

Chapter Four

Science and Mathematics Courses

A. Overview

The 2000 National Survey of Science and Mathematics Education collected data on science and mathematics course offerings in the nation's schools. Teachers provided information about time spent in elementary science and mathematics instruction; titles and duration of secondary science and mathematics courses; class sizes; ability levels; gender and race/ethnic composition; and whether their classes included students with various types of special needs. These data are presented in the following sections.

B. Time Spent in Elementary Science and Mathematics Instruction

Each teacher was asked to indicate the number of minutes spent in the most recent lesson in a randomly selected class. It was recognized that some subjects are not taught every day in some classes; for example, some elementary classes have instruction in reading and mathematics every day and in science and social studies only on alternate days. Consequently, teachers were also asked to indicate if the selected lesson had taken place on the most recent school day. As can be seen in Table 4.1, in the early grades mathematics is taught more frequently than science. On a typical day, 95 percent of the grade K–4 classes spent time on mathematics instruction, but only 69 percent spent time on science instruction.

Table 4.1
Science and Mathematics Lessons
Taught on Most Recent Day of School

	Percent of Classes			
	Science		Mathematics	
Grades K–4	69	(2.2)	95	(1.1)
Grades 5–8	90	(1.9)	93	(1.8)
Grades 9–12	93	(1.1)	92	(1.0)

To avoid overestimating the number of minutes typically spent on science and mathematics instruction, if the most recent lesson did not take place on the last day school was in session, the number of minutes was treated as zero when the average was computed. As can be seen in Table 4.2, in grades K–3, an average of only 27 minutes per day is spent on science instruction, compared to 46 minutes for mathematics. Similarly, in grades 4–6 an average of 37 minutes per day is devoted to science instruction, compared to 57 minutes for mathematics.

Table 4.2
Average Number of Minutes Per Day Spent in
Elementary School Science and Mathematics Classes*

	Number of Minutes			
	Science		Mathematics	
Grades K–3, Self-Contained	27	(1.3)	46	(1.1)
Grades 4–6, Self-Contained	37	(2.4)	57	(1.3)

* Classes in which the most recent lesson was not on the last day school was in session were assigned zeros for the number of minutes spent in the lesson.

In addition to asking teachers about the number of minutes spent in their most recent lesson in a particular subject, each elementary teacher was asked to write in the approximate number of minutes typically spent teaching mathematics, science, social studies, and reading/language arts. The average number of minutes per day typically spent on instruction in each subject in grades K–3 and 4–6 is shown in Table 4.3; to facilitate comparisons among the subject areas, only teachers who teach all four of these subjects to one class of students were included in these analyses. In 2000, grade K–3 self-contained classes spent an average of 115 minutes on reading instruction, and 52 minutes on mathematics instruction, compared to only 23 minutes on science and 21 minutes on social studies instruction. Differences in instructional time on the various subjects are not quite as pronounced in grades 4–6, ranging from 96 minutes spent on reading and 60 minutes on mathematics to 31–33 minutes on science and social studies instruction.

Table 4.3
Average Number of Minutes Per Day Spent
Teaching Each Subject in Self-Contained Classes*

	Number of Minutes			
	Grades K–3		Grades 4–6	
Reading/Language Arts	115	(2.6)	96	(2.5)
Mathematics	52	(0.8)	60	(1.0)
Science	23	(0.6)	31	(0.9)
Social Studies	21	(0.7)	33	(0.8)

* Only teachers who indicated they teach reading, mathematics, science, and social studies to one class of students were included in these analyses.

C. Science and Mathematics Course Offerings

Middle and high schools in the sample were given a list of science and mathematics courses and asked to specify the number of sections of each course offered in the school. Respondents were also asked to write in course names for those science and mathematics courses offered in the school not already on the list.

Table 4.4 shows the percent of schools with grade 7 or 8 offering each science course; data for grade 9–12 science courses are provided in Table 4.5. The most commonly offered science course in grades 7–8 is life science, with 63 percent of the schools with one or both of these grades offering life science courses. Forty-eight percent of the schools with grades 7 and/or 8 offer earth science courses; 43 percent offer physical science in grade 7 or 8; and 65 percent offer some form of general, coordinated, or integrated science in these grades.

Table 4.4
Schools Offering Various
Science Courses, Grade 7 or 8*

	Percent of Schools	
Life Science	63	(4.2)
Earth Science	48	(4.2)
Physical Science	43	(4.3)
General Science	44	(4.4)
Integrated Science	27	(3.7)
General, Coordinated, or Integrated Science	65	(4.3)

* Only schools containing grades 7 and/or 8 were included in these analyses.

At the high school level, a total of 95 percent of the schools with one or more of grades 10–12 offer courses in biology, with 91 percent offering such first-year courses as Biology I, Introductory Biology, General Biology, Regents Biology, and College-Prep Biology; 28 percent offering applied courses such as Basic Biology; 28 percent offering Advanced Placement Biology; and 48 percent offering another second year advanced biology course.

Most high schools (91 percent) offer such courses as Chemistry I, or General, Introductory, or Regents Chemistry; 13 percent offer applied chemistry courses such as Consumer, Technical, or Practical Chemistry; 24 percent offer Advanced Placement Chemistry; and 17 percent offer another second year advanced chemistry course.

Overall, 81 percent of the high schools offer a course in first-year physics, such as Physics I, or General, Introductory, or Regents Physics; 14 percent offer a first-year course in applied physics such as Practical Physics, Electronics, or Radiation Physics. Relatively few high schools (20 percent) offer one or more advanced physics courses, with 15 percent offering Advanced Placement Physics and only 6 percent offering other advanced physics courses.

Far fewer high schools offer coursework in earth science (34 percent) than in the other science disciplines, with first-year courses in earth science, or earth/space science, considerably more common than courses in specific earth science disciplines such as oceanography, astronomy, geology, or meteorology. Only 2 percent of high schools offer any second-year earth science courses.

Table 4.5
Schools Offering Various Science
Courses, Grade 9 and Grade 10, 11, or 12

	Percent of Schools			
	Schools Including Grade 9		Schools Including Grade 10, 11, or 12	
Biology				
1st year	88	(3.2)	91	(2.9)
1st year, Applied	27	(3.7)	28	(3.7)
Any 1st year	92	(2.3)	95	(1.7)
2nd year, AP	26	(3.1)	28	(3.1)
2nd year, Advanced	44	(3.6)	48	(3.7)
2nd year, Other	22	(3.0)	23	(3.0)
Any 2nd year	64	(4.5)	69	(4.6)
Chemistry				
1st year	85	(3.5)	91	(3.2)
1st year, Applied	12	(2.0)	13	(2.0)
Any 1st year	86	(3.4)	91	(3.1)
2nd year, AP	21	(2.4)	24	(2.6)
2nd year, Advanced	16	(2.1)	17	(2.2)
Any 2nd year	33	(3.4)	36	(3.5)
Physics				
1st year	75	(4.2)	81	(4.1)
1st year, Applied	13	(2.2)	14	(2.2)
Any 1st year	77	(4.2)	83	(4.1)
2nd year, AP	14	(1.9)	15	(1.9)
2nd year, Advanced	6	(1.1)	6	(1.2)
Any 2nd year	18	(2.2)	20	(2.3)
Physical Science	48	(3.5)	48	(3.6)
Earth Science				
Astronomy/Space Science	17	(2.7)	19	(2.8)
Geology	8	(1.9)	8	(2.0)
Meteorology	3	(1.2)	3	(1.2)
Oceanography/Marine Science	9	(1.9)	10	(1.9)
1st year	32	(3.0)	31	(3.0)
1st Year, Applied	8	(3.1)	8	(3.2)
Any 1st year	36	(3.5)	34	(3.5)
2nd year, Advanced/Other	2	(0.8)	2	(0.8)
Other Science				
General Science	19	(2.9)	19	(3.0)
Environmental Science	36	(3.3)	39	(3.4)
Coordinated Science	4	(2.4)	4	(2.4)
Integrated Science	12	(1.9)	12	(1.9)
Other				
Coordinated/Integrated Science	16	(2.8)	16	(2.9)
General, Coordinated, or Integrated Science	31	(3.1)	32	(3.3)

In mathematics, most schools with grade 7 or 8 offer courses in regular mathematics at those grades, with 88 percent offering Regular Math 7 and 76 percent offering Regular Math 8. (See Table 4.6.) Overall, 62 percent of the schools offer Algebra I to their seventh and/or eighth graders.

Table 4.6
Schools Offering Various
Mathematics Courses, Grade 7 or 8*

	Percent of Schools	
Remedial Mathematics, Grade 7	27	(3.6)
Regular Mathematics, Grade 7	88	(3.1)
Accelerated Mathematics, Grade 7	41	(4.1)
Remedial Mathematics, Grade 8	30	(3.6)
Regular Mathematics, Grade 8	76	(3.7)
Enriched Mathematics, Grade 8	25	(3.3)
Algebra 1, Grade 7 or 8	62	(4.3)
Integrated Middle Grades Math, Grade 7 or 8	7	(2.3)

* Only schools containing grades 7 and/or 8 were included in these analyses.

At the high school level, the traditional three-year, formal mathematics sequence is offered in the vast majority of schools with grades 10–12, with 98 percent offering Introductory Algebra or the first year in a unified/integrated mathematics sequence; 94 percent offering Geometry or a second-year formal unified course; and 96 percent offering Intermediate Algebra or a third year of unified/integrated mathematics. While 89 percent of high schools offer a fourth year in the formal mathematics sequence, including such courses as Trigonometry, Advanced Algebra, and Pre-Calculus, only 43 percent of high schools offer level-five courses such as Calculus, and only 36 percent offer a course in Advanced Placement Calculus. (See Table 4.7.)

Table 4.7
Schools Offering Various Mathematics
Courses, Grade 9 and Grade 10, 11, or 12

	Percent of Schools			
	Schools Including Grade 9		Schools Including Grade 10, 11, or 12	
Review Mathematics				
Level 1 (e.g., Remedial Mathematics)	28	(2.6)	28	(2.5)
Level 2 (e.g., Consumer Mathematics)	26	(2.6)	27	(2.5)
Level 3 (e.g., General Mathematics 3)	16	(2.3)	17	(2.4)
Level 4 (e.g., General Mathematics 4)	9	(1.7)	10	(1.8)
Informal Mathematics				
Level 1 (e.g., Pre-Algebra)	51	(3.6)	50	(3.5)
Level 2 (e.g., Basic Geometry)	21	(2.7)	23	(2.7)
Level 3 (e.g., after Pre-Algebra, but not Algebra 1)	17	(2.1)	17	(2.1)
Formal Mathematics				
Level 1 (e.g., Algebra 1 or Integrated Math 1)	98	(0.9)	98	(0.8)
Level 2 (e.g., Geometry or Integrated Math 2)	93	(2.2)	94	(2.2)
Level 3 (e.g., Algebra 2 or Integrated Math 3)	93	(2.2)	96	(2.0)
Level 4 (e.g., Algebra 3 or Pre-Calculus)	84	(3.1)	89	(2.9)
Level 5 (e.g., Calculus)	41	(3.5)	43	(3.5)
Level 5, AP	33	(3.0)	36	(3.2)
Other Mathematics Courses				
Probability and Statistics	21	(2.6)	23	(2.7)
Mathematics integrated with other subjects	4	(0.8)	4	(0.8)

In addition to obtaining information on school course offerings, the survey instruments requested that each science and mathematics teacher provide the title of a randomly selected class. As can be seen in Table 4.8, the most common science courses in grades 6–8 are General Science (29 percent of the classes) and Integrated Science (22 percent). Life Science is the most frequent of the single-discipline science courses, accounting for 20 percent of the science classes in grades 6–8.

Thirty percent of the science courses in grades 9–12 are first-year biology; first-year chemistry accounts for 19 percent of the courses; first-year physics for 10 percent; and physical science and earth science each for 7 percent. A total of 9 percent of the high school science courses are either general, integrated, or coordinated science, and 11 percent are advanced courses in biology, chemistry, or physics.

Table 4.8
Most Commonly Offered Grade 6–12
Science Courses, by Grade Range

	Percent of Classes	
Grades 6–8 Science		
Life Science	20	(2.4)
Earth Science	14	(2.3)
Physical Science	16	(2.5)
General Science	29	(2.8)
Integrated Science	22	(2.1)
Grades 9–12 Science		
1st Year Biology	30	(2.1)
Advanced Biology	6	(0.8)
1st Year Chemistry	19	(1.2)
Advanced Chemistry	3	(1.6)
1st Year Physics	10	(1.0)
Advanced Physics	2	(0.3)
Physical Science	7	(1.0)
Earth Science	7	(1.0)
General Science	3	(0.7)
Integrated/Coordinated Science	6	(0.8)
Other Science	8	(1.1)

Turning to mathematics, Table 4.9 shows that 63 percent of the courses in grades 6–8 are “regular mathematics”; 30 percent are some kind of enriched or accelerated mathematics, including Algebra I; and 6 percent are remedial mathematics.

In grades 9–12, the most commonly offered courses are Algebra I, Geometry, and Algebra II, each accounting for 18–23 percent of the mathematics courses. More advanced mathematics offerings, including Algebra III, Pre-Calculus, and Calculus, comprise 19 percent of the grade 9–12 courses. “Informal” mathematics courses such as Basic Algebra and Basic Geometry account

for 12 percent of the grade 9–12 mathematics courses, while 5 percent of the courses at this level focus on review mathematics.

Table 4.9
Most Commonly Offered Grade 6–12
Mathematics Courses, by Grade Range

	Percent of Classes	
Grades 6–8 Mathematics		
Remedial Mathematics, 6	2	(0.7)
Regular Mathematics, 6	32	(2.9)
Accelerated/Pre-Algebra Mathematics, 6	4	(1.0)
Remedial Mathematics, 7	3	(0.8)
Regular Mathematics, 7	18	(1.8)
Accelerated Mathematics, 7	7	(1.4)
Remedial Mathematics, 8	1	(0.3)
Regular Mathematics, 8	13	(1.6)
Enriched Mathematics, 8	9	(1.5)
Algebra I, Grade 7 or 8	10	(1.5)
Integrated Middle Grades Math, 7 or 8	1	(0.5)
Grades 9–12 Formal Mathematics		
Mathematics Level 1, Algebra 1	23	(1.7)
Mathematics Level 2, Geometry	20	(1.4)
Mathematics Level 3, Algebra 2	18	(1.4)
Advanced Mathematics/Calculus	19	(1.7)
Informal/Basic Mathematics	12	(1.2)
Review/General Mathematics	5	(0.8)
Other Mathematics	3	(0.8)

D. Other Characteristics of Science and Mathematics Classes

The 2000 National Survey found that the average size of science and mathematics classes is generally around 22 to 24 students (see Table 4.10). However, as can be seen in Figures 4.1–4.6, averages obscure the wide variation in class sizes. For example, 12 percent of mathematics classes in grades 9–12 have 30 or more students.

Table 4.10
Average Science and
Mathematics Class Size

	Number of Students			
	Science		Mathematics	
Grades K–12				
K–4	21.5	(0.3)	22.0	(0.3)
5–8	23.3	(0.3)	22.9	(0.5)
9–12	21.7	(0.4)	21.4	(0.3)
Grade 9–12 Science Courses				
1st Year Biology	23.1	(1.0)	—	—
1st Year Chemistry	21.4	(0.5)	—	—
1st Year Physics	16.8	(1.1)	—	—
Advanced Science Courses	19.7	(1.4)	—	—
Grade 9–12 Mathematics Courses				
Review Mathematics	—	—	18.6	(0.9)
Informal Mathematics	—	—	20.7	(0.7)
Algebra I	—	—	22.2	(0.6)
Geometry	—	—	22.6	(0.6)
Algebra II and Higher Mathematics	—	—	21.0	(0.5)

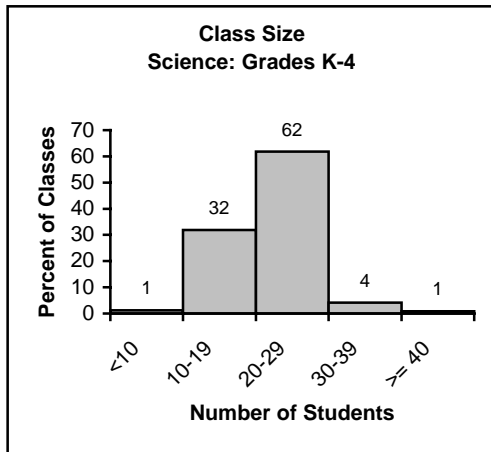


Figure 4.1

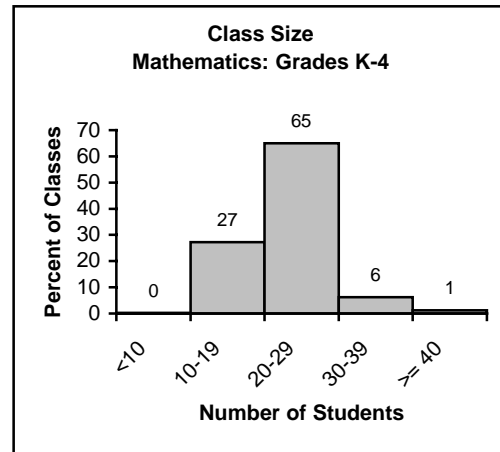


Figure 4.4

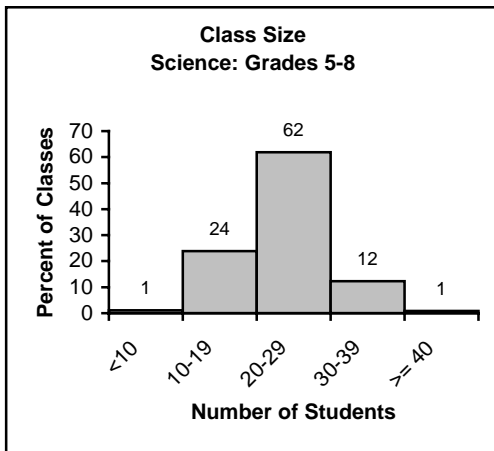


Figure 4.2

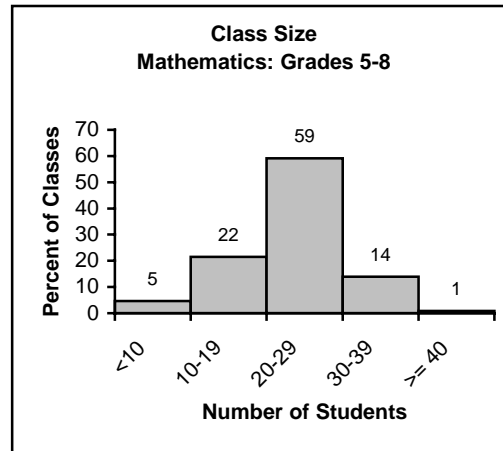


Figure 4.5

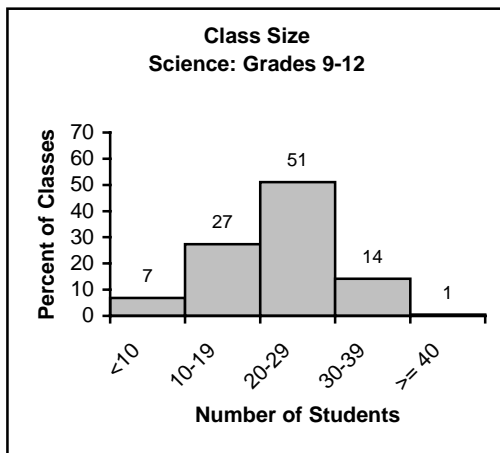


Figure 4.3

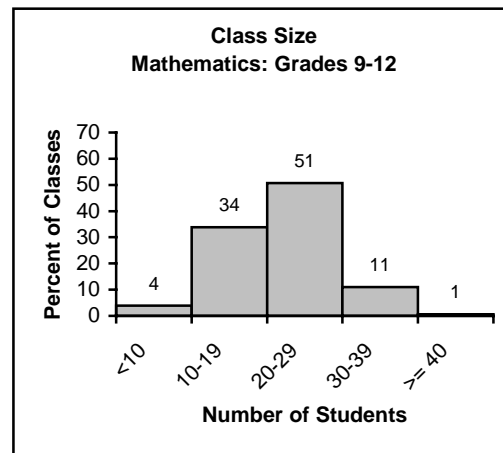


Figure 4.6

Teachers were asked whether students in the randomly selected science or mathematics class were assigned to that class by level of ability. Table 4.11 shows that the practice of assigning students to classes by ability level is generally more prevalent in mathematics than in science, and in each case is much more common in the higher grades, with 40 percent of the grade 9–12 science classes and 65 percent of the grade 9–12 mathematics classes having students assigned by ability level.

Table 4.11
Students Assigned to Science and
Mathematics Classes by Ability Level

	Percent of Classes			
	Science		Mathematics	
Grades K–4	6	(1.2)	10	(1.6)
Grades 5–8	14	(1.5)	46	(2.2)
Grades 9–12	40	(2.3)	65	(2.0)

Teachers were also asked to indicate the ability make-up of the selected class, specifying if the class was fairly homogeneous in ability or indicating that it was a mixture of ability levels. As can be seen in Table 4.12, roughly two-thirds of the classes in grades K–4 are heterogeneous in ability; most of the remaining classes are composed primarily of average-ability students. The percent of classes that are heterogeneous in ability declines with increasing grade level, with more than 60 percent of the K–4 classes, but only 37 percent of the high school science classes and 26 percent of the high school mathematics classes comprised of students of varying ability levels.

Table 4.12
Ability Grouping in Science and
Mathematics Classes, by Grade Range

	Percent of Classes					
	Grades K–4		Grades 5–8		Grades 9–12	
Science Classes						
Fairly homogeneous and low in ability	6	(1.6)	8	(1.4)	7	(0.9)
Fairly homogeneous and average in ability	28	(2.4)	23	(2.3)	29	(2.1)
Fairly homogeneous and high in ability	5	(1.3)	11	(1.4)	27	(2.1)
Heterogeneous, with a mixture of two or more ability levels	62	(2.6)	58	(2.3)	37	(2.0)
Mathematics Classes						
Fairly homogeneous and low in ability	6	(1.2)	12	(1.4)	17	(1.3)
Fairly homogeneous and average in ability	21	(1.9)	26	(2.1)	31	(1.6)
Fairly homogeneous and high in ability	5	(1.0)	18	(2.1)	26	(1.8)
Heterogeneous, with a mixture of two or more ability levels	68	(2.2)	44	(2.4)	26	(1.9)

Table 4.13 shows that the trend of decreasing percentages of heterogeneous classes with increasing grade level occurs *within* the high school grades as well. For example, 1 in 3 Geometry and Algebra II classes, but only 1 in 5 more advanced classes are heterogeneously grouped.

Table 4.13
Ability Grouping in Selected High School Science and Mathematics Classes

	Percent of Classes			
	Low	Average	High	Heterogeneous
Science Classes				
1st Year Biology	9 (1.8)	34 (4.5)	17 (2.5)	41 (3.9)
1st Year Chemistry	3 (0.9)	30 (3.7)	33 (3.9)	35 (4.2)
1st Year Physics	1 (0.4)	20 (4.5)	46 (6.2)	33 (6.7)
Mathematics Classes				
Geometry/Integrated Mathematics 2	7 (1.9)	36 (3.7)	25 (3.8)	32 (4.5)
Algebra II/Integrated Mathematics 3	4 (1.5)	33 (3.7)	29 (3.7)	34 (3.8)
Algebra III/Integrated Mathematics 4/Calculus	2 (1.1)	18 (3.8)	59 (6.7)	20 (7.3)

Table 4.14 presents data on ability grouping for science classes categorized by the percent of minority students in the class; comparable data for mathematics classes are shown in Table 4.15. Note that classes labeled “low ability” are more likely to contain a high proportion of minority students. For example, while overall 31 percent of the science classes in grades 5–8 have at least 40 percent minority students, 66 percent of the “low ability” classes are high minority.

Table 4.14
Ability Grouping in Grade K–12 Science Classes with Low, Medium, and High Percentages of Minority Students

	Percent of Classes				
	Total	Low	Average	High	Heterogeneous
Grades K–4					
< 10% Minority	33 (3.0)	18 (9.8)	30 (6.1)	51 (15.9)	34 (3.9)
10–39% Minority	30 (3.1)	21 (11.5)	37 (6.7)	34 (18.6)	28 (3.1)
≥ 40% Minority	37 (3.4)	61 (16.4)	33 (5.7)	15 (8.1)	38 (3.5)
Grades 5–8					
< 10% Minority	42 (3.4)	14 (9.3)	49 (6.7)	45 (6.3)	42 (4.4)
10–39% Minority	27 (2.6)	20 (7.5)	27 (5.6)	32 (7.4)	28 (3.5)
≥ 40% Minority	31 (3.0)	66 (10.4)	24 (4.2)	22 (5.5)	30 (4.0)
Grades 9–12					
< 10% Minority	41 (2.6)	40 (10.2)	40 (5.1)	48 (5.1)	37 (3.8)
10–39% Minority	33 (2.0)	20 (4.6)	34 (4.3)	38 (4.3)	31 (3.7)
≥ 40% Minority	26 (2.4)	40 (9.5)	26 (5.5)	15 (2.6)	32 (3.5)

Table 4.15
Ability Grouping in Grade K–12 Mathematics Classes with
Low, Medium, and High Percentages of Minority Students

	Percent of Classes				
	Total	Low	Average	High	Heterogeneous
Grades K–4					
< 10% Minority	35 (3.2)	2 (1.9)	33 (6.0)	38 (11.1)	37 (3.7)
10–39% Minority	32 (2.8)	33 (11.9)	42 (5.7)	39 (10.9)	28 (3.1)
≥ 40% Minority	33 (3.1)	65 (11.8)	25 (4.6)	23 (9.7)	34 (3.4)
Grades 5–8					
< 10% Minority	40 (2.8)	29 (6.9)	31 (4.3)	51 (6.2)	43 (4.1)
10–39% Minority	30 (2.6)	30 (6.0)	37 (4.8)	36 (5.9)	23 (3.7)
≥ 40% Minority	30 (2.7)	41 (7.8)	32 (4.5)	13 (3.9)	34 (4.5)
Grades 9–12					
< 10% Minority	42 (2.4)	29 (4.2)	40 (3.2)	54 (4.6)	39 (5.3)
10–39% Minority	31 (1.9)	30 (4.2)	35 (3.1)	30 (3.6)	27 (3.5)
≥ 40% Minority	28 (2.2)	41 (4.8)	25 (3.2)	16 (3.3)	34 (4.3)

Teachers were also asked to indicate if the randomly selected science/mathematics class included students who were formally classified as limited English proficiency, learning disabled, mentally handicapped, or physically handicapped. As can be seen in Table 4.16, students with mental handicaps are more likely to be included in regular science and mathematics instruction in the earlier grades. Students with physical handicaps are more evenly distributed, with 4–7 percent of the classes in each subject and grade range including students with physical handicaps.

Table 4.16
Science and Mathematics Classes with One or More
Students with Particular Special Needs, by Grade Range

	Percent of Classes		
	Grades K–4	Grades 5–8	Grades 9–12
Science			
Learning Disabled	50 (2.6)	63 (2.6)	37 (2.2)
Limited English Proficiency	38 (2.8)	22 (2.3)	17 (1.5)
Mentally Handicapped	8 (1.3)	9 (1.5)	3 (0.8)
Physically Handicapped	7 (1.5)	7 (1.3)	4 (0.7)
Mathematics			
Learning Disabled	47 (2.3)	47 (2.6)	31 (1.8)
Limited English Proficiency	34 (3.0)	20 (1.7)	16 (1.3)
Mentally Handicapped	7 (1.3)	2 (0.5)	2 (0.5)
Physically Handicapped	6 (1.0)	4 (0.9)	4 (0.6)

Table 4.16 also shows that sizeable numbers of science and mathematics classes in grades K–4 and 5–8 (from 47 to 63 percent) include students with learning disabilities, decreasing to 31–37 percent overall in grades 9–12. Depending on subject and grade range, 16–38 percent of the science and mathematics classes in grades K–4, 5–8, and 9–12 include one or more students with limited English proficiency (LEP). However, as can be seen in Table 4.17, the percentages of science and mathematics classes including students with LEP varies considerably by region and type of community. For example, only 17 percent of science classes in the Midwest and

Northeast, but 52 percent of those in the West, include LEP students. Similarly, 25–34 percent of urban and suburban science and mathematics classes, but only 12–14 percent of those in rural areas, include LEP students.

Table 4.17
Grade K–12, Science and Mathematics Classes with One or More Limited English Proficiency Students, by Region and Community Type

	Percent of Classes			
	Science		Mathematics	
Region				
Midwest	17	(2.7)	13	(1.9)
Northeast	17	(3.5)	14	(2.6)
South	25	(2.5)	25	(2.6)
West	52	(4.1)	47	(4.2)
Community Type				
Urban	33	(2.8)	34	(2.5)
Suburban	30	(2.5)	25	(2.6)
Rural	14	(3.0)	12	(2.2)

While females in each grade range are about as likely as males to be enrolled in science and mathematics classes overall, there are differences among courses at the high school level, with higher proportions of females in high school biology and chemistry classes and in the formal mathematics sequence (See Table 4.18.).

Table 4.18
Female and Non-Asian Minority Students in Science and Mathematics Classes, by Grade Range and Subject

	Percent of Students					
	Science			Mathematics		
	Female		Non-Asian	Female		Non-Asian
Grades						
K–4	49	(0.5)	32 (3.1)	49	(0.5)	30 (2.7)
5–8	50	(0.7)	29 (2.3)	50	(0.7)	28 (2.3)
9–12	52	(0.6)	25 (1.6)	52	(0.6)	26 (1.5)
Science Courses						
1st Year Biology	52	(1.0)	25 (2.1)	—	—	— —
1st Year Chemistry	56	(1.3)	21 (2.4)	—	—	— —
1st Year Physics	46	(1.9)	19 (3.5)	—	—	— —
Mathematics Courses						
Review Mathematics	—	—	— —	46	(2.6)	41 (4.8)
Informal Mathematics	—	—	— —	47	(1.7)	33 (3.6)
Algebra 1	—	—	— —	53	(1.5)	36 (2.9)
Geometry/Mathematics Level 2	—	—	— —	54	(1.2)	21 (2.4)
Algebra 2/Mathematics Level 3	—	—	— —	54	(1.3)	23 (2.3)
Advanced Mathematics	—	—	— —	52	(1.2)	12 (1.7)

Non-Asian minority students make up roughly 30 percent of the enrollment in grades K–12. It is interesting to note that this enrollment is fairly stable across key science courses at the high school level (ranging from 25 percent in first-year biology to 19 percent in first-year physics), but decreases markedly with increasing course levels in mathematics. For example, non-Asian minority students comprise 36 percent of the enrollment in Algebra I, but only 21 to 23 percent of the enrollment in Geometry and Algebra II, and only 12 percent of the enrollment in more advanced mathematics courses.

E. Summary

Data from the 2000 National Survey indicate that in the early grades, mathematics is taught quite a bit more frequently than science. On a typical day, almost all grade K–4 classes spend time on mathematics instruction, compared to only 7 in 10 on science instruction. Further, mathematics lessons in the early grades tend to be substantially longer than science lessons, although the amount of time devoted to reading instruction in grades K–6 dwarfs both science and mathematics.

In terms of the number of schools offering courses, the most commonly offered science course in grades 7–8 is life science, followed by earth science and then physical science. At the high school level, virtually all schools offer an introductory biology course, compared to 9 in 10 schools offering chemistry and 8 in 10 offering physics. Only about a third of high schools offer coursework in earth science. In mathematics, most schools with grade 7 or 8 offer courses in regular mathematics at those grades. Only about 6 in 10 schools offer Algebra I to their seventh and/or eighth graders. At the high school level, almost all schools offer the three-course sequence of introductory algebra, geometry, and intermediate algebra. While 9 in 10 high schools offer a fourth year in the formal mathematics sequence, only 4 in 10 offer level-five courses such as Calculus, and only about a third offer a course in Advanced Placement Calculus.

The 2000 National Survey found that the practice of assigning students to classes by ability level is generally more prevalent in mathematics than in science, and much more common in the higher grades. As a result, the percentage of classes that are heterogeneous in ability declines with increasing grade level. Further, students are not assigned to homogeneous classes proportionally by race; classes labeled “low ability” are more likely to contain a high proportion of minority students.

In the sciences, more than half of the students in high school biology and chemistry classes are females; this is also the case in courses in the formal mathematics course sequence at the high school level. Non-Asian minority students make up roughly 30 percent of the enrollment in grades K–12, but at the high school level, the proportion of these students decreases as the level of mathematics increases. The percentage of non-Asian minority students is fairly stable across high school science classes.