BHEF 2006 Issue Brief

Experts

Susan Hackwood

Susan Hackwood is the Executive Director to the California Council on Science and Technology. Previously she has worked for Bell Laboratories in various capacities, including as the Department Head of Device Robotics Technology. She was also a professor at University of California at Santa Barbara, where she was founder and Co-Director of the Center for Robotic Systems in Microelectronics. Dr. Hackwood was the founding dean of the College of Engineering at the University of California, Riverside. Dr. Hackwood received a Ph.D. in Solid State Ionics in 1979 from DeMontfort University, UK.

Bob Dynes

Bob Dynes is the President of the University of California System. Dr. Dynes, a physicist and an expert on semiconductors and superconductors, is the 18th president of the University of California, assuming those responsibilities on Oct. 2, 2003. Dr. Dynes holds a bachelor's degree in mathematics and physics from the University of Western Ontario and master's and doctorate degrees in physics from McMaster University.

Charlie Reed

Charlie Reed is the Chancellor of the California State University System. Previously he served 13 years as the Chancellor for the State University System of Florida. Dr. Reed has earned a bachelor's degree in health and physical education, a master's in secondary education and an Ed.D. in teacher education, all from George Washington University.

Collaborating to Address the Math and Science Teacher Shortage: A State-University-Business Partnership

Recent studies have pointed to the critical role of a highly qualified teaching workforce in raising mathematics and science achievement. However, states and schools face a host of challenges in recruiting, preparing and retaining enough highly qualified teachers: an aging teacher workforce, poor pay and working conditions, and rapid enrollment growth represent a few of these challenges. According to the Council of Chief State School Officers, the national teaching workforce includes an estimated 331,000 mathematics and science teachers in grades 7-12 alone. The demand for more and better trained teachers in these subjects is expected to increase due to requirements of No Child Left Behind, enrollment growth, and state mandated requirements that students take additional advanced coursework in mathematics and science. Despite some gains, many students—and in particular, those in high-poverty and rural schools—still lack access to a highly-trained teacher in these critical disciplines.

BHEF's 2006 winter meeting examined the efforts of our nation's largest state, California, to meet these challenges and quadruple the state's annual production of mathematics and science teachers through a collaborative approach involving the state, public higher education, the business community, and the K-12 system.

QUICK FACTS

Fact 1
Annual teacher turnover is significant and disproportionately affects children in high poverty schools.

Fact 2
Mathematics and science teachers leave at higher rates than other subject areas.

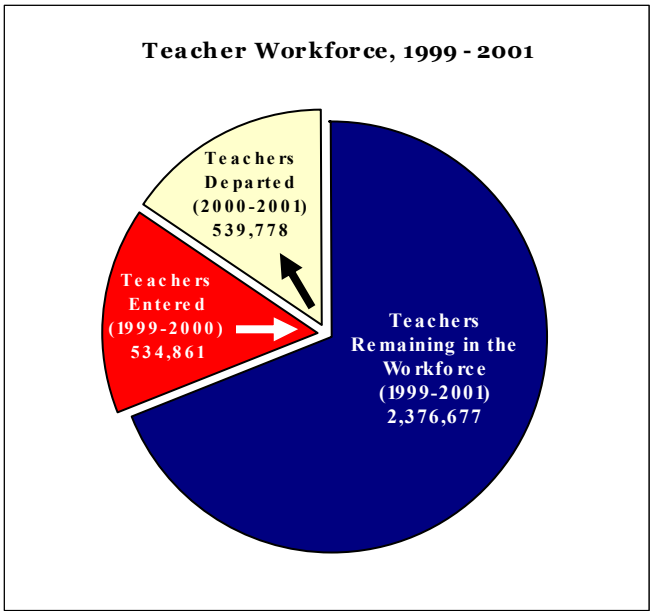
Fact 3
Many teachers in mathematics and science fields are under qualified.

Fact 4
California faces the most significant shortage of qualified teachers.

Fact 1

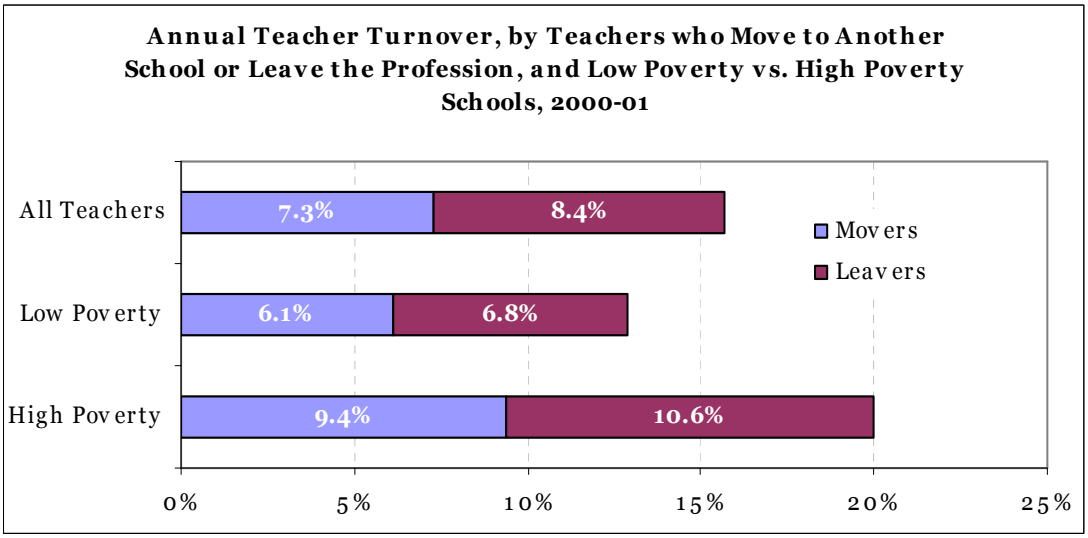
Teacher turnover is a significant national problem that disproportionately affects children in high-poverty schools. Of a total U.S. teaching workforce of over 3.4 million, more than 1 million teachers are either entering or leaving the workforce within a one-year period (Exhibit 1a). Teacher turnover is a significant problem for schools and one that disproportionately affects children in high-poverty schools, where teachers leave their jobs at a rate of twenty percent, 55 percent higher than in low-poverty schools (Exhibit 1b).

Exhibit 1a



SOURCE: Figures 8, *No Dream Denied: A Pledge to America's Children*, National Commission on Teaching and America's Future. (2003)

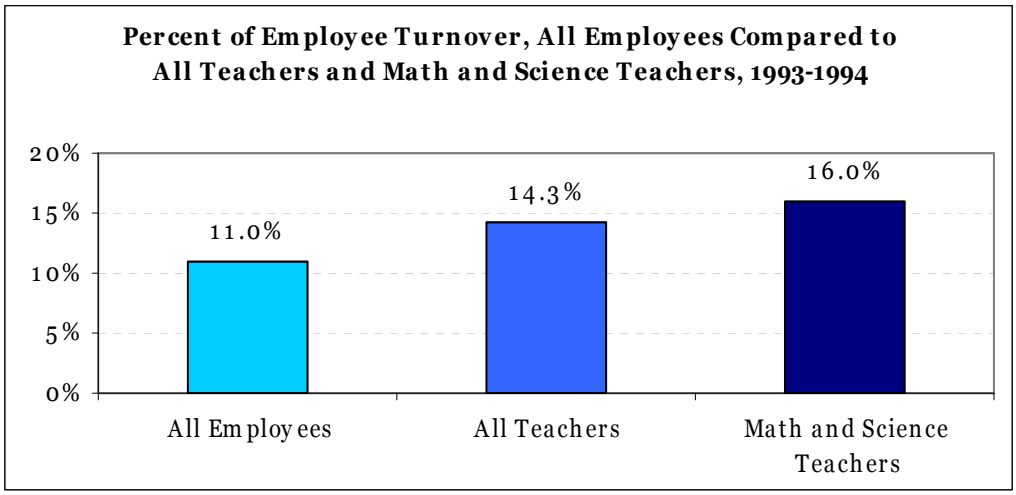
Exhibit 1b



SOURCE: Figures 5, *No Dream Denied: A Pledge to America's Children*, National Commission on Teaching and America's Future. (2003)

Fact 2

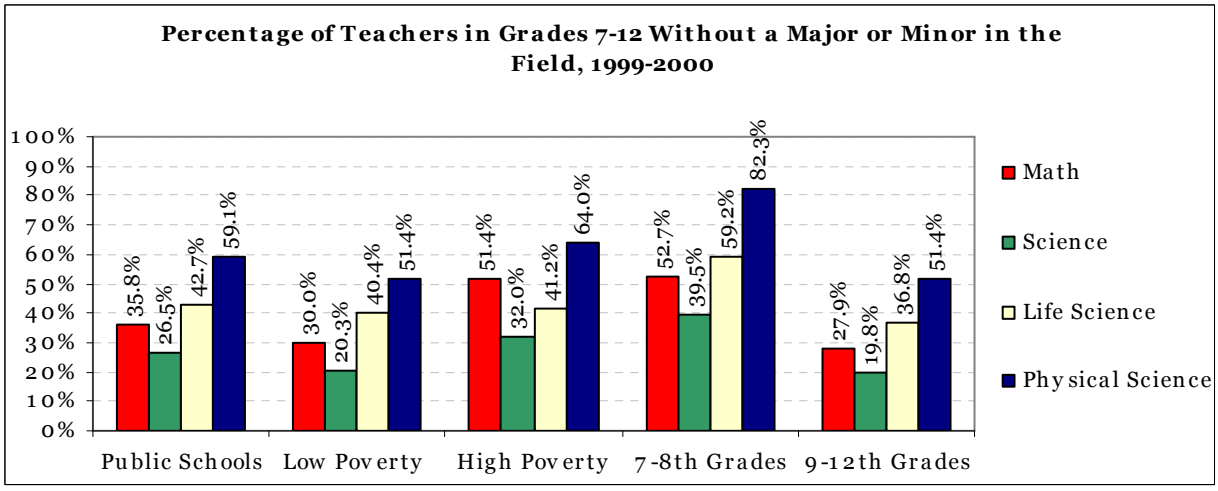
Teachers leave mathematics and science fields at higher rates than other subjects, and leave more often due to dissatisfaction. About one in six of the country's mathematics and science teachers leave or move to a new job each year—a rate higher than other subjects and professions. This suggests that more than 50,000 of the estimated 331,000 mathematics and science teachers in grades 7-12 either leave the field or move to a new job each year. Compared to other teachers, mathematics and science teachers leave more often due to dissatisfaction associated with pay and professional support.



SOURCE: Richard M. Ingersoll, *Turnover Among Mathematics and Science Teachers in the U.S.,* for National Commission on Mathematics and Science Teaching for the 21st Century, Chaired by John Glenn. *(2000)*

Fact 3

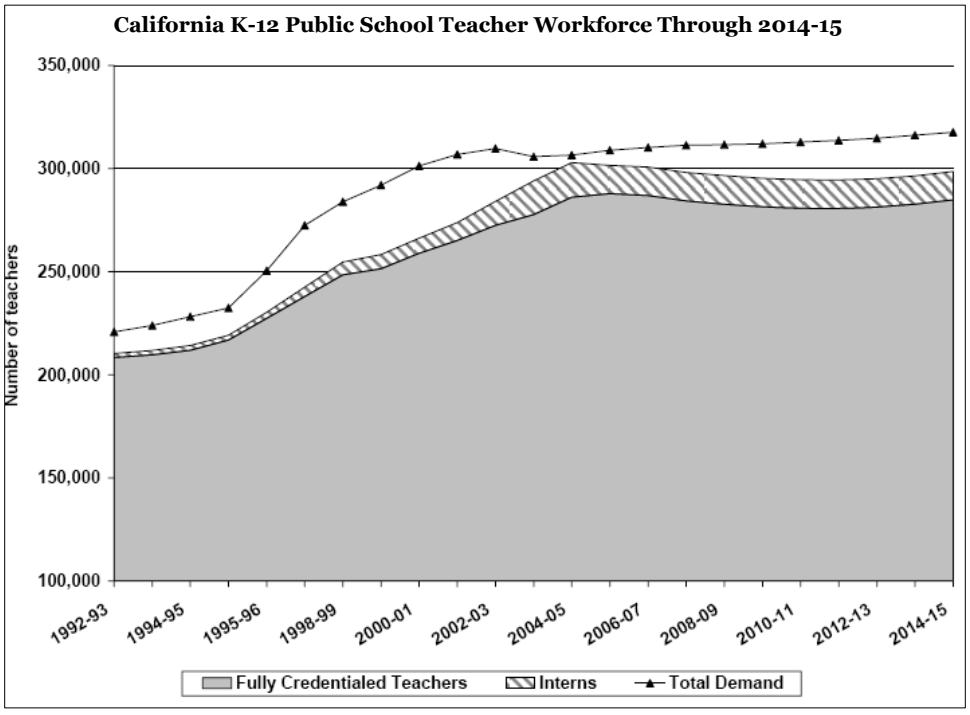
Many mathematics and science teachers lack adequate preparation, with the problem more pronounced in high-poverty schools. The percentage of teachers lacking either a major or minor in their assigned teaching field is significantly higher in high-poverty schools and in the 7th and 8th grades. Among the disciplines, the lack of highly qualified teachers is most acute in the physical sciences and in high-poverty schools, where more than half of math teachers lack a major or minor in their fields compared to just 30 percent in low-poverty schools.



SOURCE: Richard M. Ingersoll, "Out of Field Teaching and the Limits of Teacher Policy" Center for the Study of Teaching and Policy and The Consortium for Policy Research in Education. (2003).

Fact 4

Among the states, California faces the most severe shortage of teachers, particularly in the areas of mathematics and science. California has been facing a shortage of qualified teachers for the last ten years—a problem that is projected to continue over the next decade. While California has tried to fill this shortfall between credentialed teachers and overall teacher demand with under-qualified teachers (noted as "interns" in the chart below), the state is projected to experience a growing shortage of fully qualified teachers in the future.



SOURCE: Exhibit 4, *The Status of the Teaching Profession*. The Center for the Future of Teaching and Learning. (2005).