

**CONNECTICUT STATE BOARD OF EDUCATION
Hartford**

TO: State Board of Education

FROM: Dr. Dianna R. Wentzell, Commissioner of Education

DATE: November 2, 2016

SUBJECT: Presentation of the Commissioner's Council on Mathematics Report

Executive Summary

History/Background

On August 28, 2015, Commissioner Wentzell announced the formation of the Commissioner's Council on Mathematics (Council). This group, consisting of educators, industry and business leaders, and experts in math and STEM instruction spearheaded the state's efforts to improve supports in math. This Council was charged with identifying best practices, both in Connecticut and across the nation, and to explore promising innovations in the area of math. By understanding where students struggle and developing an action plan for improvement, the mathematical skills and knowledge necessary for success in life after high school can be ensured.

Development

In the months immediately following the announcement of the formation of the Council, names of possible members were solicited from various stakeholder groups. A final group was decided upon and invited to participate in January 2016. The Commissioner's Council on Mathematics commenced with a meeting on February 17, 2016. At that meeting a data dive was conducting to analyze the results of math achievement in the state and identify specific areas of concern. The results from this meeting served to develop the logic framework. The Council used the logic framework to ground and facilitate discussions and to provide a foundation for all activities and presentations.

During the meetings of the Council, visiting school teams, higher education faculty and experts in family and community relations were invited to share best practices. These presentations were viewed through the lens of how successful structures can be brought to scale and to better understand the missteps so that math education can continue to move forward. As a result of the discussions that ensued, the Council created a report that outlined the lessons learned, generated recommendations to improve math achievement statewide, and created specific action steps for each group of stakeholders.

Overview of the Commissioner's Council on Mathematics Report

The Commissioner's Council on Mathematics Report is based upon the information gathered related to the four specific categories of the logic framework, namely (1) deep knowledge of the content and practice standards, (2) curriculum development and implementation, (3) intervention

and acceleration, and (4) community and family engagement. With these as the foundation, the report highlights specific lessons learned as well as four specific recommendations with related action steps for each stakeholder group.

The lessons that the Council learned were that leadership, professional development, time and collaboration matter. Each of these lessons is clearly articulated in the report. These lessons learned are high-leverage structures that were common themes across all of the presentations.

In addition to the lessons learned, the Council made specific recommendations that were evidence based, actionable, inclusive of all stakeholders, and measurable. These recommendations parallel the areas of focus of the logic framework. The Council recommended that in order to improve math achievement in Connecticut, a deep understanding of the content standards and effective use of the practice standards must be developed, support and training to effectively implement the Connecticut Core Standards – Math (CCS-M) with fidelity must be provided, appropriate intervention and acceleration to meet the needs of diverse learners must be implemented and engagement of all stakeholders in the process of putting the CCS-M into practice must be communicated. Within each of these four specific recommendations action steps for the Connecticut State Department of Education (CSDE), districts, higher education and the community were identified.

Finally, resources that can be used to support the recommendations were provided within the report. The resources listed are all free and readily available. A description of the resource was included to help guide stakeholders.

Next Steps

With the public release of the report, stakeholders need to be thinking about next steps. The CSDE needs to lead this effort and has already started to do so. Beyond just sharing the report with various stakeholder groups, specific actions are taking place to support the recommendations of the report. There are six training sessions planned across the state to assist districts in evaluating instructional materials, a webinar series for administrators focusing on the CCS-M practice standards is being developed, and a three-day institute designed to develop knowledge and understanding of research and evidence-based practices in the field of family engagement is being planned for March 2017. The release of this report does not serve as the end, but rather the beginning of addressing and improving math achievement.

Attachments included with this summary

1. Commissioner’s Council on Mathematics Report
2. Listing of the members of the Commissioner’s Council on Mathematics

Prepared by: Jennifer R. Michalek, Education Consultant
Academic Office

Approved by: Isabelina Rodriguez
Interim Chief Academic Officer

Report of the
Commissioner's
Council on Mathematics



October 2016

CONTENTS

Commissioner’s Council On Mathematics Membership 1

Executive Summary 2

Commissioner’s Council On Mathematics Overview..... 3

 Common Core State Standards Definition/Background..... 3

 Council Rationale 3

 Council Selection 3

Council Process 4

 Overview of Process 4

 Council Actions 4

Council Logic Framework..... 5

Council Lessons Learned..... 7

 Leadership Matters..... 7

 Professional Development Matters..... 7

 Time Matters 8

 Collaboration Matters 8

Council Recommendations..... 9

 Recommendation Overview 9

 Council Recommendation Criteria..... 9

Resources..... 14

Conclusion 16

 Next Steps..... 16

The Connecticut State Department of Education is committed to a policy of equal opportunity/affirmative action for all qualified persons. The Connecticut State Department of Education does not discriminate in any employment practice, education program, or educational activity on the basis of race, color, religious creed, sex, age, national origin, ancestry, marital status, sexual orientation, gender identity or expression, disability (including, but not limited to, intellectual disability, past or present history of mental disorder, physical disability or learning disability), genetic information, or any other basis prohibited by Connecticut state and/or federal nondiscrimination laws. The Connecticut State Department of Education does not unlawfully discriminate in employment and licensing against qualified persons with a prior criminal conviction. Inquiries regarding the Department of Education’s nondiscrimination policies should be directed to: Levy Gillespie, Equal Employment Opportunity Director/Americans with Disabilities Act Coordinator, Connecticut State Department of Education, 25 Industrial Park Road, Middletown, CT 06457, 860-807-2071, Levy.Gillespie@ct.gov.



COMMISSIONER'S COUNCIL ON MATHEMATICS MEMBERSHIP

Name	Title	Affiliation
Milly Arciniegas	Executive Director	Hartford Parent University
Thomas Baird	STEM Director	Windsor High School
Janet Brown-Clayton	Principal	Lincoln-Bassett School - New Haven
Mary Anne Butler	Chief Academic Officer	State Department of Education
Ellen Cohn	Deputy Commissioner of Education	State Department of Education
Andrea Comer	Executive Director	Connecticut Business & Industry Assoc.
Craig Creller	Math Curriculum Specialist	Norwalk Public Schools
Brent Davenport	Board of Education Member/CTHSS	Plainville/Bristol Tech
Sara Egan	Grade 2 Teacher	Quaker Hill Elementary - Waterford
Mariliz Fitzpatrick	Grade 6 Teacher	Chippens Hill Middle School
Catherine Freeman	Teacher	CAS
Adam Goldberg	Professor	Southern Connecticut State University
Laurie Gonzalez	Assistant Superintendent	CREC
Ross Hanson	High School Teacher	Bloomfield High School
Melissa Hickey	Reading Director	State Department of Education
Jan Hochadel	President	AFT Connecticut
Melissa Howey	RESC Consultant	ACES
Pat Jordan	CEA Secretary	Connecticut Education Association
Robin Kalder	Professor	Central Connecticut State University
Kathleen Kennedy	President	Connecticut Parent Teacher Association
John Machnicki	Travelers Industrial Hygiene Lab	Travelers Insurance
Christie Madancy	Mathematics Coordinator	Wallingford Public Schools
Jennifer Michalek	Education Consultant	State Department of Education
Robin Moore	Numeracy Specialist	Regional School District 6
Alicia Roy	Superintendent of Schools	New Fairfield Public Schools
Rachel Saunders	Middle School Mathematics Coach/ATOMIC	Rogers Park Middle School - Danbury
Amit A. Savkar	Professor	University of Connecticut
Robert Trefry	State Board of Education Member	Connecticut State Board of Education
Jackie Vaillancourt	Mathematics Teacher	Voluntown Elementary School
Dianna Wentzell	Commissioner of Education	State Department of Education

EXECUTIVE SUMMARY

This report details the recommendations generated by the Commissioner's Council on Mathematics, which Commissioner of Education Dianna R. Wentzell initiated in response to the 2015 Smarter Balanced test results in mathematics. The Commissioner convened the council to spearhead the state's efforts to improve supports in mathematics. The Commissioner specifically charged this council to identify best practices, both in Connecticut and across the nation, and to explore promising innovations in the areas of mathematics instruction.

Through a series of workshop activities and presentations, the council worked to develop recommendations that would provide a road map for educators, policy leaders, and community members to improve mathematics education. The council's recommendations are grounded in the lessons learned regarding strong leadership, quality professional development, and dedicated time and effective collaboration within, among, and beyond school districts. These recommendations recognize the complex nature of change and the understanding that change is a process not an event.

The specific recommendations the council generated fall under the umbrella of these four, broad recommendations. They address actions all stakeholders can take, including the Connecticut State Department of Education (CSDE), each individual school district, higher education, and the community. The recommendations are:

1. Develop clear and consistent understanding of the Connecticut Core Standards – Mathematics (CCS-M) at the classroom, school, district, and state level. This understanding is defined as a deep knowledge of the content standards and an effective use of the practice standards.
2. Provide the necessary support and training to effectively implement the CCS-M with fidelity in all classrooms, schools, and districts.
3. Implement appropriate intervention and acceleration to support the needs of a diverse group of learners.
4. Engage all stakeholders in the process of putting the CCS-M into practice through effective communication that keeps teachers, parents, and community members informed and participating in the process.

These recommendations are intended to affirm and strengthen the good work currently happening in the state while providing a structure for change to improve mathematics achievement at the school, district, and state level. The implementation of these standards is ongoing, and it is clear that collaboration among all stakeholders is necessary for success in our classrooms.

COMMISSIONER'S COUNCIL ON MATHEMATICS OVERVIEW

Common Core State Standards Definition/Background

The Common Core State Standards (CCSS) are expectations of what students should know and be able to do at each grade level. Experts and teachers from across the country drafted these college- and career-ready standards and designed them to ensure that students are prepared for today's entry-level careers, freshman-level college courses, and workforce training programs.

The standards were developed under the leadership of governors and chief state school officers with participation from 48 states. The process included the involvement of state departments of education, districts, teachers, community leaders, experts in a wide array of fields, and professional educator organizations.

The Common Core focuses on developing the critical-thinking, problem-solving, and analytical skills students will need to be successful. The standards also provide a way for teachers to measure student progress throughout the school year and ensure that students are on track to meet grade-level expectations. The Common Core is not a curriculum but a standards-based approach to measuring student growth on the K–12 continuum of learning that emphasizes the importance of learning concepts and skills.

The Common Core Standards for Mathematics began with research-based learning progressions detailing what is known today about how students' mathematical knowledge, skill, and understanding develop over time. The knowledge and skills students need to be prepared for mathematics in college, career, and life are woven throughout the mathematics standards. The Common Core calls for greater focus in mathematics; contains coherence within and across grades; and requires the pursuit of conceptual understanding, procedural skill and fluency, and application.

The Connecticut State Board of Education adopted the standards on July 7, 2010. Following adoption, the Connecticut State Department of Education, local boards of education, school administrators, and teachers have worked together in the process of implementing these standards, now known as the Connecticut Core Standards, in classrooms across the state. These efforts included legislation to support school reform and funding, the reorganization of the CSDE, the revision of local district curriculum to align to the Connecticut Core Standards, and significant training and support programming for teachers. While these significant efforts across the state must be recognized and celebrated, the results of the 2015 Smarter Balanced Assessment confirm that much work remains.

Council Rationale

In response to mathematics being an area in need of significant improvement as evidenced by the Smarter Balanced Assessment in mathematics, the Commissioner charged the council with the responsibility to develop recommendations that would serve as a resource and guide to the state, school administrators, teachers, higher education personnel, business and community leaders, and parents to increase mathematics achievement. To this end, the council focused its work on a careful review of practices, corroborated by research, that districts have used and that show success in improving mathematics education.

Council members actively participated, listened with respect, focused on solutions, and, most importantly, were driven by doing what is best for Connecticut's children. Throughout council meetings, conversation and discussion focused on both the strategies presented and the evidence of success provided.

Council Selection

The Commissioner of Education selected a diverse team of parents, teachers, curriculum specialists, principals, superintendents, board of education members, higher education professors, business leaders, and State Department of Education staff members with the purpose of closely examining the current state of mathematics education in Connecticut. The Commissioner selected this team through recommendations made by various stakeholder groups across the state. These stakeholder groups included the Connecticut Parent Teacher Association (CT-PTA), the American Federation of Teachers-Connecticut (AFT-CT), the Connecticut Education Association (CEA), the Connecticut Association of Schools (CAS), the Connecticut Business & Industry Association (CBIA), and the Connecticut State Department of Education (CSDE).

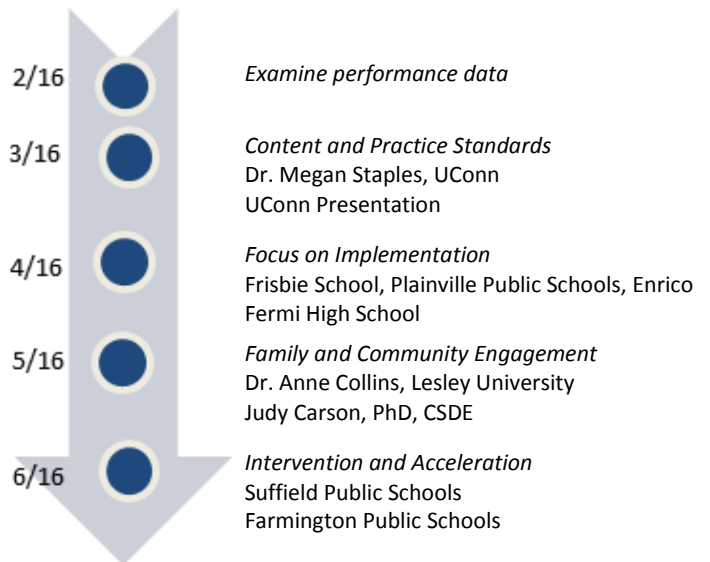
COUNCIL PROCESS

Overview of Process

Beginning in February 2016 and continuing into June, the council met monthly to investigate, discuss, and analyze a plan to improve mathematics education. The council also hosted visiting school teams representing five local districts within the state to share best practices regarding CCS-M implementation, scientific research-based interventions (SRBI), and acceleration. The council viewed these presentations through the lens of how these successful structures could be brought to scale and to better understand missteps, implementation flaws, and lessons learned moving forward. Beyond the presenting districts, the council also heard from higher education faculty knowledgeable about the practice standards and their role in classroom instruction, as well as experts in family and community relations who shared engagement strategies that can be employed at the district level.

Council Actions

Core to the premise and mission of the council was the belief that mathematics education needs to improve. As part of this fact-finding mission, the council listened to various presentations and engaged in discussions that represented the “eyes on the ground.” This through-the-eyes-of-practitioners approach was designed to lead to meaningful recommendations based upon common themes that emerged.



COUNCIL LOGIC FRAMEWORK

One of the major structures developed early in the council’s process was a logic framework designed to provide the council with a tool to organize information, guide analysis, and provide a starting point for developing recommendations. The logic framework outlined four specific categories called buckets designed to center the conversations and provide a clear framework for our pending recommendations. The council used the logic framework throughout the five-month process to ground and facilitate council member discussions and provide a foundation for all council activities and presentations. The council created the framework using an activity from its first meeting that identified strengths, weaknesses, and areas of concern based on data relating to mathematics achievement in the state.



The four buckets were created based on the following categories: Deep Knowledge of the CCS-M, Curriculum Development and Implementation, Intervention and Acceleration, Community and Family Engagement

Deep Knowledge of the CCS-M	Curriculum Development and Implementation	Intervention and Acceleration	Community and Family Engagement
The process of developing state, district, or community understanding of the content and practice standards of the CCS-M.	The process of moving the CCS-M into district curriculum documents and providing teachers with appropriate training to implement curriculum with fidelity.	The process of providing scientific research-based interventions for struggling students and providing the appropriate level of challenge for high achieving students.	The process of engaging community stakeholders in CCS-M understanding, implementation, and support to promote mastery for all students.

- **Deep Knowledge of the CCS-M** is a prerequisite to mastery of the standards at the classroom, school, district, and state level. The council prioritized this bucket with the understanding that achievement stemmed from a clear understanding of the progressions of the standards. Knowledge of the CCS-M is defined as awareness of their content and an understanding of the pedagogical changes necessitated by Standards for Mathematical Practice.

The council realized the need for development of this knowledge for both pre-service and in-service teachers. This responsibility lies with institutes of higher education as well as with districts. Institutes of higher education have a responsibility to prepare our teachers for the demands of today’s classrooms. Equally as important is ensuring that in-service teachers have the conceptual and pedagogical understanding to effectively address the focus, coherence, and rigor of the standards.

- **Curriculum Development and Implementation** is an essential function of any set of academic standards. The council closely reviewed this bucket by looking at the process and progress of local districts to revise and rewrite their curriculum documents in alignment with the CCS-M. In Connecticut, curriculum is developed and approved at the district level. Curriculum is the plan for what students will learn and how teachers will help them learn it. The curriculum documents drive the development of units and lessons that are used to deliver the instruction on a daily basis.

The council further examined the fidelity to which districts were implementing the aligned curriculum. This bucket also provided an opportunity for the council to look closely at the districts’ efforts to build the capacity of their staff to master the required instructional shifts that the standards necessitate. Capacity building is frequently achieved through professional development, but also occurs through ongoing job-

embedded activities, such as data-focused instructional teams or time reserved for instructional improvement and change.

- ***Intervention and Acceleration*** is necessary to meet the needs of all students in mastering the CCS-M. Struggling learners need to be provided with appropriate interventions that are based on scientifically researched practices. In addition, high-achieving students need to continue to be challenged in order to reach their full potential. By addressing the needs of all types of learners, mathematical success can be realized. Through this lens, the council was able to examine methods for determining which students should be receiving intervention or acceleration that align to the standards.
- ***Community and Family Engagement*** is a necessary focus for the implementation of any change in our schools. This bucket allowed the council to look closely at how districts engage each stakeholder. Community and family engagement speaks to the efforts of an organization to keep stakeholders informed, knowledgeable, and participating in the process. An engaged, informed, and focused community is a critical asset to improving outcomes for our students and supporting our teachers and leaders. An engaged community provides support for its teachers, students, staff, and administrators, thereby greatly increasing the likelihood of successful outcomes.

COUNCIL LESSONS LEARNED

Over the five-month period of council meetings, discussions, and informative presentations, council members had a unique opportunity to learn many valuable lessons regarding the characteristics of best practices across the state. As the council reviewed performance data and reacted to the analysis, consensus around areas of concern was evident. In response to this, the council focused its attention on successful vs. less successful models. The council heard from a variety of districts that have shown success with mathematics achievement as well as from individuals with proven expertise in addressing the noted areas of concern to understand best practices better. The council's goal was to develop actionable recommendations that could bring these spotlighted areas to scale in districts across the state. With this lens, the council's lessons learned capture similarities among districts that can provide the state with an example of how a district might act to improve mathematics achievement. While the council tried to make broad observations across the state in terms of geographic location, demographic conditions, and district size, these lessons learned do not tell the story of every school district. These lessons learned provide an important and summative story for Connecticut as we look toward next steps.

The lessons learned, organized into larger categories below, were gathered from membership input and best-practice presentations. The council urges policymakers, educators, and all stakeholders to review the lessons learned carefully with the mindset of "success breeds success." These lessons, presented in the format of "what matters," speak to success and beg for further steps to reduce the variance evident across the state. By learning from each other and working to bring "good ideas to scale," Connecticut will unleash expertise, innovation and the technical competence needed to improve mathematics achievement statewide.

Leadership Matters

Districts that demonstrated success in mathematics achievement all had strong leadership at both the district and school level. This leadership was characterized by a commitment to the standards and the technical capacity to guide schools toward effective mathematics instruction. Strong leaders included superintendents, principals, and teachers who possessed both a developed understanding of the content and practice standards, a recognition of the mathematical shifts required by the CCS-M, and clarity of vision to support the work needed to get the job done. Strong leadership was demonstrated through articulated and strategic district/school plans for implementation; coherent, ongoing communication to all stakeholders; and a willingness to adjust and maintain flexibility when changes needed to be made. Strong leadership involved teachers as decision makers, built stakeholder ownership and developed a systematic approach to the work necessary for successful implementation. Strong leaders identified individuals with math expertise within the school community and provided additional training so they could assist in putting the plan into action. Strong leaders got on board early, served as role models, provided support, and stayed the course through challenges.

Professional Development Matters

Districts that demonstrated success in mathematics achievement all shared a commitment to improving and growing staff capacity at all levels. From successful districts, the council noted that significant time and resources were devoted to professional development. Professional development focused on developing conceptual understanding of the mathematics content and building pedagogical practices that promoted the practice standards. With this understanding in place, emphasis could shift to working with teachers specifically to adjust to the shifts needed in daily classroom instruction. While some professional development was in single-day, in-person format, successful districts provided ongoing embedded support to their teachers. Math coaches or instructional leads who possessed deep content and pedagogical knowledge about mathematics often provided this support. School-based instructional support and training for all staff was found to be most helpful. The council learned that it is equally important for administrators and principals to have dedicated time for professional development to fully understand the mathematical shifts in order to support those responsible for mathematics instruction.

On a logistical side, while all districts demonstrated an insistence on finding time for staff to learn, collaborate, and work together, the manner in which they reserved this time varied. To ensure that staff received the knowledge and the expertise to execute the standards successfully, districts capitalized on time in the school day, after school, weekends, or the summer to provide collaborative learning opportunities.

Time Matters

Teachers felt they benefited the most when provided time to work with other teachers at their grade level as well as those teaching the grades immediately preceding and following theirs. Successful districts found a variety of ways to provide the necessary time for the development of these important instructional competencies. Districts provided early release days, late-start days, and paid time during the summer for curriculum writing, professional development, and teacher collaboration.

While time to work with colleagues on building an understanding of mathematics, knowledge of the pedagogical shifts, or other professional development activities was important, the importance of instructional time cannot be overlooked. Districts with high mathematics achievement allocated increased instructional time for mathematics. At the elementary level, one hour of instructional time was dedicated to mathematics on a daily basis. Furthermore, more successful districts worked toward making time between English language arts and mathematics more equitable.

Collaboration Matters

Districts that demonstrated success in mathematics all devoted enough time for teachers to learn, develop, and implement the standards in their classrooms. These districts provided time for teachers to prepare units and lessons collaboratively, working with fellow teachers and with the support of coaches and designated curriculum writers to ensure consistent implementation within the school and district.

Throughout the implementation process, teachers from successful districts were afforded common planning time with grade-level colleagues. This enabled the teachers to have deep conversations about content, resources, and instruction. Beyond collaboration with grade-level colleagues, it is imperative to have experts trained in best practices so that teachers have someone to turn to as they experience challenges. These experts need to have a strong mathematics background so they can help teachers gain the conceptual understanding of the mathematical topics and provide strategies for meeting the needs of all students in the classroom.

COUNCIL RECOMMENDATIONS

Recommendation Overview

The council developed recommendations based on evidence gathered from its members, the presentations and research of respected experts, and the understanding of effective practices in Connecticut school districts. The recommendations align with the logic framework and are intended to provide educators and policymakers with a concrete structure for decisions regarding next steps in supporting mathematics instruction and improving mathematics achievement.

Council Recommendation Criteria

As a guide for developing quality recommendations, the council felt strongly that all quality and meaningful recommendations must be evidence based, actionable, inclusive of all stakeholders, and measurable. By challenging and refining the recommendations to meet these criteria, the council believes that the following recommendations provide a clear path forward for improvement in mathematics education in the state.

Council recommendations regarding the improvement of mathematics instruction			
<p>Evidence Based</p> <p>Recommendations must stem from an identified challenge or concern substantiated by data.</p>	<p>Actionable</p> <p>Recommendations must be obtainable, actionable, and grounded in solid educational practice.</p> <p>Recommendations must be specific and targeted.</p> <p>Recommendations must be sustainable over time.</p>	<p>Inclusive of All Stakeholders</p> <p>Recommendations must include opportunities for participation by multiple stakeholder groups.</p> <p>Recommendations must focus and provide solutions that improve learning for students.</p>	<p>Measurable</p> <p>Recommendations must be measurable in regard to their effectiveness.</p> <p>Recommendations must provide a clear deliverable or measure regarding their long-term impact or success.</p>



Council Recommendations

1	<p>Develop clear and consistent understanding of the CCS-M at the classroom, school, district, and state level. This understanding is defined as a deep knowledge of the content standards and an effective use of the practice standards.</p>
CSDE	<ul style="list-style-type: none"> • Provide clear and consistent messaging and information for districts and communities regarding the standards through a variety of channels (professional development workshops, print, media, and digital platforms). • Develop and present leadership-training sessions for administrators to increase the understanding of the math practice standards. The focus of these sessions includes why the practice standards are necessary and what they look like in classroom instruction. • Provide resources to support districts in providing professional development to increase the mathematical content knowledge and build conceptual understanding of their teachers. • Evaluate certification regulations to ensure that new teachers have appropriate coursework and experience that support and align to the shifts in mathematics education necessitate by the CCS-M.
District	<ul style="list-style-type: none"> • Provide teachers with ongoing professional support through face-to-face workshops, qualified instructional coaches, and online learning to build their understanding of the standards. • Retain and attract knowledgeable teachers. • Establish professional learning communities for teachers to be able to deepen their mathematical knowledge. • Include numeracy goal as part of the district and school improvement plan that aligns to CCS-M. • Partner with local higher education institutions to provide content and pedagogical support to in-service teachers. • Develop partnerships with other districts in order to collaborate on professional development opportunities. • Support qualified instructional numeracy coaches in buildings.
Higher Education	<ul style="list-style-type: none"> • Increase mathematics coursework for elementary pre-service teachers. • Increase coursework that focuses on the mathematical practices at all levels. • Collaborate with district partners to ensure that pre-service teachers' field experience is with a teacher who exhibits conceptual understanding, deep content knowledge, and effective use of the practices. • Mentor teachers and provide training specific to mathematics content and pedagogy to teachers who will be assigned a pre-service teacher. • Create professional learning workshops for in-service teachers to interact with professors at the university to make the connections of what is being taught at the K-12 level and how it is used in higher education.
Community	<ul style="list-style-type: none"> • Community members should be encouraged to attend and participate in state- and district-provided workshops that deliver information about the standards. • Community-based organizations assist in promoting the importance and understanding of the CCS-M.

<p>2</p>	<p>Provide the necessary support and training to effectively implement the CCS-M with fidelity in all classrooms, schools, and districts.</p>
<p>CSDE</p>	<ul style="list-style-type: none"> • Provide and continuously expand an online library of Common Core-aligned units/lessons that can provide models for teacher use. • Provide resources for districts to analyze the alignment of their curriculum to the progressions of the standards. • Provide resources and training on how to evaluate instructional materials. • Provide guidance to districts on appropriate time they should allocate to mathematics instruction at each level of instruction.
<p>District</p>	<ul style="list-style-type: none"> • Ensure that curriculum maps are vertically and horizontally aligned to standards and developed with the collaboration of all stakeholders. Create (or adopt) district-specific, standards-aligned curriculum and corresponding assessments, paying close attention to learning progressions across grade levels. • Evaluate materials and resources for alignment to curriculum grade-level standards. • Engage teacher voice in a needs assessment of current curricular alignment to standards as well as develop a plan for next-step revisions and improvements. • Engage in shared collaborative discussions with other districts in curriculum review and development. • Create a library of resources for teachers with specific lessons and tasks by grade level that are common throughout the district. • Provide adequate instructional time for mathematics at all levels of instruction (daily mathematics for one hour). • Address fluency of specific skills as noted in the standards, specifically in curriculum documents. • Provide time for collaborative planning to elicit rich discussion about content, resources, and instruction. • Create partnerships with business and industry to support mathematics instruction.
<p>Higher Education</p>	<ul style="list-style-type: none"> • Work with local districts to ensure an understanding that implementation of a CCS-M aligned curriculum prepares students for credit bearing mathematics courses. • Create resources for the in-service teachers that would help make connections to higher-level mathematics necessary for students to succeed in STEM fields. • Tap into the strategic partnerships with industry and the community to promote the creation of such partnerships with school districts.
<p>Community</p>	<ul style="list-style-type: none"> • Community-based organizations should assist in informing and engaging the community in learning about the new standards and the instructional shifts involved in those standards through the use of various forms of media (newsletters, video, Internet, etc.). • Community-based organizations should enable students to participate in a variety of opportunities to showcase their learning aligned with standards with parents, teachers, principals, administrators, and members of the school community. • Business and industry should seek to form partnerships with local school districts to support mathematics education.

<p style="font-size: 24pt; color: #f0e68c; text-align: center;">3</p>	<p>Implement appropriate intervention and acceleration to support the needs of a diverse group of learners.</p>
<p style="color: #4f81bd; text-align: center;">CSDE</p>	<ul style="list-style-type: none"> • Develop a list of resources for districts that identify effective intervention strategies for mathematics at all levels of instruction. • Provide guidance to districts on intervention and acceleration models. • Create a bank of tasks that provide a simple entry point so struggling students can succeed, and at the same time involve rich mathematical concepts that challenge high-achieving students that districts can incorporate into their units of instruction. • Develop a list of effective screening and progress monitoring tools available to districts. • Develop a list of districts that are exemplifying best practices. • Develop a bank of valid assessments to ensure alignment to the standards for identifying students in need of tier 2 or 3 support.
<p style="color: #4f81bd; text-align: center;">District</p>	<ul style="list-style-type: none"> • Provide adequate time for intervention and acceleration within the school day. • Ensure that IEP goals align to the CCS-M standards. • Develop nontraditional courses, particularly for high school mathematics courses. • Provide professional development on specific tier 1 intervention and acceleration strategies that can be used during everyday mathematics instruction.
<p style="color: #4f81bd; text-align: center;">Higher Education</p>	<ul style="list-style-type: none"> • Partner with local districts to provide higher level mathematics courses to accelerated students. • Provide pre-service teachers with courses that build knowledge of differentiation, intervention, and enrichment specific to mathematics. • Build relationships with high schools by promoting early college experiences in high schools. • Implement the strategies for inclusive classroom environment for higher retention of underrepresented minorities in mathematics. • Create a strategic plan that includes a feedback mechanism, which works both ways from schools to higher education and higher education to schools on the performance and assessments of students’ understanding of mathematics concepts to bridge the achievement gap.
<p style="color: #4f81bd; text-align: center;">Community</p>	<ul style="list-style-type: none"> • Use out-of-school time to enable students to continue to practice and build on the mathematics concepts they are learning. • Establish partnerships with local districts to create internships for high school students with businesses that require mathematics skills.



<p>4</p>	<p>Engage all stakeholders in the process of putting the CCS-M into practice through effective communication that keeps teachers, parents, and community members informed and participating in the process.</p>
<p>CSDE</p>	<ul style="list-style-type: none"> • Provide districts with a family and community toolbox that contains resources to engage the support of parents and business leaders. • Provide professional development specific to Board of Education members about CCS-M and the Smarter Balanced Assessment. • Provide regional trainings for families and communities on the CCS-M content, pedagogy, and assessment.
<p>District</p>	<ul style="list-style-type: none"> • Employ active community engagement strategies with all members of the school community as defined by students, parents, business community, and senior citizens. Communication strategies may include college- and career-ready standards workshops, parent academies, media engagement, presentations to business community leaders, and forums to better understand community concerns or questions. Communication must be clear, jargon free, and provided in multiple languages. • Create grade- or class-specific resources that parents can use at home to support their children. These resources can include websites, printed materials, and videos. • Provide professional development for in-service teachers around effective family engagement strategies. • Develop a plan of action around the implementation of family and community engagement strategies.
<p>Higher Education</p>	<ul style="list-style-type: none"> • Communicate with all stakeholders the impact that mastery of the CCS-M has on college acceptance, credit bearing course preparedness, and graduation rates. • Require coursework in family engagement strategies for pre-service teachers. • Communicate the challenges that students face in higher education with mathematics course work and the impact this has on STEM career fields.
<p>Community</p>	<ul style="list-style-type: none"> • Parents and community members should be encouraged to attend events and seek engagement with district leaders to build understanding of the standards. • Use social media and distribution lists to promote the importance of the CCS-M.



RESOURCES

While the recommendations outlined in this report serve as a guide for all stakeholders on what can be done to improve mathematics across the state, these changes can only be realized with appropriate and effective resources. The council believes that recommendations would not be complete without a listing of resources to support the actions of the recommendations. To this end, the council has developed a list of resources to help put these suggestions into action.

Resource	Description
CTCoreStandards.org	This site contains information for all stakeholders. Information includes resources for teachers, parents, curriculum specialists, and school and district leaders. Various forms of professional development are available through this site including in-person, on demand, and a library of professional development materials.
Achieve	Achieve is a leading voice for college and career readiness. To this end, they have created a variety of resources to assist states, districts, and parents in implementation and understanding. Most notably is the Educators Evaluating the Quality of Instructional Products (EQuiP) rubric, exemplar lessons and units evaluated using EQuiP, and training materials for the implementation of the use of the rubric.
LearnZillion	LearnZillion's mission is to help teachers and parents meet the academic needs of their students. They accomplish this by providing an open, cloud-based curriculum. In addition they help teachers, schools, and districts improve instruction, track student performance and better respond to the specific needs of students.
Student Achievement Partners	The goal of Student Achievement Partners is to disseminate high-quality materials to states, districts, schools, and teachers. These materials include but are not limited to professional development modules, instructional practice guides, an interactive coherence map, lessons, an instructional materials evaluation tool, and aligned mini-assessments.
What Works Clearinghouse	What Works Clearinghouse is a trusted source of scientific evidence for what works in education to improve student outcomes. They identify studies that provide credible and reliable evidence of the effectiveness of a given practice, program, or policy.
YouCubed	YouCubed's main goal is to inspire, educate, and empower mathematics teachers. To accomplish this goal, online courses, low entry/high ceiling tasks, and resources for parents are posted and available on the site. These resources are built on the mathematics mindset research.
Illustrative Mathematics	This site provides instructional and assessment tasks, lesson plans and other resources. Besides aligned tasks, there are videos to learn about the progressions of mathematical topics across grade levels and blueprints for grades K-12 mathematics courses.
US Department of Education Family and Community Engagement	The US Department of Education has provided a variety of tools and supports for parents and families, schools and educators, and communities. Most notably posted on this site is the Family Engagement Capacity Building Framework. This framework provides guidance on how to engage families and communities with greater success.

Resource	Description
<u>Khan Academy</u>	<p>Khan Academy offers practice exercises, instructional videos, and a personalized learning dashboard that empower learners to study at their own pace in and outside of the classroom. Khan Academy in partnership with the College Board provides free, personalized study resources for all students.</p>
<u>National Council of Teachers of Mathematics</u>	<p>The National Council of Teachers of Mathematics has a variety of classroom resources, publications, and professional learning posted on the site. A highlight of this site is the collection of professional development resources that include the Principles to Actions toolkit, which contains grade-band specific modules focused on the effective teaching practices.</p>
<u>National Center on Intensive Intervention</u>	<p>With the intent of building district and school capacity to support implementation of data-based individualization for students with persistent learning needs, this site contains a variety of resources to address intervention. Included on this site are tools charts. These have been developed to assist educators and families in becoming informed consumers when selecting academic and behavioral progress monitoring tools and interventions that best meet their individual needs.</p>
<u>Bridging Practices Among Connecticut Mathematics Educators</u>	<p>Bridging Math Practices is a project funded by the State Department of Education through a Math-Science Partnership Grant. The project aimed to enhance teachers' understanding of mathematical argumentation as well as their ability to support student participation in mathematical argumentation and assess the quality of their arguments. To scale this work up, this site has posted the professional development modules, tasks and tools, and argumentation resource packets to support classroom teachers.</p>
<u>EdReports</u>	<p>EdReports.org is an independent nonprofit that publishes free reviews of instructional materials, using an educator-designed tool that measures alignment, usability, and other quality criteria. The reports help districts and educators make informed purchasing and instructional decisions that support improved student outcomes.</p>

CONCLUSION

Change is challenging; however, change is the promise of something new, something hopeful, and something bright for the future of our children. In the face of change, Connecticut is moving forward, committed to the process of making good great, and better the best. This council crafted these recommendations to ensure a continued, thoughtful, and coherent plan to improve mathematics education statewide.

We believe our recommendations serve as a next step in the ongoing journey for our state as we continue to move forward, making progress, and working hard to improve the lives of our children. We recognize that future work and focus (outside the charge of our council) needs to occur to help and support children and educators. It is imperative that we continue this work to stress the importance of mathematics literacy and enhance our students' learning and appreciation of mathematics.

Next Steps

As Connecticut continues to grow, improve, and succeed, all stakeholders need to work and learn more in the area of mathematics education, specifically as it relates to the following:

- instructional support necessary for students with special needs to access the standards;
- instructional support necessary for English learners to access the standards;
- interconnectedness of curriculum, instruction, and assessment; and
- teacher evaluation and certification requirements.

This document will help continue this important work and foster collaborative partnerships and communication throughout the state.

We hope that the children we represent speak loudly through this document and encourage us all to keep their future *front and center*.