Section 4

Quality of Elementary and Secondary Educational Environments

Contents

Summary: Quality of Elementary and Secondary Educational Environments

Elementary and secondary education is designed to provide children with the academic knowledge and skills they need to function successfully in society and to prepare them to pursue further education, to enter the workforce, and to be responsible, active citizens. If students do not receive the knowledge and skills they need to be productive, then the schools have not succeeded in their mission. Examining the characteristics of schools that are related to student learning can help to illuminate some of the reasons why students are learning or not. In 1991, an NCES Special Study Panel on Education Indicators called for a "dual focus on both learner outcomes and the quality of the national educating institutions" (U.S. Department of Education 1991).

School quality as it affects student learning may involve many different characteristics of schools, each of which may be interrelated and not one of which alone predetermines learning. These characteristics may include the courses that students take and the academic standards that teachers and administrators set, the learning opportunities afforded to students, teachers' qualifications and training, and administrators' ability to provide a safe and disciplined school environment, as well as the physical and human resources at schools. Indicators on these aspects of the elementary and secondary educational environment are included in this section.

Coursetaking and Standards

One of the most important factors contributing to the education that students receive is the kinds of courses they take. In 1983, the National Commission on Excellence in Education (NCEE) proposed that all high school students seeking a diploma be required to complete the "New Basics" core curriculum, which required students to complete more coursework in mathematics, science, English, social studies, and other course areas by the time they graduated from high school than many students at the time had completed (National Commission on Excellence in Education 1983). For example, between school years 1987–88 and 1993–94, the percentage of public school districts with high school graduation requirements that met or exceeded the NCEE's recommendations of four years of English and three years each of social studies, science, and mathematics increased (NCES 98–013). Since 1983, the percentage of high school graduates who completed advanced mathematics and science courses has increased. In 1982, 5 and 6 percent of high school graduates, respectively, (or 11 percent combined) completed mathematics courses at Advanced academic Levels II and III (the most advanced levels of coursetaking that include such mathematics courses as trigonometry, precalculus, and calculus). In 1998, 15 and 12 percent of high school graduates, respectively (or 27 percent combined) completed mathematics courses at those levels. The percentages of high school graduates who completed advanced courses in science were also higher in 1998 than in 1982 (*Indicator 40*).

However, in 1998, not all student groups took challenging mathematics and science coursework at the same rate. Asian/Pacific Islander and white high school graduates, private school graduates, and those who completed the New Basics curriculum were usually more likely than others to complete advanced levels of mathematics and science coursework (*Indicator 39*).

Although there has been progress in advanced course-taking patterns in U.S. schools, some evidence exists that the quality of U.S. educational instruction in mathematics may lag behind that of other countries. Data collected for the Third International Mathematics and Science Study (TIMSS) show that the content of mathematics lessons taught to 8th-grade students in the United States was more likely to

Summary: Quality of Elementary and Secondary Educational Environments

Continued

be rated of the lowest quality when compared with lessons taught to students in Japan and Germany. Thirty-nine and 28 percent, respectively, of Japanese and German mathematics lessons received the highest quality rating, whereas no lessons from the United States received such a rating (*Indicator 44*). Further, 8th-grade mathematics lessons in the United States differed from those in Germany and Japan in instructional processes: 83 percent of U.S. lessons contained only "task-controlled" tasks in which the teacher demonstrated a particular solution method to students and asked them to replicate that solution, as opposed to "student-controlled" tasks in which the teacher encouraged students to find alternative solution approaches on their own. Forty-eight percent of German lessons and 17 percent of Japanese lessons contained only "task-controlled" tasks. In addition, Japanese teachers emphasized mathematical thinking among students more often than did their American counterparts. The relative quality of lessons taught in the United States, compared with those taught in other countries, may be related to the relatively poor performance of U.S. students in mathematics and science at the end of secondary school, compared with students from other countries (NCES 1999–022).

Learning Opportunities

Many factors may influence learning opportunities in elementary and secondary schools, such as the number of students in a classroom, the amount of individualized attention a student receives from a teacher, and a student's access to technology in the school.

Small class sizes may bring increased opportunity for classroom contact between students and teachers and may enhance students' learning opportunities by allowing them more one-on-one contact with a teacher (NEA 2000). The National Education Association (NEA) recommends no more than 15 students per class for kindergarten through 3rd grade. In 1998, kindergarten classrooms in public schools averaged 20 students per teacher, whereas kindergarten classrooms in private schools averaged 18 students. Fifteen percent of public school kindergarten classrooms have 15 or fewer students, compared with 41 percent of private school kindergarten classrooms (*Indicator 41*). Although student/teacher ratios are not a direct measure of class size, they do provide an indirect means of assessing the possibility of contact between students and teachers. Student/teacher ratios in elementary and secondary schools were smaller in 1998 than in 1970 (*Indicator 43*).

Computers and related technology provide an alternate way for students to learn and obtain information and are an increasingly available educational resource. In 1999, 95 percent of public elementary and secondary schools had Internet access (NCES 2000–086), and 78 percent of students in grades 1–12 reported using the Internet at school (*Indicator 45*).

School Choice

By choosing the school that their children attend, parents may perceive that they can influence the quality of education their children receive. In addition, with parents choosing their children's school, schools may be prompted to compete for enrollments by improving the programs they offer (Viteritti 2000).

Since 1991, the popularity of school choice has grown among the general public. In 1996, 69 percent of the public favored allowing students and their parents to choose which public schools in the community students attend, regardless of where they live; 44 percent favored allowing students and their parents to choose a private school over the public one, up from 26 percent in 1991 (NCES 1999–036). In 1999, more children in grades 3–12 attended schools

Summary: Quality of Elementary and Secondary Educational Environments

Continued

chosen by their parents (either public or private schools) than in 1993 (24 versus 20 percent) (*Indicator 46*).

Recent data show that a decreasing proportion of parents report satisfaction with assigned public schools, especially at the secondary level. The percentage of children who attended an assigned public school whose parents were very satisfied with the child's school, teachers, and the school's academic standards decreased between 1993 and 1999. In 1999, private schools had the highest percentages of children with parents who were very satisfied with the child's school, teachers, the school's academic standards, and discipline, followed by chosen public schools and by assigned public schools. For all public schools, a higher percentage of children in grades 3–5 had parents who were very satisfied than did children in grades 9–12 (*Indicator 46*).

Teachers and Teacher Characteristics

Teachers must have a thorough grounding in the subjects they teach so they can guide their students effectively through the material and respond knowledgeably to questions and comments. The basis of their knowledge comes from their prior education, as signified by the degrees and certifications they earn. In 1998, 38 percent of full-time public school teachers held academic degrees at the bachelor's or graduate level. Teachers with three or fewer years of teaching experience were more likely than more experienced teachers to hold academic degrees. In 1998, virtually 100 percent of public school teachers had earned a bachelor's degree; 45 percent had earned a master's degree; and at least 90 percent had earned regular or standard state certificates or advanced professional certificates (*Indicator 47*). Many teachers also participate in professional development to increase their skills and knowledge. In 1998, the percentage of full-time public school teachers who participated in various development activities in the past 12 months ranged from 81 to 31 percent, depending on the type of activity (*Indicator 48*).

While there is some evidence that the Nation's teachers are educated and strive to increase their skills and learn new techniques through professional development activities, there is evidence that their salaries are not competitive with those of workers in other professions. Elementary and secondary teachers earned less in 1998 than workers in other professions with bachelor's degrees (*Indicator 25, The Condition of Education 1999*).

School Safety and Disciplined Environments

In recent years, policymakers, educators, parents, and students increasingly have voiced concern about the incidence of school-related criminal behavior. Responses to such concern include enactment of the Gun-Free Schools Act (GFSA; Sinclair 1999) and zero-tolerance policies against violent behavior and drug use in order to maintain orderly and safe schools.

Although concern has grown, data show that high school student reports of various victimizations and violent behaviors have not increased in recent years, use of several types of drugs at schools has decreased, and most public school teachers feel prepared to maintain order and discipline in their classrooms. Victimization rates at school for high school seniors changed little between 1976 and 1997. In 1997, victimization rates ranged from 5 percent (the percentage of high school seniors who reported being injured with a weapon at school during the previous 12 months) to 39 percent (the percentage of seniors who reported having something stolen at school during the past 12 months) compared with 6 to 38 percent, respectively, in 1976 (NCES 1999–022). Between 1976 and 1998, the percentage of high school seniors who reported using alcohol,

Summary: Quality of Elementary and Secondary Educational Environments

Continued

marijuana, stimulants, cocaine, or tranquilizers at school during the previous year decreased. In 1998, 71 percent of public school teachers felt they were very well prepared to maintain order and discipline in their classrooms (NCES 1999–022).

Other School Resources

The ability of the Nation's schools and educators to provide a quality educational experience to students is dependent on human and physical resources. Even if the educational standards of the schools are high, their physical condition may lag behind. Costly improvements are needed in many schools just to meet federal mandates for accessibility and elimination of hazardous conditions such as asbestos or lead paint (GAO 1995). The boom in student enrollment (see *Indicator 3*) may exacerbate personnel shortages, inadequate classroom space, and wear and tear on school buildings. In 1994–96, the average age of U.S. public schools was 42 years old. Twenty-nine percent of public schools were built before 1970 and have never been renovated or were last renovated before 1980. Sixty-one percent were built between 1970 and 1984 or built before 1970 and had been renovated since 1980. Ten percent of public schools in the United States were built after 1984, renovated or not (*Indicator 49* and NCES 1999–048).

Conclusion

In the past two decades, progress has been made in several areas in improving the quality of elementary and secondary education provided the Nation's schools. The data discussed above show some of these improvements, which include more rigorous coursetaking by high school students, increased access to technology in public schools, decreases in student/teacher ratios, and increased discipline in school environments. Nonetheless, this progress has been tempered by such factors as of lower lesson quality when compared with that of other countries, low teacher salaries, and aging school buildings. These factors may contribute to lower confidence among parents and the general public in the quality of public elementary and secondary education.

Coursetaking and Standards

Coursetaking in Mathematics and Science

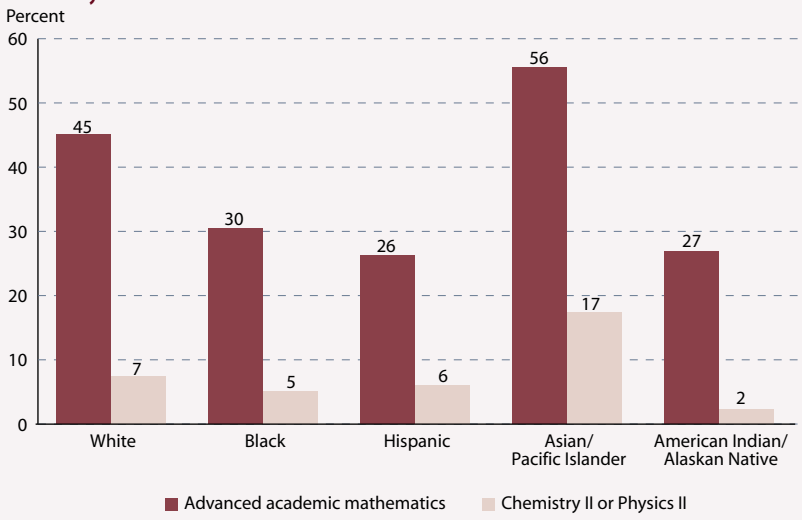
Asian/Pacific Islander and white high school graduates, private school graduates, and those who completed the New Basics curriculum were usually more likely to complete advanced levels of mathematics and science coursework than their peers. Males and females completed advanced mathematics and science courses at similar rates.

The highest level of mathematics and science coursework that students complete by high school graduation is one measure of their efforts to perform and achieve at high levels and reflects the content, not just the quantity, of mathematics and science education. In 1998, there were differences in the highest levels of mathematics and science coursework completed among student groups.

Race-ethnicity and control of school were associated with the level of coursework completed by high school graduates in mathematics and science in 1998. Asian/Pacific Islander and white high school graduates were usually more likely to complete Advanced academic level mathematics, which includes such courses as trigonometry and calculus, and the highest level of science courses (Chemistry II or Physics II) than were graduates from other racial-ethnic groups. Similarly, graduates from private schools usually completed higher levels of mathematics and some science courses than did public school graduates. In contrast, there was parity between males and females in mathematics and science coursetaking at various levels, with the exception that females were more likely to take science at the Chemistry I or Physics I level than were males.

In 1998, high school graduates who completed the core New Basics curriculum were more likely to complete the highest levels of mathematics and science courses (Advanced academic levels I, II, and III for mathematics and Chemistry I and Physics I and Chemistry II or Physics II for science) than were graduates who did not meet those requirements.

DIFFERENCES IN COURSETAKING: Percentage of high school graduates who took advanced mathematics or science courses, by race-ethnicity: 1998



NOTE: The placement of graduates in the various levels of mathematics and science courses is determined by the completion of at least one course at that level. Graduates who have completed coursework at more than one level were placed into the higher level of coursework completed. Graduates may achieve higher levels of coursework without having taken courses at lower levels.

SOURCE: U.S. Department of Education, NCES. 1998 National Assessment of Educational Progress (NAEP) High School Transcript Study.

FOR MORE INFORMATION:

Supplemental Notes 3, 8

[1] Students in this category may have taken some mathematics courses, but these courses are not defined as mathematics courses according to the classification used in this analysis. See *Supplemental Note 8* for more information.

[2] To meet the requirements of the New Basics curriculum, students must complete at least four credits in English and three each in science, mathematics, and social studies.

NOTE: The placement of graduates in the various levels of mathematics courses is determined by the completion of at least one course at that level. Graduates who have completed coursework at more than one level (e.g., Mathematics Middle academic level II and Advanced academic level I) were placed into the higher level of coursework completed (i.e., Advanced academic level I). Graduates may achieve higher levels of coursework (e.g., Mathematics Advanced academic level III) without having taken courses at lower levels (e.g., Mathematics Middle academic level I). Percentages may not add to 100.0 due to rounding.

SOURCE: U.S. Department of Education, NCES. 1998 National Assessment of Educational Progress (NAEP) High School Transcript Study.

MATHEMATICS COURSETAKING: Percentage distribution of high school graduates according to the highest levels of mathematics courses taken, by student and school characteristics: 1998

Student or school characteristic	No mathematics[1]	Non-academic	Low academic	Middle academic			Advanced academic			
				Total	Level I	Level II	Total	Level I	Level II	Level III
Total	**0.9**	**3.7**	**5.6**	**48.5**	**20.8**	**27.7**	**41.4**	**14.4**	**15.2**	**11.8**
Sex										
Male	1.1	4.2	6.4	48.1	21.7	26.4	40.1	13.2	15.0	11.9
Female	0.7	3.2	4.9	48.6	19.7	28.9	42.6	15.7	15.3	11.6
Race-ethnicity										
White	0.9	3.2	4.9	45.8	18.5	27.4	45.1	15.7	16.5	13.0
Black	0.9	3.6	8.4	56.7	25.9	30.8	30.4	14.1	9.3	7.0
Hispanic	1.0	6.4	7.7	58.8	30.6	28.2	26.2	8.4	10.7	7.1
Asian/Pacific Islander	0.2	2.8	2.8	38.6	15.8	22.8	55.5	10.3	25.3	19.9
American Indian/ Alaskan Native	0.7	9.5	6.3	56.6	26.7	29.9	26.9	9.3	10.8	6.7
Met core New Basics[2]										
Yes	0.4	0.7	2.7	38.9	10.1	28.8	57.4	18.7	20.5	18.1
No	1.5	7.3	9.2	60.4	34.0	26.4	21.6	9.0	8.6	4.0
Control of school										
Public	1.0	4.0	6.1	50.4	21.8	28.6	38.7	14.2	13.4	11.0
Private	0	0.5	0.5	28.8	9.8	18.9	70.3	16.5	33.5	20.3

[1] Students in this category may have taken some science courses, but these courses are not defined as science courses according to the classification used in this analysis. See *Supplemental Note 8* for more information.

[2] To meet the requirements of the New Basics curriculum, students must complete at least four credits in English and three each in science, mathematics, and social studies.

NOTE: The placement of graduates in the various levels of science courses is determined by the completion of at least one course at that level. Graduates who have completed coursework at more than one level (e.g., Primary Physical Science and Secondary Physical Science) were placed into the higher level of coursework completed (i.e., Secondary Physical Science). Graduates may achieve higher levels of coursework (e.g., Chemistry II or Physics II) without having taken courses at lower levels (e.g., Primary Physical Science). Percentages may not add to 100.0 due to rounding.

SOURCE: U.S. Department of Education, NCES. 1998 National Assessment of Educational Progress (NAEP) High School Transcript Study.

SCIENCE COURSETAKING: Percentage distribution of high school graduates according to the highest levels of science courses taken, by student and school characteristics: 1998

Student or school characteristic	No science[1]	Primary physical science	Secondary physical science	Biology	Chemistry I or Physics I	Chemistry I and Physics I	Chemistry II or Physics II
Total	**0.6**	**3.1**	**6.3**	**30.5**	**33.8**	**18.5**	**7.3**
Sex							
Male	0.7	3.8	7.2	31.5	29.5	19.7	7.6
Female	0.5	2.4	5.4	29.6	37.7	17.7	6.8
Race-ethnicity							
White	0.6	2.8	5.6	29.1	34.2	20.4	7.4
Black	0.8	1.7	7.9	35.7	35.7	13.3	5.0
Hispanic	0.9	6.6	9.4	35.5	29.0	12.8	6.0
Asian/Pacific Islander	0.2	2.2	4.9	22.7	34.9	17.7	17.4
American Indian/ Alaskan Native	0	3.8	8.7	39.8	33.3	12.1	2.3
Met core New Basics[2]							
Yes	0.2	0.5	1.9	17.3	41.5	28.0	10.7
No	1.2	6.3	11.7	46.9	24.3	6.7	3.1
Control of school							
Public	0.7	3.3	6.7	31.6	34.0	16.7	7.1
Private	0	0.3	1.7	19.0	32.2	37.6	9.2

FOR MORE INFORMATION: Supplemental Notes 3, 8

Coursetaking and Standards

Coursetaking in Advanced Mathematics and Science

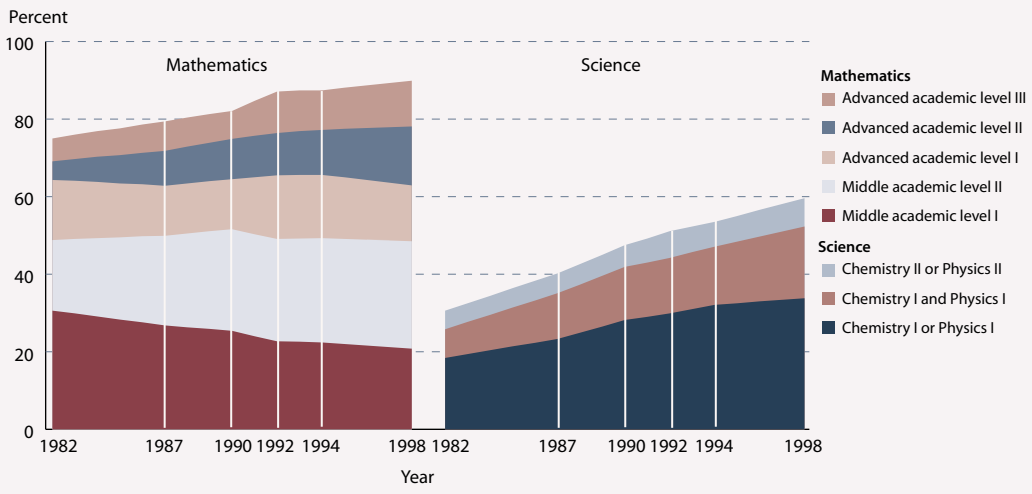
The percentages of high school graduates who completed courses in advanced mathematics and science increased since the introduction of the New Basics curriculum in 1983.

The New Basics curriculum (*National Commission on Excellence in Education: A Nation at Risk* 1983) requires that high school graduates complete a minimum of three credits each in both mathematics and science but does not specify which classes to take; therefore, a student can complete the requirements without taking advanced courses (*Indicator 39*). Another way of looking at coursetaking is to examine the nature and intensity of the highest level mathematics and science courses that students complete by the time they graduate from high school.

In 1982, 5 and 6 percent of high school graduates completed mathematics courses at the Advanced academic levels II and III (the most advanced levels of coursetaking that include such mathematics courses as trigonometry, precalculus, and calculus), respectively. In 1998, 15 and 12 percent of high school graduates completed mathematics courses at these two levels, respectively. Similarly, the percentage of high school graduates who only completed courses at Middle academic level II, which includes such courses as Algebra II, increased from 18 to 28 percent. The percentage of students whose most advanced courses were taken at Middle academic level I, which includes such classes as Algebra I and plane geometry, dropped from 31 to 20 percent (see supplemental table 40-1).

The percentages of high school graduates who completed advanced courses in science were also higher in 1998 than in 1982. For example, 5 percent of high school graduates completed courses in Chemistry II or Physics II in 1982, whereas 7 percent did so in 1998. Similarly, the percentages of graduates who completed science courses at the Chemistry I or Physics I level and the Chemistry I and Physics I level were also higher in 1998 than in 1982 (34 and 18 percent versus 19 and 7 percent, respectively) (see supplemental table 40-1).

ADVANCED COURSETAKING: Percentage distributions of high school graduates according to the highest levels of advanced mathematics and science courses taken: Selected years: 1982–98



SOURCE: U.S. Department of Education, NCES. High School and Beyond Longitudinal Study of 1980 Sophomores, "Second Follow-up" (HS&B: 1980/1984); National Education Longitudinal Study of 1988 Eighth Graders, "High School Transcript Study" (NELS: 1992); and 1987, 1990, 1992, 1994, and 1998 National Assessment of Educational Progress (NAEP) High School Transcript Studies.

FOR MORE INFORMATION:

Supplemental Note 8

Supplemental Table 40-1

National Commission on Excellence in Education: A Nation at Risk, 1983

Learning Opportunities

Class Size of Kindergartens

Kindergarten classrooms in private schools were more likely to have small class sizes in 1998 than were such classrooms in public schools.

A major goal of educational reform is to reduce class sizes in kindergarten through 3rd grade. As an illustration, the National Education Association has suggested that 15 should be the maximum number of children in classrooms at these grade levels (NEA 2000). Such class sizes, especially in the early grades, are thought to enhance chances for student learning.

The average kindergarten class in public schools had 20 students in 1998. Approximately 15 percent of these kindergarten classrooms had 15 or fewer children enrolled; 85 percent had more than 15 children enrolled. The average kindergarten class in private schools had 18 children. Forty-one percent of these classes had 15 or fewer students and the remainder had more than 15 students (see supplemental table 41-1).

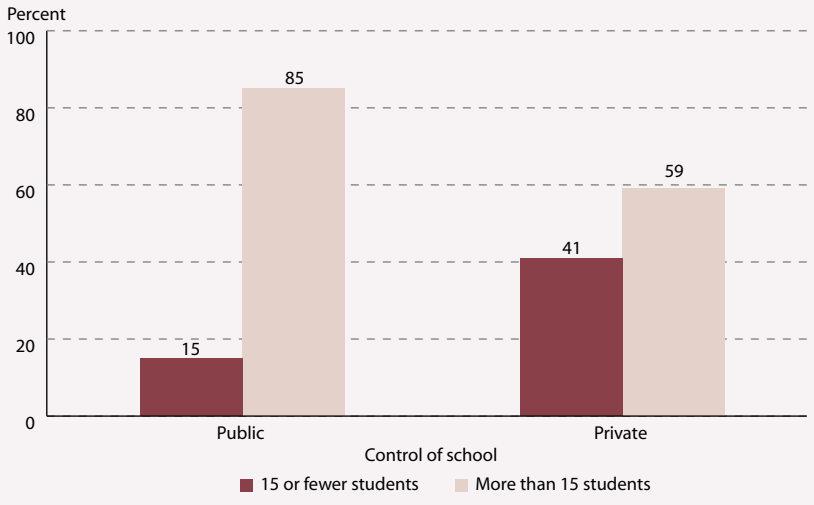
Class size also varied by the percentage of minority children in the classroom. Kindergarten classrooms with less than 10 percent minority children were more likely to have 15 or fewer children than classrooms where 75 percent or more of the children were minorities.

NOTE: Percentages may not add to 100 due to rounding.

SOURCE: U.S. Department of Education, NCES. Early Childhood Longitudinal Study, "Kindergarten Class of 1998–99," Fall 1998.

FOR MORE INFORMATION:
Supplemental Table 41-1
NEA 2000

CLASS SIZE: Percentage distribution of kindergarten classrooms, by control of school and class size: Fall 1998



Learning Opportunities

Interest Areas and Centers in Kindergarten Classrooms

Public school kindergarten classrooms are more likely to have writing and mathematics areas than private schools.

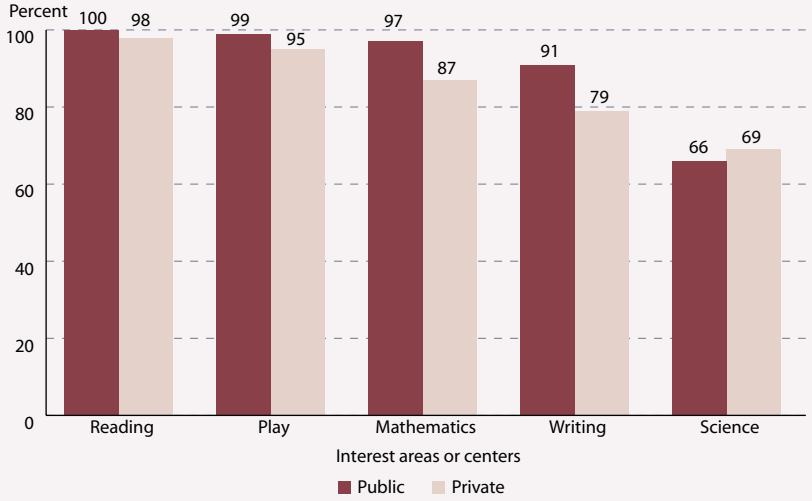
Young children, in large part, construct knowledge through doing. Consequently, it is important to present them with a variety of opportunities for active learning in classrooms (Bredekamp and Copple 1997). Kindergarten classrooms can be structured with specific areas for children to spend time in certain activities. These can include areas for writing, mathematics, science, computers, and play (e.g., solving puzzles and working with blocks).

Nearly all kindergarten classrooms have reading, mathematics, and play areas. Almost 90 percent of kindergarten classrooms have a writing area, and about 67 percent have a science area.

Public school kindergarten classrooms are more likely to have writing and mathematics areas than are private schools.

Classrooms with 75 percent or more minority children are generally less likely than classrooms with fewer minority children to have a science area (see supplemental table 42-1).

KINDERGARTEN CLASSROOMS: Percentage of kindergarten classrooms with interest areas or centers, by control of school: Fall 1998



SOURCE: U.S. Department of Education, NCES. Early Childhood Longitudinal Study, "Kindergarten Class of 1998–99," Fall 1998.

FOR MORE INFORMATION:
Supplemental Table 42-1
Bredekamp and Copple 1997

Learning Opportunities

Student/Teacher Ratios

Student/teacher ratios have decreased in public and private schools since 1970.

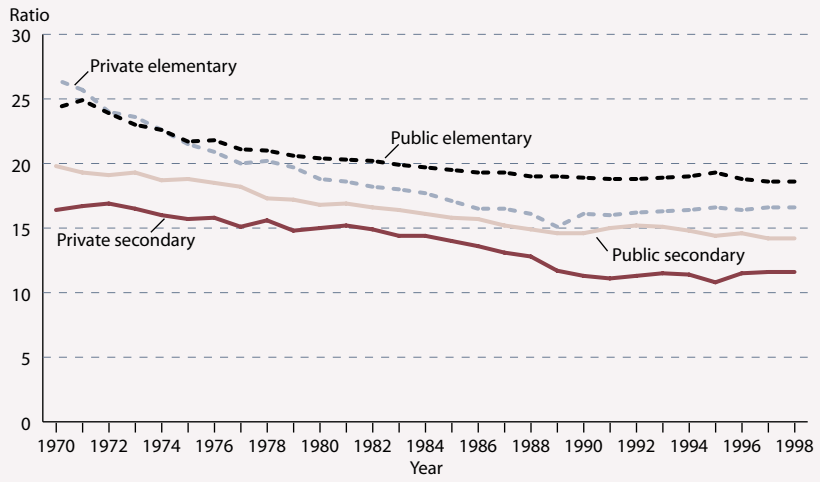
One of the goals of national education reform is to decrease class sizes across the Nation. Class size is a measure of the average number of students with whom a teacher has contact during an average class period or school day. Student/teacher ratios, a proxy measure for class size, compare the total student enrollment at a school with the total number of full-time equivalent teachers, including teachers who do not teach regular classes, such as music and physical education. Although student/teacher ratios are not a measure of class size, they provide an alternative means of assessing the potential for contact between students and teachers.

Student/teacher ratios were smaller in 1998 than in 1970. In 1970, there were 24 and 20 elementary and secondary students per teacher, respectively, in public schools. In 1998, there were 19 and 14 elementary and secondary students per public school teacher, respectively. Decreases in student/teacher ratios also occurred at private schools, with most of them taking place during the 1970s and 1980s (see supplemental table 43-1).

In most years, student/teacher ratios were usually smaller at private schools than public schools and at the secondary level than the elementary level.

While much emphasis has been placed on reducing class size at the elementary level (see *Indicator 41)*, the incidence of larger student/teacher ratios at the elementary level than at the secondary level may be partly attributable to structural differences between elementary and secondary education. The majority of elementary classrooms are self-contained, with most subjects taught by a single teacher. In contrast, most secondary classrooms are departmentalized, with different subjects taught by different teachers (NCES 97–460). Also, secondary schools usually offer more courses and teach more subjects than elementary schools. Because of this departmentalization and subject matter specialization, more teachers may be needed at the secondary level than at the elementary level to teach the same number of students.

STUDENTS AND TEACHERS: Student/teacher ratios: 1970–98



NOTE: Data for teachers are expressed in full-time equivalent (FTE) units. Distribution of unclassified teachers by level is estimated. Distribution of elementary and secondary school teachers by level is determined by reporting units. Included in the totals and the elementary category are a small number of nursery school teachers and students. Public school ratios for 1998 and private school ratios for 1971–75, 1979–80, 1981–82, 1984–85, and 1986–96 are estimated. Private school ratios for 1997 and 1998 are projected.

SOURCE: U.S. Department of Education, NCES. Statistics of Public Elementary and Secondary Day Schools; Common Core of Data surveys; Private School Surveys; *Projections of Education Statistics to 2009* (NCES 1999–038), 1999; and *Digest of Education Statistics 1999* (NCES 2000–031), 2000.

FOR MORE INFORMATION:
Supplemental Table 43-1
NCES 97–460

Learning Opportunities

Instructional Environments in 8th-Grade Mathematics

The quality of content of 8th-grade mathematics lessons in the United States was rated lower than the quality of those in Germany and Japan.

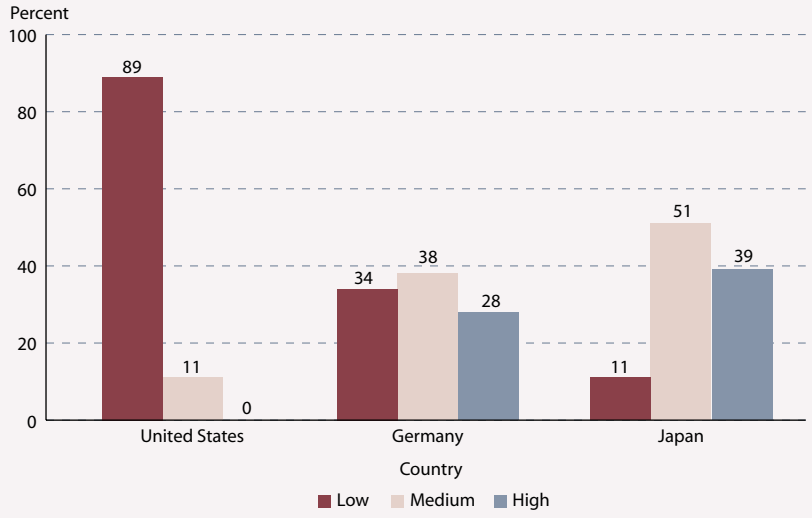
The Third International Mathematics and Science Study (TIMSS) included a Videotape Classroom Study of 231 classrooms of 8th-grade mathematics in Germany, Japan, and the United States. The study examined teachers' goals, the organization and process of mathematics instruction, and the mathematical content of the lessons presented.

A rating of the quality of the mathematical content of a subset of lessons found the United States lagging behind Germany and Japan in the quality of content in its 8th-grade mathematics lessons. Thirty-nine percent of the Japanese mathematics lessons and 28 percent of the German lessons received the highest quality rating whereas none of the U.S. lessons received this rating. In addition, U.S. lessons were more likely to receive the lowest rating (89 percent) than lessons in Germany (34 percent) or Japan (11 percent).

Eighth-grade mathematics lessons in the United States differed from those in Germany and Japan in instructional processes as well. For example, 83 percent of U.S. lessons contained only "task-controlled" tasks in which the teacher demonstrated a particular solution method to students and asked them to replicate that solution, as opposed to "solver-controlled" tasks in which the teacher encouraged students to find alternative solution approaches on their own. Forty-eight percent of German lessons and 17 percent of Japanese lessons contained only "task-controlled" tasks (see supplemental table 44-1).

After their lesson had been videotaped, teachers were asked, "What was the main thing you wanted students to learn from today's lesson?" Responses to this portion of the study showed that, while German and U.S. teachers emphasized mathematical skills as a goal more often than Japanese teachers, Japanese teachers emphasized mathematical thinking more often than did their German and American counterparts (see supplemental table 44-2).

CONTENT QUALITY: Percentage distribution of 8th-grade lessons rated as having low-, medium-, and high-quality mathematical content: 1994–95



NOTE: Percentages may not add to100 due to rounding.

SOURCE: U.S. Department of Education, NCES. *The TIMSS Videotape Classroom Study: Methods and Findings from an Exploratory Research Project on Eighth-Grade Mathematics Instruction in Germany, Japan, and the United States* (NCES 1999–074), 1999.

FOR MORE INFORMATION:

Supplemental Note 7

Supplemental Tables 44-1, 44-2

Learning Opportunities

Students' Use of the Internet

Students in grades 1–12 access the Internet primarily at school. Differences exist among racial-ethnic groups and family income levels in Internet use at school and access to a computer at home.

In 1998, 78 percent of students in grades 1–12 used the Internet at school. White students in grades 1–12 were more likely than black or Hispanic students to use the Internet at school (83 versus 70 and 71 percent, respectively). In addition, students from high-income families were more likely than students from low- and middle-income families to use the Internet at school (86 versus 68 and 78 percent, respectively) (see supplemental table 45-1).

Fifty-eight percent of students in grades 1–12 had a computer in their household in 1998, but such access varied substantially across racial-ethnic groups. For example, in 1998, 70 percent of white students had a computer in their household, compared with 28 percent of black or Hispanic students (see supplemental table 45-1).

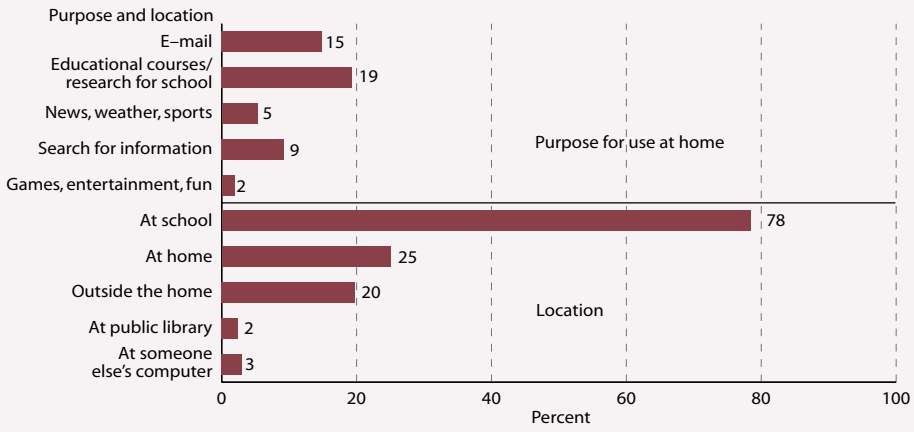
Access to a computer also varied substantially with family income: 88 percent of students from high-income families had a computer in the household, compared with 54 percent of students from middle-income families and 21 percent of students from low-income families (see supplemental table 45-1).

The highest percentage of students in grades 1–12 used the Internet on a regular basis to take educational courses or do research for school (19 percent). Furthermore, of the purposes for using the Internet on a regular basis, students named e-mail, educational courses or doing research for school, and searching the Internet for information as the three most important (see supplemental table 45-2).

NOTE: Analysis includes only those students in grades 1–12 who were ages 5–18.

SOURCE: U.S. Department of Commerce, Bureau of the Census. December and October Current Population Surveys, 1998.

INTERNET USE: Percentage of students in grades 1–12 who used the Internet for various purposes at various locations: 1998



FOR MORE INFORMATION:

Supplemental Notes 1, 3

Supplemental Tables 45-1, 45-2

School Choice

School Choice and Parental Satisfaction

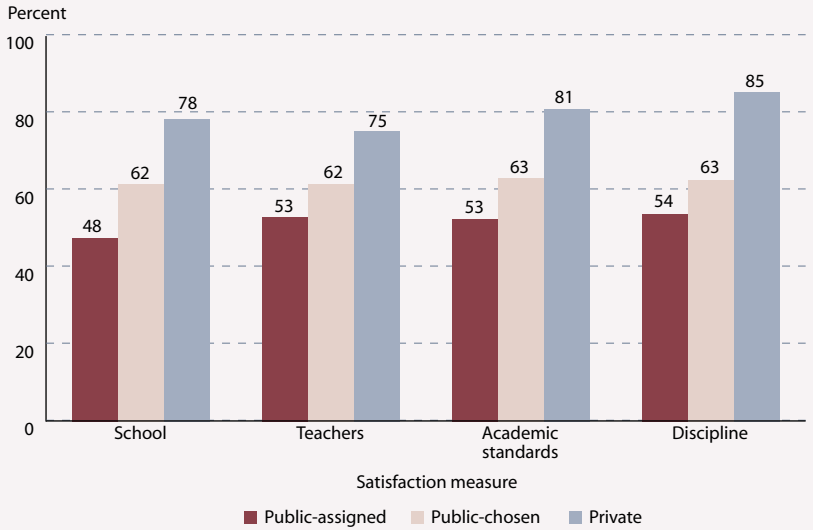
A higher percentage of students in grades 3–12 were enrolled in schools selected by their parents in 1999 than in 1993. These parents were more likely to be very satisfied with their children's schools than parents of children attending assigned schools.

Between 1993 and 1999, the percentage of students in grades 3–12 attending an assigned public school dropped from 80 to 75 percent. Overall, more students were in a public school selected by their parents than in a private school in 1999. Black students were more likely to be in a chosen school than white and Hispanic students. Of the black and Hispanic children whose parents selected their schools, more attended a public rather than a private school (see supplemental table 46-1).

In 1999, the percentages of students in grades 3–12 whose parents reported being very satisfied with their child's school, teachers, school's discipline, and academic standards were highest among those in private schools, followed by those in chosen public schools, and finally by those in assigned public schools. At private schools, a greater percentage of children had parents who were very satisfied with discipline than with the school or teachers in 1999. Although more than half of the students in assigned public schools in grades 3–12 had parents who were very satisfied with most aspects of their children's school in both 1993 and 1999, there was a decrease between these two years in the percentage of children with very satisfied parents in the categories of the school, teachers, and academic standards (see supplemental table 46-2).

For children in assigned or chosen public schools in 1999, parents were more likely to be very satisfied with the various aspects of schools when their children were in grades 3–5 than in grades 9–12. This was not the case for parents of private school children, however: these parents were as likely to be very satisfied with the school, academic standards, and discipline (but not teachers) whether their children were in grades 3–5 or 9–12.

SCHOOL SATISFACTION: Percentage of students in grades 3–12 whose parents reported being very satisfied with aspects of their child's school, by type of choice: 1999



NOTE: Includes those who responded "very satisfied," from a scale of "very satisfied," "somewhat satisfied," "somewhat dissatisfied," and "very dissatisfied." Ungraded students and homeschoolers were excluded from the estimates.

SOURCE: U.S. Department of Education, NCES. National Household Education Survey (NHES), 1999 (Parent Interview Component).

FOR MORE INFORMATION:

Supplemental Notes 2, 3

Supplemental Tables 46-1, 46-2

Teachers

Preparation and Qualifications of Public School Teachers

In 1998, 38 percent of public school teachers held subject-matter specific degrees, whereas 62 percent held degrees in various education-related fields.

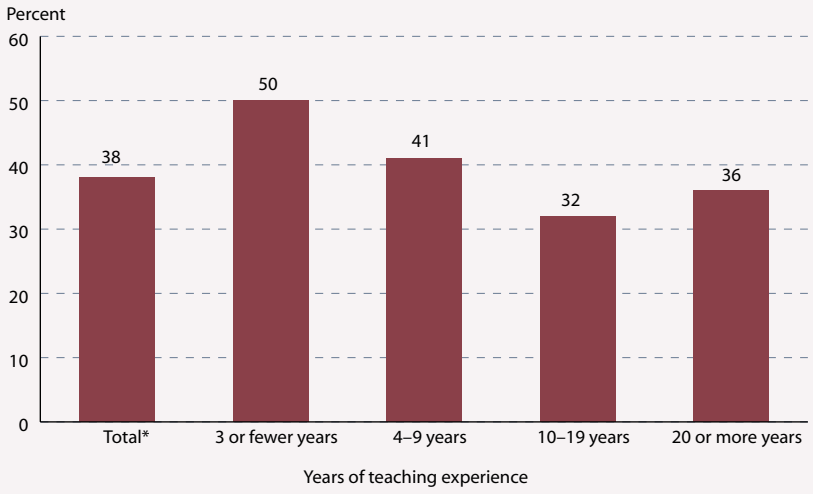
Teacher quality may be one of the most important determinants of school quality. Evaluating teachers' preservice learning and certification is one way to measure their potential effectiveness.

In 1998, almost all public school teachers had a bachelor's degree and 45 percent held a master's degree. The percentage of teachers with master's degrees increased with years of teaching experience. Teachers at schools with high minority enrollment (50 percent or more) or a high percentage of students eligible for free or reduced-price lunch (60 percent or more) were less likely to have master's degrees than their counterparts at schools with a low minority enrollment (5 percent or less) or a low percentage of students eligible for free or reduced-price lunch (less than 15 percent). Teachers at elementary and middle schools were less likely to have a master's degree than teachers at high schools (see supplemental table 47-1).

Prospective teachers have been encouraged to earn degrees in academic subjects (e.g., mathematics) rather than in education (Ravitch 1998). In 1998, 38 percent of full-time public school teachers held academic degrees. Teachers with three or fewer years of teaching experience were more likely than more experienced teachers, and high school teachers were more likely than elementary or middle school teachers to hold academic degrees.

Teachers' qualifications also can be assessed by examining their state certifications. Most public school teachers in 1998 had regular or standard state certificates or advanced professional certificates (93 and 92 percent of general elementary and departmentalized teachers, respectively) (see supplemental table 47-3). The percentage of teachers with regular or standard state certification or advanced professional certification generally increased with years of teaching experience. Conversely, teachers with three or fewer years of teaching experience were more likely to hold temporary or emergency certificates or waivers than teachers with 20 or more years of experience.

TEACHERS' EDUCATION: Percentage of full-time public school teachers with undergraduate or graduate majors in an academic field, by years of teaching experience: 1998



* Includes full-time public school teachers who taught grades 1–12 whose main teaching assignment was in English/language arts, social studies/social sciences, foreign language, mathematics, or science, or who taught in a self-contained classroom.

SOURCE: U.S. Department of Education, NCES. *Teacher Quality: A Report on the Preparation and Qualifications of Public School Teachers* (NCES 1999–080), 1999.

FOR MORE INFORMATION:

Supplemental Tables 47-1, 47-2, 47-3

Ravitch 1998

Teachers

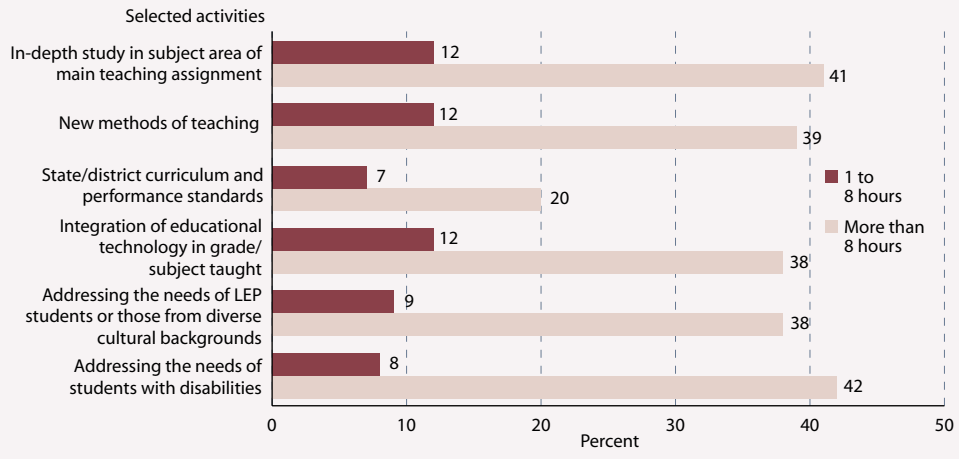
Perceived Impact of Professional Development

Teachers who spend more time in professional development activities are more likely to report improvements in classroom teaching than those who spend less.

The rationale for professional development is to build educators' capacity for effective teaching. In 1998, the percentage of full-time public school teachers who participated in development activities in the past 12 months ranged from 81 percent (implementing state or district curriculum and performance standards) to 31 percent (addressing the needs of students with limited English proficiency or from diverse cultural backgrounds). When teachers did participate in professional development, they were usually more likely to participate for one to eight hours than for longer periods of time (see supplemental table 48-1).

Teachers varied in the extent to which they believed participation in professional development helped them upgrade their knowledge and skills. In 1998, 12 percent of teachers who participated in an in-depth study in the subject area of their main teaching assignment for one to eight hours believed that the activity improved their classroom teaching a lot, whereas 41 percent of teachers who spent more than 8 hours participating in this activity shared the same perception. This correspondence between time spent participating in a professional development activity and the belief that such participation improved classroom teaching a lot was evident for other professional development activities as well. Years of teaching experience generally were not associated with feeling that participation in professional development improved classroom teaching a lot.

PARTICIPATION IN PROFESSIONAL DEVELOPMENT: Percentage of full-time public school teachers who participated in professional development in the past 12 months who believed the activity improved their classroom teaching "a lot": 1998



SOURCE: U.S. Department of Education, NCES. *Teacher Quality: A Report on the Preparation and Qualifications of Public School Teachers* (NCES 1999–080), 1999.

FOR MORE INFORMATION:
Supplemental Table 48-1

Other School Resources

Age of School Buildings

The average public school was built 42 years ago during the baby boom. About one-third of all public schools are in the oldest condition: built before 1970 and not renovated since 1980.

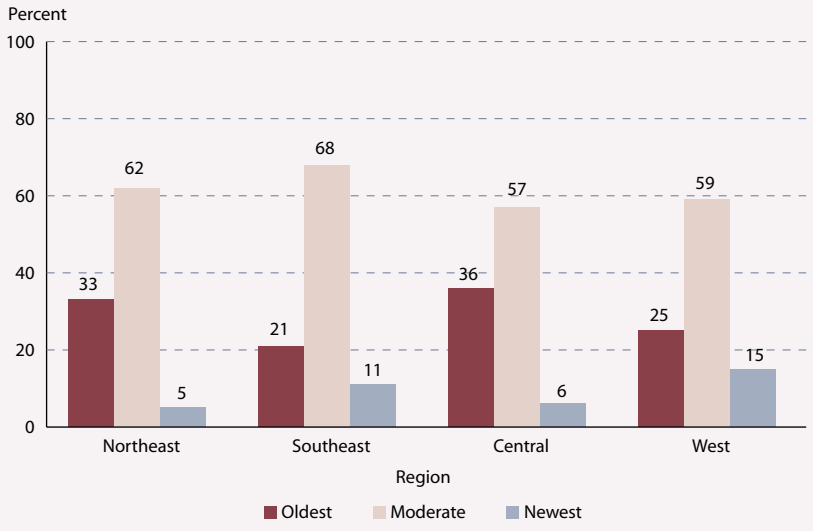
Public elementary and secondary enrollment is expected to increase another million between 1999 and 2006, reaching an all-time high of 44.4 million and increasing demand on schools (*Indicator 3*). Some fear that schools with poor or overcrowded conditions are being associated with decreases in both teacher and student performance. Older schools are also less likely to be connected to the Internet than recently built or renovated schools (NCES 98–031). Nationwide, the average age of public schools is 42 years old, and 73 percent are 30 years old or older (see supplemental table 49-1).

A school's physical condition depends on more than when it was built: it is also useful to consider when the school was last renovated. In an effort to assess the condition of America's schools, survey results from three nationwide samples from 1994, 1995, and 1996 were combined. The date of the last renovation and the school's age were two factors used to define a school's physical condition.

Across the Nation, 29 percent of all public schools are in the "oldest" condition, built before 1970 and not renovated since 1980. Sixty-one percent are "moderate" schools, built between 1970 and 1984 or before 1970 and last renovated in 1980 or later. Ten percent are "newest" schools, which were built after 1984, renovated or not (see supplemental table 49-1).

A larger percentage of public schools in the Central region than in the Southeast are in the oldest category (36 versus 21 percent). In the rest of the country, 25 percent of public schools in the West and 33 percent in the Northeast are among the oldest. A smaller percentage of schools in the Central and Northeast regions than in the West are in the newest category (6 and 5 percent, respectively, versus 15 percent). Eleven percent of public schools in the Southeast are considered newest.

CONDITION OF SCHOOLS: Percentage distribution of public schools according to school condition, by region: 1994–96



NOTE: Estimates are aggregates of data collected in 1994, 1995, and 1996. Percentages may not add to 100 due to rounding.

SOURCE: U. S. Department of Education, NCES. *How Old Are America's Public Schools?* (NCES 1999–048), 1999.

FOR MORE INFORMATION:
Supplemental Note 4
Supplemental Tables 49-1, 49-2
NCES 98–031