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# Appendix Tables

# List of Appendix Tables

## CHAPTER 1—INTRODUCTION

Appendix table 1-1. Summary of NSF funding for the Directorate for Education and Human Resources (EHR): 1956 to 1994 (dollars in millions) .....	120
Appendix table 1-2. Total budget obligations in fiscal year 1994 mathematics, science, engineering, and technological education of 11 Federal agencies (dollars in millions): 1995.....	121
Appendix table 1-3. Number and percent of students enrolled in grades 1–12 and college, by race or ethnic origin: 1970 to 1993 .....	122
Appendix table 1-4. Children ages 5–17 speaking a language other than English at home, by English proficiency level: 1980 and 1990 .....	123
Appendix table 1-5. Education level of parents of elementary or secondary school students, by student race or ethnic origin: 1970 to 1993.....	124
Appendix table 1-6. Number and percent of one- or two-parent families with children under age 18, by race or ethnic origin: 1970 to 1993.....	125
Appendix table 1-7. Number and percent of white, black, and Hispanic children ages 6–17 below the poverty level: 1970 to 1993 .....	126

## CHAPTER 2—ACHIEVEMENT IN SCIENCE AND MATHEMATICS

Appendix table 2-1. NAEP science proficiency: percent of students at or above selected anchor points, by age and race or ethnic origin, 1977 to 1992.....	127
Appendix table 2-2. NAEP mathematics proficiency: percent of students at or above selected anchor points, by age and race or ethnic origin, 1978 to 1992 .....	128
Appendix table 2-3. Percent of eighth-grade mathematics students performing at each proficiency level, by race or ethnic origin and socioeconomic status: 1988.....	129
Appendix table 2-4. Average percent of questions answered correctly on the NAEP mathematics exam, by type of question, race or ethnic origin, and age: 1992 .....	130
Appendix table 2-5. NAEP science proficiency, by percent of students at or above selected anchor points, sex, and age: 1977 to 1992.....	130
Appendix table 2-6. NAEP mathematics proficiency, by percent of students at or above selected anchor points, sex, and age, 1978 to 1992 .....	131
Appendix table 2-7. IAEP science scores for selected countries at 5th percentile, mean, and 95th percentile, by age: 1991 .....	132
Appendix table 2-8. IAEP mathematics scores for selected countries at 5th percentile, mean, and 95th percentile, by age: 1991.....	133

## CHAPTER 3—THE ELEMENTARY AND SECONDARY LEARNING ENVIRONMENT

Appendix table 3-1. Percent of states imposing graduation requirements in mathematics: 1974 to 1992 .....	134
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Appendix table 3-2. Average number of minutes per day spent teaching each subject to self-contained classes, by grade range: 1977 to 1993 .....	134
Appendix table 3-3. Mean number of credits earned by high school graduates in each subject field: 1982 to 1992 .....	135
Appendix table 3-4. Percent of high school graduates earning minimum credits in science courses, by sex and race or ethnic origin: 1982 to 1992 .....	135
Appendix table 3-5. Percent of high school graduates earning minimum credits in mathematics courses, by sex and race or ethnic origin: 1982 to 1992 .....	136
Appendix table 3-6. Percent of high school classes perceived as low and high ability, by percent minority in class: 1993 .....	137
Appendix table 3-7. Percent of grades 10–12 science and mathematics classes where teachers report ability grouping: 1986 and 1993 .....	137
Appendix table 3-8. Number of full-time and part-time teachers in science and mathematics in the United States, by sex, race or ethnic origin, and teaching assignment: 1988 and 1991 .....	138
Appendix table 3-9. Percent of public school grades 9–12 science and mathematics teachers who are female or minority, by state: 1991 .....	139
Appendix table 3-10. Distribution of science and mathematics teachers, by race or ethnic origin and grade range: 1986 and 1993 .....	140
Appendix table 3-11. Percent of science and mathematics teachers with master’s degrees, by years of teaching experience and by grade range: 1993 .....	140
Appendix table 3-12. Percent of science and mathematics classes about which teachers report having strong control over various curriculum and instructional decisions, by grade range: 1993 .....	141
Appendix table 3-13. Percent of 12th-grade science and mathematics students whose teachers report having “complete control” over particular decisions, by subject: 1992.....	142
Appendix table 3-14. Percent of 12th-grade science and mathematics students whose teachers report having “complete control” over particular decisions, by region: 1992 .....	142
Appendix table 3-15. Percent of 12th-grade science and mathematics students whose teachers report having “complete control” over particular decisions, by overall proficiency level: 1992 .....	143
Appendix table 3-16. Percent of mathematics teachers who are familiar with the National Council of Teachers of Mathematics’ standards, by level of familiarity and grade range: 1993.....	144
Appendix table 3-17. Percent of science and mathematics teachers agreeing with each of a number of statements related to curriculum and instruction, by grade range: 1993.....	145
Appendix table 3-18. Percent of mathematics teachers indicating that various strategies definitely should be a part of mathematics instruction, by strategy and grade range: 1993 .....	146
Appendix table 3-19. Percent of classes using lecture and hands-on activities in most recent lesson, by subject and grade range: 1977 to 1993 .....	147
Appendix table 3-20. Percent of science teachers indicating that various strategies definitely should be a part of science instruction, by strategy and grade range: 1993.....	148

Appendix table 3-21. Percent of science teachers completing various numbers of science courses, by area, number of science courses completed, grade range, and number of science areas: 1993.....	149
Appendix table 3-22. Grades 7–12 science teachers' level of preparation in field taught: 1993.....	150
Appendix table 3-23. Percent of mathematics teachers completing college courses in mathematics and science, by grades taught: 1993 .....	151
Appendix table 3-24. Percent of mathematics teachers completing college coursework recommended by the National Council of Teachers of Mathematics: 1986 and 1993 ....	152
Appendix table 3-25. Preparation of teachers of grades 7–12 science and mathematics classes with low, medium, and high proportions of minority students, by percent of classes: 1993 .....	153
Appendix table 3-26. Percent of self-contained elementary teachers feeling very well qualified to teach each subject: 1977 to 1993 .....	153
Appendix table 3-27. Percent of mathematics teachers considering themselves well qualified to teach specific topics, by grade range: 1993 .....	154
Appendix table 3-28. Percent of mathematics teachers considering themselves well prepared to do specific tasks, by grade range: 1993 .....	155
Appendix table 3-29. Percent of science teachers considering themselves well prepared to do specific tasks, by grade range: 1993 .....	156
Appendix table 3-30. Percent of 12th-grade students whose science and mathematics teachers discuss curriculum issues, by type of person or group with whom they discuss: 1992.....	157
Appendix table 3-31. Percent of science and mathematics teachers agreeing with each of a number of statements related to teacher collegiality, by grade range: 1993.....	158
Appendix table 3-32. Amount of time science and mathematics teachers spent on science or mathematics in-service education in the past 3 years, by subject of class taught and grade range: 1993 .....	159
Appendix table 3-33. Year of most recent college coursework in field for science and mathematics teachers, by grade range: 1993.....	159
Appendix table 3-34. Percent of science and mathematics teachers participating in various professional activities in the past 12 months, by subject and grade range: 1993 .....	160
Appendix table 3-35. Percent of mathematics classes never taking part in various activities, by grade range: 1993 .....	161
Appendix table 3-36. Percent of science classes never taking part in various activities, by grade range: 1993 .....	162
Appendix table 3-37. Percent of science and mathematics classes “covering” various proportions of their textbooks, by grade range: 1986 and 1993.....	163
Appendix table 3-38. Percent of 12th-grade science teachers responding to availability and condition of science equipment and facilities: 1992.....	164
Appendix table 3-39. Median and mean student–computer ratios for computer-using schools, by country and school level: 1992 .....	164

Appendix table 3-40. Mean percent of 16+ bit computers (80286 and higher processors) in computer-using schools: 1989 and 1992 .....	165
Appendix table 3-41. Percent of external network use by type of external network: 1992 .....	166
Appendix table 3-42. Average percentage of mathematics problems correct on test items requiring the use of a calculator, ages 9, 13, and 17: 1978 to 1992.....	166

#### CHAPTER 4—POSTSECONDARY EDUCATION

Appendix table 4-1. Percent of high school sophomores aspiring to various levels of postsecondary education, by race or ethnic origin and sex: 1980 and 1990.....	167
Appendix table 4-2. College enrollment rates of recent high school graduates, by race or ethnic origin: 1976 to 1992.....	168
Appendix table 4-3. Total fall enrollment in postsecondary institutions, by attendance status and age: 1970 to 1991 .....	169
Appendix table 4-4. Total fall enrollment in postsecondary institutions, by sex: 1970 to 1998 (projected) .....	170
Appendix table 4-5. Total fall enrollment in postsecondary institutions, by race or ethnic origin of student, all institutions, and 2-year institutions: 1976 to 1993.....	171
Appendix table 4-6. Number of college courses outside their major that 1991 bachelor's degree recipients took, by field, sex, and race or ethnic origin: 1991.....	172
Appendix table 4-7. Students with a grade point average of 3.0 or higher, by field of major and sex: 1991 .....	174
Appendix table 4-8. Number and percent of high school graduates, college enrollment, and science and engineering degree attainment, by race or ethnic origin: 1990 .....	175
Appendix table 4-9. Number and percent of high school graduates, college enrollment, and science and engineering degree attainment, by sex: 1990.....	176
Appendix table 4-10. Percent of high school seniors taking selected science and mathematics courses, by sex and post-high-school plans: 1990 and 1993 .....	177
Appendix table 4-11. Percent of all faculty who say that undergraduates in their country are adequately prepared in selected skills, by type of skill and country: 1992 .....	178
Appendix table 4-12. Percent of 1987 first-year undergraduate students in 4-year institutions who had stayed in or switched to other (declared or intended) majors by 1991, by field of major: 1991 .....	179
Appendix table 4-13. Average undergraduate tuition and fees paid by students, by type and control of institution: 1985 to 1993.....	180
Appendix table 4-14. Debt burden of 1990 bachelor's degree recipients, by postgraduation occupation: 1991 .....	180
Appendix table 4-15. Number and percent of science and engineering doctorate recipients, by primary source of support, residency status, and race or ethnic origin: 1992 .....	181

Appendix table 4-16. Participation rate of 22-year-olds in first university degrees in the natural sciences and engineering, by sex and country: most current year (1989 to 1992) .....	182
Appendix table 4-17. Degrees awarded in all fields, science and engineering, and science and engineering as a percent of all fields, by degree level: 1971 to 1991 .....	183
Appendix table 4-18. Number of bachelor's degrees awarded, by major field group and by sex: 1971 to 1991 .....	185
Appendix table 4-19. Number of master's degrees awarded, by major field group and by sex: 1971 to 1991.....	186
Appendix table 4-20. Number of doctoral degrees awarded, by major field group and by sex: 1971 to 1991.....	187
Appendix table 4-21. Science and engineering degrees awarded per hundred U.S. population, by degree level and sex: 1971 to 1991 .....	188
Appendix table 4-22. Number and percent of bachelor's degrees awarded in science and engineering, by citizenship and race or ethnic origin: 1977 to 1991 .....	189
Appendix table 4-23. Number and percent of engineering bachelor's degrees awarded to blacks and Hispanics, by institution and sex: 1993 .....	190
Appendix table 4-24. Number of doctorates awarded to U.S. citizens, by selected racial and ethnic groups: 1982 to 1992.....	191
Appendix table 4-25. Number of science and engineering doctorates awarded to U.S. citizens, by selected racial and ethnic groups and sex: 1982 to 1992 .....	191
Appendix table 4-26. Science and engineering doctorates awarded, by citizenship: 1972 to 1992 .....	192
Appendix table 4-27. Engineering technology degrees awarded, by degree level: 1975 to 1991 .....	193
Appendix table 4-28. Number of institutions of higher education, by Carnegie Institution classification type: 1987 and 1994.....	193
Appendix table 4-29. Total number and percent of full-time instructional faculty, by field and race or ethnic origin: Fall 1987 and Fall 1992 .....	194
Appendix table 4-30. Number and percent of full-time instructional faculty, by field and sex: Fall 1987 and Fall 1992.....	196
Appendix table 4-31. Principal activity of full-time higher education faculty and instructional staff, by field: Fall 1992.....	197
Appendix table 4-32. Mean number of classes taught by full-time faculty, by field, institutional type, and sex: Fall 1992 .....	198
Appendix table 4-33. Number and percent of academic departments of engineering that require or offer communications courses to faculty and graduate students, by size of department: 1992 .....	199
Appendix table 4-34. Percent of courses taught by full-time instructional faculty using different formats, by type of institution and instructor's field: Fall 1992 .....	200
Appendix table 4-35. Percent of mathematics departments offering selected academic activities to undergraduate mathematics majors, by activity and type of institution: 1990.....	201

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Appendix table 4-36. Number of calculus sections requiring selected course activities, by type of institution: 1990 .....	201
Appendix table 4-37. Percent of college and university equipment and instrumentation at doctorate-granting institutions used for instruction and research: 1990 .....	202

Appendix table 1-1

**Summary of NSF funding for the Directorate for Education and Human Resources (EHR): 1956 to 1994 (dollars in millions)**

Fiscal Year	Total NSF	EHR		K-12		Undergraduate		Graduate		Informal		Other	
		Total	Percent of NSF	Total	Percent of EHR	Total	Percent of EHR	Total	Percent of EHR	Total	Percent of EHR	Total	Percent of EHR
1956	16.0	3.5	22.0	0.9	24.1	0.6	15.9	2.1	59.1	0.0	0.0	--	--
1957	38.6	14.3	37.0	10.2	71.0	1.1	8.0	3.0	21.0	0.0	0.0	--	--
1958	50.0	19.2	38.4	12.7	66.0	2.5	13.0	4.2	22.0	0.0	0.0	--	--
1959	132.9	61.3	46.1	41.1	67.0	10.4	17.0	9.8	16.0	0.0	0.0	--	--
1960	158.6	63.7	40.2	41.4	65.0	11.5	18.0	10.2	16.0	0.3	0.5	--	--
1961	175.0	63.4	36.3	38.7	61.0	14.0	22.0	10.8	17.0	0.3	0.5	--	--
1962	260.8	83.6	32.1	52.7	63.0	15.9	19.0	14.2	17.0	0.3	0.4	--	--
1963	320.8	98.7	30.8	56.3	57.0	22.7	23.0	18.8	19.0	0.4	0.4	--	--
1964	354.6	111.2	31.4	60.1	54.0	23.4	21.0	26.7	24.0	0.4	0.4	--	--
1965	416.0	120.4	28.9	53.0	44.0	31.3	26.0	36.1	30.0	0.4	0.3	--	--
1966	466.4	124.3	26.6	52.2	42.0	32.3	26.0	39.8	32.0	0.1	0.1	--	--
1967	465.1	125.8	27.1	50.3	40.0	30.2	24.0	45.3	36.0	0.4	0.3	--	--
1968	500.3	134.5	26.9	53.8	40.0	35.0	26.0	44.4	33.0	0.3	0.2	--	--
1969	432.6	115.3	26.7	45.0	39.0	30.0	26.0	40.4	35.0	0.2	0.2	--	--
1970	462.5	120.4	26.0	50.5	41.9	27.6	23.0	42.1	34.9	0.2	0.2	--	--
1971	496.1	98.8	19.9	36.6	37.0	21.7	22.0	39.5	40.0	0.4	0.4	--	--
1972	600.7	86.1	14.3	35.3	41.0	27.6	32.0	23.3	27.0	0.7	0.8	--	--
1973	610.3	62.2	10.2	24.3	39.0	17.4	28.0	19.3	31.0	0.6	1.0	--	--
1974	645.7	80.7	12.5	30.7	38.0	29.1	36.0	19.4	24.0	2.4	3.0	--	--
1975	693.1	74.0	10.7	28.1	38.0	21.5	29.0	22.2	30.0	1.5	2.0	--	--
1976	724.4	62.5	8.6	7.5	12.0	35.0	56.0	17.5	28.0	2.5	4.0	--	--
1977	791.8	74.3	9.4	9.7	13.0	43.1	58.0	17.8	24.0	3.7	5.0	--	--
1978	857.3	74.0	8.6	14.1	19.0	35.5	48.0	18.5	25.0	5.2	7.0	--	--
1979	926.9	80.0	8.6	16.0	20.0	36.8	46.0	20.8	26.0	6.4	8.0	--	--
1980	975.1	77.2	7.9	16.9	21.9	32.3	41.8	20.3	26.3	7.6	9.9	--	--
1981	1,035.3	70.7	6.8	26.1	36.9	26.0	36.8	14.8	21.0	3.8	5.3	--	--
1982	999.1	20.9	2.1	3.8	18.3	0.0	0.0	15.0	71.8	2.1	10.0	--	--
1983	1,101.7	30.0	2.7	12.8	42.7	0.0	0.0	15.0	50.0	2.2	7.3	--	--
1984	1,306.9	75.0	5.7	52.5	70.0	0.0	0.0	20.3	27.1	2.2	2.9	--	--
1985	1,507.1	82.0	5.4	42.5	51.8	5.0	6.1	27.3	33.3	7.2	8.8	--	--
1986	1,493.2	84.6	5.7	44.7	52.9	5.4	6.3	26.5	31.4	8.0	9.4	--	--
1987	1,627.6	99.0	6.1	50.8	51.3	9.5	9.6	27.3	27.6	11.4	11.5	--	--
1988	1,722.6	139.2	8.1	76.4	54.9	19.0	13.6	30.3	21.8	13.5	9.7	--	--
1989	1,885.9	171.0	9.1	104.0	60.8	28.0	16.4	24.0	14.0	15.0	8.8	--	--
1990	2,026.1	204.3	10.1	125.0	61.2	34.0	16.6	29.9	14.6	15.4	7.5	--	--
1991	2,343.5	322.0	13.7	194.3	60.3	47.6	14.8	38.8	12.0	23.1	7.2	18.2	5.7
1992	2,571.3	441.5	17.2	269.9	61.1	68.7	15.6	50.2	11.4	34.5	7.8	18.1	4.1
1993	2,749.7	505.1	18.4	273.5	54.2	74.5	14.8	77.4	15.3	34.6	6.9	45.1	8.9
1994	3,017.8	569.0	18.9	323.6	56.9	98.2	17.3	59.9	10.5	34.6	6.1	52.6	9.2

-- Not applicable (not in EHR budget).

NOTES: "K-12" excludes informal science, and includes the public science portion of Research on Teaching and Learning. "Other" includes activities such as EPSCoR, Faculty Awards for Women, Visiting Professorships for Women, and Minority Research Centers. SOURCES: National Science Foundation. (1992). *EHR Directory of awards: Fiscal year 1990* (NSF 92-75). Washington, DC: NSF; National Science Foundation. (1994). [Budget figures]. Unpublished tabulations.

## Appendix table 1-2

## Total budget obligations in fiscal year 1994 for mathematics, science, engineering, and technological education of 11 Federal agencies (dollars in millions): 1995

Level of school	Total enacted	Federal agency				
		National Science Foundation	Dept. of Education	Dept. of Health & Human Services	Dept. of Defense	Other seven agencies
Grand total	\$2,612	\$610	\$524	\$712	\$540	\$226
Kindergarten to 12th	771	339	333	21	26	52
Undergraduate	426	176	10	37	145	58
Graduate	999	88	27	449	369	66
Public understanding of science (informal science)	416	7	154	205	--	50

-- Not available.

NOTES: Other Federal agencies include the Departments of Agriculture, Commerce, Energy, and Interior; Smithsonian Institution, National Aeronautics and Space Administration, and Environmental Protection Agency. Because of definitional changes, these figures may not be compatible with previous analyses of this topic. Agency figures may be different as result of evolving priorities for uses of funding.

SOURCE: National Science and Technology Council (NSTC) Committee on Education and Training (CET) Budget Working Group. (1995). [Budget figures from departmental budget offices]. Unpublished tabulations.

## Appendix table 1-3

Number and percent of students enrolled in grades 1-12 and college,  
by race or ethnic origin: 1970 to 1993

Level of school	Race or ethnic origin	1970	1975	1980	1985	1990	1993
		Number (in thousands)					
Grades 1-12	All races	48,665	46,129	42,005	40,845	41,984	44,126
	White	41,361	38,636	34,566	32,971	33,520	34,900
	Black	6,702	6,708	6,459	6,438	6,602	7,109
	Hispanic	NA	3,010	3,411	3,959	4,738	5,090
	Other races	602	785	980	1,436	1,862	2,117
College	All races	7,413	9,697	10,180	10,863	11,303	11,409
	White	6,759	8,516	8,875	9,334	9,465	9,366
	Black	522	948	1,007	1,049	1,187	1,261
	Hispanic	NA	411	443	579	617	867
	Other races	132	233	298	480	651	782
		Percent					
Grades 1-12	All races	100	100	100	100	100	100
	White	85	84	82	81	80	79
	Black	14	15	15	16	16	16
	Hispanic	NA	7	8	10	12	12
	Other races	1	1	2	4	4	5
College	All races	100	100	100	100	100	100
	White	91	88	87	86	84	82
	Black	7	10	10	10	11	11
	Hispanic	NA	4	4	5	5	8
	Other races	2	2	3	4	6	7

NA: Not available.

NOTES: Persons of Hispanic origin may be of any race. Totals may not equal 100 percent as a result of rounding.  
 SOURCES: U.S. Bureau of the Census. (1990). *School enrollment—social and economic characteristics of students: 1989* (Current Population Reports, Population Characteristics Series P-20, No. 443). Washington, DC: U.S. Government Printing Office; U.S. Bureau of the Census. (1991). *School enrollment—social and economic characteristics of students: October 1990* (Current Population Reports, Population Characteristics Series P-20, No. 460). Washington, DC: U.S. Government Printing Office; U.S. Bureau of the Census. (1994). *School enrollment—social and economic characteristics of students: October 1993* (Current Population Reports, Population Characteristics Series P-20, No. 479). Washington, DC: U.S. Government Printing Office.

## Appendix table 1-4

Children ages 5-17 speaking a language other than English at home,  
by English proficiency level: 1980 and 1990

Language proficiency level	Number		Percent	
	1980	1990	1980	1990
<b>All children ages 5–17</b>				
All children ages 5-17	47,493,975	45,342,448	100	100
Children who speak a language other than English	4,568,329	6,322,934	10	14
<b>Children who speak a language other than English</b>				
English proficiency level				
Very well	2,670,957	3,934,691	59	62
Well	1,235,088	1,480,680	27	23
Not well	509,665	761,778	11	12
Not at all	125,161	145,785	3	2

NOTES: Includes only children in households and excludes children in group quarters. Proficiency level reported by the householder completing the census form.  
 SOURCES: U.S. Department of Commerce. (1980). *1980 Census of population, detailed population characteristics: United States summary* (PC 80-1-D1-A). Washington, DC: U.S. Bureau of the Census; U.S. Department of Commerce. (1990). *1990 Census of population* (CPH-L-96). Washington, DC: U.S. Bureau of the Census.

## Appendix table 1-5

## Education level of parents of elementary or secondary school students, by student race or ethnic origin: 1970 to 1993

Education level	Number (in thousands)				Percent			
	1970	1980	1990	1993	1970	1980	1990	1993
Students of all races								
Total	48,016	41,369	39,923	41,707	99.9	100.0	100.1	100.0
0-8 years of school	9,812	5,921	3,518	2,653	20.4	14.3	8.8	6.4
9-11 years of school	9,079	6,232	4,691	4,553	18.9	15.1	11.8	10.9
High school graduate	16,871	15,743	14,894	14,094	35.1	38.0	37.3	33.8
College 1-3 years	5,107	6,127	7,930	10,813	10.6	14.8	19.9	25.9
College graduate or more	7,147	7,346	8,890	9,593	14.9	17.8	22.3	23.0
White students								
Total	40,825	34,050	32,021	33,124	100.0	100.0	100.0	100.0
0-8 years of school	7,258	4,412	2,628	2,049	17.8	13.0	8.2	6.2
9-11 years of school	7,094	4,358	3,238	3,030	17.4	12.8	10.1	9.1
High school graduate	15,262	13,277	11,905	11,090	37.4	39.0	37.2	33.5
College 1-3 years	4,655	5,260	6,479	8,704	11.4	15.4	20.2	26.3
College graduate or more	6,556	6,743	7,771	8,250	16.0	19.8	24.3	24.9
Black students								
Total	6,602	6,358	6,155	6,598	100.1	100.0	100.0	100.0
0-8 years of school	2,401	1,326	645	360	36.4	20.9	10.5	5.5
9-11 years of school	1,910	1,769	1,335	1,301	28.9	27.8	21.7	19.7
High school graduate	1,411	2,175	2,492	2,522	21.4	34.2	40.5	38.2
College 1-3 years	421	744	1,090	1,768	6.4	11.7	17.7	26.8
College graduate or more	459	344	593	650	7.0	5.4	9.6	9.9
Hispanic students								
Total	NA	3,347	4,420	4,704	NA	100.0	99.9	100.0
0-8 years of school	NA	1,634	1,677	1,438	NA	48.8	37.9	30.6
9-11 years of school	NA	493	735	943	NA	14.7	16.6	20.0
High school graduate	NA	774	1,184	1,280	NA	23.1	26.8	27.2
College 1-3 years	NA	293	539	728	NA	8.8	12.2	15.5
College graduate or more	NA	153	285	315	NA	4.6	6.4	6.7

NA: Not available.

NOTES: Data not available for Hispanics before 1980. Persons of Hispanic origin may be of any race. Numbers may not equal totals as a result of rounding.

SOURCES: U.S. Bureau of the Census. (1971). *School enrollment: October 1970* (Current Population Reports, Population Characteristics Series P-20, No. 222). Washington, DC: U.S. Government Printing Office; U.S. Bureau of the Census. (1981). *School enrollment—social and economic characteristics of students: October 1981 and 1980* (Current Population Reports, Population Characteristics Series P-20, No. 400). Washington, DC: U.S. Government Printing Office; U.S. Bureau of the Census. (1991). *School enrollment—social and economic characteristics of students: October 1990* (Current Population Reports, Population Characteristics Series P-20, No. 460). Washington, DC: U.S. Government Printing Office; U.S. Bureau of the Census. (1993). *School enrollment—social and economic characteristics of students: October 1992* (Current Population Reports, Population Characteristics Series P-20, No. 474). Washington, DC: U.S. Government Printing Office; U.S. Bureau of the Census. (1994). *School enrollment—social and economic characteristics of students: October 1993* (Current Population Reports, Current Population Series P-20, No. 479). Washington, DC: U.S. Government Printing Office.

## Appendix table 1-6

## Number and percent of one- or two-parent families with children under age 18, by race or ethnic origin: 1970 to 1993

Family characteristic	Number (in thousands)				Percent			
	1970	1980	1990	1993	1970	1980	1990	1993
All families, total	29,631	32,150	34,670	36,058	100	100	100	100
White	26,115	27,294	28,294	29,225	100	100	100	100
Black	3,219	4,705	5,087	5,364	100	100	100	100
Hispanic	NA	2,194	3,429	3,838	100	100	100	100
One-parent families, total	3,808	6,920	9,749	10,901	13	22	28	30
White	2,638	4,664	6,389	7,167	10	17	23	25
Black	1,148	2,114	3,081	3,377	36	52	61	63
Hispanic	NA	568	1,140	1,344	NA	26	33	35
Two-parent families, total	25,823	25,231	24,921	25,157	87	78	72	70
White	23,477	22,628	21,905	22,058	90	83	77	76
Black	2,071	1,961	2,006	1,987	64	48	39	37
Hispanic	NA	1,626	2,289	2,494	NA	74	67	65

NA: Not available.

NOTES: Persons of Hispanic origin may be of any race. Numbers may not equal totals as a result of rounding.

SOURCES: U.S. Bureau of the Census. (1992). *Household and family characteristics: March 1991* (Current Population Reports, Population Characteristics Series P-20, No. 458). Washington, DC: U.S. Government Printing Office; U.S. Bureau of the Census. (1993). *Household and family characteristics: March 1992* (Current Population Reports, Population Characteristics Series P-20, No. 467). Washington, DC: U.S. Government Printing Office; U.S. Bureau of the Census. (1994). *Household and family characteristics: March 1993* (Current Population Reports, Population Characteristics Series P-20, No. 477). Washington, DC: U.S. Government Printing Office.

## Appendix table 1-7

### Number and percent of white, black, and Hispanic children ages 6-17 below the poverty level: 1970 to 1993

Race or ethnic origin	Number (in thousands)				Percent below poverty level			
	1970	1980	1990	1993	1970	1980	1990	1993
Total	6,932	7,128	6,848	8,865	14.3	16.8	17.6	20.1
White	4,101	4,336	4,254	5,369	9.9	12.4	13.4	15.4
Black	2,708	2,544	2,206	2,999	41.3	40.4	39.8	42.6
Hispanic	NA	NA	1,545	2,117	NA	NA	36.7	37.7

NA: Not available.

NOTES: Poverty status of 1970, 1980, 1990, and 1993 as surveyed on a sample in March of 1971, 1981, 1991, and 1994, respectively. Persons of Hispanic origin may be of any race.

SOURCES: U.S. Bureau of the Census. (1971). *Characteristics of the low-income population: 1970* (Current Population Reports, Population Characteristics Series P-60, No. 18). Washington, DC: U.S. Government Printing Office; U.S. Bureau of the Census. (1981). *Characteristics of the population below the poverty level: 1980* (Current Population Reports, Population Characteristics Series P-60, No. 133). Washington, DC: U.S. Government Printing Office; U.S. Bureau of the Census. (1991). *Poverty in the United States: 1990* (Current Population Reports, Population Characteristics Series P-60, No. 175). Washington, DC: U.S. Government Printing Office; U.S. Bureau of the Census. (1994). *Official poverty statistics: 1993* (Current Population Reports, Population Characteristics Series P-60, No. 188). Washington, DC: Government Printing Office.

## Appendix table 2-1

## NAEP science proficiency: percent of students at or above selected anchor points, by age and race or ethnic origin, 1977 to 1992

Age and race or ethnic origin	Anchor point						Difference	Difference	
		1977	1982	1986	1990	1992	1977-1992	1982-1992	
Age 17	Total	300	41.7 (0.9)	37.3 (0.9)	41.3 (1.4)	43.3 (1.3)	46.6 (1.5)	4.9 (1.7)	9.3 (1.7)
	White		47.5 (0.7)	43.9 (1.2)	48.7 (1.7)	51.2 (1.5)	55.4 (1.7)	7.9 (1.8)	11.5 (2.1)
	Black		7.7 (1.0)	6.5 (1.1)	12.5 (2.2)	15.7 (4.0)	14.1 (2.5)	6.4 (2.7)	7.6 (2.7)
	Hispanic		18.5 (2.1)	11.1 (2.0)	14.8 (2.9)	21.1 (3.3)	23.0 (3.8)	4.5 (4.3)	11.9 (4.3)
	Total	250	81.6 (0.7)	76.6 (1.0)	80.7 (1.3)	81.2 (0.9)	83.3 (1.2)	1.7 (1.4)	6.7 (1.6)
	White		88.2 (0.4)	84.9 (0.9)	87.8 (1.4)	89.6 (0.8)	90.5 (1.0)	2.3 (1.1)	5.6 (1.3)
	Black		40.5 (1.5)	35.0 (2.1)	52.2 (3.2)	51.4 (3.7)	55.7 (3.7)	15.2 (4.0)	20.7 (4.3)
	Hispanic		61.5 (1.7)	48.0 (2.7)	60.0 (7.2)	59.9 (5.0)	68.3 (6.6)	6.8 (6.8)	20.3 (7.1)
	Total	200	97.1 (0.2)	95.7 (0.5)	97.1 (0.5)	96.7 (0.3)	97.8 (0.5)	0.7 (0.5)	2.1 (0.7)
	White		99.2 (0.1)	98.6 (0.2)	98.8 (0.3)	99.0 (0.2)	99.3 (0.3)	0.1 (0.3)	0.7 (0.4)
	Black		83.6 (1.3)	79.7 (1.9)	90.9 (2.1)	88.3 (1.9)	92.1 (1.8)	8.5 (2.2)	12.4 (2.6)
	Hispanic		93.1 (1.7)	86.9 (2.9)	93.3 (2.4)	91.9 (2.2)	94.6 (2.6)	1.5 (3.1)	7.7 (3.9)
Age 13	Total	300	11.1 (0.5)	9.6 (0.7)	9.1 (0.9)	11.2 (0.6)	12.0 (0.8)	0.9 (0.9)	2.4 (1.1)
	White		13.4 (0.5)	11.5 (0.8)	11.3 (1.2)	14.2 (0.8)	15.0 (1.0)	1.6 (1.1)	3.5 (1.3)
	Black		1.2 (0.4)	0.8 (0.3)	1.1 (0.4)	1.5 (0.5)	1.8 (0.8)	0.6 (0.9)	1.0 (0.9)
	Hispanic		1.8 (0.8)	2.4 (0.9)	1.5 (0.7)	3.3 (0.8)	3.3 (1.3)	1.5 (1.5)	0.9 (1.6)
	Total	250	48.8 (1.1)	50.9 (1.6)	52.5 (1.6)	56.5 (1.0)	61.3 (1.1)	12.5 (1.6)	10.4 (1.9)
	White		56.5 (0.9)	58.3 (1.4)	61.0 (1.7)	66.5 (1.2)	71.1 (1.3)	14.6 (1.6)	12.8 (1.9)
	Black		14.9 (1.7)	17.1 (1.9)	19.6 (2.8)	24.3 (3.3)	26.2 (2.8)	11.3 (3.3)	9.1 (3.4)
	Hispanic		18.1 (1.8)	24.1 (5.1)	24.9 (4.3)	30.0 (2.8)	36.5 (2.9)	18.4 (3.4)	12.4 (5.9)
	Total	200	86.0 (0.7)	89.8 (0.8)	91.6 (1.0)	92.3 (0.7)	93.1 (0.5)	7.1 (0.9)	3.3 (0.9)
	White		92.2 (0.5)	94.4 (0.6)	96.1 (0.8)	96.9 (0.4)	97.9 (0.4)	5.7 (0.6)	3.5 (0.7)
	Black		57.3 (2.4)	68.6 (2.4)	73.6 (3.0)	77.6 (3.6)	73.8 (2.8)	16.5 (3.7)	5.2 (3.7)
	Hispanic		62.2 (2.4)	75.5 (3.3)	76.7 (3.2)	80.2 (2.9)	86.2 (2.6)	24.0 (3.5)	10.7 (4.2)
Age 9	Total	300	3.2 (0.3)	2.3 (0.7)	3.0 (0.5)	3.1 (0.3)	3.4 (0.3)	0.2 (0.4)	1.1 (0.8)
	White		3.9 (0.3)	2.9 (0.9)	3.8 (0.6)	3.9 (0.4)	4.3 (0.4)	0.4 (0.5)	1.4 (1.0)
	Black		0.2 (0.1)	0.1 (0.4)	0.3 (0.2)	0.1 (0.2)	0.3 (0.3)	0.1 (0.3)	0.2 (0.5)
	Hispanic		0.3 (0.4)	0.0 (0.0)	0.2 (0.2)	0.4 (0.4)	0.4 (0.4)	0.1 (0.6)	0.4 (0.4)
	Total	250	25.7 (0.7)	24.3 (1.8)	27.5 (1.4)	31.1 (0.8)	32.8 (1.0)	7.1 (1.2)	8.5 (2.1)
	White		30.8 (0.7)	29.4 (2.1)	32.7 (1.5)	37.5 (1.1)	39.4 (1.1)	8.6 (1.3)	10.0 (2.4)
	Black		3.5 (0.6)	3.9 (1.3)	8.3 (1.5)	8.5 (1.1)	9.2 (1.4)	5.7 (1.5)	5.3 (1.9)
	Hispanic		8.8 (1.7)	4.2 (2.7)	10.7 (2.4)	11.6 (2.1)	11.7 (1.8)	2.9 (2.5)	7.5 (3.2)
	Total	200	68.0 (1.1)	70.7 (1.9)	72.0 (1.1)	76.4 (0.9)	78.0 (1.2)	10.0 (1.6)	7.3 (2.2)
	White		76.8 (0.7)	78.4 (2.0)	78.9 (1.0)	84.4 (0.7)	85.5 (0.9)	8.7 (1.1)	7.1 (2.2)
	Black		27.2 (1.5)	38.9 (2.7)	46.2 (2.3)	46.4 (3.1)	51.3 (3.5)	24.1 (3.8)	12.4 (4.4)
	Hispanic		42.0 (3.1)	40.2 (6.1)	50.1 (3.7)	56.3 (3.7)	55.5 (4.3)	13.5 (5.3)	15.3 (7.5)

NOTE: Standard errors appear in parentheses.

SOURCE: Mullis, I.V.S., et al. (1994). *NAEP 1992 trends in academic progress* (Report No. 23-TR01). Washington, DC: National Center for Education Statistics.

## Appendix table 2-2

## NAEP mathematics proficiency: percent of students at or above selected anchor points, by age and race or ethnic origin, 1978 to 1992

Age and race or ethnic origin	Anchor point						Difference		Difference	
		1978	1982	1986	1990	1992	1978-1992	1982-1992		
Age 17	Total	300	51.5 (1.1)	48.5 (1.3)	51.7 (1.4)	56.1 (1.4)	59.1 (1.3)	7.6 (1.7)	10.6 (1.8)	
	White		57.6 (1.1)	54.7 (1.4)	59.1 (1.7)	63.2 (1.6)	66.4 (1.4)	8.8 (1.8)	11.7 (2.0)	
	Black		16.8 (1.6)	17.1 (1.5)	20.8 (2.8)	32.8 (4.5)	29.8 (3.9)	13.0 (4.2)	12.7 (4.2)	
	Hispanic		23.4 (2.7)	21.6 (2.2)	26.5 (4.5)	30.1 (3.1)	39.2 (4.9)	15.8 (5.6)	17.6 (5.4)	
	Total	250	92.0 (0.5)	93.0 (0.5)	95.6 (0.5)	96.0 (0.5)	96.6 (0.5)	4.6 (0.7)	3.6 (0.7)	
	White		95.6 (0.3)	96.2 (0.3)	98.0 (0.4)	97.6 (0.3)	98.3 (0.4)	2.7 (0.5)	2.1 (0.5)	
	Black		70.7 (1.7)	76.4 (1.5)	85.6 (2.5)	92.4 (2.2)	89.6 (2.5)	18.9 (3.0)	13.2 (2.9)	
	Hispanic		78.3 (2.3)	81.4 (1.9)	89.3 (2.5)	85.8 (4.2)	94.1 (2.2)	15.8 (3.2)	12.7 (2.9)	
	Total	200	98.8 (0.1)	99.9 (0.0)	99.9 (0.1)	100.0 (0.1)	100.0 (0.0)	1.2 (0.1)	0.1 (0.0)	
	White		100.0 (0.0)	100.0 (0.0)	100.0 (0.1)	100.0 (0.0)	100.0 (0.0)	0.0 (0.0)	0.0 (0.0)	
	Black		98.8 (0.3)	99.7 (0.2)	100.0 (0.2)	99.9 (0.2)	100.0 (0.1)	1.2 (0.3)	0.3 (0.2)	
	Hispanic		99.3 (0.4)	99.8 (0.3)	99.4 (1.2)	99.6 (0.7)	100.0 (0.0)	0.7 (0.4)	0.2 (0.3)	
Age 13	Total	300	18.0 (0.7)	17.4 (0.9)	15.8 (1.0)	17.3 (1.0)	18.9 (1.0)	0.9 (1.2)	1.5 (1.3)	
	White		21.4 (0.7)	20.5 (1.0)	18.6 (1.2)	21.0 (1.2)	22.8 (1.3)	1.4 (1.5)	2.3 (1.6)	
	Black		2.3 (0.5)	2.9 (1.0)	4.0 (1.4)	3.9 (1.6)	4.0 (0.7)	1.7 (0.9)	1.1 (1.2)	
	Hispanic		4.0 (1.0)	6.3 (1.0)	5.5 (1.1)	6.4 (1.7)	7.0 (1.2)	3.0 (1.6)	0.7 (1.6)	
	Total	250	64.9 (1.2)	71.4 (1.2)	73.3 (1.6)	74.7 (1.0)	77.9 (1.1)	13.0 (1.6)	6.5 (1.6)	
	White		72.9 (0.9)	78.3 (0.9)	78.9 (1.7)	82.0 (1.0)	84.9 (1.1)	12.0 (1.4)	6.6 (1.4)	
	Black		28.7 (2.1)	37.9 (2.5)	49.0 (3.7)	48.7 (3.6)	51.0 (2.7)	22.3 (3.4)	13.1 (3.7)	
	Hispanic		36.0 (2.9)	52.2 (2.5)	56.0 (5.0)	56.7 (3.3)	63.3 (2.7)	27.3 (4.0)	11.1 (3.7)	
	Total	200	94.6 (0.5)	97.7 (0.4)	98.6 (0.2)	98.5 (0.2)	98.7 (0.3)	4.1 (0.6)	1.0 (0.5)	
	White		97.6 (0.3)	99.1 (0.1)	99.3 (0.3)	99.4 (0.1)	99.6 (0.2)	2.0 (0.4)	0.5 (0.2)	
	Black		79.7 (1.5)	90.2 (1.6)	95.4 (0.9)	95.4 (1.1)	95.0 (1.4)	15.3 (2.1)	4.8 (2.1)	
	Hispanic		86.4 (0.9)	95.9 (0.9)	96.9 (1.4)	96.8 (1.1)	98.1 (0.7)	11.7 (1.1)	2.2 (1.1)	
Age 9	Total	300	0.8 (0.1)	0.6 (0.1)	0.6 (0.2)	1.2 (0.3)	1.2 (0.3)	0.4 (0.3)	0.6 (0.3)	
	White		0.9 (0.2)	0.6 (0.1)	0.8 (0.3)	1.5 (0.4)	1.4 (0.3)	0.5 (0.4)	0.8 (0.3)	
	Black		0.0 (0.1)	0.0 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	
	Hispanic		0.2 (0.5)	0.0 (0.0)	0.1 (0.2)	0.2 (0.2)	0.1 (0.5)	-0.1 (0.7)	0.1 (0.5)	
	Total	250	19.6 (0.7)	18.8 (1.0)	20.7 (0.9)	27.7 (0.9)	27.8 (0.9)	8.2 (1.1)	9.0 (1.3)	
	White		22.9 (0.9)	21.8 (1.1)	24.6 (1.0)	32.7 (1.0)	32.4 (1.0)	9.5 (1.3)	10.6 (1.5)	
	Black		4.1 (0.6)	4.4 (0.8)	5.6 (0.9)	9.4 (1.7)	9.6 (1.4)	5.5 (1.5)	5.2 (1.6)	
	Hispanic		9.2 (2.5)	7.8 (1.7)	7.3 (2.8)	11.3 (3.5)	11.7 (2.5)	2.5 (3.5)	3.9 (3.0)	
	Total	200	70.4 (0.9)	71.4 (1.2)	74.1 (1.2)	81.5 (1.0)	81.4 (0.8)	11.0 (1.2)	10.0 (1.4)	
	White		76.3 (1.0)	76.8 (1.2)	79.6 (1.3)	86.9 (0.9)	86.9 (0.7)	10.6 (1.2)	10.1 (1.4)	
	Black		42.0 (1.4)	46.1 (2.4)	53.4 (2.5)	60.0 (2.8)	59.8 (2.8)	17.8 (3.1)	13.7 (3.7)	
	Hispanic		54.2 (2.8)	55.7 (2.3)	57.6 (2.9)	68.4 (3.0)	65.0 (2.9)	10.8 (4.0)	9.3 (3.7)	

NOTE: Standard errors appear in parentheses.

SOURCE: Mullis, I.V.S., et al. (1994). *NAEP 1992 trends in academic progress* (Report No. 23-TR01). Washington, DC: National Center for Education Statistics.

## Appendix table 2-3

## Percent of eighth-grade mathematics students performing at each proficiency level, by race or ethnic origin and socioeconomic status: 1988

Proficiency level and race or ethnic origin of student	Total	Socioeconomic status				
		Low	Middle	High		
Percent performing below basic level						
White	15.5 (0.7)	25.8 (2.0)	16.1 (0.9)	8.2 (0.8)		
Black	28.9 (1.9)	33.4 (3.1)	26.6 (2.7)	20.1 (4.8)		
Hispanic	27.6 (1.8)	32.8 (2.8)	24.8 (2.8)	14.0 (4.3)		
Asian	13.4 (2.0)	27.6 (6.0)	13.0 (3.0)	6.4 (2.3)		
Percent performing at basic level						
White	37.9 (0.9)	48.1 (2.2)	41.3 (1.3)	25.8 (1.3)		
Black	49.4 (2.1)	51.3 (3.3)	50.9 (3.1)	34.7 (5.6)		
Hispanic	46.8 (2.0)	49.3 (2.9)	46.6 (3.2)	36.5 (5.9)		
Asian	30.7 (2.7)	38.3 (6.5)	39.5 (4.3)	15.9 (3.4)		
Percent performing at intermediate level						
White	24.3 (0.8)	19.4 (1.8)	24.8 (1.1)	26.3 (1.3)		
Black	16.5 (1.6)	13.0 (2.2)	18.0 (2.4)	24.2 (5.1)		
Hispanic	16.9 (1.5)	13.5 (2.0)	18.9 (2.5)	24.2 (5.3)		
Asian	21.2 (2.4)	15.7 (4.9)	21.4 (3.6)	23.8 (4.0)		
Percent performing at advanced level						
White	22.4 (0.7)	6.8 (1.1)	17.9 (1.0)	39.8 (1.5)		
Black	5.3 (0.9)	2.3 (1.0)	4.6 (1.3)	21.0 (4.8)		
Hispanic	8.7 (1.2)	4.3 (1.2)	9.7 (1.9)	25.4 (5.3)		
Asian	34.7 (2.8)	18.5 (5.2)	26.0 (3.9)	53.9 (4.7)		

NOTES: Persons of Hispanic origin may be of any race. Standard errors appear in parentheses.  
 SOURCE: Rock, D.A., Pollack, J.M., & Hafner, A. (1991). *The tested achievement of the national education longitudinal study of the 1988 eighth grade class* (NCES 91-460). Washington, DC: U.S. Department of Education.

## Appendix table 2-4

## Average percent of questions answered correctly on the NAEP mathematics exam, by type of question, race or ethnic origin, and age: 1992

Type of question and race or ethnic origin	Age 9	Age 13	Age 17
Extended constructed response			
White	20 (0.8)	10 (0.6)	10 (0.5)
Black	5 (0.7)	2 (0.3)	4 (0.7)
Hispanic	7 (1.0)	3 (0.5)	4 (0.6)
Short constructed response			
White	47 (0.6)	59 (0.6)	44 (0.6)
Black	24 (0.8)	36 (0.9)	26 (0.9)
Hispanic	31 (0.7)	42 (0.7)	32 (0.9)
Multiple choice			
White	53 (0.5)	60 (0.5)	59 (0.4)
Black	38 (0.6)	42 (0.6)	46 (0.9)
Hispanic	42 (0.7)	46 (0.7)	49 (1.0)

NOTES: Standard errors appear in parentheses. Persons of Hispanic origin may be of any race.  
SOURCE: Dossey, J.A., Mullis, I.V.S., & Jones, C.O. (1993). *Can students do mathematical problem solving? Results from constructed-response questions in NAEP's 1992 mathematics assessment*. Washington, DC: U.S. Department of Education.

Indicators for Science and Mathematics Education 1995

## Appendix table 2-5

## NAEP science proficiency, by percent of students at or above selected anchor points, sex, and age: 1977 to 1992

Sex and age	Anchor point	Anchor					Difference	
		1977	1982	1986	1990	1992	1977 to 1992	
Age 17								
Male	300	48.8 (1.1)	45.2 (1.2)	48.8 (2.1)	48.2 (1.6)	50.9 (2.0)	2.1 (2.3)	
Female		34.8 (1.0)	29.9 (1.2)	34.1 (1.5)	38.7 (1.7)	42.0 (1.7)	7.2 (2.0)	
Male	250	85.2 (0.7)	81.2 (1.2)	82.4 (1.4)	82.5 (1.2)	85.0 (1.4)	-0.2 (1.6)	
Female		78.0 (1.0)	72.2 (1.3)	79.1 (1.7)	79.9 (1.4)	81.6 (1.4)	3.6 (1.7)	
Age 13								
Male	250	52.3 (1.3)	56.2 (1.8)	57.3 (2.1)	59.8 (1.3)	62.9 (1.4)	10.6 (1.9)	
Female		45.4 (1.2)	46.0 (1.6)	47.7 (1.7)	53.3 (1.4)	59.6 (1.4)	14.2 (1.8)	
Age 9								
Male	200	69.5 (1.2)	69.7 (2.0)	74.1 (1.4)	76.3 (1.2)	80.4 (1.4)	10.9 (1.8)	
Female		66.5 (1.1)	71.8 (2.2)	70.0 (1.3)	76.4 (1.1)	75.7 (1.2)	9.2 (1.6)	

NOTE: Standard errors appear in parentheses.  
SOURCE: Mullis, I.V.S., et al. (1994). *NAEP 1992 trends in academic progress* (Report No. 23-TR01). Washington, DC: National Center for Education Statistics.

Indicators of Science and Mathematics Education 1995

## Appendix table 2-6

## NAEP mathematics proficiency, by percent of students at or above selected anchor points, sex, and age: 1978 to 1992

Sex and age	Anchor point	Anchor					Difference 1978-1992
		1978	1982	1986	1990	1992	
Age 17							
Male	300	55.1 (1.2)	51.9 (1.5)	54.6 (1.8)	57.6 (1.4)	60.5 (1.8)	5.4 (2.2)
Female		48.2 (1.3)	45.3 (1.4)	48.9 (1.7)	54.7 (1.8)	57.7 (1.6)	9.5 (2.1)
Male	250	93.0 (0.5)	93.9 (0.6)	96.1 (0.6)	95.8 (0.8)	96.9 (0.6)	3.9 (0.8)
Female		91.0 (0.6)	92.1 (0.6)	95.1 (0.7)	96.2 (0.8)	96.3 (0.8)	5.3 (1.0)
Age 13							
Male	250	63.9 (1.3)	71.3 (1.4)	73.8 (1.8)	75.1 (1.8)	78.1 (1.6)	14.2 (2.1)
Female		65.9 (1.2)	71.4 (1.3)	72.7 (1.9)	74.4 (1.3)	77.7 (1.1)	11.8 (1.6)
Age 9							
Male	200	68.9 (1.0)	68.8 (1.3)	74.0 (1.4)	80.6 (1.0)	81.9 (1.0)	13.0 (1.4)
Female		72.0 (1.1)	74.0 (1.3)	74.3 (1.3)	82.3 (1.3)	80.9 (1.1)	8.9 (1.6)

NOTE: Standard errors appear in parentheses.

SOURCE: Mullis, I.V.S., et al. (1994). *NAEP 1992 trends in academic progress* (Report No. 23-TR01). Washington, DC: National Center for Education Statistics.

## Appendix table 2-7

IAEP science scores for selected countries at  
5th percentile, mean, and 95th percentile, by age: 1991

Age and country	5th Percentile	Mean (average)	95th Percentile
Age 13			
Ireland	36.1 (0.8)	63.3 (0.6)	88.9 (0.0)
United States	40.3 (4.9)	67.0 (1.0)	91.7 (0.0)
Spain	43.5 (0.7)	67.5 (0.6)	88.9 (0.0)
Scotland	38.9 (1.2)	67.9 (0.6)	91.7 (0.0)
France	40.3 (1.4)	68.6 (0.6)	91.7 (0.0)
Canada	43.1 (0.0)	68.8 (0.4)	90.3 (1.0)
Israel	42.4 (2.8)	69.7 (0.7)	91.7 (0.0)
Italy	44.4 (0.0)	69.9 (0.7)	91.7 (0.0)
Slovenia	44.4 (0.0)	70.3 (0.5)	91.7 (0.0)
Soviet Union	44.4 (2.2)	71.3 (1.0)	93.1 (3.1)
Hungary	45.8 (1.6)	73.4 (0.5)	94.4 (0.0)
Switzerland	50.0 (0.7)	73.7 (0.9)	94.4 (0.0)
Taiwan	43.1 (1.4)	75.6 (0.4)	95.8 (0.0)
Korea	50.0 (4.8)	77.5 (0.5)	95.8 (0.0)
Age 9			
Ireland	29.3 (1.6)	56.5 (0.7)	81.0 (1.8)
Slovenia	35.1 (0.2)	57.7 (0.5)	79.0 (0.0)
Israel	36.2 (1.4)	61.2 (0.7)	86.2 (0.0)
Soviet Union	39.7 (1.5)	61.5 (1.2)	86.2 (2.4)
Spain	36.2 (0.0)	61.7 (0.7)	84.5 (0.0)
Hungary	38.5 (0.7)	62.5 (0.5)	84.2 (2.9)
Canada	37.9 (1.1)	62.8 (0.4)	84.5 (0.0)
United States	36.2 (1.7)	64.7 (0.9)	87.9 (0.0)
Taiwan	39.7 (0.0)	66.7 (0.5)	89.7 (0.0)
Korea	44.8 (0.4)	67.9 (0.5)	87.9 (0.0)

NOTE: Standard errors appear in parentheses.

SOURCE: Bybee, R.W., et al. (1994). *Science: Measuring U.S. students' success*. Princeton, NJ: Educational Testing Service.

## Appendix table 2-8

IAEP mathematics scores for selected countries at  
5th percentile, mean, and 95th percentile, by age: 1991

Age and country	5th Percentile	Mean (average)	95th Percentile
Age 13			
United States	24.0 (0.6)	55.3 (1.0)	90.7 (0.1)
Spain	28.6 (0.5)	55.4 (0.8)	84.7 (1.3)
Slovenia	27.1 (4.4)	57.1 (0.8)	88.0 (2.6)
Ireland	26.8 (1.7)	60.5 (0.9)	90.7 (0.0)
Scotland	29.0 (3.9)	60.6 (0.9)	90.7 (0.0)
Canada	32.0 (0.0)	62.0 (0.6)	91.8 (4.3)
Israel	30.7 (0.9)	63.1 (0.8)	90.7 (0.0)
Italy	32.4 (1.5)	64.0 (0.9)	91.8 (0.5)
France	30.7 (0.8)	64.2 (0.8)	92.0 (5.3)
Hungary	32.4 (2.3)	68.4 (0.8)	96.0 (0.0)
Soviet Union	35.2 (1.4)	70.2 (1.0)	94.7 (0.0)
Switzerland	42.7 (0.8)	70.8 (1.3)	94.7 (0.0)
Taiwan	26.7 (0.6)	72.7 (0.7)	98.7 (0.0)
Korea	33.3 (2.8)	73.4 (0.6)	97.3 (1.9)
Age 9			
Slovenia	27.7 (1.8)	55.8 (0.6)	84.5 (0.0)
United States	24.6 (0.0)	58.4 (1.0)	90.2 (2.3)
Canada	28.3 (2.5)	59.5 (0.5)	88.5 (0.0)
Ireland	24.6 (0.4)	60.0 (0.8)	90.2 (0.0)
Spain	26.8 (1.8)	61.9 (1.0)	90.2 (2.4)
Israel	30.4 (2.8)	64.4 (0.7)	91.8 (0.0)
Soviet Union	30.8 (1.0)	65.9 (1.3)	93.4 (2.3)
Taiwan	32.1 (4.6)	68.1 (0.8)	95.1 (0.0)
Hungary	33.3 (1.5)	68.2 (0.6)	93.4 (0.0)
Korea	41.0 (2.8)	74.8 (0.6)	95.1 (0.0)

NOTE: Standard errors appear in parentheses.

SOURCE: Dossey, J.A., et al. (1994). *Mathematics: How do U.S. students measure up?* Princeton, NJ: Educational Testing Service.

### Appendix table 3-1

#### Percent of states imposing graduation requirements in mathematics: 1974 to 1992

Years required	1974	1980	1983	1985	1987	1989	1990	1992
Total	100	100	100	100	100	100	100	100
None	29	27	24	12	12	10	12	14
0.5–0.9	0	0	0	0	0	0	0	0
1.0–1.9	55	55	18	4	4	2	2	0
2.0–2.9	14	16	51	67	65	65	65	61
3.0–3.9	2	2	8	18	20	22	22	25
4.0	0	0	0	0	0	0	0	0

NOTES: All 50 states and the District of Columbia are included in this table. Totals may not equal 100 percent as a result of rounding. Some states required an additional year of coursework in either science or mathematics. This table counts such a requirement as one-half year in each subject.

SOURCES: Stecher, B. (1991). *Describing secondary curriculum in mathematics and science: Current conditions and future indicators* (N-3406-NSF). A RAND note presented to the National Science Foundation, Arlington, VA; Blank, R. K. & Gruebel, D. (1993). *State indicators of science and mathematics education 1993*. Washington, DC: Council of Chief State School Officers.

Indicators of Science and Mathematics Education 1995

### Appendix table 3-2

#### Average number of minutes per day spent teaching each subject to self-contained classes, by grade range: 1977 to 1993

Grade range	Year	Reading	Mathematics	Science
Grades 1-3	1977*	95 (1.6)	41 (0.6)	17 (0.2)
	1986	84 (1.6)	46 (0.6)	20 (0.4)
	1993	85 (2.1)	50 (0.7)	24 (0.7)
Grades 4-6	1977	66 (1.3)	51 (0.4)	28 (0.6)
	1986	63 (1.3)	52 (0.6)	29 (1.0)
	1993	61 (1.8)	53 (1.1)	36 (2.1)

\* The survey used estimates for teachers of grades K-3.

NOTES: Self-contained refers to teachers who are responsible for teaching most or all of their academic subjects in one class. Standard errors appear in parentheses.

SOURCES: Weiss, I.R. (1987). *Report of the 1985-86 national survey of science and mathematics education*. Research Triangle Park, NC: Research Triangle Institute; Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

Indicators of Science and Mathematics Education 1995

## Appendix table 3-3

## Mean number of credits earned by high school graduates in each subject field: 1982 to 1992

Subject	1982	1987	1990	1992
English	3.8 (0.03)	4.0 (0.02)	4.1 (0.04)	4.2 (0.02)
History or social studies	3.1 (0.02)	3.3 (0.04)	3.5 (0.03)	3.5 (0.02)
Mathematics	2.6 (0.02)	3.0 (0.03)	3.1 (0.03)	3.3 (0.02)
Science	2.2 (0.02)	2.6 (0.05)	2.9 (0.03)	3.0 (0.03)
Foreign language	1.1 (0.03)	1.5 (0.05)	1.6 (0.04)	1.8 (0.04)
Computer science	0.1 (0.01)	0.0 (0.02)	0.0 (0.02)	0.6 (0.01)

NOTES: Standard errors appear in parentheses. Credits are measured in Carnegie Units.  
 SOURCES: Legum, S., et al. (1993). *The 1990 high school transcript study tabulations: Comparative data on credits earned and demographics for 1990, 1987, and 1982 high school graduate* (NCES 93-423). Washington, DC: National Center for Education Statistics; National Center for Education Statistics. (1992). *National education longitudinal study of 1988: Second teacher follow-up study*. Unpublished tabulations.

Indicators of Science and Mathematics Education 1995

## Appendix table 3-4

## Percent of high school graduates earning minimum credits in science courses, by sex, and race or ethnic origin: 1982 to 1992

Course	Year	Total	Male	Female	White	Black	Hispanic
Any science	1982	97.6	97.5	97.7	97.7	98.6	95.9
	1987	98.7	98.4 (0.4)	99.0 (0.3)	98.7 (0.4)	98.7 (0.4)	98.5 (0.6)
	1990	99.4	99.2 (0.3)	99.7 (0.1)	99.5 (0.2)	99.0 (0.7)	99.3 (0.3)
	1992	99.6	99.5	99.7	99.5	100.0	99.7
Biology	1982	78.7	76.5	80.6	80.1	75.3	73.2
	1987	88.3 (0.9)	87.0 (1.2)	89.7 (0.7)	89.2 (1.0)	86.2 (1.7)	85.4 (1.7)
	1990	91.6 (0.9)	90.4 (1.0)	92.7 (0.9)	92.0 (1.0)	91.0 (2.3)	90.3 (1.4)
	1992	93.0	91.9	94.2	93.5	92.2	91.2
Chemistry	1982	31.6	32.4	30.9	34.7	22.5	16.7
	1987	44.8 (1.1)	45.9 (1.3)	43.7 (1.2)	47.7 (1.2)	29.8 (1.7)	29.4 (1.5)
	1990	49.6 (1.3)	48.8 (1.4)	50.4 (1.4)	52.3 (1.4)	40.3 (2.2)	38.8 (2.8)
	1992	55.5	54.2	56.8	58.0	45.9	42.6
Physics	1982	13.5	17.9	9.4	15.3	6.8	5.5
	1987	19.5 (0.9)	24.6 (1.0)	14.8 (0.9)	20.9 (1.0)	10.1 (1.1)	9.8 (1.1)
	1990	21.5 (0.8)	25.5 (0.9)	17.8 (0.9)	23.1 (0.9)	14.5 (1.9)	13.0 (1.3)
	1992	24.7	28.2	21.4	25.9	17.6	15.7

NOTES: Standard errors appear in parentheses. Standard errors are not available for 1982 and 1992. Because of the use of a different editing procedure, the statistics shown for 1982 differ slightly from previously published figures. Credits are measured in Carnegie Units.  
 SOURCES: Legum, S., et al. (1993). *The 1990 high school transcript study tabulations: Comparative data on credits earned and demographics for 1990, 1987, and 1982 high school graduates* (NCES 93-423). Washington, DC: National Center for Education Statistics; Smith, T.M., et al. (1994). *The condition of education, 1994* (NCES 94-149). Washington, DC: National Center for Education Statistics.

Indicators of Science and Mathematics Education 1995

## Appendix table 3-5

## Percent of high school graduates earning minimum credits in mathematics courses, by sex, and race or ethnic origin: 1982 to 1992

Course	Year	Total	Male	Female	White	Black	Hispanic
Any mathematics	1982	99.0	99.4	98.7	99.1	99.6	98.6
	1987	99.4	99.3 (0.2)	99.4 (0.1)	99.3 (0.2)	99.5 (0.2)	99.4 (0.2)
	1990	99.6	99.4 (0.2)	99.7 (0.1)	99.7 (0.1)	98.7 (0.7)	99.8 (0.2)
	1992	99.6	99.3	99.9	99.7	99.1	99.8
Algebra I	1982	68.4	66.4	70.4	71.1	61.1	59.9
	1987	76.3 (0.8)	75.3 (0.9)	77.2 (0.9)	77.7 (1.1)	70.7 (1.2)	73.1 (1.6)
	1990	77.3 (1.2)	75.6 (1.2)	78.8 (1.4)	77.2 (1.4)	77.6 (2.1)	81.4 (2.1)
	1992	79.4	80.0	78.9	79.6	78.0	84.4
Geometry	1982	48.4	48.3	48.5	53.9	30.3	29.0
	1987	61.5 (0.9)	61.2 (1.2)	61.7 (1.0)	65.1 (1.2)	44.0 (1.9)	40.2 (1.7)
	1990	64.7 (1.3)	63.9 (1.5)	65.4 (1.3)	67.2 (1.4)	56.3 (2.7)	54.4 (2.8)
	1992	70.4	69.0	71.7	72.6	60.4	62.9
Algebra II	1982	36.9	37.5	36.3	40.5	26.2	22.5
	1987	47.1 (1.8)	45.8 (1.9)	48.4 (1.9)	51.9 (1.9)	32.4 (1.5)	30.2 (2.0)
	1990	49.2 (1.4)	47.8 (1.5)	50.5 (1.5)	52.4 (1.7)	39.0 (2.9)	38.6 (2.7)
	1992	56.1	54.0	58.1	59.2	40.9	46.9
Trigonometry	1982	12.2	13.3	11.2	13.8	6.3	6.8
	1987	19.0 (1.5)	20.3 (1.8)	17.8 (1.4)	20.9 (1.8)	10.9 (1.1)	9.9 (0.9)
	1990	18.4 (1.3)	18.4 (1.4)	18.3 (1.3)	19.6 (1.4)	14.1 (1.9)	11.0 (1.5)
	1992	21.1	21.4	20.8	22.5	13.0	15.2
Calculus	1982	4.3	4.7	4.0	5.0	1.4	1.6
	1987	6.2 (0.4)	7.7 (0.6)	4.7 (0.4)	5.9 (0.4)	2.3 (0.4)	3.6 (0.7)
	1990	6.6 (0.5)	7.7 (0.6)	5.6 (0.4)	7.0 (0.5)	2.8 (0.5)	3.9 (0.7)
	1992	10.1	10.3	9.8	10.7	6.9	4.7

NOTES: Standard errors appear in parentheses. Standard errors are not available for 1982 and 1992. Because of the use of a different editing procedure, the statistics shown for 1982 differ slightly from previously published figures. Credits are measured in Carnegie Units. SOURCES: Legum, S., et al. (1993). *The 1990 high school transcript study tabulations: Comparative data on credits earned and demographics for 1990, 1987, and 1982 high school graduates* (NCES 93-423). Washington, DC: National Center for Education Statistics; Smith, T. M., et al. (1994). *The condition of education, 1994* (NCES 94-149). Washington, DC: National Center for Education Statistics.

### Appendix table 3-6

#### Percent of high school classes perceived as low and high ability, by percent minority in class: 1993

Percent minority	Low ability		High ability	
	Science	Mathematics	Science	Mathematics
Less than 10%	9 (3.1)	6 (1.6)	31 (4.6)	28 (4.1)
10% to 39%	10 (1.9)	11 (2.4)	28 (3.4)	24 (2.9)
40% or more	15 (1.4)	24 (4.2)	14 (2.3)	11 (2.5)

NOTE: Standard errors appear in parentheses.

SOURCE: Weiss, I.R. (1994). *1993 National survey of science and mathematics education*. Unpublished tabulations.

Indicators of Science and Mathematics Education 1995

### Appendix table 3-7

#### Percent of grades 10-12 science and mathematics classes where teachers report ability grouping: 1986 and 1993

Ability grouping	Science		Mathematics	
	1986	1993	1986	1993
Total	100	100	100	100
Homogeneous, low ability	10 (1.3)	7 (1.3)	19 (2.2)	10 (1.5)
Homogeneous, average ability	33 (1.9)	28 (2.8)	29 (2.5)	31 (1.9)
Homogeneous, high ability	35 (1.9)	29 (2.0)	34 (2.6)	25 (3.2)
Heterogeneous	22 (1.7)	36 (2.2)	18 (2.1)	34 (2.6)

NOTES: Standard errors appear in parentheses. Totals may not equal 100 percent as a result of rounding.

SOURCES: Weiss, I.R. (1987). *Report of the 1985-86 national survey of science and mathematics education*. Research Triangle Park, NC: Research Triangle Institute; Weiss, I.R. (1994). *1993 National survey of science and mathematics education*. Unpublished tabulations.

Indicators of Science and Mathematics Education 1995

## Appendix table 3-8

**Number of full-time and part-time teachers in science and mathematics in the United States, by sex, race or ethnic origin, and teaching assignment: 1988 and 1991**

Year and grade range	Total	Male	Female	White	Black	Hispanic	Other
1988							
Total	2,592,673	742,710	1,839,119	2,244,888	189,849	75,142	49,589
Elementary grades K-6	1,256,132	145,529	1,105,024	1,076,667	99,102	41,188	24,472
Secondary grades 7-12							
All secondary teachers	1,336,541	597,185	734,095	1,168,222	90,747	33,954	25,118
Science and mathematics specialists	476,600	230,016	245,021	415,865	33,485	10,280	10,265
Primary or secondary assignment:							
Biology	52,231	30,086	21,984	47,150	2,149	866	1,189
Chemistry	19,683	12,708	6,930	17,728	753	297	598
Earth science	21,143	12,671	8,413	18,210	1,892	442	338
Physics	8,908	6,817	2,091	8,343	161	95	220
General science	52,772	28,718	23,963	46,812	3,682	1,050	647
Mathematics	180,954	89,289	90,800	158,199	12,449	4,240	3,877
Other fields	140,908	49,726	90,840	119,423	12,399	3,291	3,396
Other teachers	859,941	362,558	481,444	742,467	55,744	23,241	14,637
1991							
Total	2,882,547	797,836	2,084,712	2,516,238	216,132	97,491	52,686
Elementary grades K-6	1,418,958	163,643	1,255,315	1,218,898	116,602	53,076	30,383
Secondary grades 7-12							
All secondary teachers	1,463,589	634,193	829,396	1,297,340	99,530	44,416	22,304
Science and mathematics specialists	461,120	225,986	235,134	411,135	29,989	12,101	7,896
Primary or secondary assignment:							
Biology	67,151	36,919	30,231	60,186	3,639	2,303	1,022
Chemistry	23,618	14,643	8,975	21,900	1,004	521	192
Earth science	19,074	10,935	8,139	17,221	1,090	601	162
Physics	10,022	8,105	1,917	9,635	102	53	233
General science	56,572	29,663	26,908	50,276	4,021	1,354	920
Mathematics	200,959	98,168	102,791	176,183	15,155	5,584	4,037
Other fields	83,724	27,552	56,172	75,734	4,977	1,683	1,330
Other teachers	1,002,469	408,207	594,262	886,205	69,541	32,315	14,408

SOURCE: National Center for Education Statistics. (1994). *1990-91 Schools and staffing survey (SASS)*. Unpublished tabulations.

## Appendix table 3-9

## Percent of public school grades 9-12 science and mathematics teachers who are female or minority, by state: 1991

State	Percent female science teachers		Percent minority science teachers		Percent female mathematics teachers		Percent minority mathematics teachers	
Total	35	(1.5)	10	(0.9)	45	(1.5)	13	(1.7)
Alabama	71	(4.8)	16	(4.7)	71	(5.9)	14	(4.7)
Alaska	15	(7.6)	8	(4.5)	27	(6.9)	4	(1.8)
Arizona	37	(7.6)	7	(3.5)	47	(7.3)	14	(4.1)
Arkansas	51	(8.6)	19	(6.7)	56	(9.0)	8	(3.0)
California	25	(7.3)	28	(6.1)	32	(6.8)	36	(8.2)
Colorado	33	(5.3)	5	(2.7)	27	(5.5)	2	(1.3)
Connecticut	40	(8.9)	9	(2.8)	59	(8.2)	*	
Delaware	--		--		--		--	
District of Columbia	--		--		--		--	
Florida	42	(8.4)	24	(7.3)	64	(7.4)	9	(3.8)
Georgia	58	(9.1)	18	(5.5)	68	(7.2)	17	(5.2)
Hawaii	--		--		--		--	
Idaho	24	(5.5)	*		35	(4.3)	5	(1.9)
Illinois	41	(7.8)	4	(0.7)	36	(6.6)	13	(3.4)
Indiana	13	(4.0)	4	(2.3)	45	(6.3)	6	(2.1)
Iowa	25	(8.6)	*		36	(7.0)	*	
Kansas	29	(8.0)	*		44	(6.7)		(0.0)
Kentucky	51	(7.3)	*		65	(4.8)	3	(1.9)
Louisiana	41	(6.7)	24	(7.1)	51	(6.2)	27	(7.4)
Maine	22	(5.6)	0	(0.0)	31	(3.8)	*	
Maryland	53	(11.2)	10	(5.8)	51	(8.3)	14	(5.5)
Massachusetts	27	(6.0)	1	(1.0)	40	(6.3)	5	(2.5)
Michigan	27	(5.6)	*		17	(5.5)	*	
Minnesota	17	(4.8)	0	(0.0)	31	(5.4)	*	
Mississippi	48	(6.1)	34	(6.7)	61	(5.9)	32	(5.9)
Missouri	30	(7.0)	*		47	(6.8)	*	
Montana	19	(4.0)	*		21	(6.1)	*	
Nebraska	18	(5.1)	*		33	(8.7)		(0.0)
Nevada	--		--		60	(11.8)	15	(9.5)
New Hampshire	--		--		--		--	
New Jersey	32	(7.0)	5	(3.6)	47	(8.0)	5	(3.3)
New Mexico	40	(6.4)	33	(10.7)	48	(9.9)	28	(6.8)
New York	31	(7.4)	3	(1.9)	49	(7.1)	8	(3.4)
North Carolina	57	(6.3)	14	(5.4)	59	(7.1)	17	(5.0)
North Dakota	21	(4.4)	0	(0.0)	37	(4.9)	*	
Ohio	32	(7.9)	0	(0.0)	31	(7.2)		(0.0)
Oklahoma	25	(5.1)	6	(2.6)	50	(6.5)	13	(4.8)
Oregon	25	(6.0)	*		29	(5.6)	4	(1.9)
Pennsylvania	29	(5.6)	*		48	(7.9)	*	
Rhode Island	--		--		--		--	
South Carolina	47	(4.5)	29	(6.9)	70	(6.2)	11	(3.6)
South Dakota	25	(5.2)	*		43	(4.4)		(0.0)
Tennessee	48	(6.9)	14	(3.8)	62	(7.5)	9	(2.9)
Texas	43	(4.7)	17	(4.2)	54	(5.6)	17	(4.2)
Utah	27	(6.7)	*		32	(5.0)	6	(2.4)
Vermont	--		--		--		--	
Virginia	46	(9.3)	*		63	(6.6)	18	(5.9)
Washington	25	(5.1)	4	(3.1)	24	(6.8)	6	(1.8)
West Virginia	55	(8.2)	*		56	(6.5)	*	
Wisconsin	16	(4.5)	*		30	(8.3)	*	
Wyoming	19	(6.1)	*		28	(7.4)	*	

\* Less than 0.5 percent.

-- Too few sample cases for a reliable estimate.

NOTE: Standard errors appear in parentheses.

SOURCE: Blank, R.K., Matti, M.C., Weiss, I.R., Broughman, S., & Rollefson, M. (1994). *SASS by state, 1990-91 schools and staffing survey: Selected state results* (NCES 94-343). Washington, DC: National Center for Education Statistics.

### Appendix table 3-10

#### Distribution of science and mathematics teachers, by race or ethnic origin and grade range: 1986 and 1993

Year	Race or ethnic origin	Grade range		
		1-6	7-9	10-12
1986	Total	100	100	100
	White	86 (1.0)	93 (1.1)	94 (0.8)
	Black	10 (0.8)	6 (1.0)	4 (0.6)
	Hispanic	3 (0.5)	1 (0.4)	1 (0.3)
	Other	1 (0.3)	1 (0.4)	1 (0.3)
1993	Total	100	100	100
	White	89 (1.3)	91 (1.2)	93 (0.7)
	Black	5 (0.8)	6 (0.6)	3 (0.5)
	Hispanic	4 (1.1)	2 (0.4)	1 (0.3)
	Other	1 (0.3)	2 (0.7)	2 (0.5)

NOTES: Standard errors appear in parentheses. Totals may not equal 100 percent as a result of rounding.  
 SOURCES: Weiss, I.R. (1987). *Report of the 1985-86 national survey of science and mathematics education*. Research Triangle Park, NC: Research Triangle Institute; Weiss, I.R. (1994). *1993 National survey of science and mathematics education*. Unpublished tabulations.

Indicators of Science and Mathematics Education 1995

### Appendix table 3-11

#### Percent of science and mathematics teachers with master's degrees, by years of teaching experience and by grade range: 1993

Years of teaching experience	Grade range		
	1-4	5-8	9-12
0 to 2	8 (1.9)	11 (2.7)	21 (4.4)
3 to 5	19 (3.5)	17 (4.2)	31 (3.7)
6 to 10	39 (4.4)	34 (5.8)	45 (4.7)
11 to 20	40 (3.9)	50 (4.3)	62 (2.4)
21 or more	47 (4.3)	58 (3.9)	72 (2.4)

NOTE: Standard errors appear in parentheses.  
 SOURCE: Weiss, I.R. (1994). *1993 National survey of science and mathematics education*. Unpublished tabulations.

Indicators of Science and Mathematics Education 1995

## Appendix table 3-12

### Percent of science and mathematics classes about which teachers report having strong control over various curriculum and instructional decisions, by grade range: 1993

Field and decision	Grade range		
	1–4	5–8	9–12
Science			
Selecting teaching techniques	66 (2.1)	72 (3.0)	79 (3.0)
Determining amount of homework to be assigned	72 (2.1)	75 (3.1)	81 (2.5)
Setting pace for covering topics	56 (2.5)	63 (2.8)	71 (2.6)
Choosing criteria for grading students	60 (3.4)	66 (3.1)	69 (2.5)
Selecting sequence in which topics are covered	56 (2.0)	62 (3.0)	68 (2.7)
Selecting other instructional materials	30 (2.0)	42 (2.8)	55 (3.8)
Determining goals and objectives	32 (1.9)	40 (3.0)	53 (3.7)
Selecting content, topics, and skills to be taught	27 (2.5)	36 (2.6)	50 (3.3)
Selecting textbooks	11 (1.5)	25 (2.3)	45 (4.2)
Mathematics			
Selecting teaching techniques	69 (2.7)	71 (2.7)	76 (1.4)
Determining amount of homework to be assigned	68 (3.1)	72 (2.9)	79 (1.8)
Setting pace for covering topics	60 (3.3)	55 (3.1)	56 (2.4)
Choosing criteria for grading students	53 (2.7)	63 (2.7)	66 (2.3)
Selecting sequence in which topics are covered	52 (2.1)	52 (2.9)	54 (2.4)
Selecting other instructional materials	36 (2.3)	40 (2.1)	52 (2.2)
Determining goals and objectives	29 (3.1)	33 (1.8)	41 (2.4)
Selecting content, topics, and skills to be taught	22 (2.0)	27 (2.2)	39 (2.4)
Selecting textbooks	12 (1.4)	20 (2.0)	35 (2.6)

NOTES: Teachers were given a five-point scale for each decision, with 1 labeled as "no control" and 5 labeled "strong control." Standard errors appear in parentheses.

SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

### Appendix table 3-13

#### Percent of 12th-grade science and mathematics students whose teachers report having “complete control” over particular decisions, by subject: 1992

Decision	Science	Mathematics	All science and mathematics
Determining amount of homework	70	71	71
Selecting teaching techniques	68	69	69
Selecting content, topics, and skills to be taught	45	24	32
Disciplining students	37	41	40
Selecting textbooks and other instructional materials	37	19	27

SOURCE: National Center for Education Statistics. (1992). *National education longitudinal study of 1988: Second teacher follow-up study*. Unpublished tabulations.

Indicators of Science and Mathematics Education 1995

### Appendix table 3-14

#### Percent of 12th-grade science and mathematics students whose teachers report having “complete control” over particular decisions, by region: 1992

Area	Midwest	Northeast	South	West
Determining amount of homework	69	72	71	74
Selecting teaching techniques	69	76	64	71
Selecting content, topics, and skills to be taught	39	34	24	37
Disciplining students	38	48	36	41
Selecting textbooks and other instructional materials	32	36	18	27

SOURCE: National Center for Education Statistics. (1992). *National education longitudinal study of 1988: Second teacher follow-up study*. Unpublished tabulations.

Indicators of Science and Mathematics Education 1995

## Appendix table 3-15

## Percent of 12th-grade science and mathematics students whose teachers report having “complete control” over particular decisions, by overall proficiency level: 1992

Subject and area	Proficiency level					
	Below		Level 2	Level 3	Level 4	Level 5
	Level 1	Level 1				
Science						
Determining amount of homework	73	71	72	70	--	--
Selecting teaching techniques	68	66	68	71	--	--
Selecting content, topics, and skills to be taught	26	29	33	36	--	--
Disciplining students	41	38	40	41	--	--
Selecting textbooks and other instructional materials	20	21	28	32	--	--
Mathematics						
Determining amount of homework	70	74	72	73	70	69
Selecting teaching techniques	64	66	67	69	69	73
Selecting content, topics, and skills to be taught	25	27	29	33	35	36
Disciplining students	35	38	38	42	40	44
Selecting textbooks and other instructional materials	15	20	21	28	30	35

-- Not applicable.

NOTES: Science levels of proficiency as defined by the NELS:88 Second follow-up student component data file user's manual are as follows:

Science Level 1: Understanding of everyday science concepts, "common knowledge" that can be acquired in everyday life.

Science Level 2: Understanding of fundamental science concepts upon which more complex science knowledge can be built.

Science Level 3: Understanding of relatively complex scientific concepts, typically requiring an additional problem-solving step.

Mathematics levels of proficiency as defined by their NELS:88 Second follow-up student component data file user's manual are as follows:

Math Level 1: Simple arithmetical operations on whole numbers, essentially single-step operations that rely on rote memory.

Math Level 2: Simple operations with decimals, fractions, powers, and roots.

Math Level 3: Simple problem solving, requiring the understanding of low-level mathematical concepts.

Math Level 4: Understanding of intermediate-level mathematical concepts or having the ability to formulate multistep solutions to work problems.

Math Level 5: Proficiency in solving complex multistep word problems or the ability to demonstrate knowledge of mathematics material found in advanced mathematics courses.

SOURCE: National Center for Education Statistics. (1992). *National education longitudinal study of 1988: Second teacher follow-up study*. Unpublished tabulations.

## Appendix table 3-16

### Percent of mathematics teachers who are familiar with the National Council of Teachers of Mathematics' standards, by level of familiarity and grade range: 1993

Standard and level of familiarity	Grade range		
	1-4	5-8	9-12
Curriculum and evaluation standards			
Total	100	100	100
Well aware of them	18 (1.6)	28 (2.2)	56 (2.6)
Heard about them, but don't know much about them	39 (1.8)	41 (3.0)	33 (2.7)
Not aware of them	30 (2.9)	22 (2.6)	8 (1.4)
Not sure	13 (1.2)	9 (2.1)	3 (0.3)
Professional standards for teaching			
Total	100	100	100
Well aware of them	12 (1.3)	19 (1.7)	40 (2.0)
Heard about them, but don't know much about them	38 (2.0)	48 (3.0)	44 (2.7)
Not aware of them	38 (2.8)	25 (2.8)	13 (1.8)
Not sure	12 (1.3)	8 (1.4)	3 (0.4)

NOTES: Standard errors appear in parentheses. Totals may not equal 100 percent as a result of rounding.

SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

## Appendix table 3-17

## Percent of science and mathematics teachers agreeing with each of a number of statements related to curriculum and instruction, by grade range: 1993

Field and statement	Grade range		
	1-4	5-8	9-12
Science			
Students learn best when they study science in the context of a personal or social application	94 (1.4)	94 (2.2)	86 (4.5)
Virtually all students can learn to think scientifically	80 (2.4)	84 (3.3)	76 (2.6)
Laboratory-based science classes are more effective than nonlaboratory classes	78 (2.1)	87 (1.5)	90 (1.2)
It is important for students to learn basic scientific terms and formulas before learning underlying concepts and principles	31 (2.2)	44 (3.7)	55 (2.6)
Students learn best in classes with students of similar abilities	23 (2.3)	33 (3.3)	68 (2.0)
Mathematics			
Students learn best when they study mathematics in the context of a personal or social application	94 (1.3)	91 (1.7)	84 (1.7)
Virtually all students can learn to think mathematically	76 (2.0)	76 (2.6)	72 (2.3)
Students must master arithmetic computation before going on to algebra	70 (2.2)	77 (3.1)	81 (1.7)
Students learn mathematics best in classes with students of similar abilities	41 (1.9)	62 (3.8)	76 (2.9)
Students should be able to use calculators most of the time	24 (1.9)	39 (3.1)	73 (1.7)

NOTES: Includes teachers who indicated "Strongly Agree" and "Agree" to each statement. Standard errors appear in parentheses.  
SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

## Appendix table 3-18

### Percent of mathematics teachers indicating that various strategies definitely should be a part of mathematics instruction, by strategy and grade range: 1993

Strategy	Grade range		
	1-4	5-8	9-12
Hands-on or manipulative activities	82 (2.2)	49 (3.2)	26 (2.2)
Concrete experience before abstract treatments	81 (2.0)	55 (2.7)	33 (2.5)
Applications of mathematics in daily life	81 (1.6)	75 (3.1)	50 (2.8)
Emphasis on solving real problems	80 (1.9)	78 (1.9)	57 (2.9)
Every student studying mathematics each year	76 (2.7)	69 (3.5)	38 (2.5)
Emphasis on mathematical reasoning	69 (2.0)	64 (2.6)	58 (3.0)
Emphasis on connections among concepts	68 (1.7)	62 (2.4)	52 (2.2)
Students working in cooperative learning groups	58 (1.8)	41 (2.8)	27 (2.2)
Use of computers	52 (2.9)	39 (3.3)	34 (2.3)
Emphasis on arithmetic computation	49 (2.4)	36 (2.4)	22 (1.8)
Coordination of mathematics with science	34 (2.1)	27 (3.4)	22 (2.6)
Taking student preconceptions about a topic into account when planning curriculum or instruction	34 (2.9)	26 (2.8)	18 (2.5)
Use of calculators	33 (3.2)	37 (3.7)	50 (2.5)
Inclusion of performance-based assessment	33 (1.9)	29 (2.9)	18 (1.6)
Deeper coverage of fewer mathematics ideas	33 (3.6)	31 (3.4)	16 (2.6)
Emphasis on writing about mathematics	32 (2.0)	23 (2.6)	20 (2.8)
Integration of mathematics subjects all taught together each year	26 (1.7)	25 (3.2)	20 (2.8)
Coordination of mathematics with vocation or technology education	25 (2.5)	23 (2.8)	19 (1.7)

NOTE: Standard errors appear in parentheses.

SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

## Appendix table 3-19

## Percent of classes using lecture and hands-on activities in most recent lesson, by subject and grade range: 1977 to 1993

Year	Grades	Science		Mathematics	
		Lecture	Hands-on	Lecture	Hands-on
1977*	1-3	60 (3.4)	67 (3.3)	58 (3.4)	58 (3.4)
	4-6	69 (3.3)	54 (3.6)	68 (3.3)	38 (3.5)
	7-9	72 (2.3)	59 (2.5)	83 (1.9)	23 (2.1)
	10-12	76 (2.1)	53 (2.4)	89 (1.5)	24 (2.2)
1986	1-3	71 (2.3)	52 (2.5)	69 (2.3)	60 (2.5)
	4-6	78 (2.8)	45 (3.3)	82 (2.4)	31 (2.9)
	7-9	83 (2.2)	43 (3.0)	89 (1.9)	18 (2.3)
	10-12	84 (2.0)	39 (2.7)	90 (1.2)	10 (1.2)
1993	1-3	75 (4.1)	62 (0.7)	79 (2.6)	79 (1.9)
	4-6	82 (2.5)	50 (3.3)	90 (2.0)	51 (4.1)
	7-9	80 (2.9)	50 (3.9)	93 (1.4)	26 (2.7)
	10-12	88 (1.5)	43 (2.3)	94 (2.1)	26 (3.1)

\* The 1977 survey includes kindergarten.

NOTE: Standard errors appear in parentheses.

SOURCES: Weiss, I.R. (1987). *Report of the 1985-86 national survey of science and mathematics education*. Research Triangle Park, NC: Research Triangle Institute; Weiss, I.R. (1994). *1993 National survey of science and mathematics education*. Unpublished tabulations.

## Appendix table 3-20

### Percent of science teachers indicating that various strategies definitely should be a part of science instruction, by strategy and grade range: 1993

Strategy	Grade range		
	1-4	5-8	9-12
Hands-on or laboratory activities	78 (2.3)	78 (2.8)	76 (2.1)
Applications of science in daily life	73 (2.5)	69 (4.3)	60 (3.6)
Concrete experience before abstract treatments	70 (2.6)	51 (4.4)	35 (3.1)
Every student studying science every year	63 (2.0)	61 (2.9)	37 (2.6)
Students working in cooperative learning groups	57 (2.5)	50 (3.0)	30 (2.0)
Emphasis on connections among concepts	52 (2.7)	54 (4.4)	53 (2.5)
Coordination of sciences with mathematics	47 (2.8)	43 (3.5)	47 (3.8)
Coordination of sciences with language arts	46 (2.7)	35 (3.7)	20 (3.0)
Coordination of sciences with social science	43 (2.9)	34 (3.6)	19 (3.8)
Taking student conceptions about a natural phenomenon into account when planning curriculum or instruction	39 (2.2)	34 (4.0)	22 (1.4)
Coordination of sciences with vocational or technology education	37 (2.5)	33 (4.2)	29 (1.7)
Use of computers	30 (3.6)	37 (4.3)	36 (2.3)
Coordination of science disciplines	30 (3.4)	37 (3.3)	35 (2.7)
Revisiting science topics, each time in greater depth	29 (2.6)	21 (2.4)	19 (1.6)
Deeper coverage of fewer science concepts	28 (2.8)	30 (3.1)	20 (1.6)
Applications of scientific methods in addressing societal issues	28 (2.3)	33 (3.3)	35 (3.1)
Inclusion of performance-based assessment	22 (2.4)	26 (3.5)	18 (1.8)

NOTE: Standard errors appear in parentheses.

SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

## Appendix table 3-21

**Percent of science teachers completing various numbers of science courses,  
by area, number of science courses completed, grade range, and number of  
science areas: 1993**

Area and number of courses	Grade range		
	1-4	5-8	9-12
Number of science areas completed			
Total	100	100	100
None	1 (0.5)	0 (0.2)	0 (0.1)
1	9 (1.4)	7 (1.9)	4 (1.0)
2	28 (2.2)	25 (3.2)	20 (2.2)
3	63 (2.9)	68 (2.9)	77 (2.3)
Area of study			
Life science			
Total	100	100	100
None	8 (1.2)	6 (1.6)	6 (1.1)
1 to 3 courses	68 (3.5)	47 (4.6)	17 (2.6)
4 to 7 courses	20 (3.2)	28 (3.2)	20 (3.0)
8 or more courses	4 (1.2)	18 (2.1)	57 (1.9)
Physical science			
Total	100	100	100
None	25 (2.2)	19 (3.1)	1 (0.2)
1 to 3 courses	58 (3.2)	44 (3.8)	13 (3.0)
4 to 7 courses	14 (1.9)	23 (2.8)	29 (2.3)
8 or more courses	4 (0.9)	14 (2.5)	57 (2.0)
Earth science			
Total	100	100	100
None	15 (1.6)	14 (2.2)	20 (2.3)
1 to 3 courses	66 (2.8)	53 (3.4)	43 (2.2)
4 to 7 courses	16 (2.0)	24 (2.1)	25 (1.6)
8 or more courses	2 (0.9)	8 (1.8)	11 (1.2)

NOTES: Standard errors appear in parentheses. Totals may not equal 100 percent as a result of rounding.  
SOURCE: Weiss, I.R. (1994). *1993 National survey of science and mathematics education*. Unpublished tabulations.

## Appendix table 3-22

### Grades 7-12 science teachers' level of preparation in field taught: 1993

Field of class taught and grade range	Total	Number of courses taken in same field taught		
		6 or more courses	Fewer than 6 courses	
			6 or more courses in another field	Fewer than 6 courses in another field
Life science, 7-12	100	82 (5.6)	3 (1.2)	14 (5.7)
Earth science, 7-12	100	45 (5.3)	34 (8.2)	21 (8.2)
Physical science, 7-12	100	75 (4.2)	11 (2.5)	14 (3.9)
Biology, 9-12	100	94 (1.9)	3 (1.6)	3 (1.1)
Chemistry, 9-12	100	82 (3.4)	18 (3.6)	1 (0.4)
Physics, 9-12	100	74 (6.0)	22 (5.7)	4 (2.9)

NOTES: Standard errors appear in parentheses. Totals may not equal 100 percent as a result of rounding.

SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

## Appendix table 3-23

## Percent of mathematics teachers completing college courses in mathematics and science, by grades taught: 1993

College course completed	Grade range		
	1-4	5-8	9-12
Mathematics for elementary school teachers	98 (1.2)	80 (2.2)	20 (2.8)
Mathematics for middle school teachers	14 (1.7)	41 (3.6)	30 (1.9)
Geometry for elementary or middle school teachers	30 (2.2)	35 (3.2)	24 (1.7)
College algebra or trigonometry or elementary functions	42 (2.3)	57 (3.7)	89 (1.0)
Calculus	12 (1.8)	32 (2.2)	95 (1.3)
Advanced calculus	4 (1.3)	17 (2.1)	72 (2.9)
Differential equations	2 (0.7)	12 (1.3)	62 (3.3)
Geometry	22 (2.3)	39 (3.0)	84 (2.6)
Probability and statistics	27 (3.0)	44 (3.1)	81 (2.7)
Abstract algebra or number theory	10 (1.5)	22 (2.2)	75 (2.9)
Linear algebra	6 (1.4)	20 (2.0)	78 (2.6)
Applications of mathematics or problem solving	24 (1.8)	28 (2.5)	45 (2.7)
History of mathematics	8 (1.5)	13 (1.6)	42 (2.6)
Discrete mathematics	2 (1.2)	6 (1.2)	26 (2.0)
Other upper-division mathematics	6 (1.7)	18 (1.9)	57 (3.3)
Biological sciences	74 (2.8)	72 (2.9)	55 (2.9)
Chemistry	28 (2.2)	37 (2.4)	51 (2.8)
Physics	17 (1.6)	27 (1.9)	59 (3.0)
Physical science	49 (2.8)	48 (3.6)	31 (2.6)
Earth or space science	45 (2.8)	45 (2.4)	28 (2.8)
Engineering	2 (1.1)	3 (0.9)	10 (0.8)
Computer programming	21 (1.9)	30 (2.4)	65 (2.5)
Other computer science	21 (2.2)	24 (2.6)	33 (2.6)
Supervised student teaching in mathematics	50 (2.6)	41 (3.3)	65 (2.9)
Methods of teaching mathematics	99 (0.4)	91 (2.1)	84 (2.7)
Instructional use of computers or other technologies	35 (3.4)	32 (2.7)	43 (2.3)

NOTE: Standard errors appear in parentheses.

SOURCES: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.; Weiss, I.R. (1994). *1993 National survey of science and mathematics education*. Unpublished tabulations.

## Appendix table 3-24

### Percent of mathematics teachers completing college coursework recommended by the National Council of Teachers of Mathematics: 1986 and 1993

Grade range and course	1986	1993
Grades 7-9		
Calculus	71 (2.7)	73 (3.8)
College geometry	69 (2.8)	70 (3.8)
Probability or statistics	61 (2.0)	69 (3.9)
Abstract algebra or number theory	49 (3.0)	55 (5.1)
Applications of mathematics or problem solving	36 (2.9)	40 (2.1)
Grades 10-12		
Calculus	89 (1.3)	95 (1.5)
College geometry	80 (1.6)	84 (3.1)
Probability and statistics	76 (1.7)	85 (1.8)
Abstract algebra or number theory	69 (1.9)	80 (2.5)
Linear algebra	69 (1.9)	82 (1.6)
Advanced calculus	63 (1.9)	73 (3.3)
Other upper-division mathematics	63 (1.9)	62 (3.8)
Differential equations	61 (2.0)	66 (3.1)
Applications of mathematics or problem solving	39 (2.0)	49 (2.7)
History of mathematics	37 (1.9)	46 (2.8)

NOTE: Standard errors appear in parentheses.

SOURCES: Weiss, I.R. (1987). *Report of the 1985-86 national survey of science and mathematics education*. Research Triangle Park, NC: Research Triangle Institute; Weiss, I.R. (1994). *1993 National survey of science and mathematics education*. Unpublished tabulations.

### Appendix table 3-25

#### Preparation of teachers of grades 7-12 science and mathematics classes with low, medium, and high proportions of minority students, by percent of classes: 1993

Field of class taught and field of study	Proportion of minority students		
	Low	Medium	High
Science or science education			
Undergraduate major in science	60 (3.9)	61 (2.7)	62 (3.2)
Undergraduate or graduate major in science or science education	72 (3.7)	72 (3.0)	68 (3.7)
Undergraduate or graduate major or minor in science or science education	94 (1.7)	89 (2.8)	85 (2.7)
Mathematics or mathematics education			
Undergraduate major in mathematics	37 (3.1)	37 (2.8)	31 (2.3)
Undergraduate or graduate major in mathematics or mathematics education	62 (3.7)	54 (3.3)	47 (2.7)
Undergraduate or graduate major or minor in mathematics or mathematics education	78 (3.7)	73 (3.7)	67 (2.6)

NOTES: Low indicates a proportion of less than 10 percent minority. Medium indicates a proportion between 10 percent and 39 percent minority. High indicates a proportion of at least 40 percent minority. Standard errors appear in parentheses.

SOURCE: Weiss, I.R. (1994). *1993 National survey of science and mathematics education*. Unpublished tabulations.

Indicators of Science and Mathematics Education 1995

### Appendix table 3-26

#### Percent of self-contained elementary teachers feeling very well qualified to teach each subject: 1977 to 1993

Subject	1977*	1986	1993
Reading or language arts	63 (1.7)	86 (1.0)	76 (1.9)
Mathematics	49 (1.8)	69 (1.3)	60 (2.4)
Social studies	39 (1.7)	51 (1.4)	61 (1.7)
Life sciences	--	27 (1.2)	26 (2.0)
Science	22 (1.5)	--	--

-- Not applicable.

\* The survey used estimates for teachers of grades K-3.

NOTES: Self-contained refers to teachers who are responsible for teaching most or all of their academic subjects in one class. Standard errors appear in parentheses.

SOURCES: Weiss, I.R. (1987). *Report of the 1985-86 national survey of science and mathematics education*. Research Triangle Park, NC: Research Triangle Institute; Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

Indicators of Science and Mathematics Education 1995

### Appendix table 3-27

#### Percent of mathematics teachers considering themselves well qualified to teach specific topics, by grade range: 1993

Topic	Grade range		
	1-4	5-8	9-12
Estimation	50 (2.7)	64 (3.3)	72 (2.2)
Number sense and numeration	66 (2.6)	71 (3.0)	78 (2.3)
Number systems and number theory	44 (2.3)	58 (2.8)	67 (2.9)
Measurement	54 (2.6)	60 (3.2)	79 (2.2)
Fractions and decimals	47 (2.1)	81 (3.0)	93 (1.6)
Geometry and spatial sense	42 (2.3)	50 (3.0)	69 (3.3)
Functions	36 (2.1)	49 (2.5)	75 (2.2)
Patterns and relationships	58 (3.1)	52 (3.3)	71 (2.8)
Algebra	17 (2.0)	44 (3.1)	95 (0.8)
Trigonometry	5 (1.3)	13 (1.6)	60 (2.7)
Probability and statistics	11 (1.6)	28 (3.0)	33 (2.3)
Discrete mathematics	5 (0.8)	10 (2.0)	20 (1.7)
Conceptual foundations of calculus	2 (0.5)	4 (0.8)	29 (1.8)
Mathematical structure	7 (1.8)	14 (2.1)	30 (2.0)

NOTE: Standard errors appear in parentheses.

SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

### Appendix table 3-28

#### Percent of mathematics teachers considering themselves well prepared to do specific tasks, by grade range: 1993

Task	Grade range		
	1-4	5-8	9-12
Present the applications of mathematics concepts	93 (1.6)	93 (2.0)	87 (2.7)
Use cooperative learning groups	87 (1.7)	82 (2.6)	66 (2.9)
Take into account student preconceptions about mathematics when planning curriculum and instruction	81 (2.6)	76 (3.3)	66 (2.3)
Use computers as an integral part of mathematics instruction	51 (2.7)	48 (3.7)	43 (2.2)
Use calculators as an integral part of mathematics instruction	55 (2.8)	71 (2.2)	81 (2.4)
Integrate mathematics with other subject areas	78 (2.8)	70 (2.9)	50 (2.9)
Manage a class of students who are using manipulatives	90 (1.5)	79 (2.5)	62 (2.8)
Use a variety of assessment strategies	77 (2.5)	73 (3.2)	67 (2.1)
Use the textbook as a resource rather than as the primary instructional tool	79 (1.1)	67 (3.8)	62 (3.0)
Use performance-based assessment	61 (2.8)	63 (2.6)	58 (2.4)
Teach groups that are heterogeneous in ability	89 (1.8)	85 (2.5)	71 (2.3)
Teach students from a variety of cultural backgrounds	70 (2.5)	73 (2.7)	63 (3.0)
Teach students who have limited English proficiency	28 (3.1)	33 (3.3)	25 (2.4)
Teach students who have learning disabilities	52 (3.6)	43 (3.6)	28 (2.8)
Encourage participation of females in mathematics	95 (1.6)	95 (1.1)	92 (1.5)
Encourage participation of minorities in mathematics	84 (2.9)	84 (2.6)	83 (1.6)
Involve parents in the mathematics education of their children	67 (2.6)	57 (2.6)	49 (2.3)

NOTE: Standard errors appear in parentheses.

SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

### Appendix table 3-29

#### Percent of science teachers considering themselves well prepared to do specific tasks, by grade range: 1993

Task	Grade range		
	1-4	5-8	9-12
Present the applications of science concepts	74 (2.3)	80 (3.5)	92 (3.1)
Use cooperative learning techniques	83 (2.2)	83 (2.5)	64 (3.4)
Take into account student preconceptions about natural phenomena when planning curriculum and instruction	70 (2.2)	63 (3.8)	62 (3.0)
Use computers as an integral part of science instruction	30 (3.4)	31 (2.7)	40 (2.4)
Integrate science with other subject areas	76 (2.3)	67 (3.0)	62 (2.5)
Manage a class of students who are using hands-on or laboratory activities	78 (2.6)	83 (2.1)	91 (3.1)
Use a variety of assessment strategies	70 (3.0)	78 (3.2)	85 (1.5)
Use the textbook as a resource rather than as the primary instructional tool	77 (3.1)	70 (3.0)	80 (3.0)
Use performance-based assessment	60 (2.9)	65 (3.3)	64 (2.7)
Teach groups that are heterogeneous in ability	89 (2.3)	90 (1.9)	71 (2.9)
Teach students from a variety of cultural backgrounds	73 (2.7)	69 (3.7)	62 (2.3)
Teach students who have limited English proficiency	32 (2.7)	25 (3.4)	23 (2.1)
Teach students who have learning disabilities	50 (3.5)	46 (3.1)	27 (1.8)
Encourage participation of females in science	92 (2.0)	94 (1.7)	90 (3.0)
Encourage participation of minorities in science	87 (2.3)	86 (2.4)	80 (3.3)
Involve parents in the science education of their children	57 (3.6)	56 (3.1)	43 (3.0)

NOTE: Standard errors appear in parentheses.

SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

### Appendix table 3-30

#### Percent of 12th-grade students whose science and mathematics teachers discuss curriculum issues, by type of person or group with whom they discuss: 1992

Person or group	Science students	Mathematics students	Science and mathematics students
Teachers in the department	95	97	96
Department chair	82	86	86
Principals	60	59	59
Teachers outside the department	58	59	58
Other teachers outside the school	57	60	59
Other school administrators	45	49	47
Parents	41	42	42
Others in the community (business leaders, university staff, etc.)	36	32	33

SOURCE: National Center for Education Statistics. (1992). *National education longitudinal study of 1988: Second teacher follow-up study*. Washington, DC: NCES.

### Appendix table 3-31

#### Percent of science and mathematics teachers agreeing with each of a number of statements related to teacher collegiality, by grade range: 1993

Field and statement	Grade range		
	1-4	5-8	9-12
<b>Science</b>			
I feel supported by colleagues to try out new ideas in teaching science	74 (2.3)	76 (3.1)	87 (1.6)
I feel that I have many opportunities to learn new things in my present job	74 (2.2)	68 (3.9)	66 (2.0)
Science teachers in this school regularly share ideas and materials	55 (2.5)	56 (3.1)	72 (2.1)
Most science teachers in this school contribute actively to making decisions about the science curriculum	44 (2.8)	47 (3.8)	66 (2.3)
I receive little support from the school administration for teaching science	21 (2.3)	23 (3.5)	23 (2.6)
I have time during the regular school week to work with my peers on science curriculum and instruction	14 (1.6)	14 (2.4)	16 (3.6)
Science teachers in this school regularly observe each other teaching classes as part of sharing and improving instructional strategies	11 (1.8)	11 (1.8)	14 (3.1)
<b>Mathematics</b>			
I feel supported by colleagues to try out new ideas in teaching mathematics	84 (2.0)	83 (3.3)	80 (2.3)
I feel that I have many opportunities to learn new things in my present job	76 (2.3)	72 (2.5)	57 (3.0)
Mathematics teachers in this school regularly share ideas and materials	65 (2.3)	52 (3.2)	67 (2.8)
The testing program in my state or district dictates what mathematics I teach	60 (3.0)	52 (3.3)	40 (2.6)
Most mathematics teachers in this school contribute actively to making decisions about the mathematics curriculum	47 (1.8)	46 (2.8)	69 (2.6)
I receive little support from the school administration for teaching mathematics	14 (1.5)	19 (3.1)	20 (2.6)
I have time during the regular school week to work with my peers on mathematics curriculum and instruction	21 (1.9)	17 (1.8)	16 (1.6)
Mathematics teachers in this school regularly observe each other teaching classes as part of sharing and improving instructional strategies	12 (1.8)	10 (2.1)	11 (1.8)

NOTES: Includes teachers indicating "Strongly Agree" and "Agree" to each statement. Standard errors appear in parentheses.  
SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

**Appendix table 3-32****Amount of time science and mathematics teachers spent on science or mathematics in-service education in the past 3 years, by subject of class taught and grade range: 1993**

Subject of class taught	Amount of time	Grade range		
		1-4	5-8	9-12
Science	None	26 (2.8)	17 (1.9)	12 (1.5)
	Fewer than 6 hours	30 (1.8)	22 (2.6)	14 (1.8)
	6 -15 hours	22 (2.1)	27 (4.2)	18 (3.0)
	16 - 35 hours	14 (1.9)	14 (2.8)	19 (1.4)
	More than 35 hours	9 (1.8)	20 (2.4)	38 (3.1)
Mathematics	None	17 (1.5)	15 (1.5)	10 (1.8)
	Fewer than 6 hours	22 (2.0)	22 (3.5)	14 (2.8)
	6 -15 hours	29 (2.4)	23 (2.5)	21 (1.8)
	16 - 35 hours	18 (2.4)	24 (2.5)	24 (2.6)
	More than 35 hours	15 (2.0)	17 (2.0)	31 (2.5)

NOTE: Standard errors appear in parentheses.

SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

Indicators of Science and Mathematics Education 1995

**Appendix table 3-33****Year of most recent college coursework in field for science and mathematics teachers, by grade range: 1993**

Field and year of most recent course	Grade range		
	1-4	5-8	9-12
Science, total	100	100	100
Before 1983	53 (2.5)	41 (3.0)	24 (3.8)
1983 - 1988	20 (2.1)	18 (1.6)	21 (1.5)
1989 - 1993	26 (3.0)	41 (2.8)	55 (3.2)
Mathematics, total	100	100	100
Before 1983	41 (2.3)	39 (3.8)	31 (1.8)
1983 - 1988	22 (1.9)	22 (3.1)	26 (2.7)
1989 - 1993	37 (2.6)	40 (3.3)	43 (2.2)

NOTES: Standard errors appear in parentheses. Totals may not equal 100 percent as a result of rounding.

SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

Indicators of Science and Mathematics Education 1995

## Appendix table 3-34

### Percent of science and mathematics teachers participating in various professional activities in the past 12 months, by subject and grade range: 1993

Field and activity	Grade range		
	1-4	5-8	9-12
<b>Science</b>			
Served on a school or district curriculum committee	17 (3.4)	26 (2.3)	40 (2.7)
Served on a school or district textbook selection committee	14 (2.0)	19 (2.1)	37 (2.9)
Attended any national or state teacher association meetings	7 (1.0)	20 (3.0)	37 (3.3)
Taught any in-service workshops or courses in science or science teaching	5 (1.1)	9 (1.2)	16 (2.0)
Received any local, state, or national grants or awards for teaching	3 (0.7)	8 (1.3)	17 (1.9)
<b>Mathematics</b>			
Served on a school or district curriculum committee	18 (1.9)	25 (2.6)	51 (2.5)
Served on a school or district textbook selection committee	16 (2.0)	31 (2.7)	47 (2.9)
Attended any national or state teacher association meetings	9 (1.4)	19 (2.1)	39 (2.6)
Taught any in-service workshops or courses in mathematics or mathematics teaching	6 (1.4)	6 (0.8)	13 (1.2)
Received any local, state, or national grants or awards for teaching	3 (0.7)	3 (0.8)	8 (0.6)

NOTE: Standard errors appear in parentheses.

SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

## Appendix table 3-35

Percent of mathematics classes never taking part in various activities,  
by grade range: 1993

Activity	Grade range		
	1-4	5-8	9-12
Work at home on mathematics projects that take a week or more	72 (2.3)	53 (2.8)	66 (2.0)
Listen and take notes during presentation by teacher	63 (3.2)	12 (2.7)	1 (0.2)
Watch films, filmstrips, or videotapes	51 (2.2)	51 (2.4)	54 (2.4)
Work in class on mathematics projects that take a week or more	48 (1.8)	41 (2.7)	58 (2.1)
Write their reasoning about how to solve a problem	31 (1.9)	14 (1.5)	20 (1.6)
Use computers or calculators to develop an understanding of mathematics concepts	21 (1.6)	14 (2.3)	19 (2.2)
Use computers or calculators to do computations	17 (1.3)	8 (3.1)	7 (1.4)
Use computers or calculators to explore problems	17 (1.3)	10 (3.0)	15 (1.5)
Make conjectures and explore possible methods to solve a mathematics problem	16 (2.1)	8 (1.3)	14 (1.9)
Do mathematics problems from textbooks	11 (2.1)	1 (0.4)	1 (0.3)
Participate in dialogue with the teacher to develop an idea	8 (1.7)	5 (1.3)	4 (0.7)
Learn about mathematics through real-life applications	3 (1.2)	3 (1.1)	8 (1.2)
Do mathematics problems from worksheets	2 (0.7)	2 (0.4)	3 (0.6)
Use manipulative materials or models	1 (0.3)	7 (1.3)	19 (1.6)
Work in small groups	1 (0.3)	2 (0.6)	4 (0.6)

NOTE: Standard errors appear in parentheses.

SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

### Appendix table 3-36

#### Percent of science classes never taking part in various activities, by grade range: 1993

Activity	Grade range		
	1-4	5-8	9-12
Listen and take notes during presentation by teacher	52 (1.8)	6 (1.0)	0 (0.2)
Work at home on science projects that take a week or more	51 (1.9)	27 (2.3)	49 (2.3)
Use a computer	38 (3.0)	44 (3.0)	54 (3.2)
Prepare written science reports	36 (2.1)	10 (1.1)	12 (2.3)
Work in class on science projects that take a week or more	28 (2.5)	22 (2.1)	43 (3.4)
Read a science textbook in class	23 (2.4)	9 (1.4)	21 (1.2)
Take field trips	23 (2.7)	35 (2.9)	62 (2.3)
Watch films, filmstrips, or videotapes	6 (1.9)	2 (0.5)	8 (1.5)
Watch the teacher demonstrate a scientific principle	3 (0.8)	4 (1.6)	1 (0.4)
Participate in dialogue with the teacher to develop an idea	3 (1.0)	1 (0.5)	1 (0.4)
Do hands-on or laboratory science activities	2 (0.7)	2 (0.6)	1 (0.3)
Work in small groups	2 (1.0)	1 (0.2)	1 (0.1)

NOTE: Standard errors appear in parentheses.

SOURCE: Weiss, I.R., Matti, M.C., & Smith, P.S. (1994). *Report of the 1993 national survey of science and mathematics education*. Chapel Hill, NC: Horizon Research, Inc.

## Appendix table 3-37

## Percent of science and mathematics classes “covering” various proportions of their textbooks, by grade range: 1986 and 1993

Subject and textbook coverage	1986			1993		
	Grades 1-6	Grades 7-9	Grades 10-12	Grades 1-6	Grades 7-9	Grades 10-12
Science, total	100	100	100	100	100	100
Less than 25%	4 (0.8)	2 (0.8)	1 (0.5)	11 (1.7)	4 (0.7)	4 (1.2)
25% to 49%	11 (1.3)	11 (1.9)	12 (1.8)	18 (1.9)	16 (1.9)	18 (2.3)
50% to 74%	24 (1.2)	27 (2.8)	38 (3.7)	23 (1.8)	32 (3.0)	37 (2.6)
75% to 90%	30 (1.8)	41 (2.9)	34 (2.6)	29 (1.7)	40 (4.5)	34 (2.2)
Greater than 90%	31 (1.9)	20 (3.4)	15 (2.0)	19 (2.0)	8 (1.6)	8 (1.0)
Mathematics, total	100	100	100	100	100	100
Less than 25%	0 (0.0)	1 (0.6)	3 (0.7)	1 (0.4)	0 (0.1)	1 (0.2)
25% to 49%	2 (0.6)	7 (1.5)	6 (1.0)	4 (0.7)	5 (1.1)	6 (0.7)
50% to 74%	8 (1.1)	17 (2.3)	23 (1.7)	22 (1.6)	20 (2.0)	24 (2.3)
75% to 90%	41 (1.9)	50 (3.0)	45 (2.0)	47 (2.1)	47 (2.5)	49 (3.2)
Greater than 90%	48 (3.0)	26 (2.6)	23 (1.7)	26 (2.0)	27 (2.2)	20 (1.7)

NOTES: Standard errors appear in parentheses. Totals may not equal 100 percent as a result of rounding.

SOURCES: Weiss, I.R. (1987). *Report of the 1985-86 national survey of science and mathematics education*. Research Triangle Park, NC: Research Triangle Institute; Weiss, I.R. (1994). *1993 National survey of science and mathematics education*. Unpublished tabulations.

## Appendix table 3-38

## Percent of 12th-grade science teachers responding to availability and condition of science equipment and facilities: 1992

Description	Availability of consumable supplies	Condition of science equipment used	Availability of facilities (lab equipment)
Total	100.0	100.0	100.0
None	3.3	2.7	4.7
Poor	11.8	12.4	12.7
Fair	26.4	32.0	24.9
Good	40.8	41.3	36.7
Excellent	17.7	11.7	21.0

NOTE: Totals may not equal 100 percent as a result of rounding.

SOURCE: National Center for Education Statistics. (1992). *National education longitudinal study of 1988: Second teacher follow-up study*. Washington, DC: NCES.

Indicators of Science and Mathematics Education 1995

## Appendix table 3-39

## Median and mean student-computer ratios for computer-using schools, by country and school level: 1992

Education level	Country	Student-computer ratio*		
		Total schools	Median	Mean
Elementary	Japan	82	24	110 (16.7)
	Netherlands	175	16	24 (1.7)
	United States	171	6	7 (0.5)
Lower secondary	Austria	261	11	11 (0.3)
	Germany	134	15	17 (0.8)
	Japan	129	31	88 (14.4)
	Netherlands	285	14	15 (0.5)
	United States	148	5	7 (0.7)
Upper secondary	Austria	162	4	5 (0.4)
	Japan	136	23	38 (4.5)
	United States	130	5	8 (1.1)

\* Student-computer ratio is calculated using grade-specific enrollment for three grades at each school level (rather than full school enrollment): the target grade, the grade immediately before the target grade, and the grade immediately after it.

NOTE: Standard errors appear in parentheses.

SOURCE: Pelgrum, W.J., Janssen Reinen, I.A.M., & Plomp, T. (Eds.). (1993). *Schools, teachers, students and computers: A cross-national perspective* (IEA COMPED Study Stage 2). Netherlands: IEA.

Indicators of Science and Mathematics Education 1995

### Appendix table 3-40

#### Mean percent of 16+ bit computers (80286 and higher processors) in computer-using schools: 1989 and 1992

Education level	Nation	1989	1992
Lower secondary	Japan	77	92
	Austria	23	67
	Germany	12	38
	Netherlands	1	22
	United States	1	17
Upper secondary	Japan	72	85
	Austria	19	77
	Slovenia	17	76
	United States	3	29

NOTE: Standard errors are not available.

SOURCE: Pelgrum, W.J., Janssen Reinen, I.A.M., & Plomp, T. (Eds.). (1993). *Schools, teachers, students and computers: A cross-national perspective* (IEA COMPED Study Stage 2). Netherlands: IEA.

### Appendix table 3-41

#### Percent of external network use by type of external network: 1992

Education level and type of network	Percent of all schools	Percent of schools that use external networks
Elementary, total number of schools	163	37
AT&T ID Learning	3	13
Dialog or other databases	5	24
National Geographic Kids Network	6	24
CompuServe or other e-mail	11	46
Other	11	43
Lower secondary, total number of schools	142	33
AT&T ID Learning	3	12
Dialog or other databases	3	15
National Geographic Kids Network	3	15
CompuServe or other e-mail	12	52
Other	8	36
Upper secondary, total number of schools	141	61
AT&T ID Learning	5	11
Dialog or other databases	13	30
National Geographic Kids Network	1	3
CompuServe or other e-mail	15	34
Other	15	34

NOTE: Standard errors are not available.

SOURCE: Anderson, R.E. (Ed.). (1993). *Computers in American schools, 1992: An overview*. Minneapolis, MN: University of Minnesota.

Indicators of Science and Mathematics Education 1995

### Appendix table 3-42

#### Average percentage of mathematics problems correct on test items requiring the use of a calculator, ages 9, 13, and 17: 1978 to 1992

Tested age	Items on test	1978	1982	1986	1990	1992
9 years	8	74 (1.0)	75 (0.8)	75 (0.7)	78 (0.9)	80 (0.5)
13 years	8	55 (1.4)	52 (1.4)	55 (1.4)	60 (1.0)	62 (1.3)
17 years	11	63 (1.0)	59 (1.2)	65 (1.2)	66 (1.0)	67 (0.8)

NOTE: Standard errors appear in parentheses.

SOURCE: Mullis, I.V.S., et al. (1994). *NAEP 1992 trends in academic progress* (Report No. 23-TR01). Washington, DC: National Center for Education Statistics.

Indicators of Science and Mathematics Education 1995

## Appendix table 4-1

## Percent of high school sophomores aspiring to various levels of postsecondary education, by race or ethnic origin and sex: 1980 and 1990

Sex, race, or ethnic origin	High school diploma or less		Two years or fewer of college or vocational school		College graduate		Graduate degree	
	1980	1990	1980	1990	1980	1990	1980	1990
All sophomores	26.5	10.2	32.9	30.3	22.7	32.1	17.9	27.4
Male	28.0	11.0	31.7	32.3	22.4	32.9	18.0	23.8
Female	23.4	9.4	34.2	28.3	23.8	31.4	18.7	30.9
Asian	11.7	8.2	21.5	21.7	32.4	31.4	34.3	38.7
Hispanic	33.7	14.3	33.7	38.5	17.0	25.5	15.6	21.7
Black	26.3	11.1	32.7	30.2	21.8	28.2	19.2	30.5
White	25.9	9.4	33.1	29.5	23.4	33.9	17.7	27.3
Native American	35.7	18.8	32.9	43.0	17.2	21.8	14.2	16.5

NOTES: Persons of Hispanic origin may be of any race. Totals may not add to 100 percent as a result of rounding.  
SOURCE: National Center for Education Statistics. (1992). *High school and beyond study, 1980 to 1992*. Washington, DC: NCES.

## Appendix table 4-2

College enrollment rates of recent high school graduates,  
by race or ethnic origin: 1976 to 1992

Year	Recent high school graduates <sup>1</sup> (numbers in thousands)				Enrolled in college <sup>2</sup> (numbers in thousands)				Percent of high school graduates enrolled in college			
	Total	White	Black <sup>3</sup>	Hispanic <sup>3</sup>	Total	White	Black <sup>3</sup>	Hispanic <sup>3</sup>	Total	White	Black <sup>3</sup>	Hispanic <sup>3</sup>
1976	2,987	2,640	320	152	1,458	1,291	134	80	48.8	48.9	41.9	52.6
1977	3,140	2,768	335	156	1,590	1,403	166	80	50.6	50.7	49.6	51.3
1978	3,161	2,750	352	133	1,584	1,378	161	57	50.1	50.1	45.7	42.9
1979	3,160	2,776	324	154	1,559	1,376	147	69	49.3	49.6	45.4	44.8
1980	3,089	2,682	361	129	1,524	1,339	151	68	49.3	49.9	41.8	52.7
1981	3,053	2,626	359	146	1,646	1,434	154	76	53.9	54.6	42.9	52.1
1982	3,100	2,644	384	174	1,568	1,376	140	75	50.6	52.0	36.5	43.1
1983	2,964	2,496	392	138	1,562	1,372	151	75	52.7	55.0	38.5	54.3
1984	3,012	2,514	438	185	1,662	1,455	176	82	55.2	57.9	40.2	44.3
1985	2,666	2,241	333	141	1,539	1,332	141	72	57.7	59.4	42.3	51.1
1986	2,786	2,307	386	169	1,499	1,292	141	75	53.8	56.0	36.5	44.4
1987	2,647	2,207	337	176	1,503	1,249	175	59	56.8	56.6	51.9	33.5
1988	2,673	2,187	382	179	1,575	1,328	172	102	58.9	60.7	45.0	57.0
1989	2,454	2,051	337	168	1,463	1,238	178	93	59.6	60.4	52.8	55.4
1990	2,355	1,921	341	112	1,410	1,182	158	53	59.9	61.5	46.3	47.3
1991	2,276	1,867	320	154	1,420	1,207	146	88	62.4	64.6	45.6	57.1
1992	2,398	1,900	353	199	1,479	1,204	169	109	61.7	63.4	47.9	54.8

NOTES: Persons of Hispanic origin may be of any race. Data are based upon sample surveys of the civilian population.

<sup>1</sup> Individuals aged 16 to 24 who graduated from high school during the preceding 12 months.

<sup>2</sup> Enrollment in college as of October of each year for individuals aged 16 to 24 who graduated from high school or received the GED during the preceding 12 months.

<sup>3</sup> As a result of the small sample size, black and Hispanic data are subject to relatively large sampling errors.

SOURCE: National Center for Education Statistics. (1994). *Digest of educational statistics 1994* (NCES 94-115). Washington, DC: U.S. Government Printing Office.

## Appendix table 4-3

Total fall enrollment in postsecondary institutions,  
by attendance status and age: 1970 to 1991

Age	1970	1975	1980	1985	1987	1990	1991
	Full-time students (in thousands)						
Total	5,815	6,841	7,098	7,075	7,231	7,821	8,115
14-17 years	242	242	216	203	142	141	114
18 and 19	2,406	2,510	2,580	2,322	2,488	2,479	2,408
20 and 21	1,647	1,854	2,060	1,975	2,024	2,121	2,299
22-24	881	1,008	1,174	1,227	1,223	1,387	1,496
25-29	407	692	610	695	693	802	868
30-34	100	279	264	310	293	403	401
35 and older	134	256	193	345	367	487	528
Percent 21 years and younger	73.9	67.3	68.4	63.6	64.4	60.6	59.4
	Part-time students (in thousands)						
Total	2,766	4,344	4,999	5,172	5,536	5,998	6,244
14-17 years	17	36	31	32	95	26	7
18 and 19	194	276	320	278	359	321	305
20 and 21	233	390	364	408	480	498	469
22-24	576	746	815	705	766	779	790
25-29	668	1,082	1,261	1,258	1,237	1,261	1,266
30-34	388	687	979	951	972	957	1,067
35 and older	689	1,127	1,229	1,540	1,626	2,157	2,339
Percent 21 years and younger	16.1	16.2	14.3	13.9	16.9	14.1	12.5

NOTES: Distribution by age is based on samples of the civilian noninstitutional population. Numbers may not add to totals as a result of rounding.

SOURCE: National Center for Education Statistics. (1994). *Digest of educational statistics 1994* (NCES 94-115). Washington, DC: U.S. Government Printing Office.

### Appendix table 4-4

#### Total fall enrollment in postsecondary institutions, by sex: 1970 to 1998 (projected)

Year	Enrollment (in thousands)			Percent female
	Total	Men	Women	
1970	8,581	5,044	3,537	41.2
1975	11,185	6,149	5,036	45.0
1980	12,097	5,874	6,223	51.4
1985	12,247	5,818	6,429	52.5
1987	12,767	5,932	6,835	53.5
1990	13,820	6,284	7,535	54.5
1991	14,359	6,502	7,857	54.7
1998*	15,111	6,811	8,300	54.9

\* Projected

SOURCE: National Center for Education Statistics. (1994). *Digest of educational statistics 1994* (NCES 94-115). Washington, DC: U.S. Government Printing Office.

## Appendix table 4-5

## Total fall enrollment in postsecondary institutions, by race or ethnic origin of student, all institutions, and 2-year institutions: 1976 to 1993

Race or ethnic origin	1976	1980	1984	1988	1990	1991	1993
All institutions							
Students (in thousands)							
Total	10,986	12,087	12,233	13,043	13,820	14,359	14,306
White	9,076	9,833	9,815	10,283	10,723	10,990	10,604
Black	1,033	1,107	1,076	1,130	1,247	1,335	1,410
Hispanic	384	472	535	680	783	867	989
Asian	198	286	390	497	573	637	724
Native American	76	84	84	93	103	114	122
Nonresident alien	219	305	335	361	392	416	457
Percent (U.S. citizens only)							
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White	84.3	83.5	82.5	81.1	79.9	78.8	76.6
Black	9.6	9.4	9.0	8.9	9.3	9.6	10.2
Hispanic	3.6	4.0	4.5	5.4	5.8	6.2	7.1
Asian	1.8	2.4	3.3	3.9	4.3	4.6	5.2
Native American	0.7	0.7	0.7	0.7	0.8	0.8	0.9
Nonresident alien	--	--	--	--	--	--	--
Two-year institutions							
Students (in thousands)							
Total	3,879	4,521	4,527	4,868	5,240	5,652	5,566
White	3,077	3,556	3,514	3,702	3,954	4,199	3,961
Black	429	473	459	473	524	578	599
Hispanic	210	255	289	384	424	484	557
Asian	79	124	167	199	215	256	295
Native American	41	47	46	50	55	74	63
Nonresident alien	42	64	53	60	67	63	91
Percent (U.S. citizens only)							
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White	80.2	79.8	78.5	77.0	76.4	75.1	72.3
Black	11.2	10.6	10.3	9.8	10.1	10.3	10.9
Hispanic	5.5	5.7	6.5	8.0	8.2	8.7	10.2
Asian	2.1	2.8	3.7	4.1	4.2	4.6	5.4
Native American	1.1	1.1	1.0	1.0	1.1	1.3	1.2
Nonresident alien	--	--	--	--	--	--	--

--Distribution for U.S. citizens only.

NOTES: Numbers may not add to totals as a result of rounding. Persons of Hispanic origin may be of any race.

SOURCES: National Center for Education Statistics. (1994). *Digest of educational statistics 1994* (NCES 94-115). Washington, DC: U.S. Government Printing Office; National Center for Education Statistics. (1995). *Fall enrollment in colleges and universities*. Unpublished tabulations.

## Appendix table 4-6

## Number of college courses outside their major that 1991 bachelor's degree recipients took, by field, sex, and race or ethnic origin: 1991

Courses	Total	Male	Female	Race or ethnic origin			
				Black	Hispanic	Asian	Other race or ethnic origin
Mathematics and computer science coursetaking by non-mathematics and non-computer-science majors							
Total, nonmajors	1,008,018	449,784	557,512	59,496	40,653	37,019	55,246
None	196,601	75,274	119,952	10,934	6,983	7,684	12,551
1-4	647,586	268,780	376,358	37,311	24,748	21,153	31,319
5 or more	163,831	105,730	61,202	11,251	8,922	8,181	11,376
Percent							
Total, nonmajors	100.0	100.0	100.0	100.0	100.0	100.0	100.0
None	19.5	16.7	21.5	18.4	17.2	20.8	22.7
1-4	64.2	59.8	67.5	62.7	60.9	57.1	56.7
5 or more	16.3	23.5	11.0	18.9	21.9	22.1	20.6
Engineering coursetaking by non-engineering majors							
Total, nonmajors	978,503	417,450	558,376	59,214	39,361	33,355	53,151
None	908,211	370,072	533,972	56,113	37,768	28,147	50,918
1-4	57,112	35,436	22,559	2,739	1,362	4,465	1,293
5 or more	13,180	11,942	1,845	362	231	743	940
Percent							
Total, nonmajors	100.0	100.0	100.0	100.0	100.0	100.0	100.0
None	92.8	88.7	95.6	94.8	96.0	84.4	95.8
1-4	5.8	8.5	4.0	4.6	3.5	13.4	2.4
5 or more	1.3	2.9	0.3	0.6	0.6	2.2	1.8

Continued

## Appendix table 4-6

## Number of college courses outside their major that 1991 bachelor's degree recipients took, by field, sex, and race or ethnic origin: 1991, continued

Courses	Total	Male	Female	Race or ethnic origin			
				Black	Hispanic	Asian	Other race or ethnic origin
Life and physical sciences coursetaking by non-life and non-physical-sciences majors							
Total, nonmajors	984,866	441,116	543,238	57,595	40,175	35,837	54,378
None	211,507	93,301	118,223	11,992	10,807	6,855	13,391
1-4	609,855	263,147	345,009	36,500	21,820	18,792	30,526
5 or more	163,504	84,668	80,006	9,103	7,548	10,190	10,461
Percent							
Total, nonmajors	100.0	100.0	100.0	100.0	100.0	100.0	100.0
None	21.5	21.2	21.8	20.8	26.9	19.1	24.6
1-4	61.9	59.7	63.5	63.4	54.3	52.4	56.1
5 or more	16.6	19.2	14.7	15.8	18.8	28.4	19.2
Social sciences coursetaking by non-social-sciences majors							
Total, nonmajors	860,673	386,976	473,240	48,297	34,676	33,293	49,258
None	51,791	22,078	29,340	2,176	2,502	2,028	4,957
1-4	338,265	158,003	180,885	18,284	13,935	13,815	21,656
5 or more	470,617	206,895	263,014	27,837	18,239	17,450	22,645
Percent							
Total, nonmajors	100.0	100.0	100.0	100.0	100.0	100.0	100.0
None	6.0	5.7	6.2	4.5	7.2	6.1	10.1
1-4	39.3	40.8	38.2	37.9	40.2	41.5	44.0
5 or more	54.7	53.5	55.6	57.6	52.6	52.4	46.0

NOTES: Persons of Hispanic origin may be of any race. Numbers shown are population estimates from a weighted sample.  
 SOURCE: University of Pennsylvania Institute for Research on Higher Education and the Association of American Colleges and Universities. (1994). *Estimates of student curricular activity from a national survey of colleges and universities*. Philadelphia: University of Pennsylvania.

## Appendix table 4-7

## Students with a grade point average of 3.0 or higher, by field of major and sex: 1991

Major and sex	Total students	Number of students with GPA 3.0 or higher	Percent of students
All students			
All fields, total	1,044,267	562,741	53.9
Science and engineering, total	345,009	185,907	53.9
Mathematical and computer sciences	36,249	19,751	54.5
Life and physical sciences	59,401	36,659	61.7
Engineering	65,764	34,087	51.8
Social sciences	183,595	95,410	53.9
Males			
All fields, total	473,851	221,271	46.7
Science and engineering, total	200,077	98,532	49.2
Mathematical and computer sciences	24,067	11,693	48.6
Life and physical sciences	32,734	19,500	59.6
Engineering	56,401	27,706	49.1
Social sciences	86,875	39,633	45.6
Females			
All fields, total	570,416	338,047	59.3
Science and engineering, total	149,298	88,610	59.4
Mathematical and computer sciences	12,904	8,373	64.9
Life and physical sciences	27,178	17,364	63.9
Engineering	12,040	7,532	62.6
Social sciences	97,176	55,341	56.9

SOURCE: University of Pennsylvania Institute for Research on Higher Education and the Association of American Colleges and Universities. (1994). *Estimates of student curricular activity from a national survey of colleges and universities*. Philadelphia: University of Pennsylvania.

## Appendix table 4-8

## Number and percent of high school graduates, college enrollment, and science and engineering degree attainment, by race or ethnic origin: 1990

Race or ethnic origin	U.S. population (18-24 years old)	High school graduates (18-24 years old)	High school graduates enrolled in college (18-24 years old)	Science and engineering earned bachelor's degrees	Science and engineering earned doctorates
Number					
Total	24,852,000	20,311,000	7,964,000	379,392	14,014
White	20,393,000	16,823,000	6,635,000	296,140	12,560
Black	3,520,000	2,710,000	894,000	21,274	285
Hispanic	2,749,000	1,498,000	435,000	15,680	382
Percent					
Total	100.0	100.0	100.0	100.0	100.0
White	82.1	82.8	83.3	78.1	89.6
Black	14.2	13.3	11.2	5.6	2.0
Hispanic	11.1	7.4	5.5	4.1	2.7

NOTES: Persons of Hispanic origin may be of any race. Totals may not add to 100 percent because not all races and ethnic groups are shown.  
 SOURCES: National Science Foundation. (1994). *Science and engineering degrees, by race/ethnicity of recipients: 1977-1991* (NSF 94-306). Arlington, VA: NSF; U.S. Bureau of the Census. (1992). *School enrollment—social and economic characteristics of students: October 1990* (Current Population Reports, Series P-20, No.460). Washington, DC: U.S. Government Printing Office.

Indicators of Science and Mathematics Education 1995

Appendix table 4-9

**Number and percent of high school graduates, college enrollment, and science and engineering degree attainment, by sex: 1990**

Sex	U.S. population (18-24 years old)	High school graduates (18-24 years old)	High school graduates enrolled in college (18-24 years old)	Science and engineering earned bachelor's degrees	Science and engineering earned doctorates
Number					
Total	24,852,000	20,311,000	7,964,000	329,094	22,763
Male	12,134,000	9,778,000	3,922,000	189,082	16,447
Female	12,718,000	10,533,000	4,042,000	140,012	6,316
Percent					
Total	100.0	100.0	100.0	100.0	100.0
Male	48.8	48.1	49.2	57.5	72.3
Female	51.2	51.9	50.8	42.5	27.7

SOURCES: National Science Foundation. (1994). *Science and engineering degrees: 1966-1991* (NSF 94-305). Arlington, VA: NSF; U.S. Bureau of the Census. (1992). *School enrollment—social and economic characteristics of students: October 1990* (Current Population Reports, Series P-20, No.460). Washington, DC: U.S. Government Printing Office.

Indicators of Science and Mathematics Education 1995

## Appendix table 4-10

## Percent of high school seniors taking selected science and mathematics courses, by sex and post-high-school plans: 1990 and 1993

Course area	Year	All students	Male	Female	Post-high-school plans		
					Intended major in the natural sciences or engineering	Other college major	Non-college-bound
Mathematics							
Algebra	1990	89	88	89	98	97	77
	1993	91	91	92	98	98	79
Geometry	1990	71	70	71	93	89	48
	1993	74	73	75	94	89	46
Trigonometry	1990	28	31	27	67	38	6
	1993	36	36	37	74	42	8
Calculus	1990	8	10	6	26	11	*
	1993	11	13	9	33	8	*
Number in sample	1990	2,332	1,107	1,225	276	474	752
	1993	2,046	1,071	975	229	464	579
Science							
Low-level science	1990	75	74	76	62	73	84
	1993	73	74	72	52	73	90
Biology	1990	92	93	92	98	98	86
	1993	91	90	93	96	96	83
Chemistry	1990	53	54	53	84	73	27
	1993	60	59	62	85	75	29
Physics	1990	23	27	19	52	27	6
	1993	32	32	27	64	30	7
Number in sample	1990	2,296	1,096	1,201	276	486	748
	1993	2,016	1,057	959	229	464	578

\* Less than 1 percent.

SOURCE: National Science Board. (1993). *Science and engineering indicators - 1993* (NSB 93-1). Washington, DC: U.S. Government Printing Office.

Indicators of Science and Mathematics Education 1995

## Appendix table 4-11

**Percent of all faculty who say that undergraduates in their country are adequately prepared in selected skills, by type of skill and country: 1992**

Country	Mathematics and quantitative reasoning	Written and oral communication
Hong Kong	39	19
South Korea	37	59
Sweden	32	32
Russia	27	26
Mexico	23	24
Japan	22	30
Chile	22	17
Israel	19	15
Australia	18	20
United States	15	20

NOTE: Includes faculty of all disciplines and departments.

SOURCE: Mooney, C.J. (1994, June 22). The shared concerns of scholars. *The Chronicle of Higher Education*. XL (42). pp. A37-A38.

## Appendix table 4-12

### Percent of 1987 first-year undergraduate students in 4-year institutions who had stayed in or switched to other (declared or intended) majors by 1991, by field of major: 1991

Field of major	Remained in same or like major	Moved to other group of majors
All natural sciences and engineering	56.0	44.0
Engineering	61.9	38.1
Natural sciences		
Biological sciences	49.1	51.0
Computer sciences	46.4	53.6
Mathematical sciences	37.3	62.7
Physical sciences	48.8	51.2
Social and behavioral sciences	72.0	28.0
Non-science and -engineering		
Business	59.5	40.5
Education	67.7	32.3
English	84.9	15.1
Fine arts	70.1	29.9
History or political science	65.2	34.8

NOTE: Like majors are defined as follows: Group one—biological sciences, physical sciences, engineering, and mathematical sciences; Group two—history or political science, social and behavioral sciences, fine arts, and English. Computer sciences, business, and education were defined to be separate majors, without other like majors. SOURCE: Seymour, E., & Hewitt, N.M. (1994). Talking about leaving: Factors contributing to high attrition rates among science, mathematics & engineering undergraduate majors. *Final report to the Alfred P. Sloan Foundation on an ethnographic inquiry at seven institutions*. Boulder, CO: University of Colorado.

### Appendix table 4-13

#### Average undergraduate tuition and fees paid by students, by type and control of institution: 1985 to 1993

Year	Public institutions		Private institutions	
	4-year	2-year	4-year	2-year
1985	\$1,657	\$788	\$7,497	\$4,703
1986	1,717	835	7,976	4,785
1987	1,809	844	8,516	4,713
1988	1,897	871	8,782	5,135
1989	1,961	865	9,152	5,709
1990	2,012	854	9,492	5,875
1991	2,025	884	9,743	5,975
1992	2,181	965	10,062	5,921
1993	2,352	1,018	10,393	6,101

NOTES: 1993 data are preliminary. Public institution tuition and fees are shown for in-state residents. Amounts represent real 1993 dollars.

SOURCE: National Center for Education Statistics. (1993). *Digest of educational statistics 1993* (NCES 93-292). Washington, DC: U.S. Government Printing Office.

Indicators of Science and Mathematics Education 1995

### Appendix table 4-14

#### Debt burden of 1990 bachelor's degree recipients, by postgraduation occupation: 1991

Occupation	Percent with debt	Median debt	Median income	Median debt as a percent of median first-year income
Engineers, surveyors, architects	51.5	\$6,900	\$31,200	22.1
Elementary & secondary teachers	51.0	\$6,500	\$18,200	35.7
Science technicians	46.9	\$4,000	\$20,500	19.5
Engineering technicians	46.2	\$8,000	\$27,900	28.7
Social scientists & urban planners	45.3	\$8,000	\$20,500	39.0
Natural scientists & mathematicians	44.6	\$5,000	\$23,900	20.9
Computer scientists	40.2	\$8,000	\$30,000	26.7

NOTES: Median debt includes only those with debt. Median income includes only those with debt and first-year income. SOURCE: U.S. Department of Education, Office of Policy and Planning. (1993). *Debt burden: The next generation*. Rockville, MD: Westat, Inc.

Indicators of Science and Mathematics Education 1995

## Appendix table 4-15

## Number and percent of science and engineering doctorate recipients, by primary source of support, residency status, and race or ethnic origin: 1992

Primary source of support	Noncitizens			U.S. citizens					
	Total	Permanent residents	Temporary residents	Total	Whites	Blacks	Hispanics	Asians	Native Americans
Number									
Total	17,823	918	5,681	11,199	10,042	205	285	480	51
University	10,976	645	4,347	5,970	5,380	75	126	277	27
Personal	4,320	192	523	3,599	3,271	77	99	109	17
Federal	1,206	26	68	1,113	975	24	39	61	3
Other	1,325	55	744	516	421	29	21	33	4
Percent									
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
University	61.6	70.2	76.5	53.3	53.6	36.6	44.2	57.8	52.9
Personal	24.2	20.9	9.2	32.1	32.6	37.6	34.8	22.7	33.3
Federal	6.8	2.8	1.2	9.9	9.7	11.7	13.7	12.7	5.9
Other	7.4	6.0	13.1	4.6	4.2	14.1	7.4	6.9	7.8

NOTES: Persons of Hispanic origin may be of any race. University sources include research and teaching assistantships funded under Federal research grants, as well as other sources available to universities. Personal sources include loans (Federal and non-Federal), recipients' own earnings, and contributions from family and spouse. Federal sources include Federal agency fellowship and traineeship programs. Other support includes U.S. nationally competitive fellowships, business or employer funds, foreign government, state government, and other nonspecified sources. Numbers represent only those doctorate recipients with known primary support. Percents are based on these numbers. Data also include health sciences which are not included in other doctoral data in this report.

SOURCE: Ries, P., & Thurgood, D. (1994). *Summary report 1992: Doctorate recipients from United States universities*. Washington, DC: National Academy Press.

Appendix table 4-16

## Participation rate of 22-year-olds in first university degrees in the natural sciences and engineering, by sex and country: most current year (1989 to 1992)

Region/ country	All first university degrees	Natural sciences <sup>1</sup>	Social sciences	Engineering <sup>2</sup>	Persons 22-years-old	Percent 22-year-olds		
						With first univ. degree	With NS&E degree <sup>3</sup>	NS&E degrees earned as a percent of all 22-year-olds
Male								
Asia								
Japan <sup>4</sup>	290,253	20,221	138,708	78,705	915,800	31.7	10.8	5.5
South Korea	104,627	15,953	7,579	26,763	447,600	23.4	9.5	5.0
Taiwan	23,556	4,723	1,167	8,110	190,800	12.4	6.7	3.5
Europe								
Austria	5,996	1,071	301	978	62,272	9.6	3.3	1.7
Bulgaria	10,296	1,047	201	3,337	61,046	16.9	7.2	3.7
France	55,637	10,416	3,925	13,394	435,915	12.8	5.5	2.8
Germany <sup>5</sup>	111,894	18,475	20,829	34,634	660,000	16.1	7.6	4.1
Greece	8,600	1,731	969	1,547	78,932	10.9	4.2	2.1
Italy	46,519	6,779	10,447	7,278	465,783	10.0	3.0	1.5
Poland	24,525	3,309	752	6,100	265,441	9.2	3.5	1.8
Spain	51,208	7,390	1,495	5,996	338,000	15.2	4.0	2.0
Sweden	7,203	897	262	2,018	60,871	11.8	4.8	2.5
Switzerland	5,893	1,088	429	751	47,859	11.5	3.6	2.0
United Kingdom <sup>6</sup>	46,888	12,963	6,536	8,647	437,232	10.7	4.9	2.5
North America								
Canada	56,157	8,235	7,929	7,738	205,200	27.4	7.3	4.0
United States	508,952	62,341	74,900	68,851	1,896,959	26.8	6.9	3.5
Female								
Asia								
Japan <sup>4</sup>	109,750	4,932	18,519	2,650	871,600	12.6	0.9	0.4
South Korea	61,289	7,242	2,632	1,308	411,400	14.9	2.1	1.0
Taiwan	19,396	1,810	2,007	840	180,200	10.8	1.5	0.7
Europe								
Austria	4,673	481	457	70	59,590	7.8	0.9	0.5
Bulgaria	13,590	1,341	259	3,211	57,259	23.7	7.8	3.8
France	48,200	5,484	3,419	3,195	417,947	11.5	2.1	1.0
Germany <sup>5</sup>	69,751	11,425	16,297	4,218	627,400	10.6	2.4	1.2
Greece	9,832	1,228	998	450	73,717	13.3	2.3	1.1
Italy	49,706	6,369	8,864	622	450,470	11.0	1.6	0.8
Poland	30,835	3,551	1,329	1,340	252,900	12.2	1.9	0.9
Spain	70,691	5,912	4,024	648	322,400	21.9	2.0	1.0
Sweden	9,859	595	938	529	57,994	17.0	1.9	0.9
Switzerland	3,272	376	495	26	45,940	7.1	0.9	0.4
United Kingdom <sup>6</sup>	38,005	7,368	6,855	1,398	416,872	9.1	2.1	1.0
North America								
Canada	74,007	5,272	13,811	929	198,200	34.2	3.1	1.5
United States	599,045	50,542	95,205	11,630	1,829,155	32.8	3.4	1.7

NOTES: NS&E = Natural sciences and engineering. Data for Bulgaria, Germany, Italy, Poland, Switzerland, and the United Kingdom are from 1992. Data for Austria, France, Greece, Japan, Sweden, and the United States are for 1991. All other data are from 1990.

<sup>1</sup> Includes degrees in math and computer sciences and agricultural sciences. <sup>2</sup> Includes degrees in engineering technology. <sup>3</sup> Social science degrees are not included in this proportion. <sup>4</sup> Japanese social sciences data are adjusted to delete business. <sup>5</sup> Average age of German degree recipient is 27 years of age. Population given is for all 27-year-olds in united Germany. <sup>6</sup> United Kingdom data do not include open universities. SOURCE: National Science Foundation. (1994). [Special tabulations of statistics of international degrees]. Unpublished data.

## Appendix table 4-17

## Degrees awarded in all fields, science and engineering, and science and engineering as a percent of all fields, by degree level: 1971 to 1991

Degree	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
All fields, total												
Associate	N/A											
Bachelor's	846,110	894,110	930,272	954,376	931,663	934,443	928,228	930,201	931,340	940,251	946,877	964,043
Master's	231,486	252,774	264,525	278,259	293,651	313,001	318,241	312,816	302,075	299,095	296,798	296,580
Doctoral	31,867	33,041	33,755	33,047	32,952	32,946	31,716	30,875	31,239	31,020	31,357	31,111
Science and engineering, total												
Associate	N/A											
Bachelor's	294,357	306,459	321,085	326,230	313,555	309,491	303,798	303,555	303,162	304,695	306,792	315,023
Master's	56,454	60,049	62,046	62,239	63,198	65,007	67,397	67,264	64,226	64,089	64,366	66,568
Doctoral	19,363	19,324	19,352	18,694	18,711	18,364	17,892	17,539	17,753	17,668	18,143	18,190
Science and engineering as a percent of all fields												
Associate	N/A											
Bachelor's	34.8	34.3	34.5	34.2	33.7	33.1	32.7	32.6	32.6	32.4	32.4	32.7
Master's	24.4	23.8	23.5	22.4	21.5	20.8	21.2	21.5	21.3	21.4	21.7	22.4
Doctoral	60.8	58.5	57.3	56.6	56.8	55.7	56.4	56.8	56.8	57.0	57.9	58.5

Continued

## Appendix table 4-17

## Degrees awarded in all fields, science and engineering, and science and engineering as a percent of total, by degree level: 1971 to 1991, continued

Degree	1983	1984	1985	1986	1987	1988	1989	1990	1991
All fields, total									
Associate	461,888	457,851	459,087	451,258	440,816	441,093	440,375	459,048	486,297
Bachelor's	980,679	986,345	990,877	1,000,204	1,003,532	1,006,033	1,030,171	1,062,151	1,107,997
Master's	290,931	285,462	287,213	289,829	290,532	300,091	311,050	324,947	338,498
Doctoral	31,282	31,337	31,297	31,895	32,363	33,490	34,318	36,057	37,451
Science and engineering, total									
Associate	23,901	28,183	26,580	25,359	23,130	21,520	19,733	19,810	19,352
Bachelor's	317,875	324,483	332,422	335,460	331,526	322,482	322,821	329,094	337,675
Master's	67,716	68,564	70,562	71,831	72,603	73,655	76,425	77,788	78,368
Doctoral	18,506	18,641	18,824	19,339	19,784	20,832	21,625	22,763	23,854
Science and engineering as a percent of all fields									
Associate	5.2	6.2	5.8	5.6	5.3	4.9	4.5	4.3	4.0
Bachelor's	32.4	32.9	33.5	33.5	33.0	32.1	31.3	31.0	30.5
Master's	23.3	24.0	24.6	24.8	25.0	24.5	24.6	23.9	23.2
Doctoral	59.2	59.5	60.1	60.6	61.1	62.2	63.0	63.1	63.7

N/A: Not available.

NOTE: Data on science and engineering associate degrees are not available before 1983.

SOURCE: National Science Foundation. (1994). *Science and engineering degrees: 1966-91* (NSF 94-305). Arlington, VA: NSF.

## Appendix table 4-18

## Number of bachelor's degrees awarded, by major field group and by sex: 1971 to 1991

Year	Total				Female				
	Total S&E	Engineering	Natural sciences	Social and behav. sci.	Total S&E		Engineering	Natural sciences	Social and behav. sci.
					Number	Percent			
1971	294,357	45,248	94,544	154,565	85,039	28.9	361	23,848	60,830
1972	306,459	45,711	96,410	164,338	90,037	29.4	492	24,709	64,836
1973	321,085	46,779	103,004	171,302	95,995	29.9	576	26,885	68,534
1974	326,230	43,248	109,752	173,230	102,578	31.4	698	29,986	71,894
1975	313,555	39,824	110,584	163,147	102,814	32.8	845	31,878	70,091
1976	309,491	38,790	113,296	157,405	103,921	33.6	1,317	33,653	68,951
1977	303,798	41,357	113,908	148,533	104,993	34.6	2,044	35,289	67,660
1978	303,555	47,251	112,286	144,018	107,667	35.5	3,482	36,457	67,728
1979	303,162	53,469	110,790	138,903	109,915	36.3	4,881	37,494	67,540
1980	304,695	58,810	110,253	135,632	113,480	37.2	5,952	38,905	68,623
1981	306,792	63,717	110,468	132,607	115,815	37.8	7,063	40,366	68,386
1982	315,023	67,460	113,998	133,565	121,399	38.5	8,275	42,819	70,305
1983	317,875	72,670	116,554	128,651	123,337	38.8	9,652	45,426	68,259
1984	324,483	76,153	122,252	126,078	125,221	38.6	10,729	47,973	66,519
1985	332,422	77,572	129,817	125,033	128,958	38.8	11,246	51,449	66,263
1986	335,460	76,820	131,082	127,558	130,689	39.0	11,138	51,836	67,715
1987	331,526	74,425	125,166	131,935	131,545	39.7	11,404	49,706	70,435
1988	322,482	70,154	115,611	136,717	130,933	40.6	10,779	46,569	73,585
1989	322,821	66,947	109,137	146,737	133,483	41.3	10,188	43,446	79,849
1990	329,094	64,705	105,021	159,368	140,012	42.5	9,973	42,680	87,359
1991	337,675	62,187	105,383	170,105	148,347	43.9	9,665	43,477	95,205

NOTE: S&amp;E is science and engineering.

SOURCE: National Science Foundation. (1994). *Science and engineering degrees: 1966-91* (NSF 94-305). Arlington, VA: NSF.

## Appendix table 4-19

## Number of master's degrees awarded, by major field group and by sex: 1971 to 1991

Year	Total				Female			
	Total science and engineering	Engineering	Natural sciences	Social and behavioral sciences	Total science and engineering	Engineering	Natural sciences	Social and behavioral sciences
1971	56,454	16,367	20,735	19,352	10,338	186	4,598	5,554
1972	60,049	16,764	21,658	21,627	11,328	271	4,851	6,206
1973	62,046	16,545	21,899	23,602	11,813	278	4,683	6,852
1974	62,239	15,205	22,040	24,994	12,711	347	4,913	7,451
1975	63,198	15,167	21,468	26,563	13,788	372	4,888	8,528
1976	65,007	16,045	21,150	27,812	15,015	568	4,986	9,461
1977	67,397	16,012	21,856	29,529	16,498	698	5,493	10,307
1978	67,264	16,080	21,967	29,217	17,230	843	5,680	10,707
1979	64,226	15,279	21,544	27,403	17,612	937	5,852	10,823
1980	64,089	15,943	21,347	26,799	18,085	1,123	5,903	11,059
1981	64,366	16,451	21,136	26,779	18,861	1,329	5,975	11,557
1982	66,568	17,557	22,368	26,643	20,011	1,575	6,722	11,714
1983	67,716	18,886	22,540	26,290	20,998	1,755	7,054	12,189
1984	68,564	20,145	23,170	25,249	21,531	2,100	7,483	11,948
1985	70,562	20,972	23,961	25,629	22,320	2,244	7,730	12,356
1986	71,831	21,096	25,151	25,584	23,220	2,400	8,305	12,515
1987	72,603	22,070	25,208	25,325	23,844	2,770	8,545	12,529
1988	73,655	22,726	25,784	25,145	23,835	2,808	8,463	12,564
1989	76,425	23,743	26,047	26,635	25,580	3,082	8,831	13,667
1990	77,788	23,995	26,255	27,538	26,558	3,269	9,027	14,262
1991	78,368	24,013	25,638	28,717	27,927	3,357	9,135	15,435

SOURCE: National Science Foundation. (1994). *Science and engineering degrees: 1966-91* (NSF 94-305). Arlington, VA: NSF.

## Appendix table 4-20

## Number of doctoral degrees awarded, by major field group and by sex: 1971 to 1991

Year	Total				Female			
	Total science and engineering	Engineering	Natural sciences	Social and behavioral sciences	Total science and engineering	Engineering	Natural sciences	Social and behavioral sciences
1971	19,363	3,514	10,280	5,569	1,990	16	1,000	974
1972	19,324	3,509	9,986	5,829	2,142	22	1,040	1,080
1973	19,352	3,374	9,804	6,174	2,510	46	1,171	1,293
1974	18,694	3,161	9,266	6,267	2,662	34	1,163	1,465
1975	18,711	3,011	9,250	6,450	2,905	52	1,252	1,601
1976	18,364	2,838	8,866	6,660	3,060	55	1,272	1,733
1977	17,892	2,648	8,640	6,604	3,185	74	1,273	1,838
1978	17,539	2,425	8,560	6,554	3,410	53	1,397	1,960
1979	17,753	2,494	8,796	6,463	3,703	62	1,527	2,114
1980	17,668	2,479	8,826	6,363	3,915	90	1,652	2,173
1981	18,143	2,528	8,956	6,659	4,143	99	1,724	2,320
1982	18,190	2,646	9,135	6,409	4,307	124	1,868	2,315
1983	18,506	2,781	9,182	6,543	4,650	124	1,983	2,543
1984	18,641	2,913	9,329	6,399	4,739	151	2,005	2,583
1985	18,824	3,166	9,435	6,223	4,840	198	2,123	2,519
1986	19,339	3,376	9,612	6,351	5,114	225	2,316	2,663
1987	19,784	3,712	9,845	6,227	5,253	242	2,361	2,650
1988	20,832	4,188	10,437	6,207	5,606	286	2,570	2,750
1989	21,625	4,544	10,656	6,425	6,044	375	2,799	2,870
1990	22,763	4,893	11,363	6,507	6,316	415	2,932	2,969
1991	23,854	5,212	11,989	6,653	6,789	452	3,122	3,215

SOURCE: National Science Foundation. (1994). *Science and engineering degrees: 1966-91* (NSF 94-305). Arlington, VA: NSF.

Indicators of Science and Mathematics Education 1995

## Appendix table 4-21

Science and engineering degrees awarded per hundred  
U.S. population, by degree level and sex: 1971 to 1991

Year	Bachelor's degree			Master's degree			Doctoral degree		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
1971	8.4	11.9	4.9	1.5	2.4	0.5	0.7	1.3	0.2
1972	8.7	12.3	5.1	1.7	2.7	0.6	0.7	1.2	0.2
1973	8.8	12.2	5.3	1.7	2.8	0.7	0.6	1.1	0.2
1974	8.7	11.8	5.5	1.7	2.8	0.7	0.6	1.1	0.2
1975	8.1	10.8	5.4	1.7	2.7	0.7	0.6	1.1	0.2
1976	7.8	10.3	5.3	1.7	2.6	0.8	0.6	1.1	0.2
1977	7.5	9.7	5.2	1.7	2.6	0.8	0.5	0.7	0.2
1978	7.4	9.5	5.3	1.7	2.5	0.9	0.5	0.8	0.2
1979	7.1	9.0	5.2	1.6	2.3	0.9	0.5	0.8	0.2
1980	7.1	8.9	5.3	1.5	2.2	0.9	0.5	0.7	0.2
1981	7.2	8.9	5.4	1.5	2.1	0.9	0.5	0.7	0.2
1982	7.4	9.0	5.7	1.5	2.1	0.9	0.5	0.7	0.2
1983	7.3	8.9	5.7	1.6	2.1	1.0	0.5	0.7	0.2
1984	7.6	9.3	5.9	1.6	2.2	1.0	0.4	0.7	0.2
1985	7.9	9.6	6.2	1.6	2.2	1.0	0.4	0.7	0.2
1986	8.1	9.7	6.4	1.7	2.2	1.1	0.4	0.7	0.2
1987	8.3	9.8	6.6	1.7	2.3	1.1	0.4	0.7	0.2
1988	8.4	9.9	7.0	1.7	2.3	1.1	0.5	0.7	0.3
1989	8.7	10.0	7.3	1.9	2.5	1.3	0.5	0.7	0.3
1990	9.0	10.1	7.8	2.0	2.6	1.4	0.5	0.7	0.3
1991	9.0	9.9	8.1	2.1	2.6	1.5	0.5	0.8	0.3

NOTE: Bachelor's degrees, per hundred 22-year-olds; master's, per hundred 24-year-olds; doctorates, per hundred 30-year-olds.  
SOURCE: National Science Foundation. (1994). *Science and engineering degrees: 1966-91* (NSF 94-305). Arlington, VA: NSF.

## Appendix table 4-22

## Number and percent of bachelor's degrees awarded in science and engineering, by citizenship and race or ethnic origin: 1977 to 1991

Citizenship	1977	1979	1981	1985	1987	1989	1990	1991
	Number							
Total, all recipients	374,579	373,431	374,693	375,786	376,450	371,248	379,392	389,952
Total, U.S. citizens and permanent residents	365,907	363,308	361,362	356,256	351,607	350,242	355,032	366,945
White	323,845	318,819	313,486	307,061	298,129	293,262	296,140	303,532
Black	23,134	23,324	23,767	20,223	20,224	20,481	21,274	23,170
Hispanic	11,002	12,163	13,107	13,373	13,846	14,811	15,680	17,021
Asian	6,558	7,591	9,572	13,996	17,921	20,222	20,453	21,628
Native American	1,368	1,411	1,430	1,603	1,487	1,466	1,485	1,594
Nonresident alien	8,486	10,039	13,282	15,526	14,824	13,138	13,216	13,591
Unknown	186	84	49	4,004	10,019	7,868	11,144	9,416
	Percent							
Total, all recipients	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Percent of all recipients, U.S. citizens and permanent residents	97.7	97.3	96.4	94.8	93.4	94.3	93.6	94.1
Total, U.S. citizens and permanent residents	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White	88.5	87.8	86.8	86.2	84.8	83.7	83.4	82.7
Black	6.3	6.4	6.6	5.7	5.8	5.8	6.0	6.3
Hispanic	3.0	3.3	3.6	3.8	3.9	4.2	4.4	4.6
Asian	1.8	2.1	2.6	3.9	5.1	5.8	5.8	5.9
Native American	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Nonresident alien	--	--	--	--	--	--	--	--
Unknown	--	--	--	--	--	--	--	--

-- Figures are percentages of total U.S. citizens and permanent residents only.

NOTES: Persons of Hispanic origin may be of any race. Percentages may not add to 100 as a result of rounding.

SOURCE: National Science Foundation. (1994). *Science and engineering degrees, by race/ethnicity of recipients: 1977-91* (NSF 94-306). Arlington, VA: NSF.



## Appendix table 4-24

Number of doctorates awarded to U.S. citizens,  
by selected racial and ethnic groups: 1982 to 1992

Year	Science and engineering total			Non-science and -engineering total		
	Black	Hispanic	Native American	Black	Hispanic	Native American
1982	285	226	38	762	309	39
1983	283	237	27	639	302	54
1984	299	254	31	654	282	43
1985	278	244	41	634	317	55
1986	254	276	52	569	295	47
1987	234	305	52	534	313	63
1988	260	327	41	554	270	53
1989	284	310	52	537	273	42
1990	285	382	41	613	335	55
1991	349	405	55	652	325	75
1992	300	414	69	651	341	79

NOTE: Persons of Hispanic origin may be of any race.

SOURCE: National Science Foundation. (1993). *Selected data on science and engineering doctorate awards: 1992* (NSF 93-315). Washington, DC: NSF.

Indicators of Science and Mathematics Education 1995

## Appendix table 4-25

Number of science and engineering doctorates awarded  
to U.S. citizens, by selected racial and ethnic groups  
and sex: 1982 to 1992

Year	Black		Hispanic		Native American	
	Male	Female	Male	Female	Male	Female
1982	159	126	160	66	27	11
1983	150	133	140	97	22	5
1984	156	143	173	81	26	5
1985	152	126	148	96	21	20
1986	124	130	177	99	33	19
1987	115	119	179	126	31	21
1988	143	117	199	128	28	13
1989	142	142	180	130	33	19
1990	151	134	232	150	24	17
1991	180	169	238	167	36	19
1992	151	149	253	161	42	27

NOTE: Persons of Hispanic origin may be of any race.

SOURCE: National Science Foundation. (1993). *Selected data on science and engineering doctorate awards: 1992* (NSF 93-315). Washington, DC: NSF.

Indicators of Science and Mathematics Education 1995

## Appendix table 4-26

Science and engineering doctorates awarded,  
by citizenship: 1972 to 1992

Year	Total	U.S. citizens	Noncitizens	Unknown citizenship	Percent noncitizen
1972	19,324	15,144	3,860	320	20.0
1973	19,352	14,971	4,044	337	20.9
1974	18,694	13,750	4,092	852	21.9
1975	18,710	14,288	4,056	366	21.7
1976	18,268	14,082	3,839	347	21.0
1977	17,723	13,636	3,651	436	20.6
1978	17,383	13,331	3,557	495	20.5
1979	17,589	13,524	3,602	463	20.5
1980	17,523	13,410	3,662	451	20.9
1981	17,996	13,544	3,855	597	21.4
1982	18,017	13,292	3,981	744	22.1
1983	18,393	13,403	4,298	692	23.4
1984	18,514	13,250	4,527	737	24.5
1985	18,712	12,947	4,957	808	26.5
1986	19,251	12,869	5,128	1,254	26.6
1987	19,706	12,819	5,536	1,351	28.1
1988	20,739	13,217	6,047	1,475	29.2
1989	21,528	13,311	6,498	1,719	30.2
1990	22,672	14,014	7,739	919	34.1
1991	23,780	14,225	8,882	673	37.4
1992	24,432	14,262	9,372	798	38.4

SOURCES: National Science Foundation. (1993). *Science and engineering doctorates: 1960-91* (NSF 93-301). Washington, DC: NSF; National Science Foundation. (1993). *Selected data on science and engineering doctorate awards: 1992* (NSF 93-315). Washington, DC: NSF.

## Appendix table 4-27

Engineering technology degrees awarded,  
by degree level: 1975 to 1991

Year	Degree			
	Associate	Bachelor's	Master's	Doctoral
1975	30,906	8,589	371	5
1976	36,263	9,180	493	10
1977	38,588	9,864	505	12
1978	41,708	10,314	579	15
1979	41,716	10,906	496	16
1980	43,696	12,180	510	16
1981	52,478	13,567	532	21
1982	58,574	14,778	636	33
1983	51,332	18,663	622	18
1984	50,718	20,225	694	6
1985	53,693	20,533	816	15
1986	49,904	20,928	925	21
1987	49,813	20,577	883	13
1988	49,640	20,447	980	14
1989	48,342	20,098	1,135	18
1990	46,931	19,150	1,194	18
1991	45,104	18,294	1,188	25

SOURCE: National Science Foundation. (1994). *Science and engineering degrees: 1966-91* (NSF 94-305). Arlington, VA: NSF.

Indicators of Science and Mathematics Education 1995

## Appendix table 4-28

Number of institutions of higher education, by Carnegie  
Institution classification type: 1987 and 1994

Type	1987	1994
Total	3,389	3,600
Doctorate-granting institutions	213	236
Master's-granting institutions	595	532
Bachelor's-granting institutions	572	633
Specialized-degree-granting institutions	642	690
Tribal colleges	—	29
Two-year colleges	1,367	1,480

— Unavailable because the tribal colleges category did not exist in 1987.

NOTE: Data use 1994 Carnegie classification system.

SOURCE: Carnegie Foundation for the Advancement of Teaching. (1991, May/June). Research-intensive vs. teaching-intensive institutions. *Change*, 23-26.

Indicators of Science and Mathematics Education 1995

## Appendix table 4-29

Total number and percent of full-time instructional faculty, by field and race or ethnic origin:  
Fall 1987 and Fall 1992

Field	1987						1992					
	Total	White	Asian	Black	Hispanic	Native American	Total	White	Asian	Black	Hispanic	Native American
Number												
Total	399,741	354,811	20,814	12,637	8,570	2,909	365,348	319,217	20,092	17,089	7,613	1,337
Science and engineering, total	132,965	118,275	8,262	2,978	2,889	561	142,685	122,161	11,673	5,530	2,903	418
Natural sciences	72,043	64,767	4,591	861	1,484	341	78,016	67,282	6,494	2,606	1,430	204
Social and behavioral sciences	41,974	37,637	1,087	2,018	1,011	221	45,082	40,041	1,493	2,375	1,008	165
Engineering	18,948	15,871	2,584	100	394	0	19,587	14,838	3,686	549	465	49
Non-science and -engineering, total	266,776	236,536	12,552	9,659	5,681	2,347	222,663	197,056	8,418	11,559	4,710	920
Business	25,022	21,530	2,196	690	171	435	28,162	25,195	1,633	944	230	159
Education	25,674	22,720	365	1,606	718	265	28,099	24,775	354	2,209	607	154
Fine arts	26,072	23,675	436	798	1,012	151	25,637	22,613	697	1,526	670	132
Health sciences	85,763	75,079	6,649	2,348	976	711	44,883	39,738	2,359	2,134	528	125
Humanities	49,585	44,862	998	1,200	2,195	330	51,831	46,039	1,724	1,996	1,925	147
Other programs	54,661	48,670	1,909	3,017	610	455	44,052	38,697	1,653	2,751	749	202

Continued

## Appendix table 4-29

Total number and percent of full-time instructional faculty, by field and race or ethnic origin:  
Fall 1987 and Fall 1992, continued

Field	1987						1992					
	Total	White	Asian	Black	Hispanic	Native American	Total	White	Asian	Black	Hispanic	Native American
Total	100.0	88.8	5.2	3.2	2.1	0.7	100.0	87.4	5.5	4.7	2.1	0.4
Science and engineering, total	100.0	89.0	6.2	2.2	2.2	0.4	100.0	85.6	8.2	3.9	2.0	0.3
Natural sciences	100.0	89.9	6.4	1.2	2.1	0.5	100.0	86.2	8.3	3.3	1.8	0.3
Social and behavioral sciences	100.0	89.7	2.6	4.8	2.4	0.5	100.0	88.8	3.3	5.3	2.2	0.4
Engineering	100.0	83.8	13.6	0.5	2.1	0.0	100.0	75.8	18.8	2.8	2.4	0.3
Non-science and -engineering, total	100.0	88.7	4.7	3.6	2.1	0.9	100.0	88.5	3.8	5.2	2.1	0.4
Business	100.0	86.0	8.8	2.8	0.7	1.7	100.0	89.5	5.8	3.4	0.8	0.6
Education	100.0	88.5	1.4	6.3	2.8	1.0	100.0	88.2	1.3	7.9	2.2	0.6
Fine arts	100.0	90.8	1.7	3.1	3.9	0.6	100.0	88.2	2.7	6.0	2.6	0.5
Health sciences	100.0	87.5	7.8	2.7	1.1	0.8	100.0	88.5	5.3	4.8	1.2	0.3
Humanities	100.0	90.5	2.0	2.4	4.4	0.7	100.0	88.8	3.3	3.9	3.7	0.3
Other programs	100.0	89.0	3.5	5.5	1.1	0.8	100.0	87.8	3.8	6.3	1.7	0.5

NOTES: Numbers may not equal totals as a result of rounding. Asian includes Pacific Islanders. Persons of Hispanic origin may be of any race.  
SOURCE: National Center for Education Statistics. (1994). [Special tabulations from the 1993 national study of postsecondary faculty]. Unpublished data.

Indicators of Science and Mathematics Education 1995

### Appendix table 4-30

#### Number and percent of full-time instructional faculty, by field and sex: Fall 1987 and Fall 1992

Field	1987				1992			
	Total	Male	Female	Percent female	Total	Male	Female	Percent female
Total	399,853	300,121	99,732	24.9	365,348	259,670	105,678	28.9
Science and engineering, total	133,069	111,025	22,045	16.6	142,685	118,360	24,325	17.0
Natural sciences	72,043	60,028	12,015	16.7	78,016	66,023	11,993	15.4
Social and behavioral sciences	41,974	32,415	9,559	22.8	45,082	33,900	11,182	24.8
Engineering	19,053	18,582	471	2.5	19,587	18,437	1,150	5.9
Non-science and -engineering, total	266,783	189,096	77,687	29.1	222,663	141,310	81,353	36.5
Business	25,023	19,835	5,188	20.7	28,162	21,777	6,384	22.7
Education	25,673	15,610	10,063	39.2	28,099	15,212	12,887	45.9
Fine arts	26,072	19,745	6,327	24.3	25,637	17,641	7,996	31.2
Health sciences	85,762	59,724	26,038	30.4	44,883	24,098	20,784	46.3
Humanities	49,594	34,717	14,877	30.0	51,831	32,479	19,352	37.3
Other programs	54,660	39,465	15,195	27.8	44,052	30,102	13,949	31.7

NOTE: Numbers may not equal totals as a result of rounding.

SOURCE: National Center for Education Statistics. (1994). [Special tabulations from the 1993 national study of postsecondary faculty]. Unpublished data.

## Appendix table 4-31

## Principal activity of full-time higher education faculty and instructional staff, by field: Fall 1992

Field	Number of faculty	Percent			
		Total	Teaching	Research	Other
Total	595,340	100.0	66.8	11.5	21.7
Engineering	26,588	100.0	68.9	16.5	14.6
Natural sciences, total	121,989	100.0	63.3	23.6	13.1
Life science	50,652	100.0	45.2	38.8	16.0
Physical science	29,884	100.0	68.6	19.0	12.4
Computer science	14,439	100.0	77.4	10.5	12.0
Mathematical science	27,014	100.0	83.7	7.3	9.0
Social and behavioral sciences	62,422	100.0	73.3	9.6	17.1
Non-science and -engineering, total	384,341	100.0	66.7	7.6	25.7
Health sciences	91,280	100.0	48.2	13.0	38.8
Education	41,304	100.0	71.1	3.1	25.8
Business	41,552	100.0	80.1	6.7	13.3
Humanities	79,875	100.0	82.1	2.9	15.0
Fine arts	33,328	100.0	85.2	1.1	13.7
Other	97,002	100.0	57.5	10.8	31.7

NOTES: Other activity includes clinical service, administration, community or public service, technical activities, on sabbatical from institution, or other unclassified activities. Totals may not equal 100 percent as a result of rounding.

SOURCE: National Center for Education Statistics. (1994). [Special tabulations from the 1993 national study of postsecondary faculty]. Unpublished data.

Appendix table 4-32

## Mean number of classes taught by full-time faculty, by field, institutional type, and sex: Fall 1992

Field	Total	Type of institution											
		Doctoral			Master			Bachelor			2-year college		
		All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female
Agriculture	2.3	1.8	1.8	1.3	2.9	3.0	2.7	5.0	5.0	--	3.8	3.8	3.7
Bioscience	2.2	1.7	1.6	1.8	2.6	2.7	2.5	2.6	2.5	2.6	3.4	3.4	3.2
Physical science	2.3	1.7	1.7	1.8	2.7	2.7	2.5	2.9	3.1	2.3	3.1	3.0	3.1
Mathematics	3.2	2.0	2.0	2.2	3.3	3.3	3.1	3.2	3.3	3.2	4.0	4.1	3.9
Computer science	3.4	2.1	2.1	1.9	2.9	2.8	3.2	3.8	3.6	4.2	4.4	4.3	4.6
Social science	2.9	2.1	2.1	2.2	3.2	3.2	3.2	3.0	3.0	2.8	4.0	4.0	3.9
Engineering	2.4	1.8	1.8	1.4	2.8	2.8	3.0	2.5	2.6	1.0	3.5	3.6	3.1
Business	3.3	2.3	2.3	2.4	3.0	3.0	3.1	4.0	3.9	4.1	4.5	4.6	4.4
Education	3.1	2.5	2.7	2.4	3.3	3.4	3.2	3.2	3.0	3.4	3.8	3.9	3.7
Fine arts	3.4	2.8	2.7	2.8	3.4	3.4	3.5	3.4	3.5	3.1	4.3	4.4	4.0
Health science	2.4	2.1	2.1	2.1	2.7	2.6	2.7	2.5	3.7	2.4	2.7	3.2	2.6
Humanities	3.2	2.4	2.4	2.4	3.2	3.2	3.1	3.1	3.1	3.1	4.1	4.2	4.0
Other	3.1	2.2	2.3	2.2	3.2	3.3	3.0	3.2	3.2	3.1	3.7	3.7	3.6

-- Too few sample cases for a reliable estimate.

SOURCE: National Center for Education Statistics. (1992). [Special tabulations from the 1993 national study of postsecondary faculty]. Unpublished data.

Indicators of Science and Mathematics Education 1995

### Appendix table 4-33

#### Number and percent of academic departments of engineering that require or offer communications courses to faculty and graduate students, by size of department: 1992

	Total	Smaller departments (20 or fewer faculty)	Larger departments (more than 20 faculty)
Number of departments	744	523	221
	Percent of academic departments		
Course offered to			
Faculty	39	32	53
Graduate students	40	31	60
Course required of			
Faculty	7	9	6
Graduate students	33	24	39
Areas covered by course			
Teaching techniques	83	82	85
Academic or career advising	66	60	70
English language skills	29	34	21
American customs and behavior	30	24	35

NOTE: Includes only electrical, mechanical, and civil engineering.

SOURCE: Burton, L., & Celebuski, C. A. (1994). *Higher education surveys: Undergraduate education in electrical, mechanical and civil engineering* (HES Survey No. 16). Washington, DC: National Science Foundation.

### Appendix table 4-34

#### Percent of courses taught by full-time instructional faculty using different formats, by type of institution and instructor's field: Fall 1992

Type of institution and field	Total	Lecture	Seminar	Discussion group	Laboratory or problem session	Other
Doctorate-granting institutions, total	100.0	61.1	13.2	10.6	8.7	6.4
Natural sciences	100.0	75.2	7.7	5.9	9.4	1.9
Engineering	100.0	84.7	4.2	1.1	7.8	2.3
Social and behavioral sciences	100.0	67.8	20.2	7.8	1.9	2.3
Non-science and -engineering	100.0	52.9	14.6	13.6	9.9	9.0
Master's-granting institutions, total	100.0	62.8	7.9	11.5	8.8	9.0
Natural sciences	100.0	79.2	2.9	3.9	11.0	2.9
Engineering	100.0	75.2	3.5	3.3	15.3	2.7
Social and behavioral sciences	100.0	77.4	10.1	5.5	2.9	4.1
Non-science and -engineering	100.0	54.9	9.0	15.2	9.0	11.9
Bachelor's-granting institutions, total	100.0	52.0	11.3	17.6	8.9	10.3
Natural sciences	100.0	71.4	5.4	6.2	13.9	3.1
Engineering	100.0	68.5	3.3	0.0	28.2	0.0
Social and behavioral sciences	100.0	67.3	15.8	12.0	2.2	2.7
Non-science and -engineering	100.0	42.6	12.0	22.3	8.8	14.2
Two-year institutions, total	100.0	66.2	2.3	10.1	14.4	7.0
Natural sciences	100.0	84.6	0.7	2.1	10.5	2.1
Engineering	100.0	78.5	0.9	3.1	15.9	1.6
Social and behavioral sciences	100.0	86.1	3.8	5.0	3.0	2.2
Non-science and -engineering	100.0	57.1	2.7	13.6	16.9	9.6

NOTE: Other includes role playing or simulation, television or radio, group projects, and cooperative learning groups.  
SOURCE: National Center for Education Statistics. (1994). [Special tabulations from the 1993 national study of postsecondary faculty].  
Unpublished data.

## Appendix table 4-35

**Percent of mathematics departments offering selected academic activities to undergraduate mathematics majors, by activity and type of institution: 1990**

Activities	Institution type		
	Doctorate-granting	Master's-granting	Bachelor's-granting
Regular problem-solving opportunities	69	63	25
Research projects	59	47	37
Senior project or thesis	23	36	28
Regular social activities with faculty	21	45	53

SOURCE: Albers, D.J., Loftsgaarden, D.O., Rung, D.C., & Watkins, A.E. (1992). *Statistical abstract of undergraduate programs in the mathematical sciences and computer science in the United States: 1990-91 CBMS survey* (MAA Notes No. 23). Washington, DC: Mathematical Association of America.

Indicators of Science and Mathematics Education 1995

## Appendix table 4-36

**Number of calculus sections requiring selected course activities, by type of institution: 1990**

Course	Institution type		
	Doctorate-granting	Master's-granting	Bachelor's-granting
Number of sections			
Total	3,690	1,813	3,580
Writing activities	75	32	762
Group projects	52	34	163
Computer assignments	167	139	466
Percent			
Total	100.0	100.0	100.0
Writing activities	2.0	1.8	21.3
Group projects	1.4	1.9	4.6
Computer assignments	4.5	7.6	13.0

SOURCE: Albers, D.J., Loftsgaarden, D.O., Rung, D.C., & Watkins, A.E. (1992). *Statistical abstract of undergraduate programs in the mathematical sciences and computer science in the United States: 1990-91 CBMS survey* (MAA Notes No. 23). Washington, DC: Mathematical Association of America.

Indicators of Science and Mathematics Education 1995

### Appendix table 4-37

#### Percent of college and university equipment and instrumentation at doctorate-granting institutions used for instruction and research: 1990

Usage	Percent
Research only	63
Predominantly research	29
Predominantly instruction	5
Instruction only	3

NOTE: Includes only movable instrumentation and equipment originally costing \$10,000 to \$999,999 owned by research-performing colleges and universities for use in the natural sciences and engineering, from 1988 to 1989.

SOURCE: National Science Foundation. (1991). *Characteristics of science/engineering equipment in academic settings: 1989-90* (NSF 91-315). Washington, DC: NSF.