Dear California State Board of Education,

I am writing as a private citizen who is a parent to four public school children. That said, in my job I have been able to teach math teachers and future math teachers for over 20 years, so those experiences clearly play a role in my comments.

First, as with the previous version, I would like to commend the strong focus on supports for English Learners in mathematics. I am also grateful for the focus on number talks and discourse routines. In my experience, a teacher who can successfully facilitate a number talk using discourse strategies and talk moves is in much better position to teach a full math lesson well. I also appreciate the focus on productive struggle and how the 5 Practices for Orchestrating Discourse are modeled and explained in the context of problem-solving tasks.

However, my overall reading of the third version of the California Mathematics Framework (CMF) leads me to conclude that it will FAIL California students and decrease overall math proficiency during a time when test scores are as low as they have been. I ask you to REJECT this version of the framework and continue to use the 2013 version until these 5 major issues detailed below can be addressed and remedied.

1. **<u>The CMF is NOT based on the California Common Core Content Standards for Mathematics (CA-CCSS-M).</u>**
    a. Still in this third version, NEVER ONCE are all the content standards written out. A California Mathematics Framework has the following goal: “This framework serves as a guide to implementing the California Common Core State Standards for Mathematics (CA CCSSM or the Standards), adopted in 2010 and updated in 2013.” (Ch 1 line 37) Yet, only 6.3% of the CMF discusses or even lists specific CA math content standards (1072 lines out of 17,088 lines). The CMF has clearly FAILED to do its job.
    b. The CMF states, “Given educators’ more-advanced understanding of the individual standards, this framework focuses on connections between standards” (Ch 1 line 809) What about new teachers or those who switch grade levels? They surely don’t know the standards. The CMF is happy to list the standards for mathematical practice MULTIPLE times (e.g, Ch 4 line 378), so why can’t we adopt a CMF that at least lists the math CONTENT standards once?
2. **<u>The CMF has redefined “rigor” and “fluency” and moved completely away from the BALANCE between conceptual understanding, procedural fluency and application (Problem-Solving) NECESSARY for students to succeed in math.</u>**

    The CMF is nearly 100% focused on Problem-Solving with an occasional discussion of manipulatives that might lead to conceptual understanding and then the even more rare mention of some procedure that needs to be mastered. In the same way in which we moved away from phonics to whole language and now have finally realized the harmful effects of that, the CMF is proposing moving away from procedural fluency (and really much of the conceptual understanding) in favor of “application”, labeled in the CMF as

“authentic tasks”, “Open tasks”, “Engaging tasks”, etc. While I am a huge fan of authentic and engaging tasks, those should occur ⅓ of the time, not be the “preponderance” of time on these (Ch 10 line 789).

a. The 2013 CA Math Framework DEFINED Rigor as follows:
“*Rigor* has three aspects: *conceptual understanding*, *procedural skill and fluency*, and *application*. Educators need to pursue, **with equal intensity**, all three aspects of rigor in the major work of each grade.” The 2013 CA Math Framework goes on to describe what each of these three aspects are as follows:

“*Conceptual understanding.* Teachers need to teach more than how to “get the right answer,” and instead should support students’ ability to acquire concepts from several perspectives so that students are able to see mathematics as more than a set of mnemonics or discrete procedures. Students demonstrate solid conceptual understanding of core mathematical concepts by applying these concepts to new situations as well as writing and speaking about their understanding. When students learn mathematics conceptually, they understand *why* procedures and algorithms work, and doing mathematics becomes meaningful because it makes sense.

Procedural skill and fluency. Conceptual understanding is not the only goal; teachers must also structure class time and homework time for students to practice procedural skills. Students develop fluency in core areas such as addition, subtraction, multiplication, and division so that they are able to understand and manipulate more complex concepts. Note that fluency is *not* memorization without understanding; it is the outcome of a carefully laid-out learning progression that requires planning and practice.

Application. The CA CCSSM require application of mathematical concepts and procedures throughout all grade levels. Students are expected to use mathematics and choose the appropriate concepts for application even when they are not prompted to do so. Teachers should provide opportunities in all grade levels for students to apply mathematical concepts in real-world situations, as this motivates students to learn mathematics and enables them to transfer their mathematical knowledge into their daily lives and future careers. Teachers in content areas outside mathematics (particularly science) ensure that students use grade-level-appropriate mathematics to make meaning of and access content.

The 2013 CA Math Framework summarizes this, saying, “These three aspects of rigor **should be taught in a balanced way**. Over the years, many people have taken sides in a perceived struggle between teaching for conceptual understanding and teaching procedural skill and fluency. The CA CCSSM present a balanced approach: teaching *both*, understanding that each informs the other. Application helps make mathematics relevant to the world and meaningful for students, enabling them to maintain a productive disposition toward the subject so as to stay engaged in their own learning.” (2013 CA Math Framework, Instructional Strategies Chapter, Pages 2-3).

The current proposed CMF, which I ask you to reject, has re-defined rigor: “Rigor refers to an integrated way in which conceptual understanding, strategies for problem-solving and computation, and applications are learned, so that each supports the other. The challenge posed by the principle of rigor is to provide all

students with experiences that interweave concepts, problem-solving (including appropriate computation), and application, such that each supports the other." (Ch 13 line 134) Note how procedural skill and fluency (the phonics of math) have been reduced down to "appropriate problem-solving (including appropriate computation) in this new definition. A second, new, definition of rigor in the proposed CMF reads, "Rigor. This framework interprets rigor to mean that conceptual understanding can be used to analyze a novel situation encountered in the world. Rigor means that students understand and can flexibly apply methods to different situations, connect mathematical ideas, approaches, and representations." (Ch 14, line 396). The CMF's re-defining "rigor" is clearly a repeat of the failed experiment to remove phonics based instruction, as teachers can no longer focus on procedural fluency just to increase student fluency, but can only do the "whole language' approach of things being embedded in real world contexts. In fact, the 2013 CA Math Framework warned AGAINST exactly what the proposed CMF is asking educators to do. Following is a quote about rigor from the National Governors Association as part of the Council of Chief State School Officers:

"**Rigor in the Curricular Materials**

"To date, curricula have not always been balanced in their approach to these three aspects of rigor. Some curricula stress fluency in computation without acknowledging the role of conceptual understanding in attaining fluency and making algorithms more learnable. Some stress conceptual understanding without acknowledging that fluency requires separate classroom work of a different nature. Some stress pure mathematics without acknowledging that applications can be highly motivating for students and that a mathematical education should make students fit for more than just their next mathematics course. At another extreme, some curricula focus on applications, without acknowledging that math doesn't teach itself. The standards do not take sides in these ways, but rather they set high expectations for all three components of rigor in the major work of each grade. Of course, that makes it necessary that we focus—otherwise we are asking teachers and students to do more with less."

—National Governors Association Center for Best Practices, Council of Chief State School Officers (NGA/CCSSO) 2013, 4

Note how they describe "At another extreme, some curricula focus on applications, without acknowledging that math doesn't teach itself." That is precisely what the proposed CMF is doing- what the 2013 CA Math Framework warned against! Application (called "authentic tasks", "Open tasks", "Engaging tasks", "Culturally Relevant Tasks", etc in the proposed CMF) is the only thing that matters in the CMF: "Teachers are to "plan for a preponderance of student time to be spent on authentic problems. (Ch 1 Line 672) Does "preponderance of student time" sound like "balance"? Surely this guidance is in direct opposition to the 2013 CA Math Framework, and instead, is directing Californians to the extreme side of the "war" (application instead of procedural fluency) which the 2013 Framework explicitly warned against. Do not allow CA to repeat the same failed experiment as happened with reading!!! I am fortunate to have worked with

over 30 school districts to help them improve math instruction; achieving instructional balance has been the primary factor leading to success and which actually produces changes in ALL teachers (not just those who quickly buy into making math fun). My own children attend a district that had the direct support of You Cubed founders; while fun things happened, oftentimes standards were not learned, test scores and math proficiency suffered and I was asked to come undo the harm. As the math TOSA in this district told me "180 great lessons don't make a coherent curriculum". Again, we are all fans of engaging and authentic tasks; I train teachers to do number talks, CGI, authentic tasks, etc; however, I also make sure they have BALANCE in also including targeted, standards-based conceptual development and procedural fluency.

3. **In the CMF, the adopted California Common Core Content Standards are being replaced with "Big Ideas" aligned to 4 "Content Connections" which were not vetted, shared with the CA public, nor written by people with advanced math degrees; there is no evidence the "big ideas" will prepare our students for success in mathematics.** The SBE needs to require that a California Math Framework focus on the Math Content Standards adopted by the state of California. The proposed CMF will fail students (especially struggling students) as it shifts away from standards-based instruction where students learned specific concepts and skills towards ill-defined and vague "big ideas" which have no guarantee of ensuring topics required for success in math are mastered.
    - In direct contrast to the job of a CA Math Framework, the proposed CMF I ask you to reject recommends teaching "Big Ideas" as the content (see evidence below). Who decided the "big ideas" should replace the content standards (which were created primarily by 3 professionals who hold PhD's in MATHEMATICS and which were vetted and voted on in California with public knowledge and input)? According to the CMF, three individuals determined the "big ideas" for California and the CMF. In Chapter 3 line 244 and again in Chapter 3 line 1468 we read, "Three big ideas (Boaler, Munson, and Williams, 2018), and "Three big ideas (Boaler, Munson, and Williams, 2018) related to number sense for the high school level call for students to do the following." Who are "Boaler, Munson and Williams" who apparently have the authority to determine what students in California will learn in math? Well, of these three, only 1 holds a degree in mathematics (Cathy Williams has a Bachelor's in Applied Mathematics). NONE of the three hold a master in mathematics and NONE of the three hold a PhD in mathematics. SBE- you must reject a framework where "big ideas" created by non-mathematicians are replacing content standards written by mathematicians and vetted by thousands. If not, California will fail to produce a STEM workforce; the decision about what math is to be learned *must* be left up to those with advanced degrees in mathematics who know what is needed for STEM careers.

      Additionally, the CMF tells us these "big ideas" (chosen by three individuals without a single advanced math degree) are in fact just ONE interpretation of big

ideas. “It should be said that there are many interpretations of big ideas in mathematics, and those presented in these figures are one variation. Providing mathematics teachers with adequate release time to collaborate with colleagues and engage in discussions around their vision of big ideas at their grade level or in a particular course can enable them to create rich, deep tasks that invite students to explore and grapple with those big ideas.” (Ch 7 line 952). If this is the case, and big ideas are the way to go instead of standards, why doesn’t the SBE put together a group of qualified individuals to draft these and then have them vetted and voted upon in California. Why are we allowing three under-qualified individuals to decide our students’ fate or allowing grade level teams (who typically involve teachers without math degrees) to decide what “big ideas” their students will learn. This will be a failed experiment with the cost being math proficiency for a generation.

Evidence that the CMF wants to REPLACE Math Content Standards with their “Big Ideas”

- “In this framework, the big ideas are delineated by grade level and are the core content of each grade.” (Ch 6 line 228)
- “The foundational mathematics content—that is, the big ideas’ (Ch 6 line 942)
- “In this framework, the big ideas are delineated by grade level and are the core content of each grade.” (Ch 7 line 165)
- Teachers should be “Teaching from big ideas, not individual standards.” (Ch 10 line 177)
- “Educators of pre-service teachers need to align their programs to reflect the authentic-context, big-idea-based instruction described in this framework.” (Ch 10, line 247). So the “big ideas” proposed by 3 individuals without strong math backgrounds will be here to stay and the math content standards will be a thing of the past!

This replacement of math content standards as the primary focus applies to lesson design, publishers, Teacher Preparation Programs, and grading as well.

- “This framework reflects a revised approach, advocating that publishers and teachers avoid organizing around the detailed content standards and instead organize around the most important mathematical ideas.” (Ch 1 Line 405)
- “To help educators attain the goal of ensuring deep, active learning of mathematics for all students, this framework is centered around the investigation of big ideas in mathematics, connected to each other and to authentic, real world contexts and taught in multidimensional ways that meet varied learning needs.” (Ch 1 Line 50)
- “Planning teaching around big ideas, the first component of equitable, engaging teaching, lays the groundwork for enacting the other four.” (Ch 1 line 361)
- “Design class activities around big ideas, with an emphasis on investigations and connections, not individual standards.’ (Ch 1 line 590)
- “In the classroom, teachers teach the big ideas by designing instruction around student investigations of intriguing, authentic experiences relevant to students’ grade level, backgrounds, and interests.” (Ch 6 line 235)
- “These include designing lessons from a small number of big ideas in each grade band; spending a preponderance of student time on authentic problems that

engage multiple content and practice standards situated within one or more big ideas; focusing on connections, to students' lives and among mathematical ideas; and using strategies that show connections between different mathematical ideas on various topics across grade levels." (Ch 10 line 789)

- "Instructional materials should primarily involve tasks that invite students to make sense of these big ideas, elicit wondering in authentic contexts, and necessitate mathematical investigation. Big ideas in math are central to the learning of mathematics, link numerous mathematical understandings into a coherent whole, and provide focal points for students' investigations. An authentic activity or problem is one in which students investigate or struggle with situations or questions about which they actually wonder. Lesson design should be built to elicit that wondering. For example, environmental observations and issues on campus and in students' local community provide rich contexts for student investigations and mathematical analysis. Such discussions will concurrently help students develop their understanding of California's Environmental Principles and Concepts." (Ch 8 line 147)
- "Mastery-based grading describes a form of grading that focuses on mastery of ideas rather than on points or scores. This approach is sometimes referred to as standards-based grading, and although it refers to standards, it does not have to focus on specific standards. It could, instead, use cluster headings, which are more akin to the Content Connections and Big Ideas approach of this framework." Ch 12 line 606

Note that not EVEN ONCE are the Math Content Standards Written out anywhere in the over 17,000 lines of text. How can the SBE adopt a CA math framework that does not even list the content standards students are supposed to learn?

The math content standards were written in a logical order. As the CMF accurately notes, "California's mathematics content standards were built on progressions of topics across grade levels, informed by both research on children's cognitive development and by the logical structure of mathematics." (Ch 6 line 982). Later on we read, "The Common Core State Standards are based on an understanding of how young people typically develop mathematical knowledge and skills in a sequenced." (Ch 3 line 41) So why would the SBE adopt a CA math framework that recommends we shift away from this logical structure that is sequenced and built on research towards a single interpretation of "big ideas"? As Chapter 5 line 507 states, "As readers consider the three subsequent chapters of the framework, they will see ideas similar to the ones discussed in this chapter, organized to help them learn about and begin to use the big ideas approach. While the transition between standards domains and progressions discussed in this chapter and this new approach will not be straightforward for classroom teachers, both emphasize the central idea that students at all levels should have experiences that build their mathematical toolkits for making sense of their worlds." So the CMF is clearly suggesting a "transition" from standards domains and progression (those research based, logical, sequenced standards) to a "new" approach (big ideas) that will not be straightforward. This is not an experiment I want performed on CA public school students. We also read in Chapter 1 line 369, "To reach the goal of deep, active learning of mathematics for all, this framework encourages a shift away from the previous approach of identifying the major standards (or "power" standards) as focal points for organizing curriculum and instruction (see box). It instead

encourages teachers to think about TK–12 math as a series of big ideas." What evidence is there to make these major shifts? In Chapter 2, line 287 the CMF states, "Rather than focusing on specific procedures and memorization, instruction is more effective when teachers aim to develop understanding of bigger ideas and procedures." What study do they cite to support this claim? NONE. The CMF is now making changes to instruction away from the standards based instruction California has implemented for over 26 years without ANY EVIDENCE.

There are a number of other major concerns (beyond the background of who wrote the big ideas and the lack of evidence they will help students become proficient in math, and the fact that one interpretation of this will replace standards based instruction).

- The CA Common Core Standards for Math were written such that some standards were designated as "Major" and others were designated as "additional" or "supporting". It is explained that the additional/supporting standards provide context and opportunities for students to practice and apply what is major, but the learning of those standards is not as important in and of themselves. In all grade levels, K-8 the major work includes all facts and operations with whole numbers, fractions, decimals and integers, place value, algebraic thinking (including expressions and equations), and ratios and proportions. Additional or supporting standards include all standards related to data, statistics or probability as well as all standards related to Geometry. The CMF proposes that teachers "organize early-grade instruction around the Content Connections, which connect the mathematical big ideas." (Ch 6 line 153).The 4 Content Connections, which the CMF describe as the "what" of teaching math are as follows: 1) Reasoning with Data; 2) Exploring Changing Quantities; 3) Taking wholes apart, putting wholes together; and 4) Discovering shape and space (Ch 1 Line 457). So two of the four CC's (50%) are topics which the California Common Core Content Standards for Mathematics (as evidenced in the 2013 CA math framework and the SBAC blueprint) are NOT MAJOR WORK of ANY GRADE LEVEL. How will 50% of the "what" of math being focused on standards that are not major support struggling students? How will it help students achieve proficiency in math and be competitive for STEM careers? As noted previously, the CMF proposed a "shift away from the previous approach of identifying the major standards (or "power" standards) as focal points for organizing curriculum and instruction." On what evidence and research is this proposed? The authors of the CA Math Content standards (which this CMF proposed replacing with big ideas) surely had and used evidence as they wrote standards and noted which were major.
- Based upon what is written in the CMF (and the fact that the math content standards are NEVER listed or written out anywhere in the 14 chapters + 3 appendices), there is no reason to believe teachers will even address most of the content standards if they implement this CMF.
    - The language of the CMF reveals not all standards will be addressed and further shows a lack of knowledge of the standards by the authors of the CMF.
        i. The CMF makes statements about instances when teachers might touch "multiple standards". "These chapters illustrate this framework's approach to instructional design by focusing on several big ideas that have great impact on students' conceptual understanding of numbers and that also encompass multiple content standards." (Ch 1 line 1699) Again in Chapter 8, line 922

we read, “As students explore and investigate with the Big Ideas, they will likely encounter many different content standards.”

ii. In another example, Chapter 3 line 812, we read about what teaching big ideas looks like in a classroom. The CMF states, “Students need time and opportunity to collaborate, critique, and reason about where to place the numbers on the number line (SMP.2, 3). For example, where might 4/7 be placed in relation to ½.” This is great, but the problem is that this is describing a grade 5 classroom and the standards come from grade 4. Again, this gives the public no confidence that the authors of the CMF even know the content standards; further, this does not give the public confidence that our students, if the CMF is adopted, will have a chance to learn them.

iii. In another example we read, “In sixth grade, students are introduced to the idea that letters can stand for numbers.” (Ch 3 line 1302). Students are actually introduced to the idea that letters can stand for numbers in BOTH the grades 3 & 4 content standards. Again I ask, do the authors of the CMF know the content standards?

iv. In yet another example, the CMF states, “For example, content standard 4.NF.2 (compare two fractions with different numerators and different denominators) may be addressed during an investigation in which students reason with data (CC1) and the same standard might also be addressed by lessons in which students take wholes apart and/or put parts together (CC3).” (Ch 6 line 301/431) This does not sound logical and well thought out but relies on when teachers “might” do math; given CA students’ dire performance in math, we can not adopt a framework that has opportunities to possibly learn specific math.

- There are CONTENT STANDARDS MISSING from the “big idea” tables. While the CMF never tries to write out all the math content standards, it does attempt to at least list a standard number next to each big idea. However, in doing this, they SKIPPED 3 standards. The revision process of this third version of the CMF has lasted over a year and not one author can notice that 3 standards are missing? That is unacceptable!
  i. TK is missing NS 2.4: Solve simple addition and subtraction problems with a small number of objects (sums up to 10), usually by counting.
  ii. Grade 2 is missing NBT 4: Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.
  iii. Grade 6 is missing EE 8: Write an inequality of the form x>c or x>c to represent a constraint or condition in a real-world or

mathematical problem. Recognize that inequalities of the form x>c or x<c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

iv. When a standard is written out, it is partially written out which is very misleading to an elementary teacher who has multiple subjects to teach and cannot be expected to memorize all the math standards. For example grade 3 notes the standard "Categorize shapes by attributes and recognize that different shapes may share certain attributes." (3.G.1) Unfortunately they left out the specific shape names listed in the actual standard (which include rhombus, parallelogram square and rectangle) so a grade 3 teacher reading the framework is likely to work on all shapes as opposed to the specific and narrow focus on quadrilaterals as called out in the content standards.

- Examples of how to teach the "big ideas" through "content connections" reveal a clear lack of math knowledge of the writers of the CMF and give the public reason for concern if this CMF is implemented. Following are some specific examples of bizarre and illogical associations.
  i. Grade 2: "Partition a rectangle into rows and columns of same-size squares and count to find the total number of them." is listed under the big idea "Represent Data" How is cutting a rectangle "data"?
  ii. Grade 2 MD 5 "Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem." This standard is listed under the big idea "Dollars and cents" How is "length" listed under dollars and cents?
  iii. Grade 4: NBT 3 "Use place value understanding to round multi-digit whole numbers to any place," and NBT 4 "Fluently add and subtract multi-digit whole numbers using the standard algorithm." These are both listed under the big idea of "Shapes and Symmetry", defined as "Draw and identify shapes, looking at the relationships between rays, lines, and angles. Explore symmetry through folding activities."
  iv. Grade 5: "NF 4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product *(a/b) × q* as *a* parts of a partition of *q* into *b* equal parts; equivalently, as the result of a sequence of operations *a × q ÷ b. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)* b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. 5. Interpret multiplication as scaling (resizing), by: a. Comparing

the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence *a/b = (n × a)/(n × b)* to the effect of multiplying *a/b* by 1. 7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.1 a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.* b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.* c. Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem.*"* Guess what "big idea" these standards about multiplying and dividing fractions are found under? Did you guess "Shapes on a Plane"? Neither did I as there is NO connection here!!!

v. Algebra I "investigate situations that involve linear, quadratic, and exponential models, and use these models to solve problems. Recognize linear functions grow by equal differences over equal intervals; exponential functions grow by equal factors over equal intervals, and functions grow or decay by a percentage rate per unit interval. Interpret the inverse of functions, and model the inverse in graphs, tables, and equations." This standard can be found under the content connection of "putting wholes together and taking whole apart".

Why would nearly anything in Algebra I fit into the same 4 categories focused on in Kindergarten? Apparently for "consistency" as literally anything is taking the place of a focus on students mastering math content standards. The CMF states (Ch 8 line 77), "For consistency across the entire transitional kindergarten through grade twelve span, the expected understandings, skills, and dispositions of graduates are organized by Content Connection (CC).

- Reasoning with Data (CC1)
- Exploring Changing Quantities (CC2)
- Taking Wholes Apart, Putting Parts Together (CC3)
- Discovering Shape and Space (CC4)."

- An obsession with “data” has taken over much of the CMF without evidence to support this drastic change. As noted before, “data” has always been “additional or supporting” in the standards and NEVER major. Yet this CMF not only devotes an entire chapter to it, but also makes it 1 of the 4 content connections all big ideas relate to. I can understand the desire for relevance, but then why not focus on Financial Applications (and algebra in secondary). Is it because the two of the authors of the “big ideas” have designed their own data course? This is surely something to be explored by the SBE.
    - In Chapter 5 line 231 we read, “there are multiple opportunities to support such data-rich experiences and integrate the five components of equitable and engaging teaching described in chapter two, <u>even if the standards domains do not appear explicitly within a grade or grade band.</u>” So teaching data comes BEFORE being concerned about grade level standards?
    - Chapter 7 line 514 tells us, “Grades six through eight mathematics courses should give prominence to statistical understanding and reasoning with and about data—reflecting the growing importance of data in most mathematical situations that students will encounter in their lives.” Again, who is deciding this? Where are the math experts (those with PhD’s in math that know what students need to learn for a rigorous math education?)
    - There are multiple instances of the CMF describing that teachers could or should do data that involve topics either well above or well below grade level standards This blatant disregard for content standards to focus on “data” is not acceptable. See Ch 5 line 493, Chapter 5 line 561 and Chapter 5 line 604 for examples.
    - The focus on data has so clouded the CMF’s thinking, they describe activities with virtually no math (which would be ok if CA students were proficient, but since we’re far below, math teachers need to teach math content standards). We read, “For example, students may be challenged to discover which location (inside or outside the classroom) has the “best” types of tables for collaborative group work. As a part of this task, students explore the idea of “best” and discuss features such as size of the tabletop, height of the table, and shape. The teacher guides the students to consider which attributes of the table could be measured and then provides a template for student pairs to collect their observations and measurements—e.g., of width, height, and shape of the table. After collecting data, students notice that some of the table shapes were hard to measure because of their unexpected shape—e.g., trapezoids, kidney beans, and circles.” Ch 5 line 700. So students spend all this time to measure something and then note that some things are hard to measure. Is that the rigor we expect in CA schools in grade 5?

Textbook publishers are required to ensure content standards are all addressed, so what isn’t the CMF held to the SAME standard?.

- To be eligible for adoption, programs must include a well-defined sequence of instructional opportunities that provides a path for all students to become proficient in the standards (Ch 13 line 239)

- Materials that fail to meet all of the criteria in category 1 (Mathematics Content/Alignment with the Standards) will not be considered suitable for adoption. (Ch 13 line 246)
- Instructional materials, as defined in *EC* Section 60010(h), must be aligned to the CA CCSSM Content Standards and SMPs, adopted by the SBE in August 2010 and modified in January 2013. (Ch 13 line 257)

4. **The CMF is more concerned with developing students' positive math identities and making sure they are "engaged" during class than it is with ensuring students master math content standards.**

California students have declined in math proficiency as measured by the CAASPP, down to 33.38% proficient or advanced in 2021-22 (down from about 40% proficient or advanced in 2018-19) (CMF Chp. 2, line 46). On the National Assessment (NAEP), California students have also declined, with only 30% of 4th graders proficient or above in 2022 (down from 34% in 2019) (link) and only 23% of grade 8 students proficient or advanced in 2022 (down from 29% in 2019) (link). So what are California's plans to remedy this massive problem? While there should be a focus on proven interventions such as tutoring and intervention courses, this proposed CMF is more concerned with students feeling positive about math than they are about students learning math.

- A simple search of language used in the CMF reveals the primary focus of this math framework is NOT on learning math content standards, but rather on helping kids feel good about math. The word "identity" (in reference to building up students' math identities to feel positive about the subject) appears 25 times. The word "belonging" (in that students feel a sense of belonging to the math community) appears 18 times. Contrast that with how many times helping students achieve math "proficiency" is mentioned- ONLY 11 TIMES! No reasonable adult is against students feeling good about math, but that feeling comes as a consequence of reaching proficiency and mastering math content, not as the primary goal of a math teacher. Following are specific examples of the over-emphasis on students feeling good at math at the expense of increasing math content proficiency.

    - This framework offers ideas for teaching in ways that create space for students with a wide range of social identities to access mathematical ideas and **feel a sense of belonging to the mathematics community."** (Ch. 2, Line 192)

    - "Both mathematics educators and mathematics education researchers argue that teaching toward social justice can play an important role in shifting students' perspectives on mathematics as well as **their sense of belonging as mathematics thinkers."** (Ch. 2, Line 462)

    - "This concept is about **building positive mathematical identities**, beginning at the pre-kindergarten level." (Ch 2, Line 467)

- “Teaching in culturally responsive ways that acknowledge and draw on students’ backgrounds, histories, and funds of knowledge **enable students to feel a sense of belonging.” (**Ch 2, Line 499)

- “Teachers can create opportunities for themselves and their students to share autobiographies as mathematics doers and learners, thereby creating spaces for students to participate as authors of their mathematical learning experiences.” (Ch 2, Line 514)
- “They **strengthen their identities as members of the mathematics community.”** (Ch 2, Line 792)

- “A classroom that welcomes students’ unfinished thinking normalizes mathematical struggle as part of learning and **positions all learners as belonging to the discipline of mathematics.”** (Ch 2, Line 871)

- “The aim is to have students come to view mathematics as a subject that is about sense making and reasoning, to which **they can contribute and belong.”** (Ch 2, Line 988)

- “Data investigation can support teachers as they seek to **create climates of belonging for students**, inviting them to investigate real data that is likely relevant to their lives.” (Ch 5, Line 123)

- **“Educators can offer social and emotional support to students** by designing engaging lessons that allow students to connect in meaningful ways with content.” (Ch 5, Line 1400)

- “Important principles underlying the teaching of data science that will offer the greatest chance for social, emotional, and academic development include the following:
    - ***Convey Mindset and Belonging Messages.”*** *(Ch 5, Line 1409)*

- “This framework is intended to help teachers ensure that the **math experiences of all their students are positive** ”(Ch 7 Line 68)

- “The idea is for teachers to help students experience the “wonder, joy, and beauty of math” (National Council of Teachers of Mathematics) and help students **develop and sustain a positive identity as capable mathematics learners**.” (Ch 7, Line 72)

- “When students are engaged in meaningful, investigative experiences, they can come to view mathematics, and **their own relationship to mathematics, far more positively.”** (Ch 2 line 164)

I want students to view their relationship to math positively, but that can NOT be the primary goal of math instruction. To that end I teach (and model for) student teachers and inservice teachers how to establish a healthy classroom culture. That said, it is one piece of good math instruction, not the primary goal. As a state, for the sake of our future, we MUST focus on increasing math proficiency, even if that means students sometimes feel like they are not good at math. Let's not hide that and pretend all students are on equal footing; rather, let's put struggling students into groups and provide extra support so they CAN become proficient.

- In addition to an overemphasis on feeling good about math in the place of achieving proficiency in math, the CMF puts self-esteem and not feeling anxious as other primary goals. The CMF claims (without any supporting evidence) "Students also self-select out when mathematics is experienced as the memorization of meaningless formulas—perhaps because they see no relevance for their learning and no longer recognize the inherent value or purpose in learning mathematics." (Ch 1, Line 248). Isn't it possible that some self-select out of math when it gets too hard, just like nearly everything else in life students self-select out of (even if it's fun and engaging), such as little league, boy scouts, dance, music, etc. The authors also write, "Other research examines beliefs and attitudes such as utility value (belief that mathematics is relevant to personal goals and to societal problems), and this research shows a severe drop off in utility value during high school." (Ch 8 Line 612). Of course many things we ask students to learn in high school have a drop off in utility; what happened to the attitude of there just being some things you need to learn and perhaps you'll see relevance or apply them later in life; e.g. many students don't care about credit or loans when they 15 years old, but if they learn the math behind finance, they will be very thankful of its utility later in life. The state of California has set our content STANDARDS in math. That is what students MUST learn, whether or not they see "utility" in it. The same is true in reading, writing, and all academic courses required for graduation. The CMF needs to focus on students mastering math content standards!!! The CMF is so concerned with how students feel, the authors have forgotten the primary goal of math education- to learn math!

- In addition to the focus on math teachers needing to build student self-esteem, the CMF proposes that exams be changed to help with student feelings. Chapter 12 Line 854 reads, "Summative assessments have the potential to be anxiety-inducing for students, so some best practices should be implemented to minimize damaging effects." Most every challenging thing in life is anxiety inducing, so what is the CMF preparing students for? A world where they are not competent (proficient) and yet everyone praises them for anything they say or do at all so they feel good about themselves?

5. **The advice given on "acceleration" is unclear and based on false pretenses.**
If adopted and implemented, the CMF will lead to greater inequities as students with financial means will seek math acceleration or all of their education outside of the public school system, leaving their mathematically advanced, but socio-economically disadvantaged peers, stuck in classrooms with students who are often 3-5 years below grade level with limited options to better their situation through STEM.

The CMF clearly wants ALL students in the same math course with their grade level peers until grade 11

- The CMF describes "heterogeneously grouped classrooms" from "grade school through high school" (Ch 1, line 208).
- The CMF notes "possible pathways for high school coursework, reflecting a common ninth- and tenth-grade experience, and a broader array of options in eleventh and twelfth grade." (Ch 8 line 702 and Ch 8 line 1295).

- Note that Chapter 10 Line 809 reads, "The framework recommends that all students take the same rich mathematics courses in kindergarten through grade eight." It is obvious that there are NOT CLEAR recommendations within the CMF about acceleration and course taking as two places say common courses through grade 10 and one through grade 8. Apparently some folks working on the CMF (such as was evidenced in the First Field Review) still want no acceleration before grade 11, but someone else has decided to back that up to no acceleration before grade 9. This confusing, unclear, and unsubstantiated advice should not be present in a CMF that the SBE adopts

- As "evidence" for why the US should not allow acceleration before grade 11, the CMF states, "Another review of international evidence about tracking found that, while most Organisation for Economic Co-operation and Development (OECD) countries do not differentiate curriculum options for students until ninth or tenth grade, those that track students into different course options earlier increase inequality in learning significantly (Woessmann, 2009)." (Ch 9, Line 148) First, it is interesting to note that other countries (who are far outperforming the US in math) allow acceleration in grade 9 or 10, and yet the CMF is recommending waiting until grade 11. What is even more heinous in this quote is that the reference cited to justify holding students back from acceleration (Woessmann, 2009) discusses students being tracked into DIFFERENT SCHOOLS, not being allowed to accelerate into 1 different class within the same school. There are very different repercussions to students being moved to a different school while their peers are left at a "lower" school than there are with the current policy in California where a student might be in an advanced math class and then regular classes and another might be in regular math but then advanced English or History. This is akin to one student taking culinary arts while another takes photography and another ceramics. Students recognize, often as early as Kindergarten, that math is easier for some students and other aspects of school is easier for others. Do NOT approve a California Math Framework which makes recommendations about the harmful effects of acceleration

based upon countries who do not have anywhere close to the same definition of what it means to “accelerate”.

- In Chapter 7 of the CMF, we read that Middle School “is a time when students make choices about mathematics coursework—or have those choices made for them—that have long-term implications, including for their college and career achievements.” (Ch 7 line 51) One must ask, then, if students are to have a common math experience until grade 11 (as the CMF guides), isn’t the CMF making choices for students that have “long term implications”, such as their not being competitive for college admission into STEM majors or careers in STEM fields (as their peers in other states or private schools did accelerate before grade 11)? This CMF needs to be rejected and the version that is adopted needs to give CLEAR pathways that allow for acceleration BOTH in Middle School AND in High School so no one is held back and anyone can choose to accelerate when ready

<u>Evidence used to defend no acceleration before grade 11 does not support this proposal.</u>

- The CMF states, “These perceptions may also be linked to labels— “low kids,” “bubble kids,” “slow kids” —that lead to a differentiated and unjust mathematics education for students, with some channeled into low level math.” (Ch 1 line 243). First, since when is “differentiated math” a bad thing? The CMF has stated how essential it is for a teacher to differentiate in their classroom (e.g.Ch 8 line 467). Secondly, almost no school in California has a “low level” math class (unless it is for SPED students). In California, thanks to the California Math Content Standards, the 2013 CA Math Framework, and standardized testing (SBAC), students take their grade level math up through high school. There are hardly any high schools that offer a course LOWER than Algebra I or Integrated Math I, so the CMF is fighting a straw man.
- “Research indicates that in the era in which California policy encouraged all students to take Algebra in eighth grade, success for many students was undermined. Several studies found that, contrary to the hoped-for improvements, widespread acceleration often led to declines in overall mathematics achievement. One study found that most students who took Algebra in the eighth grade failed to score “proficient” on the end-of-course Algebra California Standards Test (CST). Students who failed eighth-grade Algebra and thus took the Algebra CST again at the end of their ninth-grade year scored lower on average than students who took the Algebra CST for the first time at the end of ninth grade (Liang, Heckman, and Abedi, 2012).” (Ch 8 Line 269) This is an accurate statement and it is very true that not ALL students should be required to accelerate in grade 8. The experiment many low performing districts engaged in by placing all 8th graders in Algebra I to not take a “hit” on their API score was horrible for all students. That said, that is hardly evidence for saying no one should accelerate. Where is the logical reasoning the CMF constantly argues for? Are the only options no one accelerates in grade 8 or everyone does? What about those who are ready to accelerate, get to? During this same time period described above, many high performing (high SES) districts were very restrictive about who got to take Algebra I in grade 8, and those schools typically had all students achieve advanced on the test that year and in subsequent years. In addition, the very next section of the CMF describes a

program where all students in New York accelerated and that was successful. So, how can the SBE adopt a framework that draws such inaccurate conclusions as this CMF does and propose large scale changes based upon these false claims?

- Chapter 9 line 120 reads, “For many, this tracking begins in the early years of elementary school—often around third grade.” There is no citation here and NO evidence of this being the practice in California. Many districts allow acceleration in high school, while most allow it in grades 7 or 8 with a very few allowing acceleration in grade 6. It is just not the case that “for many” acceleration (meaning taking a course above your current grade level) occurs in grade 3 (or even 4 or 5).

<u>The recommendations of the CMF around high school course taking lowers expectations, and as such, will harm CA students</u>

- The CMF proposes DROPPING the current practice of having all students take Algebra II, and, instead, offer easier, more interesting courses. This is lowering expectations rather than providing extra support to allow all students to succeed in Algebra II, thus keeping their options open for college degrees and careers. Chapter 8 line 730 reads, “In addition to offering Mathematics III or Algebra II, districts have the flexibility to offer other third-year and fourth-year courses.” The SBAC only assesses high school students in grade 11, and a large portion of the content comes from Algebra II. If students do not take Algebra II, they will fail the exam in even high percentages. Rather than providing supports to help struggling students master Algebra II standards, the CMF proposes just not completing that challenging course. The CMF does note that “If students take another third-year course (besides Mathematics III or Algebra II), they should be made aware that they are leaving the usual pathway for taking Calculus in high school or in their first semester of college (as is expected in some universities for STEM majors).” (Ch 8 line 758)
- The CMF points out that “to meet the law” students really only need Algebra I. Chapter 8 line 677 states, “By completing Algebra I and Geometry or Mathematics I and II,[1] students will satisfy the requirements of California Assembly Bill 220 of the 2015 legislative session that requires students to complete two mathematics courses in order to receive a diploma of graduation from high school, with at least one course meeting the rigor of Algebra I.” The SBE and California should not be okay with the CMF’s attitude of “lowering the bar”. Nearly every district expects students to complete Algebra II; to enact the CMF’s proposal would be to go backwards in progress towards equity to which California has made great strides.

<u>The SBE should adopt a CMF that clearly suggests pathways to accelerate beginning in middle school to ensure we support our mathematically inclined students</u>.

- In a line meant to support NOT accelerating before grade 11, the CMF actually points out a major reason TO accelerate as early as middle school: advanced math students tend to get bored and disinterested in math when they are grouped in a class with students with a massive range of proficiency. In Chapter 8 line 877 we read, “The UC Board of Admissions and Relations with Schools (BOARS) made a similar statement: BOARS commends the Common Core's goal of deeper understanding of the mathematical concepts taught at each K–12 grade level. A strong grasp of these ideas is crucial for college coursework in many fields, and students should be sure to take enough time to

master the material. Choosing an individually appropriate course of study is far more important than rushing into advanced classes without first solidifying conceptual knowledge. Indeed, students whose math classes are at a mismatched level—either too advanced or too basic—often become frustrated and lose interest in the topic. (BOARS, 2016)"

Students in California should have every opportunity to attain to high levels of math (including Calculus) if they want. These opportunities to "accelerate" should be clearly mapped out in a CMF the SBE adopts and have multiple entry points and opportunities for students to get on or off the accelerated pathways throughout middle and high school (when gaps become larger issues and students need challenge and have interest in high levels of math). These pathways should be built upon options students can take in the regular school day without having to "double up" and lose electives. The current CMF is a mess in terms of advice they give districts; the CMF clearly does not want anyone to accelerate before grade 11, but then the CMF states not before grade 9 and then confounds accelerating in math for a single class within a heterogeneous high school with "tracking" in other countries in which students join entirely different, homogeneous schools. California students who want STEM degrees and/or careers need to be competitive with students from other states, countries and private schools. This CMF is holding them back and needs to be rejected.

Conclusion

If the CMF vision is implemented, our Black, Brown and Socioeconomically Disadvantaged students (for whom most of my work focuses on helping) will suffer the most. It is well known that being proficient in mathematics is a strong indicator of later economic success in life, and yet, Black or African American and Brown (Latino or Hispanic) students in California are failing math at historic rates. Black or African American students are down to 16% proficient or advanced on CAASPP in 2021-22 from their high of 21% in 2019, and Latino or Hispanic students are down to 21% proficient or advanced in 2021-22 from their high of 28% in 2019. (Ch 2, line 54) The majority of teachers go into education to better the lives of students, regardless of their skin color; in mathematics, this means helping all their students achieve proficiency in math content standards. What does the CMF suggest to teachers to help increase the proficiency of these ethnic groups? Does the CMF devote extensive time to discussing successful intervention and tutoring programs which raise test scores for these students? Unfortunately, the CMF is instead focused on ensuring these students have "authentic experiences" and that teachers "center contributions that historically marginalized people have made to mathematics." (Ch 2 line 513) This is akin to saying you will help someone get better at soccer by showing them people from their ethnic group who are experts and then getting them excited about soccer; who thinks that will help? Everyone knows you get better at soccer (and in our case, math) by learning and practicing. Rather than assume our struggling students need some type of "show" to help them learn, let's support them (and all CA students) to put in the hard work to master math content standards and achieve proficiency on the CAASPP.

SBE- please reject this framework and only adopt one based upon the CA math content standards that has BALANCED instruction and places math proficiency (as measured by CAASPP) as the primary focus. Please only adopt a framework that correctly proportions the focus on student feelings about math and authentic tasks with a focus on standards-based conceptual development and procedural fluency. If a CMF discusses options to accelerate, require clear language and give multiple options for students to choose to join or leave the accelerated pathway, beginning in grade 7. Keep the completion of Algebra II/ Integrated Math III as the goal for all students. Please only adopt a framework that focuses on mathematics and evidenced-based ways to help more students become proficient in math, as this is how equity will be achieved.