



Examining Students' Access to High-Quality Mathematics Education: Well-Prepared Teachers

District Self-Assessment and Reflection Tool



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This district self-assessment tool has two main sections. It starts by summarizing research on how teachers' qualifications affect students' opportunities to learn mathematics, along with key findings from the 2018 NSSME+ about the current teaching workforce and students' access to well-prepared teachers. The second section consists of a set of related questions for district leaders to consider when examining (1) the qualifications of their mathematics teaching force and how teachers are distributed across grade levels, schools, and student groups; and (2) the nature of locally offered mathematics professional development opportunities and the extent to which those opportunities are equally accessible to K–12 teachers. The questions also inform potential improvements to systems support teachers' preparedness.

Well-Prepared Teachers: Why Do They Make a Difference?

Of all the factors that affect students' mathematics education experience and their opportunity to learn, teachers are among the most important. For years, studies have shown that teachers' qualifications such as their years of experience, mathematics content knowledge, and pedagogical content knowledge are linked to the quality of mathematics instruction and student achievement (e.g., Darling-Hammond, 2000; Hill, Rowan, & Ball, 2005; Rockoff, 2004). Further, more recent research indicates that professional development centered around curriculum materials focused on deepening teachers' mathematics and pedagogical content knowledge can lead to improved student outcomes (Franklin & Chang, 2025; Lynch et al., 2025). Well-prepared mathematics teachers draw on deeper mathematical knowledge and more robust instructional practices, which directly shape students' mathematical experiences. However, research also indicates that the unequal distribution of well-prepared teachers has led to disparities in learning opportunities for different groups of students (e.g., Malzahn et al., 2020; Oakes et al., 1990, Schmidt et al., 2021).

2018 NSSME+ Findings: What Do We Know?

The 2018 NSSME+ collected data on a number of indicators of teacher preparedness, such as their years of teaching experience and content preparation. It also collected information on professional development (PD) opportunities offered locally, including workshops, teacher study groups, and formal induction programs that provide critical support and guidance to strengthen teacher preparation. Findings from this study provide important information about the status of the mathematics teaching force and the extent to which all students across the nation have access to well-prepared teachers. For example, in 2018:

- Many K–12 mathematics teachers lacked the breadth and extent of formal preparation recommended by NCTM.¹ However, in general, they perceived themselves as being prepared regarding the mathematics content they taught.
- Mathematics classes with the highest percentage of students from groups historically underrepresented in STEM (high-HUS classes) were more likely to be taught by less experienced teachers or those without a degree in mathematics or mathematics education.
- Over 80 percent of K–12 mathematics teachers had participated in mathematics-focused PD in the preceding three years. However, the amount of PD varied, with more secondary teachers having received 36 hours or more of mathematics-focused PD than their elementary counterparts.
- About half or more of the nation’s schools offered mathematics-focused PD workshops and teacher study groups, yet these professional learning opportunities were more likely to occur in urban schools than suburban and rural schools.
- A majority of schools offered PD workshops that emphasized topics important for strengthening teacher preparation such as deepening teachers’ understanding of mathematics concepts, how mathematics is done (e.g., considering how to approach a problem, explaining and justifying solutions), and how students think about various mathematical ideas.
- The nation’s schools use a variety of methods to provide mathematics-focused PD to their teachers. It was relatively common to use teacher workdays during the school year for mathematics-focused PD. However, it was more common for elementary and middle schools to provide common planning time for PD than high schools.
- Less than half of the nation’s schools offered one-on-one mathematics coaching. Still, coaching was more likely to be offered in suburban and urban schools than in rural schools and in high-poverty schools compared to low-poverty schools (measured by the percentage of students eligible for free/reduced price lunch).
- A majority of the nation’s schools had formal induction programs for beginning teachers, typically lasting 1–2 years—shorter than the recommended three years of support associated with increase teacher retention and student learning gains.
- Many of the schools’ formal induction programs included a number of supports important for a program’s success (e.g., formally assigned school-based mentors, content-specific PD opportunities, common planning time with experienced colleagues). However, suburban and rural schools were more likely than their urban counterparts to have formally assigned school-based mentors as part of their program.

¹ National Council of Teachers of Mathematics. (2012). *NCTM CAEP mathematics content for elementary mathematics specialist*. Reston, VA: Author.

National Council of Teachers of Mathematics. (2012). *NCTM CAEP mathematics content for middle grades*. Reston, VA: Author.

National Council of Teachers of Mathematics. (2012). *NCTM CAEP mathematics content for secondary*. Reston, VA: Author.

District Self-Assessment and Reflection Questions

The following questions are intended to help districts reflect on how they work toward ensuring all students have access to well-prepared mathematics teachers.

Part I: Teachers Assignment to Schools and Classes

1. Gather data on the levels of teaching experience such as years of teaching experience, years of teaching mathematics) for the district's K–12 mathematics teachers. Organize this information separately by grade band and school. At the high school level, list the type of courses taught by each teacher, noting entry level vs. advanced courses.
 - a. How does teacher experience compare between schools with different demographics (high- and low-poverty) and across types of courses (e.g., entry level vs. advanced)?
2. Gather data on the types of degrees, certifications, and credentials for the district's K–12 mathematics teachers. Categorize the teachers based on this information. For example:

Qualified Teacher: A teacher who holds a standard or professional teaching license aligned for their assigned grade band and has a solid background in mathematics, such as a degree in mathematics, mathematics education, or substantial mathematics coursework.

Out-of-Field Teacher: An elementary teacher with limited coursework in mathematics or a secondary teacher assigned to teach mathematics who is licensed as an educator, but not certified in mathematics for the grade level or course they teach (e.g., teachers certified in another subject or grade range).

Provisionally Credentialed or Emergency-Status Teacher: A teacher currently teaching mathematics under a temporary, provisional, or emergency credential.

- a. Using your categorization of teachers, to what extent and how are teachers with varying qualifications distributed across school characteristics and course levels?
3. What could your district do to level the playing field so that newer and less qualified teachers are not concentrated in certain schools or classes?

Part II: Supporting Mathematics Teachers

4. Consider the district's current system and processes for supporting teachers' professional learning. What professional learning opportunities does the district provide focused supporting and strengthening K–12 mathematics teachers' instruction (such as deepening their mathematics content knowledge, learning about difficulties students may have with particular mathematical ideas and procedures, differentiating mathematics instruction to meet

the needs of all learners)? (Consider opportunities such as workshops, teacher study groups, professional learning communities, and one-on-one coaching.)

- a. Do teachers have on-going, regular opportunities to learn about and reflect on their mathematics teaching? Are these opportunities available at all grade levels?
5. Although teachers can benefit from participating in professional development, it is often difficult to find time for them to do so. Which of the following supports are used to provide teachers in the district with time for professional development opportunities focused on mathematics and/or mathematics teaching? If minimal support is offered, what more could the district do to better support teachers' time for professional development?

☐	a. Early dismissal and/or late start for students
☐	b. Professional days/teacher work days during the students' school year
☐	c. Professional days/teacher work days before and/or after the students' school year
☐	d. Common planning time for teachers
☐	e. Substitute teachers to cover teachers' classes while they attend professional development
☐	f. None of the above

6. Does your district have an induction program for beginning teachers? If so, which of the following characteristics of high-quality inductions are included in it? How could the district improve its induction program to better support beginning teachers of mathematics?

☐	a. Release time to attend national, state, or local teacher conferences
☐	b. Financial support to attend national, state, or local teacher conferences
☐	c. Common planning time with experienced teachers who teach the same subject or grade level
☐	d. Release time to observe other teachers in their grade/subject area
☐	e. Formally assigned school-based mentor teachers
☐	f. District/diocese-based or university-based mentors
☐	g. Reduced course load
☐	h. Reduced class size
☐	i. Reduced number of teaching preps
☐	j. A meeting to orient them to school/district/diocese policies and practices
☐	k. Professional development opportunities on teaching their subject
☐	l. Professional development opportunities on providing instruction that meets the needs of students from the cultural backgrounds represented in your school
☐	m. Classroom aides/teaching assistants
☐	n. Supplemental funding for classroom supplies
☐	o. Support is provided for multiple years

7. Based on your review of teacher experience, qualifications, and access to professional learning opportunities and induction supports, what specific actions can the district take over the next 1–3 years to strengthen both the preparedness and equitable placement of its mathematics teachers? In your reflection, consider:
- a. How might the district **recruit, support, and retain well-prepared mathematics teachers**, particularly in schools or courses serving students with the greatest needs?
 - b. What **systemic adjustments** (e.g., hiring practices, course assignments, induction structures) could improve equitable access to experienced and well-qualified teachers?
 - c. How could professional learning offerings be **expanded, differentiated, or better aligned** to teachers' grade levels, content needs, and student populations?
 - d. What resources, partnerships, or policy changes would be necessary to implement these actions, and how progress will be **monitored and evaluated** over time?

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