

## 1        **Supporting High-Quality Common Core Mathematics Instruction**

2

3        The planning and implementation of effective and efficient mathematics instruction that  
4        meets the needs of every student requires broad support. It is an obligation of everyone,  
5        including administrators, teacher leaders, college and university personnel, community  
6        members, and parents. Each of these groups is an important contributor. The  
7        stakeholders at each school or school district form a support system that assists in the  
8        design, implementation, and evaluation of effective mathematics instructional programs.  
9        These stakeholders also serve an important function as advocates for a sustained focus  
10       on the achievement of the CA CCSSM by every student. This chapter addresses the  
11       roles and responsibilities of the stakeholders, in the development, implementation, and  
12       maintenance of high-quality, standards-based mathematics instructional programs.

13

14       A summary of the findings of the State Superintendent of Public Instruction’s Task  
15       Force on Educator Excellence, contained in the 2012 report “Greatness by Design” is  
16       pertinent. This comprehensive report calls out to teachers, administrators, and other  
17       supervisors of mathematics instruction to take certain actions in response to the need  
18       for continual improvement of mathematics instruction in California. The table below  
19       contains the main recommendations from this report relevant to the support of a high-  
20       quality mathematics instructional program. (State Superintendent of Public Instruction’s  
21       Task Force on Educator Excellence *Greatness by Design* [Greatness by Design] 2012,  
22       5-6).

*Teacher Education* is uneven in duration and quality. Some educators are given excellent preparation while others receive minimal. Education for and development of teacher leaders is more uneven in quality. Steps must be taken to ensure every teacher participates in a high-quality preparation program and that mechanisms for developing leadership exist and are supported.

*Mentoring for Beginners* is decreasing. Fewer and fewer teachers are receiving the benefits of high-quality mentoring in California, due to several factors, not the least of which is a decrease in funding for such purposes. New teachers need to be supported through the difficult transition in their first few years of teaching.

*Professional Learning* time and opportunities are sorely underfunded. California teachers have little time for collaboration or learning—usually only about three to five hours per week of individual planning time. Opportunities for professional learning and teacher collaboration must be seen as an integral part of the teaching profession.

*Evaluation* is frequently spotty and rarely designed to give teachers and administrators the feedback and support that would help them improve or provide a fair and focused way to make personnel decisions. Evaluation efforts should be focused on helping teachers grow and improve, as opposed to being used to reprimand.

*Leadership Pathways* are by and large poorly defined and poorly supported. There are few opportunities for expert teachers to share practices with their peers or to take on leadership roles. Most teachers are still isolated from each other, teaching in egg-crate classrooms and performing the same functions as they did when they first entered. A

teaching profession has not yet evolved that regularly supports the spread of expertise. This needs to change if high-quality mathematics instruction is to be available to every student in California. Inequities due to quality of instruction can be lessened through professionals working together.

24

25 In addition to the sweeping findings of this report, it is evident that substantial  
26 professional learning for teachers will be needed to successfully implement the CA  
27 CCSSM. While no single district or school has the absolute power or resources to  
28 address all of these concerns, both the mathematics teaching community and  
29 stakeholders in the mathematics instruction of every student in California should  
30 consider these issues as major roadblocks to true progress. It is time for school and  
31 university educators around the state to combine their efforts and unite behind a  
32 common goal of improving mathematics instruction for all California students.

33

#### 34 **Administrative Role and Support**

35 The role of school board members, district administrators, and school administrators is  
36 crucial to the success of any mathematics instructional program. Setting and clearly  
37 articulating high expectations for instruction by all teachers and learning by every  
38 student is the foundation of a successful program. It is also essential that administrators  
39 express a positive attitude toward mathematics and an appreciation for its importance in  
40 the future of every student. One of the most important jobs of principals and  
41 administrators is to help create a system of collaboration among teachers for developing

42 CA CCSSM instructional practices, recognizing that this process will take time and  
43 support.

44  
45 District and school administrators, as well as school board members, need to  
46 understand what high-quality mathematics instruction looks like in order to effectively  
47 support programs of instruction. This includes

- 48 • Knowledge of the Standards for Mathematical Practice contained in the CA  
49 CCSSM, as well as the Standards for Mathematical Content.
- 50 • An understanding of the role the Standards for Mathematical Practice play  
51 and how they contribute to establishing effective mathematics learning  
52 environments.
- 53 • An understanding that the Standards for Mathematical Practice are on an  
54 equal footing with the content standards in the CA CCSSM. In particular, if  
55 students are not engaging in the mathematical practice standards, then the  
56 CA CCSSM are not being fully implemented.

57 Some resources that may help administrators understand the implications of the CA  
58 CCSSM for teaching include:

- 59 1. Inside Mathematics (practice standards by grade  
60 [videos]): [http://www.insidemathematics.org/index.php/mathematical-practice-](http://www.insidemathematics.org/index.php/mathematical-practice-standards)  
61 [standards](http://www.insidemathematics.org/index.php/mathematical-practice-standards)
- 62 2. The Mathematics Common Core Toolbox (PARCC prototyping  
63 project): <http://www.ccsstoolbox.com>

- 64 3. Implementing the Mathematical Practice Standards (browse  
65 illustrations): <http://mathpractices.edc.org/browse-by-mps>  
66 4. Mathematics Assessment Project  
67 (Standards): <http://map.mathshell.org/materials/stds.php>  
68 5. Kansas flip charts: <http://katm.org/wp/common-core/>

69  
70 Administrators may need to seek out their own opportunities for learning more about the  
71 CA CCSSM by attending professional workshops, conferences, or professional learning  
72 opportunities for teachers along with their staffs. Administrators must become informed  
73 instructional leaders for mathematics education. They should also rely on teacher  
74 leaders at their school sites or within their districts to offer support and knowledge of  
75 such practices. In addition, administrators must be aware of the multiple assessment  
76 strategies that can be utilized in the mathematics classroom and have a balanced  
77 approach towards assessing the effectiveness of mathematics instruction. They  
78 understand that the results of multiple assessment strategies reflect an accurate  
79 understanding of student learning and that a student's score on a single test does not  
80 necessarily give an accurate picture of such learning. In the same vein, a short  
81 walkthrough of a classroom performed once a year is typically insufficient to accurately  
82 judge the effectiveness of instruction. To this end, district and school administrators  
83 themselves should participate in ongoing professional learning on the topic of  
84 mathematics education and assessment of learning.

85

86 Administrators convey high expectations for mathematics instruction by working with  
87 teachers as they plan, develop effective questions, and observe, and provide  
88 constructive, informative feedback while the teachers are implementing their plans.  
89 Frequent mathematics lesson or mathematics class observations allow the school  
90 administrator to provide those who teach mathematics with relevant feedback regarding  
91 their instructional practices. They engage with students and teacher to glean a full  
92 picture of which practices the teacher is employing and which practices are effective.

93  
94 The Standards for Mathematical Practice play a crucial role in any CA CCSSM  
95 classroom. Administrators may be unfamiliar with these practices and many would  
96 benefit from their own professional learning experiences that are centered on the  
97 CA CCSSM. The Standards for Mathematical Practice describe ways in which students  
98 engage in mathematics to develop deep conceptual understanding and procedural  
99 fluency. As students grow in mathematical maturity, evidence of the Standards for  
100 Mathematical Practice changes but the essence stays the same. Students should be  
101 actively engaged in doing meaningful mathematics, discussing mathematical ideas and  
102 reasoning, applying mathematics in interesting situations, and discovering new  
103 mathematical ideas through modeling the world around them. The Standards for  
104 Mathematical Practice appear in different forms depending on the grade level of the  
105 classroom, but in any classroom, they represent the ways in which students engage in  
106 *doing* mathematics and play a core role in instruction. (Adapted from Massachusetts  
107 Department of Elementary and Secondary Education [Massachusetts] 2011, 9).The

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108 Standards for Mathematical Practice are also described in the “Overview of the  
109 Standards Chapters” in this framework.

110

111 The table below lists the Standards for Mathematical Practice and provides a few  
112 examples of what implementation of each practice could look like in the classroom.

Standards for Mathematical Practice	Students:	Teachers:
<p><b>1. Make sense of problems and persevere in solving them.</b></p>	<ul style="list-style-type: none"> <li>• Analyze information and explain the meaning of the problem</li> <li>• Actively engaged in problem solving (Develop, carry out, and refine a plan)</li> <li>• Show patience and positive attitudes</li> <li>• Ask themselves if their answers make sense</li> <li>• Check their answers with a different method</li> </ul>	<ul style="list-style-type: none"> <li>• Pose rich problems and/or ask open-ended questions</li> <li>• Provide wait-time for processing/finding solutions</li> <li>• Circulate to pose probing questions and monitor student progress</li> <li>• Provide opportunities and time for cooperative problem solving and reciprocal teaching</li> </ul>
<p><b>2. Reason abstractly and quantitatively.</b></p>	<ul style="list-style-type: none"> <li>• Represent a problem symbolically</li> <li>• Explain their thinking</li> <li>• Use numbers and quantities flexibly by applying properties of operations and place value</li> <li>• Examine the reasonableness of their answers/calculations</li> </ul>	<ul style="list-style-type: none"> <li>• Ask students to explain their thinking regardless of accuracy</li> <li>• Highlight flexible use of numbers</li> <li>• Facilitate discussion through guided questions and representations</li> <li>• Accept varied solutions/representations</li> </ul>
<p><b>3. Construct viable arguments and critique the reasoning of others.</b></p> <p>Students build proofs by induction and proofs by contradiction. CA 3.1 (for higher mathematics only).</p>	<ul style="list-style-type: none"> <li>• Make conjectures to explore their ideas</li> <li>• Justify solutions and approaches</li> <li>• Listen to the reasoning of others, compare arguments, and decide if the arguments of others makes sense</li> <li>• Ask clarifying and probing questions</li> </ul>	<ul style="list-style-type: none"> <li>• Provide opportunities for students to listen to or read the conclusions and arguments of others</li> <li>• Establish a safe environment for discussion</li> <li>• Ask clarifying and probing questions</li> <li>• Avoid giving too much assistance (e.g., providing answers or procedures)</li> </ul>
<p><b>4. Model with mathematics.</b></p>	<ul style="list-style-type: none"> <li>• Apply prior knowledge to new problems and reflect</li> <li>• Use representations to solve real life problems</li> <li>• Apply formulas and equations where appropriate</li> <li>• Ask questions about the world around them and attempt to attach meaningful mathematics to the world</li> </ul>	<ul style="list-style-type: none"> <li>• Pose problems connected to previous concepts</li> <li>• Provide a variety of real world contexts</li> <li>• Use intentional representations</li> <li>• Provide students the space to ask questions and pose problems about the world around them</li> </ul>
<p><b>5. Use appropriate tools strategically.</b></p>	<ul style="list-style-type: none"> <li>• Select and use tools strategically (and flexibly) to visualize, explore,</li> </ul>	<ul style="list-style-type: none"> <li>• Make appropriate tools available for learning</li> </ul>

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	<p>and compare information</p> <ul style="list-style-type: none"> <li>• Use technological tools and resources to solve problems and deepen understanding</li> </ul>	<p>(calculators, concrete models, digital resources, pencil/paper, compass, protractor, etc.)</p> <ul style="list-style-type: none"> <li>• Embed tools with their instruction</li> </ul>
6. Attend to precision.	<ul style="list-style-type: none"> <li>• Calculate accurately and efficiently</li> <li>• Explain thinking using mathematics vocabulary</li> <li>• Use appropriate symbols and specify units of measure</li> </ul>	<ul style="list-style-type: none"> <li>• Recognize and model efficient strategies for computation</li> <li>• Use (and challenging students to use) mathematics vocabulary precisely and consistently</li> </ul>
7. Look for and make use of structure.	<ul style="list-style-type: none"> <li>• Look for, develop, and generalize relationships and patterns</li> <li>• Apply conjectures about patterns and properties to new situations</li> </ul>	<ul style="list-style-type: none"> <li>• Provide time for applying and discussing properties</li> <li>• Ask questions about the application of patterns</li> <li>• Highlight different approaches for solving problems</li> </ul>
8. Look for and make use of regularity in repeated reasoning.	<ul style="list-style-type: none"> <li>• Look for methods and shortcuts in patterns in repeated calculations</li> <li>• Evaluate the reasonableness of intermediate results and solutions</li> </ul>	<ul style="list-style-type: none"> <li>• Provide tasks and problems with patterns</li> <li>• Ask about possible answers before, and reasonableness after computations</li> </ul>

113

114 Adapted from: "SMP Student Teacher Indicator." Howard County Public School System • Elementary and Secondary Mathematics Offices • Draft

115 2011

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116 Administrators play an important role in supporting teachers during the time of  
117 transitioning to a CA CCSSM classroom and beyond. The Standards for Mathematical  
118 Practice represent a different vision of what students are doing in classrooms. They  
119 may be investigating mathematical concepts with manipulatives for an entire class  
120 period or working on the same mathematics problem for a substantial amount of time.  
121 Parents may not understand this style of instruction and these new expectations for  
122 California students and administrators will need to provide opportunities and support for  
123 teachers to introduce and explain the CA CCSSM during interactions with parents.

124

### 125 **Mathematics Professional Learning for Teachers**

126 In order to support California mathematics teachers in providing highly effective  
127 mathematics instruction to their students, professional learning opportunities that  
128 deepen mathematics teachers' content knowledge and provide effective instructional  
129 strategies must be made available. The content of such programs must be aligned with  
130 the goals and standards for teaching mathematics in California. As the report  
131 "Greatness by Design" notes, California must rebuild a professional learning system  
132 grounded in the following principles: sustained, content-embedded, collegial and  
133 connected to practice, focused on student learning, and aligned with school  
134 improvement efforts (Greatness by Design 2012, 16). Below are some important  
135 features of professional learning programs for teachers of mathematics.

136

### 137 **Content of Professional Learning Programs**

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138 For a mathematics program to be effective, it must also be taught by knowledgeable  
139 teachers. According to Liping Ma, “The real mathematical thinking going on in a  
140 classroom, in fact, depends heavily on the teacher's understanding of mathematics” (Ma  
141 2010). A landmark study in 1996 found that students with initially comparable academic  
142 achievement levels had vastly different academic outcomes when teachers’ knowledge  
143 of the subject matter differed (Milken 1999). The message from the research is clear:  
144 having knowledgeable teachers really does matter; teacher expertise in a subject drives  
145 student achievement. “Improving teachers’ content subject matter knowledge and  
146 improving students’ mathematics education are thus interwoven and interdependent  
147 processes that must occur simultaneously” (Ma 2010; Massachusetts 2011, 10).

148  
149 Professional learning for mathematics teachers must address teacher content  
150 knowledge of the specific topics taught at their grade level(s), as well as mathematics  
151 relevant to prior and later grade levels where appropriate. Research over the past  
152 decade has shown a positive correlation between teacher content knowledge and  
153 student learning (Hill and Lubienski 2007; Hill, Rowan, and Ball 2005), and the required  
154 content knowledge of teachers at each grade level has changed significantly with the  
155 adoption of the CA CCSSM. These changes in content must be taken into account  
156 when designing professional learning programs for teachers. Specific guidelines will be  
157 provided below for the mathematics content knowledge at various grade spans that  
158 might appear in such programs.

159

160 The Standards for Mathematical Practice (MP) represent a shift towards students “doing  
161 mathematics” in the classroom, and as noted in *The Mathematical Education of*  
162 *Teachers II*, teachers “must not only understand the practices of the discipline, but how  
163 these practices can occur in school mathematics and be acquired by students (p.8).”  
164 In order for teachers to develop an understanding of the Standards for Mathematical  
165 Practice and their implications for mathematics instruction, they should engage in  
166 solving problems through using the mathematics practices. Intensive content-focused  
167 professional learning workshops—such as Saturday meetings or multi-day summer  
168 workshops—provide a forum wherein teachers can do this. For example, professional  
169 learning should:

- 170 • Engage teachers in the posing and solving of problems, requiring teachers to  
171 make sense out of problems and learn to persevere in solving them (MP.1).
- 172 • Encourage teachers to explain their reasoning and to make conjectures and  
173 critique each other’s reasoning in a safe environment (MP.3).
- 174 • Allow teachers to learn which tools are appropriate for the mathematics at  
175 hand and gather experience with the use of those tools in the classroom  
176 (MP.4).

177 Professional learning programs that incorporate teacher collaboration across schools or  
178 districts can draw on successful experiences of other teachers in teaching the  
179 Standards for Mathematical Practice.

180

181 In addition to a teacher’s grade level mathematics content knowledge, contemporary  
182 mathematics education research points to the importance of teacher acquisition of a  
183 specific body of content knowledge for teaching mathematics, often referred to as  
184 *pedagogical content knowledge* (See Hill, and others 2007 for a comprehensive  
185 discussion of this idea). This body of knowledge includes understanding problem  
186 solving strategies that arise through student thinking, knowledge of multiple  
187 representations of mathematical concepts (e.g. multiple representations of fractions),  
188 comprehension of the relationships that are embedded within content areas, an  
189 understanding of common student thinking and misconceptions, knowledge of specific  
190 teaching strategies for different topics, and knowledge of ways to differentiate  
191 instruction, among others. Of note are strategies for involving students in classroom  
192 discourse as a means to teaching with the Standards for Mathematical Practice and  
193 formative assessment strategies that serve to inform teachers as to the efficacy of  
194 lessons, units or modules, and the extent of student understanding. Mathematics  
195 instruction that pays attention to the needs of specific populations, including students  
196 with disabilities and English learners, is crucial to providing high-quality mathematics  
197 instruction for *all* California mathematics students. To the extent possible, mathematics  
198 professional learning for teachers should be attentive to these areas and should rely on  
199 the most current materials and research in regards to this specified knowledge for  
200 teachers.

201

202 Suggestions for the mathematics content for teachers of various grade bands are given  
203 below, referred to by the domains and conceptual categories in the CA CCSSM. These  
204 are based on the recommendations found in two documents, *Gearing Up for the*  
205 *Common Core State Standards in Mathematics*, and *The Mathematical Education of*  
206 *Teachers II*:

- 207 • Grades K-2: Counting and Cardinality, Number and Operation in Base Ten,  
208 Operations and Algebraic Thinking.
- 209 • Grades 3-5: Number and Operations—Fractions, Numbers and Operations in Base  
210 Ten, Operations and Algebraic Thinking.
- 211 • Grades K-5: Measurement and Data, Geometry.
- 212 • Grades 6-8: Ratios and Proportional Relationships, The Number System,  
213 Geometry, Statistics and Probability.
- 214 • Grades 9-12: Functions, Modeling, Integrating Mathematical Ideas.

215 The “Progressions for the Common Core State Standards in Mathematics” documents  
216 (<http://ime.math.arizona.edu/progressions/>) are useful tools for teachers to study when  
217 exploring these topic areas, and can be used as starting points for content-based  
218 professional learning programs.

219  
220 School administrators and their teachers should strive to develop an understanding of  
221 students and their culture to enhance mathematics instruction. Teachers have the  
222 potential to behave as institutional agents with the capacity and commitment to provide  
223 institutional resources and opportunities to students (Stanton-Salazar 1997). Teacher-

224 student relationships have the potential to contain *social capital*, i.e. forms of support  
225 that help students become effective participants in the school system (Bourdieu 1977,  
226 1986; Stanton-Salazar 1997). In the context of school, teacher-student relationships  
227 include student learning and achievement (Katz 1999). Katz (1999) also states that two  
228 essential tenets of productive teacher-student relationships are high expectations and  
229 caring for students. Many students place a lot of emphasis on care and respect. When  
230 relationships developed between teachers and students become supportive, these  
231 relationships have the potential to alter students' lives in positive ways (Stanton-Salazar  
232 2001). This notion of teacher-student relationship is derived from the social capital  
233 framework, which was cultivated by Bourdieu, in order to examine the role of  
234 relationships between institutional agents and their students (Stanton-Salazar 2001).

235

236 Finally, the mathematics supervisors who provide mathematics professional learning  
237 opportunities for teachers should be well versed in the relevant mathematics content  
238 knowledge, knowledge of students and instructional strategies, and classroom issues  
239 that teachers face. Strong partnerships are encouraged between schools, districts and  
240 county offices of education, and mathematics education and mathematics faculty from  
241 nearby institutions of higher education. All have a stake in the mathematics instruction  
242 of California students, and all have something to offer to professional learning programs  
243 for teachers.

244

## 245 **Forms of Mathematics Professional Learning Programs for Teachers**

246 The forms of mathematics professional learning programs for teachers vary, but there  
247 are some common characteristics of effective professional learning programs that  
248 should be attended to when designing such programs. Professional learning programs  
249 for teachers should include mathematics content instruction for teachers as well as  
250 effective and appropriate pedagogical strategies for the classroom. Professional  
251 learning programs for teachers should be sustained, with a focus on long-term goals. A  
252 one-shot, single-day workshop is unlikely to have a lasting effect on classroom  
253 instruction without consistent and long-term follow-up and support. Both research and  
254 the collective experience of thousands of teachers, administrators and teacher  
255 educators in California confirm this (Darling-Hammond, and others 2009; Blank and de  
256 las Alas 2009).

257

258 Below are some of the common models of lasting, supportive professional learning  
259 programs:

- 260 • *Summer intensive workshops or university courses for teachers.* One- or two-week  
261 summer professional learning institutes allow teachers to focus solely on the  
262 development of their content knowledge and knowledge of instructional strategies.  
263 Various types of multimedia resources allow teachers to examine mathematics  
264 teaching in a collaborative environment and develop plans for implementation during  
265 the school year. However, summer workshops are most effective when paired with  
266 follow-up programs.



- 267 • *Teacher collaboration (coaching, math circles, professional learning communities).*  
268 Site-based professional learning engages teachers in real time study of their  
269 practice. A lone teacher has a difficult road ahead if he or she wishes to implement  
270 new strategies in his or her classroom without the support and understanding of  
271 colleagues. Teacher collaboration has been a feature of successful professional  
272 learning programs that serves to help teachers make larger-scale changes in  
273 mathematics instruction at their schools. Such efforts will be needed with the  
274 implementation of the CA CCSSM.
- 275 • *Lesson Study.* The challenges to collaboration include a tradition of autonomy in  
276 classrooms, time and scheduling constraints, lack of supportive leadership, and  
277 pressure for individual accountability. One innovative way that provides a structure  
278 for teacher collaboration is the *Lesson Study Model*. Lesson study, adapted from  
279 Japan, is a form of long-term professional development in which teams of teachers  
280 collaboratively plan, observe, analyze, and refine actual classroom lessons. Each  
281 lesson study cycle consists of three phases: planning a lesson, observing student  
282 reactions to the lesson, and then analyzing those reactions. Because the focus is on  
283 the effectiveness of a lesson itself and what students learn, rather than on an  
284 individual teacher's performance, the method helps reduce the anxiety and  
285 resistance to being observed that some teachers feel. To watch a full lesson study  
286 cycle, visit <http://www.devstu.org/lesson-study>.
- 287 • *Fostering of Teacher Leadership.* Teachers can be encouraged to utilize their  
288 expertise in formal or informal leadership roles. Teachers who attend workshops or

289 conferences should be given the opportunity to share what they have learned with  
290 peer teachers. A teacher who shows commitment to professional learning can  
291 become a mathematics coach or start a lesson study group at his/her school.  
292 Teachers may participate on a textbook committee, take a role in designing  
293 benchmark assessments, or be part of the school or district academic planning  
294 team. Many teachers are unaware of the leadership roles they can play in their  
295 school or district unless they are encouraged to take on such roles.

296  
297 A final feature of effective mathematics professional learning is school-wide  
298 administrative support. Teachers face many pressures in the classroom that may make  
299 them less willing to take risks when it comes to implementing new instructional  
300 techniques or using new materials. If principals and other administrators support  
301 teacher efforts to improve their instructional practices, then such changes are more  
302 likely to be integrated into classroom practice.

303

#### 304 **Induction and Support for New Teachers**

305 Induction and support for new teachers should be given special attention in California  
306 schools. As of the writing of this document, the research of Ingersoll and others  
307 indicates that the recruitment and retention of mathematics teachers is of crucial  
308 importance nationwide. Data show that large numbers of teachers report dissatisfaction  
309 with their jobs due to feelings of isolation, a lack of school-wide support and  
310 collaboration, and a lack of effective professional learning. Research indicates that this

311 situation can be alleviated to a large degree by the implementation of effective support  
312 programs specifically tailored to new teachers (Ingersoll 2010). Features of such  
313 programs are similar to those described above, but also include:

- 314 • Mentoring by knowledgeable, effective, reflective, and experienced teachers in  
315 the same grade level and content area as the novice teachers.
- 316 • Content knowledge development to draw connections between the university  
317 mathematics courses that novice teachers just completed and the mathematics  
318 they are now required to teach.
- 319 • Classroom strategies specifically tailored to classroom management issues and  
320 difficulties with engaging students in the Standards for Mathematical Practice.

321

## 322 **Evaluation of Instruction**

323 As described in “Greatness by Design,” successful evaluation systems for teachers  
324 should provide useful feedback over time while also identifying those who are  
325 struggling, and providing intensive assistance and removing those who do not improve.  
326 The report recommends that evaluation systems should (Greatness by Design 2012,  
327 17):

- 328 • *Be Based on the California Standards for the Teaching Profession* and used to  
329 assess educator’s practices, from pre-service preparation to induction and  
330 throughout the remainder of the career;
- 331 • *Tie evaluation to useful feedback and to professional learning opportunities* that  
332 are relevant to educator’s goals and needs;

- 333 • *Assess the Extent to which Instruction aligns with the CA CCSSM*, including  
334 focus on both mathematics content and the Standards for Mathematical Practice;
- 335 • *Combine data from a variety of sources*, including valid measures of educator  
336 practice, student learning, and professional contributions, which are examined in  
337 relation to one another;
- 338 • *Include both formative and summative assessments*, providing information to  
339 both improve practice and to support personnel decisions;
- 340 • *Differentiate support* based on educator’s level of experience and individual  
341 needs;
- 342 • *Build on successful Peer Assistance and Review models* for educators who need  
343 assistance, to ensure intensive, expert support and well-grounded personnel  
344 decisions;
- 345 • *Value and promote collaboration*, which supports whole school improvement; and
- 346 • *Be a priority within the district*, with dedicated time, training and support provided  
347 to evaluators and those who mentor educators needing assistance.

348

### 349 **Expanded Learning Time**

350 The *Common Core State Standards System Implementation Plan for California*  
351 developed by the California Department of Education (CDE) recommends that districts  
352 “integrate the CCSS into programs and activities beyond the K-12 school setting” and  
353 suggests “professional development to district administrators, school principals, and  
354 after school program directors on how to collaborate to incorporate into after

355 school/extended day programs activities that enrich and extend the CCSS-related  
356 learning initiated during the regular day.”<sup>1</sup>

357

358 *What is Expanded Learning Time?*

359 Expanded learning time is an approach to enhance and integrate active learning  
360 experiences beyond the traditional school day – through after-school, before school,  
361 summer, and extended day, week or year – to reduce the achievement gap and  
362 improve student success.<sup>2</sup> These strategies utilize time outside of the classroom as a  
363 unique opportunity to address the academic, social, emotional, and physical needs and  
364 interests of students through individualized and engaging learning that results in  
365 improved student achievement. Programs should be high-quality, include community  
366 partners, be results-driven, and flexible to student and community needs.

367

368 According to a report by The Forum for Youth Investment (Devaney and Yohalem  
369 2012), specific opportunities for the traditional education and expanded learning  
370 partners to collaborate effectively on common core implementation could include:

- 371     • Increased alignment and communication between the school and after school  
372         staff about learning supports and opportunities.

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<sup>1</sup> The terms extended learning programs and expanded learning programs are used interchangeably and broadly refer to the learning times and experiences outside of the regular school day and year, e.g., before school, after school, intersessions, and summer. CDE has chosen to use the term “expanded learning time.”

<sup>2</sup> This is the working definition of expanded learning time as of December 2012 and adopted by the California Department of Education After School Division. This definition was developed in collaboration with *The Partnership of Children and Youth*.

- 373 • Increased alignment around skills and knowledge emphasized in the common  
374 core, rather than content standards.
- 375 • Awareness-raising and knowledge-sharing between school and after school staff.
- 376 • Increased joint training, professional development, and planning time.
- 377 • Supporting communication strategies on the role and implementation of common  
378 core with parents and community partners.

379 The underlying principles as outlined in the definition of expanded learning time  
380 referenced above explicitly reinforce and complement key aspects of Standards for  
381 Mathematical Practice such as making learning relevant, project-based, and engaging.

382

383 As supported by the bullets above, as a first step school staff and administrators could  
384 invite expanded learning providers to specific school and community meetings and  
385 trainings, and then develop plans for more intentional alignment. This may also include  
386 sharing resources and materials on common core implementation and the CA CCSSM.

387 Additional resources and partners for schools and school staff include a range of  
388 expanded learning technical assistance providers, such as county offices of education  
389 and contracted entities that can facilitate local partnerships and share best practice  
390 programming around common core implementation. Given the demands of common  
391 core implementation, it is opportune to better understand and test out intersections in  
392 programming and skill development between the traditional school day and their  
393 expanded learning partners.

394

395 **College, University and Professional Support**

396 The support of college and university personnel for high-quality mathematics instruction  
397 is also crucial. Personnel from institutions of higher education support K–12  
398 mathematics education by joining in partnership with their local schools. By becoming  
399 more involved with these other institutions of learning, college and university personnel  
400 become more aware of the research that needs to be done in the school settings.  
401 Armed with research conducted in their profession, college and university personnel can  
402 be strong advocates of high-quality mathematics instructional practices.

403  
404 Teachers who are well prepared to teach mathematics are vital to the success of  
405 mathematics education in California. The adoption of new mathematics content  
406 standards and the forthcoming changes in assessment require many teachers to gain  
407 new knowledge and alter classroom practices. Even experienced teachers need support  
408 in learning and instituting new curriculum and instructional strategies, and new teachers  
409 and teacher candidates need even greater support in learning to teach mathematics as  
410 they acquire the fundamentals of teaching. Colleges and university personnel can  
411 provide support for those teachers through school visits and through the learning  
412 opportunities offered by higher education.

413  
414 In addition, the introduction of new mathematics standards means that the curriculum of  
415 college teacher-preparation courses that address mathematics must change to reflect  
416 new content and the Standards for Mathematical Practice. Developers of teacher

417 preparation programs must take the initiative to create programs that ensure knowledge  
418 of the CA CCSSM through appropriate coursework and pedagogical preparation to  
419 teach higher-order thinking and performance skills for students, in addition to culturally  
420 and linguistically responsive pedagogy (Greatness by Design 2012, 29). Teacher  
421 credentialing programs should include a focus on implementing the CA CCSSM.

422

423 Local county offices of education are linked with the California Department of Education  
424 and can provide resources for the implementation of the CA CCSSM and professional  
425 learning for instruction. County offices of education have access to the latest CA  
426 CCSSM resources and can provide support for administrators in understanding the CA  
427 CCSSM and opportunities for collaboration among schools.

428

429 Finally, local, statewide, or national professional organizations, such as the California  
430 Mathematics Project (<http://csmp.ucop.edu/cmp>), which has numerous regional sites,  
431 the California Mathematics Council (CMC), local affiliates of CMC, the National Council  
432 of Teachers of Mathematics (NCTM), and the National Council of Supervisors of  
433 Mathematics (NCSM) can all play a role in the support of schools, administrators and  
434 teachers in transitioning to the CA CCSSM.

435

### 436 **Community and Parent Support**

437 Although the school is the primary learning environment for formal mathematics, the  
438 home and community also play significant roles. Only through the cooperation of the



439 school, the home, and the community can students become fully prepared for a lifelong  
440 appreciation of mathematics. Mathematics can have a place outside of the classroom,  
441 in mathematics clubs, through local and national mathematics competition teams, and  
442 through school mathematics activities that promote parent and family involvement (e.g.  
443 “Family Math Night”).

444  
445 Schools and districts can create formal and informal partnerships with a variety of public  
446 and private organizations, agencies, and businesses to seek support and participation  
447 in the mathematical education of California’s children. Many private companies and  
448 organizations have education departments that seek opportunities to work with  
449 youngsters. Schools are encouraged to (1) use community resources to provide the  
450 additional adult support and instructional materials that students need to meet their  
451 mathematics education requirements and (2) start to develop students’ ideas about the  
452 workforce, careers, and their relationships to their communities with regards to  
453 mathematics.

454  
455 Parental involvement in the mathematics education of their children can take many  
456 different forms. Some parents may show their support by voicing to their children  
457 consistent respect for the value of education in general and mathematics specifically.  
458 Parents help their children with homework or projects and take an active approach in  
459 their learning when they can. They mirror the appreciation for reasoning and learning  
460 mathematics they wish to see in their children. Parents may volunteer in the classroom

461 or serve in an advisory capacity on an appropriate committee. They may attend  
462 mathematics nights and workshops that are sponsored by the school or district.  
463 Regardless of how parents or family members support education, they are always made  
464 to feel welcome at their children’s schools and know that their contributions are valued  
465 and appreciated.

466  
467 Parents and families need to be advised of school district goals and plans for  
468 mathematics education programs. They are informed about the CA CCSSM and the  
469 grade- or course-level expectations for their children and how to support their children’s  
470 achievement of the standards, including their children’s understanding of the Standards  
471 for Mathematical Practice. In particular, parents are informed as to how the adoption of  
472 the CA CCSSM represents a change in mathematics instruction to one that is focused  
473 on students actively participating in the reasoning and discovery involved in learning  
474 mathematics. A community effort will be needed to propel California schools forward as  
475 they transition to the CA CCSSM.

476