

# CBMS Mathematics Alignment Initiative Summary

*A collaboration of the Conference Board of Mathematical Sciences and the Charles A. Dana Center*

## Background

The Conference Board of Mathematical Sciences and the Charles A. Dana Center at the University of Texas at Austin have collaborated for almost ten years to improve students' experiences and success in mathematics in postsecondary education through the multiple mathematics pathways movement. In 2018, the growing need to bridge the work of higher education and K–12 mathematics inspired the CBMS Mathematics Alignment Initiative. The goal of the Initiative was to support states in developing plans and recommendations for improving mathematics alignment from secondary to postsecondary education in their state. Too many barriers, many of them arbitrary, make it difficult for students to make this mathematics transition which should be clear and seamless.

Improving the transition and alignment requires changes to state and institutional policies and practices like graduation, placement, and admissions, as well as an examination of course content, sequences, and advising in K–12 districts. CBMS and the Dana Center invited teams of K–12 and higher education state leaders, as well as faculty and administrative leaders from both sectors, to identify their challenges, solutions, and ultimately make recommendations to improve mathematics transition and alignment in their states.

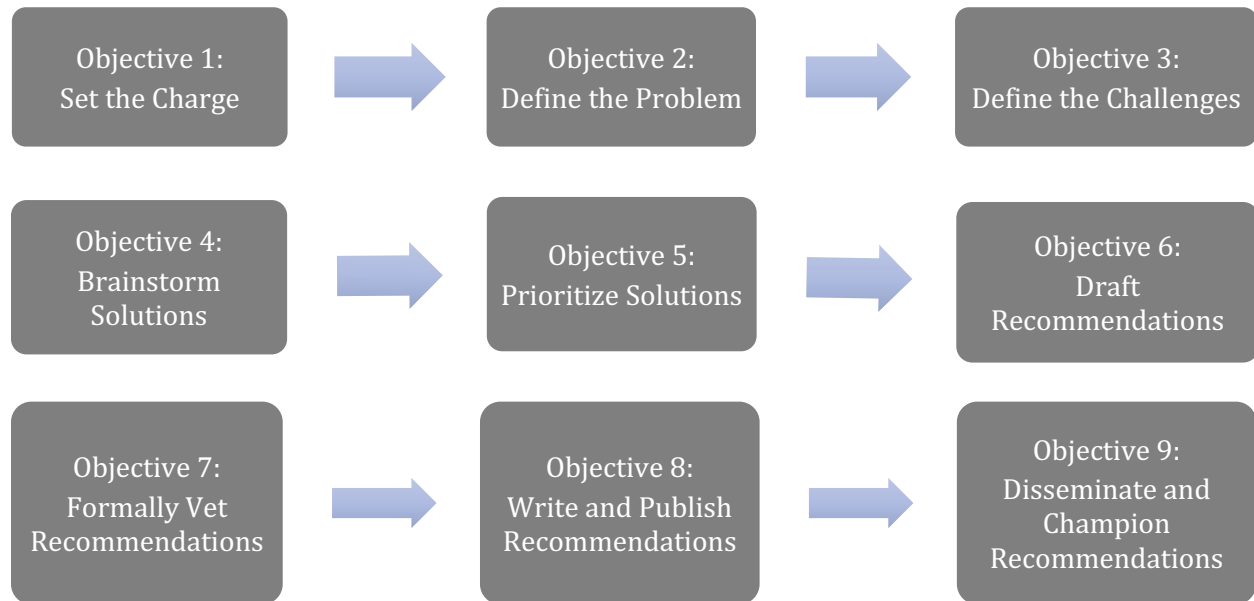
CBMS and the Dana Center reviewed the applications of twenty-nine states and ultimately chose twenty-three to participate based on the presence of the enabling conditions for successful participation.

Alabama	Indiana	Minnesota	Tennessee
Arizona	Iowa	Missouri	Utah
Arkansas	Kansas	Nebraska	Virginia
California	Maine	Ohio	Washington
Georgia	Maryland	Oklahoma	Wisconsin
Idaho	Massachusetts	Oregon	

States participated in Forums in May 2019 and October 2020 with quarterly virtual work sessions in cohorts of states in between.



The Dana Center guided states through a taskforce process with the following nine objectives.



#### [Culminating Forum, October 2020, Action Plans, Recommendations](#)

CBMS and the Dana Center hosted a three-day virtual forum on October 5, 6, and 13, which marked the formal end to this phase of the project. Over 200 participants registered with around 135 participants attending whole-group and breakout sessions. Participation was consistent over the three days of the forum. Participants represented 21 states with representatives from K–12 and higher education state agency and system leaders, math faculty, district leaders, and higher education institution leaders. The Forum programming was a mix of keynote speakers, key learnings sessions to highlight and share the work of states, and a variety of facilitated breakouts by role, state cohort, and implementation topic. A description of the speakers and forum objectives follow. The Forum dashboard with the agenda and session recordings as well as other information can be accessed at [bit.ly/CBMSForum2020](https://bit.ly/CBMSForum2020).

#### **Forum Objectives:**

- State teams will reflect on the work of their task force and that of other states over the past year to gain new knowledge and insight about the work.
- State teams will build on their previous work and will draft an action plan for secondary-to-postsecondary mathematics alignment work for the next 3, 6, and 9 months, with a focus on expanding opportunities for historically marginalized groups of students.

### Keynote Speakers:

- **Maria Echaveste**, President and CEO, The Opportunity Institute
- **Grace Suh**, Vice President for Education, IBM
- **Uri Treisman**, Professor of Mathematics, Professor of Public Affairs, The University of Texas at Austin; Executive Director, Charles A. Dana Center
- **Sol Garfunkel**, Executive Director, Consortium for Mathematics and Its Applications (COMAP)

### Topical Breakout Sessions:

- Implementing Mathematics Pathways in Rural Communities
  - **Bob Klein**, Professor and 2019–2020 American Council on Education Fellow, Ohio University, Athens, Ohio, Author of Why Rural Matters annual report
- Avoiding Tracking in Mathematics Pathways
  - **Paul Gray**, President Elect, NCSM; Chief Curriculum Officer, Cosenza & Associates
  - **Shelly Jones**, Positions Papers Editor, NCSM; Associate Professor of Mathematics, Central Connecticut State University
  - **Connie Schrock**, Past President, NCSM; Professor of Mathematics and Economics, Emporia State University
- Building Teacher Capacity and Support in Mathematics Statewide
  - **Nicole Bono**, Deputy, Office of Talent, Louisiana Department of Education
- Engaging Students with Mathematics for Life
  - **Doug Sovde**, Former Director, K–12 Strategy, Policy, and Services, Charles A. Dana Center at The University of Texas at Austin
  - **Josh Recio**, Course Program Specialist, Secondary Mathematics, Charles A. Dana Center at The University of Texas at Austin

Based on forum feedback, 86.4 percent of those completing the survey agreed or strongly agreed that “the forum offered guidance to advance the work of mathematics alignment in my state or organization.” Participants noted how much they appreciated the time with leaders in their same roles and wanted opportunities for on-going collaboration with this group of states and leaders, their interest in taking the work to scale, and wanting further national support to communicate about the modernization of mathematics with local stakeholders.

Two states, Kansas and Minnesota, had to withdraw from the initiative. A key staff member in Kansas left their role in the middle of the project and though many parties were interested in continuing, there was not an entity that had capacity to lead the work. Minnesota formally withdrew from the project because they felt that higher education institutions in the state needed further progress on mathematics pathways implementation before starting work to align with K–12.

## States' Priorities in Action Plans and Recommendations

Participating state teams have written recommendations, created action plans for work over the next nine months, and/or begun implementation of new policies and practices to improve mathematics alignment in their state. States' documents for private review, not for distribution, can be found [at this link](#). In the chart below, you can see where states are choosing to focus their work of mathematics alignment at this time. The chart is based on documents that the states submitted for this project and their current areas of focus, though may not indicate the full breadth of their work. Some states are in the beginning stages of the work, and thus have not attended to the many facets of this work yet.

State	State Leadership and/or Taskforce in Place and Plan to Move Forward	Institutionalize Math Alignment Work	Teacher Recruitment and/or Support	Course Sequence/Math Pathways Definition, Alignment	Standards, Course Creation	Advising	College Readiness and Placement	Specific Equity Priorities or Actions	Policy (e.g Assessment, Accountability, Corequisite, Graduation Requirements)	Evaluation, Targets for Continuous Improvement	Communications
Alabama	x	x	x	x		x	x				x
Arizona	x	x	x	x			x				
Arkansas	x			x	x	x	x	x			x
California	x		x	x					x		
Georgia	x	x	x	x	x				x		x
Idaho	x										
Indiana	x	x	x	x	x					x	
Iowa	x	x	x	x			x	x		x	x
Maine	x	x	x	x	x		x		x		x
Maryland	x			x					x	x	x
Mass	x		x	x		x		x	x		
Missouri	x			x		x		x		x	x
Nebraska	x				x						
Ohio	x		x	x	x	x				x	x
Oklahoma	x		x	x	x	x	x				x
Oregon	x	x		x	x		x	x		x	x
Tennessee	x			x	x	x	x	x	x	x	x
Utah	x			x		x	x		x		x
Virginia	x			x	x	x			x		
Washington	x	x	x	x	x		x	x	x		
Wisconsin	x	x	x	x	x			x			x

## Examples of Recommendations

Below are samples of recommendations from participating states.

APPROACH	STATE EXAMPLES
<b>Institutionalize Mathematics Alignment Work</b>	<p><b>Alabama</b> Create a statewide organization to extend the work of Strategic Task Force to Accelerate Mathematics Pathways (STAMP). Membership will include members of the STAMP leadership team, the task force, and ex officio members from various stakeholder groups such as ACTM, AlaMATYC, AMTEA, AACTM, and NCSM affiliate.</p> <p><b>Oregon</b> Establish a state level coordinating group that coordinates projects and resources at the K-16 levels. A non-profit umbrella organization would support change management practices to create system level reforms.</p> <ul style="list-style-type: none"> <li>• Establish collaborative math networks of educational leaders to support the development and advocacy of systemic change within the K–12 and postsecondary levels.</li> <li>• State-level coordinating group to identify and organize efforts over time (see engagement over time below)</li> <li>• Support PK–12 Math Leadership Network</li> <li>• Support Post-Secondary Math Leadership Network.</li> <li>• Identify funding sources to support coordinated effort of the math non-profit including dedicated FTE support for communication, project management, and administrative needs of the math organization.</li> </ul>
<b>Teacher Support</b>	<p><b>Arizona</b> Reimagine the training of pre-service and in-service teachers that includes a focus on the active learning guiding principles:</p> <ol style="list-style-type: none"> <li>1. Support students’ deep engagement in mathematical reasoning;</li> <li>2. Encourage peer-to-peer interaction;</li> <li>3. Support instructors' interest in and use of student thinking; and</li> <li>4. Develop instructors' attention to equitable and inclusive practices.</li> </ol> <ul style="list-style-type: none"> <li>• Implement a state-wide effort towards coherent, intensive, long-term professional development program be implemented with acritical mass of site-based teacher teams participating together.</li> <li>• Encourage school and district administrators to participate in all or part of the professional development in an effort to reframe their perspective and insights on the teaching and learning of mathematics for teacher evaluation and other purposes.</li> </ul>

<p><b>Standards, Course Creation</b></p>	<p><b>Georgia</b> Revise Algebra II standards to better prepare students for the range of mathematics pathways in addition to the Path to Calculus. Revised standards are under review by the Georgia State Board of Education.</p> <p><b>Ohio</b> Develop two new Algebra 2 Equivalent courses: Data Science Foundations &amp; Computer Science/Discrete Math with plans for pilot, evaluation of pilot, and creation of implementation toolkits for administrators, teachers, counselors, parents, etc.</p>
<p><b>Advising</b></p>	<p><b>Arkansas</b> Develop mathematics pathways advising guides for high school counselors and teachers involved in student success plans. Arkansas Department of Elementary and Secondary Education has developed draft pathway guidance that will evolve into advising guides with a format similar to degree plans used in post-secondary.</p>
<p><b>College Readiness and Placement, Course Sequences / Math Pathways Definition</b></p>	<p><b>Massachusetts</b> Streamline course options, instructional resources, and secondary to postsecondary transition practices that build a coherent mathematics pathway for all:</p> <ul style="list-style-type: none"> <li>• Audit postsecondary admissions practices for consistency and transparency as they relate to K–12 mathematics pathways,</li> <li>• Audit postsecondary mathematics written and enacted curriculum for alignment, rigor, and relevance within and across institutions,</li> <li>• Incorporate student and family decision making in secondary mathematics course selection based on future interests as they connect to pathways and to business and industry opportunities (i.e. externships),</li> <li>• Streamline secondary mathematics courses across all levels to include more articulated model course pathway options,</li> <li>• Eliminate middle grades (6-8) tracking, and minimize leveling within secondary mathematics courses, and</li> <li>• Identify tools to signal high quality, pathways-aligned course curricular materials to follow Algebra II or Math 3 and continued mathematics learning.</li> </ul> <p><b>Tennessee</b></p> <ul style="list-style-type: none"> <li>• Make statistical concepts should be more prominent in the required high school mathematics course sequence.</li> <li>• Establish a single sequence of courses: High School Math 1, 2, and 3 for all students.</li> <li>• Reduce the number of state-level summative assessments in high school mathematics from three to two. Assess students on a state-</li> </ul>

level summative instrument for High School Mathematics 1 and 2 and eliminate the assessment attached to the third course in the sequence. The ACT exam will serve as a comprehensive assessment inclusive of content in the third course.

- Reduce the number of course options offered the senior year.
- Develop recommendations that address structural inequities - recruiting, advising, transitioning, completing - in mathematics pathways, especially at the postsecondary level as they pertain to underrepresented populations.