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High School Coursetaking

Findings from The Condition of Education 2007

U.S. Department of Education
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June 2007

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June 2007

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Suggested Citation

Planty, M., Provasnik, S., and Daniel, B. (2007). *High School Coursetaking: Findings from The Condition of Education 2007* (NCES 2007-065). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

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Preface

The Condition of Education summarizes important developments and trends in education using the latest available data. The report, which is required by law, is an indicator report intended for a general audience of readers who are interested in education. The indicators represent a consensus of professional judgment on the most significant national measures of the condition and progress of education for which accurate data are available. The 2007 print edition includes 48 indicators in five main areas: (1) enrollment trends and student characteristics at all levels of the education system from early childhood education to graduate and first-professional programs; (2) student achievement and the longer term, enduring effects of education; (3) student effort and rates of progress through the educational system among different population groups; (4) the contexts of elementary and secondary education in terms of courses taken, teacher characteristics, and other factors; and (5) the contexts of postsecondary education.

The 2007 edition also includes a special analysis that examines changes in student coursetaking in high school using national transcript data from 1982 to 2005. To make the special analysis available to audiences interested in the coursetaking patterns and trends of U.S. high school students, the special analysis is reprinted here as a separate volume. Technical notes about the data sources, methodology, and standard errors are included at the end of this booklet.

Special analyses included in the 2000–07 editions of *The Condition of Education* are available both as booklets and in the full print volumes. They are also available on the NCES *Condition of Education* website (http://nces.ed.gov/programs/coe).

High School Coursetaking

Introduction

Using the national data from high school transcript studies conducted from 1982 to 2005, this special analysis addresses the following questions related to students' coursetaking patterns and trends during this period:

- What do states require and what do schools offer for coursework?
- How many course credits do students earn by high school graduation, on average, and how has the number of credits changed, overall and by subject, since the 1980s?
- What percentage of high school graduates complete advanced courses in science, in mathematics, in English, and in foreign languages?
- Do these percentages vary across student characteristics, including sex, race/ethnicity, and school control?
- What is the coursetaking pattern in 9th and 10th grades for students who drop out compared with students who graduate?
- What percentage of high school students take Advanced Placement (AP) examinations, and how well do they do?

The first section of this special analysis describes state-level standards related to coursework and high school exit examinations in all 50 states and the District of Columbia, which is treated as a state in this analysis. This is followed by a discussion of the availability of advanced course offerings in public schools.[1] Both requirements and offerings provide a context for examining the patterns of student coursetaking as they relate to minimum standards and expectations. The second section describes the number and types of credits that public and private high school graduates earned. It then examines the percentages and characteristics of public and private high school graduates who took advanced courses in science, mathematics, English, and foreign languages. The special analysis concludes with a summary of key findings.

Requirements and Offerings

State Standards for Coursetaking

Many states have enacted minimum requirements for graduation that focus on the number and types of courses that students take in high school and the passing of standardized state tests of proficiency or competency in specific subjects. Starting in the early 1980s, many states adopted or added requirements patterned after the *New Basics* coursetaking standards recommended by the National Commission on Excellence in Education (NCEE) for high school graduation (Alexander and Pallas 1984; Chaney, Burgdorf, and Atash 1997). First articulated in *A Nation at Risk* (NCEE 1983), the New Basics recommendations called for all high school students to complete 4 years of English; 3 years each of mathematics, science, and social studies; and a half-year of computer science. For college-bound students, the New Basics also called for the completion of 2 years of a foreign language.

Currently, 37 states now require public high school students to take at least 20 credits (in Carnegie units[2]) of coursework; 8 states require fewer than 20 credits; and other states' course graduation requirements are determined locally (see table 1).[3] Of those states with coursetaking requirements, 37 require 4 or more years of English, 31 require 3 or more years of social studies, 27 require 3 or more years of mathematics, and 23 require 3 or more years of science.

Table 1. State coursework requirements for high school graduation in Carnegie units: 2005

State	All courses	English/ language arts	Social studies	Math-ematics	Science	Health/ physical education	Arts/ vocation	Foreign language
Alabama	24	4	4	4	4	1.5	0.5	0
Alaska	21	4	3	2	2	1	0	0
Arizona	20	4	2.5	2	2	0	1	0
Arkansas	21	4	3	3	3	1	0.5	0
California	13	3	3	2	2	2	1	1[2]
Colorado	(1)	†	†	†	†	†	†	†
Connecticut	20	4	3	3	2	1	1	0
Delaware	22	4	3	3	3	1.5	0	0
District of Columbia	23.5	4	3.5	3	3	1.5	1	2
Florida	24	4	3	3	3	1	1	0
Georgia	22	4	3	4	3	1	0	2
Hawaii	22	4	4	3	3	1.5	0	0
Idaho	21	4.5	2.5	2	2	0.5	1	1[2]
Illinois	16	3	2	2	1	0.5	1	1[2]
Indiana	20	4	2	2	2	1	0	0
Iowa	(1)	†	1.5	†	†	†	†	†
Kansas	21	4	3	2	2	1	0	0
Kentucky	22	4	3	3	3	1	1	0
Louisiana	23	4	3	3	3	2	0	0
Maine	16	4	2	2	2	1.5	1	0
Maryland	21	4	3	3	3	1	1	2
Massachusetts	(1)	†	†	†	†	†	†	†
Michigan	(1)	†	0.5	†	†	†	†	†
Minnesota	21.5[3]	†	†	†	†	0	†	0
Mississippi	20	4	3	3	3	0.5	1	0
Missouri	22	3	2	2	2	1	1	0
Montana	20	4	2	2	2	1	1	0
Nebraska	(1)	†	†	†	†	†	†	†
Nevada	22.5	4	2	3	2	2.5	1	0
New Hampshire	19.75	4	2.5	2	2	1.25	0.5	0
New Jersey	22	4	3	3	3	3	2	0
New Mexico	23	4	3	3	2	1	0	0
New York	22	4	4	3	3	2.5	1	1
North Carolina	20	4	3	4	3	1	0	2
North Dakota	21	†	†	†	†	†	†	†
Ohio	20	4	3	3	3	1	0	0
Oklahoma	23	4	3	3	3	0	2	0
Oregon	22	3	3	2	2	2	1	1
Pennsylvania[4]	†	†	†	†	†	†	†	†
Rhode Island	18	4	2	3	2	1.5	0.5	2
South Carolina	24	4	3	4	3	1	0	1
South Dakota	22	4	3	2	2	0	1	0
Tennessee	20	4	3	3	3	1	1	2

See notes at end of table.

Table 1. State coursework requirements for high school graduation in Carnegie units: 2005—Continued

State	All courses	English/ language arts	Social studies	Math-ematics	Science	Health/ physical education	Arts/ vocation	Foreign language
Texas	24	4	4	3	3	2	1	2
Utah	15	3	2.5	2	2	2	1.5	0
Vermont	20	4	3	3	3	1.5	1	0
Virginia	22	4	3	3	3	2	1	0
Washington	19	3	2.5	2	2	2	0	0
West Virginia	24	4	3	3	3	2	1	0
Wisconsin	21.5	4	3	2	2	2	0	0
Wyoming	13	4	3	3	3	0	0	0

† Not applicable.

[1] Graduation requirements are determined locally.

[2] 1.0 credit required in Foreign language or Arts, not both.

[3] Effective class of 2008.

[4] State minimum credit requirements have been phased out in Pennsylvania. Each school district (including charter schools) shall specify requirements for graduation in a strategic plan requiring state approval. To graduate, students must demonstrate proficiency in reading, writing, and mathematics on either state or local assessments aligned with state guidelines.

NOTE: Local school districts frequently have other graduation requirements in addition to state requirements. English/language arts can include English, reading, literature, creative writing, etc. Mathematics can include basic math, algebra I and II, geometry, precalculus, calculus, statistics, etc. Social studies can include world history, U.S. history, geography, economics, government, etc. Science can include biology, chemistry, physics, anatomy, earth science, etc. Arts/vocation can include fine arts, practical arts, vocational, or career preparatory credits. Technology can include computer literacy, computer technology, technology competency, etc. The Carnegie unit is a standard of measurement that represents 1.0 credit for the completion of a 1-year course.

SOURCE: Education Commission of the States (ECS). (2006). *Standard High School Graduation Requirements (50-state)*.

State Standards for Exit Exams

Along with course requirements, in 2006, some 22 states required public school students (and, in a few states, private school students[4]) to pass high school exit examinations to receive a high school diploma (see figure 1) (Center on Education Policy [CEP] 2006). Three more states will adopt such "exit exams" between 2008 and 2012: Washington in 2008, Maryland in 2009,[5] and Oklahoma in 2012. Most of these 25 states' exit exams are aligned with 10th-grade proficiency standards or higher, but some are aligned with 8th- and 9th-grade proficiency standards.

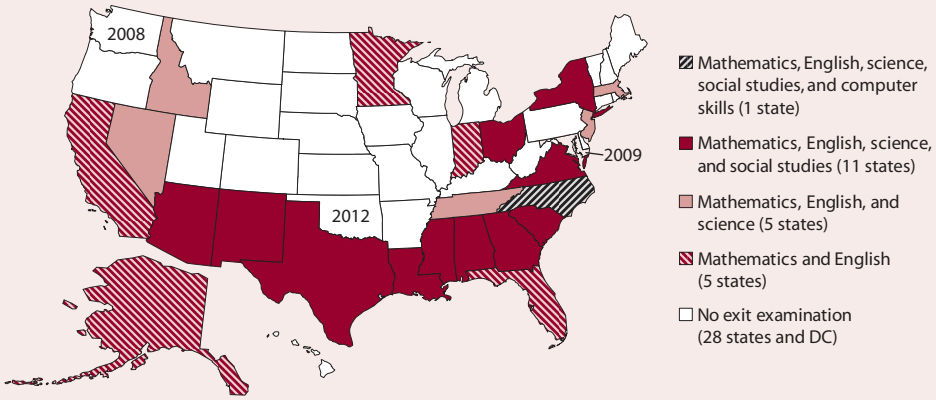
In 2006, some 65 percent of the nation's public high school students were enrolled in a school with an exit exam requirement (CEP 2006). High school exit exam requirements are most prevalent in the southern and western states. The few exceptions are in Indiana, Massachusetts, Minnesota, New Jersey, New York, and Ohio.

Given this geographic distribution, minority public school students are the group most affected by state exit exam requirements: 76 percent of minority public high school students were required to pass an exit exam for graduation in 2006, compared with 58 percent of all White public high school students (CEP 2006, table 2).

The number of examinations required for graduation and the subjects in which they are required vary by state (see supplemental table SA-1). In the 22 states with exit exams in effect and in the 3 states with exit exams that will go into effect between 2008 and 2012, students must pass both an English/language arts and a mathematics exit exam. In addition, 19 of these 25 states will require an exam in science by 2012, and 13 states will require a U.S. history/social studies exam.[6]

Since 2002, all states with an exit exam have required both an English/language arts and a mathematics exam. The total number of

Figure 1. States with mandatory exit examinations, by subject, and states phasing in exit examinations, by date: 2006



NOTE: States labeled with years are scheduled to institute exit examinations in the year shown. Six of the states shown with mathematics, English, and science will institute their science exit examination between 2007 and 2010. Utah had planned to enforce an exit exam requirement in 2006, but that year they decided not to withhold diplomas from students who failed the examination if they met other graduation requirements. See supplemental table SA-1 for a complete list.
SOURCE: Center on Education Policy. (2006). *State High School Exit Exams: A Challenging Year*, adapted from table 1, data from state departments of education, June 2006.

states with a mandatory science exit exam has increased from 7 states in 2002 to 11 states in 2006, and is projected to increase to 19 states by 2012.

Advanced Course Offerings

The number of advanced courses high school students take is limited by what is offered. This section examines the extent to which public schools offer college-level coursework to high school students, available as *Advanced Placement (AP)*, *International Baccalaureate (IB)*, and *dual-credit courses*, all of which are described below.[7]

AP courses and their end-of-course examinations are developed and administered by the College Board. Students who score a 3.0 or better (on a 5.0 point scale) may earn college credit or advanced standing in a college in the subject area in which the course/exam was taken. IB courses are defined as courses that make up a 2-year liberal arts curriculum that leads to an IB diploma and meets the requirements established by the IB program. Students taking these courses, typically in grades 11 and 12, must meet all requirements and pass IB examinations in each subject area in order to receive the IB diploma. In some schools, students who are not seeking an IB diploma are allowed to take individual IB courses. AP and IB postsecondary credit is given at the discretion of the colleges and therefore students receive this credit after they have applied and been accepted to a college. Dual-credit courses allow students to earn both high school and postsecondary credits for a single course, which is considered an actual college course. Thus, the dual credit earned is usually recorded on a college transcript from the postsecondary institution administering the course. The descriptions of college-level course offerings in this section were taken from a 2002–03 survey of a nationally representative sample of public high schools (Waits, Setzer, and Lewis 2005).

Overall, in 2002–03, some 71 percent of public high schools offered at least one dual-credit course, 67 percent offered AP courses, and 2 percent offered IB courses (see supplemental table SA-2). The larger the enrollment of a

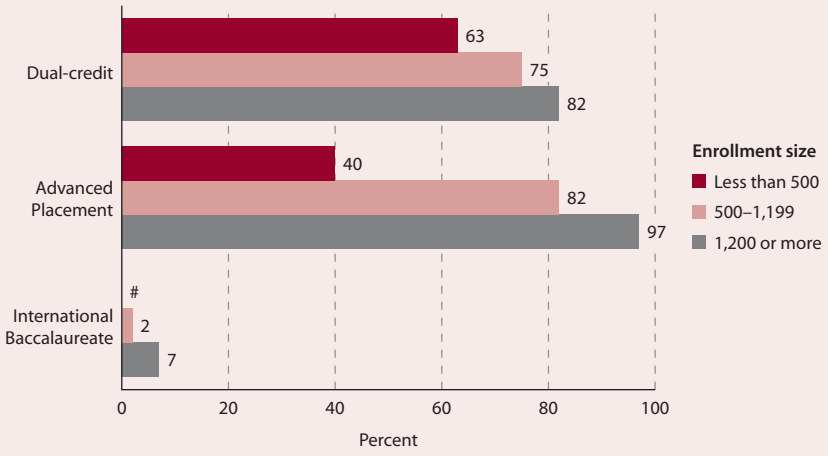
school, the more likely that school was to offer AP and/or dual-credit courses: 40 percent of small schools (those with an enrollment of less than 500) offered AP courses, compared with 82 percent of medium-sized schools (those with an enrollment of 500 to 1,199) and 97 percent of large schools (those with an enrollment of 1,200 or more) (see figure 2). Similarly, 63 percent of small schools offered courses for dual credit, compared with 75 percent of medium-sized schools and 82 percent of large schools.

Public schools located in rural areas were less likely to report offering AP courses (50 percent) than public schools in cities (77 percent), urban fringe areas (87 percent), and towns (72 percent) (see supplemental table SA-2). Dual-credit courses, in contrast, were less likely to be offered in public schools located in cities than in public schools located in towns or urban fringe areas (65 vs. 79 and 74 percent, respectively). Seventy percent of rural schools offered courses for dual credit.

Public schools with the lowest minority enrollment (those in which minority students made up less than 6 percent of the enrollment) were the least likely to offer AP courses when compared with schools with higher minority enrollments. Among public schools that offered dual credits, however, schools with the highest minority enrollment were the least likely to offer these courses when compared with schools with lower minority enrollments.

State standards and advanced course offerings provide a context for understanding student coursetaking patterns. The next section presents trends in the coursetaking patterns of high school graduates over more than two decades, from 1982 to 2004.

Figure 2. Percentage of public high schools that offered dual-credit courses, Advanced Placement (AP), and International Baccalaureate (IB), by school enrollment: 2002–03



Rounds to zero.

NOTE: Dual-credit courses allow students to earn both high school and postsecondary credits for a single course. AP courses and their end-of-course examinations are developed and administered by The College Board and allow students to earn postsecondary credit. IB courses are defined as courses that make up a 2-year liberal arts curriculum that leads to an IB diploma.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Dual Credit and Exam-based Courses," FRSS 85, 2003.

Coursetaking Patterns

National data on public and private high school student coursetaking and educational attainment come from two sets of surveys sponsored by the U.S. Department of Education's National Center for Education Statistics (NCES): the high school longitudinal transcript studies—including the High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B-So:80/82); the National Education Longitudinal Study of 1988 (NELS:88/92), "Second Follow-up, High School Transcript Survey, 1992"; and the Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study"—and the National Assessment of Educational Progress (NAEP) High School Transcript Studies (HSTS), selected years, 1987–2005.

The high school longitudinal transcript studies provide information on graduates of public and private high schools in 1982, 1992, and 2004. The NAEP High School Transcript Studies (HSTS) cover the experiences of public and private high school graduates in 1987, 1990, 1994, 1998, 2000, and 2005. The HSTS gathers information from the transcripts of students in public and private schools nationwide. Both survey systems are part of larger studies that track students' performance in high school.

Credits on a student's transcript quantify the amount of coursework that a student has completed. Credits can be organized by subject and placed in taxonomies, each of which includes courses either of similar academic challenge and difficulty or at the same stage in the progression of learning in a subject.[8] However, because credits cannot measure the breadth or depth of the course content, they cannot be used to measure how the curriculum may have changed over time or how much high school courses with similar transcript titles vary across classes and schools. Even courses with the same titles may vary considerably in terms of their content and what they demand of students.

Transcript data recording the number of credits that students earned in all their high school classes were collected from nationally representative samples of high school students beginning with the longitudinal study in 1982. Drawing upon these data, the next section of this analysis presents trends in the coursetaking patterns of public and private high school graduates between 1982 and 2004.[9]

Credits Earned

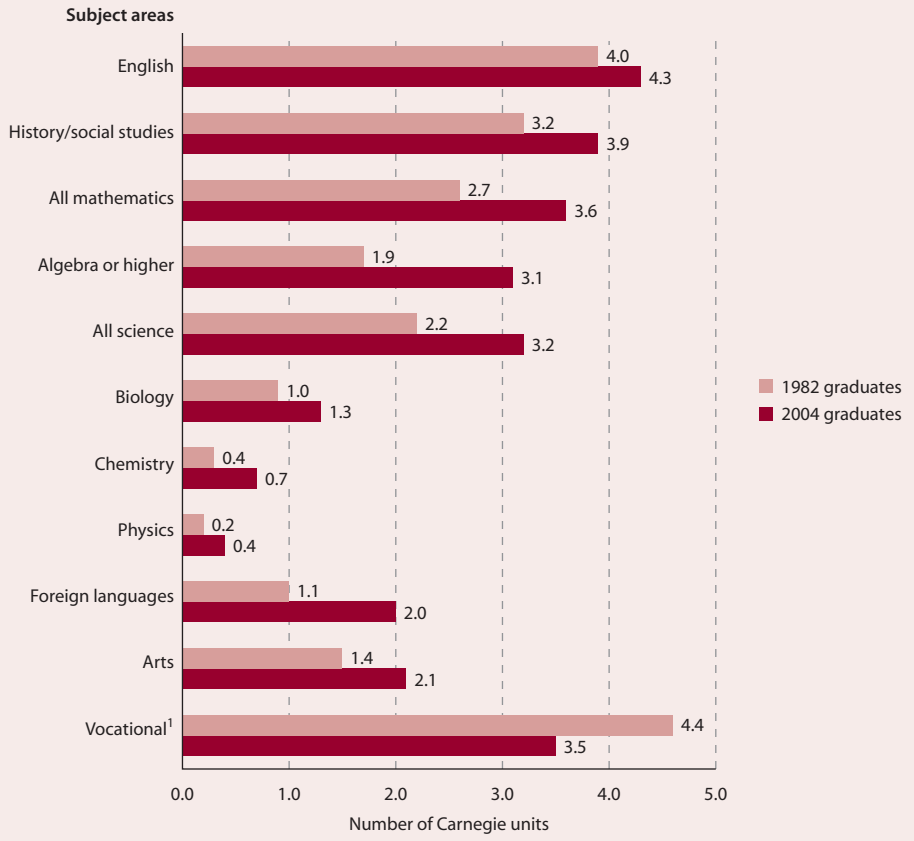
From the early 1980s, when states began to increase the number of courses required to receive a high school diploma, the average number of credits earned by high school graduates increased from 21.7 credits in 1982 to 25.8 credits in 2004 (see supplemental table SA-3). When looking at the number of credits earned by subject in 2004 versus 1982, graduates earned an average of 4.3 versus 4.0 credits in English, 3.6 versus 2.7 credits in mathematics, and 3.2 versus 2.2 credits in science. The amount of college-preparatory coursetaking in mathematics and science also increased markedly between 1982 and 2004. For example, the average number of credits that graduates earned in algebra and more advanced mathematics courses increased from 1.9 to 3.1; in chemistry, it increased from 0.4 to 0.7; and in physics, it increased from 0.2 to 0.4.

These increases in credits earned in mathematics, English, and science have not coincided with a decline in other coursework. In fact, credits earned in other subjects have increased. For example, comparing 1982 and 2004, graduates earned an average of 3.2 versus 3.9 credits in history/social studies, 1.4 versus 2.1 in arts, and 1.1 versus 2.0 credits in foreign languages (see figure 3). The only subject area in which the number of credits earned has decreased over this time period is vocational coursetaking. Vocational coursetaking decreased, from an average of 4.4 credits earned in 1982 to 3.5 credits earned in 2004. Vocational courses are organized educational programs, services, and

activities that are directly related to the preparation of individuals for paid or unpaid employment, or for additional preparation for a career that requires certification or training other than a bachelor's or an advanced degree.

These general increases in credits earned since 1982 are, in large part, a product of more graduates taking more advanced courses. In mathematics, for example, between 1982 and 2004, the percentage of graduates who completed a year of geometry increased from 47 to 76 percent, the percentage who completed a semester or more of algebra II increased from 40 to 67 percent, and the percentage who completed a semester or more of analysis/precalculus increased from 6 to 28 percent (see supplemental table SA-4).[10] Similarly, in science, the same trends are evident: during these years, the percentage of graduates who completed a year of chemistry increased from 32 to 64 percent, the percentage who completed a year of physics increased from 15 to 33 percent, and the percentage who completed a year each of biology, chemistry, and physics increased from 11 to 26 percent.

Figure 3. Average number of Carnegie units earned by high school graduates in various subject areas: 1982 and 2004



[1] Includes nonoccupational vocational education, vocational general introduction, agriculture, business, marketing, health, occupational home economics, trade and industry, and technical courses.

NOTE: The Carnegie unit is a standard of measurement that represents 1.0 credit for the completion of a 1-year course. Data differ slightly from figures appearing in other NCES reports because of differences in taxonomies and case exclusion criteria.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B-So:80/82); and Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study."

Coursetaking varied by students' sex and race/ethnicity over time and within each year. In 1982, on average, females earned 0.35 more total credits than males (see supplemental table SA-3). However, by 2004, no measurable differences were detected. In 1982, males earned 0.14 more credits in both mathematics and science than did females, but by 2004, no measurable differences were detected.

In 1982, on average, Asian/Pacific Islander graduates earned more total credits than graduates of any other race/ethnicity. By 2004, these differences were no longer evident. However, in both 1982 and 2004, Asian/Pacific Islander graduates earned more credits in both mathematics and science than did graduates of any other race/ethnicity.

A Special Look: Dropouts and Course Credit Accrual

This special analysis so far has focused on coursetaking for high school graduates, or more precisely, students who graduate high school within 4 years of starting. Although some students are still enrolled in high school after their classmates have graduated, others have dropped out. It is important to understand how the coursetaking patterns of students who eventually drop out compare with those of students who receive a high school diploma. A lack of credit accrual—credits earned per year—early in high school has been shown to be one of the better predictors for subsequent dropping out (Allensworth and Easton 2005). Students may not accrue the expected number of credits because they earn a failing grade or attempt too few credits.

This special look considers the extent to which there are differences by 10th grade in the credit accrual for students who eventually drop out compared with students who graduate on time.[11] Table 2 shows the credit accrual (in Carnegie units) by 2002, their sophomore year, for dropouts and "on-time graduates" (Hampden-Thompson et al. 2007). Some students drop out before 10th grade; their counts are not reflected here, nor are those of students who attain an alternative credential (e.g., GED), or who are still in school after 2004.

Students who eventually dropped out were behind their peers who graduated on time in the total number of credits they accrued in the 2000–01 and 2001–02 academic years (9th and 10th grades, respectively, for on-time graduates) as well as the amount they accrued in their English, mathematics, and science courses in both academic years. In the 2000–01 academic year, students who would eventually drop out after the 10th grade earned an average of 5.1 credits, while those who graduated on time in 2004 earned an average of 6.6 credits. Year-to-year change shows that credit accrual declined for dropouts, putting them further behind. While on-time graduates accrued 6.6 and 6.7 credits in the 2000–01 and 2001–02 academic years, dropouts earned even fewer credits in 2001–02 (4.6) than they did in the previous academic year (5.1).

Table 2. Average course credit accrual of spring 2002 10th-graders, by academic year, subject, and high school status: 2004

	Academic year (AY)			Subject (AY 2000–02)		
Status in 2004	2000–01	2001–02	Total	English	Mathematics	Science
Dropouts	5.1	4.6	9.7	1.7	1.3	1.2
On-time graduates[1]	6.6	6.7	13.3	2.1	2.0	1.8

[1] "On-time graduates" are students who graduated high school within 4 years between the fall of 2003 and the summer of 2004.

NOTE: The basic unit of coursework measurement is the course credit. Course credits refer to standardized Carnegie units.

SOURCE: Hampden-Thompson, G., Kienzl, G., Daniel, B., and Kinukawa, A. (2007). *Course Credit Accrual and Dropping Out of High School* (NCES 2007-018), tables 1 and 2.

Trends in Advanced Coursetaking

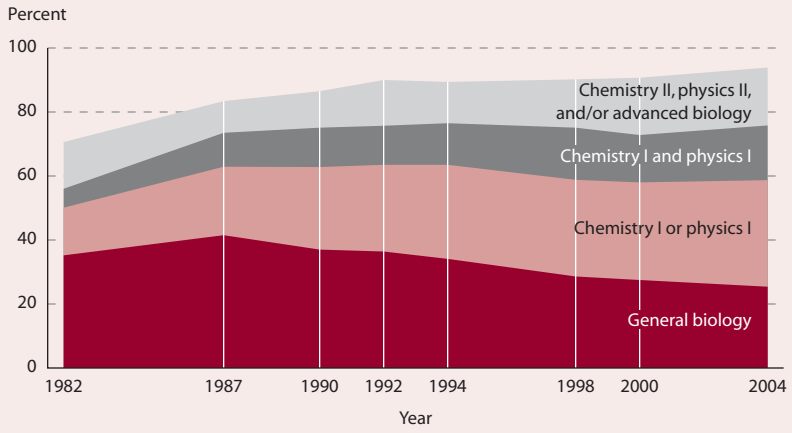
Science and Mathematics

This section shows trends between 1982 and 2004 in the highest level of science and mathematics coursework that high school graduates completed. In 1982, some 35 percent of high school graduates had completed advanced science coursework (i.e., at least one course classified as more challenging than general biology); this percentage increased to 68 percent by 2004 (see figure 4 and supplemental table SA-5). Most of this increase is attributable to increases in completion of chemistry I and/or physics I. The percentage of graduates who had completed at least one course of either chemistry II, physics II, and/or advanced biology fluctuated from year to year and ultimately increased just 3 percentage points, from 15 to 18 percent between 1982 and 2004.[12]

The percentage of high school graduates who had completed courses in advanced mathematics (i.e., completed at least one course classified as more challenging than algebra II) increased from 26 percent in 1982 to 50 percent in 2004 (see figure 5 and supplemental table SA-6). Moreover, the percentage of graduates who had completed a calculus-level course more than doubled over this period (from 6 to 14 percent).[13]

As was the case in 1998 and 2000 (data not shown), in 2004, female graduates were more likely than male graduates to have completed some advanced science coursework (71 vs. 65 percent) (see supplemental table SA-7). This difference, however, is mostly attributable to the larger percentage of female than male graduates who completed a course in chemistry I or physics I. There were no measurable dif-

Figure 4. Percentage of high school graduates who completed middle and advanced levels of science courses, by highest level of coursework completed: Selected years, 1982–2004



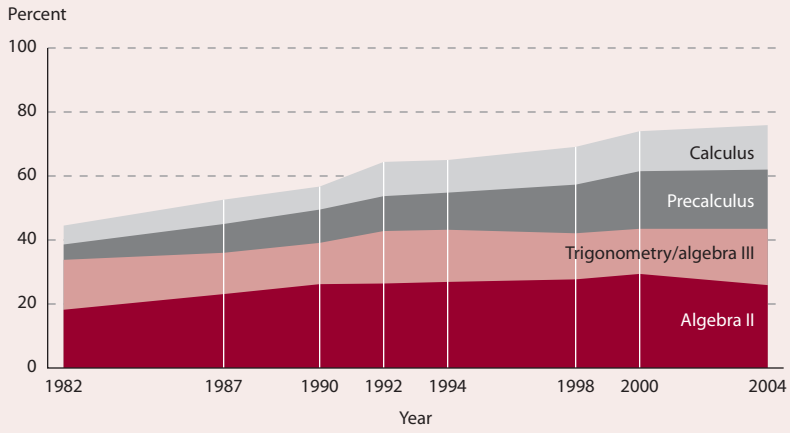
NOTE: Not displayed are the percentages of graduates who completed lower academic science courses. The distribution of graduates in the various levels of science courses was determined by the level of the most academically advanced course they had completed. Graduates may have completed advanced levels of courses without having taken courses at lower levels. See Technical Notes and Methodology for more details on these levels. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics. High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B-So:80/82); National Education Longitudinal Study of 1988 (NELS:88/92), "Second Follow-up, High School Transcript Survey, 1992"; Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study"; and National Assessment of Educational Progress (NAEP), 1987, 1990, 1994, 1998, and 2000 High School Transcript Studies (HSTS).

ferences between the percentage of female and male graduates who completed coursework in chemistry I *and* physics I or in the percentage who completed a course in chemistry II, physics II, and/or advanced biology. Unlike in 1998 and 2000 (data not shown), in 2004, female graduates were more likely than male graduates to have completed some advanced mathematics courses (e.g., trigonometry, precalculus, or calculus); however, as in 1998 and 2000, there was no measurable difference between the percentage of female and male graduates who completed calculus-level coursework (see supplemental table SA-8).

Asian/Pacific Islander graduates were more likely than graduates of any other race/ethnicity in 1998, 2000, and 2004 to have completed advanced science and mathematics courses (1998 and 2000 data not shown) (see supplemental tables SA-7 and SA-8). For example, 33 percent of Asians/Pacific Islanders completed a calculus-level course, compared with 16 percent of Whites, 7 percent of Hispanics, 6 percent of American Indians, and 5 percent of Blacks. Following Asians/Pacific Islanders, Whites were more likely than Blacks, Hispanics, and American Indians to have completed advanced science and mathematics courses in each of these 3 years.

In 1998, 2000, and 2004, private school graduates were also more likely than public school graduates to have completed advanced courses in science and mathematics. For example, in 2004, a greater percentage of private school graduates than public school graduates completed at least one advanced course in science (85 vs. 67 percent) and a calculus-level course (25 vs. 13 percent).

Figure 5. Percentage of high school graduates who completed middle and advanced levels of mathematics courses, by highest level of coursework completed: Selected years, 1982–2004



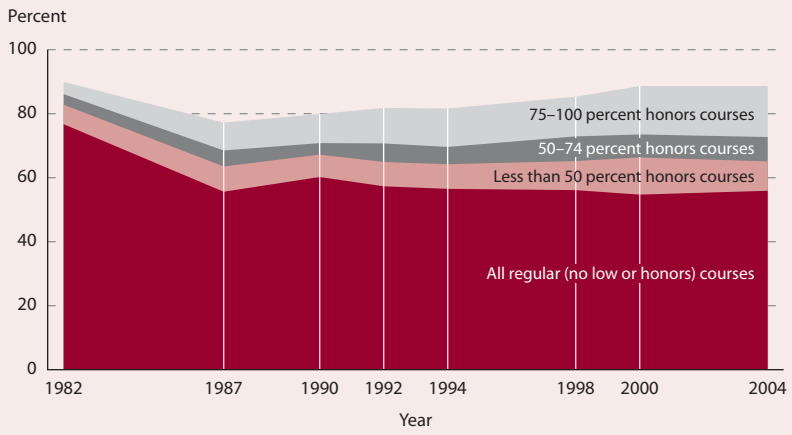
NOTE: Not displayed are the percentages of graduates who completed lower academic mathematics courses. The distribution of graduates in the various levels of mathematics courses was determined by the level of the most academically advanced course they had completed. Graduates may have completed advanced levels of courses without having taken courses at lower levels. See Technical Notes and Methodology for more details on these levels. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B-So:80/82); National Education Longitudinal Study of 1988 (NELS:88/92), "Second Follow-up, High School Transcript Survey, 1992"; Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study"; and National Assessment of Educational Progress (NAEP), 1987, 1990, 1994, 1998, and 2000 High School Transcript Studies (HSTS).

English and Foreign Language

Since the early 1980s, the percentage of high school graduates completing honors English and advanced foreign language courses has also increased (see figures 6 and 7 and supplemental tables SA-9 and SA-10). In 1982, about 13 percent of high school graduates had completed some advanced English coursework classified as "honors"; by 2004, this percentage had risen to 33 percent. Moreover, during this period, the percentage who had completed 75–100 percent of their English courses at the honors level increased from 4 to 16 percent.

The percentage of high school graduates who had completed advanced foreign language study (i.e., year 3 or higher of a foreign language) was greater in 2004 than in 1982. In 1982, about 15 percent of graduates had completed some advanced foreign language study; by 2004, this percentage had more than doubled to 35 percent. In addition, over this period, the percentage of graduates who had not completed any foreign language study decreased markedly (from 46 to 15 percent).

Figure 6. Percentage of high school graduates who completed regular and advanced levels of English, by highest course completed: Selected years, 1982–2004



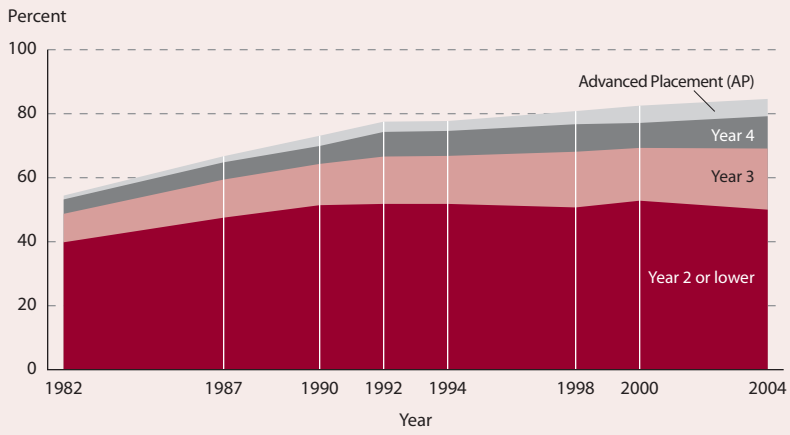
NOTE: For each graduate, the percentages of completed English courses classified as "below level," "at grade level," and "honors" were calculated. Graduates may have completed advanced levels of courses without having taken courses at lower levels. See Technical Notes and Methodology for more details on these levels. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B:80/82); National Education Longitudinal Study of 1988, "High School Transcript Study" (NELS:88/92); Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study"; and National Assessment of Educational Progress (NAEP), 1987, 1990, 1994, 1998, and 2000 High School Transcript Studies (HSTS).

As was the case in 1998 and 2000 (data not shown), in 2004, female graduates were more likely than male graduates to have completed advanced English and foreign language study (see supplemental tables SA-11 and SA-12). In 1998 and 2000 (data not shown), no racial/ethnic group of graduates completed advanced courses in English or foreign language study at higher rates than those for all other racial/ethnic groups. However, in 2004, Asian/Pacific Islanders completed advanced courses in English and in advanced foreign language study at higher rates than those for all other racial/ethnic groups. In all 3 years, Black graduates were less likely than Asian/Pacific Islander, Hispanic, and White graduates to have completed advanced foreign language courses.

In 1998, 2000, and 2004, private school graduates were also more likely than public school graduates to have completed advanced courses in foreign language study; however, apparent differences in the rates at which they completed advanced English courses were not significant (1998 and 2000 data not shown).

Figure 7. Percentage of high school graduates who completed low and advanced foreign language courses, by highest course completed: Selected years, 1982–2004



NOTE: The distribution of graduates among the various levels of foreign language courses was determined by the level of the most academically advanced course they completed. Graduates who had completed courses in different languages were counted according to the highest level course completed. Graduates may have completed advanced levels of courses without having taken courses at lower levels. See Technical Notes and Methodology for more details on these levels. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B:80/82); National Education Longitudinal Study of 1988, "High School Transcript Study" (NELS:88/92); Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study"; and National Assessment of Educational Progress (NAEP), 1987, 1990, 1994, 1998, and 2000 High School Transcript Studies (HSTS).

A Special Look: Advanced Placement (AP) Examinations

Advanced Placement (AP) courses provide students with the opportunity to take college-level courses while in high school. The AP program offers 37 courses in 20 subjects that are developed by The College Board. A qualifying score of 3.0 or better (using a 5.0 point scale) on a course examination may enable a student to earn college credit or advanced standing in the subject area in which the course/exam was taken. Between 1997 and 2005, the number of students taking AP examinations increased 111 percent (from 566,720 to 1,197,439) (see table 3).[14] Over this period, the participation of White students increased 105 percent, compared with 213 percent for Hispanic students, 177 percent for Black students, 124 percent for American Indian students, and 114 percent for Asian students. As a result, the participation of minority groups increased from 27 percent of all students taking AP examinations in 1997 to 33 percent in 2005. Conversely, the percentage of White students taking AP examinations declined from 66 percent in 1997 to 64 percent in 2005.

While the number of students and the percentage of minorities participating in AP examinations have increased each year, the annual average scores have remained about 3.0, out of a possible 5.0 (see supplemental table SA-13). The examination scores of White and Asian students have remained relatively constant across all subjects, averaging about 3.0 and 3.1, respectively, while the scores of students in other racial/ethnic groups have declined. For example, the average scores of Hispanic students declined across all examination subjects, from 3.1 in 1997 to 2.5 in 2005.

The percentage of examinations resulting in a qualifying score of 3.0 or better decreased from a high of 65 percent in 1997 to a low of 59 percent in 2005 (see supplemental table SA-14). At the same time, the number of examinations with a score of at least a 3.0 increased 111 percent (from 579,865 to 1,225,845) (see figure 8). However, the number of examinations with a score of 1.0 or 2.0 increased 163 percent (from 319,598 to 839,200).

Table 3. Number and percent change of students taking Advanced Placement (AP) examinations, by race/ethnicity: 1997–2005

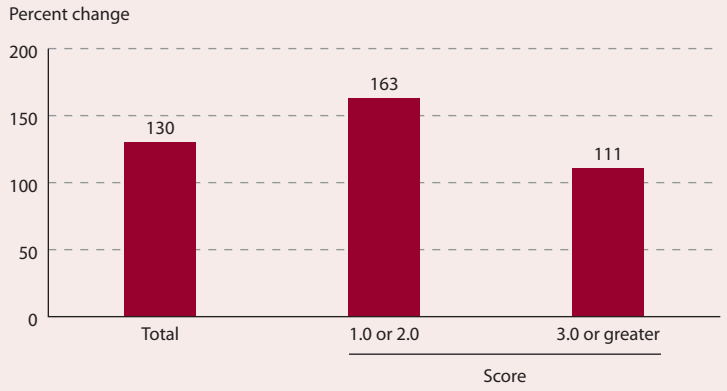
Race/ethnicity	1997	1998	1999	2000	2001	2002	2003	2004	2005	Percent change 1997 to 2005
Total[1]	**566,720**	**618,257**	**685,981**	**747,922**	**820,880**	**913,251**	**998,329**	**1,081,102**	**1,197,439**	**111**
White	371,606	403,553	445,880	504,600	549,065	607,816	660,225	702,489	762,548	105
Total minority[1]	154,046	170,054	194,557	225,825	250,230	280,276	315,046	350,425	398,243	159
Black	24,469	27,054	31,023	36,158	40,078	45,271	51,160	57,001	67,702	177
Hispanic	47,626	53,627	62,853	74,852	86,018	98,495	114,246	130,042	148,960	213
Asian/Asian American	63,528	68,109	75,875	85,756	92,762	102,653	111,704	121,038	135,815	114
American Indian/ Alaska Native	2,520	2,761	3,136	3,584	3,472	3,896	4,530	4,974	5,654	124
Missing	41,068	44,650	45,544	17,497	21,585	25,159	23,058	28,188	36,648	-11

[1] Total includes other race/ethnicity categories not separately shown.

NOTE: Data reported are for all students who completed an AP exam. The College Board collects racial/ethnic information based on the categories American Indian/Alaska Native; Asian/Asian American; Black/Afro-American; Latino: Chicano/Mexican, Puerto Rican, Other Latino; White; and Other. Hispanic refers to the sum of all Latino subgroups. Race categories exclude persons of Hispanic ethnicity.

SOURCE: The College Board, Advanced Placement Program. (1997–2005). *National Summary Reports*.

Figure 8. Percent change in student scores on Advanced Placement (AP) examinations, by test score categories: 1997 to 2005



SOURCE: The College Board, Advanced Placement Program. (1997–2005). *National Summary Reports*.

Summary

With requirements for earning a high school diploma becoming more rigorous over the past 20 years, there have been increases in the rates at which students accrue course credits. For example, between 1982 and 2004, the average number of course credits accrued by high school graduates increased from 21.7 to 25.8 credits.

This growth in the number of credits earned has been accompanied by an increase in the advanced coursework completed by high school students. More students are now taking advanced courses in mathematics and science—in particular calculus, chemistry I, and physics I—and in English and foreign languages. Further evidence of the prevalence of advanced coursetaking is an increase in the percentage of students who take AP examinations: between 1997 and 2005, the total number of students taking AP examinations more than doubled. As the number of participants in AP courses has increased, average scores have remained relatively stable; however, there has been a decrease in the percentage of examinations resulting in a qualifying score of 3.0 or more, from 65 to 59 percent. At the same time that academic coursetaking has been rising, there has not been an improvement in 12th-grade NAEP scores (Shettle et al. 2007).

Gaps in advanced coursetaking by sex and race/ethnicity are evident in mathematics, science, English, and foreign language study. Most notably, since 1998, females have been more likely than males to complete some advanced science coursework, though no differences by sex were detected in the proportions of students who took the highest levels of science or mathematics coursework. In addition, in 2004, Asian/Pacific Islander graduates were more likely than graduates of any other race/ethnicity to complete advanced courses in mathematics, science, English, and foreign language study.

Notes

[1] The most recent data available for this special analysis did not collect data on advanced course offerings from private schools.

[2] The basic unit of coursework measurement is the course credit or standardized "Carnegie unit." A Carnegie unit is a standard of measurement used for secondary education that is equivalent to the completion of a course that meets one period per day for one school year, where a period is typically at least 40 minutes.

[3] Many local school districts and schools impose their own standards for graduation that exceed these state requirements.

[4] In 2006, nine states had exit examination requirements for some private school students. In several states, these requirements applied to all students in state-accredited private schools; however, in other states, these requirements applied only to specific categories of private school students (e.g., students placed in private schools by school districts or other public agencies) (CEP 2006, table 22).

[5] Maryland's exit examination process was revised in 2004.

[6] North Carolina also has a mandatory test in civics and economics and in computer skills.

[7] Information on the content of the dual-credit coursework, and the extent to which it qualifies as advanced, was not collected as part of the Fast Response Survey (FRSS).

[8] All high school courses recorded in student transcripts are coded in accordance with the Classification Scheme of Secondary School Courses (CSSC). Courses in the CSSC taxonomy can then be grouped according to their academic level to classify a student's highest level of coursetaking within a particular subject. The CSSC is designed to describe course offerings in secondary education and to provide a coherent means for classifying these courses in this way. Each CSSC code has six digits, with an associated course title, alternate titles, and a course description.

[9] The definition of a high school graduate and what was considered a complete transcript record differs slightly between survey collections and other NCES reports. See Technical Notes and Methodology for more detail.

[10] These data report only the percentage of students who earned credit in each course while in high school and do not include a count of those courses taken prior to entering high school. In 2004, approximately 95 percent of graduates had taken algebra I before or during high school.

[11] "On-time" graduates are students who graduated between the fall of 2003 and the summer of 2004.

[12] Academic levels are labeled according to the most commonly known course at that level; courses with different names or on topics of different but similar academic difficulty may be included under these rubrics. See Technical Notes and Methodology for a complete listing of all the courses classified at each academic level.

[13] Calculus-level courses include AP calculus, calculus, and calculus/analytical geometry.

[14] The focus in the section is on students and examinations. Individuals may take multiple examinations. Furthermore, the data for this section's analysis count all test takers and are not limited to high school graduates.

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Supplemental Tables

Table SA-1. States with mandatory exit examinations, by subject, and states phasing in exit examinations, by date: 2006

State	English/ language arts	Mathematics	Science	U.S. history/ social studies	Computer skills
Total	**25**	**25**	**19**	**13**	**1**
Alabama	✓	✓	✓	✓	
Alaska[1]	✓	✓			
Arizona[1]	✓	✓			
California	✓	✓			
Florida	✓	✓			
Georgia[1]	✓	✓	✓	✓	
Idaho	✓	✓	✓		
Indiana	✓	✓			
Louisiana	✓	✓	✓	✓	
Maryland	2009	2009	2009	2009	
Massachusetts	✓	✓	2010		
Minnesota[1]	✓	✓			
Mississippi[1]	✓	✓	✓	✓	
Nevada[1]	✓	✓	2008		
New Jersey	✓	✓	2007		
New Mexico[1]	✓	✓	✓	✓	
New York	✓	✓	✓	✓	
North Carolina[2]	✓	✓	2010	2010	✓
Ohio[1]	✓	✓	✓	✓	
Oklahoma	2012	2012	2012	2012	
South Carolina	✓	✓	2010	2010	
Tennessee	✓	✓	✓		
Texas[1]	✓	✓	✓	✓	
Virginia[1]	✓	✓	✓	✓	
Washington[1]	2008	2008	2010		

[1] A writing test is required in addition to the English/language arts examination or as a component of it.

[2] A civics and economics test is required in addition to a U.S. history examination.

NOTE: Year in table indicates when the state is scheduled to institute an exit examination in that subject. Utah had planned to enforce an exit exam requirement in 2006, but that year decided not to withhold diplomas from students who failed the examination if they met other graduation requirements.

SOURCE: Center on Education Policy. (2006). *State High School Exit Exams: A Challenging Year,* adapted from table 1, data from state departments of education, June 2006.

Table SA-2. Number and percentage of public high schools that offered dual-credit, Advanced Placement (AP), and International Baccalaureate (IB) courses, by selected school characteristics: 2002–03

School characteristic	Total number of high schools	Offered dual-credit courses		Offered Advanced Placement courses		Offered International Baccalaureate courses	
		Number	Percent	Number	Percent	Number	Percent
All public high schools	**16,500**	**11,700**	**71**	**11,000**	**67**	**390**	**2**
Enrollment size							
Less than 500	7,400	4,700	63	3,000	40	‡	‡
500 to 1,199	5,000	3,700	75	4,100	82	70	2
1,200 or more	4,100	3,300	82	3,900	97	290	7
School locale							
City	2,700	1,800	65	2,100	77	150	6
Urban fringe	4,100	3,100	74	3,600	87	180	4
Town	2,400	1,900	79	1,700	72	20!	1!
Rural	7,200	5,000	70	3,600	50	‡	‡
Region							
Northeast	2,800	1,600	58	2,300	84	30	1
Southeast	3,500	2,400	69	2,400	69	170	5
Central	5,200	4,100	80	2,800	54	50	1
West	5,100	3,600	71	3,500	69	150	3
Percent minority enrollment							
Less than 6 percent	5,600	4,300	76	3,300	58	#	#
6 to 20 percent	3,800	3,000	78	2,600	70	90	2
21 to 49 percent	3,200	2,300	72	2,400	75	150	5
50 percent or more	3,600	2,100	58	2,500	69	150	4

Rounds to zero.

! Interpret data with caution (estimates are unstable).

‡ Reporting standards not met (too few cases).

NOTE: Dual-credit courses allow students to earn both high school and postsecondary credits for a single course. AP courses and their end-of-course examinations are developed and administered by The College Board and allow students to earn postsecondary credit. IB courses are defined as courses that make up a 2-year liberal arts curriculum that leads to an IB diploma. Percentages are based on unrounded numbers. Detail may not sum to totals because of rounding or missing data. For the FRSS study sample, there were 29 cases for which the percent minority enrollment in the school was missing. Those cases were included in the totals and in analyses by other school characteristics.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Dual Credit and Exam-Based Courses," FRSS 85, 2003.

Table SA-3. Average number of Carnegie units earned by high school graduates in various subject areas, by selected characteristics: 1982 and 2004

Graduation year and characteristic	Total	English	History/ social studies	Mathematics		
				Total	Less than algebra	Algebra or higher
1982 graduates	**21.7**	**4.0**	**3.2**	**2.7**	**0.9**	**1.9**
Sex						
Male	21.5	3.9	3.2	2.8	0.9	1.9
Female	21.9	4.0	3.2	2.6	0.8	1.8
Race/ethnicity						
White	21.8	3.9	3.2	2.8	0.7	2.0
Black	21.2	4.1	3.1	2.6	1.3	1.3
Hispanic	21.4	4.0	3.1	2.4	1.2	1.2
Asian/Pacific Islander	22.4	4.0	3.1	3.2	0.7	2.6
American Indian/Alaska Native	21.5	4.0	3.3	2.4	1.2	1.1
Control of school						
Public	21.6	3.9	3.2	2.6	0.9	1.7
Private	22.8	4.2	3.6	3.3	0.5	2.8
2004 graduates	**25.8**	**4.3**	**3.9**	**3.6**	**0.5**	**3.1**
Sex						
Male	25.8	4.3	3.9	3.6	0.5	3.0
Female	25.9	4.4	4.0	3.6	0.5	3.1
Race/ethnicity						
White	26.0	4.2	4.0	3.6	0.4	3.2
Black or African American	25.7	4.4	3.9	3.7	0.7	3.0
Hispanic	25.2	4.5	3.8	3.4	0.7	2.8
Asian/Pacific Islander	25.8	4.4	3.9	3.8	0.3	3.5
American Indian/Alaska Native	25.5	4.4	4.0	3.3	0.9	2.3
Control of school						
Public	25.8	4.3	3.9	3.6	0.5	3.0
Private	26.5	4.4	4.0	3.8	0.2	3.7

See notes at end of table.

Table SA-3. Average number of Carnegie units earned by high school graduates in various subject areas, by selected characteristics: 1982 and 2004—Continued

Graduation year and characteristic	Science					Foreign languages	Arts	Vocational education[1]
	Total	General science	Biology	Chemistry	Physics			
1982 graduates	**2.2**	**0.7**	**1.0**	**0.4**	**0.2**	**1.1**	**1.4**	**4.4**
Sex								
Male	2.3	0.8	0.9	0.4	0.2	0.9	1.3	4.3
Female	2.2	0.7	1.0	0.4	0.1	1.3	1.6	4.4
Race/ethnicity								
White	2.3	0.7	1.0	0.4	0.2	1.2	1.5	4.2
Black	2.1	0.8	0.9	0.3	0.1	0.8	1.3	4.6
Hispanic	1.8	0.8	0.8	0.2	0.1	0.9	1.3	5.0
Asian/Pacific Islander	2.7	0.5	1.1	0.6	0.4	1.8	1.3	3.2
American Indian/Alaska Native	2.1	0.7	0.8	0.4	0.1	0.5	1.7	4.7
Control of school								
Public	2.2	0.7	0.9	0.3	0.2	1.0	1.5	4.6
Private	2.6	0.7	1.1	0.5	0.3	2.0	1.2	2.3
2004 graduates	**3.2**	**0.8**	**1.3**	**0.7**	**0.4**	**2.0**	**2.1**	**3.5**
Sex								
Male	3.2	0.9	1.2	0.7	0.4	1.8	1.8	3.8
Female	3.3	0.8	1.3	0.8	0.3	2.2	2.4	3.2
Race/ethnicity								
White	3.3	0.8	1.3	0.8	0.4	2.1	2.3	3.5
Black or African American	3.2	1.0	1.3	0.7	0.3	1.7	1.7	3.8
Hispanic	2.9	0.9	1.1	0.6	0.3	1.9	1.9	3.3
Asian/Pacific Islander	3.6	0.7	1.4	0.9	0.6	2.4	1.9	2.5
American Indian/Alaska Native	3.0	0.9	1.2	0.5	0.3	1.3	1.6	4.4
Control of school								
Public	3.2	0.8	1.3	0.7	0.4	1.9	2.1	3.7
Private	3.5	0.6	1.4	1.0	0.6	2.7	1.9	1.5

[1] Includes nonoccupational vocational education, vocational general introduction, agriculture, business, marketing, health, occupational home economics, trade and industry, and technical courses.

NOTE: The Carnegie unit is a standard of measurement that represents 1.0 credit for the completion of a 1-year course. Data differ slightly from figures appearing in other NCES reports because of differences in taxonomies and case exclusion criteria. Race categories exclude persons of Hispanic ethnicity. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B-So:80/82); National Education Longitudinal Study of 1988 (NELS:88/92), "Second Follow-up, High School Transcript Survey, 1992"; Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study"; and National Assessment of Educational Progress (NAEP), 1987, 1990, 1994, 1998, and 2000 High School Transcript Studies (HSTS).

Table SA-4. Percentage of high school graduates, by selected mathematics and science courses in high school: Selected years, 1982–2004

Year	Any mathematics	Algebra I[1]	Geometry	Algebra II[2]	Trigonometry	Analysis/ precalculus	Statistics/ probability
Minimum credit earned	1.0	1.0	1.0	0.5	0.5	0.5	0.5
1982	98.5	55.2	47.1	39.9	8.1	6.2	1.0
1987	99.0	58.8	58.6	49.0	11.5	12.8	1.1
1990	99.9	63.7	63.2	52.8	9.6	13.3	1.0
1994	99.8	65.8	70.0	61.1	11.7	17.3	2.0
1998	99.8	62.8	75.1	61.7	8.9	23.1	3.7
2000	99.8	61.7	78.3	67.8	7.5	26.7	5.7
2004	99.8	59.3	75.7	67.5	9.6	28.4	7.5

Year	Calculus	AP calculus	Any science	Biology	AP/honors biology	Chemistry	AP/honors chemistry
Minimum credit earned	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1982	5.0	1.6	96.4	77.4	10.0	32.1	3.0
1987	6.1	3.4	97.8	86.0	9.4	44.2	3.5
1990	6.5	4.1	99.3	91.0	10.1	48.9	3.5
1994	9.3	7.0	99.5	93.2	11.9	55.8	3.9
1998	11.0	6.7	99.5	92.7	16.2	60.4	4.7
2000	11.6	7.9	99.5	91.2	16.3	62.0	5.8
2004	12.8	9.2	99.5	90.0	17.4	64.2	5.4

Year	Physics	AP/honors physics	Engineering	Astronomy	Geology/ earth science	Biology and chemistry	Biology, chemistry, and physics
Minimum credit earned	1.0	1.0	1.0	0.5	0.5	2.0	3.0
1982	15.0	1.2	1.2	1.2	13.6	29.3	11.2
1987	20.0	1.8	2.6	1.0	13.4	41.4	16.6
1990	21.6	2.0	4.2	1.2	24.7	47.5	18.8
1994	24.5	2.7	4.5	1.7	22.9	53.7	21.4
1998	28.8	3.0	6.7	1.9	20.7	59.0	25.4
2000	31.4	3.9	3.9	2.8	17.4	59.4	25.1
2004	32.7	4.4	8.9	3.3	22.6	60.5	25.8

[1] Excludes prealgebra.

[2] Includes algebra/trigonometry and algebra/geometry.

NOTE: These data only report the percentage of students who earned a minimum amount of credit in each course while in high school and do not include a count of those courses taken prior to entering high school. In 2004, approximately 95 percent of graduates had taken algebra I before or during high school.

SOURCE: U.S. Department of Education, National Center for Education Statistics. High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B-So:80/82); National Education Longitudinal Study of 1988 (NELS:88/92), "Second Follow-up, High School Transcript Survey, 1992"; Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study"; and National Assessment of Educational Progress (NAEP), 1987, 1990, 1994, 1998, and 2000 High School Transcript Studies (HSTS).

Table SA-5. Percentage distribution of high school graduates, by highest level of science course completed: Selected years, 1982–2004

				Advanced academic level			
Year	No science[1]	Low academic level	General biology	Total	Chemistry I or physics I	Chemistry I and physics I	Chemistry II, physics II, and/or advanced biology
1982	2.2	27.2	35.2	35.4	14.9	5.9	14.6
1987	0.8	15.8	41.5	41.9	21.4	10.6	9.9
1990	0.7!	12.8	37.0	49.5	25.8	12.3	11.4
1992	0.3!	9.7	36.4	53.5	27.1	12.2	14.3
1994	0.6	10.0	34.1	55.3	29.4	13.0	12.9
1998	0.6	9.3	28.6	61.5	30.2	16.3	15.1
2000	0.7	8.7	27.5	63.1	30.5	14.8	17.9
2004	0.6	5.6	25.4	68.4	33.3	17.1	18.1

! Interpret data with caution (estimates are unstable).

[1] Graduates 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.

NOTE: The distribution of graduates in the various levels of science courses was determined by the level of the most academically advanced course they had completed. Graduates may have completed advanced levels of courses without having taken courses at lower levels. See Technical Notes and Methodology for more details on these levels. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B-So:80/82); National Education Longitudinal Study of 1988 (NELS:88/92), "Second Follow-up, High School Transcript Survey, 1992"; Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study"; and National Assessment of Educational Progress (NAEP), 1987, 1990, 1994, 1998, and 2000 High School Transcript Studies (HSTS).

Table SA-6. Percentage distribution of high school graduates, by highest level of mathematics course completed: Selected years, 1982–2004

				Middle academic			Advanced academic			
Year	No mathematics[1]	Non-academic	Low academic	Total	Algebra I/geometry	Algebra II	Total	Trigonometry/algebra III	Precalculus	Calculus
1982	0.8	16.7	7.4	48.8	30.6	18.2	26.3	15.6	4.8	5.9
1987	0.9	12.0	7.6	50.1	27.0	23.1	29.5	12.9	9.0	7.6
1990	0.6	9.0	8.2	51.6	25.4	26.2	30.6	12.9	10.4	7.2
1992	0.4!	6.2	6.3	49.0	22.7	26.4	38.1	16.4	10.9	10.7
1994	0.7	5.7	6.2	49.4	22.5	26.9	38.1	16.3	11.6	10.2
1998	0.8	3.6	5.3	48.9	21.2	27.7	41.4	14.4	15.2	11.8
2000	0.8	2.5	4.1	48.0	18.6	29.4	44.6	14.1	18.0	12.5
2004	0.6	1.8	3.0	44.6	18.7	25.9	50.0	17.6	18.5	13.9

! Interpret data with caution (estimates are unstable).

[1] Indicates that student transcript records did not list any recognized mathematics courses; however, these graduates may have studied some mathematics.

NOTE: The distribution of graduates among the various levels of mathematics courses was determined by the level of the most academically advanced course they had completed. Graduates may have completed advanced levels of courses without having taken courses at lower levels. Academic levels are labeled according to the most commonly known course at that level; courses with different names or on topics of different but similar academic difficulty may be included under these rubrics. See Technical Notes and Methodology for a complete listing of all the courses classified at each academic level. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B-So:80/82); National Education Longitudinal Study of 1988 (NELS:88/92), "Second Follow-up, High School Transcript Survey, 1992"; Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study"; and National Assessment of Educational Progress (NAEP), 1987, 1990, 1994, 1998, and 2000 High School Transcript Studies (HSTS).

Table SA-7. Percentage distribution of high school graduates, by highest level of science course completed and selected characteristics: 2004

Characteristic	No science[1]	Low academic level	General biology	Advanced academic level			
				Total	Chemistry I or physics I	Chemistry I and physics I	Chemistry II, physics II, and/or advanced biology
Total	**0.6**	**5.6**	**25.4**	**68.4**	**33.3**	**17.1**	**18.1**
Sex							
Male	0.8	6.7	27.0	65.5	29.8	17.9	17.8
Female	0.3	4.6	23.8	71.3	36.6	16.3	18.4
Race/ethnicity							
White	0.5	5.0	23.9	70.7	32.1	18.2	20.3
Black	0.9	5.0	31.2	63.0	39.8	12.4	10.8
Hispanic	0.7	8.3	30.9	60.2	35.9	15.5	8.8
Asian/Pacific Islander	0.5	3.0	12.8	83.7	25.9	19.1	38.8
American Indian	#	10.3	41.9	47.8	28.2	12.3	7.3
Control of school							
Public	0.6	6.0	26.5	66.9	33.4	16.0	17.6
Private	0.1!	1.4	13.2	85.4	32.1	29.2	24.1

Rounds to zero.

! Interpret data with caution (estimates are unstable).

[1] Graduates 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.

NOTE: The distribution of graduates in the various levels of science courses was determined by the level of the most academically advanced course they had completed. Graduates may have completed advanced levels of courses without having taken courses at lower levels. See Technical Notes and Methodology for more details on these levels. Race categories exclude persons of Hispanic ethnicity. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study."

Table SA-8. Percentage distribution of high school graduates, by highest level of mathematics course completed and selected characteristics: 2004

Characteristic	No mathematics[1]	Non-academic	Low academic	Middle academic			Advanced academic			
				Total	Algebra I/ geometry/	Algebra II	Total	Trigonometry/ algebra III	Precalculus	Calculus
Total	**0.6**	**1.8**	**3.0**	**44.6**	**18.7**	**25.9**	**50.0**	**17.6**	**18.5**	**13.9**
Sex										
Male	0.7	2.2	3.7	45.2	20.0	25.2	48.2	16.3	17.4	14.5
Female	0.4	1.4	2.4	44.0	17.5	26.6	51.7	18.8	19.7	13.2
Race/ethnicity										
White	0.5	1.6	2.6	41.0	16.9	24.0	54.3	18.2	20.1	16.0
Black	1.3	1.8	3.8	51.3	19.8	31.5	41.7	22.9	14.0	4.7
Hispanic	0.3	2.5	4.2	58.6	27.0	31.6	34.3	13.0	14.5	6.8
Asian/Pacific Islander	0.4	0.3	1.5	28.7	11.3	17.5	69.1	12.5	23.1	33.4
American Indian	2.4!	8.5	4.5	62.9	22.8	40.1	21.8	8.9	7.2	5.6
Control of school										
Public	0.6	1.9	3.3	46.4	19.9	26.5	47.7	17.2	17.7	12.8
Private	0.2	#	0.2	24.6	5.7	18.9	75.0	21.9	27.6	25.5

Rounds to zero.

! Interpret data with caution (estimates are unstable).

[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.

NOTE: The distribution of graduates among the various levels of mathematics courses was determined by the level of the most academically advanced course they had completed. Graduates may have completed advanced levels of courses without having taken courses at lower levels. Academic levels are labeled according to the most commonly known course at that level; courses with different names or on topics of different but similar academic difficulty may be included under these rubrics. See Technical Notes and Methodology for a complete listing of all the courses classified at each academic level. Race categories exclude persons of Hispanic ethnicity. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study."

Table SA-9. Percentage distribution of high school graduates, by type of English course completed: Selected years, 1982–2004

Year	No English[2]	Low academic level[3]	Regular English (no low or honors) courses	Advanced academic level[1]			
				Total	Less than 50 percent of courses	50–74 percent of courses	75–100 percent of courses
1982	0.1	10.0	76.7	13.3	6.1	3.3	3.8
1987	0.7	22.1	55.6	21.5	7.9	5.0	8.7
1990	0.6	19.6	60.2	19.6	7.0	3.6	9.1
1992	0.2	18.0	57.3	24.4	7.6	5.8	11.1
1994	0.8	17.6	56.5	25.1	7.7	5.4	12.0
1998	0.9	13.7	56.1	29.3	9.1	7.7	12.4
2000	0.7	10.7	54.7	33.9	11.6	7.2	15.1
2004	0.7	10.8	55.9	32.7	9.2	7.6	15.9

[1] Includes graduates who completed a general English course classified as "below grade level" if they completed a greater percentage of "honors" courses than "below grade level" courses.

[2] Indicates that student transcript records did not list any recognized English courses; however, these graduates may have studied some English. If graduates took only English as a second language (ESL) courses for credit, they would be listed in this category.

[3] Low academic level courses include all general English courses classified as "below grade level." Graduates may have taken a general English course classified as regular or "honors" and be classified in the low academic level if the percentage of "below grade level" courses completed was the plurality of courses completed.

NOTE: For each graduate, the percentages of completed courses classified as "below level," "at grade level," and "honors" were calculated. (Not all graduates completed 4 years of English.) After the percentage of graduates at each level had been calculated, the percentage of graduates who fit the category requirement for each level was determined, as explained in Technical Notes and Methodology. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B:80/82); National Education Longitudinal Study of 1988, "High School Transcript Study" (NELS:88/92); Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study"; and National Assessment of Educational Progress (NAEP), 1987, 1990, 1994, 1998, and 2000 High School Transcript Studies (HSTS).

Table SA-10. Percentage distribution of high school graduates, by highest level of foreign language course completed: Selected years, 1982–2004

Year	None	Year 2 or less	Advanced academic level			
			Year 3 or higher	Year 3	Year 4	Advanced Placement (AP)
1982	45.6	39.8	14.6	8.9	4.5	1.2
1987	33.3	47.5	19.2	11.9	5.4	1.9
1990	26.9	51.4	21.7	12.9	5.6	3.2
1992	22.5	51.8	25.7	14.8	7.7	3.2
1994	22.3	51.8	25.9	15.0	7.8	3.1
1998	19.4	50.7	30.0	17.4	8.6	4.1
2000	17.4	52.8	29.8	16.5	7.8	5.4
2004	17.3	49.2	33.5	18.4	9.8	5.3
2004[1]	15.5	50.0	34.5	19.1	10.1	5.4

[1] Foreign language coursetaking based upon classes in Amharic (Ethiopian), Arabic, Chinese (Cantonese or Mandarin), Czech, Dutch, Finnish, French, German, Greek (Classical or Modern), Hawaiian, Hebrew, Italian, Japanese, Korean, Latin, Norse (Norwegian), Polish, Portuguese, Russian, Spanish, Swahili, Swedish, Turkish, Ukrainian, or Yiddish.

NOTE: Foreign language coursetaking based upon classes in Spanish, French, Latin, or German, unless noted otherwise. From 1982 to 2000, less than 1 percent of students studied only a foreign language other than Spanish, French, Latin, or German. The distribution of graduates among the various levels of foreign language courses was determined by the level of the most academically advanced course they completed. Graduates who had completed courses in different languages were counted according to the highest level course completed. Graduates may have completed advanced levels of courses without having taken courses at lower levels. See Technical Notes and Methodology for more details on these levels. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B:80/82); National Education Longitudinal Study of 1988, "High School Transcript Study" (NELS:88/92); Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study"; and National Assessment of Educational Progress (NAEP), 1987, 1990, 1994, 1998, and 2000 High School Transcript Studies (HSTS).

Table SA-11. Percentage distribution of high school graduates, by type of English course taken and selected characteristics: 2004

Characteristic	No English[2]	Low academic level[3]	Regular English (no low or honors) courses	Advanced academic level[1]			
				Total	Less than 50 percent of courses	50–74 percent of courses	75–100 percent of courses
Total	**0.7**	**10.8**	**55.9**	**32.7**	**9.2**	**7.6**	**15.9**
Sex							
Male	0.6	12.3	60.5	26.6	8.4	6.1	12.0
Female	0.7	9.3	51.5	38.5	9.9	9.0	19.6
Race/ethnicity							
White	0.6	7.5	56.5	35.4	9.5	8.3	17.6
Black	0.5	15.4	60.2	23.9	8.3	6.2	9.4
Hispanic	1.3	21.1	52.8	24.9	8.5	5.3	11.1
Asian/Pacific Islander	0.1	13.2	43.6	43.1	9.0	8.1	26.0
American Indian	1.0!	16.1	61.7	21.2	2.9	1.6	16.8
Control of school							
Public	0.7	11.3	55.1	32.9	9.3	7.4	16.1
Private	0.2	4.3	64.9	30.7	7.4	9.6	13.7

! Interpret data with caution (estimates are unstable).

[1] Includes graduates who completed a general English course classified as "below grade level" if they completed a greater percentage of "honors" courses than "below grade level" courses.

[2] Indicates that student transcript records did not list any recognized English courses; however, these graduates may have studied some English. If graduates took only English as a second language (ESL) courses for credit, they would be listed in this category.

[3] Low academic level courses include all general English courses classified as "below grade level." Graduates may have taken a general English course classified as regular or "honors" and be classified in the low academic level if the percentage of "below grade level" courses completed was the plurality of courses completed.

NOTE: For each graduate, the percentages of completed courses classified as "below level," "at grade level," and "honors" were calculated. (Not all graduates completed 4 years of English.) After the percentage of graduates at each level had been calculated, the percentage of graduates who fit the category requirement for each level was determined, as explained in Technical Notes and Methodology. Race categories exclude persons of Hispanic ethnicity. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B:80/82); National Education Longitudinal Study of 1988, "High School Transcript Study" (NELS:88/92); Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study"; and National Assessment of Educational Progress (NAEP), 1987, 1990, 1994, 1998, and 2000 High School Transcript Studies (HSTS).

Table SA-12. Percentage distribution of high school graduates, by highest level of foreign language course completed and selected characteristics: 2004

Characteristic	None	Year 1 or less	Year 2	Advanced academic level			
				Year 3 or higher	Year 3	Year 4	Advanced Placement (AP)
Total	**15.5**	**16.1**	**33.9**	**34.5**	**19.1**	**10.1**	**5.4**
Sex							
Male	19.2	17.7	33.6	29.4	17.3	8.0	4.2
Female	11.9	14.6	34.1	39.4	20.8	12.1	6.5
Race/ethnicity							
White	14.1	15.6	33.0	37.2	20.6	11.4	5.3
Black	15.9	22.5	42.0	19.6	13.3	5.5	0.8
Hispanic	20.4	14.6	32.3	32.8	15.1	7.8	10.0
Asian/Pacific Islander	10.8	12.3	26.4	50.5	27.2	14.2	9.1
American Indian	41.6	19.4	23.9	15.1	9.3	5.3	0.5
Control of school							
Public	16.5	16.8	34.1	32.6	18.1	9.3	5.2
Private	4.3	9.0	30.6	56.1	30.2	18.2	7.7

NOTE: Foreign language coursetaking based upon classes in Amharic (Ethiopian), Arabic, Chinese (Cantonese or Mandarin), Czech, Dutch, Finnish, French, German, Greek (Classical or Modern), Hawaiian, Hebrew, Italian, Japanese, Korean, Latin, Norse (Norwegian), Polish, Portuguese, Russian, Spanish, Swahili, Swedish, Turkish, Ukrainian, or Yiddish. Some graduates in each category also studied more than one foreign language. The distribution of graduates among the various levels of foreign language courses was determined by the level of the most academically advanced course they completed. Graduates who had completed courses in different languages were counted according to the highest level course completed. Graduates may have completed advanced levels of courses without having taken courses at lower levels. See Technical Notes and Methodology for more details on these levels. Race categories exclude persons of Hispanic ethnicity. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002/04), "High School Transcript Study."

Table SA-13. Mean score on Advanced Placement (AP) exams, by selected subjects and race/ethnicity: 1997–2005

Subject and race/ethnicity	1997	1998	1999	2000	2001	2002	2003	2004	2005
All exams	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.9
White	3.0	3.0	3.1	3.1	3.0	3.1	3.0	3.0	3.0
Black	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0
Hispanic	3.1	3.0	2.8	2.9	2.8	2.8	2.7	2.7	2.5
Asian/Asian American	3.1	3.1	3.1	3.1	3.0	3.1	3.1	3.1	3.1
American Indian/Alaska Native	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.4
Biology	3.2	3.0	3.1	3.1	3.0	3.1	3.0	3.0	3.0
White	3.2	3.1	3.2	3.2	3.1	3.2	3.1	3.1	3.1
Black	2.2	2.1	2.2	2.1	2.0	2.1	2.0	2.1	2.1
Hispanic	2.5	2.3	2.4	2.3	2.3	2.3	2.2	2.3	2.2
Asian/Asian American	3.4	3.2	3.3	3.3	3.1	3.3	3.2	3.3	3.3
American Indian/Alaska Native	2.8	2.7	2.7	2.7	2.5	2.6	2.5	2.4	2.5
Calculus AB	2.8	3.0	3.0	3.0	3.0	3.1	3.1	3.0	2.9
White	2.9	3.1	3.1	3.1	3.1	3.2	3.2	3.1	3.0
Black	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.0	1.9
Hispanic	2.3	2.5	2.4	2.4	2.3	2.4	2.4	2.2	2.2
Asian/Asian American	3.0	3.2	3.1	3.1	3.1	3.2	3.2	3.1	3.1
American Indian/Alaska Native	2.5	2.7	2.6	2.5	2.5	2.7	2.5	2.4	2.4
Chemistry	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
White	2.9	2.9	2.9	2.9	2.8	2.8	2.9	2.9	2.8
Black	2.0	1.9	2.0	2.0	1.9	1.9	1.8	1.9	1.8
Hispanic	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0
Asian/Asian American	3.1	3.0	3.0	3.1	3.1	3.1	3.0	3.1	3.1
American Indian/Alaska Native	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.4	2.1
English literature and composition	3.1	3.1	3.1	3.1	3.0	3.0	2.9	3.0	2.9
White	3.2	3.1	3.2	3.2	3.1	3.1	3.1	3.1	3.1
Black	2.3	2.3	2.3	2.2	2.2	2.1	2.2	2.1	2.0
Hispanic	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.3
Asian/Asian American	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.0	3.0
American Indian/Alaska Native	2.7	2.6	2.7	2.7	2.5	2.5	2.5	2.6	2.4
Physics B	2.8	3.0	2.9	2.7	2.7	2.7	2.8	2.7	2.8
White	2.8	3.0	2.9	2.8	2.9	2.8	2.9	2.8	2.9
Black	2.0	2.1	1.8	1.8	1.7	1.8	1.8	1.7	1.7
Hispanic	2.2	2.2	2.1	2.0	1.9	1.9	2.1	1.9	2.0
Asian/Asian American	2.8	2.9	2.9	2.8	2.8	2.8	2.9	2.7	2.9
American Indian/Alaska Native	2.4	2.8	2.2	2.4	2.3	2.4	2.3	2.3	2.3
U.S. history	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.8	2.7
White	2.9	2.9	2.8	2.9	2.9	2.9	2.9	2.9	2.8
Black	2.1	2.2	2.0	2.1	2.1	2.1	2.0	2.0	1.9
Hispanic	2.3	2.4	2.2	2.3	2.1	2.1	2.1	2.1	2.0
Asian/Asian American	3.0	2.9	2.8	2.9	2.8	2.9	2.9	3.0	2.8
American Indian/Alaska Native	2.4	2.5	2.4	2.5	2.4	2.4	2.4	2.4	2.3

NOTE: Total averages for all examinations and by subject area include other race/ethnicity categories not separately shown. Biology, calculus AB, chemistry, English literature and composition, physics B, and U.S. history are some of the most frequently taken AP exams. The grades for all AP exams range from 1.0 to 5.0, with 5.0 being the highest score. Data reported are for all students who completed an AP exam. The College Board collects racial/ethnic information based on the categories American Indian/Alaska Native; Asian/Asian American; Black/Afro-American; Latino: Chicano/Mexican, Puerto Rican, Other Latino; White; and Other. Hispanic refers to the sum of all Latino subgroups. Race categories exclude persons of Hispanic ethnicity.

SOURCE: The College Board, Advanced Placement Program. (1997–2005). *National Summary Reports*.

Table SA-14. Percentage of Advanced Placement (AP) examinations with a score of 3.0 or greater, by subject and race/ethnicity: 1997–2005

Subject and race/ethnicity	1997	1998	1999	2000	2001	2002	2003	2004	2005
All exams	64.5	64.1	63.5	63.7	61.3	63.1	61.5	61.5	59.4
White	65.5	65.5	65.4	66.2	64.1	66.4	64.9	65.1	63.4
Black	35.9	35.1	34.6	33.8	31.2	33.2	31.8	31.6	28.6
Hispanic	61.1	59.5	57.4	55.9	52.5	52.5	50.5	50.1	46.7
Asian/Asian American	67.0	66.3	65.0	65.0	63.2	65.0	64.1	64.2	63.5
American Indian/Alaska Native	51.0	50.9	49.6	50.5	44.4	46.0	45.2	46.3	44.2
Biology	67.3	60.1	65.0	64.2	58.0	64.3	58.6	60.8	61.0
White	68.9	62.5	67.0	67.0	61.7	68.2	62.1	64.5	64.5
Black	35.9	32.3	35.9	33.1	26.9	32.1	28.6	29.6	30.2
Hispanic	46.5	38.0	42.1	39.3	33.9	38.2	33.7	35.9	35.6
Asian/Asian American	72.3	66.7	70.7	70.1	63.7	69.3	64.3	66.9	68.7
American Indian/Alaska Native	58.0	51.7	54.9	52.1	42.6	48.2	41.5	40.6	43.3
Calculus AB	59.3	65.8	63.4	63.2	63.6	67.0	65.6	59.0	57.6
White	60.5	67.9	65.7	66.2	66.7	70.3	68.9	62.3	61.1
Black	31.7	36.1	33.7	34.4	33.6	37.3	36.6	30.1	28.4
Hispanic	42.2	46.4	45.5	43.2	42.4	45.3	43.9	36.8	35.4
Asian/Asian American	64.3	68.9	66.3	64.8	66.0	69.1	69.0	62.9	62.4
American Indian/Alaska Native	50.1	54.7	49.6	48.3	47.1	52.1	47.5	42.4	42.1
Chemistry	58.1	57.8	56.9	58.0	57.4	56.9	56.2	56.4	55.4
White	58.7	58.5	57.9	58.9	58.8	58.3	58.7	58.1	57.0
Black	29.1	27.1	28.0	30.8	28.3	27.3	25.6	27.7	25.1
Hispanic	35.3	36.7	30.0	32.7	31.8	31.9	29.9	31.0	31.1
Asian/Asian American	63.9	63.9	62.1	64.9	65.1	64.7	62.4	64.5	64.8
American Indian/Alaska Native	38.5	36.1	38.6	35.7	38.9	38.2	34.9	42.3	34.4
English literature and composition	68.9	68.1	68.2	68.1	63.1	66.0	62.6	64.9	61.9
White	72.1	71.6	72.4	73.5	68.1	71.6	68.0	71.4	68.7
Black	36.0	35.0	35.1	33.1	30.2	31.3	30.5	30.2	26.2
Hispanic	46.8	46.5	44.6	42.9	37.5	39.6	38.3	38.5	36.3
Asian/Asian American	70.0	69.8	67.6	69.7	63.3	65.9	63.4	64.4	63.2
American Indian/Alaska Native	55.1	51.9	52.2	56.3	42.9	47.7	45.1	49.0	42.9
Physics B	59.8	65.9	61.8	58.2	58.7	59.4	59.8	57.0	59.2
White	61.1	68.7	64.9	61.8	62.4	63.4	63.2	61.4	63.3
Black	33.1	35.5	28.2	25.1	24.0	25.9	26.9	23.1	22.6
Hispanic	41.8	41.2	35.3	32.6	33.4	32.7	35.3	30.7	31.7
Asian/Asian American	61.1	65.3	62.5	57.9	59.4	59.8	61.6	57.1	63.2
American Indian/Alaska Native	46.7	56.9	41.1	49.5	43.0	47.7	42.1	44.9	45.3
U.S. history	54.7	53.7	50.8	53.9	50.9	53.7	51.6	56.7	50.4
White	56.2	55.1	52.9	57.2	54.6	57.6	55.8	61.3	55.1
Black	29.3	29.1	25.5	28.3	25.1	28.3	25.2	29.6	23.8
Hispanic	38.0	35.8	31.3	32.0	27.6	30.1	27.7	31.7	27.4
Asian/Asian American	58.4	57.6	53.6	55.6	53.5	57.2	54.9	61.2	56.4
American Indian/Alaska Native	37.9	42.3	38.0	42.7	38.9	37.6	37.8	42.1	36.7

NOTE: Total averages for all examinations and by subject area include other race/ethnicity categories not separately shown. Biology, calculus AB, chemistry, English literature and composition, physics B, and U.S. history are some of the most frequently taken AP exams. The grades for all AP exams range from 1.0 to 5.0, with 5.0 being the highest score. Data reported are for all students who completed an AP exam. The College Board collects racial/ethnic information based on the categories American Indian/Alaska Native; Asian/Asian American; Black/Afro-American; Latino: Chicano/Mexican, Puerto Rican, Other Latino; White; and Other. Hispanic refers to the sum of all Latino subgroups. Race categories exclude persons of Hispanic ethnicity.

SOURCE: The College Board, Advanced Placement Program. (1997–2005). *National Summary Reports*.

Technical Notes and Methodology

Data Source and Estimates

The transcript data in this special analysis were obtained from a statistical sample of the entire population of students or schools. Estimating the size of the total population or subpopulations from a data source based on a sample of the entire population requires consideration of several factors before the estimates become meaningful. However conscientious an organization may be in collecting data from a sample of a population, there will always be some margin of error in estimating the size of the actual total population or subpopulation because the data are available from only a portion of the total population. Consequently, data from samples can provide only an estimate of the true or actual value. The margin of error or the range of the estimate depends on several factors, such as the amount of variation in the responses, the size and representativeness of the sample, and the size of the subgroup for which the estimate is computed. The magnitude of this margin of error is measured by what statisticians call the "standard error" of an estimate.

Standard Errors

The standard error for each estimate in this special analysis was calculated in order to determine the "margin of error" for these estimates. The standard errors for all the estimated means and percentages reported in the figures and tables of the special analysis can be found on *The Condition of Education* homepage at http://nces.ed.gov/programs/coe.

An estimate with a smaller standard error provides a more reliable estimate of the true value than an estimate with a higher standard error. Standard errors tend to diminish in size as the size of the sample (or subsample) increases. Consequently, for the same data, such as the percentage of students who scored in the top 25 percent on the NAEP mathematics assessment, standard errors will almost always be larger for students who took calculus as their highest mathematics course completed than for students who took algebra I as their highest mathematics course completed because the latter represent a larger proportion of the population.

Data Analysis and Interpretation

Due to standard errors, caution is warranted when drawing conclusions about the size of one population estimate in comparison to another or whether a time series of population estimates is increasing, decreasing, or staying about the same. Although one estimate of the population size may be larger than another, a statistical test may reveal that there is no measurable difference between the two estimates due to their uncertainty. Whether differences in means or percentages are statistically significant can be determined by using the standard errors of the estimates. When differences are statistically significant, the probability that the difference occurred by chance is usually small; for example, it might be about 5 times out of 100. For this special analysis, differences between means or percentages (including increases or decreases) are stated only when they are statistically significant. To determine whether differences reported are statistically significant, two-tailed *t* tests, at the .05 level, were used. The *t* test formula for determining statistical significance was adjusted when the samples being compared were dependent.

Rounding and Other Considerations

Although values reported in the supplemental tables are rounded to one decimal place (e.g., 76.5 percent), values reported in this special analysis are rounded to whole numbers (with any value of 0.5 or above rounded to the next highest whole number). Due to rounding, total percentages sometimes differ from the sum of the reported parts, which may, for example, equal 99 or 101 percent, rather than the percentage distribution's total of 100 percent.

Measuring High School Coursetaking

There are various ways to measure the academic coursework that students complete. For example, one can measure the number of courses a student has completed in different subjects (e.g., whether a student completed two, three, or four courses in mathematics). If one is interested in how common it is for students to complete certain courses, one can measure the percentage of high school students who have completed those courses. Yet another method is to measure the highest level of coursework completed in different subjects (e.g., whether a student's most academically challenging mathematics course was algebra I, trigonometry, or calculus). Based on these three methods, analysts have created different measures to categorize high school coursetaking. This supplemental note describes the coursetaking taxonomies used in the Special Analysis of *The Condition of Education 2007*.

All of the coursetaking data used in the Special Analysis come from transcripts of graduates of public and private high schools, which were collected as part of the U.S. Department of Education's National Assessment of Educational Progress (NAEP), Education Longitudinal Study of 2002 (ELS:2002), National Education Longitudinal Study of 1988 (NELS:88), and the High School & Beyond study (HS&B). It is important to note that comparability cannot be perfect because (1) the Secondary School Taxonomy (SST), was revised in 1998, (2) these data come from different transcript collections, thus introducing the possibility of minor variations in the coding methodology even though steps were taken to replicate the data collection and coding methodology in each study, and (3) these data used slightly different sample selection criteria when determining high school graduation status.

The high school courses taken by students are organized according to the Classification of Secondary School Courses (CSSC) and the Secondary School Taxonomy (SST). All courses in a student's transcript are coded with a CSSC value after checking course titles on the student's transcripts with course catalogs from the student's high school describing the contents of those courses. These coded courses are then assigned to broader course groupings, forming the academic levels in each subject area, using the Secondary School Taxonomy (SST).

Course credits are expressed in Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that is equivalent to the completion of a course that meets one period per day for one school year, where a period is typically at least 40 minutes.

Transcript studies are a reliable source of information but they do have limitations. One limitation is that transcript studies can describe the intended—but not the actual—curriculum. The content and instructional methods of one course taught in one school by a certain teacher may be different from the content and instructional methods of another course classified as having the same CSSC code taught in another school, or even the same school, by a different teacher. Nevertheless, validation studies and academic research have shown significant differences between the highest level of academic courses completed by students and their scores on tests of academic achievement (Chaney, Burgdorf, and Atash 1997).

Academic Pipelines

Academic "pipelines" organize transcript data in English, science, mathematics, and foreign language into levels based on the normal progression and difficulty of courses within these subject areas. Each level includes courses either of similar academic challenge and difficulty or at the same stage in the progression of learning in that subject area. In the mathematics pipeline, for example, algebra I is placed at a level lower in the pipeline continuum than is algebra II because algebra I is traditionally completed before algebra II and is generally less academically difficult or complex.

Classifying transcript data into these levels allows one to infer that high school graduates who have completed courses at the higher levels of a pipeline have completed more advanced coursework than graduates whose courses fall at the lower levels of the pipeline. Tallying the percentage of graduates who completed courses at each level permits comparisons of the percentage of high school graduates in a given year who reach each of the levels, as well as comparisons among different graduating classes.

In classifying students' courses from their transcripts according to a pipeline, only the courses completed with a passing grade in a subject area are included and not courses attempted. The inability to identify the number and types of courses attempted is due to inconsistent school reporting procedures. For example, many students retake courses they fail. In these instances, some schools report all courses attempted, while others report only the last course taken, substituting the passing grade. The pipeline also does not provide information on how many courses graduates completed in a particular subject area. Graduates are placed at a particular level in the pipeline based on the level of their highest completed course, regardless of whether they completed courses that would fall lower in the pipeline. Thus, graduates who completed year 3 of (or 11th-grade) French did not necessarily complete the first 2 years.

Mathematics Pipeline

Originally developed by Burkam and Lee (NCES 2003-01), the mathematics pipeline progresses from no mathematics courses or nonacademic courses to low, middle, and advanced academic coursework. Each level in the pipeline represents the highest level of mathematics coursework that a graduate completed in high school. Thus, a graduate whose highest course is at the low academic level progressed no further in the mathematics pipeline and did not complete a traditional algebra I course, a prerequisite for higher level mathematics in high school. The mathematics pipeline has eight levels; however, two of these levels can be combined to create a "middle academic level," and the top three levels can be combined to create an "advanced academic level."

No Mathematics

Includes graduates who completed either no coursework in mathematics or only basic or remedial-level mathematics. It is thus possible for a graduate to have taken one or more courses in mathematics, but to be placed in the no mathematics level.

Nonacademic Level

Highest completed courses are in general mathematics or basic skills mathematics, such as general mathematics I or II; basic mathematics I, II, or III; consumer mathematics; technical or vocational mathematics; and mathematics review.

Low Academic Level

Highest completed courses are preliminary courses (e.g., prealgebra) or mathematics courses of reduced rigor or pace (e.g., algebra I taught over the course of 2 academic years). Considered to be more academically challenging than nonacademic courses, courses at this level include prealgebra; algebra I, part I; algebra I, part II; and geometry (informal).

Middle Academic Level

The middle academic level is divided into two sublevels, each of which is considered to be more academically challenging than the nonacademic and low academic levels, though the first level is not considered as challenging as the second level.

Algebra I/Geometry Level

Highest completed courses include algebra I; plane geometry; plane and solid geometry; unified mathematics I and II; and pure mathematics.

Algebra II Level

Highest completed course is algebra II or unified mathematics III.

Advanced Academic Level

The advanced academic level is divided into three sublevels, each of which is considered more academically challenging than the nonacademic, low academic, and middle academic levels, though the first level is not considered as challenging as the second level, nor the second level as challenging as the third.

Trigonometry/Algebra III Level

Highest completed course is algebra III; algebra/trigonometry; algebra/analytical geometry; trigonometry; trigonometry/solid geometry; analytical geometry; linear algebra; probability; probability/statistics; statistics; statistics (other); or an independent study.

Precalculus Level

Highest completed course is precalculus or an introduction to analysis.

Calculus Level

Highest completed course is Advanced Placement (AP) calculus; calculus; or calculus/analytical geometry.

Science Pipeline

Unlike mathematics and other subjects, such as foreign languages, coursework in science does not follow a common or easily defined sequence. Depending on a school's curriculum, students can choose from several courses with minimal sequencing requirements. Consequently, the method used to construct the science pipeline differs from that used to construct the mathematics pipeline. First, all science courses were placed in one of four groups based on subject matter: (1) life science (e.g., biology, ecology, zoology); (2) chemistry; (3) physics; and (4) all other physical sciences (e.g., geology, earth science, physical science). Second, a pipeline was constructed for each of these four groups. Third, the pipelines for chemistry, physics, and all other physical sciences were combined into a single pipeline (a physical science pipeline). Finally, the physical science and life science pipelines were combined to create a single science pipeline. The final pipeline has seven levels; however, for the Special Analysis, two of these levels were combined into one category (low academic level).

No Science

Includes graduates who did not complete any courses in science or who completed only basic or remedial-level science. It is possible for a graduate to have taken one or more courses in science but to be placed in the no science level.

Low Academic Level

The low academic level is composed of two levels, each of which is considered to be more academically challenging than no science.

Primary Physical Science

Highest completed course is in basic physical sciences: applied physical science; earth science; college preparatory earth science; or unified science.

Secondary Physical Science and Basic Biology

Highest completed course is astronomy; geology; environmental science; oceanography; general physics; basic biology I; or consumer or introductory chemistry.

General Biology

Highest completed course is general biology I; secondary life sciences (including ecology, zoology, marine biology, and human physiology); or general or honors biology II.

Chemistry I or Physics I

Highest completed course is introductory chemistry, chemistry I, organic chemistry, physical chemistry, consumer chemistry, general physics, or physics I.

Chemistry I and Physics I

Highest completed courses include one level I chemistry course (see above) and one level I physics course (see above).

Chemistry II or Physics II or Advanced Biology

Highest completed course is advanced biology, International Baccalaureate (IB) biology II, IB biology III, AP biology, field biology, genetics, biopsychology, biology seminar, biochemistry and biophysics, biochemistry, botany, cell and molecular biology, cell biology, microbiology, anatomy, and miscellaneous specialized areas of life sciences, chemistry II, IB chemistry II, IB chemistry III, AP chemistry, physics II, IB physics, AP physics B, AP physics C: mechanics, AP physics C: electricity/magnetism, or physics II without calculus.

English Pipeline

English language and literature courses do not fit neatly into an ordered hierarchical framework. Instead of building on previously studied content, the English curriculum is stratified by the level of academic challenge and intensity of work required within a specific content area rather than among different courses. For example, within the general English curriculum, most schools have three tracks that vary by level of academic

challenge: below-grade- level or low academic-level courses, at-grade or regular courses, and above-grade or honors courses. Thus, unlike the mathematics and science pipelines that are based on progress within a content continuum (e.g., algebra I, geometry, algebra II, trigonometry, and calculus), the English pipeline is constructed to reflect the proportion of coursework completed by graduates in each track. It reflects the quality of a graduate's English coursetaking rather than the progression from low-level to more challenging coursework. The English pipeline has seven categories; however, for the Special Analysis, two of these levels were combined into one category (low academic level).

No English

No courses classified as English were ever completed by the graduate. It is possible for a graduate to have taken one or more unclassified English courses and be placed in the no English level. For the most part, these unclassified courses were English coursework for blind and deaf students or English as a Second Language courses.

Low Academic Level

The low academic level is divided into two sublevels, the second of which is considered to be more academically challenging than the first.

50 Percent or More Low Academic-Level English

The number of completed courses classified as low academic level, when divided by the total number of completed low academic-, regular-, and honors-level courses, yields a percentage between 50 and 100.

Some, but Less than 50 Percent Low Academic-Level Courses

The number of completed courses classified as low academic level, when divided by the total number of completed low academic-, regular-, and honors-level courses, yields a percentage less than 50. It is possible for a graduate to have also completed less than 50 percent honors-level courses and be classified under this category if the percentage of low academic-level courses completed was equal to or greater than the percentage of honors-level courses completed.

Regular

All completed English courses classified at grade level; no low academic-level or honors-level courses.

Advanced Academic Level

The advanced academic level is divided into three sublevels.

Some, but Less than 50 Percent Honors-Level Courses

The number of completed courses classified as honors level, when divided by the total number of completed low academic-, regular-, and honors-level courses, yields a percentage less than 50. It is possible for a graduate to have also completed less than 50 percent low academic-level courses and be classified under this category if the percentage of low academic-level courses completed was less than the percentage of honors-level courses completed.

50 Percent or More, but Less than 75 Percent Honors-Level Courses

The number of completed courses classified as honors level, when divided by the total number of completed low academic-, regular-, and honors-level courses, yields a percentage of 50 or greater and less than 75.

75 Percent or More Honors-Level Courses

The number of completed courses classified as honors level, when divided by the total number of completed low academic-, regular-, and honors-level courses, yields a percentage between 75 and 100.

Foreign Language Pipeline

Coursework in a foreign language follows an ordered, sequential path. Most high school students who study a foreign language progress along such a path, which is typically a sequence of four year-long courses in the language. Not all students do this, however. Some students begin their studies in the middle of a sequence because they have prior knowledge of the language. Some repeat the same year of study. And a few (about 7 percent of 1988 graduates) study more than one language. The highest level of completed coursework in the foreign

language pipeline thus may not indicate the total number of years a graduate has studied a foreign language or languages. The distribution of graduates among the various levels of foreign language courses was determined by the level of the most academically advanced course those graduates completed.

The foreign language pipeline originally did not classify all foreign language study: before 2004, only courses in French, German, Latin, and Spanish were counted because these were the most commonly offered foreign languages. The next four most commonly offered foreign languages (Italian, Japanese, Hebrew, and Russian) each accounted for less than 1 percent of 1988 graduates who studied foreign languages in the unweighted NELS:88 sample that was used to create the pipeline. Adding these four languages to the four most common languages in the pipeline originally made less than 0.1 percent difference in the percentage of graduates who studied a single language, though it made more difference (yet less than 1 percent difference) in the percentage of graduates who never studied a language and who studied more than one language.

Beginning with 2004 transcript data, the foreign language pipeline expanded its definition of foreign language coursetaking to include any classes in Amharic (Ethiopian), Arabic, Chinese (Cantonese or Mandarin), Czech, Dutch, Finnish, French, German, Greek (Classical or Modern), Hawaiian, Hebrew, Italian, Japanese, Korean, Latin, Norse (Norwegian), Polish, Portuguese, Russian, Spanish, Swahili, Swedish, Turkish, Ukrainian, or Yiddish. Compared with the pre-2004 definition, this expanded definition increased the percentage of students who had completed a foreign language course at year 3 or higher by 1 percent. It decreased the percentage of students classified as having completed no foreign language study by 1.8 percent.

Under both definitions, the foreign language pipeline has six categories. For the Special Analysis, however, two of these levels were combined into one category (year 2 or less).

None

No courses classified as foreign language study were ever completed by graduate. Only courses included in the foreign language pipeline definition are counted as foreign language study (see above), so it is possible for a graduate to have taken one or more courses of some other foreign language and be placed in this category.

Year 1 (1 year of 9th-grade instruction) or less

Graduate completed no more than either a full Carnegie unit (1 academic year of coursework) of 9th-grade (year 1) foreign language instruction or half a Carnegie unit of 10th-grade (year 2) foreign language instruction.

Year 2 (1 year of 10th-grade instruction)

Graduate completed either a full Carnegie unit (1 academic year of coursework) of 10th-grade (year 2) foreign language instruction or half a Carnegie unit of 11th-grade (year 3) foreign language instruction.

Year 3 (1 year of 11th-grade instruction)

Graduate completed either a full Carnegie unit (1 academic year of coursework) of 11th-grade (year 3) foreign language instruction or half a Carnegie unit of 12th-grade (year 4) foreign language instruction.

Year 4 (1 year of 12th-grade instruction)

Graduate completed either a full Carnegie unit (1 academic year of coursework) of 12th-grade (year 1) foreign language instruction or half a Carnegie unit of 13th-grade (year 5) foreign language instruction.

AP Instruction

Graduate completed an AP foreign language course.