

**REPORT OF THE TASK FORCE ON TEACHER
PREPARATION, CERTIFICATION, AND
SHORTAGE**

TO THE

**NATIONAL COUNCIL OF TEACHERS OF
MATHEMATICS
BOARD OF DIRECTORS**

FEBRUARY 2005

Task Force on Teacher Preparation, Certification, and Shortage Executive Summary

Members

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Charge

Make recommendations for Council action related to ensuring the adequacy (number and quality) of the mathematics teaching force, including teacher supply, certification regulations, and licensing standards. Specific areas for which the Board seeks input include:

- The nature and extent of shortage of qualified mathematics teachers.
- The Council's role in recruiting future teachers and raising public perception of mathematics teaching as a profession.
- The Council's role in the National Council for Accreditation of Teacher Education (NCATE) accreditation or in other national accreditation programs like the Teacher Education Accreditation Council (TEAC).
- The Council's role in offering advice on what might constitute necessary preparation for the "highly qualified teacher of mathematics," whether certified through alternative or traditional routes.
- The Council's role in supporting prospective teachers as they prepare to become teachers of mathematics.
- Actions the Board should consider regarding the impact on mathematics teachers of the federal No Child Left Behind mandate for every school to have a "highly qualified" teacher in every classroom by 2005–2006.
- Mechanisms for ensuring that the Council continually monitors and considers actions regarding teacher preparation, certification, and shortages.
- The Council's role in promotion of equity and diversity in the mathematics teacher workforce (refer to policy statements about recruitment and retention of minority teachers from the Wingspread Conference held September 23–24, 2003).

Preamble

For all students to learn mathematics well, they must have a highly skilled, committed, and professionally supported teacher of mathematics. Nationally there are simply not enough such teachers entering the profession or committing to long-term careers in the profession. A variety of actions from many individuals and organizations are needed to recruit, prepare, and retain sufficient numbers of teachers of mathematics. This report outlines actions for the National Council of Teachers of Mathematics (NCTM) Board of Directors to consider.

NCTM has always had as its goal that every mathematics classroom would have a quality teacher. Teacher quality includes, but is not limited to, appropriate mathematical content knowledge; deep interest in mathematics; a commitment to lifelong professional improvement; the desire and skill to help students learn and apply mathematical knowledge; and the ability to use the resources necessary to teach effectively.

Key recommendations

The full report of the task force includes several recommendations for the NCTM Board. Included in these recommendations are key areas NCTM seems particularly well-suited to address.

Teachers Entering the Profession

1. NCTM should develop a Web source targeting the needs of preservice teachers of mathematics and introducing interested parties to the profession of teaching mathematics. Preservice teachers tend to make heavy use of Internet resources for gathering information.

The Council should:

- Support active recruitment from two-year colleges, tribal colleges, historically black and Hispanic serving institutions.
- Encourage two-year colleges and military college programs to offer Associate of Arts in Teaching degrees.
- Monitor programs, such as Transition-to-Teaching or Troops-to-Teachers (people from business, industry, and the military transitioning to mathematics education), to ensure quality mathematics teachers.
- Promote the value and worth of mathematics teaching through public awareness initiatives.
- Recommend incentives for mathematics teachers at the K–12 levels and consider white papers to support the incentives. (See additional detailed recommendations on p.9).

2. NCTM should develop guidelines for mentoring new teachers of mathematics. All experienced teachers of mathematics have a role to play in mentoring new teachers. There is a need for guidelines for all teachers who have the responsibility to assist the professional development of new teachers of mathematics. Differentiation in mentoring may be needed between those who enter the profession through traditional means and those who enter through alternative pathways.

The Council should support policies that:

- Emphasize that students who are the lowest achievers and the toughest to teach need the best math teachers.
- Keep new mathematics teachers from being assigned the most difficult classes to teach.

- Encourage the National Science Foundation to increase the opportunities for universities to offer mathematics content institutes for teachers at all levels.
- Emphasize the need for well-developed mentoring programs.
- Encourage local Affiliates to join forces with state departments of education to provide quality staff development opportunities for teachers.
- Encourage local Affiliates to partner with civic groups and organizations to recognize exemplary teachers.
- Utilize the expertise of retired teachers of mathematics at the local and state levels.
- Continue and expand sessions for beginning teachers at NCTM regional and annual meetings.

Teachers in the Profession

3. In efforts to retain quality mathematics teachers, NCTM should diversify its professional development opportunities for its members. In particular, the Council should develop online professional development structured using the *Professional Standards for Teaching Mathematics*, second edition, and other NCTM materials.
4. NCTM should encourage local Affiliates to partner with civic groups and organizations to recognize exemplary teachers.

Strengthening the profession

5. NCTM should provide a mechanism for monitoring actions regarding teacher preparation, certification, accreditation, and shortages to review and study the data in regard to policies at the state and federal levels that impact the interpretation of the “highly qualified” definition.

The Council should:

- Write an article outlining the standards developed by the National Council for Accreditation of Teacher Education (NCATE) Task Force that is submitted to the Association of State Boards of Education for publication in their newsletter or journal.
 - Write a similar article to be submitted to the National Association of State Directors of Teacher Education and Certification publications.
 - Send representation to meetings and conferences such as the National Center for Alternative Certification to gather information about preparing and retaining mathematics teachers.
 - Become a member of such organizations as the National Center for Alternative Certification which promote and support excellence in training for mathematics teachers.
6. The Council should establish a subcommittee to develop a Web source to advise, guide, and provide research for persons serving on state committees regarding

curriculum development/state frameworks, licensure standards for mathematics at all levels, and textbook adoption.

7. The Board should promote a research agenda that tracks the impact of alternative certification routes on the mathematics education profession, on student achievement, and on a comparison of various models of alternative certification.

The Council should:

- Support full teacher preparation and induction programs while acknowledging that the knowledge and skills necessary for a highly qualified teacher may be obtained through nontraditional routes.
- Encourage conversations between the colleges of education and departments of mathematics at institutions of higher education. A white paper should be developed to explain reasons it is important to balance content and pedagogy.
- Stay abreast of accreditation issues and be prepared to take a public stand when standards are being circumvented or new processes are being proposed, such as a national cutoff score on the Praxis II Assessment.

REPORT OF THE TASK FORCE ON MATHEMATICS TEACHER PREPARATION, CERTIFICATION, AND SHORTAGES

Preamble

For all students to learn mathematics well, they must have a highly skilled, committed, and professionally supported teacher of mathematics. Nationally there are simply not enough such teachers entering the profession or committing to long-term careers in the profession. A variety of actions from many individuals and organization are needed to recruit, prepare, and retain a sufficient number of teachers of mathematics. This report outlines actions for the NCTM Board to consider.

The National Council of Teacher of Mathematics has always had as its goal that every mathematics classroom would have a quality teacher. Teacher quality includes, but is not limited to, appropriate mathematical content knowledge; deep interest in mathematics; a commitment to lifelong professional improvement; the desire and skill to help students learn and apply mathematical knowledge; and the ability to use the resources necessary to teach effectively.

The Nature and Extent of Shortage of Qualified Mathematics Teachers

Nature

Shortages. The shortage of quality mathematics teachers is endemic to the P–12 teaching environment, primarily at the secondary level. The shortage and the quality of P–12 mathematics teachers are, in part, a function of a shortage of mathematics teacher educators in institutions of higher education. Future shortages are predicted by the low numbers of students majoring and minoring in mathematics. Only 41 percent of current mathematics teachers had mathematics as an area of study in college.¹

The Task Force on Women, Minorities, and the Handicapped in Science and Technology finds that women and minorities are seldom entering fields that require advanced mathematics and science degrees.² Yet, jobs requiring math and science skills are growing at nearly double the rates of all jobs. As a result, one of the fastest growing sectors of our economy is significantly underrepresented by women and minorities³:

- African Americans make up 12 percent of the population, yet they earn only 5 percent of the bachelor's degrees.
- Hispanics are 9 percent of the population, yet they hold only 3 percent of the bachelor's degrees.
- Native Americans make up 0.6 percent of the population, yet they hold only 0.3 percent of all bachelor's degrees.

The declining numbers of black and Hispanic students majoring in education is steeper than the overall decline in education majors.

Local, state and national mandates are overwhelming and contribute to the shortage of mathematics teachers. Shortages are further complicated by⁴:

- Early retirement incentives
- Classroom dynamics and management issues
- Nonexistent or inappropriate staff development
- Nonexistent or inappropriate mentoring
- Lack of administrative and collegial support
- Perception that teachers have no real input into decision making
- Placement of beginning teachers in the most challenging classrooms
- Burden of extracurricular assignments
- Constant changes in curricular, instructional, and assessment demands by national, state and local policymakers
- Inconsistency in salaries between districts, states, etc.
- Lack of understanding of the role culture and social issues play in the learning of mathematics
- Lack of licensure, service credit, and pension reciprocity between states and districts
- Late and cumbersome hiring practices

Distribution. Shortages are exacerbated by related issues such as geographic distribution and staffing policies. Least qualified teachers are often systematically sorted into schools and classrooms with the highest minority enrollments, largest low income enrollments, and the most academically disadvantaged students.⁵ Demographically some states or school districts contain few minorities locally available for its teacher pool.

Many districts still prefer to hire untrained teachers who cost less than qualified teachers with more education and experience. Teachers are viewed as an expense, not as an asset.

Some states and districts are experiencing shortfalls while others have surpluses. West Virginia has a surplus of teachers due to declining population. Urban and rural school districts face more difficulty recruiting than suburban districts.⁶ There is no current national policy to manage the labor force in teaching.⁷

Retention. Some researchers have shown retention to be a greater problem than recruitment. Frustrated educators, especially math and science professionals, working in school systems with few supports are drawn to the private sector where salaries are significantly higher and chances for career advancement and overall working conditions are better.⁸ A higher percentage of teachers who leave the profession every year do so because of job dissatisfaction rather than retirement (49 percent versus 27 percent). Four out of ten mathematics and science teachers leave the profession because of job dissatisfaction.⁹ The attrition rate for mathematics teachers is more than twice that of social science teachers.¹⁰ Minority teachers leave teaching at higher rates than white teachers.¹¹

Extent

The number of students to be taught mathematics is increasing. By 2020 the school age population of the United States will increase by 20 percent. In 2001–2002, more students were taking more mathematics. Over 50 percent of high school students were taking higher-level courses in mathematics and over 90 percent were taking a mathematics course at some level. Even as student numbers and course enrollments are increasing, the teacher force is aging. Nationally, 28 percent of mathematics teachers are age 50 or over. Retirements are increasing. Approximately one-third of the mathematics teaching force will retire in the next few years.¹²

According to the Statistics for Survival 40 of the 50 states reported mathematics teacher shortages.¹³

According to data from National Center for Educational Statistics, 69 percent of middle school students and 31 percent of high school students were taught mathematics by teachers without a major in mathematics and no certification.¹⁴

Only 60 percent of middle grade mathematics and science teachers were state-certified in their assigned subject in 2002, which was a slight increase in math and slight decline in science compared to rates in 1994.¹⁵

According to the 2000 National Assessment of Education Progress¹⁶ and the 1999 Trends in International Mathematics and Science Study (TIMSS) report¹⁷, between 22 percent and 31 percent of the nation's 8th-grade students were taught mathematics by teachers without a degree in mathematics or mathematics education.

Studies published in 2002 report that students enrolled in mathematics or science classes with high minority and high poverty are less likely to be taught by a teacher who is well prepared in the subject area. In the case of middle school mathematics, 72 percent of high-minority classes were taught by teachers with no major or minor in mathematics as compared with 55 percent of low-minority classes. In high schools, the pattern is maintained with a 33 percent to 23 percent differential between high- and low-minority mathematics classes.¹⁸

In low-poverty secondary schools 27 percent of mathematics teachers did not have a major or minor in the subject, while 43 percent of teachers in high-poverty schools did not have a mathematics major or minor.¹⁹

The Council's Role in Recruiting Future Teachers and Raising Public Perception of Mathematics Teaching as a Profession

Recruitment

Current mathematics teachers are the most powerful recruiters for future mathematics teachers. As Usiskin says we must “tout our profession.”²⁰ Recruitment of mathematics teachers should begin early—as early as middle school.

The Council should:

- Support active recruitment from two-year colleges, tribal colleges, historically black and Hispanic serving institutions.
- Encourage two-year colleges and military college programs to offer Associate of Arts in Teaching degrees.
- Monitor programs, such as Transition-to-Teaching or Troops-to-Teachers (people from business, industry and the military transitioning to mathematics education), to ensure quality mathematics teachers.
- Promote the value and worth of mathematics teaching through public awareness initiatives. Ideas to consider include:
 - Direct the Affiliate Services Committee to create a PowerPoint presentation for the recruitment of mathematics teachers, and make it available to Affiliates.
 - Develop Web site articles/notices such as the pamphlet “So You Want to Be a Math Teacher.”
 - Jointly campaign with other groups to promote mathematics teaching to the general public.
 - Include teacher recruitment materials in the Advocacy Toolkit.
 - Link with other educational groups promoting future teacher programs at middle and high school levels.
 - Link with Mathematical Association of America (MAA) to promote a positive attitude toward teaching to current majors in mathematics.
 - Design a visiting mathematics educator lecture program (MAA model).
 - Initiate a program for speakers participating at NCTM regional conferences to provide sessions for students at local middle and high schools.
 - Continue the practice initiated in *Dialogues* of including in each journal snapshots of teachers highlighting the positive aspects of teaching and intrinsic and extrinsic benefits of the profession.
- Recommend incentives for mathematics teachers at the K–12 levels.²¹

Consider white papers on the following:

 - Differentiated pay for mathematics teachers
 - Differentiated staffing including job sharing, part time, etc.

- Induction programs with opportunities to earn master’s degree or CEU credits in cooperation with higher education institutions for a minimum of 2 years
- Re-entry programs for certificated teachers who are not teaching
- Mentoring programs for a minimum of 2 years
 - For those with traditional certification
 - For those with alternative certification
- Subsidized housing
- Low-cost/no-cost loans
- Sabbaticals or other restorative leave programs
- Cooperative program between business and teachers of mathematics in a teachers-teaching-teachers program
- Encourage the continuation and expansion of federal tax credit for purchase of classroom materials, and expand this to state and local income tax relief.
- Encourage the development of more loan forgiveness programs for teachers.

Retention

Research shows that retention is as important as recruitment. “Our inability to support high-quality teaching in many of our schools is driven not by too few teachers coming in but by too many going out.”²² Therefore the Council should support policies that:

- Emphasize that students who are the lowest achievers and the toughest to teach need the best math teachers.
- Keep new mathematics teachers from being assigned the most difficult classes to teach.
- Encourage the National Science Foundation to increase the opportunities for universities to offer mathematics content institutes for teachers at all levels.
- Emphasize the need for well-developed mentoring programs.
- Encourage local Affiliates to join forces with state departments of education to provide quality staff development opportunities for teachers.
- Encourage local Affiliates to partner with civic groups and organizations to recognize exemplary teachers.
- Utilize the expertise of retired teachers of mathematics at the local and state levels.
- Continue and expand the sessions for beginning teachers at regional and annual conferences.

The Council should develop a guide for mentoring mathematics teachers. All experienced teachers of mathematics have a role to play in mentoring new teachers. There is a need for guidelines for all teachers who have the responsibility to assist the professional development of new teachers of mathematics. Differentiation in mentoring may be needed between those who enter the profession through traditional means and those who enter through alternative pathways.

In efforts to retain quality mathematics teachers, NCTM should continue to provide a variety of professional development opportunities. The Council should develop online

professional development structured using the *Professional Standards for Teaching Mathematics*, second edition and other NCTM materials.

The Council's Role in Accreditation of Teacher Preparation Programs

The role of accreditation is to ensure quality in the preparation of teachers. The most important role for NCTM is in the definition of the mathematics content and the pedagogical requirements for teacher preparation.

Beyond the content requirements, the accreditation standards must include knowledge of and field experiences that bring the reality of the classroom to the teacher candidate. Our future teachers must be aware of the diversity of the students now in classrooms, the challenges that they will meet in student behavior, the parental influence in school decisions, and the chain of command in school climates.

The accreditation standards must be applied to all initial licensure programs, the traditional route as well as those for alternative certification. Further, the mathematics requirements for elementary generalist teachers need to be more specific. The Council must make sure that when the standards for the elementary generalist are being considered for revision that those proposed are critically reviewed and feedback provided to the Association of Childhood Education International writing team (2004–2005 review). A mathematics voice is also needed in the standards for early childhood education, special education, English language learners, and other related areas.

The accreditation reporting process should be reasonable, yet provide a clear representation of the program. This process should not be so weighty that the professors preparing teacher candidates are not able to prepare for their classes.

The Council should support full teacher preparation and induction programs while acknowledging that the knowledge and skills necessary for a highly qualified teacher may be obtained through non-traditional routes.

The Council should encourage conversations between the colleges of education and departments of mathematics at institutions of higher education. A white paper should be developed to explain reasons it is important to balance content and pedagogy.

The Council should stay abreast of accreditation issues and be prepared to take a public stand when standards are being circumvented or new processes are being proposed, such as a national cutoff score on the Praxis II Assessment.

The Council's Role in Offering Advice on What Might Constitute Necessary Preparation for the "Highly Qualified Teachers of Mathematics," Whether Certified Through Alternative or Traditional Routes

Several key findings of Jennifer King Rice²³ define a set of characteristics that relate to ultimate effectiveness of mathematics teachers with their students. Some of these key findings are:

- Advance degrees in mathematics are positively related to student learning in secondary school.
- The effect of advanced degrees for elementary teachers is less well defined.
- Certification in mathematics is related to high school mathematics achievement, while the effect specific to alternate or emergency certification is not yet known.
- Coursework in both teaching content and pedagogy are positively related to student outcomes.
- Pedagogy is important at all levels, while content courses make the most difference for high school teachers.
- Student teaching experiences also yield positive effects for teachers' learning and confidence.

The mathematical knowledge needed for teaching is different from that required by college students pursuing other mathematics-related professions. Prospective teachers need a solid understanding of mathematics so that they can teach it as a coherent, reasoned activity and communicate its elegance and power.²⁴

The Council's role is to continue collaboration with Mathematical Association of America and the Conference Board of the Mathematical Sciences and others to advise on what constitutes necessary preparation for a highly qualified teacher of mathematics. The Council should continue to support the need for all teachers of mathematics to be "highly qualified" in three main areas:

1. All teachers should know mathematics beyond the level they are teaching.
 2. All teachers should know how students learn mathematics.
 3. All teachers should know how to help students learn mathematics.
- (Source: "Administrator's Guide: How to Support and Improve Mathematics Education in Your School," [NCTM-ASCD])

Alternative certification, like all teacher certification, is governed by the individual states. This makes it difficult to get information regarding individuals who are certified in this manner and to know exact requirements for the various avenues available to receive alternative certification. Working with this background it appears that the best avenues NCTM has to influence these programs are the following:

- Require that alternative certification programs operating through colleges or universities that are NCATE accredited meet the same accreditation requirements that post-baccalaureate programs meet.

- Require that alternative certification programs operating through the state partnerships of NCATE submit their programs when the state partnerships are up for review.
- Write an article outlining the standards developed by the National Council for Accreditation of Teacher Education (NCATE) Task Force that is submitted to the Association of State Boards of Education for publication in their newsletter or journal.
- Write a similar article to be submitted to the National Association of State Directors of Teacher Education and Certification publications.
- Send representation to meetings and conferences such as the National Center for Alternative Certification to gather information about preparing and retaining mathematics teachers, and provide updates to the subcommittee whose formation is recommended.
- Become a member of such organizations as the National Center for Alternative Certification which promote and support excellence in training for mathematics teachers.

The Council should work through its membership in the national organization of state certification officers (National Association of State Directors of Teacher Education and Certification-NASDTEC) to establish a mechanism for reaching alternatively certificated teachers. This might include direct mailings if states can/will provide lists and/or a yearly mailing to state certification officers outlining the support services available to teachers through NCTM. This might include an insert to be included with certificate mailings to teachers.

The Council's Role in Supporting Prospective Teachers as They Prepare to Become Teachers of Mathematics

The Council should continue offering reduced membership fees, introductory kits, and special fees for conferences to preservice teachers of mathematics. The Council should continue its encouragement of forming affiliated campus groups (NCTM Student Affiliates) and should consider additional support such as a subsidized speakers bureau, targeted sessions at national and regional meetings, representatives from these groups on NCTM committees, and a preservice section on the Web site.

The Council should collaborate with the Association of Mathematics Teacher Educators in providing support for mathematics educators involved in methods courses, field supervision, etc. There is a need for guidelines for supervisors of student teachers in mathematics. Many times supervisors of teacher candidates have no experience teaching mathematics, and teacher preparation programs may or may not include a mathematics educator. These guidelines would provide these supervisors with access to NCTM's philosophy regarding effective mathematics teaching. Previously developed materials regarding evaluation of mathematics teaching might serve as a template, with appropriate adjustments for guiding a supervisor in helping a novice teacher.

The Council should develop a Web source targeting the needs of preservice teachers. This could serve as a recruitment tool but also a retention mechanism as we introduce preservice teachers to the role of professional involvement early. Many programs may not provide access to NCTM resources, or the generalist assigned the responsibility of mathematics methods courses or supervision may not understand the need for this type of support. Content might include:

- Encouragement for preservice teachers
- Welcome to the profession
- Good preparation for teaching mathematics
- Helping those whose preparation programs may not be NCTM anchored
- Simple and direct support for development of assignments that might be made within a teacher preparation program

Actions the Board Should Consider Regarding the Impact on Mathematics Teachers of the Federal No Child Left Behind Mandate for Every School to Have a “Highly Qualified” Teacher in Every Classroom by 2005–2006

The “highly qualified” definition in the law, as interpreted by the states, could result in unintended but rational consequences for teachers and school districts that attempt to remain in compliance. Unintended consequences include a loss of experienced teachers who are not able to become “highly qualified” based upon the state’s interpretation of the law. School districts are then faced with the dilemma of replacing experienced teachers in the midst of a critical shortage of mathematics teachers.

Data Collection and Analysis

The Board should work with existing research bodies to ensure that appropriate data are being collected and analyzed based upon the impact of the NCLB legislation on teachers of mathematics across the country. Some of these bodies might include the Council of Chief State School Officers (CCSSO), the Education Commissions of the States (ECS), the Southeast Center for Teaching Quality, and regional education laboratories.

The Board may wish to use the data to ascertain whether the implementation of inconsistent and multiple representations, across the states, of the NCLB “highly qualified” definition is driving mathematics teachers out of the profession, thereby adding to the teacher shortage in mathematics.

It is recommended that a subcommittee continually monitor actions regarding teacher preparation, certification, accreditation, and shortages to review and study the data in regard to policies at the state and federal levels that impact the interpretation of the “highly qualified” definition.

Block Grants to States

The U.S. Department of Education makes NCLB funds available to the states in the form of “block grants” through the Title II-A and B programs. These funds can be used for

professional development and retraining of teachers of mathematics to help them reach “highly qualified” status.

The Board should consider making recommendations that articulate how school districts and institutions of higher education can form partnerships to support mathematics teachers in achieving highly qualified status and how to keep the partnerships active and viable.

The Board should also consider developing a model for “How to organize and implement effective Mathematics Partnerships (P-16).” The document can be extremely helpful to school districts and institutions of higher education that have no previous experience in building this type of partnership. Dissemination of this model could be supported through leadership academies, conference presentations, or online access.

These recommendations could also include models of effective professional development programs, graduate courses (designed specifically for teacher needs based on student achievement data), and test preparation programs to help improve teacher passing rates on state-approved teacher exams that lead to the highly qualified designation.

Research Activities

The Board should ensure that ongoing research is conducted on the impact of the Mathematics and Science Partnerships (formed under the auspices of NCLB) on the improvement of teacher quality and student achievement in general.

The Board should stay abreast of research being generated at the Centers for Learning and Teaching funded by the National Science Foundation.

The Board should consider a program to provide research opportunities in undergraduate mathematics education like those available in mathematics and other disciplines that would encourage and stimulate research and recruiting.

The Board should promote a research agenda that tracks the impact of alternative certification routes on the mathematics education profession, on student achievement, and on a comparison of various models of alternative certification. This might be done in conjunction with the Education Commission of the States, Education Trust, and the Council of Chief State School Officers.

Mechanisms for Ensuring that the Council Continually Monitors and Considers Actions Regarding Teacher Preparation, Certification, and Shortages

The Council should direct the recommended subcommittee to continually monitor actions regarding teacher preparation, certification, accreditation, and shortages. We envision this committee to include the Council’s NCATE representative and any NCTM representative to other accrediting bodies, the NCTM government relations representative, etc. This committee would collaborate with the research, professional

development, Learning, Teaching, Curriculum, Assessment Committee (LTCAC), and national affiliated groups such as the Association of State Supervisors of Mathematics (ASSM) and Association of Mathematics Teacher Educators (AMTE).

The committee would oversee recommended actions such as data collection and analysis, block grants, and research activities.

The Council should develop a Web source to advise, guide, and provide research for persons serving on state committees regarding:

- Curriculum development/state frameworks
- Licensure standards for mathematics at all levels
- Textbook adoption

As a Web source, this could be constantly updated as new research is produced and/or the political climate changes.

The Council's Role in Promotion of Equity and Diversity in the Mathematics Teacher Workforce

Educators and community members recognize that most students, including a disproportionate number of women, minorities, and the poor, leave school without mathematical skills they need to thrive in an increasingly complex global economy. A tradition of low expectations, changing workforce needs, economic necessity, shifting demographics, and a shortage of minority mathematics teachers are some of the factors that have had an impact on this problem. The problem also has a negative impact on building a workforce of minority teachers.

The Council should partner with the P–16 educational community and other educational organizations²⁶ to:

- Provide educational leadership to support equity and excellence through policy, staffing, professional development, curriculum, new standards, and assessments.²⁷
- Address teacher- and-student related factors that influence the shortage of minority teachers and the factors that influence minority student performance and participation in mathematics.
 - Take an active role in promoting and developing professional development experiences for teachers designed to support the reexamination of beliefs, expectations, and cultural sensitivities; develop skill in teaching in diverse classrooms; improve practice in new curriculum, instruction, and assessment strategies; and redefining roles and responsibilities in support of equity in mathematics.
 - Address teacher- and student-related factors that influence minority student participation and performance in mathematics (e.g., expectations, previous experiences, assessment practices, language, and stereotypes).
- Raise expectations throughout the school community for the mathematics achievement of females, minorities, and students with disabilities.²⁸
- Monitor licensure tests and assessments to ensure that they are fair and valid for all populations.

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