

Academic Senate CSU (ASCSU)

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May 13, 2022

To: California Department of Education
California Instruction Quality Commission,
California State Board of Education
c/o mathframework@cde.ca.gov.
Re: Mathematics Framework Second Field Review

Ladies and Gentlemen,

Please accept the attached *Recommendations for the [California Mathematics Framework, Revision Draft 2](#)*. These recommendations have been drafted and authorized by the Academic Preparation and Education Programs (APEP) standing committee of the statewide Academic Senate of the California State University (ASCSU). The standing committee consists of disciplinary experts in mathematics and education who are statewide academic senators elected by their respective campuses to represent the educational interests of faculty and students.

Thank you for the opportunity to comment on this important document that has significant implications to the academic preparation of all public-school students in California. Chair, Academic Senate CSU

Sincerely,



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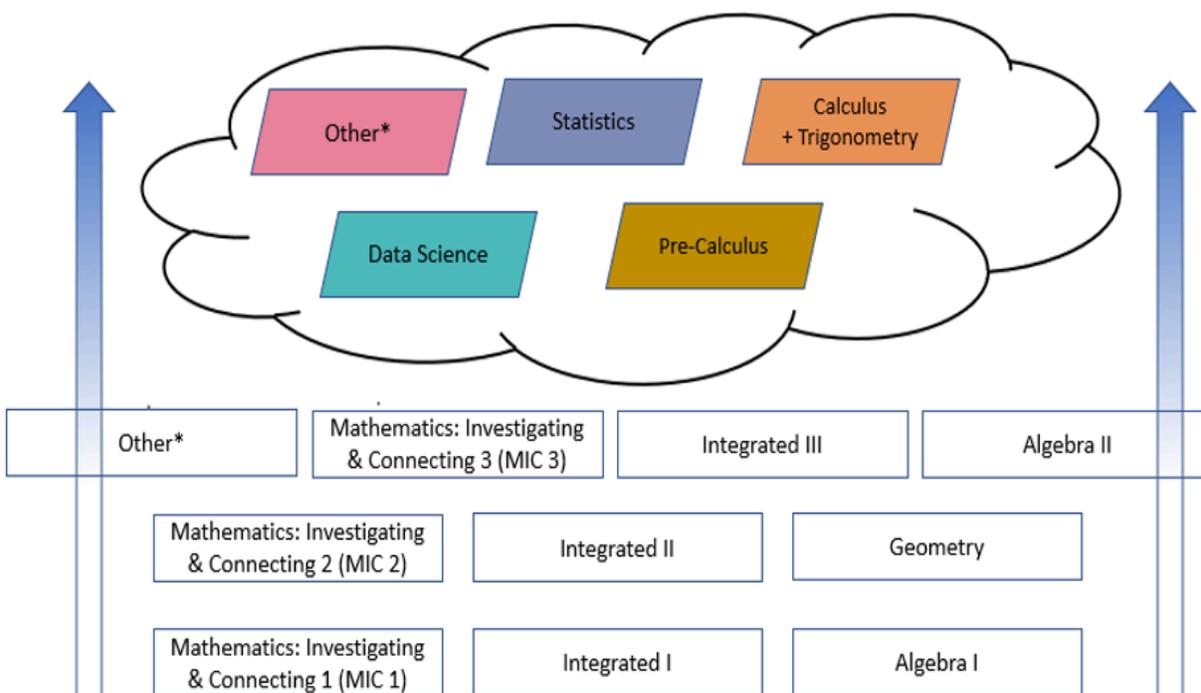
Robert Keith Collins
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Recommendations for the Mathematics [Framework Second Field Review](#)

Overall the second draft appears to be a vast improvement over the first. The comments below relate to Chapter 8 and specifically to the description of different pathways for mathematical study. The lens applied to the comments is both national needs for excellence in mathematics education and awareness of inequities related to preparation for STEM fields.

The University of California categorizes the first three years of high school mathematics, as “foundational”. Currently, these [UC/CSU Area C approved](#) college and career preparation courses are Algebra 1, Geometry, Algebra II or Integrated Mathematics I, II, III. The content of these courses is articulated in the California Common Core State Standards, Mathematics 2013 ([CCCCSSM](#)). Courses beyond foundational, when approved by the UC for Area C are referred to as “advanced”. The minimum expectation of the UC and CSU is that all college-bound students will have taken and passed the foundational courses. Both the UC and CSU recommend that students take a 4th year “advanced” mathematics course. Our first recommendation is that any third year “other” course, referred to in figure 8.3 (reproduced below), should include sufficient content to meet the expectations of the CSU and UC regarding foundational coursework and furthermore, properly prepare the student for success on the 11th grade SBAC mathematics assessment.

870 **Figure 8.3**



The framework draft presents a variety of different pathways beyond the foundational coursework. Some intentionally prepare students for calculus, either in high school or college, and others are designed to “*reflect the many different interests and aims of students, such as those seeking employment after high school, others whose objective is a career in STEM for whom a university degree is critical, others who are interested in a university degree in a non-STEM intensive major, and the many students who are still deciding upon post-high school ambitions while they are in high school.*” Chapter 8, page 37.

The concern we have with multiple pathways is the possible unintended consequence of prematurely channeling students away from preparation leading to careers in science, technology, engineering, and mathematics (STEM). Research¹ shows that black, Hispanic and female students are underrepresented in STEM majors and that white, and Asian males are overrepresented in these majors that lead to high paying and mathematically demanding jobs. While it is certainly the case that some high school students may know accurately their career aspirations, we believe such student choice is driven in large part by life experiences and perceived societal norms that contribute to the persistence of these disparities in representation. In order to help disrupt the conditions leading to disparities in representation, high school mathematics pathways should not be built on the assumption that students know best what courses they should take. We fear that building alternative pathways on this assumption may ultimately serve to preserve the status quo of overrepresentation of white and Asian males in STEM fields and therefore we have serious concerns about the development of new alternative pathways in high school mathematics curriculum.

For both college and career readiness, all students should develop the knowledge and skills contained in the foundational sequences of Algebra I, Geometry, Algebra 2, Integrated I, II, III or MIC I, II, III. While we don’t oppose a variety of 4th year advanced options, we are concerned that efforts by districts and schools to develop alternative pathways may divert attention and energy away from the much needed pedagogical reforms called for in the revised framework. We recommend the revised framework clearly articulate the prioritization of those reforms. Furthermore, we recommend the framework provide that when alternative pathways are developed, the included courses serve to inspire, motivate, and prepare students for authentic access to the full spectrum of college level quantitative work. In particular, strong caution should be provided that advanced courses such as data science, statistics, or financial algebra

¹ *The STEM Labor Force of Today*, National Science Board, 2021

<https://nces.nsf.gov/pubs/nsb20212/participation-of-demographic-groups-in-stem>
STEM Equity, N A P E <https://napequity.org/stem/>

The gender gap in science and technology, in numbers, World Economic Forum 2021

<https://www.weforum.org/agenda/2021/07/science-technology-gender-gap/>

Diversity in the STEM workforce varies widely across jobs, Pew Research Center 2018

<https://www.pewresearch.org/social-trends/2018/01/09/diversity-in-the-stem-workforce-varies-widely-across-jobs/>

sufficiently deepen the understandings of precalculus and algebraic concepts as to not result in prematurely channeling high school students away from STEM or other algebra-intensive majors.

These recommendations are submitted on behalf of the Academic Preparation and Education Programs committee of the Academic Senate of the California State University.



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