

# Mathematics Instructional Added Authorization and Mathematics Instructional Leadership Specialist Credential Preconditions and Program Standards

**Commission on Teacher Credentialing**

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[Commission on Teacher Credentialing Program Standards](https://www.ctc.ca.gov/educator-prep/stds-prep-program)

**Adopted September 2010, updated March 2011:**

**Mathematics Instructional Added Authorization Preconditions**

**Mathematics Instructional Leadership Specialist Credential Preconditions**

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## Mathematics Instructional Added Authorization Preconditions

1. A program sponsor that operates a program for the Mathematics Instructional Added Authorization shall determine, prior to admission to the credential program, that each candidate possesses a valid California teaching credential requiring a bachelor’s degree and a professional preparation program, including student teaching or a clear, full-time designated subjects teaching credential, provided that the holder also possesses a bachelor’s degree and has met the basic skills requirement, or its equivalent. The prerequisite credential must include an authorization to teach English learners.
2. A Commission-approved program shall determine prior to recommending a candidate for the Mathematics Instructional Added Authorization Program, that the candidate has three years of teaching experience.
3. Prior to admission, the program sponsor shall verify the candidate’s level of mathematics content expertise. Full admission to the K through Pre-Algebra or the K through Algebra I program is contingent on candidate mastery of the relevant mathematics standards as determined by the program

## Mathematics Instructional Leadership Specialist Precondition

1. A Commission-approved program shall determine prior to recommending a candidate for the MIL Specialist credential that the candidate has completed a Mathematics Instructional Added Authorization program.

##  Mathematics Instructional Added Authorization Program Standards

### Standard 1: Program Design

The preparation program and any prerequisites include a purposeful, interrelated, and developmentally-designed sequence of coursework and field experiences. The design of the program follows an explicit statement of program philosophy and purpose based on a sound rationale informed by theory, research, and practice. It effectively coordinates and articulates expertise in integrating and applying K-Pre-Algebra and/or K-Algebra I content knowledge, specialized mathematical knowledge for teaching and thinking, and pedagogical knowledge and practices for teaching mathematics.

The sponsoring institution demonstrates a commitment to candidate preparation by providing appropriate support for the program. The program has a qualified leadership team with expertise in mathematics content, mathematics education, teacher education, and teacher leadership.

The program provides extensive opportunities for candidates to demonstrate mathematical and pedagogical content knowledge and skills to support effective mathematics instruction and student learning. Coursework and fieldwork address the complex interplay of math content and pedagogy in effective teaching. Candidates are prepared to enhance mathematical development for all students including English learners, students with disabilities, students who are gifted and talented, and students at risk.Candidates are prepared to collaborate and co-teach with other math teachers as well as teachers of other subject matter disciplines. The program includes a planned process of comprehensive assessments ensuring that candidates are prepared to teach K through Pre-Algebra or K through Algebra I. In addition, its design ensures that candidates are equipped to understand the challenges of developing mathematics literacy among California’s diverse student and teaching population.

[[1]](#footnote-1)These three mutually supportive domains are defined by the following seven elements and organized into two standards, which provide structure for the program design:

| **Mathematical Content Knowledge** | **Specialized Mathematical Knowledge for Teaching and Thinking** | **Pedagogical Knowledge and Practices for Teaching Mathematics** |
| --- | --- | --- |
| Admission to the program is contingent on candidate mastery of mathematics as determined by the program based on the math content outlined in the preconditions. | 1. Students’ mathematical thinking
2. Mathematical representation
3. Mathematical language
 | 1. Mathematics curriculum
2. Instructional planning
3. Classroom discourse
4. Assessment
 |

### Standard 2: Specialized Mathematics Knowledgefor Teaching and Thinking

The program provides opportunities for candidates to develop Mathematical Knowledge for Teaching and understand mathematics content, consistent with the candidate’s level of certification. The program provides opportunities for candidates to develop advanced competency to:

1. Plan and implement instruction that includes differentiation, accommodations, and interventions and is based on students’ mathematical thinking by:
	1. Using error analysis processes to review and understand students’ misconceptions and to distinguish whether a specific error reflects a misunderstanding of the mathematical process or a need for language development in the area of mathematical concepts
	2. Understanding the order of presentation of mathematical concepts that lead to student proficiency in mathematics
	3. Analyzing the learning trajectories of individual students
	4. Explaining standard and alternative algorithms and solution strategies
2. Use a variety of appropriate methods of mathematical representation, including technology, oral language, written symbols, pictures, concrete materials/models, real-world situations, while also:
	1. Identifying and understanding strengths and limitations of various representations of mathematical concepts
	2. Linking representations to underlying mathematical theories and to other representations.
3. Use and understand the correct usage of mathematical language by:
	1. Analyzing mathematical vocabulary in the context of mathematical concepts when listening and responding to students’ questions and comments
	2. Evaluating their own and colleagues’ presentation of mathematical definitions and terms, as well as considering students’ culture, language, and cognitive needs when using academic language to scaffold instruction

### Standard 3: Pedagogical Knowledge and Practices for Teaching Mathematics

The program provides candidates with opportunities to develop advanced practices in the use of students’ mathematical thinking, mathematical representation, mathematical language, mathematics curriculum, instructional planning, classroom discourse, and assessment. The program will provide opportunities for candidates to develop advanced skills in evaluating, planning, and implementing appropriate interventions to increase student achievement.

The program will provide opportunities for candidates to develop the type of pedagogical expertise needed to modify curriculum to address the specific needs of diverse groups of students, including but not limited to struggling students, English language learners, gifted and talented students, and students with special needs.

Candidates must be able to demonstrate advanced competency to:

1. Plan and implement mathematics instruction in developmentally and culturally responsive ways to meet specific student needs, including the ability to
2. Analyze and adapt resources, technologies, and standards-aligned instructional materials, including adopted materials, for targeted audiences based on students’ cultural, linguistic, and cognitive development
3. Identify and connect concepts that are fundamental to learning mathematics, such as place value, fractions, real numbers and algebra

2. Plan instruction that supports students’ learning of mathematics by:

1. Selecting and developing student learning tasks that enable teachers to understand the conjectures and generalizations that students make
2. Aligning instructional goals, assessments, instructional strategies, and practice (e.g., assignments, homework) using SDAIE strategies as appropriate
3. Designing and implementing flexible grouping strategies (homogeneous, semi-homogeneous, heterogeneous, large group, small group, and individual learning) according to students’ needs and level of achievement
4. Focusing on the mathematics content standards and the key concepts within the standards
5. Collaborating with individual teachers (pre-service, novice, and experienced) through co-planning and co-teaching to improve student learning

3. Develop strategies for classroom discourse by being able to:

1. Facilitate student to student interaction
2. Analyze questioning strategies to lead discussions that actively involve all students
3. Select culturally appropriate examples and reframe problems to encourage students’ deep understanding within a mathematical context
4. Advance and cultivate positive attitudes toward mathematics; encouraging curiosity, flexibility, and persistence in solving mathematical problems

4. Use assessments for:

1. Identifying gaps in students’ knowledge and for designing instruction to bridge the gaps, language assessments for identifying gaps in understanding mathematics terms, summative assessments and standardized assessments for measuring student growth
2. Guiding instruction and developing curriculum that is targeted, accommodated, and differentiated for intensive intervention as necessary
3. Communicating progress to students, parents, colleagues, and other appropriate service providers
4. Deriving demographic, process, and outcome data at the student, school, and district levels to support informed decisions in designing targeted instruction that promotes students equitable access to learn high-level mathematics

### Standard 4: Field Experiences

Programs facilitate individualized and balanced field experiences that provide candidates with timely and ongoing feedback to guide improvements in practice as described in Category B. These field experiences are integrated into coursework and are aligned with the candidate competence standard.

The guided field experiences extend candidates’ understandings of the three domains and their elements. The candidate is provided substantive opportunities to observe and practice each of the proficiencies described in Category B. The fieldwork component will include the following grade spans: Kindergarten through Grade 3 and Grade 4 through Grade 7 for the candidates that are prepared to teach K through Pre-Algebra. In addition, candidates prepared to teach K through Algebra I also have field experience in Algebra 1. The program collaborates with local educational agencies in providing guidance, site-based support, and coordination of field experiences to ensure the candidate has successful experiences working with English learners, students with disabilities, students who are gifted and talented, and students at risk.

### Standard 5: Determination of Candidate Competence

Program sponsors use multiple measures to determine that each candidate has demonstrated competence across the proficiencies described in Category B, including advanced level culminating projects to demonstrate professional competency. Program options for advanced level culminating projects to demonstrate professional competency may include, but are not limited to, professional presentations, action research, designing curriculum, and school, district, or county collaborative projects.

## Mathematics Instructional Leadership (MIL) Specialist Program Standards

### Standard 1: Program Design

The preparation programs and their prerequisites include a purposeful, interrelated, developmentally designed sequence of coursework and field experiences. Programs provide integrated coursework and fieldwork through a model that enables each candidate to demonstrate proficiency as a MIL Specialist. The program includes a planned process for the comprehensive assessment of candidates in the following areas:

1. Understand practitioner research and encourage teachers to use it in their practice
2. Design and implement professional development that engages teachers, administrators, and parents while promoting student engagement and achievement in mathematics
3. Analyze and use data to design solutions to the challenges of developing mathematical literacy among California’s diverse population
4. Lead a professional community of practitioners to promote student engagement and achievement in mathematics and minimize the achievement gap

### Standard 2: Leadership Knowledge and Skills for the Mathematics Instructional Leader:

The candidate will facilitate the use of a variety of appropriate content-based learning materials and learning strategies that recognize students as active learners, understand the importance of reflection and inquiry, emphasize the quality of student application and performance, utilize appropriate and effective technology, and accelerate mathematics achievement for all students, including English Learners, students with special needs, gifted and talented students, and students at risk. Candidates will guide and support the long-term professional development of staff, consistent with the ongoing effort to improve the learning of all students, relative to the content standards, and provide opportunities for all members of the school community to develop and use skills in distributed leadership and shared responsibility. The candidates will utilize multiple assessments, including assessments that are sensitive to the learning needs of special populations in terms of language, culture, and language, processing and cognitive difficulties, to evaluate student learning in an ongoing process focused on improving the academic performance of each student.

Specifically, the program prepares candidates to demonstrate expertise in the following four areas: research-supported mathematics teaching, learning and coaching, professional development and learning, using data to inform student instruction and professional development, and developing professional learning communities.

### Standard 3: Fieldwork Integrated with Coursework for Mathematics Instructional Leadership:

Candidates are provided extensive opportunities to observe, acquire, and use appropriate pedagogical content knowledge for teaching, coaching, and mentoring, and to acquire skills to design and implement innovative processes that are research supported, including uses of technology. Programs provide candidates with timely and on-going feedback to guide improvement in practice through action research connected to instruction, program design, assessment, and leadership. These field experiences are embedded in coursework and aligned with the program assessment standards. The program provides opportunities for candidates to collaborate with local educational agencies in providing guidance, site-based support, and supervision of field experiences.

Programs facilitate individualized and balanced field experiences that provide candidates with timely and ongoing feedback to guide improvements in practice as described in Category B. These field experiences are integrated into coursework and are aligned with the candidate competence standard. Candidates will support opportunities for all members of the school community to develop and use skills in collaboration, distributed leadership, and shared responsibility in ways that are sensitive to students’ families’ cultures.

MIL Specialist credential candidates must also demonstrate the capacity to analyze the effectiveness of their own practices in terms of the direct impact of their practices on the people with whom they work (e.g., students, teachers, parents, administrators, and community members), in part, by minimizing the achievement gap, and the real or potential impact of their practices on research of students and student learning of mathematics.

### Standard 4: Determination of Candidate Professional Competence for the Mathematics Instructional Leader:

Program sponsors may provide any combination of advanced level culminating projects through which candidates demonstrate professional expertise and competency that reflect the candidates’ capacity to tailor assessment, instruction, and professional support to the needs of all students, including the special needs of students of different cultures, language levels, and with processing and cognitive difficulties. Candidates will collect field-based evidence throughout the program to demonstrate competence in the four areas of leadership practice at various grade spans (Kindergarten-3, 4-7, Algebra I, Geometry, Algebra II, and Advanced Mathematical study). The evidence should be integrated and demonstrate a professional level of proficiency.

1. All “students” refers to, but is not limited to, struggling students, English learners, gifted and talented students, and students with special needs. Program Sponsors will need to address all levels whenever the word “students” is used in this document*.* [↑](#footnote-ref-1)