**Table 1**
*Reports Addressing the Need for Improved Math and Science Education in the United States*

| Report | Description |
|---|---|
| | Overarching reports: |
| *How People Learn: Brain, Mind, Experience and School* (National Research Council, 2000) | Focuses on current research on learning necessary for deep understanding, effective teaching, and supportive environments. Six key topics regarding understanding and five regarding teaching and supportive environments are discussed. |
| *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Future* (National Academy of Sciences, National Academy of Engineering, & Institute of Medicine, 2005) | Makes recommendations on how America can maintain its position in the fields of science and technology. It states that revitalizing mathematics and science education from kindergarten through 12th grade is essential, along with finding and keeping scientists and engineers from both the United States and abroad. |
| *From Neurons to Neighborhoods: The Science of Early Childhood Development* (National Research Council & Institute of Medicine, 2000) | Closely examines variables that affect very young children during development. |
| *Eager To Learn: Educating Our Preschoolers* (National Research Council, 2001b) | Illustrates the way in which young children are presently being educated, using examples from the field of cognitive science as a framework. The book offers conclusions and recommendations for early childhood education. |
| *Engaging Schools: Fostering High School Students' Motivation to Learn* (National Research Council & Institute of Medicine, 2004) | Reviews current research on what shapes adolescents' school engagement and motivation to learn, including new findings on students' sense of belonging, and looks at ways these can be used to reform urban high schools. This book looks at various approaches to reform through different methods of instruction and assessment, adjustments in school size, vocational teaching, and other key areas. |
| | Mathematics education: |
| *Adding It Up: Helping Children Learn Mathematics* (National Research Council, 2001a) | Describes in detail variables associated with learning mathematics. |
| *Review and Appraisal of the Federal Investment in STEM Education Research* (National Science and Technology Council, 2006) | "This report presents the results of an analysis of the federal government's investment in learning and education research within the domains of science, technology, engineering and mathematics (STEM)" (p. 2). The National Science and Technology Council's Education and Workforce Development Subcommittee created a STEM task force whose goals were to review the current federal investment in research in learning and education for Grades K–20, as well as to provide recommendations for strengthening the federal education research portfolio to improve "STEM learning and educational practices in the long run" (p. 2). |
| *Foundations for Success: The Final Report of the National Mathematics Advisory Panel* (National Mathematics Advisory Panel, 2008) | The National Mathematics Advisory Panel was created by President Bush to advise the President and the Secretary of Education on the best use of scientifically based research on the teaching and learning of mathematics, with a focus on algebra. Five task groups and three subcommittees were created; their evidence guidelines and initial findings are outlined in this report. |
| | Science education: |
| *Learning to Think Spatially: GIS as a Support System in the K–12 Curriculum* (National Research Council, 2006b) | Spatial thinking is a cognitive skill that can be used in everyday life, the workplace, and science to structure problems, find answers, and express solutions using the properties of space. It can be learned and taught formally to students with appropriately designed tools, technologies, and curricula. This report explains the nature and functions of spatial thinking and shows how spatial thinking can be supported across the K–12 curriculum through the development of appropriate support systems. |

**Table 1 (*continued*)**

| Report | Description |
|---|---|
| *Taking Science to School: Learning and Teaching Science in Grades K–8* (National Research Council, 2007) | What is science for a child? How do children learn about science and how to do science? Drawing on a vast array of work from neuroscience to classroom observation, *Taking Science to School* provides a comprehensive picture of what is known about teaching and learning science from kindergarten through eighth grade. By looking at a broad range of questions, this book provides a basic foundation for guiding science teaching and supporting students in their learning. |
| *Ready, Set, Science! Putting Research to Work in K–8 Science Classrooms* (Michaels, Shouse, & Schweingruber, 2007) | This volume is designed as a practitioner-oriented accompaniment to *Taking Science to School: Learning and Teaching Science in Grades K–8.* It summarizes the findings in *Taking Science to School* and then goes on to present detailed case studies of real classroom experiences that illustrate the complexities that science teachers grapple with every day: selecting and designing rigorous and engaging instructional tasks, managing classrooms, orchestrating productive discussions with culturally and linguistically diverse groups of students, and helping students make their thinking visible using a variety of representational tools. The aim is to make the implications of research clear, accessible, and stimulating for a broad range of science educators. |
| *America's Lab Report: Investigations in High School Science* (National Research Council, 2006a) | Laboratory experiences as a part of most U.S. high school science curricula have been taken for granted for decades, but they have rarely been carefully examined. What do they contribute to science learning? What can they contribute to science learning? What is the current status of labs in our nation's high schools as a context for learning science? |
| | Assessment: |
| *Knowing What Students Know: The Science and Design of Educational Assessment* (National Research Council, 2001c) | At a time when traditional testing is subject to increasing criticism, research suggests that new, exciting approaches to assessment may be on the horizon. Advances in the sciences of how people learn and how to measure such learning offer the hope of developing new kinds of assessments—assessments that help students succeed in school by making as clear as possible the nature of their accomplishments and the progress of their learning. *Knowing What Students Know* essentially explains how expanding knowledge in the scientific fields of human learning and educational measurement can form the foundations of an improved approach to assessment. These advances suggest ways that the targets of assessment—what students know and how well they know it—as well as the methods used to make inferences about student learning can be made more valid and instructionally useful. Principles for designing and using these new kinds of assessments are presented, and examples are used to illustrate the principles. Implications for policy, practice, and research are also explored. |
| *High Stakes: Testing for Tracking, Promotion, and Graduation* (National Research Council, 1999) | Everyone is in favor of "high education standards" and "fair testing" of student achievement, but there is little agreement as to what these terms actually mean. *High Stakes* looks at how testing affects critical decisions for American students. As more and more tests are introduced into the country's schools, it becomes increasingly important to know how those tests are used—and misused—in assessing children's performance and achievements. |