Key Issue:
Recruiting Mathematics and Science Teachers for Rural Areas

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1100 17th Street N.W., Suite 500
Washington, DC 20036
877-322-8700 • 202-223-6690
ncctq@learningpt.org

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Contents

Scenario: Last in Line

Superintendent Joyce Graves sits with her 15 rural colleagues on the advisory board of their regional education service alliance. Only a handful of the high schools in the region have made adequate yearly progress (AYP) on a consistent basis since No Child Left Behind (NCLB) went into effect. Poor and persistently low-performing, the majority face corrective action if they cannot show some improvement next year.

"We have finally received the funds we've been seeking to support teacher training and implementation of (Bob Moses') Algebra Project," says Alliance Director Cleveland Hargrove. "Middle and high school math teachers will get a two-week summer training in pedagogy and content and monthly follow-up training and support throughout the school year. This is the opportunity we've been looking for—to get our teachers up to snuff and all of our kids taking Algebra I in the eighth grade."

"That's great," Graves says, "but my district won't be able to participate this year."

"Why?" asks Hargrove. "We've been planning this for a long time and everyone agreed that this would be our regional focus for mathematics."

"I know," replies Graves. "The problem is that I don't have any mathematics teachers. I have three openings at the high school and two at the middle school. They are all filled with substitutes and I have no candidates for any of the positions."

"I understand," says another colleague, sympathetically. "I lost nearly half the teachers in my middle school last year. I still haven't been able to replace them all with certified teachers."

"Have you contacted the colleges?" asks another. "Students are graduating now and looking for jobs."

"I have, but I have to wait until everyone else has hired the ones they want before I can hire anyone," says Graves. "You know when it comes to hiring teachers, we are always the last in line."

Benefits

Combining recruitment and retention incentives for mathematics and science teachers with creative staffing, rural-focused teacher preparation, and supportive policies will help rural schools do the following:

- **Address the poverty-related issues that make it difficult for nonamenity rural communities to attract and retain teachers.** Providing highly qualified teachers in rural schools is no small matter as nearly a third of America's public schools (30.3 percent) and teachers are located in rural areas. In 2002–03, 27 percent (12.5 million) of public school students attended schools in communities of fewer than 25,000 people; 19 percent (8.8 million) attended schools in communities of fewer than 2,500 people. While rural communities are not a homogeneous set, poverty rates among them are generally higher than for urban and suburban communities. This is particularly true of the "nonamenity" rural communities of the Southeast (Georgia, North Carolina, and South Carolina); the Mid-South Delta (Louisiana, Mississippi, Arkansas, and Alabama); the Great Plains (Oklahoma, North Dakota, and South Dakota); Central Appalachia (Kentucky and West Virginia); and the Southwest (New Mexico and Arizona). These schools are often underresourced as a result of diminished local tax bases and the inequitable distribution of state funds.

- **Attract highly qualified *experienced* teachers to hard-to-staff rural schools.** Poverty alone makes it difficult for many rural schools to attract and retain highly qualified teachers. Consequently, rural schools in nonamenity communities tend to have younger, less experienced teachers who leave when the opportunity arises for greater pay and more professional and social amenities. There is an urgent need for rural schools to attract experienced mathematics and science teachers who have the content knowledge, intellectual flexibility, and demonstrated commitment to the teaching profession to meet the unique challenges and capitalize on the unique opportunities for mathematics and science teaching in rural settings. Such teachers are needed to improve the quality of mathematics and science education, mentor new mathematics and science teachers through their induction into the profession, and take on leadership roles in whole-school and whole-district reform.

- **Recruit *new* mathematics and science education graduates to teach in nonamenity rural schools.** Add to the conditions of rural poverty a near "cataclysmic" teacher shortage, noncompetitive pay, and the relative isolation of working in rural communities and it is easy to see why "the main problem of rural school districts" is recruiting and retaining quality teachers. There is an urgent need to provide special incentives, improved working conditions, community supports, and other considerations to attract high-quality new mathematics and science teachers to rural schools.

  In addition, teacher preparation programs rarely provide content and clinical experiences that could prepare a teacher candidate or nurture his or her disposition to teach in rural communities. Clinical experiences tend to be centered in urban or suburban schools in close proximity to college and university campuses. In many instances, preservice interns

are offered teaching contracts and bonuses by their internship site long before rural districts have the opportunity to recruit them. Providing teacher candidates with a more diverse preservice experience that includes interning in rural settings would give rural schools the opportunity to market themselves before these candidates commit to other districts. Building and supporting consortia with rural-focused higher education teacher preparation programs and equalizing pay across districts also would help.

- **Stem the tide of attrition and migration among mathematics and science teachers in rural schools.** Half of new teachers leave the profession in the first five years of their teaching careers. Thousands more retire each year and college preparation programs are not keeping pace with the need for replacements. Nationwide, an estimated 3.9 million teachers will be needed by 2014. Recruitment alone will not do it. Neither will it keep teachers in places where they are needed most. Retaining teachers in the profession and in high-needs rural schools must become a top priority if rural districts are to have any chance of providing every child with a qualified teacher. That means stemming the tides of attrition (teachers leaving the profession to pursue other career paths) *and* migration (teachers moving from school to school or district to district). State policymakers must take some responsibility by ensuring more equitable and adequate funding and reduce the financial competition for teachers between poor and wealthy districts.

- **Build partnerships to address the out-of-school issues that make retention difficult.** Schools can address some of the retention issues with more supportive work environments, more visionary and participatory leadership, better professional development opportunities, greater collegiality among educators, and stronger links between teachers and the community. But schools alone cannot accomplish the task of retaining teachers as many of the reasons teachers leave or avoid rural places have to do with out-of-school factors that are beyond the schools' immediate control. Rural schools and communities must work together to provide the out-of-school supports necessary for teacher retention—adequate and affordable housing, access to basic human services, telecommunications connectivity, transportation, and social and cultural amenities.

- **Increase mathematics and science offerings in rural schools.** Rural teachers in small schools have more preparation and more teaching assignments in areas for which they might not be well prepared. A single rural high school science teacher, for example, might well be the school's entire science faculty. It is unlikely that that teacher will have received sufficient academic grounding in chemistry, biology, *and* physics. Job sharing, distance learning technologies, and partnerships (with higher education institutions, museums, practicing scientists, science organizations, mathematics educators, and research mathematicians) can help expand mathematics and science offerings in rural schools while maintaining high quality and relevancy in instruction.

- **Expand the pool of young people eligible to pursue mathematics and science college majors and teaching careers.** Recruiting highly qualified mathematics and science teachers assumes there is a pool from which to recruit. Diminishing the pool is a combination of low interest among college students in the teaching profession; low enrollment and graduation rates of students majoring in mathematics, science, and

engineering; and the exodus of new and experienced teachers from the classroom. Early college and dual enrollment programs can help maintain and expand the interest of students who might not have access to higher level courses in their high schools. Summer bridge programs are useful strategies for helping students who might be interested in mathematics and science disciplines but need additional help to get on track to complete majors in those areas without remediation during their first two years of college. Aligning high school mathematics and science courses with the skills and competencies needed to succeed in college-level coursework also will help get students on the path to success at the college level.

Tips

When recruiting mathematics and science teachers for rural schools, remember to do the following:

- Invest in high-quality induction programs and improved working conditions to help solve the teacher shortage problem in nonamenity or low-amenity rural schools.
- Begin recruiting *before* prospective teachers graduate or do their clinical internships. Do not expect to get early access to prospective teachers if you are not willing to build strong partnerships with college or university-based teacher preparation programs.
- Join with other groups to provide amenities and improve conditions in the community. Recruitment and retention are a whole-community effort, not just a school effort.
- Count on more than just recruiting to fill the need for mathematics and science teachers. Helping school-aged students have a successful high school experience and connect well with their community will increase the likelihood that they will want to return to their community to work.
- Look for state-level interventions on multiple fronts, including increases in teacher pay, to help the highest need rural districts recruit and retain high-quality mathematics and science teachers. Don't expect change in schools if you are not willing to work for state-level change in policy.
- Be willing to disequalize teacher pay across disciplines, districts, and schools in order to recruit and retain mathematics and science teachers in rural places.

Strategy 1: Increase Teacher Pay

In 2002, the average public K–12 teacher salary was $44,367, up only $2,598 above the 1972 average when adjusted for inflation. Rural teachers earned on average 13.4 percent less than nonrural teachers. Teacher salaries in the 10 most rural states, excluding Alaska, rank among the lowest in the nation. New teachers continue to earn 35 percent less than new sales and marketing graduates, 43 percent less than new business administration graduates, and 68 percent less than new engineering graduates. To attract and retain rural teachers, states will need to increase teacher pay and level the playing field between rural and nonrural schools.

Resource 1: *The Competitive Disadvantage*

Jimerson, L. (2003). *The competitive disadvantage: Teacher compensation in rural America.* Washington, DC: Rural School and Community Trust. Retrieved May 15, 2006, from http://www.ruraledu.org/site/apps/nl/content3.asp?c=beJMIZOCIrH&b=1000115&ct=1146997

This study compares rural and nonrural teacher pay across the career spectrum. At all levels from beginning to highest salary, rural teachers earn considerably less than nonrural teachers. The gap is significant among and within states and widens with the teachers' training and experience. In FY 2002, for example, the gap between the highest rural and nonrural teacher salary in Illinois was an astounding $33,761. The gap persists even in states that have a statewide teacher salary scale. The study places the rural teacher salary issue in the broader context of No Child Left Behind and state policy and offers some policy-based remedies that would lessen the competitive disadvantage for rural schools.

Resource 2: *Why Rural Matters*

Johnson, J., & Strange, M. (2005). *Why rural matters 2005: The facts about rural education in the 50 states.* Washington, DC: Rural School and Community Trust. Retrieved May 15, 2006, from http://files.ruraledu.org/whyruralmatters/WRM2005.pdf

This biannual report gives a comprehensive, state-by-state overview of the condition of rural education in the 50 states. Researchers ranked states on the importance of rural education based on the numbers and percentages of students enrolled in rural schools, the percentage of public schools in rural areas, and the percentage of state funding going to rural schools. Other factors included poverty, percentage of limited-English-speaking students, percentage of children of color, student-teacher ratio, rural four-year graduation rate, and National Assessment of Educational Progress mathematics and reading scores for Grades 4 and 8. The 10 states ranked highest in priority for policy change were New Mexico, Alabama, Arizona, Arkansas, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, and South Carolina.

Strategy 2: Provide Incentives and Policies to Redistribute the Teacher Workforce

The "best" teachers rarely list pay as the reason for entering the teaching profession. Yet given equal pay across assignments, most will choose to work in better resourced systems in high-amenity communities with higher performing students. Likewise, newly certified teachers tend to avoid the most needy schools and districts, including rural ones. Teacher pay should be structured to encourage the natural distribution of highly qualified teachers across districts, schools, and content areas.

Substrategy 2.1: Restructure Teacher Pay to Encourage the Voluntary Redistribution of the Teacher Workforce

Increasing teacher pay can attract more people to the teaching profession, but across the board increases are not sufficient to get and keep mathematics and science teachers where they are needed most. Local, state, and federal policymakers must provide incentives and policy supports that will encourage and support the voluntary redistribution of the teacher workforce.

Resource 3: *Regulation Versus Markets*

Podgursky, M. (2001). Regulation versus markets: The case for greater flexibility in the market for public school teachers. In M. C. Wang & H. J. Walberg (Eds.), *Tomorrow's teachers* (pp. 117–148). Richmond, CA: McCutchan Publishing Corporation.

Economist Michael Podgursky argues that the single-salary pay scale, even with higher pay, does not allow for adjustments to compensate for differing working conditions. Given equal pay, teachers will use their seniority to transfer to preferred schools and new teachers will look for the better conditions with which to begin. Consequently, troubled schools—including hard-to-staff rural schools—end up with the least experienced teachers. He concludes that "if schools differ in terms of nonpecuniary conditions (e.g., safety, student rowdiness [and rural-ness]), then equalizing teacher pay will disequalize teacher quality. On the other hand, if districts wish to equalize quality they will need to disequalize pay" (pp.137–138).

Resource 4: Rural Districts Meeting Teacher Quality Requirements

Schwartzbeck, T. D., & Prince, C. D. (with Redfield, D., Morris, H., & Hammer, P. C.). (2003). *How are rural school districts meeting the teacher quality requirements of no child left behind?* Charleston, WV: AEL. Retrieved May 15, 2006, from: http://www.edvantia.org/publications/index1.cfm?&section=publications&area=publications&id=480

Researchers surveyed rural teachers and superintendents to determine the challenges to meeting NCLB teacher requirements, the obstacles they face in recruiting and retaining teachers, and the strategies they were using to get highly qualified teachers in their classrooms. The smaller the school, the more difficulty superintendents reported in attracting and retaining teachers. The

most frequently cited challenge to recruitment was social isolation while the most frequently cited challenge to retention was low salaries.

Resource 5: The Cost of Getting a Rural Teacher

Prince, C. D. (2002). *Higher pay in hard-to-staff schools: The case for financial incentives.* Arlington, VA: American Association of School Administrators. Retrieved May 15, 2006, from http://www.aasa.org/files/PDFs/Publications/higher_pay.pdf

The author notes that rural places are generally viewed as having a lower cost of living that requires lower teacher pay. Policymakers need to consider the "hidden costs" of living in rural places where public transportation, suitable housing, and necessary services require the expenses of home ownership and automobile operation. For these reasons, it will take more money to attract teachers to rural areas.

Resource 6: Middle School Mathematics Teacher Corps

Contact: Middle School Mathematics Teacher Corps, Virginia State Department of Education, P. O. Box 2120, Richmond, VA 23218
Website: http://www.pen.k12.va.us/VDOE/Instruction/OCP/teachercorps.html

Sixty-nine low-performing middle schools in Virginia can hire qualified mathematics teachers from the Middle School Mathematics Teacher Corps. Teachers apply to enter the state-approved pool and receive extra pay for teaching in those schools. If hired from outside the division (or district), teachers receive an extra $10,000 per year for each of three years. Teachers from inside the division who enter the pool and take assignments in designated schools earn an extra $5,000 per year for each of three years. Corps members must be highly qualified and submit a letter of recommendation. They are trained in a coaching model that also is used in the state's Mathematics Specialist Program. It is expected that the effects of these highly qualified teachers will be felt throughout the school through professional development activities and other leadership roles that they might assume.

Resource 7: Shaw (Mississippi) School District Local Incentive Pay Plan

Contact: Shaw School District, P.O. Box 510, Shaw, MS 38773

Incentive pay takes on many forms, including signing bonuses. But signing bonuses are handled in many different ways and are often single payments made at the time of contract signing. Located in the rural Mississippi Delta, the impoverished Shaw School District provides locally funded teacher pay bonuses spread over a three-year period and paid at critical points in the year—at contract signing, just prior to Christmas, and at the end of the school year as teachers enter the summer months of unemployment. This mutually beneficial plan gives teachers cash at times when they need it most and gives the school the opportunity to pay in increments without depleting its fund. It is important to note that this local incentive fills a gap in the state's teacher recruitment plan which provides housing assistance, moving expenses, scholarships and loan

forgiveness, and the opportunity for master's level study and sabbaticals for teachers in critical teacher shortage areas.

Substrategy 2.2: Provide Scholarships and Forgivable Loans for Teachers to Teach in Geographical Shortage Areas

Incentives that are specifically targeted to rural, low-resourced schools and specific subject areas have proven beneficial in attracting teachers and reducing the rate of turnover.

Resource 8: Mississippi's Teacher Shortage Act of 1998

Contact: State Student Financial Aid at 800-327-2980 or 601-432-6997
Website: http://www.mde.k12.ms.us/mtc/teach.htm

Mississippi's Teacher Shortage Act of 1998 provides incentives for teachers to teach in the rural Mississippi Delta and other hard-to-staff school districts. The initiative has several components, including the following two scholarship and loan programs:

- Critical Needs Teacher Scholarship Program—Provides college tuition, fees, books and the average cost of room and meals for full-time and part-time undergraduates. Four-year awards are given in exchange for teaching three years in a designated critical shortage area. Other awards are given year for year. Scholarship recipients who do not teach in a critical shortage area must pay back the award with interest.
- William F. Winter Scholarship Loan Program—Provides up to $4,000 for juniors and seniors in teacher education programs. One year of loan forgiveness is given for one year of teaching in Mississippi and four years of forgiveness are given for three years of teaching in a critical shortage area.

Substrategy 2.3: Combine Pay Incentives With Cohort Assignments

Many times, new or "turn around" teachers are placed in schools where there is little support for them as new professionals and where the dominant culture runs counter to their vision and commitment. Placing such teachers in schools in cohort groups will increase their effectiveness and their desire to remain, even when they are in different disciplines.

Resource 9: Teacher Rewards for Poor Kids

Contact: Hillsborough County Public Schools, 901 E. Kennedy Blvd., Tampa, FL 33619, or call 813-272-4000.

Ave, M. (2006, April 16). Do teacher rewards pay off for poor kids? *St. Petersburg Times Online*. Retrieved May 15, 2006, from http://www.sptimes.com/2006/04/16/Hillsborough/Do_teacher_rewards_pa.shtml

Hillsborough County schools in Florida attracted five nationally certified teachers to Clair-Mel Elementary School through a salary incentive plan to get good teachers in poor schools. Teachers representing multiple disciplines were all friends, held master's degrees, and came as a cohort.

They received a $10,000 bonus plus $4,500 for board certification. Teachers reported a high level of satisfaction in the school (where 90 percent of students are poor) and plan to return for a second year.

Substrategy 2.4: Combine Pay Incentives With Improved Working Conditions

Educators on the ground tell us that pay matters, but working conditions matter more.

Resource 10: Attracting Well-Qualified Teachers to Struggling Schools

Prince, C. D. (2002, Winter). Attracting well-qualified teachers to struggling schools. *American Educator.* Retrieved May 15, 2006, from http://www.aft.org/pubs-reports/american_educator/winter2002/AttractingTeachers.html

This American Federation of Teachers policy brief examines the issue of teacher pay incentives as a means of attracting highly qualified teachers to high-needs schools and districts. The author notes that differentiated pay is a relatively new intervention and that we do not yet know how effective it will be. She recommends monetary incentives *along with* improved conditions as a means of recruiting and retaining teachers in high-needs areas. "Salary matters less when other characteristics of the workplace are personally and professionally satisfying. When they are not, or if the work itself is significantly more demanding, salary matters more and can be the tipping point that determines whether teachers stay or leave. Adjusting salaries upward can compensate for less appealing aspects of jobs; conversely, improving the relative attractiveness of jobs can compensate for lower salaries."

Resource 11: *Educators on What it Would Take to Staff All Classrooms With Quality Teachers*

Hirsch, E. (2006, April). *Recruiting and retaining teachers in Mobile, Alabama: Educators on what it would take to staff all classrooms with quality teachers.* Chapel Hill, NC: Center for Teaching Quality. Retrieved May 15, 2006, from http://www.teachingquality.org/pdfs/al_recruitretain_mobile.pdf

Researchers surveyed 3,300 educators from Mobile, Alabama, and found that "non-financial incentives are more important to educators than bonuses. Reduced teaching load or lower class size, additional support personnel for teachers and students, and guaranteed planning time can effectively recruit teachers to hard-to-staff schools" (p. v). Recommendations include ensuring that principals can be strong, supportive leaders.

Strategy 3: Stem the Tide of Attrition and Migration

Teachers are professionals. They want to teach in schools that allow good teaching to happen and in environments that make good teaching possible.

Resource 12: *A Different Approach to Solving the Teacher Shortage Problem*

Ingersoll, R. M. (2001). *A different approach to solving the teacher shortage problem.* (Teaching Quality Policy Brief No. 3). Seattle, WA: Center for the Study of Teaching and Policy, University of Washington. Retrieved May 15, 2006, from http://depts.washington.edu/ctpmail/PDFs/Brief_three.pdf

Teachers who migrate from school to school or district to district account for half of the turnover that schools and districts experience. These teachers have not abandoned the profession but are looking for better conditions under which to practice—conditions that include access to basic resources, collaborative relationships with colleagues, reasonable and appropriate teaching assignments, supportive leadership and infrastructures, connections with parents and community, and opportunities to grow and lead. Addressing the reasons teachers migrate between schools and districts can help stem the tide of migration.

Substrategy 3.1: Reduce the Sense of Isolation Through Increased Collegiality and Community Connections

The limited research we have on rural teacher recruitment and retention lists professional isolation and lack of community connections among the main reasons teachers avoid or leave rural schools. For some, connecting with an outside professional community means a trip by plane or boat. While technology is a useful means of connecting across places, access is difficult in many rural places separated from others by mountains and severe weather conditions. For these and all rural communities, it is important that teachers are able to feel a sense of connectedness and collegiality within their own place.

Resource 13: Why Teachers Avoid Rural Schools

Collins, T. (1999). Attracting and retaining teachers in rural areas. *ERIC Digest.* Charleston, WV: ERIC Clearinghouse on Rural Education and Small Schools. (ERIC Document No. ED438152). Retrieved May 15, 2006, from http://www.ericdigests.org/2000-4/rural.htm

Based on a survey of 94 rural British Columbia teachers, the author cites geographic, professional, and social isolation among the top reasons for leaving rural teaching assignments. Current research suggests that isolation remains a key factor.

Resource 14: Challenges to Rural Teacher Recruitment

Schwartzbeck, T. D., & Prince, C. D. (with Redfield, D., Morris, H., & Hammer, P. C.). (2003). *How are rural school districts meeting the teacher quality requirements of no child left*

behind? Charleston, WV: AEL. Retrieved May 15, 2006, from http://www.edvantia.org/publications/index1.cfm?&section=publications&area=publications&id=480

Among superintendents responding to a survey who indicated that it was extremely or very difficult to attract teachers, 75 percent cited social isolation as the key factor and 71 percent cited geographic isolation. Of those who indicated it was difficult to retain teachers, 76 percent cited social isolation as the primary factor and 68 percent cited geographic isolation.

Resource 15: Rural Learning Communities

Contact: Rural School and Community Trust Capacity Building Program, 1775 Graham Avenue, Suite 204, Henderson, NC 27536
Website: www.ruraledu.org

The Rural School and Community Trust, in collaboration with the National School Reform Faculty and rural educators around the country, has developed a professional development initiative that helps rural schools develop collegial relationships and practices through the establishment of professional learning communities or critical friends groups. Teachers learn to use protocols to create a safe and collegial environment for reflective practice, examining student and teacher work products.

Resource 16: National School Reform Faculty

Contact: National School Reform Faculty, P. O. Box 1787, Bloomington, IN 47402
Website: www.nsrfharmony.org

The National School Reform Faculty is "a network of people, schools, and organizations pursuing significant change in schools." Its professional development work focuses on developing collegial relationships, encouraging reflective practice, and rethinking leadership in restructuring schools in support of increased student achievement. Its program focuses on the concepts of facilitative leadership and critical friendship.

Resource 17: Connecting School and Community

Contact: Rural School and Community Trust Capacity Building Program, 1775 Graham Avenue, Suite 204, Henderson, NC 27553
Website: http://www.ruraledu.org/site/c.beJMIZOCIrH/b.1563225/k.E71D/SchoolCommunity_Partnerships.htm

The Rural School and Community Trust has developed a professional development initiative that helps schools and communities bring together diverse players (teachers, students, administrators, community members) in a series of conversations and exercises aimed at building and sustaining collaborations around important community and school issues. The process leads to place-based strategies to accomplish a community's vision and is very effective in connecting educators to community resources and integrating them and their work into the larger community.

Substrategy 3.2: Provide Reasonable and Appropriate Teaching Assignments

Reduced class load, reduced number of preparations, and a choice of the "better" student are not options for many rural teachers. "Reasonable" and "appropriate" must be addressed in the context of rural. This might mean allowing flexibility in grade configurations, restructuring the school's course offerings, and rethinking local policies on the role of the community in schools.

Resource 18: Duluth Teacher Job Sharing Policy

Duluth Public Schools Board of Education Policy No 4105
Website: http://www.duluth.k12.mn.us/policies/4000_Series_HUMAN_RESOURCES/4105_job_sharing.htm

Job sharing is a way of attracting teachers who do not wish to take on the full-time responsibilities of teaching. It is a particularly useful strategy for attracting retirees, parents who wish to balance work and family responsibilities, and others. Job sharing can help alleviate the multiple preparations that mathematics and science teachers have to make when they are assigned to small rural schools. This local school board policy defines and explains the process.

Resource 19: Wichita Teacher Job Sharing Policy

Wichita Public Schools Board of Education Policy No 4250
Website: http://www.usd259.com/policies/4250.html

Revised in November 2005, the Wichita School Board policy defines job sharing and outlines the process for applying for a job sharing assignment.

Substrategy 3.3: Provide Rural-Sensitive, Social Justice-Oriented School Leadership

Weak and nonvisionary leadership is another key reason teachers give for avoiding assignments in certain schools. While school leadership everywhere has things in common, leadership for rural schools requires an additional set of skills and sensitivities.

Resource 20: Rural School Leadership: The Legacy of Desegregation

Williams, D., & King, J. (2002). *Rural school leadership in the deep south: The double-edged legacy of school desegregation.* Washington, DC: The Rural School and Community Trust. Retrieved May 15, 2006, from http://www.ruraledu.org/site/c.beJMIZOCIrH/b.1073911/apps/nl/content3.asp?content_id=%7bF77119F2-3253-4110-B0E7-0C423B5540AA%7d&notoc=1

The Rural School and Community Trust, with funding from the Wallace Readers Digest Fund and the Hearst Foundation, convened rural school leaders from the Deep South to give voice to the challenges they faced in leading whole-school and community reform. Participants from Alabama, Mississippi, Louisiana, and Arkansas explained the unique challenges of leading

change and supporting high achievement within the context of the rural South and No Child Left Behind.

Resource 21: Rural School Leadership: A Framework for Professional Development

Williams, D., & King, J. (2003), Rural school leadership in the deep south: A framework for professional development. Washington, DC: The Rural School and Community Trust. Retrieved May 15, 2006, from http://www.ruraledu.org/site/c.beJMIZOCIrH/b.1073911/apps/nl/content3.asp?content_id=%7bDBB6C6FE-5191-4B9A-BE88-9BEB85101E00%7d&notoc=1

Rural superintendents from the Deep South designed a framework for the professional development of rural school leaders aimed at creating a climate of professionalism, high expectations, and shared leadership in the context of No Child Left Behind and the rural South.

Substrategy 3.4: Provide Opportunities for Teachers to Grow and Lead

Many teachers want the opportunity to grow and take on leadership responsibilities without leaving the classroom. They want a voice in decision making and they want to feel valued as professionals. Rural communities often do not have the resources to support such growth and need assistance from the state. Experienced teachers in Mississippi's designated critical shortage areas are given the opportunity to further their education and take on school leadership positions through state-sponsored fellowship and sabbatical programs.

Resource 22: Mississippi Teacher Fellowship Program

Contact: Mississippi Teacher Fellowship Program at 888-611-5160
Website: http://www.mde.k12.ms.us/mtc/teach.htm

The Mississippi Teacher Fellowship Program provides tuition, books, materials, and fees for up to three years as well as access to a mentoring network. Fellows must be teaching in a designated critical shortage district, hold a Class A license, and be accepted in an approved M.Ed. or Education Specialist program. Fellowship recipients are obligated to teach three years in a geographical critical shortage area or repay the award with interest.

Resource 23: Mississippi School Administrator Sabbatical Program

Mississippi State Department of Education
Website: http://www.mde.k12.ms.us/mtc/teach.htm

Teachers with three years of experience and a school district recommendation can receive their regular salary and fringe benefits while participating in an administrator sabbatical program. In exchange, participants must spend five years in administration in the sponsoring district or repay the award with interest.

Strategy 4: Build Strong University-School Partnerships

University-school partnerships can give rural schools early access to prospective mathematics and science teachers and strengthen K–12 mathematics and science education.

Resource 24: University-School Teacher Education Partnerships

Contact: University of North Carolina General Administration, Division of University-School Programs, 140 Friday Center Drive, Chapel Hill, NC 27515, or call 919-843-4792
Website: http://www.northcarolina.edu/content.php/usp/about.htm

At the urging of the UNC Deans' Council on Teacher Education, the North Carolina General Assembly provided funding to establish university-school teacher education partnerships at the 16 constituent institutions of the state university system. Partnerships were intended to improve teacher education and professional development and increase enrollment in teacher education programs in high-needs content areas, including mathematics and science. It was the impetus for many of the professional development school partnerships started around the state as well as professional development networks that reached out to rural districts.

Resource 25: Education Renewal Zones

Contact: Rural School and Community Trust Capacity Building Program, 1775 Graham Avenue, Suite 204, Henderson, NC 27536, or call 252- 433-8844
Website: http://files.ruraledu.org/misc/erz.htm

An Education Renewal Zone (ERZ), according to the Rural School and Community Trust website, is a "broad-based collaborative effort among geographically or technologically proximate stakeholders—schools, higher education institutions, community members, and youth and support organizations—that concentrates resources on improving and sustaining rural schools in high needs communities." The work of these entities, together with the work of Rural School and Community Trust staff, forms a comprehensive response to the key challenges facing rural education and provides a model for other rural (and urban) communities throughout the country. Each ERZ centers on a teacher education institution that assumes the lead in identifying10–15 rural school or district partners; in selecting and forming an ERZ Advisory Committee with school, community, and higher education representation; in developing and implementing an ERZ needs analysis pertaining to teacher quality, recruitment, and retention; and in designing a specific focus and plan of work to meet the needs of partnership schools and communities.

Substrategy 4.1: Recruit Prospective Mathematics and Science Teachers Early in Their College Careers

Resource 26: Where Can We Find Teachers?

Moin, L., Dorfield, J., & Schunn, C. (2005, January). *Where can we find K–12 science & math teachers? A search by academic year, discipline, and academic performance level.* Paper presented at the annual meeting of the Association for the Education of Teachers of

Science, Colorado Springs, CO. Retrieved May 15, 2006, from http://www.wcer.wisc.edu/scalemsp/research/Products/MoinDorfieldSchunn_FutureK12Teachers.pdf

This study set out to determine "which science, engineering, and math (SEM) majors during which years in their undergraduate education and from which academic performance levels are most interested in K–12 teaching." Although based on SEM majors at two urban research institutions, the study has implications for the development of rural mathematics and science teacher recruitment plans. Study results suggest that the most promising targets for K–12 teacher recruitment are as follows:

- SEM undergraduates in their junior and senior years independent of SEM major.
- SEM undergraduates in midacademic performance levels independent of SEM major and academic year.
- Mathematics majors followed by science majors.

Substrategy 4.2: Give Prospective Teachers a Diverse Clinical Experience

Prospective teachers need to be exposed to rural as well as urban settings during their preservice experiences. Strong partnerships between rural schools and higher education institutions make this possible and give rural schools the opportunity to market themselves before students begin applying for teaching positions.

Resource 27: Central Methodist University Education Renewal Zone

Contact: Central Methodist University Teacher Education Division, 411 Central Methodist Square, Fayette, MO 65248, or call 660-248-3391

Central Methodist College was one of the pilot institutions in the Rural School and Community Trust's Education Renewal Zone initiative. The school has revamped its teacher education program to respond to the unique needs of rural school districts and to give students the opportunity to experience rural schools prior to completing their teacher education programs.

Strategy 5: Strengthen K–12 Mathematics and Science Education

Strengthening K–12 mathematics and science education will enable more students to enter college without needing remediation and put more of them in the pipeline to become mathematics and science majors and teachers.

Resource 28: Place-Based Learning

Contact: Rural School and Community Trust Capacity Building Program, 1775 Graham Avenue, Suite 204, Henderson, NC 27536
Website: http://www.ruraledu.org/site/c.beJMIZOCIrH/b.1073935/k.EBFA/Placebased_Learning.htm

Mathematics and science instruction is rarely connected to the rich natural habitats of rural places, especially in low-performing schools that feel compelled to utilize "research-based" models and pacing guides to achieve minimal standards within a severely constricted curricular framework. Place-based learning is a proven strategy that can excite students about learning, reignite the passions of teachers, and build strong and mutually beneficial linkages between the school and the community. It has the power to reengage the vast numbers of students that research indicates are now disengaged although present in our schools.

Resource 29: The Science House

Contact: The Science House, North Carolina State University, P. O. Box 8211, Raleigh, NC 27695, or call 919-515-6118
Website: http://www.science-house.org/info/index.html

The Science House is a partnership of faculty and staff from science and education departments across the NC State University campus and collaborates with many other K–12 support organizations in North Carolina. It works in partnership with K–12 teachers to emphasize the use of hands-on learning activities in mathematics and science. Through school demonstration programs, student science camps, teacher workshops, and innovative laboratory training, and support projects, The Science House annually reaches more than 5,000 teachers and 25,000 students in 60 North Carolina counties. The Science House activities bring the science, mathematics, and technology expertise of NC State University to enhance teacher effectiveness and to help students visualize careers in these disciplines. Located in the Physics Department, The Science House has outreach sites in rural northeastern and western North Carolina. Department staff members train teachers in science content and pedagogy using the natural habitats of the communities around them.

Resource 30: Mathematics Specialist Program

Contact: Virginia Department of Education, P. O. Box 2120, Richmond, VA 23218
Website: www.mathscience.k12.va.us/1tea/math_k8_tea.html

In a model developed at Virginia Commonwealth University, Virginia's Mathematics Specialist Program places master teachers in high-needs schools. A Mathematics Specialist is a teacher in the elementary or middle grades who has interest and special preparation in mathematics content, scientifically based research in the teaching and learning of mathematics, diagnostic and assessment methods, and leadership skills. The school-based Mathematics Specialist serves as a resource in professional development, instructing children who have learning difficulties in mathematics, curriculum development and implementation, mentoring new teachers, and parent community education.

Resource 31: Common Curricular Content

Schmidt, W. H. (2004, February). A vision for mathematics. *Educational Leadership, 61*(5).

This author notes that the United States must move closer to offering what most of the world considers demanding mathematics for all middle school students. He points out that most of the 40-plus Trends in International Mathematics and Science Study participating countries have common standards for all students in Grades 1–8 and that the practice of tracking students in the middle grades is unique to the United States. He recommends a common mathematics curriculum for all students from Grades 1–8.

Resource 32: Teacher-to-Teacher Initiative

U.S. Department of Education Teacher-to-Teacher Initiative
Website: http://www.ed.gov/teacherinitiative.

As part of the department's Teacher-to-Teacher Initiative, a series of summer workshops have been held across the country for the past two years. These workshops have been conducted by some of the nation's leading teachers and education experts—individuals who use research-based practices and proven methods for increasing student achievement in their schools.

The department also has created "digital workshops"—a series of free online courses based on past Teacher-to-Teacher Workshops. These courses provide on-demand professional development for teachers in specific content areas. Depending on state and/or district policies, teachers may earn professional development credit for taking these digital courses.

Strategy 6: Use Technology to Provide Highly Qualified Teachers for Hard-to-Staff Schools

Resource 33: North Carolina School of Science and Mathematics

Contact: North School of Science and Mathematics, P.O. Box 2418, Durham, NC 27715
Website: http://www.dlt.ncssm.edu/distance_learning/

The North Carolina School of Science and Mathematics is an upper level, university-affiliated high school for gifted and talented students interested in pursuing mathematics and science careers. Through I-TV and other distance learning technologies, highly qualified teachers at the school provide instruction to rural students in rural school districts that are unable to hire highly qualified teachers or offer specific science courses. In addition, the schools provide rural and isolated areas with enrichment programs, paired teaching collaborations, workshops, and graduate-level courses.

Strategy 7: Target Special and Underrepresented Population Groups for Mathematics and Science Majors and Teaching Careers

Resource 34: Summer Bridge Program

National Science Foundation
Website: http://www.nsf.gov/index.jsp

This National Science Foundation program provides summer experiences for prospective mathematics, science, and engineering majors who might need additional help to enter and succeed in college-level mathematics coursework in their freshman year. It enables students who might otherwise need competency mathematics in their freshman year to go directly in college-level coursework and stay on track for program completion. Virginia State University is considering the addition of a second bridge program targeting the average student who might have an interest but lack the confidence and some skills to enter mathematics and science programs. Research indicates that these students are more likely to become teachers than other mathematics and science majors.

Resource 35: Maynard Outreach Program

Contact: Maynard Outreach Programs, School of Education and Psychology, Elizabeth City State University, Elizabeth City, NC 27909
Website: http://tep.ecsu.edu/maynard_outreach_program.htm

Maynard Outreach Program targets African-American males for enrollment in the teacher education program. Through it, the institution has succeeded in doubling the enrollment of African-American men in the school's teacher education programs.

Resource 36: Expanding Your Horizons Conference

Missouri State University Expanding Your Horizons Conference
Website: http://www.cnas.missouristate.edu/eyh/more%20information%20about%20eyh%20oth.htm

Expanding Your Horizons is an annual conference offered on the Missouri State University campus. It offers opportunities for middle grade students to get involved with scientific learning and to talk with women scientists and professionals from the community about their careers, work experience, and education. It aims to increase young women's interest in science, mathematics, and technology through hands-on activities directed by women in those fields; foster awareness of career opportunities for women in mathematics- and science-related fields; provide students an opportunity to meet and form personal contacts with women scientists, engineers, and mathematicians; provide parents, teachers, and other adult leaders with the knowledge and resources to encourage young women to choose any career they desire; and encourage scientific discovery by using the processes and procedures needed to design and carry out an award-winning science project.

Strategy 8: Address Out-of-School Issues That Impact Recruitment and Retention Through Partnerships

Low beginning pay and the absence of affordable housing in many rural communities make it difficult for new teachers to obtain suitable living arrangements in the districts in which they work. As a result, their already low salaries are taxed further with the extra cost of commuting long distances. Rural schools must build partnerships to address the out-of-schools factors that make teacher recruitment and retention difficult.

Substrategy 8.1: Housing Assistance

Resource 37: Mississippi Teacher Shortage Act of 1998

Housing Assistance for Teachers
Contact: Fannie Mae Partnership Office at 800-601-1194
Contact: Mississippi Home Corporation at 601-718-4629
Website: http://www.mde.k12.ms.us/mtc/teach.htm

Mississippi, in partnership with Fannie Mae and the Mississippi Home Corporation, provides loans of up to $6,000 to pay closing costs on homes purchased by teachers in a school district designated as a critical shortage area. The home must be in the same county as the school district. The loan can be forgiven in total over three years at the rate of one year of teaching for one third the amount of the loan. Critical shortage areas are primarily in the rural Mississippi Delta. They are defined as districts with 60 or more teaching positions having 10 percent or more of their teaching staff not appropriately licensed. For districts with fewer than 60 teaching positions, designation is based on having 15 percent or more of the teaching staff not appropriately licensed.

Resource 38: Teacher Next Door

U.S. Department of Housing and Urban Development Teacher Next Door Program
Contact: 800-569-4287
Website: http://www.hud.gov/offices/hsg/sfh/reo/goodn/tnd.cfm

The Teacher Next Door program is designed to encourage teachers to buy homes in low- and moderate-income neighborhoods. Participants must be employed full-time by a public or private school or a federal, state, county, or municipal educational agency as a state-certified K–12 teacher or administrator. In addition, they must work in the area where the home is located and agree to live in the home as their only residence for three years. According to the website, Teacher Next Door properties are single-family homes located in Revitalization Areas and are listed and sold exclusively on the Internet. The selected bidder may purchase the property at a 50 percent discount from the list price. For example, if a HUD home is listed for $100,000, teachers can buy it for $50,000. They also can apply for FHA-insured mortgages with a down payment of $100 and finance closing costs.

Resource 39: Teacher Mortgage Loans

Bank of America Teacher Flex Mortgage and Teacher Zero Down Programs
Website: www.bankofamerica.com/community/index.cfm?template+cdb_teacherprog

Bank of America offers two programs specifically aimed at helping teachers and other educators purchase a home. The Teacher Flex Mortgage Program targets school teachers, school administrators, librarians, or health care professionals who lack established credit histories. The Teacher Zero Down Program targets those who have a good established credit history but lack the funds to make a down payment. Teacher Zero Down features and benefits include 100 percent financing and lower income requirements.

Substrategy 8.2: Reimbursement of Moving Expenses

Resource 40: Mississippi Moving Expense Reimbursement Plan

Moving Expense Reimbursement Plan
Website: http://www.mde.k12.ms.us/mtc/teach.htm

The Mississippi program provides up to $1,000 in reimbursements for moving expenses for teachers locating to critical shortage areas. This one-time-only award is given on approval of the local school district.

Substrategy 8.3: Business Partnerships

Partnering with local businesses can provide community-based incentives for new and continuing teachers at no cost to the school or district. This strategy provides a win-win situation for both educators and businesses. Educators receive savings on multiple products and services and feel appreciated by their community. Businesses get to advertise to potential customers at no cost.

Resources 41 and 42: New Teacher Incentive Package and Thanks for Teaching

Alamance County (North Carolina) Area Chamber of Commerce
Website: http://www.alamancechamber.com/educationsub3.asp

Each spring, Chamber members contribute to a New Teacher Incentive Package. Approximately 300 packages are assembled and distributed to new educators working in Alamance County in an effort to reduce the "upfront" money needed to relocate to the area. Each package includes fliers offering discounts or waiving deposits to local hotels, apartment complexes, Internet services, banks, storage facilities and moving companies. Also included are coupons and discounts from area restaurants, retail stores, and service providers.

To show appreciation to current educators, Chamber member businesses offer specials and discounts through a Thanks for Teaching website. Offers include discounts on car services, residential closing costs, tax preparation, chiropractic services, and Internet services.

Strategy 9: Grow Your Own

Many believe that the best chance that rural schools have of getting qualified teachers, including mathematics and science teachers, is to identify and nurture the interests of people from their own communities and support them in completing teacher education and certification requirements. These grow-your-own efforts focus both on school-aged children and adults in the community.

Resource 43: NC TEACH

North Carolina Teachers of Excellence for All Children (NC TEACH)
Website: http://ncteach.ga.unc.edu/generalinfo.html

NC TEACH is a rigorous alternative teacher preparation program designed to recruit, train, support, and retain midcareer professionals as they become licensed teachers in North Carolina. The program is administered by the UNC Office of the President in collaboration with the North Carolina Department of Public Instruction. Established in 2000, more than 1,300 people have become licensed teachers through the NC TEACH program. NC TEACHers currently serve in more than 85 counties and school districts in all regions of the state. In 2002, 16 percent were in secondary science, 6 percent in secondary mathematics, 8 percent in middle school science, and 11 percent in middle school mathematics.

Through a collaborative initiative with the North Carolina Department of Public Instruction, NC TEACH and LEARN NC, a statewide group of teacher education faculty, have developed online modules based on the original NC TEACH curriculum. These modules are a significant part of an online alternative licensure program that includes a face-to-face orientation, access to a student resource center, and support services. Standalone and integrated modules include: The Teacher and the School, Understanding the Learner, Effective Teaching, Diversity, Technology, and content methods modules in mathematics, science, and special populations. The primary goal of developing this online program was to increase the capacity to offer alternative licensure programs to lateral entry teachers in North Carolina.

Resource 44: North Carolina Model Teacher Education Consortium

North Carolina Model Teacher Education Consortium
Website: http://www.ncmtec.com/services.htm

The NC Model Teacher Education Consortium is for persons seeking a first education degree, initial licensure, or clearance of provisional, emergency or lateral entry licensure. All full-time employees of a consortium local education agency, part-time substitutes with at least 15 days in the semester prior, bus drivers, clerical and nutrition workers, full-time consortium institutions of higher education and community college partner employees, full-time college/university School of Education instructors and paraprofessionals are eligible to participate. Participants with little or no college experience can take the first two years of study at a community college and transfer directly into an education major at a four-year institution. The Consortium pays a portion of the tuition, textbooks, and student fees. Students with more college experience may take

Consortium-sponsored courses taught by four-year colleges and universities on community college campuses closer to home.

Resource 45: Clark County School District Grow-Your-Own

Clark County, Nevada, School District
Website: www.ccsd.net/jobs

Clark County (Nevada) School District's comprehensive plan for recruiting and retaining teachers includes a high school teacher education magnet program and a teacher cadet program patterned after the South Carolina Teacher Cadet Program. In addition to targeting school-aged children, the district also targets adults in the community. The target pools include substitute teachers, the Latin Chamber of Commerce, churches, stay-at-home parents, retired firemen and policemen, and others.

Strategy 10: Expand the Use of the H-1B Visa Program

Resource 46: H-1B Visa Program

H-1B Visa Program
Website: http://www.usimmigrationsupport.org/visa_h1b.html

H-1B is an employment-based, nonimmigrant visa category for temporary workers in specialty professions, including science. An employer must offer a job and apply for the H1 visa petition with the U.S. immigration department. This approved petition allows for a total stay in the United States of six years. Initial approval is for three years. While a lot of rural districts have relied heavily on this source for mathematics and science teachers, it is here recommended with caution and only as a last resort. Students often report difficulty in understanding teachers' accents and cultural clashes need to be managed carefully.

Real-Life Example: Weldon Goes to India

Weldon City Schools in North Carolina loses more than a third of its teachers each year. In some years, the middle school has lost as many as half of its teachers. Two years ago, the superintendent complained that she could not commit to sending science teachers to a regional summer training because she said, "I have no science teachers."

Last year, when Kelvin Edwards, executive director of human resources, could not find mathematics and science teachers in the United States, he extended his search overseas. In September, several weeks after school opened, five teachers from India signed on to teach mathematics and science at Weldon's middle and high schools. They made a three-year commitment through the H-1B Visa Program. Two are teaching chemistry and biology at the high school and three are teaching middle grade science and mathematics at the middle school.

Edwards noted that he had no choice but to look elsewhere to fill the perpetual cycle of turnovers in mathematics and science. "I just had a problem recruiting fully-certified math and science teachers," he said. The state is not producing enough science and mathematics teachers and the region cannot compete with larger school systems in cities that offer sign-on bonuses. Mathematics and science teachers in Weldon schools usually stay no more than two years, and the district has had to hire lateral-entry teachers with no classroom experience or education degree.

Edwards stressed that the teachers from India are highly qualified. Most of them held three degrees, had at least seven years of teaching experience, and spoke several languages.

Neighboring Wilson County schools has hired nearly 20 teachers from India during the past two years. Edwards visited the district and observed the teachers' classes before taking the trip to India, where he interviewed 226 candidates. He believes Weldon students will benefit greatly from having foreign instructors who will introduce them to a new ethnic group and culture. "It's going to give them a sense of diversity. It's just going to give them exposure," he said.

This piece was adapted in part from the Daily Herald serving Roanoke Rapids, North Carolina. The full article is available at http://www.rrdailyherald.com/articles/2005/08/09/news/news3.txt

Note: Weldon is one of three public school systems in Halifax County, North Carolina. It is 98 percent African American and has historically been one of the state's lowest performing systems.

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