

## Background and Purpose

In 2000, the National Science Foundation supported the fourth in a series of national surveys of science and mathematics education through a grant to Horizon Research, Inc. The first survey was conducted in 1977 as part of a major needs assessment of science and mathematics education consisting of a comprehensive review of the literature; case studies of 11 districts throughout the United States; and a national survey of teachers, principals, and district and state personnel. A second survey of teachers and principals was conducted in 1985–86 to identify trends since 1977, and a third survey was conducted in 1993.

The 2000 National Survey of Science and Mathematics Education was designed to provide up-to-date information and to identify trends in the areas of teacher background and experience, curriculum and instruction, and the availability and use of instructional resources. Among the questions addressed by the survey:

- How well prepared are science and mathematics teachers in terms of both content and pedagogy?
- What are teachers trying to accomplish in their science and mathematics instruction, and what activities do they use to meet these objectives?
- To what extent do teachers support reform notions embodied in the National Research Council's *National Science Education Standards* and the National Council of Teachers of Mathematics' *Principles and Standards for School Mathematics*?
- What are the barriers to effective and equitable science and mathematics education?

Complete details of the study—sample design, sampling error considerations, instrument development, data collection, and file preparation and analysis—as well as copies of the instruments are included in the technical report,<sup>†</sup> which is available free of charge on the Internet at <http://2000survey.horizon-research.com/reports/status.php>.

The current report focuses on trends in science and mathematics education, in most cases between 1993 and 2000, but in some instances dating back to 1977 or 1985–86. The response rates for the teacher questionnaire ranged from 74 percent to 86 percent, and for the principal/program questionnaire, from 79 to 88 percent. Generally, while 1993 and 2000 data are reported for grades 1–4, 5–8, and 9–12, comparisons that go back to the earlier surveys are typically shown for grades 1–3, 4–6, 7–9, and 10–12 since that is how they were presented in those reports and the raw data are not available for additional analyses. A few items have been revised between administrations of the surveys (e.g., in 1993 teachers were asked how often

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<sup>†</sup> Weiss, I.R., Banilower, E.R., McMahon, K.C., and Smith, P.S. *Report of the 2000 National Survey of Science and Mathematics Education*. Chapel Hill, NC: Horizon Research, Inc., 2001.

students “work in small groups,” in 2000 the item asked how often students “work in groups”); these changes and similar details are described in the endnotes.

The standard errors for the estimates presented in this report are included in parentheses in the tables and represented as error bars in figures. In a few cases, standard errors for 1993 data are estimated using the average design effect for the subject and grade range of interest; these instances are referenced in the endnotes. Statistically significant changes ( $p < 0.05$ ) between 1993 and 2000 are asterisked (\*) in each table. When more than two years of data are presented, the 2000 data are compared to both 1993 data and the earliest year’s data available. In these instances, an overall alpha of 0.05 was maintained using the Bonferroni adjustment. The narrative sections of the report point out only those differences which are substantial as well as statistically significant at the 0.05 level.

The report is organized into major topical areas. Section One focuses on science and mathematics teachers’ backgrounds and beliefs. Basic demographic data are presented along with information about course background, perceptions of preparedness, and pedagogical beliefs. The second section examines data on the professional status of teachers, including perceptions of their autonomy in making curriculum and instruction decisions, and their opportunities for continued professional development. Section Three presents information about the time spent on science and mathematics instruction in the elementary grades, and about science and mathematics course offerings at the secondary level. The fourth section examines the instructional objectives of science and mathematics classes, and the activities used to achieve these objectives, followed by a discussion of the availability and use of various types of instructional resources in Section Five. Section Six presents data about a number of factors which are likely to affect science and mathematics instruction, including school-wide programs, practices, and problems.