Dear California State Board of Education,

I am writing to ask you to REJECT the Mathematics Framework Revised Draft (CMF) proposed for the Jul 12-13, 2023 meeting. To have a STEM (Science, Technology, Engineering and Mathematics) workforce in the United States, we need students with advanced capabilities in mathematics to take higher level courses (such as Calculus) in High School so they can be competitive for acceptance and success into college STEM programs and careers. The CMF provides, at best, unclear pathways about how to allow students to get to higher level math classes in the K-12 public school system, and at worst, denies options for students to accelerate and get to Calculus by 12th grade. 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 First Field Review of the proposed California Math Framework was explicit in their statement that all students will have a common math experience until grade 11. There was NO mention of courses like Algebra being an option in grade 8, and in fact, studies with false or misleading claims were used to support many of these arguments. Thankfully, the SBE did not pass that version nor the second version of the CMF, and this current, third, version now has some wiggle room in at least acknowledging that 8th grade Algebra could be an option. While progress has been made, I ask you to again reject this CMF and require that CLEAR Pathways be recommended with research to support these recommendations, as the current CMF is still very much focused on students not being able to accelerate until grade 11 as well as keeping with the original damaging consequences of lowering overall math course taking for high school students.

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”.

What does non-acceleration look like?

- Since all students are recommended to be in the same math class until grade 11, the CMF describes what grade 10 classes should look like. We read, “When differentiation occurs at tenth grade to add greater challenge to the courses of advanced students, the curriculum remains similar, and both lanes allow students to reach advanced courses like calculus.” (Ch 8 line 467) So advanced students, 1-3 years AHEAD of grade level standards are learning similar curriculum to students who are on grade level and also with students who are 3-7 years below grade level (which is the reality based upon the fact that more than 77% of 11th graders were below proficient on the SBAC in 2021-22) (link) with over 70% of students below proficient in grade 8. Who is the teacher really going to teach? If the teacher chooses the middle (which is common) the advanced students suffer and lose opportunities to get into STEM fields, and the lowest students also suffer falling even further behind. There is one vignette in the CMF that explains how to support this type of classroom successfully (Ch 9 beginning Line 327), but that relies upon two teachers and personalized learning where each student progresses at their own pace with occasional whole class investigations, and students able to complete “courses” anytime during the year and progress to the next course; e.g a student might complete Algebra I and begin Geometry in one year while another student completed just part of Algebra I. If this is the math instruction the CMF is guiding for, then there needs to be significantly more time dedicated to explaining this, supporting it with evidence and an explanation of how team teaching will work with students taking courses, some over 2 years and others over 2 months and how this looks on transcripts and affects college admission, etc.

- 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).

The “solutions” to allow students to accelerate and reach Calculus are unjust and will harm socio-economically disadvantaged students

- The CMF proposes students eliminate or skip a course (apparently either Algebra II or Pre-Calculus) in high school to be able to reach calculus. “An alternative to eighth grade acceleration would be to adjust the high school curriculum instead, eliminating redundancies in the content of current courses, so that students do not need four courses before Calculus. As enacted, Algebra II tends to repeat a significant amount of the content of Algebra I, and Precalculus repeats content from Algebra II.” (Ch 8 line 688, also stated again in Chapter 8, line 1295) What does this look like? If the CMF is proposing this, they should map out possible course sequences to show which standards would be addressed in each course, ensuring students have time to develop conceptual understanding, procedural fluency and applications in real world contexts.

  While the CMF claims that it is very possible to complete 5 courses (Algebra I, Geometry, Algebra 2, Precalculus and Calculus) over the 4 years of high school, it also argues that students who don’t accelerate in middle school are “stuck”. Chapter 9 line 121 reads, “Schools sometimes use elementary school test data to determine students’ placement, which typically also determines their ultimate destination. Because students are then taught different content, they often cannot easily change pathways. This practice is unjustifiable.” I agree wholeheartedly that it is unjustifiable to determine if a student can have a STEM career based upon what they do in elementary school; however, this is another logical fallacy. Why can’t some students accelerate in middle school (if they show they are ready) and others accelerate in high school (as proposed above)? A CMF the SBE approves should have MULTIPLE entry and exit points for students to choose to accelerate or go back to a regular paced pathway throughout middle and high school. Many districts have such pathways and options (for example Irvine Unified in Orange County and Palm Springs Unified in San Bernardino County). If we truly want to support all students to have the opportunity to achieve STEM careers, we need flexible pathways starting in middle school!
- The CMF proposes summer classes to allow students to accelerate. “Schools may also organize supplemental course taking in summer programs, to allow students who start Algebra or Mathematics I in ninth grade to be able to take Calculus in high school if they choose.” (Ch 8 line 696) Why should a student have to go to summer school to accelerate? This is particularly unjust for Socio-economically disadvantaged students who often have to work or provide childcare for siblings during the summer.

- The CMF proposes "doubling up" to allow students to accelerate. In Chapter 8 line 819 we read, "So, in her fourth year, she enrolls in her school's precalculus class, along with a half-semester support class her school offers for students whose interest in mathematics grows late in their high school time." Why does a student need to forgo an elective or other course which might help them get ahead for college or career to take another math class because the CMF decided it wanted all students in the same class until grade 11?
- The CMF proposes students can take extra courses. "One form of flexible grouping involves moving the beginning of separate course pathways to later grades—e.g., from fourth, fifth, or sixth grade to at least eighth grade—and supporting extra course-taking options during the school year or during summer school so that students may accelerate at any time during middle or high school." (Ch 8 line 226) The public school system needs to allow for acceleration without the extra burden on students to take extra classes or summer classes. Requiring this extra time will increase inequity as students with financial means will go outside the public school system to get their needs met and their less fortunate peers will be stuck doubling up, in summer school or without the opportunity to accelerate and reach Calculus.

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

- 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.

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

- 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)"

Clearly the SBE has been grappling with the issue of acceleration as evidenced from the changing perspective from the first Field Review CMF (no acceleration before grade 11) to an attitude of It's possible, but not desired, to accelerate in Middle School. I ask the SBE to reject this version of the CMF until clear pathway options with supporting evidence can be explained (or take out any mention of acceleration as the CMF is clearly not in a position to "guide" with their unclear descriptions and writing.) In fact, the CMF (in this third version) notes that more discussion is needed: "It would be helpful for the state to convene a working group of mathematics experts to discuss and clarify possible high school pathways." (Ch 8 line 245)

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.