

## 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<br>Grade 9 |       | Schools Including<br>Grade 10, 11, or 12 |       |
| <b>Biology</b>                              |                              |       |  |       |
| 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) |
| <b>Chemistry</b>                            |                              |       |  |       |
| 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) |
| <b>Physics</b>                              |                              |       |  |       |
| 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) |
| <b>Earth Science</b>                        |                              |       |  |       |
| 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) |
| <b>Other Science</b>                        |                              |       |  |       |
| 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) |
| <b>Other</b>                                |                              |       |  |       |
| 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 |       |
| <b>Review Mathematics</b>                            |                           |       |                                       |       |
| 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) |
| <b>Informal Mathematics</b>                          |                           |       |                                       |       |
| 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) |
| <b>Formal Mathematics</b>                            |                           |       |                                       |       |
| 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) |
| <b>Other Mathematics Courses</b>                     |                           |       |                                       |       |
| 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 |       |
|--------------------------------|--------------------|-------|
| <b>Grades 6–8 Science</b>      |                    |       |
| 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) |
| <b>Grades 9–12 Science</b>     |                    |       |
| 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**

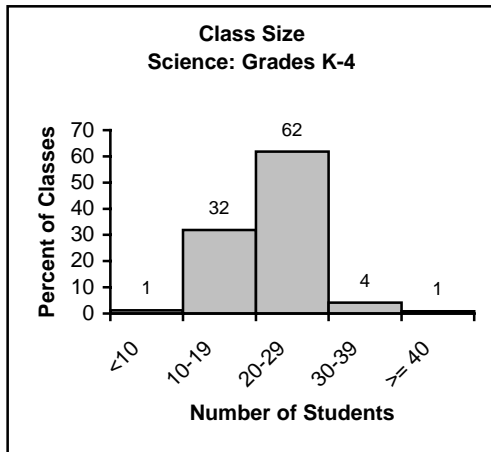
|  | <b>Percent of Classes</b> |       |
|--|---------------------------|-------|
| <b>Grades 6–8 Mathematics</b>          |                           |       |
| Remedial Mathematics, 6                | 2                         | (0.7) |
| Regular Mathematics, 6                 | 32                        | (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) |
| <b>Grades 9–12 Formal Mathematics</b>  |                           |       |
| 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

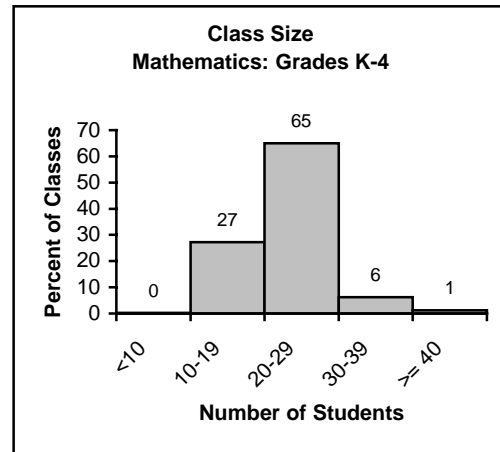
The 2000 National Survey found that the average size of science and mathematics classes is generally around 22 to 24 students (see Table 4.10). However, as can be seen in Figures 4.1–4.6, averages obscure the wide variation in class sizes. For example, 12 percent of mathematics classes in grades 9–12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

**Table 4.10**  
Average Science and  
Mathematics Class Size

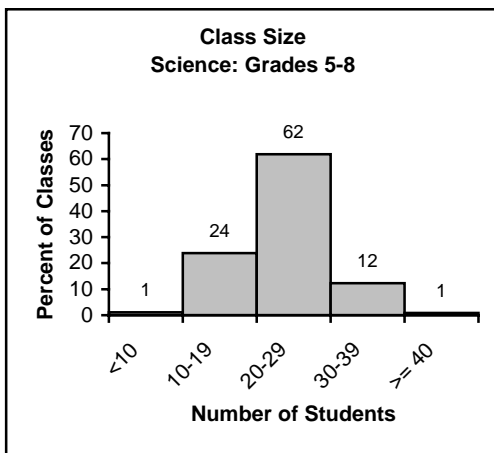
|                                       | Number of Students |       |             |       |
|---------------------------------------|--------------------|-------|-------------|-------|
|                                       | Science            |       | Mathematics |       |
| <b>Grades K–12</b>                    |                    |       |             |       |
| 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) |
| <b>Grade 9–12 Science Courses</b>     |                    |       |             |       |
| 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) | —           | —     |
| <b>Grade 9–12 Mathematics Courses</b> |                    |       |             |       |
| 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) |



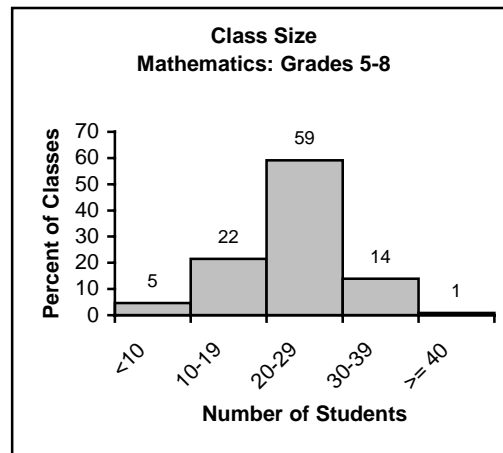
*Figure 4.1*



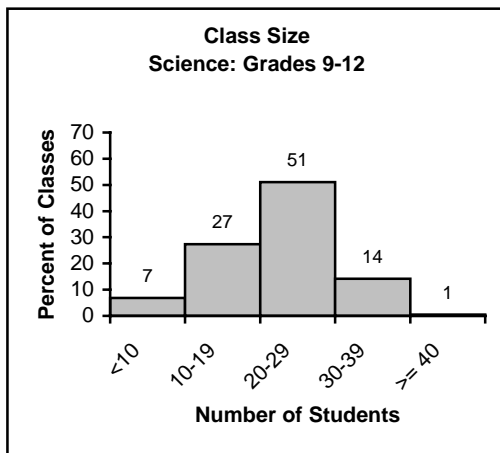
*Figure 4.4*



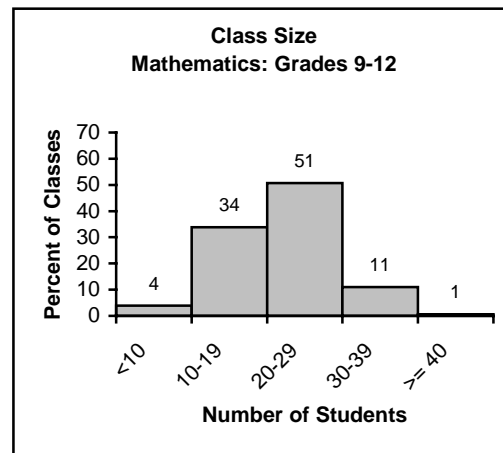
*Figure 4.2*



*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 |       |
| <b>Science Classes</b>                                      |                    |       |            |       |             |       |
| 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) |
| <b>Mathematics Classes</b>                                  |                    |       |            |       |             |       |
| 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 |
| <b>Science Classes</b>                        |                    |          |          |               |
| 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)      |
| <b>Mathematics Classes</b>                    |                    |          |          |               |
| 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 |
| <b>Grades K–4</b>  |                    |           |          |           |               |
| < 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)      |
| <b>Grades 5–8</b>  |                    |           |          |           |               |
| < 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)      |
| <b>Grades 9–12</b> |                    |           |          |           |               |
| < 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 |
| <b>Grades K–4</b>  |                    |           |          |           |               |
| < 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)      |
| <b>Grades 5–8</b>  |                    |           |          |           |               |
| < 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)      |
| <b>Grades 9–12</b> |                    |           |          |           |               |
| < 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 |
| <b>Science</b>              |                    |            |             |
| 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)     |
| <b>Mathematics</b>          |                    |            |             |
| 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 |       |
| <b>Region</b>         |                    |       |             |       |
| 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) |
| <b>Community Type</b> |                    |       |             |       |
| 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 |
| <b>Grades</b>                 |                     |       |           |             |       |           |
| 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)  |
| <b>Science Courses</b>        |                     |       |           |             |       |           |
| 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)  | —           | —     | —         |
| <b>Mathematics Courses</b>    |                     |       |           |             |       |           |
| 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)  |

