally more rigorous than that found in many states.

[3] See the brief slide deck by Hung-His Wu, a highly respected conservative mathematician at UC Berkley and one of the authors of the California math standards, for a compelling argument for advantages for the CCSS math standards compared with the California math standards. http://www.stanford.edu/group/pace/PODCASTS/slideshows/2010_6_10_WU.pdf

Overall the content of the secondary level math standards is quite similar. There are relatively minor differences among the three sets of standards when comparing the content of particular courses; the biggest differences arise because the California math standards include math through Calculus (although Calculus is not required of students), while the Massachusetts and CCSS include content through Pre-calculus. Additionally, the CCSS pay greater attention to creating and using mathematical models based on real-world contexts than do either Massachusetts or California.

Comparisons about the rigor of the secondary level standards are quite tricky. The CCSS specifically define the knowledge and skills necessary for success in entry-level credit –bearing courses and 21st century careers. Neither Massachusetts nor California similarly identifies college- and career-ready standards. While the CCSS Initiative appropriately steered clear of defining course-taking requirements for high school graduation, to meet the college and career ready standards all students would have to take 3 years of math through Algebra II, or the equivalent.[4] ADP has urged states to require all students to complete a curriculum aligned with the college and career ready standards, including math through Algebra II. Twenty-one states now require students to complete such a course of study. In contrast, California requires students to take only 2 years of math including Algebra I. Massachusetts delegates decisions about course taking requirements to local school districts. Both states have rigorous graduation exams – but neither exam requires students to demonstrate knowledge and skills at the college and career ready level in order to pass.

In short, while the California and Massachusetts standards may be similarly rigorous to the CCSS, or even more so in some limited ways, they are aspirational while the CCSS is intended to be required for all students. While symbolically and politically quite important, the debate in each state about the relative rigor of the high school standards seems to miss the larger educational point – very rigorous standards that students are neither required to meet nor have the opportunity to learn are not nearly as valuable as required standards that prepare all students for postsecondary success.

How do the CCSS in mathematics compare with NAEP?

States that adopt the CCSS will prepare their students to do well on 4th and 8th grade state National Assessment of Education Progress. The NAEP Framework was an important resource for the developers of CCSS, so the two documents are well aligned. Overall the two documents describe expectations of comparable rigor for the end of 4th and 8th grade, with only minor differences. Where there are differences, the CCSS tend to be more rigorous than NAEP, though there are no more than a handful of expectations that are included in 8th grade NAEP that are not included in the CCSS by the 8th grade.

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS AND LITERACY IN HISTORY/SOCIAL STUDIES AND SCIENCE/TECHNICAL

The CCSS for English Language Arts (ELA) and Literacy in History/Social Studies and Science/Technical subjects have been received quite favorably by the states and the field overall, with relatively few debates and contested issues. Much of the criticism that does exist come from a small but well organized group in Massachusetts. Their primary concerns at this point, are that the CCSS do not pay sufficient attention to literature content and the skills of literary analysis, and the extent to which the Obama Administration's Race to the Top funds provide coercive pressures to adopt the standard despite perceived deficiencies.

[4] The CCSS organize the content into strands, not into courses. In response to requests from many states, Achieve is leading an effort to organize the standards into model courses and curricular pathways. There will be a traditional course sequence that includes Algebra I, Geometry, Algebra II and culminates in one of several 4th year courses, including but not limited to Pre-calculus, AP Statistics and a course that emphasizes modeling. There will also be an integrated math sequence that includes the identical content but combines algebra and geometry into several courses, much as many high performing countries do. Though these course sequences start in 9th grade, we will also produce a version of each that starts Algebra I in 8th grade. These model pathways will be available by the end of June, and included as an appendix to the CCSS.

As their title indicates, the standards are not limited to the traditional boundaries of ELA courses, particularly in high school, where the content emphasis is primarily focused on reading and writing about literature. Instead, drawing on evidence that underscores the relatively weak reading and writing skills high school graduates bring to both college and the workplace, the CCSS explicitly demand attention to literacy skills across the curriculum, not just in the English class. The ADP Benchmarks took a step in this direction when released in 2004; the CCSS take this on more directly and systematically as they took seriously the charge to develop standards that promote college and career readiness. This is a major advance, for it distributes responsibility for developing content specific reading and writing skills to teachers of each subject, rather than leaving them unattended entirely, or the sole province of high school English teachers.

Will the CCSS in ELA & Literacy prepare high school graduates for college and careers?

The CCSS are anchored in a rigorous definition of college and career readiness that requires most of all the ability to read and comprehend complex texts like those encountered in the college classroom and the work place, and to be able to write clear, logical and well reasoned arguments that are supported by evidence, as well as the ability to accurately describe and interpret source material they have read. There is overwhelming evidence that these skills are in short supply among recent high school graduates who enter either postsecondary classrooms or the workplace. The CCSS also spell out listening and speaking skills, focused on purposeful academic talk in one-on-one, small group and whole class settings. These standards stress reading, writing, sharing of evidence in addition to collaboration skills. As such, the college and career ready standards build on and align well with the ADP benchmarks. However, they represent an *advance over the ADP Benchmarks* in that they more systematically extend the literacy skills to history, social studies and science and technical courses.

Starting in Kindergarten, the CCSS at each level are focused, coherent (the reading, writing, listening and speaking standards are tightly related to and reinforce each other) and show a very clear grade-by-grade progression of knowledge and skills, leading up to college and career-ready skills by the end of the 12th grade standards. The reading standards establish a "staircase" of increasing complexity in what students must be able to read independently so that all students are ready for the demands of reading no later than the end of high school. The reading standards are supplemented by material that lays out an approach to defining text complexity and by a large set of text exemplars that together help teachers determine appropriate reading materials at each grade. This precise and systematic attention to text complexity is a major advance over all state ELA standards.

The CCSS also pay careful attention to multimedia literacy, for example by addressing a broad range of media and electronic texts, requiring students to produce multimedia presentations, use computers to find information, read and evaluate information found online, and communicate and collaborate virtually.

While the CCSS for English Language Arts & Literacy are different from standards for proficiency in English that English Language Learners (ELLs) must meet, they were designed to support the learning of all students, including ELLs. For example, the CCSS ask students to understand the differences between formal and informal language, adapt their writing or speech to a variety of contexts and communication tasks, and reflect on their own language development. The speaking and listening standards emphasize working with diverse cultures, and the reading standards emphasize world literature and works from diverse cultures.

How do the CCSS in ELA & Literacy compare with the expectations of high performing countries?

The standards compare very favorably to those in high performing countries. Achieve did a detailed comparative analysis of the CCSS with standards in Alberta Canada and New South Wales Australia, both English speaking jurisdictions that have performed at high levels in international assessments (PISA and PIRLS), and are known for their clearly structured standards. We found few differences, and those that do

exist reflect different purposes of the documents in each jurisdiction, or different decisions about what should be included in the standards themselves. For example, the Alberta standards include student learning strategies and attitudes toward reading, in addition to defining student achievement in reading and writing. In contrast, U.S. standards, including the CCSS, focus exclusively on learning outcomes, steering clear of student attitudes and instructional or student cognitive strategies.

One major difference between the CCSS and international standards we have examined is that most other countries include reading lists, often required, that highlight major works of world and national literature. In contrast, only a few states provide reading lists at all with their ELA standards. Massachusetts provides a sample author list (from which it selects reading passages for the state assessment), Indiana provides a lengthy set of illustrative readings, as does California. Developing a reading list is extremely controversial, which is why all but a handful of states have left the selection of literature students will read to local school districts. While not providing a suggested reading list, the CCSS does provide a large number of exemplars of both literary and informational texts to illustrate the complexity, quality, and range of texts students should be able to read independently at each grade level. The CCSS also include in the standards a small number of required texts, including seminal US texts (The Declaration of Independence, the Preamble to the Constitution, the Bill of Rights, and Lincoln's Second Inaugural) and one play by Shakespeare.

How do the CCSS in ELA & Literacy compare with the Massachusetts and California standards?

As noted above, the CCSS provide significant advances over current state standards, including Massachusetts and California. These advances include reading and writing across the curriculum, attention to text complexity, and the architecture -- focus and grade by grade progression -- of the standards. Overall the content, rigor and demand of the Massachusetts and California standards and the CCSS are more similar than different. All describe similar content related to reading and writing literary and informational texts and a similar progression for K-12. There are some modest differences among three sets of standards, most of which are most often a matter of the degree of specificity with which particular content is addressed.

There are several differences between the CCSS and the Massachusetts Curriculum Frameworks that are noteworthy, primarily because they represent the major line of attack of the CCSS in Massachusetts. One is that the Massachusetts standards focus heavily on the structure and origins of modern English, and covers identifying parts of speech and sentence types (e.g., complex and compound). Massachusetts is unusual in taking this more traditional approach to grammar study; other state standards tend to focus on the ***application*** of grammar and usage skills rather than the ***acquisition*** of linguistic knowledge. While the CCSS take the latter approach, its expectations for correctness are similar to those of Massachusetts; in the CCSS students are expected to use parts of speech properly in context, even if they aren't expected to memorize the parts of speech themselves. Similarly, Massachusetts ELA standards place greater emphasis knowing the terms and vocabulary of literary analysis than the CCSS. The CCSS do require students to compare, contrast and otherwise analyze works of literature, but do not place the same level of attention to the specialized vocabulary for doing so.[5]

How do the CCSS in ELA & Literacy compare with NAEP?

Overall the CCSS and NAEP frameworks in reading and writing at 4th and 8th grade are well aligned with each other, calling for a very similar set of skills, reading similar range of texts. Student in states that adopt CCSS are setting learning expectations that are well matched to the performance expectations defined by NAEP.

[5] Note that the *political* significance of these differences far outweighs their *educational* significance. Note also that MA can address these differences by adding a modest amount of additional content, an approach that is consistent with the expectations for adoption of the Common Core State Standards.