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A Descriptive Overview of the Transcripts from the High School Graduating Class of 2003–04

E.D. TAB

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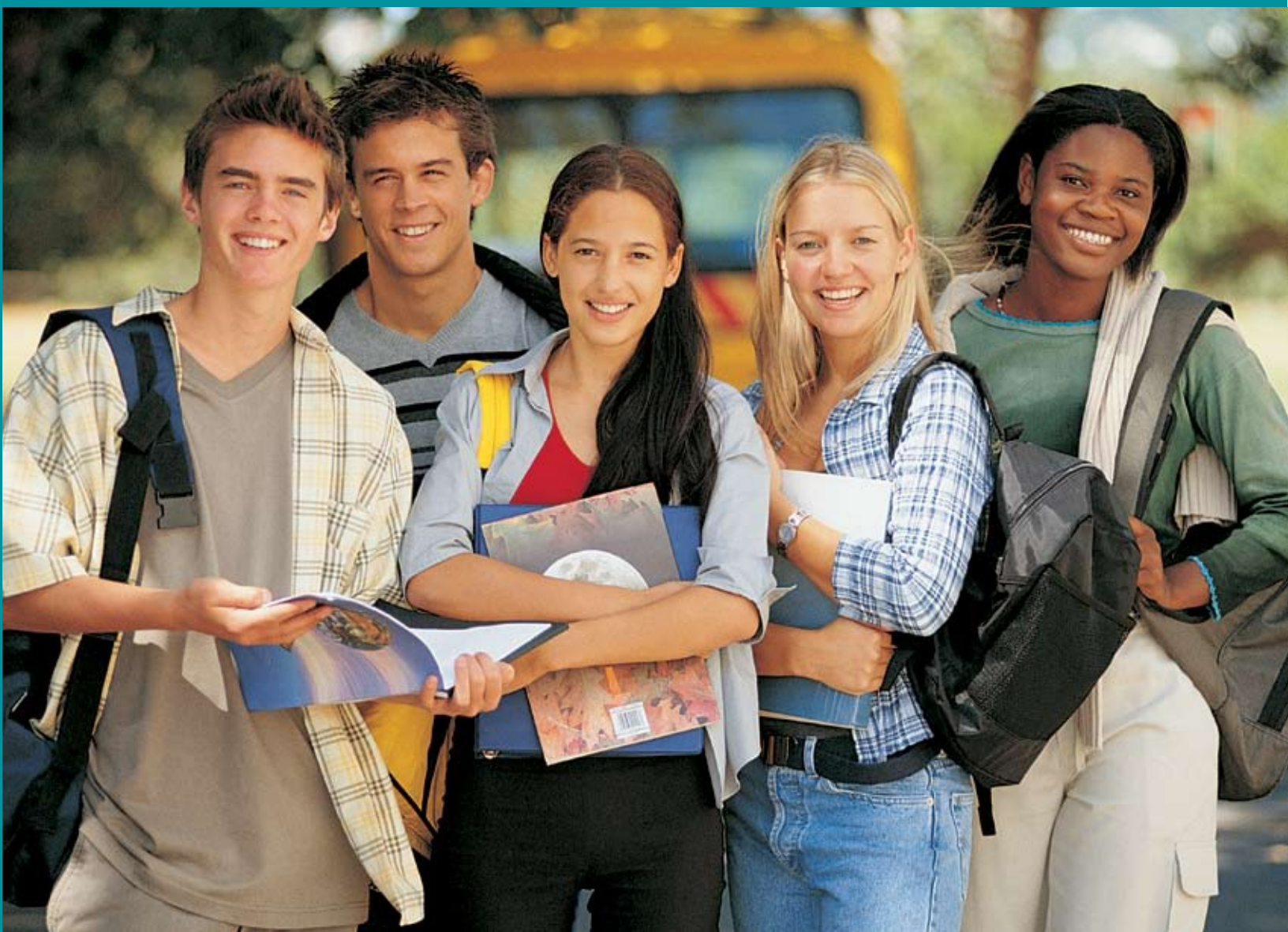

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November 2006

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Foreword

The Education Longitudinal Study of 2002 (ELS:2002) provides a wealth of information from multiple sources about the factors and circumstances related to the performance and social development of the American high school student over time. This E.D. TAB profiles the academic preparation of the graduating high school class of 2003–04. The report supplies a brief examination of the coursetaking patterns of 2003–04 graduates, with a focus on their participation in mathematics, science, and Advanced Placement/International Baccalaureate courses. Additionally, the report links these coursetaking patterns with test achievement in mathematics, grade point average, and expectations for future educational attainment. The appendix provides a comprehensive description of the ELS:2002 design for data users, in addition to outlining its research capabilities for addressing key research questions.

We hope that the information provided in this report will be useful to a wide range of interested readers, including policymakers and educators. We further hope that the results reported here will encourage other researchers to use the ELS:2002 data.

Jeffrey A. Owings, *Associate Commissioner*
Elementary/Secondary & Libraries Studies

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Daniel J. Pratt of RTI served as the ELS:2002 project director. Steven J. Ingels of RTI was principal investigator. Key RTI task leaders were Tiffany Lytle (transcript data collection and processing), Ellen Stutts (associate project director), Debbie Herget (first follow-up in-school and field data collection), Doug Currivan (first follow-up out-of-school computer-assisted telephone interview [CATI] data collection), James Rogers (data processing), and Peter Siegel (sampling and statistics). Other RTI staff who played major roles in ELS:2002 were Christopher Alexander, Kimberly Ault, Stephen Black, Laura J. Burns, Debbie Capps, James Chromy, Elizabeth Copello, Marianne Daye, D. Wesley Dukes, Brian Evans, Catherine Forstner, Sherry Hubbard-Bednasz, Ruby Johnson, Erich Lauff, Mani Medarametla, Melanie Pressley, Denise Rhatigan, Helen Smith, Milorad Stojanovic, David Wilson, and Donghui Wang. Test development, scaling, and equating were conducted by Judith M. Pollack, Donald A. Rock, and Michelle Najarian, under a subcontract with Educational Testing Service.

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Introduction

This report uses transcript data from the Education Longitudinal Study of 2002 (ELS:2002) to provide nationally representative information about the level of academic preparation the high school graduating class of 2003–04 had when leaving high school. ELS:2002 is the most recent secondary school longitudinal study conducted by the National Center for Education Statistics (NCES). It began with a nationally representative sample of 10th-graders in public and private schools in the United States in 2002. The 2002 sophomore cohort was surveyed again in the spring of 2004 when most of the sample members were high school seniors. This sample was "freshened" with a sample of spring 2004 seniors who were not high school sophomores in the spring of 2002 or were not in the United States at that time. In the spring of 2005, transcripts were collected from all these students' high schools. Transcripts provide enrollment histories, graduation dates, and coursetaking records—key pieces of information for researchers and policymakers interested in the current state of the American high school curriculum. This report uses information from the transcripts to identify students who graduated with a diploma between September 1, 2003, and August 31, 2004 (i.e., the high school graduating class of 2003–04). The analysis profiles their coursetaking histories from the 9th through the 12th grades and explores the relationships between their coursework, their proficiency in math, their grade point average, and their expectations for their future education.

Focus of This Report

The patterns of courses taken by high school students are a major policy concern in education. Courses are the building blocks of the high school curriculum. Although a variety of courses—including general skills, occupation-specific, and advanced college preparatory courses—are typically available to most students, not all students take courses that adequately prepare them for life after high school. A large body of literature within the sociology of education demonstrates that coursetaking patterns are both related to student background and linked with later attainment. In general terms, racial/ethnic minorities, students from less affluent backgrounds, and public school students tend to take less rigorous courses while in high school than do their peers (Alexander and Cook 1982; Finn, Gerber, and Wang 2002; Hoffer, Greeley, and Coleman 1985). Further, research shows that students who take less rigorous courses are less likely to attain a college degree and do not do as well in the workforce as students who take more rigorous courses (Adelman 1999; Altonji 1995; Hotchkiss and Dorsten 1987).

This report focuses on two general areas. First, it presents the curricular landscape for contemporary American high school students. How many credits are today's high school graduates earning? In what subject areas are they most/least focusing their energies? Do these patterns vary across characteristics of the student and the schools they attend?

Second, this report describes the linkage between academic pathways, particularly in mathematics coursework, and high school performance and preparation for postsecondary life. What is the association between advanced coursetaking and grades? Is advanced mathematics coursetaking associated with greater mathematics proficiency? Are students who take more advanced courses more prepared than their peers who take lower-level courses? To what degree is there an association between educational expectations and coursetaking? This report updates

past research by providing nationally representative information on a recent cohort of youth by showing both the general patterns of coursetaking and their relationships with academic preparation and expectations for future education.

This analysis focuses on 11,560 students who received a diploma between September 1, 2003 and August 31, 2004 (i.e., the high school graduating class of 2003–04) and had at least 3 years of transcript information. Those who graduated before or after this time frame, as well as those not enrolled during this time frame (e.g., dropouts and homeschoolers), were excluded from the analysis. Coursetaking patterns are examined by select student background characteristics, high school experiences, and measures of preparation. Student background characteristics and high school experiences include

- sex;
- race/ethnicity[1] (American Indian or Alaska Native; Asian [includes Native Hawaiian/Pacific Islander]; Black or African American; Hispanic or Latino; and White);
- socioeconomic status (lowest quarter, middle two quarters, highest quarter);
- native language (English, non-English);
- parent's highest education (high school or less, some college, 4-year college degree or higher);
- family composition (mother and father, mother or father and guardian, single parent, other);
- extracurricular participation during their senior year (no participation, less than 1 hour a week, 1 to 4 hours a week, more than 4 hours a week);
- weekday hours employed during their senior year (no employment, 1 to 15 hours per week, more than 15 hours per week);
- school control (public, Catholic, other private, mixed[2]);
- school location (urban, suburban, rural, mixed); and
- school region (Northeast, Midwest, South, West, mixed).

[1] All race categories exclude individuals of Hispanic or Latino origin.
[2] Students' school control, location, and region were categorized as mixed if they had transferred out of their base-year school to another school whose control, location, or region differed from that of their base-year school. For example, a student who attended a public school in the South during the base-year interview, transferred, and then was interviewed at a public school in the Midwest before the first follow-up interview would be classified on school region as mixed.

Indicators of performance and preparation include the following:

- number of credits earned in specific courses;[3]
- mastery of specific mathematics knowledge and skills;
- overall grade point average (GPA); and
- academic GPA.

Lastly, this report shows educational expectations. These gauge how American youth on the cusp of high school graduation envision their future educational attainment. Information on the construction of these variables is provided in appendix A.

About the Education Longitudinal Study of 2002 (ELS:2002)

NCES is involved in research on the development and critical transitions experienced by students as they proceed through high school and into postsecondary education and the labor market. ELS:2002 is a longitudinal study, starting with a nationally representative sample of 10th-graders in public and private schools in the United States in 2002. The 2002 sophomore cohort was surveyed again in the spring of 2004 when most of the sample members were high school seniors. In the spring of 2005, transcripts were collected from all sample members. The ELS:2002 base-year, first follow-up, and transcript studies are described briefly below.

Base-Year Design

The ELS:2002 base-year study was carried out in a nationally representative probability sample of about 750 public, Catholic, and other private schools in the spring term of the 2001–02 school year. Of 17,590 eligible selected sophomores, 15,360 completed a base-year questionnaire. The weighted response rate for student questionnaire completion was 87.3 percent. Of the 15,360 student questionnaire completers, 14,540 (95.1 percent, weighted) also completed cognitive assessments in mathematics and reading. A nonresponse bias analysis was performed to ensure that any identified biases were small and that the data could be used with confidence. Missing data for key questionnaire and test variables were imputed. Further details of the school-level response rate; base-year school, student, and item-level bias analyses; and base-year design are provided in reports by Ingels and colleagues (2004, 2005).

First Follow-up Design

The basis for the 2004 first follow-up sample was the sample of schools and students studied in the ELS:2002 base year. Base-year students were surveyed whether they were in the base-year school, in a new school, or out of school (early graduate or dropout). Two additional sets of students were included in the first follow-up survey: freshened and base-year nonrespondents. Freshened students are 2004 seniors who were not sophomores in 2002.[4] To

[3] Schools participating in the transcript collection were asked how many credits a student would earn for taking a course that meets every day, one period a day, all school-year long. Because these schools varied widely in their assignment of credits to courses, credits were standardized to facilitate accurate comparison of course credits across schools within a transcript/student record and between transcripts/student records.

[4] In spring term 2002, such students may have been out of the country, been enrolled in school in the United States in a grade other than 10th, had an extended illness or injury, been homeschooled, been institutionalized, or temporarily dropped out of school. These students comprised the first follow-up "freshening sample."

ensure that a nationally representative sample of high school seniors was selected, these students were given a chance for selection in the first follow-up. Similar to the base-year design, the first follow-up included a student questionnaire and cognitive test in mathematics administered to each selected student.[5] High school seniors in the base-year schools were typically surveyed and tested in group sessions at their schools. Seniors who had transferred to another school were usually interviewed outside of the school setting, usually via telephone. Although seniors who remained in their base-year schools were administered the mathematics assessment, transfer students were not. However, a mathematics test score was imputed for the transfer students. The sample included about 14,250 seniors, of whom 13,420 participated, for a weighted response rate of 94.4 percent. Further details about the first follow-up response rates and data collection procedures are provided in appendix A of this report and reported in detail by Ingels and colleagues (2005).

Transcript Study Design

In the spring of 2005, approximately 1 year after most sample members had graduated from high school, transcripts were collected for all sample members who participated in at least one of the first two student interviews: the base-year interview or the first follow-up interview. Transcripts were also requested for students who could not participate in either of the interviews because of a physical or mental disability or language barrier. Unlike previous NCES transcript studies, which collected transcripts from the last school attended by the sample member, the ELS:2002 transcript study collected transcripts from all of the base-year schools and the last school attended by sample members who transferred out of their base-year school. The sample includes 16,350 students, of whom 14,920 participated, for a weighted response rate of 90.7 percent. The present analysis focuses on 11,560 respondents who comprised the graduating high school class of 2003–04. Further details about the data collection procedures are provided in appendix A (see also Bozick et al. 2006).

For this analysis, the sample is restricted to respondents who graduated between September 1, 2003, and August 31, 2004 who have at least 3 years of coursetaking information on their transcript. A high school graduate is defined as a sample member who received a regular, regents, or honors diploma (and not a General Educational Development [GED] or alternate certificate). Those who received a GED or alternate certificate are not considered high school graduates. The focus on high school graduates ensures that estimates are for those who had the opportunity to enroll over the course of approximately 3 to 4 academic years. The sample is selected using the following selection criteria: F1RTROUT = 1 (fall 2003–summer 2004 graduate) and [F1RTRFLG = 3 or F1RTRFLG = 4] (transcript data available for 3 or 4 academic years). The analysis uses the transcript sample weight (F1TRSCWT) to ensure that the estimates can be generalized to the graduating high school class of 2003–04.

Additional information about the ELS:2002 history, purpose, sample design, weighting, and variable definitions is provided in appendix A. Appendix B presents the standard errors for the estimates. It is important to note that many of the variables examined in this report are related to one another, and complex interactions and relationships have not been explored here.

[5] The assessment was administered only to those first follow-up students who remained in their base-year school. However, test scores were imputed for transfer students.

The purpose of an E.D. TAB is to introduce new NCES surveys and data through the presentation of selected descriptive information in tabular format. More in-depth studies of the transcript data, using more sophisticated methodologies and focusing on a range of research questions and policy issues, will follow in the near future and by other researchers whose curiosity to dig deeper has been piqued by the associations reported in this report.[6]

[6] In addition to the ELS:2002 high school transcript study, NCES has collected transcripts to augment two other longitudinal studies: the High School and Beyond Longitudinal Study of 1980 Sophomores (HS&B) and the National Education Longitudinal Study of 1988 (NELS:88). NCES has also collected transcripts to link with assessment information in the National Assessment of Educational Progress (NAEP) in 1987, 1990, 1994, 1998, 2000, and 2005.

Selected Findings

This E.D. TAB presents national data on the transcripts of the high school graduating class of 2003–04. In particular, the report examines high school graduates' coursetaking patterns, academic performance, and preparation for postsecondary education and the labor market. Using data from their high school transcripts, this report describes the number and types of courses public and private high school seniors took between 9th and 12th grades, credits earned in Advanced Placement (AP) and International Baccalaureate (IB) courses, type of academic program, and mathematics and science coursetaking patterns, by a select number of student characteristics. A course credit is equivalent to a course that meets every day, one period a day, all school-year long. These coursetaking patterns are then examined in relation to mathematics proficiency levels and grade point average (GPA). Finally, the relationship between educational expectations and coursetaking is examined.

Coursetaking Patterns of the High School Graduating Class of 2003–04

High school coursetaking patterns are based on the Secondary School Taxonomy (Bradby and Hoachlander 1999), which divides high school coursework into four distinct curricula: academic, vocational, enrichment/other, and special education. Table 1 highlights both total credits earned as well as credits earned in academic subjects, which include mathematics, science, English, social studies, fine arts, and non-English language, by selected characteristics of the high school graduating class of 2003–04.

- Table 1 shows mean course credits earned by the high school graduating class of 2003-04 by selected characteristics. These high school graduates earned an average of 25.8 course credits, 19.0 in academic subjects (table 1).
- The high school graduating class of 2003–04 earned an average of 3.6 mathematics course credits, 3.3 science credits, 4.3 English credits, 3.9 social studies credits, 2.0 fine arts credits, and another 2.0 credits in non-English language courses (tables 2a and 2b).

Advanced Placement and International Baccalaureate Courses

- Overall, about 30 percent of the high school graduating class of 2003–04 earned credit in AP or IB courses. Around 12 percent earned credit in a mathematics AP/IB course (table 3).
- Among the high school graduating class of 2003–04, 33 percent of females and 27 percent of males earned any credit in AP/IB courses (table 3).
- Among the high school graduating class of 2003–04, 53 percent of Asians, 33 percent of Whites, 25 percent of Hispanics, and 16 percent of Blacks earned any credit in AP/IB courses (table 3).

- Among the high school graduating class of 2003–04, 38 percent of Catholic school students, 42 percent of other private school students, and 29 percent of public school students earned any credit in AP/IB courses (table 3).

Curriculum Concentration

Four categories indicate overall coursetaking patterns in high school: academic concentration, occupational concentration, academic and occupational concentration, and general. An academic curriculum concentration includes a minimum of four credits of English; one credit of mathematics higher than algebra II and any two other credits in math; one science credit higher than general biology and any two other credits in science; one credit of social studies in U.S. or world history and any two other credits in social studies; and two credits in a single foreign language. An occupational curriculum concentration includes at least three credits in one specific labor market preparation area, such as agriculture, business, marketing, health care, protective services, trade and industrial, technology, food service, child care, and personal and other services programs. Those meeting both the criteria of an academic and occupational curriculum concentration are classified as academic and occupational concentration. Those following a general curriculum meet the criteria of neither an academic nor an occupational concentration.

- Among the high school graduating class of 2003–04, 26 percent followed an academic curriculum concentration, 15 percent followed an occupational curriculum concentration, 3 percent followed both an academic and occupational curriculum concentration, and another 56 percent followed a general curriculum (table 4).

Mathematics Coursetaking Patterns

Coursetaking patterns in mathematics are measured using the pipeline measure originally developed by Burkam and Lee (see appendix A and Burkam and Lee 2003 for more detailed information). This measure indicates the highest level of mathematics for which the student received non-zero credit while in high school. Course levels include: level 1—no math; level 2—basic math/pre-algebra; level 3—core secondary through algebra II; level 4—trigonometry, statistics, pre-calculus; and level 5—calculus.

- Among the 2003–04 high school graduates, 5 percent took level 2 math; 45 percent took level 3 math; 36 percent took level 4 math; and 14 percent took level 5 mathematics as their highest mathematics course in high school (table 5).
- Among the high school graduating class of 2003–04, 33 percent of Asians, 16 percent of Whites, 7 percent of Hispanics, 5 percent of Blacks, and 6 percent of American Indians took level 5 math as their highest mathematics course in high school (table 5).

Science Coursetaking Patterns

Science coursetaking patterns are based on the science coursetaking pipeline developed by Burkam and Lee (2003), which indicates the highest level of science for which the student received non-zero credit while in high school. Course levels include: level 1—no science;

level 2—primary physical science; level 3—secondary physical science and basic biology; level 4—general biology; level 5—chemistry I or physics I; level 6—chemistry I and physics I; level 7—chemistry II or physics II or advanced biology; level 8—both levels 6 and 7.

- Among the high school graduating class of 2003–04, 2 percent took level 2 science , 3 percent took level 3 science, 25 percent took level 4 science, 33 percent took level 5 science, 17 percent took level 6 science, 10 percent took level 7 science, and 9 percent took level 8 science (table 6).

Mathematics Achievement

The ELS:2002 first follow-up included an assessment of students' performance in mathematics. The test was designed to measure the achievement status of 12th-graders at both the individual and group levels. This E.D. TAB employs a score that allows achievement to be understood in terms of specific levels of skill mastery. The mathematics levels are (1) simple arithmetical operations with whole numbers; (2) simple operations with decimals, fractions, powers, and roots; (3) simple problem solving, requiring the understanding of low-level mathematical concepts; (4) understanding of intermediate-level mathematical concepts and/or multistep solutions to word problems; and (5) complex multistep word problems and/or advanced mathematics material. Tables 7 through 9 summarize mathematics performance for the high school graduating class of 2003–04, by course credits earned. Course credits were classified as low if the student's percentile rank on the distribution of course credits was below 25th. Course credits were classified as high if the student's rank on the distribution of course credits was at least 75th.

- Seventy-two percent of graduates who earned a high number of total course credits and 56 percent of graduates who earned a low number of course credits exhibited a mastery of level 3 (simple problem solving, requiring the understanding of low-level mathematical concepts) (table 7).
- Ninety-one percent of graduates with an academic curriculum and 46 percent of students in an occupational curriculum demonstrated a mastery of level 3 (simple problem solving, requiring the understanding of low-level mathematical concepts) (table 8).
- Ninety-nine percent of graduates whose highest mathematics course was calculus and 81 percent of graduates whose highest mathematics course was trigonometry, statistics, or pre-calculus demonstrated a mastery of level 3 (simple problem solving, requiring the understanding of low-level mathematical concepts) (table 9).

Grade Point Average

Grade point average is measured two ways: overall academic grade point average and overall grade point average. Academic grade point average is based on grades received in academic courses (math, science, English, social studies, fine arts, and non-English language), while overall grade point average is based on grades received in all courses.[7]

[7] Details regarding the formulae used in the calculation of grade point average appear in Bozick et al. 2006.

- The high school graduating class of 2003–04 had a mean GPA of 2.9 overall and 2.7 in academic courses (table 10).
- About 47 percent of the high school graduating class of 2003-04 earned at least a B average (3.0 GPA) in their courses (table 10).
- Among the high school graduating class of 2003–04, academic concentrators had a 3.3 overall GPA, and occupational concentrators had a 2.6 overall GPA (table 11).
- Among the high school graduating class of 2003–04, seniors who took calculus had an average overall GPA of 3.5, and seniors who took basic mathematics or pre-algebra as their highest mathematics course had an average GPA of 2.3 (table 12).

Educational Expectations

- Among the high school graduating class of 2003–04, those expecting to earn a graduate or professional degree earned 21 academic credits in high school, and those expecting to have some college experience but not a degree earned 17 credits (table 13).
- Among the high school graduating class of 2003–04, 45 percent of graduates expecting to earn a graduate or professional degree and 19 percent of graduates expecting to have some college experience but not a degree took level 4 mathematics (trigonometry, statistics, pre-calculus) (table 14).

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Tables

Table 1. Mean total course credits earned by high school graduates, by selected student characteristics: Academic year 2003–04

Characteristic	Mean course credits earned	Mean course credits earned in academic subjects	Mean course credits earned in occupational subjects
Total	25.8	19.0	3.5
Sex			
Male	25.8	18.4	3.8
Female	25.9	19.6	3.2
Race/ethnicity[1]			
American Indian or Alaska Native	25.5	17.5	4.4
Asian or Pacific Islander	25.8	19.9	2.5
Black or African American	25.7	18.4	3.7
Hispanic or Latino	25.2	18.3	3.3
White	26.0	19.3	3.5
Socioeconomic status			
Lowest quarter	25.5	17.8	4.2
Middle two quarters	25.9	18.8	3.7
Highest quarter	26.1	20.3	2.5
Native language[2]			
English	25.9	19.1	3.5
Non-English	25.3	18.7	3.1
Parents' education			
High school or less	25.7	18.0	4.2
Some college	25.8	18.6	3.8
4-year college degree or more	26.0	19.9	2.8
Family composition			
Mother and father	26.0	19.4	3.3
Mother or father and guardian	25.9	18.6	3.9
Single parent (mother or father)	25.6	18.5	3.7
Other[3]	25.0	17.8	3.6
Extracurricular participation			
No participation	25.1	17.7	4.2
< 1 hour a week	25.7	19.0	3.6
1–4 hours a week	26.0	19.5	3.2
> 4 hours a week	26.4	19.9	3.0

See notes at end of table.

Table 1. Mean total course credits earned by high school graduates, by selected student characteristics: Academic year 2003–04—Continued

Characteristic	Mean course credits earned	Mean course credits earned in academic subjects	Mean course credits earned in occupational subjects
Employment			
No employment	25.8	19.3	3.0
1–15 hours a week	26.1	19.7	3.1
> 15 hours a week	25.8	18.6	3.9
School control[4]			
Public	25.8	18.9	3.7
Catholic	27.3	20.2	1.5
Other private	25.3	20.3	1.3
Mixed	26.9	20.3	2.3
School location[4]			
Urban	25.5	19.2	2.9
Suburban	25.8	18.9	3.5
Rural	26.6	19.3	4.1
Mixed	25.8	18.3	3.8
School region[4,5]			
Northeast	26.6	20.0	3.3
Midwest	25.4	18.5	3.8
South	26.6	19.5	3.8
West	24.5	18.1	2.8
Mixed	26.1	19.4	3.2

[1] All race categories exclude Hispanic or Latino origin.
[2] The first language students learned to speak when they were children.
[3] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.
[4] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school control, location, and region variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).
[5] Region is defined by the U.S. Census Bureau based on the state in which the school is located.
NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Core courses represent all courses in mathematics, science, English, social studies, fine arts, and non-English language. Occupational courses represent all courses in family and consumer sciences, general labor market preparation, and specific labor market preparation. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table 2a. Mean total course credits earned in academic courses by high school graduates, by selected student characteristics: Academic year 2003–04

Characteristic	Mean course credits earned in academic subjects	Mean course credits earned in mathematics	Mean course credits earned in science	Mean course credits earned in English
Total	19.0	3.6	3.3	4.3
Sex				
Male	18.4	3.5	3.2	4.3
Female	19.6	3.6	3.3	4.3
Race/ethnicity[1]				
American Indian or Alaska Native	17.5	3.2	3.0	4.3
Asian or Pacific Islander	19.9	3.8	3.6	4.4
Black or African American	18.4	3.7	3.2	4.4
Hispanic or Latino	18.3	3.4	2.9	4.5
White	19.3	3.6	3.3	4.2
Socioeconomic status				
Lowest quarter	17.8	3.4	3.0	4.4
Middle two quarters	18.8	3.5	3.2	4.3
Highest quarter	20.3	3.7	3.6	4.3
Native language[2]				
English	19.1	3.6	3.3	4.3
Non-English	18.7	3.5	3.1	4.6
Parents' education				
High school or less	18.0	3.4	3.0	4.3
Some college	18.6	3.5	3.2	4.3
4-year college degree or more	19.9	3.7	3.5	4.3
Family composition				
Mother and father	19.4	3.6	3.3	4.3
Mother or father and guardian	18.6	3.5	3.1	4.3
Single parent (mother or father)	18.5	3.5	3.1	4.3
Other[3]	17.8	3.4	3.0	4.4
Extracurricular participation				
No participation	17.7	3.3	3.0	4.3
< 1 hour a week	19.0	3.6	3.2	4.3
1–4 hours a week	19.5	3.6	3.4	4.3
> 4 hours a week	19.9	3.7	3.4	4.3
Employment				
No employment	19.3	3.6	3.3	4.4
1–15 hours a week	19.7	3.6	3.4	4.3
> 15 hours a week	18.6	3.5	3.2	4.3

See notes at end of table.

Table 2a. Mean total course credits earned in academic courses by high school graduates, by selected student characteristics: Academic year 2003–04—Continued

Characteristic	Mean course credits earned in academic subjects	Mean course credits earned in mathematics	Mean course credits earned in science	Mean course credits earned in English
School control[4]				
Public	18.9	3.5	3.2	4.3
Catholic	20.2	3.8	3.5	4.4
Other private	20.3	3.8	3.6	4.3
Mixed	20.3	3.8	3.5	4.6
School location[4]				
Urban	19.2	3.6	3.3	4.3
Suburban	18.9	3.5	3.2	4.2
Rural	19.3	3.6	3.3	4.4
Mixed	18.3	3.5	3.0	4.5
School region[4,5]				
Northeast	20.0	3.7	3.6	4.3
Midwest	18.5	3.4	3.2	4.1
South	19.5	3.8	3.4	4.5
West	18.1	3.3	2.9	4.2
Mixed	19.4	3.9	3.4	4.6

[1] All race categories exclude Hispanic or Latino origin.
[2] The first language students learned to speak when they were children.
[3] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.
[4] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school control, location, and region variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).
[5] Region is defined by the U.S. Census Bureau based on the state in which the school is located.
NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Core courses represent all courses in mathematics, science, English, social studies, fine arts, and non-English language. Occupational courses represent all courses in family and consumer sciences, general labor market preparation, and specific labor market preparation. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table 2b. Mean total course credits earned in academic courses by high school graduates, by selected student characteristics: Academic year 2003–04

Characteristic	Mean course credits earned in academic subjects	Mean course credits earned in social studies	Mean course credits earned in fine arts	Mean course credits earned in non-English language
Total	19.0	3.9	2.0	2.0
Sex				
Male	18.4	3.9	1.7	1.8
Female	19.6	4.0	2.3	2.2
Race/ethnicity[1]				
American Indian or Alaska Native	17.5	4.2	1.5	1.3
Asian or Pacific Islander	19.9	3.9	1.8	2.4
Black or African American	18.4	3.9	1.6	1.7
Hispanic or Latino	18.3	3.8	1.8	1.9
White	19.3	4.0	2.1	2.1
Socioeconomic status				
Lowest quarter	17.8	3.8	1.7	1.5
Middle two quarters	18.8	3.9	2.0	1.9
Highest quarter	20.3	4.1	2.2	2.5
Native language[2]				
English	19.1	4.0	2.0	2.0
Non-English	18.7	3.8	1.7	2.0
Parents' education				
High school or less	18.0	3.9	1.8	1.6
Some college	18.6	3.9	2.0	1.9
4-year college degree or more	19.9	4.0	2.2	2.3
Family composition				
Mother and father	19.4	3.9	2.1	2.1
Mother or father and guardian	18.6	4.0	1.9	1.8
Single parent (mother or father)	18.5	3.9	1.9	1.8
Other[3]	17.8	3.8	1.6	1.5
Extracurricular participation				
No participation	17.7	3.9	1.7	1.5
< 1 hour a week	19.0	4.0	2.0	2.0
1–4 hours a week	19.5	4.0	2.1	2.1
> 4 hours a week	19.9	4.0	2.2	2.3
Employment				
No employment	19.3	3.9	2.1	2.0
1–15 hours a week	19.7	4.0	2.1	2.3
> 15 hours a week	18.6	3.9	1.9	1.8

See notes at end of table.

Table 2b. Mean total course credits earned in academic courses by high school graduates, by selected student characteristics: Academic year 2003–04—Continued

Characteristic	Mean course credits earned in academic subjects	Mean course credits earned in social studies	Mean course credits earned in fine arts	Mean course credits earned in non-English language
School control[4]				
Public	18.9	3.9	2.0	1.9
Catholic	20.2	4.1	1.6	2.8
Other private	20.3	4.0	2.1	2.5
Mixed	20.3	4.2	1.7	2.4
School location[4]				
Urban	19.2	3.9	1.9	2.1
Suburban	18.9	3.9	2.0	2.0
Rural	19.3	4.1	2.2	1.8
Mixed	18.3	4.1	1.8	1.5
School region[4,5]				
Northeast	20.0	4.2	1.8	2.4
Midwest	18.5	3.8	2.2	1.9
South	19.5	4.0	1.9	1.9
West	18.1	3.8	2.0	1.8
Mixed	19.4	4.1	1.7	1.8

[1] All race categories exclude Hispanic or Latino origin.
[2] The first language students learned to speak when they were children.
[3] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.
[4] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school control, location, and region variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).
[5] Region is defined by the U.S. Census Bureau based on the state in which the school is located.
NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table 3. Percentage of high school graduates earning any credit for Advanced Placement (AP) and International Baccalaureate (IB) courses, by selected student characteristics: Academic year 2003–04

Characteristic	Percent earning any credits in AP/IB courses	Percent earning any credits in AP/IB mathematics courses	Percent earning any credits in AP/IB calculus courses
Total	30.0	11.5	9.3
Sex			
Male	27.2	12.3	9.9
Female	32.8	10.8	8.7
Race/ethnicity[1]			
American Indian or Alaska Native	14.9	4.9	4.9
Asian or Pacific Islander	52.8	33.0	26.7
Black or African American	15.7	3.9	2.8
Hispanic or Latino	25.3	6.3	4.9
White	32.6	12.8	10.3
Socioeconomic status			
Lowest quarter	16.3	4.4	3.6
Middle two quarters	24.2	7.9	5.9
Highest quarter	50.9	23.5	19.5
Native language[2]			
English	29.7	11.3	9.0
Non-English	32.0	13.4	11.3
Parents' education			
High school or less	17.6	5.4	4.3
Some college	22.2	6.3	4.7
4-year college degree or more	43.6	19.4	15.9
Family composition			
Mother and father	35.0	14.1	11.6
Mother or father and guardian	22.5	6.7	4.6
Single parent (mother or father)	23.0	8.3	6.4
Other[3]	12.8	4.0	3.3
Extracurricular participation			
No participation	14.7	3.7	2.7
< 1 hour a week	27.5	8.8	6.6
1–4 hours a week	34.3	13.0	10.4
> 4 hours a week	40.4	17.5	14.4
Employment			
No employment	35.8	14.8	12.7
1–15 hours a week	38.8	16.2	12.9
> 15 hours a week	22.3	7.2	5.5

See notes at end of table.

Table 3. Percentage of high school graduates earning any credit for Advanced Placement (AP) and International Baccalaureate (IB) courses, by selected student characteristics: Academic year 2003–04—Continued

Characteristic	Percent earning any credits in AP/IB courses	Percent earning any credits in AP/IB mathematics courses	Percent earning any credits in AP/IB calculus courses
School control[4]			
Public	29.2	11.2	8.8
Catholic	38.1	13.7	13.0
Other private	42.2	19.1	16.7
Mixed	25.5	5.7	4.8
School location[4]			
Urban	35.3	13.2	10.5
Suburban	31.2	12.5	10.0
Rural	21.9	7.9	6.5
Mixed	13.6	2.6	2.6
School region[4,5]			
Northeast	30.1	12.2	9.4
Midwest	23.8	10.1	8.9
South	32.8	12.0	9.5
West	32.9	12.1	9.3
Mixed	26.7	5.4	5.4

[1] All race categories exclude Hispanic or Latino origin.
[2] The first language students learned to speak when they were children.
[3] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.
[4] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school control, location, and region variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).
[5] Region is defined by the U.S. Census Bureau based on the state in which the school is located.
NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table 4. Percentage distribution of high school graduates in academic and occupational programs, by selected student characteristics: Academic year 2003–04

Characteristic	Academic concentration	Occupational concentration	Academic and occupational concentration	General curriculum
Total	25.8	15.1	3.2	55.9
Sex				
Male	24.6	19.1	3.6	52.8
Female	27.0	11.4	2.9	58.8
Race/ethnicity[1]				
American Indian or Alaska Native	13.3	14.8	1.1	70.8
Asian or Pacific Islander	39.5	6.8	2.4	51.3
Black or African American	17.2	15.5	4.5	62.8
Hispanic or Latino	15.8	13.1	2.1	69.1
White	29.1	16.0	3.3	51.6
Socioeconomic status				
Lowest quarter	12.7	20.5	2.5	64.3
Middle two quarters	22.0	17.1	3.4	57.5
Highest quarter	42.4	7.5	3.3	46.7
Native language[2]				
English	26.5	15.6	3.4	54.5
Non-English	21.2	12.1	1.9	64.8
Parents' education				
High school or less	15.6	20.5	2.9	61.0
Some college	19.3	18.2	3.2	59.4
4-year college degree or more	37.0	9.5	3.4	50.0
Family composition				
Mother and father	29.9	13.5	3.2	53.4
Mother or father and guardian	18.8	19.5	3.7	58.1
Single parent (mother or father)	20.2	16.9	3.0	59.8
Other[3]	12.8	16.1	1.8	69.3
Extracurricular participation				
No participation	12.5	20.8	2.3	64.4
< 1 hour a week	24.3	15.9	3.4	56.3
1–4 hours a week	30.7	13.6	3.3	52.4
> 4 hours a week	34.1	11.2	3.8	50.9
Employment				
No employment	28.5	11.0	2.7	57.8
1–15 hours a week	33.4	11.4	2.9	52.3
> 15 hours a week	20.5	19.6	3.9	56.0

See notes at end of table.

Table 4. Percentage distribution of high school graduates in academic and occupational programs, by selected student characteristics: Academic year 2003–04—Continued

Characteristic	Academic concentration	Occupational concentration	Academic and occupational concentration	General curriculum
School control[4]				
Public	23.5	16.4	3.4	56.7
Catholic	54.0	2.8	0.9	42.3
Other private	46.5	1.0	0.6	51.9
Mixed	32.5	7.3	0.5	59.7
School location[4]				
Urban	28.5	11.6	3.4	56.5
Suburban	26.2	14.5	3.3	56.0
Rural	23.3	21.8	2.9	52.0
Mixed	9.3	15.2	2.2	73.3
School region[4,5]				
Northeast	35.1	13.8	3.6	47.5
Midwest	23.4	17.7	2.1	56.8
South	29.2	18.1	5.2	47.5
West	15.6	8.9	1.2	74.3
Mixed	19.6	9.5	1.0	69.9

[1] All race categories exclude Hispanic or Latino origin.
[2] The first language students learned to speak when they were children.
[3] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.
[4] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school control, location, and region variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).
[5] Region is defined by the U.S. Census Bureau based on the state in which the school is located.
NOTE: An academic concentrator earned the following: four credits of English; one mathematics credit higher than middle academic II on the mathematics pipeline (F1RMAPIP) and any two other credits in math; one science credit higher than general biology on the science pipeline (F1RSCPIP) and any two other credits in science; one credit of social studies in U.S. or world history and any two other credits in social studies; and two credits in a single foreign language. An occupational concentrator earned at least three credits in one specific labor market preparation area. Those following a general curriculum met the criteria of neither an academic concentration nor an occupational concentration. Detail may not sum to totals because of rounding. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table 5. Percentage distribution of high school graduates completing various mathematics course levels since 9th grade, by selected student characteristics: Academic year 2003–04

Characteristic	Highest mathematics coursetaking level taken since 9th grade[1]				
	Level 1	Level 2	Level 3	Level 4	Level 5
Total	0.6	4.8	44.6	36.1	13.9
Sex					
Male	0.7	5.9	45.2	33.6	14.5
Female	0.4	3.8	44.0	38.5	13.2
Race/ethnicity[2]					
American Indian or Alaska Native	2.4	12.9	62.9	16.1	5.6
Asian or Pacific Islander	0.4	1.8	28.7	35.6	33.4
Black or African American	1.3	5.6	51.3	37.0	4.7
Hispanic or Latino	0.3	6.7	58.6	27.5	6.8
White	0.5	4.2	41.0	38.3	16.0
Socioeconomic status					
Lowest quarter	1.4	9.2	57.6	25.6	6.2
Middle two quarters	0.5	4.7	49.1	35.6	10.0
Highest quarter	0.2	1.6	26.9	44.9	26.4
Native language[3]					
English	0.6	4.5	43.7	37.4	13.8
Non-English	0.5	6.5	50.6	27.9	14.5
Parents' education					
High school or less	1.2	8.2	56.0	27.3	7.3
Some college	0.6	5.2	51.0	34.7	8.6
4-year college degree or more	0.2	2.5	32.8	42.5	22.0
Family composition					
Mother and father	0.3	3.9	40.3	38.2	17.3
Mother or father and guardian	1.0	4.9	52.1	34.6	7.4
Single parent (mother or father)	0.9	6.8	50.4	32.7	9.3
Other[4]	1.7	10.4	57.8	24.8	5.4
Extracurricular participation					
No participation	1.2	8.9	55.7	29.1	5.0
< 1 hour a week	0.6	4.9	47.9	35.5	11.1
1–4 hours a week	0.3	3.5	42.6	38.7	14.9
> 4 hours a week	0.1	1.9	36.4	40.9	20.7
Employment					
No employment	0.3	5.4	41.7	34.6	18.0
1–15 hours a week	0.5	3.3	36.9	40.5	18.7
> 15 hours a week	0.5	4.4	50.6	35.3	9.1

See notes at end of table.

Table 5. Percentage distribution of high school graduates completing various mathematics course levels since 9th grade, by selected student characteristics: Academic year 2003–04—Continued

Characteristic	Highest mathematics course level taken since 9th grade[1]				
	Level 1	Level 2	Level 3	Level 4	Level 5
School control[5]					
Public	0.6	5.2	46.4	34.9	12.8
Catholic	0.1	0.3	24.8	52.4	22.4
Other private	0.3	0.1	23.8	45.4	30.4
Mixed	†	0.3	46.0	43.3	10.4
School location[5]					
Urban	0.8	4.0	40.2	41.0	14.0
Suburban	0.5	4.6	44.7	35.1	15.2
Rural	0.5	6.2	48.3	33.6	11.4
Mixed	0.4	7.7	62.1	23.6	6.3
School region[5,6]					
Northeast	0.6	5.0	41.7	35.0	17.7
Midwest	0.6	5.0	41.7	39.4	13.3
South	0.8	4.2	43.0	38.8	13.3
West	0.2	5.4	52.8	29.4	12.2
Mixed	†	4.5	50.2	37.3	7.9

† Not applicable.
[1] Course levels are: Level 1—no math; Level 2—basic math/pre-algebra; Level 3—core secondary through algebra II; Level 4—trigonometry, statistics, pre-calculus; and Level 5—calculus.
[2] All race categories exclude Hispanic or Latino origin.
[3] The first language students learned to speak when they were children.
[4] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.
[5] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school control, location, and region variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).
[6] Region is defined by the U.S. Census Bureau based on the state in which the school is located.
NOTE: Highest mathematics course taken is based on a taxonomy of course types for which the student received a nonzero credit while in high school. Detail may not sum to totals because of rounding. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table 6. Percentage distribution of high school graduates completing various science course levels since 9th grade, by selected student characteristics: Academic year 2003–04

Characteristic	Highest science course level taken since 9th grade[1]							
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8
Total	0.6	2.2	3.4	25.4	33.3	17.1	9.6	8.5
Sex								
Male	0.8	2.8	3.9	27.0	29.8	17.9	8.1	9.7
Female	0.3	1.6	2.9	23.8	36.6	16.3	11.1	7.3
Race/ethnicity[2]								
American Indian or Alaska Native	†	5.7	4.6	41.9	28.2	12.3	5.3	2.0
Asian or Pacific Islander	0.5	1.7	1.3	12.8	25.9	19.0	13.4	25.4
Black or African American	0.9	2.3	2.6	31.2	39.8	12.4	6.5	4.3
Hispanic or Latino	0.7	3.5	4.7	30.9	35.9	15.5	5.5	3.3
White	0.5	1.9	3.1	23.9	32.1	18.2	11.0	9.4
Socioeconomic status								
Lowest quarter	1.2	3.9	5.1	35.9	33.1	9.2	8.0	3.6
Middle two quarters	0.5	2.2	3.8	27.7	34.4	15.9	9.9	5.7
Highest quarter	0.2	1.1	1.4	13.4	31.4	25.0	10.3	17.1
Native language[3]								
English	0.5	2.1	3.4	24.9	33.7	17.3	9.8	8.3
Non-English	0.7	3.0	3.5	28.8	30.2	15.2	8.5	10.2
Parents' education								
High school or less	1.0	4.1	4.9	34.5	33.3	9.7	8.8	3.7
Some college	0.5	1.8	3.9	28.9	34.8	15.4	9.2	5.5
4-year college degree or more	0.4	1.4	2.1	17.2	32.0	22.7	10.4	13.7
Family composition								
Mother and father	0.4	1.8	3.1	21.6	32.7	19.9	10.2	10.3
Mother or father and guardian	0.7	2.7	4.0	31.7	34.9	11.4	9.4	5.4
Single parent (mother or father)	0.9	2.9	3.7	30.3	34.3	13.3	8.4	6.3
Other[4]	2.0	4.5	4.4	38.4	30.2	11.5	6.3	2.6

See notes at end of table.

Table 6. Percentage distribution of high school graduates completing various science course levels since 9th grade, by selected student characteristics: Academic year 2003–04—Continued

Characteristic	Highest science course level taken since 9th grade[1]							
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8
Extracurricular participation								
No participation	0.9	3.6	6.2	35.6	31.5	11.1	7.6	3.6
< 1 hour a week	0.5	2.8	2.3	28.2	33.7	14.8	9.7	8.1
1–4 hours a week	0.2	2.1	2.8	21.8	34.6	19.7	9.9	8.9
> 4 hours a week	0.2	1.1	2.0	18.2	34.0	21.3	11.0	12.2
Employment								
No employment	0.4	2.2	3.2	22.4	32.1	18.8	9.7	11.1
1–15 hours a week	0.4	1.9	2.7	19.8	32.8	20.5	11.1	10.8
> 15 hours a week	0.3	2.2	3.9	29.4	34.7	14.5	8.9	6.0
School control[5]								
Public	0.6	2.4	3.6	26.5	33.3	16.0	9.6	8.0
Catholic	0.2	0.4	1.5	15.2	31.5	30.1	9.3	11.7
Other private	†	†	0.6	10.3	33.1	28.9	9.5	17.6
Mixed	†	†	0.6	17.1	46.5	15.0	14.2	6.6
School location[5]								
Urban	0.6	2.0	1.9	20.9	36.3	20.0	8.3	10.0
Suburban	0.5	2.3	3.9	24.9	31.6	17.1	10.3	9.4
Rural	0.6	2.1	4.0	31.1	33.6	13.8	10.0	4.9
Mixed	1.4	3.3	4.7	39.3	30.9	9.6	7.9	3.0

See notes at end of table.

Table 6. Percentage distribution of high school graduates completing various science course levels since 9th grade, by selected student characteristics: Academic year 2003–04—Continued

Characteristic	Highest science course level taken since 9th grade[1]							
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8
School region[5,6]								
Northeast	0.5	2.4	5.3	20.6	30.7	22.3	7.7	10.4
Midwest	0.5	1.8	3.5	25.3	30.4	17.5	11.3	9.7
South	0.7	1.1	2.3	25.8	37.7	15.6	9.3	7.7
West	0.6	4.3	3.3	28.9	32.1	14.3	9.8	6.7
Mixed	†	†	8.6	22.4	27.9	21.2	7.2	12.7

† Not applicable.

[1] Course levels are: Level 1—no science; Level 2—primary physical science; Level 3—secondary physical science and basic biology; Level 4—general biology; Level 5—chemistry I or physics I; Level 6—chemistry I and physics I; Level 7—chemistry II or physics II or advanced biology; Level 8—both Levels 6 and 7.

[2] All race categories exclude Hispanic or Latino origin.

[3] The first language students learned to speak when they were children.

[4] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.

[5] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school control, location, and region variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).

[6] Region is defined by the U.S. Census Bureau based on the state in which the school is located.

NOTE: Highest mathematics course taken is based on a taxonomy of course types for which the student received a nonzero credit while in high school. Detail may not sum to totals because of rounding. The academic year extended from September 1, 2003 to August 31, 2004.

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

Table 7. Percentage distribution of high school graduates demonstrating mastery of specific mathematics knowledge and skills, by credit earned in selected courses: Academic year 2003–04

Credits earned in selected courses	Mathematics proficiency levels[1]				
	Level 1	Level 2	Level 3	Level 4	Level 5
Total	96.6	80.5	65.0	37.3	4.2
Total course credits earned					
Low	95.2	74.1	56.3	30.0	3.2
Middle	97.2	83.0	67.9	39.9	4.7
High	97.6	84.9	71.6	42.5	4.9
Total course credits earned in academic subjects					
Low	92.6	63.7	42.3	17.4	1.0
Middle	98.0	85.5	70.6	40.3	4.1
High	99.1	92.5	83.5	57.2	8.8
Total course credits earned in occupational subjects					
Low	98.6	91.1	82.3	56.6	8.9
Middle	97.2	81.8	66.1	37.5	4.0
High	93.9	69.7	49.3	21.8	1.1
Total course credits earned in mathematics					
Low	92.5	65.4	40.6	15.4	0.7
Middle	95.2	72.7	52.8	24.2	1.1
High	97.7	86.3	74.1	46.9	6.5
Total course credits earned in science					
Low	89.0	55.2	31.8	11.3	0.3
Middle	95.8	75.2	56.4	28.2	2.1
High	98.6	90.0	79.5	51.6	7.3
Total course credits earned in English					
Low	89.1	61.8	45.3	25.5	5.3
Middle	96.1	78.5	60.4	33.9	3.8
High	96.7	80.8	65.5	37.7	4.3
Total course credits earned in social studies					
Low	81.9	46.3	29.0	11.4	0.5
Middle	95.3	75.3	58.3	33.1	3.9
High	97.4	82.9	68.0	39.2	4.4

[1] Mathematics proficiency levels are: Level 1—simple arithmetical operations on whole numbers, including single-step operations that rely on rote memory; Level 2—simple operations with decimals, fractions, powers, and roots; Level 3—simple problem solving, requiring the understanding of low-level mathematical concepts; Level 4—understanding of intermediate-level mathematical concepts and/or having the ability to formulate multistep solutions to word problems; and Level 5—proficiency in solving complex multistep word problems and/or having the ability to demonstrate knowledge of material found in advanced mathematics courses.

NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Core courses represent all courses in mathematics, science, English, and social studies. Noncore courses represent all other courses not defined as core courses. Level of mastery is reported at the group level by calculating the mean of the probability scores in the given area. Since the means are on a decimal scale between 0 and 1, they represent the proportions of members of a subgroup falling within a performance level. For course credits earned, “low” refers to students whose percentile rank on the distribution of course credits was below 25th, “medium” refers to students whose percentile rank on the distribution of course credits was at least 25th and below 75th, and “high” refers to students whose percentile rank on the distribution of course credits was at least 75th. The academic year extended from September 1, 2003 to August 31, 2004.

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

Table 8. Percentage of high school graduates demonstrating mastery of specific mathematics knowledge and skills, by academic program: Academic year 2003–04

Academic program	Mathematics proficiency levels[1]				
	Level 1	Level 2	Level 3	Level 4	Level 5
Total	96.6	80.5	65.0	37.3	4.2
Academic (only)	99.7	96.7	90.8	66.0	9.9
Occupational (only)	94.4	68.5	46.0	18.9	1.0
Both academic and occupational	99.3	95.1	85.1	53.9	6.3
General	95.6	75.2	56.7	27.6	2.3

[1] Mathematics proficiency levels are: Level 1—simple arithmetical operations on whole numbers, including single-step operations that rely on rote memory; Level 2—simple operations with decimals, fractions, powers, and roots; Level 3—simple problem solving, requiring the understanding of low-level mathematical concepts; Level 4—understanding of intermediate-level mathematical concepts and/or having the ability to formulate multistep solutions to word problems; and Level 5—proficiency in solving complex multistep word problems and/or having the ability to demonstrate knowledge of material found in advanced mathematics courses.

NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Level of mastery is reported at the group level by calculating the mean of the probability scores in the given area. Since the means are on a decimal scale between 0 and 1, they represent the proportions of members of a subgroup falling within a performance level. The academic year extended from September 1, 2003 to August 31, 2004.

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

Table 9. Percentage of high school graduates demonstrating mastery of specific mathematics knowledge and skills, by highest mathematics course level taken: Academic year 2003–04

Highest mathematics course level taken	Mathematics proficiency levels[1]				
	Level 1	Level 2	Level 3	Level 4	Level 5
Total	96.6	80.5	65.0	37.3	4.2
No math	65.4	19.1	9.1	1.9	†
Basic math/pre-algebra	81.9	28.3	9.4	2.3	#
Core secondary through algebra II	95.5	70.8	47.1	16.1	0.3
Trigonometry, statistics, pre-calculus	99.0	92.2	81.4	48.4	2.3
Calculus	99.9	99.7	98.7	87.3	23.2

† Not applicable.

Rounds to zero.

[1] Mathematics proficiency levels are: Level 1—simple arithmetical operations on whole numbers, including single-step operations that rely on rote memory; Level 2—simple operations with decimals, fractions, powers, and roots; Level 3—simple problem solving, requiring the understanding of low-level mathematical concepts; Level 4—understanding of intermediate-level mathematical concepts and/or having the ability to formulate multistep solutions to word problems; and Level 5—proficiency in solving complex multistep word problems and/or having the ability to demonstrate knowledge of material found in advanced mathematics courses.

NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Core courses represent all courses in mathematics, science, English, and social studies. Noncore courses represent all other courses not defined as core courses. Level of mastery is reported at the group level by calculating the mean of the probability scores in the given area. Since the means are on a decimal scale between 0 and 1, they represent the proportions of members of a subgroup falling within a performance level. The academic year extended from September 1, 2003 to August 31, 2004.

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

Table 10. Grade point average (GPA) for high school graduates, by credits earned in selected courses: Academic year 2003–04

Credits earned in selected courses	Mean GPA[1]	Percent with at least a 3.0 GPA[1]	Mean academic GPA[1]	Percent with at least a 3.0 academic GPA[1]
Total	2.9	46.9	2.7	40.1
Total course credits earned				
Low	2.6	36.2	2.5	30.4
Middle	2.9	49.9	2.8	43.0
High	3.0	56.3	2.9	48.3
Total course credits earned in academic subjects				
Low	2.5	25.9	2.3	18.4
Middle	2.9	49.7	2.8	42.1
High	3.2	69.8	3.2	65.4
Total course credits earned in occupational subjects				
Low	3.1	62.9	3.0	58.9
Middle	2.9	47.1	2.7	40.4
High	2.7	34.2	2.5	24.9
Total course credits earned in mathematics				
Low	2.3	22.1	2.1	15.9
Middle	2.7	33.6	2.5	26.8
High	3.0	56.9	2.9	50.0
Total course credits earned in science				
Low	2.3	19.2	2.1	13.9
Middle	2.7	38.4	2.6	31.4
High	3.1	61.1	3.0	54.2
Total course credits earned in English				
Low	2.4	25.3	2.2	21.6
Middle	2.8	42.9	2.6	36.3
High	2.9	47.4	2.7	40.5
Total course credits earned in social studies				
Low	2.4	30.1	2.2	22.8
Middle	2.8	42.1	2.6	35.4
High	2.9	48.9	2.8	42.0

[1] GPA is based on all courses. Academic GPA is based only on math, English, science, social studies, fine arts, and non-English courses.

NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Core courses represent all courses in mathematics, science, English, and social studies. Noncore courses represent all other courses not defined as core courses. For course credits earned, “low” refers to students whose percentile rank on the distribution of course credits was below 25th, “medium” refers to students whose percentile rank on the distribution of course credits was at least 25th and below 75th, and “high” refers to students whose percentile rank on the distribution of course credits was at least 75th. The academic year extended from September 1, 2003 to August 31, 2004.

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

Table 11. Grade point average (GPA) for high school graduates, by academic and occupational program: Academic year 2003–04

Academic program	Mean GPA[1]	Percent with at least a 3.0 GPA[1]	Mean academic GPA[1]	Percent with at least a 3.0 academic GPA[1]
Total	2.9	46.9	2.7	40.1
Academic (only)	3.3	74.5	3.2	68.1
Occupational (only)	2.6	30.1	2.4	21.8
Both academic and occupational	3.2	67.5	3.0	54.6
General	2.7	37.5	2.6	31.3

[1] GPA is based on all courses. Academic GPA is based only on math, English, science, and social studies courses.
NOTE: Highest mathematics course taken is based on a taxonomy of course types for which the student received a nonzero credit while in high school. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table 12. Grade point average (GPA) for high school graduates, by highest mathematics course level taken: Academic year 2003–04

Highest mathematics course level taken	Mean GPA[1]	Percent with at least a 3.0 GPA[1]	Mean academic GPA[1]	Percent with at least a 3.0 academic GPA[1]
Total	2.9	46.9	2.7	40.1
No math	2.4	22.0	2.3	19.8
Basic math/pre-algebra	2.3	11.7	2.1	8.8
Core secondary through algebra II	2.5	26.1	2.4	18.7
Trigonometry, statistics, pre-calculus	3.1	60.9	2.9	53.0
Calculus	3.5	90.8	3.5	86.9

[1] GPA is based on all courses. Academic GPA is based only on math, English, science, social studies, fine arts, and non-English courses.
NOTE: Highest mathematics course taken is based on a taxonomy of course types for which the student received a nonzero credit while in high school. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table 13. Mean credits earned in selected courses for high school graduates, by educational expectations: Academic year 2003–04

Educational expectation	Course credits				
	Mean course credits earned	Mean course credits earned in academic subjects	Mean course credits earned in mathematics	Mean course credits earned in AP/IB courses	Mean course credits earned in occupational subjects
Total	25.8	19.0	3.6	0.8	3.5
High school or less	25.0	16.2	3.3	#	5.3
Some college	25.2	17.1	3.2	0.1	4.7
College graduation	25.9	19.3	3.6	0.6	3.3
Graduate/professional degree	26.3	20.5	3.8	1.6	2.6

Rounds to zero.

NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Core courses represent all courses in mathematics, science, English, and social studies. Noncore courses represent all other courses not defined as core courses. AP/IB = Advanced Placement/International Baccalaureate. The academic year extended from September 1, 2003 to August 31, 2004.

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

Table 14. Percentage distribution of high school graduates completing various mathematics course levels since 9th grade, by educational expectations: Academic year 2003–04

Educational expectation	Highest mathematics course level taken since 9th grade[1]				
	Level 1	Level 2	Level 3	Level 4	Level 5
Total	0.6	4.8	44.6	36.1	13.9
High school or less	2.6	19.5	63.7	13.6	0.6
Some college	0.9	10.2	69.3	18.5	1.2
College graduation	0.3	2.0	43.9	42.7	11.0
Graduate/professional degree	0.1	1.5	26.9	44.8	26.6

[1] Course levels are: Level 1—no math; Level 2—basic math/pre-algebra; Level 3—core secondary through algebra II; Level 4—trigonometry, statistics, pre-calculus; and Level 5—calculus.

NOTE: Highest mathematics course taken is based on a taxonomy of course types for which the student received a nonzero credit while in high school. Detail may not sum to totals because of rounding. The academic year extended from September 1, 2003 to August 31, 2004.

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

Appendix A
Technical Notes and Glossary

Appendix A
Technical Notes and Glossary

A.1 Overview of the Technical Appendix

The National Center for Education Statistics (NCES) of the U.S. Department of Education has collected longitudinal data for more than 30 years. Starting in 1972 with the National Longitudinal Study of the High School Class of 1972 (NLS-72) and continuing to the most recent study, the Education Longitudinal Study of 2002 (ELS:2002), NCES has provided longitudinal and trend data to education policymakers and researchers who link secondary school educational achievement and experiences with important downstream outcomes, such as entry into the labor market and postsecondary educational access and attainment.

The base year of ELS:2002 was the first stage of a major new effort designed to provide data about critical transitions experienced by students as they proceed through high school and into postsecondary education or their careers. The 2002 sophomore cohort was surveyed again in 2004 and the sample freshened to make it fully representative of spring term 2004 high school seniors. Transcript information was collected in 2005 about a year after most of the sample had graduated from high school. Future follow-ups will collect policy-relevant data about postsecondary access and choices, postsecondary attainment, entry into the work force, family formation, voting, volunteerism, and life goals and values.

The first section of this appendix details ELS:2002 study objectives; lists some of the major research and policy issues that the study addresses; explains the four levels of analysis—cross-sectional, longitudinal, cross-cohort, and international comparison—that can be conducted with ELS:2002 data; and supplies an overview of the base-year, first follow-up, and transcript study designs and methodologies.

This section is followed by a discussion of the sampling; weighting and imputation; base-year, first follow-up, and transcript response rates; the quality of estimates; the standard errors; and the electronic codebooks. Finally, a glossary documents the analysis variables used in this report.

A.2 Overview of ELS:2002

A.2.1 Study Objectives

ELS:2002 is a longitudinal study that surveys the same individuals repeatedly over time. Individual students are expected to be followed until about age 30; the base-year schools have been surveyed twice (they were surveyed in 2002 and again in 2004). In the high school years, ELS:2002 is an integrated multilevel study, involving multiple respondent populations, including students, their parents, their teachers, and their schools (school data are collected at three levels: from the principal, the librarian, and on a facilities checklist, completed by survey administrators based on their observations at the school). Transcripts were collected from the schools in 2005, approximately 1 year after most of the students had graduated from high school. This multilevel focus supplies researchers with a comprehensive picture of the home, community, and school

environments and their influences on the student. This multiple-respondent perspective is unified by the fact that, for most purposes, the student is the basic unit of analysis.[1]

Key elements in the ELS:2002 longitudinal design are summarized by wave below.

Base Year (2002)

- Baseline survey of high school sophomores completed in spring term 2002.
- Cognitive tests in reading and mathematics completed.
- Surveyed parents, English teachers, and mathematics teachers. Collected school administrators' responses to questionnaires.
- School facilities checklist and a media center (library) questionnaire completed.
- Sample sizes of approximately 750 schools and over 17,000 students (of whom 15,362 participated). Schools were the first-stage unit of selection, with sophomores randomly selected within schools.
- Oversampling of Asians and private schools.
- Design linkages (test score equating in reading and mathematics, some questionnaire items in common) with the Program for International Student Assessment (PISA) and score reporting linkages to the prior longitudinal studies (the High School and Beyond longitudinal study [HS&B] and the National Education Longitudinal Study of 1988 [NELS:88]).

First Follow-up (2004)

- Follow-up in 2004, when most sample members were seniors but some were dropouts or in other grades.
- Administered student questionnaire, dropout questionnaire, assessment in mathematics, and school administrator questionnaire; special tailored instruments for early graduates and homeschooled students.
- Returned to the same schools but separately followed transfer students, as well as dropouts, early graduates, and sample members who went into a homeschool setting.
- Freshened to ensure a nationally representative 2004 senior cohort.

High School Transcript and Course Offerings Record Collection (2005)

- High school transcript component with data collection in 2005 to ensure complete high school records were captured (coursetaking records for grades 9–12). School course offerings were also captured for most base-year schools.

[1] Base-year school administrator, library media center, and facilities data can be used to report on the nation's schools with schools that have 10th grade in the 2001–02 school year. (First follow-up school administrator data, on the other hand, do not properly generalize to the nation's school with a senior class in 2004.) However, the primary use of the school-level data (and the purpose of parent and teacher surveys) is to provide further contextual information on the student.

Second Follow-up (2006)

- Post-high-school follow-ups using a single questionnaire with branching of questions to accommodate the diverse pathways followed by the cohort.
- Questionnaire available as a single application in three electronic modalities: on the Web for self-administration, computer-assisted telephone interview, and computer-assisted personal interview.

Further Follow-ups

- Number of (and dates for) further follow-ups to be determined.

A.2.2 ELS:2002 Research and Policy Issues

Apart from helping to describe the status of high school students and their schools, ELS:2002 will provide information to help address a number of key policy and research questions. The study is intended to produce a comprehensive dataset for developing and evaluating education policy. Part of its aim is to inform decisionmakers, education practitioners, and parents about changes in the operation of the education system over time and the effects various elements of the system have on the lives of the individuals who pass through it. Issues that can be addressed with data collected in the high school years include the following:

- students' academic growth in mathematics;
- the process of dropping out of high school;
- the relationship between family background and students' educational success;
- the association between coursetaking choices and academic success in the high school years;
- the equitable distribution of educational opportunities as registered in the distinctive school experiences and performance of students from various policy-relevant subgroups, such as
  - students in public and private high schools;
  - language minority students;
  - students with disabilities;
  - students in urban, suburban, and rural settings;
  - students in different regions of the country;
  - students from upper, middle, and lower socioeconomic status levels;
  - male and female students; and
  - students from different racial or ethnic groups; and
- steps taken to facilitate the transition from high school to postsecondary education or the world of work.

After ELS:2002 students have completed high school, a new set of issues can be examined. These issues include

- the later educational and labor market activities of high school dropouts;
- the transition of those who do not go directly on to postsecondary education or to the world of work;
- access to, and choice of, undergraduate and graduate educational institutions;
- persistence in attaining postsecondary education goals;
- entry of new postsecondary graduates into the workforce;
- social and economic rates of return on education to both the individual and society; and
- adult roles, such as family formation and civic participation.

A.2.3 Analytic Levels

These research and policy issues can be investigated at several distinct levels of analysis. The overall scope and design of the study provide for the following four analytical levels:

- cross-sectional profiles of the nation's high school sophomores and seniors (as well as dropouts after spring of the sophomore year);
- longitudinal analysis (including examination of life-course changes);
- intercohort comparisons with American high school students of earlier decades; and
- international comparisons (U.S. 15-year-olds compared with 15-year-olds in other nations).

Cross-sectional profiles. ELS:2002 cross-sectional data permit characterization of the nation's high school sophomores in the spring of the 2001–02 school year and seniors in the spring of the 2003–04 school year.

Longitudinal analysis. Longitudinal analysis is now possible with release of data from the 2004 first follow-up. ELS:2002 provides the basis for within-cohort comparison by following the same individuals over time to measure achievement growth in mathematics; monitor enrollment status and school completion over the high school years and thereafter; and record such key outcomes as postsecondary entry and attainment, labor market experiences, civic participation, and family formation. These outcomes, in turn, can be related to antecedents identified in earlier rounds, including individual, home, school, and community factors.

Intercohort comparisons. As part of an important historical series of studies that repeats a core of key items each decade, ELS:2002 offers the opportunity for analyzing trends in areas of fundamental importance, such as patterns of coursetaking, rates of participation in extracurricular activities, academic performance, and changes in goals and aspirations. A 1980–2002 NCES high school sophomore trend report is currently in preparation. With completion of the first follow-up in 2004, researchers can now compare ELS:2002 high school seniors' experience,

attitudes, and achievement with that of NELS:88 seniors in 1992, HS&B seniors in 1980 and 1982, and NLS-72 seniors in 1972.

Starting with the ELS:2002 first follow-up academic transcript component, trend comparisons can also be made with transcript data containing students' high school course histories and sequences because comparable transcript studies have been conducted. These started with HS&B (1982) and include NELS:88 (1992) and the National Assessment of Educational Progress (NAEP) (1987, 1990, 1994, 1998, 2000, and 2005).

International comparisons. The Organization for Economic Cooperation and Development's (OECD's) Program for International Student Assessment (PISA) is an internationally standardized assessment, jointly developed by the 32 participating countries (including the United States) and administered to 15-year-olds in groups in their schools (Lemke et al. 2001). PISA covers three domains: reading literacy, numeracy, and scientific literacy; a subset of the PISA reading literacy and numeracy items have been included on ELS:2002. PISA aims to define each domain not merely in terms of mastery of the school curriculum, but also in terms of important knowledge and skills needed in adult life. A special feature of ELS:2002 is that it can be linked to PISA. Specifically, ELS:2002 base-year reading results have been put on the PISA:2000 literacy scale, and base-year results are also being put on the PISA:2003 mathematics scale. It will thus be possible to relate PISA scale scores in the two areas to longitudinal outcomes, through ELS:2002 results from the first follow-up onward.

A.2.4 Overview of the Base-Year, First Follow-up, and Transcript Study Design and Content

Base-year study design. ELS:2002 was conducted in a national probability sample of about 750 participating (of 1,220 eligible contacted) public, Catholic, and other private schools in the spring term of the 2001–02 school year. Of 17,590 eligible selected sophomores, 15,360 completed a base-year questionnaire, as did 13,480 of their parents and 7,140 of their teachers.[2] Of the 750 participating schools, 740 principals and 720 librarians completed questionnaires.

Seven study components comprised the base-year design: assessments of students (achievement tests in mathematics and reading); a survey of students; surveys of parents, teachers, school administrators, and librarians; and a facilities checklist (completed by survey administrators, based on their observations at the school). The student assessments measured achievement in mathematics and reading; the baseline scores can serve as a covariate or control variable for later analyses. Mathematics achievement was reassessed in the first follow-up, so that achievement gain over the last 2 years of high school can be measured and related to school processes and mathematics coursetaking. The student questionnaire gathered information about the student's background, school experiences and activities, plans and goals for the future, employment and out-of-school experiences, language background, and psychological orientation toward learning.

One parent of each participating sophomore was asked to respond to a parent survey. The parent questionnaire was designed to gauge parental aspirations for the child, home background

[2] Note that the participating student sample defines the eligible parent and teacher samples. The 7,140 teacher completions are those linked to student respondents. Of the 15,360 student participants, 14,080 had at least one associated teacher-provided student report.

and the home education support system, the child's educational history prior to 10th grade, and parental interactions with and opinions about the student's school. For each student enrolled in English or mathematics, a teacher was also selected to be surveyed. Teachers typically (but not invariably) reported on multiple ELS:2002 sophomores. The teacher questionnaire collected the teacher's evaluation of the student and provided information about the teacher's background and activities. The head librarian or media center director at each school was asked to complete a library media center questionnaire, which inquired into the school's library media center facility, its staffing, its technological resources, collection and expenditures, and scheduling and transactions. Finally, the facilities checklist was a brief observational form completed for each school by survey administrators. The form collected information about the condition of school buildings and facilities.

First follow-up study design. In the first follow-up, the base-year schools were surveyed by means of an administrator questionnaire. Base-year students were surveyed whether in the base-year school, in a new school, or out of school. Additional seniors were added in a freshening process, and a mathematics assessment was administered to first follow-up students in the original (base-year) sample of schools. Information about coursetaking (covering all years of high school and including the sequence in which courses were taken and grades earned) was collected at the end of high school, through the high school transcript component of the ELS:2002 first follow-up study.

The basis for the sampling frame for the first follow-up was the sample of schools and students studied in the ELS:2002 base year. There were two overlapping but conceptually different target student populations, or populations of inferential interest, for the first follow-up. The first population (the ELS:2002 sophomore cohort) consists of students who were enrolled in the 10th grade in the spring term of 2002. The second population (the ELS:2002 senior cohort) comprises students who were enrolled in the 12th grade in the spring term of 2004. The former population includes students who dropped out of school between 10th and 12th grades, students who graduated early, students who went from a school setting to a homeschool setting, and students who fell behind the modal grade progression of their peers (e.g., students who repeated a grade and were 11th-graders in spring 2004). The latter population includes students in the sophomore cohort who were seniors in 2004, plus samples of students in the baseline schools from each of these missing groups who were seniors in 2004. Including representatives of these missing groups who were seniors in 2004 to the first follow-up data makes the entire sample of 2004 high school seniors nationally representative. This additional group of high school seniors is called the "freshening sample."

Because of these two target populations and the major analytical subgroups, the full-scale sample encompasses the following types of students from the spring of 2004:

- ELS:2002 base-year student sample members enrolled (in either the 12th grade or some other grade) in the school in which they were originally sampled;
- ELS:2002 base-year sophomores who dropped out of school prior to first follow-up (2004) data collection;
- ELS:2002 base-year student respondents who finished high school early, including those who graduated from high school early, as well as those who did not graduate

but achieved alternative certification (e.g., exam-certified equivalency such as a General Educational Development [GED] certificate);

- ELS:2002 base-year student respondents who transferred out of the school in which they were originally sampled (including homeschooled students);
- ELS:2002 base-year sample students who were deemed unable to participate directly during the base year owing to severe disability or insufficient command of the English language such that they could not complete a questionnaire; and
- Students at the base-year sample school who were enrolled in the 12th grade in spring of 2004 but were not in 10th grade in the United States during the 2001–02 school year. In spring term 2002, such students may have been out of the country, been enrolled in school in the United States in a grade other than 10th, had an extended illness or injury, been homeschooled, been institutionalized, or temporarily dropped out of school. These students comprised the first follow-up freshening sample.

Although all groups in the sample as categorized above were eligible to complete a questionnaire, different instruments were tailored to different study populations. The practice followed was to provide a core set of items to which sample members would respond, supplemented by items specific to the circumstances of a particular group (such as dropouts, for whom questions about their current school situation would not be relevant).

For some classifications of the sample, a first follow-up test score in mathematics has either been collected (students still in the base-year school who participated in the in-school administration) or imputed (students who had transferred to a new school or those still in the base-year school but who were unable to participate during the in-school sessions). For the senior cohort of 2004—the analysis population of this report—test data in mathematics are available. Note that for out-of-high-school categories of sample members, such as dropouts, early graduates, and the homeschooled, a test score has neither been collected nor imputed. (Missing test score data have been imputed for base-year nonrespondents who became respondents in the first follow-up. With these scores, this group can be assimilated into a sophomore cohort panel analysis.)

Further details of the instrumentation, sample design, data collection results, data processing, weighting and imputation, and data files available for analysis may be found in the *Education Longitudinal Study of 2002: Base-Year to First Follow-up Data File Documentation* (Ingels et al. 2005).[3]

Transcript study design. The ELS:2002 transcripts were collected from sample members in late 2004 and early 2005, about 6 months to 1 year after most students had graduated from high school. Collecting the transcripts in the 2004–05 academic year allowed for more complete high school records. Transcripts were collected from the school that the students were originally sampled from in the base year (which was the only school for most sample members) and from their last school of attendance if it was learned during the first follow-up student data collection that they had transferred. By requesting transcripts and related information for transfer

[3] See appendix reference list (section A.5) for full citation. The manual can be downloaded from the NCES website: http://nces.ed.gov/pubsearch. For more comprehensive information about the base year, see Ingels et al. 2004.

students from a second school, this study offers a unique advantage by having extensive information on multiple school attendance and therefore increased accuracy of enrollment histories. Incomplete records were obtained for sample members who had dropped out of school, had fallen behind the modal progression sequence, or were enrolled in a special education program requiring or allowing more than 12 years of schooling. For freshened students, transcripts were only collected from their senior year school. Transcripts were collected for regular graduates, dropouts, early graduates, and students who were homeschooled after their sophomore year.

The ELS:2002 high school transcript data collection sought key pieces of information about coursetaking from the student's official high school record—including courses taken while attending secondary school, information on credits earned, year and term a specific course was taken, and final grades. When available, other information was collected, including dates enrolled, reason for leaving school, and standardized test scores. Once collected, information (e.g., course name, credits earned, course grades) was transcribed and can be linked back to the student's questionnaire or assessment data. Due to the size and complexity of the file, and because of reporting variation by school, additional variables were constructed from the raw transcript file. These composite variables include standardized grade point average (GPA), high school academic program, total credits earned by subject, and others. Further details of the instrumentation, sample design, data collection results, data processing, weighting and imputation, and data files available for analysis may be found in the *Education Longitudinal Study of 2002: First Follow-up Transcript Component Data File Documentation* (Bozick et al. 2006).

A.3 Sample Design, Weighting, Response Rates, Quality of Estimates, Standard Errors, and the Electronic Codebook

A.3.1 Sampling

The ELS:2002 base-year sample design began with a nationally representative, two-stage stratified probability sample. The first stage of selection was schools; schools were selected with probability proportional to size (PPS). The public school sample was stratified by the nine U.S. Census divisions and by location (metropolitan status of urban, suburban, or rural). Private schools (Catholic and other private) were stratified by four levels of geography (Census region) and location; private schools were oversampled. The target sample size was 800 schools. Cooperation was sought from 1,220 eligible selections. The realized sample comprised 750 participating 10th-grade schools (67.8 participation rate). The second stage of selection was students. Of 17,590 sampled students in the schools, 15,360 students participated. Some groups (e.g., Asians, students in nonpublic schools) were oversampled. The weighted student response rate was 87.3 percent; detailed base-year response rates are reported in section A.3.3.

The first follow-up returned to the same schools to seek their cooperation, and to base-year sophomore respondents and a sample of base-year nonrespondents, regardless of whether they had remained in the base-year school. In addition, at participating base-year schools in the first follow-up, a sample freshening procedure was implemented so that spring term 2004 seniors who had not had a chance of selection into the sophomore cohort 2 years before would have a chance of selection into ELS:2002 as seniors. Although 5 of the 750 base-year schools were

ineligible because they no longer enrolled ELS:2002 sample members or seniors, of the eligible schools, 700 (93.4 percent) participated. Overall, there were 16,520 sample members (students, dropouts, homeschooled, or early graduates), of whom 14,990 participated. The sample included 14,250 seniors, of whom 13,420 participated. The weighted response rate for the analysis sample in this report, high school seniors, was 94.4 percent. Detailed first follow-up response rates are reported in section A.3.3.

The transcript study collected records from December 2004 through June 2005. Survey materials were sent to 2,032 schools including 759 schools that participated either in the base year or first follow-up[4] and 1,291 transfer schools that were first contacted regarding ELS:2002 during transcript data collection. Schools were paid $5 for each transcript.

Transcripts for 16,105 sample members were requested. Included were 100 sample members who were ineligible to participate in the base year or first follow-up due to a physical disability, a mental disability, or language barrier. Transcripts for 247 eligible sample members were not requested. These included 224 eligible sample members who attended schools that refused to participate in the transcript collection during a prior component of ELS:2002 data collection and 23 eligible sample members whose schools agreed to participate, but had individually refused to participate during a prior component of ELS:2002 data collection.

Ninety-five schools required explicit consent from sample members or their parents/guardians before releasing transcript information. Transcripts were not collected for 535 eligible sample members who refused to sign a form granting permission for the release of their transcript.

A.3.2 Weighting and Imputation

Weighting. The general purpose of the weighting scheme was to compensate for unequal probabilities of selection of schools and students into the base-year sample and to adjust for the fact that not all schools and students selected into the sample actually participated. Three sets of weights were computed in the base year: a school weight, a weight for student questionnaire completion, and a contextual data weight for the "expanded" sample of questionnaire-eligible and questionnaire-ineligible students.[5] School and student weights were adjusted for nonresponse, and these adjustments were designed to significantly reduce or eliminate nonresponse bias for data elements known for most respondents and nonrespondents. In addition, base-year school weights were poststratified to known population totals.

In the first follow-up, three individual-level weights were generated to accommodate the 2002 sophomore cohort 2 years later and the freshened senior cohort of 2004: a cross-sectional weight based on 2004 questionnaire completion, an expanded sample weight that extended the

[4] Of these 759 schools, 741 were base-year schools, five were schools that students had moved to due to a school closing or reorganization prior to first follow-up in-school data collection, and 13 were schools that students had transferred to prior to first follow-up in-school data collection.

[5] The base-year expanded sample weight generalizes to the population of all sophomores, regardless of whether they were capable of completing the questionnaire. The base-year student questionnaire weight (BYSTUWT) generalizes only to the population of students who were eligible to complete the student questionnaire; that is, those who were not judged incapable of participation by virtue of a severe disability or lack of proficiency in the English language.

weighting to encompass questionnaire-ineligible sample members, and a panel weight for sophomore cohort members with data at both points in time.[6]

One weight, F1TRSCWT, was computed for transcript respondents. The procedure for assigning the weights was the following. First, the first follow-up design weight (F1DWT) was used as the starting weight because it was greater than zero for all transcript sample members. Next, generalized exponential models (GEM) were used to compute weight adjustments. Extreme weights were adjusted, truncated, and smoothed by GEM as part of the nonresponse and poststratification adjustments rather than as a separate step. As the predictors of response propensity were potentially heterogeneous for different types of nonrespondents, the nonresponse adjustment was performed in two stages: first, at the school refusal stage (e.g., the school refused to provide any transcript); and second, at the within-school student-level nonresponse stage (e.g., the school had no record of the student, there was no transcript available for the student, the school required student permission, or the school refused to release a particular transcript). These two stages were chosen because there were sufficient sample sizes in each group for weight adjustments and because the distribution of nonrespondents in each group was different. The final transcript weight for each sample member is the product of the first follow-up design weight, the nonresponse adjustment factor, and the poststratification factor. The estimates in this report were produced using F1TRSCWT.

Imputation. For key classification variables, missing data were replaced with imputed values. Single imputation (by means of a weighted sequential hot deck procedure) was implemented for missing key questionnaire variables. Multiple imputation of the ability estimate (*theta*) was used to treat missing assessment data. Table A-1 lists variables subject to imputation and proportions missing. Tables A-1a (base year) and A-1b (first follow-up) list variables subject to imputation and percent missing (i.e., percent that were imputed).

[6] There are two different cases in which a respondent can have data at two points in time. Both are covered by the panel weight: first, by virtue of completing a questionnaire both in the base year and first follow-up; and second, for base-year nonrespondents, by virtue of completing both a first follow-up questionnaire and a New Participant Supplement from which missing key base-year classification variables could be filled in. In addition, for base-year nonparticipants participating in the first follow-up, a base-year reading and mathematics score was imputed.

Table A-1a. ELS:2002 base year imputation variables: 2002

Variable	Weighted percent imputed
Student sex	0.05
Student race/ethnicity	0.02
Student language minority status	2.07
Student Hispanic subgroup	2.93
Student Asian subgroup	7.26
School program type	6.64
Student postsecondary educational aspirations	2.36
Parental aspirations for student postsecondary achievement	14.53
Family composition	12.55
Mother's educational attainment	3.88
Mother's occupation	5.58
Father's educational attainment	10.28
Father's occupation	15.03
Family income	22.40
10th grade ability estimates (theta) for reading	6.26
10th grade ability estimates (theta) for mathematics	5.33

NOTE: Additional reading and mathematics assessment variables generated on basis of imputed theta score.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002).

Table A-1b. ELS:2002 first follow-up imputation variables: 2004

Variable	Weighted percent imputed[1]
Student sex	0.04
Student race/ethnicity	0.14
Student language minority status	0.93
Student Hispanic subgroup	5.65
Student Asian subgroup	7.21
School program type	5.09
Student postsecondary attainment: educational expectations	0.67
Parental aspirations for student postsecondary attainment	5.52
Family composition	0.96
Mother's educational attainment[2]	1.42
Mother's occupation[2]	2.02
Father's educational attainment[2]	2.17
Father's occupation[2]	2.50
Family income (2001)[2]	7.42
Enrollment status (in-school vs. out, grade)	2.42
12th-grade student ability estimates (theta) for mathematics[3]	18.23
10th-grade student ability estimates (theta) for mathematics[3]	5.09
10th-grade student ability estimates (theta) for reading[3]	5.09

[1] The denominator used in calculating the weighted percent missing varies by variable due to restrictions on eligibility for imputation.

[2] Used to construct socioeconomic status (SES).

[3] Used to construct scale, quartile, and proficiency scores.

NOTE: Base year (10th grade) test scores were imputed in both the base year and first follow-up; in the first follow-up, the base year scores were imputed for base year nonrespondents who responded in 2004.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002).

A.3.3 Base-Year, First Follow-up, and Transcript Response Rates

Base-year response rates. Of 1,220 eligible contacted schools, 750 participated in the study, for an overall weighted school participation rate of approximately 68 percent (62 percent unweighted). Of 17,590 selected eligible students, 15,360 participated, for a weighted student response rate of approximately 87 percent.[7] (School and student weighted response rates reflect use of the base weight [design weight] and do not include nonresponse adjustments.) School and student unit nonresponse bias analyses were performed, as well as an item nonresponse bias analysis for the questionnaires. The school-level bias due to nonresponse prior to and after computing weights was estimated based on the data collected from both respondents and nonrespondents and sampling frame data. At the unit level (but not the item level), weighting techniques were employed to reduce detected bias; after final nonresponse adjustments, the remaining relative bias ranged from 0 percent to 0.2 percent for schools and from 0 percent to 0.07 percent for students. For details of the bias analyses, see the *Education Longitudinal Study of 2002: Base Year Data File User's Manual* (Ingels et al. 2004). Unweighted and weighted school-level response by stratum is summarized in table A-2. Second-stage unit response rates by component are summarized in table A-3.

Table A-2. Unweighted school sampling and eligibility, and unweighted and weighted participation, by sampling stratum: 2002

School sampling stratum	Sampled schools		Eligible schools		Participating schools		
	Number	Unweighted percent[1]	Number	Unweighted percent[2]	Number	Unweighted percent[3]	Weighted percent
Total	1,270	100.00	1,220	96.29	750	61.59	67.80
School control							
Public	950	75.16	930	97.17	580	62.63	69.09
Catholic	140	11.04	140	100.00	100	67.86	74.04
Other private	180	13.80	160	88.57	80	49.68	62.94
School location							
Urban	430	34.23	410	95.39	250	60.39	67.27
Suburban	630	49.68	610	96.67	360	59.28	59.81
Rural	200	16.09	200	97.06	140	71.21	79.32

[1] Percent is based on overall total within column. Details may not sum to totals due to rounding.

[2] Percent is based on number sampled within row.

[3] Percent is based on number eligible within row.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002).

[7] Stage 1 (school) response rates can be multiplied by stage 2 (student) response rates for a combined two-stage response rate: 68 percent * 87 percent = 59 percent.

Table A-3. Summary of ELS:2002 base-year completion and coverage rates: 2002

Instrument	Selected	Participated	Weighted percent	Unweighted percent
Student questionnaire	17,590	15,360	87.28	87.33
Student assessment[1]	15,360	14,540	95.08	94.67
Parent questionnaire[2]	15,360	13,490	87.45	87.80
Teacher ratings of students[3]	15,360	14,080	91.64	91.66
School administrator questionnaire	750	740	98.53	98.80
Library media center questionnaire	750	720	95.93	95.48
Facilities checklist	750	750	100.00	100.00

[1] Percentage of cases for which a student questionnaire was obtained and for which a cognitive test was also obtained. Note that test scores have been imputed where missing so that test scores are available for all 15,362 questionnaire completers.

[2] Indicates a coverage rate: percentage of participating students with a parent report. More parents participated; these completion rates reflect the number of records in the public-use data file, where parent (and teacher) data were excluded for students who did not complete a base-year student questionnaire.

[3] Indicates a coverage rate: ratings obtained from at least one teacher.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002).

First follow-up response rates. First follow-up weighted response rates are reported at the student level only (the school sample was not strictly representative of the nation's high schools that have 12th grade in 2003–04). Overall, 14,990 of 16,520 sample members participated, for a weighted response rate of 88.7 percent. However, for the analysis population for this report—the senior cohort—the weighted response rate was 94.4 percent, with 13,420 seniors (of a possible 14,250) participating. Further details of first follow-up coverage and completion rates are provided in tables A-4 and A-5.

High school transcript response rates. A total of 1,549 out of 1,953 schools participated in the request for transcripts for an unweighted participation rate of 79.3 percent. The base-year school weighted response rate is 94.5 percent. The course offerings response rate for base-year schools is 88.0 percent. Ninety-one percent (90.7 percent, weighted) of the entire student sample have some transcript information (14,920 out of 16,373).

Table A-4. Summary of ELS:2002 first follow-up completion and coverage rates: 2004

Instrument	Selected	Participated	Weighted percent	Unweighted percent
Total sample for public-use file	16,520	14,990	88.70	90.76
Student questionnaire	13,090	12,430	93.39	94.92
Student mathematics assessment[1]	12,430	11,000	87.40	88.48
School administrator questionnaire[2]	12,430	11,860	95.90	95.41
Transfer questionnaire	1,800	1,280	68.36	70.87
Dropout questionnaire	880	690	73.20	78.31
Early graduate questionnaire	690	560	80.64	81.51
Homeschooled questionnaire	60	40	61.46	67.21

[1] Indicates a coverage rate: percentage of cases for which a student questionnaire was obtained and for which a cognitive test was also obtained. When a test was not obtained, test results were imputed.

[2] Indicates a coverage rate: percentage of students affiliated with base-year (2002) schools in 2004 (student questionnaire completers) for whom a school administrator report was obtained.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002).

Table A-5. Questionnaire completion rate for ELS:2002 senior cohort: 2004

Characteristic	Completed student questionnaire		Completed transfer questionnaire		Completion rate	
	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted
Total (2004 seniors)	96.84	96.78	74.32	73.79	94.42	94.25
Participated (n)		12,270		1,160		13,420
Sampled (n)		12,680		1,570		14,250
School control						
Public	96.77	96.57	73.63	72.07	94.30	93.89
Catholic	97.69	97.61	83.91	80.77	96.45	96.04
Other private	97.66	97.29	79.47	77.89	94.86	94.59
School location						
Urban	96.87	96.78	74.23	73.27	93.78	93.63
Suburban	96.58	96.72	75.03	74.52	94.44	94.52
Rural	97.46	96.94	72.55	73.09	95.25	94.66
School region[1]						
Midwest	97.54	97.53	69.40	70.36	94.44	94.41
Northeast	96.11	96.14	80.92	77.60	95.17	94.80
South	97.14	97.14	75.61	74.60	94.71	94.63
West	96.28	95.84	74.62	74.38	93.37	92.92
Race/ethnicity						
American Indian or Alaska Native	96.86	95.79	83.78	83.33	93.79	93.81
Asian or Pacific Islander	97.10	96.86	72.86	74.03	94.40	94.51
Black or African American	97.13	96.90	77.37	76.47	93.72	93.40
Hispanic or Latino	96.94	96.86	74.22	73.08	93.77	93.36
More than one race	96.60	95.19	67.61	63.74	93.19	91.07
White	96.77	96.87	73.48	73.91	94.82	94.87

[1] Region is defined by the U.S. Census Bureau based on the state in which the school is located.

NOTE: School-level variables—school control, location, and region—are based on the base-year school in 2002 for sophomore cohort members. For freshened students, the variable is based on the base-year school in 2004, the time point at which freshened seniors entered the sample.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002).

A.3.4 Quality of Estimates: Reliability and Validity of ELS:2002 Data

The transcript items used in this report are based on the student-level file. This file contains a record for each of the 14,920 sample members for whom a transcript was collected and passed the criteria for being considered a transcript respondent. A sample member was considered a respondent in the ELS:2002 transcript data file if the following criteria were met:

1. The sample member had at least one transcript sent from one of their schools; and
2. The sample member had at least one complete course record for at least one grade (9th, 10th, 11th, or 12th). A complete course record was defined as having nonmissing information on all of the following five variables for at least one course:
   - F1CCRSE: Course title;
   - F1CYEAR: School year in which course was taken;

- F1CGRLEV: Grade level in which course was taken;
- F1CCRED: School-assigned course credit; and
- F1CGRADE: Standardized course grade.

If sample members met the first criterion, but not the second, their transcripts were examined in more detail. If enough valuable information about courses (e.g., titles, terms, credits, or grades) were present and judged usable, the sample member was considered a respondent. A total of 14,290 sample members were classified as respondents in the ELS:2002 transcript data file.

Analysts should recognize and understand a key limitation of the transcript data. Fourteen percent of transcript respondents do not have 4 "complete" years of high school transcript information. This most often occurs when the data are missing or when the data are censored. Missing transcript information may result from unit nonresponse from the school, inability to obtain multiple transcripts for certain transfer students, or school recordkeeping errors or inconsistencies. In this case, the student *should* have 4 years of data but for one reason or another it was not reported. Censored data lead to fewer than 4 years of data because the student is a dropout, early graduate, or homeschooled. In this case, the student *should not* have 4 years of data. The information is "complete" in the sense that it captures the student's entire high school experience but is censored artificially by the student's pathway and status. There are also instances where the respondent has both missing and censored data. Since many variables are constructed under the assumption of having 4 years of data (e.g., total credits earned, overall high school GPA, etc.), recognizing this limitation is crucial to making accurate inferences from statistical analyses.

Most of the nontranscript items used in the ELS:2002 questionnaires were taken from prior studies, particularly HS&B and NELS:88. Given their past use with large, nationally representative samples, their measurement characteristics are well established. A number of data quality studies have been conducted using these items. Interested readers should see, in particular, reports by Fetters, Stowe, and Owings (1984), Kaufman and Rasinski (1991), and McLaughlin and Cohen (1997). Data quality analyses for the subset of new questionnaire items used in ELS:2002 (as well as the reading and mathematics assessments) can be found in the base-year field test report (Burns et al. 2003). The base-year and base-year to first follow-up data manuals (Ingels et al. 2004, 2005) also address issues of questionnaire and assessment data quality for both the ELS:2002 baseline and its first follow-up.

A.3.5 Survey Standard Errors

Because the ELS:2002 sample design involved stratification, the disproportionate sampling of certain strata, and clustered (i.e., multistage) probability sampling, the resulting statistics are more variable than they would have been if they had been based on data from a simple random sample of the same size.

Calculating exact standard errors for survey estimates can be difficult. Several procedures are available for calculating precise estimates of sampling errors for complex samples. Procedures such as Taylor Series approximations, Balanced Repeated Replication (BRR), and

Jackknife Repeated Replication (JRR), which can be found in advanced statistical programs such as SUDAAN, AM, or WESVAR, produce similar results. The ELS:2002 analyses included in this report used SUDAAN and the Taylor Series procedure to calculate standard errors.

A.3.6 Electronic Codebooks

An electronic codebook (ECB)[8] for the ELS:2002 base-year, first follow-up, and high school transcript combined data (NCES 2006–338) is available from NCES through a restricted-use licensing process. The ECB system is primarily an electronic version of a fully documented survey codebook. The data user can browse through all interview or instrument items (variables) contained in the ELS:2002 data files, search variable and value labels for key words related to particular research questions, review the actual wording of these items along with notes and other pertinent information related to them, examine the definitions and programs used to develop derived variables, and importantly, output the data for statistical analysis. The ECB also provides an electronic display of the distribution of counts and percentages for each variable in the dataset.

Analysts can use the ECB to select or "tag" variables of interest, print hardcopy codebooks that display the distributions of the tagged variables, and generate SAS and SPSS program syntax (including variable and value labels) that can be used with the analyst's own statistical software. Further details of the instrumentation, sample design, data collection results, data processing, and data files available for analysis may be found in the *Education Longitudinal Study of 2002: First Follow-up Transcript Component Data File Documentation* (Bozick et al. 2006).

A.4 Glossary—Description of Variables Used

Each variable used in analysis for this report is described below. The topic headings are student demographic characteristics, family characteristics, student transcript and educational characteristics, and mathematics achievement. To see the original questionnaires and obtain specific item wording and information about the context in which particular questions were posed, researchers can consult web-published portable document format (pdf) files containing the base-year and first follow-up questionnaires at http://www.nces.ed.gov/surveys/els2002/index.asp. Further information about the construction of composite variables (such as socioeconomic status [SES]), as well as the code used to construct these variables, can be found in the ECB (NCES 2006–338).

STUDENT DEMOGRAPHIC CHARACTERISTICS

NATIVE LANGUAGE (F1STLANG): The data for F1STLANG are taken directly from the base-year student questionnaire for base-year respondents or from the first follow-up new participant supplement. Otherwise, they are imputed. The native language of the student is classified as either English or a language other than English.

[8] Information on obtaining electronic codebooks for ELS:2002 and other NCES datasets can be found by reviewing the data products for the study at http://nces.ed.gov/pubsearch.

RACE/ETHNICITY (F1RACE): The race/ethnicity variable for this report includes five categories: (1) American Indian or Alaska Native; (2) Asian, including Native Hawaiian/Pacific Islander; (3) Black or African American; (4) Hispanic or Latino; and (5) White. All race categories exclude individuals of Hispanic or Latino origin.

The ELS:2002 race variables reflect new federal standards for collecting race and ethnicity data that allow respondents to mark more than one choice for race. For base-year respondents, information on race/ethnicity was obtained from the base-year student questionnaire when available or from (in order of preference) the sampling roster, the parent questionnaire if the parent respondent was a biological parent, or logical imputation based on other questionnaire items (e.g., surname, native language). The base-year race/ethnicity questions were asked in the first follow-up for newly participating students (i.e., base-year nonrespondents).

SEX (F1SEX): For base-year respondents, this variable was constructed from the base-year student questionnaire or, where missing, from (in order of preference) the school roster, logical imputation based on first name, or statistical imputation. In the first follow-up, students new to the study were asked whether their sex was male or female.

EXTRACURRICULAR PARTICIPATION (F1S27): Senior year extracurricular participation was classified into four groups: No participation; Less than 1 hour a week; 1 to 4 hours a week; and More than 4 hours a week.

WORK (F1S59; F1S60): Senior year employment was determined based on two questions. First, students were asked if they were ever employed for pay (F1S59, Have you ever worked for pay, not counting work around the house?). If yes, then students were asked how many hours per week on average they worked (F1S60). Those who were never employed or reported working zero hours per week were coded as (1) No employment. Others were coded as either working (2) 1 to 15 hours per week or (3) More than 15 hours per week.

FAMILY CHARACTERISTICS

FAMILY COMPOSITION/CONFIGURATION (F1FCOMP): F1FCOMP is based on BYFCOMP for base-year respondents and a surrogate for first follow-up new participants. New participants were asked to answer questions about family composition that were asked of parents in the base year. Because family composition can change over time, the variable is only an approximation, in that information was gathered at either of two time points (2002 or 2004) before combining into one measure. The nine response options include (1) Mother and father, (2) Mother and male guardian, (3) Father and female guardian, (4) Two guardians, (5) Mother only, (6) Father only, (7) Female guardian only, (8) Male guardian only, and (9) Lives with student less than half time. These categories were collapsed into four: Mother and father (1), Mother or father and guardian (2 and 3), Single parent—mother or father (5 and 6), and Other (4, 7, 8, and 9).

FATHER'S EDUCATION (F1FATHED): The variables F1FATHED and F1MOTHED were used to create F1SES1 as well as F1PARED. Father's highest level of education completed is taken from the parent questionnaire (BYP34A or BYP34B, depending on the sex of the respondent) or, where missing, from (in order of preference) the student questionnaire (BYS83B) or imputation. Eight distinct levels of education were identified: (1) Did not finish high school;

(2) Graduated from high school or GED; (3) Attended 2-year school, no degree; (4) Graduated from 2-year school; (5) Attended college, no 4-year degree; (6) Graduated from college; (7) Completed master's degree or equivalent; and (8) Completed Ph.D., M.D., or other advanced degree. Note that for about 1 percent of cases, a respondent classified under mother's education could be a male spouse/partner of a 10th-grader's biological or adoptive father and vice versa: a respondent classified under father's education could be a female spouse/partner of a 10th-grader's biological or adoptive mother.

MOTHER'S EDUCATION (F1MOTHED): Mother's highest level of education completed is taken from the parent questionnaire or, where missing, from (in order of preference) the student questionnaire (base year for base-year respondents, first follow-up for base-year nonrespondents) or imputation. Eight distinct levels of education are identified: (1) Did not finish high school; (2) Graduated from high school or GED; (3) Attended 2-year school, no degree; (4) Graduated from 2-year school; (5) Attended college, no 4-year degree; (6) Graduated from college; (7) Completed master's degree or equivalent; and (8) Completed Ph.D., M.D., or other advanced degree. (Also, see note on father's education, above.)

PARENTS' EDUCATION (F1PARED): F1PARED is equivalent to either F1MOTHED or F1FATHED, whichever is the highest level of education. For base-year respondents, mother's/father's highest level of education completed is taken from the parent questionnaire or, where missing, from (in order of preference) the base-year student questionnaire or imputation. For base-year nonrespondents who were first follow-up respondents, this information was taken from the New Participant Supplement. Eight distinct levels of education are identified: (1) Did not finish high school; (2) Graduated from high school or GED; (3) Attended 2-year school, no degree; (4) Graduated from 2-year school; (5) Attended college, no 4-year degree; (6) Graduated from college; (7) Completed master's degree or equivalent; and (8) Completed Ph.D., M.D., or other advanced degree. For this report, the eight levels of PARED were collapsed into three: High school or less (1 and 2); Some college (3, 4, 5); and 4-year college degree or higher (6, 7, and 8).

SOCIOECONOMIC STATUS (F1SES1QU): Socioeconomic status exists as both a continuous variable and as a categorical variable based on weighted quarters. The categorical form of the variable (F1SES1Q) divides SES1 into quarters based on the weighted marginal distribution. It was recoded to combine the middle two categories of the SES1QU variable. Three categories result: (1) lowest quarter of SES1 (i.e., students below the 25th percentile rank for SES); (2) middle two quarters of SES1 (i.e., students whose SES percentile rank was at least 25th and below 75th); and (3) highest quarter of SES1 (i.e., students whose SES percentile rank was at least 75th).

F1SES1 is a NLS-72/HS&B/NELS:88-comparable composite variable constructed from parent questionnaire data when available and from imputation or student substitutions when not. SES is based on five equally weighted, standardized components: father's/guardian's education (F1FATHED), mother's/guardian's education (F1MOTHED), family income (BYINCOME), father's/guardian's occupational prestige score (from F1OCCUFATH), and mother's/guardian's occupational prestige score (from F1OCCUMOTH).

For a description of how F1FATHED and F1MOTHED were constructed, see above. Income was based on parent questionnaire information or imputed otherwise. The parent questionnaire was the preferred source of data for OCCUFATH and OCCUMOTH. Parent questionnaire respondents were asked to describe the father's and mother's occupations and subsequently code each into one of 17 categories. If the respondent provided only text, project staff coded the occupation. In the absence of parent questionnaire occupation data, student-supplied parent occupation text from the base year (for base-year respondents) or first follow-up (for base-year nonrespondents who responded in the first follow-up) was coded by project staff, if possible. Missing occupations were imputed. An occupation prestige value was determined for F1OCCUM and F1OCCUF based on the 1961 Duncan SEI index.

STUDENT TRANSCRIPT AND EDUCATIONAL CHARACTERISTICS

Course-taking. Course-taking patterns will be measured using the following composite variables:

- F1RHTUN: Total course credits earned;
- F1RHTAC: Total course credits earned in academic subjects;
- F1RHTVO: Total course credits earned in vocational subjects;
- F1RMAT_C: Total course credits earned in mathematics;
- F1RSCI_C: Total course credits earned in science;
- F1RENG_C: Total course credits earned in English;
- F1RSOC_C: Total course credits earned in social studies;
- F1RFIN_C: Total course credits earned in fine arts; and
- F1RNON_C: Total course credits earned in non-English language.

For clarity of presentation and ease of interpretation, these credit count variables are treated in some tables as a three-category variable indicating low credit counts, medium credit counts, and high credit counts. These categories were constructed by dividing the distribution of credits into four quarters. Student whose percentile rank on this distribution was below 25th were classified as low. Students whose percentile rank on this distribution was at least 25th and below 75th were classified as medium. Students whose percentile rank on this distribution was at least 75th were classified as high.

Also included in this report are measures of Advanced Placement (AP) and International Baccalaureate (IB) coursetaking:

- F1RAPIB: Total course credits earned in AP/IB courses;
- F1RAPMA: Total course credits earned in AP/IB mathematics courses; and
- F1RAPCA: Total course credits earned in AP/IB calculus.

Mathematics and science course-taking pipeline. An ordinal composite variable (F1RMAPIP) indicates the highest level of mathematics for which the student received non-zero credit while in high school. The original mathematics pipeline measure was created by Burkam

and Lee (2003) using transcript data from NELS:88.[9] They assigned 47 high school courses (with non-zero enrollment) to one of four levels based on their Classification of Secondary School Courses (CSSC) codes and a description of course content: nonacademic mathematics courses, low academic mathematics courses, middle academic mathematics courses, and advanced academic mathematics courses. This initial 4-level measure was later expanded to create a more sensitive 8-level measure. Additionally, as new courses were detected in subsequent transcript studies, they were incorporated into the pipeline at the appropriate level:[10]

1. No mathematics;
2. Nonacademic mathematics (basic mathematics, consumer mathematics);
3. Low academic mathematics (pre-algebra);
4. Middle academic mathematics I (algebra I and geometry);
5. Middle academic mathematics II (algebra II);
6. Advanced mathematics I (trigonometry, analytical geometry, statistics);
7. Advanced mathematics II (pre-calculus); and
8. Advanced mathematics III (calculus).

For this report, the eight levels of F1RMAPIP were collapsed into five to report the highest level of mathematics taken in high school: No mathematics (1); Basic mathematics and pre-algebra (2 and 3); Core secondary through algebra II (4 and 5); trigonometry, statistics, pre-calculus (6 and 7); and calculus (8).

An ordinal composite variable (F1RSCPIP) indicates the highest level of science for which the student received non-zero credit while in high school. Also developed by Burkam and Lee, this variable captures the "breadth and depth" of a student's science coursetaking histories using four criteria: (1) subject matter taken, (2) when taken (e.g., freshman, sophomore, junior, or senior year), (3) whether taken with another science course, and (4) academic difficulty. The continuum reflects the order of the most common science curriculum used in schools where students take general science courses first, followed by biology, then chemistry, and finally physics. Recent analyses of science coursetaking using NCES data have realigned the positioning of advanced biology. The current science coursetaking pipeline measure contains eight categories:

1. No science;
2. Primary physical science;
3. Secondary physical science/basic biology;

[9] The conceptualization and construction of the mathematics coursetaking pipeline (F1RMAPIP), the science coursetaking pipeline (F1RSCPIP), and the non-English language pipeline (F1RNEPIP) were modeled after initial research done by Burkam and Lee (2003) using the transcript data in NELS:88. See Burkam and Lee (2003) for more detailed information on these measures.

[10] When analyzing multiple indicators of coursetaking, users may note that students coded as having taken "no math" on F1RMAPIP have some mathematics credit recorded on their transcript (e.g., vocational or occupational mathematics). This is because the original mathematics pipeline construction was based on 47 courses and did not consider certain lower level and/or remedial courses to count toward the pipeline.

4. General biology;
5. Chemistry I or physics I;
6. Chemistry I and physics I;
7. Chemistry II or physics II or advanced biology; and
8. Chemistry and physics and level 7.

Academic program. There are three variables that indicate overall coursetaking patterns: F1RACADC, F1ROCCUC, and F1RTRPG:

- F1RACADC: Academic concentrator;
- F1ROCCUC: Occupational concentrator; and
- F1RTRPG: Transcript indicated curriculum concentration.

The first variable, F1RACADC, indicates whether the student met the minimum requirements to be considered an academic concentrator. These minimum requirements include

- four credits of English;
- one mathematics credit higher than middle academic II on the mathematics pipeline (F1RMAPIP) and any two other credits in math;
- one science credit higher than general biology on the science pipeline (F1RSCPIP) and any two other credits in science;
- one credit of social studies in U.S. or world history and any two other credits in social studies; and
- two credits in a single foreign language.

The second coursetaking pattern variable, F1ROCCUC, indicates whether the student met the minimum requirements to be considered an occupational concentrator. To be considered an occupational concentrator, the respondent must have earned at least three credits in one specific labor market preparation area.

The third coursetaking pattern variable, F1RTRPRG, combines the information from F1RACADC and F1ROCCUC to jointly indicate meeting the academic and/or occupational concentrator requirements. This categorical variable includes four categories: Academic concentrator (only); Occupational concentrator (only); Academic concentrator and occupational concentrator; and General. Those following a general curriculum met the criteria of neither an academic nor an occupational concentration. Because this variable is based on updated definitions of academic and occupational concentrator, it is *not* directly comparable to a similar variable (F2RTRPRG) in NELS:88.

Grade point average: Grade point average is measured two ways: overall academic grade point average (F1RAGP) and overall grade point average (F1RGP). Academic grade point average is based on grades received in academic courses (math, science, English, social studies,

fine arts, and non-English language), while overall grade point average is based on grades received in all courses.

Student status. The variable F1RTROUT indicates the final student status (i.e., mode of high school exit) as it appears on the most recent school transcript and includes 17 categories:

1. Fall 2003–summer 2004 graduate;
2. Post-summer 2004 graduate;
3. Pre-fall 2003 graduate;
4. Graduation date unknown;
5. Diploma with special education adjustments;
6. Certificate of attendance;
7. Still enrolled in school;
8. Dropped out;
9. Transferred;
10. Died;
11. Left for health-related reason;
12. Received General Educational Development (GED) certification;
13. Withdrew;
14. Dismissed;
15. Incarcerated;
16. Other; and
17. Status cannot be determined.

Two sets of information about the student's base-year (BY) school and information about the student's final transfer school were used to construct the school control, location, and region variables. If the student was enrolled in the same school in the BY interview and at the time of high school exit, the student will have information listed only for one school: the BY school. If the student transferred out of the BY school and the final transfer school provided transcripts, information will be listed on two schools: the BY school and the final transfer school. Only two schools were contacted for transcript information for transfer students: the BY school and the final transfer school. There is no school-level information available for other schools that the student may have attended in the interim. For example, if the student attended Roosevelt High for 9th and 10th grade, transferred to St. James for 11th grade, and transferred to Eisenhower High for 12th grade, information would only be collected from Roosevelt High (the BY school) and Eisenhower High (the final transfer school).

The variable F1RTRFLG indicates the extent of transcript coverage across years. It includes five categories:

0. No transcript data for any year;

1. Transcript data for 1 academic year;

2. Transcript data for 2 academic years;

3. Transcript data for 3 academic years; and

4. Transcript data for 4 academic years.

Those classified as 1, 2, 3, or 4 on F1RTRFLG are respondents. Respondents are considered to have transcript information for an academic year if they have at least one complete course record for that academic year.

SCHOOL CONTROL (F1RS1CTR; F1RS2CTR): This variable indicates the type of school attended by the respondent in the base-year and, if applicable, the transfer school. Students were classified by the consistency across these two school sectors. The resulting variable includes four categories: Public school, Catholic school, Other private school, and Mixed.

SCHOOL LOCATION (F1RS1URB; F1RS2URB): This variable indicates the location of the school attended by the respondent in the base-year and, if applicable, the transfer school. Students were classified by the consistency across these two school locations. If students attended schools in the same location for both schools, they were assigned that location. If not, they were classified as "mixed." The resulting variable includes four levels: Urban—large or mid-size central city; Suburban—large or small town or urban fringe of a large or mid-size city; Rural—school in a rural area; and Mixed.

SCHOOL REGION (F1RS1REG; F1RS2REG): This variable indicates the region of the school attended by the respondent in the base-year school and, if applicable, the transfer school. Students were classified by the consistency across these two school regions. If students attended school in the same region for both schools, they were assigned that region. If not, they were classified as "mixed." The resulting variable includes five categories: Northeast; Midwest; South; West; and Mixed.

MATHEMATICS ACHIEVEMENT

PROBABILITY OF PROFICIENCY SCORES IN MATHEMATICS (F1TX1MPP, F1TX2MPP, F1TX3MPP, F1TX4MPP, F1TX5MPP): Mathematics achievement tests were administered to students who remained in their base-year school in their senior year. From these tests, criterion-referenced proficiency probability scores were created. These scores are based on clusters of items that mark different levels on the mathematics scale developed in NELS:88.

Mathematics levels include

- simple arithmetical operations on whole numbers (level 1);
- simple operations with decimals, fractions, powers, and roots (level 2);
- simple problem solving, requiring the understanding of low-level mathematical concepts (level 3);

- understanding of intermediate-level mathematical concepts and/or multistep solutions to word problems (level 4); and
- complex multistep word problems and/or advanced mathematics material (level 5).

The proficiency levels are hierarchical in the sense that mastery of a higher level typically implies proficiency at lower levels. The proficiency probabilities were computed using item response theory (IRT)-estimated item parameters calibrated in NELS:88. Each proficiency probability represents the likelihood that a student would pass a given proficiency level defined as above in the NELS:88 sample. Note that probability of proficiency scores are IRT-derived estimates based on overall performance, rather than counts of actual item responses. Not all students received all test items, owing to the two-stage adaptive format of the ELS:2002 base-year assessments and to assignment of forms of varying difficulty in the first follow-up based on the prior round ability estimate. Nevertheless, the IRT model permits proficiency probabilities to be estimated, even for those sophomores who were not administered a particular proficiency cluster. Table A-6 shows variable names, descriptions, and summary statistics for the five ELS:2002 proficiency probability scores.

Table A-6. ELS:2002 item response theory (IRT) NELS:88-equated estimated number-right score and proficiency probability scores: 2004

Variable name	Description	Range	Weighted mean	Weighted standard deviation
F1NELS2M	Mathematics—NELS-equated estimated number right (1992 scale)	0–81	50.1	14.2
F1TX1MPP	Mathematics—level 1	0–1	0.96	0.12
F1TX2MPP	Mathematics—level 2	0–1	0.78	0.37
F1TX3MPP	Mathematics—level 3	0–1	0.62	0.45
F1TX4MPP	Mathematics—level 4	0–1	0.35	0.41
F1TX5MPP	Mathematics—level 5	0–1	0.04	0.14

SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002).

This report illustrates a cross-sectional use of the probability of proficiency scores: proficiency probabilities are averaged to produce estimates of mastery rates, both overall and within population subgroups. (Note that dichotomous proficiency scores [as appeared on the NELS:88 dataset], indicating in yes/no fashion whether a given student is proficient at a particular level, have not been produced for the ELS:2002 data.) Because the range of the scores is zero to one, means can be expressed in percentage form. For example, the weighted mean for mastery of mathematics level 1 is 0.96, which is equivalent to saying that 96 percent of test takers achieved mastery at this level (simple arithmetical operations on whole numbers). Although the continuous probability of proficiency scores can be used to measure status, they are perhaps most useful for measuring change. A sophomore trend report (currently in preparation) will illustrate the use of the proficiency probabilities in measuring intercohort change (essentially, because NELS:88 and ELS:2002 have been equated and are on the same scale, mean gain or loss across cohorts at any proficiency level can be measured by subtracting the NELS:88 score from the ELS:2002 score). With the addition of the ELS:2002 first follow-up data, the probability of proficiency scores can also be used longitudinally to measure achievement gain. Because base-year and first follow-up data are on the same vertical scale, mean gain (or loss) can be determined by subtracting the base-year probability score from the first follow-up probability

score. Measuring gains in probability of proficiency at each mastery level permits researchers to investigate not only the amount of gain in total scale score points but also where (that is, what proficiency level) along the score scale different students are making their largest gains in achievement between sophomore and senior year. In turn, it is possible to relate gains in specific skills to specific school processes or curricular experiences.

EDUCATIONAL EXPECTATIONS

EDUCATIONAL EXPECTATIONS (F1STEXP): This variable is taken directly from the student questionnaire when available and imputed otherwise. Students were asked, "As things stand now, how far in school do you think you will get?"[11] The eight response options were (1) Less than high school graduation; (2) High school graduation or GED only; (3) Attend or complete a 2-year school course in a community college or vocational school; (4) Attend college, but not complete a 4-year degree; (5) Graduate from college; (6) Obtain a master's degree or equivalent; (7) Obtain a Ph.D., M.D., or other advanced degree; and (8) Don't know. These categories were collapsed into five: High school diploma or less (1 and 2), Some college (3 and 4), College graduate (5), Graduate/professional degree (6 and 7), and Don't know (8).

[11] While the expectations for the educational attainment variable are subject to the limitations of single-item measures, it is repeated over time, that is, asked on a cross-round basis. It has been one of the most frequently employed variables in analyzing both HS&B data and NELS:88, showing expected relationships with related variables when incorporated into multivariate models (see, for example, Kao and Tienda [1998]; Plank and Jordan [2001]; Smith-Maddox [1999, 2000]). Cross-round analyses in NELS:88 show that the expectation question behaves the way it "should" (in relation to what is theoretically expected) over time, with diminishing expectations as students accumulate a more realistic picture of their capacities and the world (see McLaughlin and Cohen [1997]). Adelman (1999, 2006) has created an analytically useful composite variable out of the across-wave instances of the expectation and timing of college entrance variables, looking at stability and change in anticipations at two points in time.

A.5 Appendix A References

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Appendix B
Standard Error Tables

Table B-1. Standard errors for table 1 estimates (mean total course credits earned by high school graduates, by selected student characteristics): Academic year 2003–04

Characteristic	Mean course credits earned	Mean course credits earned in academic subjects	Mean course credits earned in vocational subjects
Total	0.10	0.09	0.06
Sex			
Male	0.11	0.10	0.08
Female	0.10	0.10	0.06
Race/ethnicity[1]			
American Indian or Alaska Native	0.63	0.59	0.30
Asian or Pacific Islander	0.18	0.19	0.10
Black or African American	0.21	0.16	0.12
Hispanic or Latino	0.21	0.19	0.09
White	0.12	0.10	0.08
Socioeconomic status			
Lowest quarter	0.15	0.12	0.10
Middle two quarters	0.11	0.10	0.07
Highest quarter	0.13	0.12	0.06
Native language[2]			
English	0.10	0.09	0.07
Non-English	0.19	0.17	0.08
Parents' education			
High school or less	0.13	0.11	0.09
Some college	0.11	0.11	0.07
4-year college degree or more	0.12	0.10	0.06
Family composition			
Mother and father	0.11	0.10	0.06
Mother or father and guardian	0.13	0.13	0.09
Single parent (mother or father)	0.13	0.12	0.08
Other[3]	0.24	0.23	0.17
Extracurricular participation			
No participation	0.12	0.11	0.09
< 1 hour a week	0.15	0.14	0.11
1–4 hours a week	0.14	0.13	0.08
> 4 hours a week	0.11	0.10	0.06
Employment			
No employment	0.12	0.12	0.07
1–15 hours a week	0.13	0.12	0.07
> 15 hours a week	0.12	0.10	0.08

See notes at end of table.

Table B-1. Standard errors for table 1 estimates (mean total course credits earned by high school graduates, by selected student characteristics): Academic year 2003–04—Continued

Characteristic	Mean course credits earned	Mean course credits earned in academic subjects	Mean course credits earned in vocational subjects
School control[4]			
Public	0.11	0.09	0.07
Catholic	0.25	0.17	0.08
Other private	0.42	0.37	0.11
Mixed	0.33	0.37	0.18
School location[4]			
Urban	0.20	0.17	0.10
Suburban	0.14	0.11	0.09
Rural	0.20	0.24	0.15
Mixed	0.26	0.23	0.19
School region[4,5]			
Northeast	0.19	0.17	0.18
Midwest	0.25	0.18	0.13
South	0.15	0.11	0.10
West	0.20	0.26	0.09
Mixed	0.51	0.50	0.32

[1] All race categories exclude Hispanic or Latino origin.
[2] The first language students learned to speak when they were children.
[3] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.
[4] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school control, location, and region variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).
[5] Region is defined by the U.S. Census Bureau based on the state in which the school is located.
NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Core courses represent all courses in mathematics, science, English, social studies, fine arts, and non-English language. Vocational courses represent all courses in family and consumer sciences, general labor market preparation, and specific labor market preparation. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table B-2a. Standard errors for table 2a estimates (mean total course credits earned in academic courses by high school graduates, by selected student characteristics): Academic year 2003–04

Characteristic	Mean course credits earned in academic subjects	Mean course credits earned in mathematics	Mean course credits earned in science	Mean course credits earned in English
Total	0.09	0.02	0.02	0.02
Sex				
Male	0.10	0.02	0.03	0.03
Female	0.10	0.02	0.02	0.03
Race/ethnicity[1]				
American Indian or Alaska Native	0.59	0.13	0.19	0.21
Asian or Pacific Islander	0.19	0.04	0.06	0.05
Black or African American	0.16	0.05	0.05	0.05
Hispanic or Latino	0.19	0.04	0.04	0.06
White	0.10	0.02	0.02	0.03
Socioeconomic status				
Lowest quarter	0.12	0.03	0.03	0.04
Middle two quarters	0.10	0.02	0.02	0.03
Highest quarter	0.12	0.03	0.03	0.03
Native language[2]				
English	0.09	0.02	0.02	0.02
Non-English	0.17	0.04	0.04	0.05
Parents' education				
High school or less	0.11	0.03	0.03	0.03
Some college	0.11	0.03	0.03	0.03
4-year college degree or more	0.10	0.02	0.03	0.03
Family composition				
Mother and father	0.10	0.02	0.02	0.03
Mother or father and guardian	0.13	0.03	0.03	0.04
Single parent (mother or father)	0.12	0.03	0.03	0.03
Other[3]	0.23	0.06	0.07	0.07
Extracurricular participation				
No participation	0.11	0.03	0.03	0.03
< 1 hour a week	0.14	0.04	0.04	0.04
1–4 hours a week	0.13	0.03	0.04	0.03
> 4 hours a week	0.10	0.02	0.03	0.03
Employment				
No employment	0.12	0.03	0.03	0.03
1–15 hours a week	0.12	0.03	0.03	0.03
> 15 hours a week	0.10	0.03	0.03	0.03

See notes at end of table.

Table B-2a. Standard errors for table 2a estimates (mean total course credits earned in academic courses by high school graduates, by selected student characteristics): Academic year 2003–04—Continued

Characteristic	Mean course credits earned in academic subjects	Mean course credits earned in mathematics	Mean course credits earned in science	Mean course credits earned in English
School control[4]				
Public	0.09	0.02	0.02	0.03
Catholic	0.17	0.03	0.06	0.06
Other private	0.37	0.07	0.06	0.08
Mixed	0.37	0.11	0.10	0.10
School location[4]				
Urban	0.17	0.04	0.05	0.04
Suburban	0.11	0.03	0.03	0.03
Rural	0.24	0.05	0.05	0.07
Mixed	0.23	0.07	0.06	0.09
School region[4,5]				
Northeast	0.17	0.05	0.06	0.04
Midwest	0.18	0.03	0.04	0.05
South	0.11	0.03	0.03	0.03
West	0.26	0.05	0.04	0.07
Mixed	0.50	0.21	0.16	0.14

[1] All race categories exclude Hispanic or Latino origin.
[2] The first language students learned to speak when they were children.
[3] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.
[4] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school control, location, and region variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).
[5] Region is defined by the U.S. Census Bureau based on the state in which the school is located.
NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Core courses represent all courses in mathematics, science, English, social studies, fine arts, and non-English language. Vocational courses represent all courses in family and consumer sciences, general labor market preparation, and specific labor market preparation. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table B-2b. Standard errors for table 2b estimates (mean total course credits earned in academic courses by high school graduates, by selected student characteristics): Academic year 2003–04

Characteristic	Mean course credits earned in academic subjects	Mean course credits earned in social studies	Mean course credits earned in fine arts	Mean course credits earned in non-English language
Total	0.09	0.03	0.03	0.03
Sex				
Male	0.10	0.03	0.04	0.03
Female	0.10	0.03	0.04	0.03
Race/ethnicity[1]				
American Indian or Alaska Native	0.59	0.26	0.26	0.19
Asian or Pacific Islander	0.19	0.05	0.07	0.06
Black or African American	0.16	0.05	0.07	0.06
Hispanic or Latino	0.19	0.05	0.07	0.06
White	0.10	0.03	0.04	0.03
Socioeconomic status				
Lowest quarter	0.12	0.04	0.05	0.04
Middle two quarters	0.10	0.03	0.04	0.03
Highest quarter	0.12	0.04	0.06	0.03
Native language[2]				
English	0.09	0.03	0.04	0.03
Non-English	0.17	0.05	0.06	0.06
Parents' education				
High school or less	0.11	0.03	0.05	0.03
Some college	0.11	0.04	0.04	0.03
4-year college degree or more	0.10	0.03	0.05	0.03
Family composition				
Mother and father	0.10	0.03	0.04	0.03
Mother or father and guardian	0.13	0.05	0.06	0.04
Single parent (mother or father)	0.12	0.04	0.05	0.04
Other[3]	0.23	0.08	0.09	0.09
Extracurricular participation				
No participation	0.11	0.04	0.04	0.04
< 1 hour a week	0.14	0.05	0.06	0.05
1–4 hours a week	0.13	0.04	0.07	0.04
> 4 hours a week	0.10	0.03	0.05	0.03
Employment				
No employment	0.12	0.03	0.06	0.04
1–15 hours a week	0.12	0.04	0.05	0.04
> 15 hours a week	0.10	0.03	0.04	0.03

See notes at end of table.

Table B-2b. Standard errors for table 2b estimates (mean total course credits earned in academic courses by high school graduates, by selected student characteristics): Academic year 2003–04—Continued

Characteristic	Mean course credits earned in academic subjects	Mean course credits earned in social studies	Mean course credits earned in fine arts	Mean course credits earned in non-English language
School control[4]				
Public	0.09	0.03	0.04	0.03
Catholic	0.17	0.07	0.10	0.06
Other private	0.37	0.13	0.21	0.14
Mixed	0.37	0.09	0.14	0.17
School urbanicity[4]				
Urban	0.17	0.05	0.07	0.05
Suburban	0.11	0.04	0.04	0.04
Rural	0.24	0.08	0.08	0.06
Mixed	0.23	0.08	0.10	0.08
School region[4,5]				
Northeast	0.17	0.06	0.07	0.06
Midwest	0.18	0.06	0.07	0.05
South	0.11	0.04	0.06	0.03
West	0.26	0.08	0.08	0.06
Mixed	0.50	0.13	0.20	0.18

[1] All race categories exclude Hispanic or Latino origin.
[2] The first language students learned to speak when they were children.
[3] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.
[4] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school sector, region, and urbanicity variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).
[5] Region is defined by the U.S. Census Bureau based on the state in which the school is located.
NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table B-3. Standard errors for table 3 estimates (percentage of high school graduates earning any credit for Advanced Placement [AP] and International Baccalaureate [IB] courses, by selected student characteristics): Academic year 2003–04

Characteristic	Percent earning any credits in AP/IB courses	Percent earning any credits in AP/IB mathematics courses	Percent earning any credits in AP/IB calculus courses
Total	0.85	0.59	0.46
Sex			
Male	0.96	0.72	0.62
Female	1.07	0.66	0.53
Race/ethnicity[1]			
American Indian or Alaska Native	4.69	2.57	2.57
Asian or Pacific Islander	2.56	2.30	2.12
Black or African American	1.37	0.68	0.54
Hispanic or Latino	1.72	0.75	0.60
White	1.04	0.72	0.60
Socioeconomic status			
Lowest quarter	1.10	0.56	0.50
Middle two quarters	0.89	0.52	0.41
Highest quarter	1.35	1.22	1.00
Native language[2]			
English	0.90	0.61	0.49
Non-English	1.79	1.11	1.00
Parents' education			
High school or less	1.03	0.58	0.50
Some college	0.94	0.49	0.40
4-year college degree or more	1.22	1.02	0.81
Family composition			
Mother and father	0.99	0.73	0.60
Mother or father and guardian	1.37	0.76	0.57
Single parent (mother or father)	1.20	0.77	0.67
Other[3]	1.83	1.14	1.06
Extracurricular participation			
No participation	0.93	0.47	0.38
< 1 hour a week	1.69	1.00	0.81
1–4 hours a week	1.40	0.89	0.77
> 4 hours a week	1.19	0.95	0.81
Employment			
No employment	1.35	1.06	0.89
1–15 hours a week	1.26	0.94	0.80
> 15 hours a week	0.96	0.59	0.50

See notes at end of table.

Table B-3. Standard errors for table 3 estimates (percentage of high school graduates earning any credit for Advanced Placement [AP] and International Baccalaureate [IB] courses, by selected student characteristics): Academic year 2003–04—Continued

Characteristic	Percent earning any credits in AP/IB courses	Percent earning any credits in AP/IB mathematics courses	Percent earning any credits in AP/IB calculus courses
School control[4]			
Public	0.91	0.63	0.48
Catholic	2.65	1.48	1.50
Other private	4.83	3.21	2.93
Mixed	5.30	1.91	1.71
School location[4]			
Urban	1.79	1.25	0.97
Suburban	1.19	0.85	0.68
Rural	1.67	1.00	0.76
Mixed	2.28	0.88	0.88
School region[4,5]			
Northeast	1.92	1.66	1.20
Midwest	1.67	0.92	0.83
South	1.40	0.96	0.74
West	1.98	1.33	1.04
Mixed	7.42	3.95	3.95

[1] All race categories exclude Hispanic or Latino origin.
[2] The first language students learned to speak when they were children.
[3] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.
[4] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school sector, region, and urbanicity variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).
[5] Region is defined by the U.S. Census Bureau based on the state in which the school is located.
NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table B-4. Standard errors for table 4 estimates (percentage distribution of high school graduates in academic and occupational programs, by selected student characteristics): Academic year 2003–04

Characteristic	Academic concentration	Occupational concentration	Academic and occupational concentration	General curriculum
Total	0.83	0.62	0.29	0.94
Sex				
Male	0.97	0.84	0.38	1.13
Female	0.99	0.68	0.30	1.07
Race/ethnicity[1]				
American Indian or Alaska Native	4.81	4.14	1.00	5.40
Asian or Pacific Islander	2.26	0.97	0.47	2.22
Black or African American	1.52	1.53	1.07	2.12
Hispanic or Latino	1.22	1.05	0.54	1.56
White	1.06	0.79	0.29	1.11
Socioeconomic status				
Lowest quarter	0.89	1.14	0.48	1.39
Middle two quarters	0.88	0.80	0.36	1.08
Highest quarter	1.42	0.64	0.44	1.53
Native language[2]				
English	0.90	0.68	0.31	1.02
Non-English	1.46	1.08	0.42	1.77
Parents' education				
High school or less	0.88	1.02	0.42	1.26
Some college	0.98	0.91	0.38	1.16
4-year college degree or more	1.20	0.62	0.42	1.28
Family composition				
Mother and father	0.98	0.69	0.32	1.10
Mother or father and guardian	1.33	1.26	0.65	1.57
Single parent (mother or father)	1.15	1.02	0.47	1.39
Other[3]	1.93	2.51	0.85	3.05
Extracurricular participation				
No participation	0.87	1.04	0.35	1.22
< 1 hour a week	1.58	1.31	0.62	1.87
1–4 hours a week	1.40	1.04	0.58	1.64
> 4 hours a week	1.17	0.78	0.44	1.21
Employment				
No employment	1.23	0.84	0.43	1.40
1–15 hours a week	1.33	0.91	0.36	1.46
> 15 hours a week	0.93	0.84	0.41	1.07

See notes at end of table.

Table B-4. Standard errors for table 4 estimates (percentage distribution of high school graduates in academic and occupational programs, by selected student characteristics): Academic year 2003–04—Continued

Characteristic	Academic concentration	Occupational concentration	Academic and occupational concentration	General curriculum
School control[4]				
Public	0.87	0.68	0.31	1.00
Catholic	3.56	0.86	0.35	3.65
Other private	4.06	0.48	0.36	4.21
Mixed	4.62	2.44	0.37	4.81
School location[4]				
Urban	1.69	0.99	0.68	1.86
Suburban	1.17	0.85	0.41	1.35
Rural	1.90	1.92	0.34	2.04
Mixed	1.72	2.65	0.87	3.21
School region[4,5]				
Northeast	2.37	1.61	1.05	2.43
Midwest	1.60	1.44	0.42	1.97
South	1.24	0.98	0.48	1.26
West	1.62	0.99	0.34	1.97
Mixed	6.64	5.09	0.70	7.59

[1] All race categories exclude Hispanic or Latino origin.
[2] The first language students learned to speak when they were children.
[3] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.
[4] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school sector, region, and urbanicity variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).
[5] Region is defined by the U.S. Census Bureau based on the state in which the school is located.
NOTE: The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table B-5. Standard errors for table 5 estimates (percentage distribution of high school graduates completing various mathematics course levels since 9th grade, by selected student characteristics): Academic year 2003–04

Characteristic	Highest mathematics course level taken since 9th grade[1]				
	Level 1	Level 2	Level 3	Level 4	Level 5
Total	0.10	0.33	0.91	0.82	0.53
Sex					
Male	0.15	0.45	1.07	0.94	0.71
Female	0.10	0.38	1.09	1.03	0.64
Race/ethnicity[2]					
American Indian or Alaska Native	2.42	4.68	6.17	5.19	2.65
Asian or Pacific Islander	0.25	0.43	2.37	2.21	2.45
Black or African American	0.42	0.96	2.15	2.15	0.67
Hispanic or Latino	0.16	1.05	1.87	1.73	0.84
White	0.11	0.36	1.09	0.97	0.67
Socioeconomic status					
Lowest quarter	0.31	0.81	1.39	1.23	0.67
Middle two quarters	0.12	0.43	1.05	0.96	0.51
Highest quarter	0.09	0.36	1.14	1.26	1.07
Native language[3]					
English	0.10	0.33	0.96	0.87	0.56
Non-English	0.19	0.92	2.00	1.50	1.23
Parents' education					
High school or less	0.26	0.71	1.20	1.06	0.66
Some college	0.15	0.52	1.23	1.13	0.57
4-year college degree or more	0.08	0.36	1.11	1.10	0.89
Family composition					
Mother and father	0.07	0.37	1.05	0.95	0.68
Mother or father and guardian	0.34	0.66	1.68	1.56	0.73
Single parent (mother or father)	0.23	0.69	1.38	1.34	0.76
Other[4]	0.98	2.26	3.23	2.68	1.44
Extracurricular participation					
No participation	0.26	0.75	1.38	1.37	0.54
< 1 hour a week	0.24	0.87	1.84	1.72	0.99
1–4 hours a week	0.17	0.46	1.47	1.51	0.90
> 4 hours a week	0.08	0.29	1.15	1.13	0.89
Employment					
No employment	0.13	0.65	1.50	1.29	1.03
1–15 hours a week	0.17	0.40	1.26	1.20	0.89
> 15 hours a week	0.15	0.43	1.05	1.01	0.58

See notes at end of table.

Table B-5. Standard errors for table 5 estimates (percentage distribution of high school graduates completing various mathematics course levels since 9th grade, by selected student characteristics): Academic year 2003–04—Continued

Characteristic	Highest mathematics course level taken since 9th grade[1]				
	Level 1	Level 2	Level 3	Level 4	Level 5
School control[5]					
Public	0.11	0.36	0.98	0.88	0.55
Catholic	0.10	0.12	2.68	2.57	1.84
Other private	0.23	0.07	3.01	2.71	3.98
Mixed	†	0.26	5.07	5.23	3.79
School location[5]					
Urban	0.25	0.56	1.78	1.74	1.06
Suburban	0.12	0.47	1.27	1.04	0.77
Rural	0.16	0.77	2.02	1.98	1.08
Mixed	0.38	1.93	3.36	2.59	1.56
School region[5,6]					
Northeast	0.23	0.85	2.32	2.00	1.45
Midwest	0.21	0.66	1.65	1.78	0.89
South	0.19	0.46	1.35	1.14	0.84
West	0.09	0.81	2.24	1.90	1.22
Mixed	†	4.40	8.23	8.40	4.09

† Not applicable.
[1] Course levels are: Level 1—no math; Level 2—basic math/pre-algebra; Level 3—core secondary through algebra II; Level 4—trigonometry, statistics, pre-calculus; and Level 5—calculus.
[2] All race categories exclude Hispanic or Latino origin.
[3] The first language students learned to speak when they were children.
[4] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.
[5] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school sector, region, and urbanicity variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).
[6] Region is defined by the U.S. Census Bureau based on the state in which the school is located.
NOTE: Highest mathematics course taken is based on a taxonomy of course types for which the student received a nonzero credit while in high school. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table B-6. Standard errors for table 6 estimates (percentage distribution of high school graduates completing various science course levels since 9th grade, by selected student characteristics): Academic year 2003–04

Characteristic	Highest science course level taken since 9th grade[1]							
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8
Total	0.09	0.28	0.36	0.87	0.89	0.82	0.54	0.51
Sex								
Male	0.15	0.42	0.42	0.99	0.96	0.88	0.63	0.63
Female	0.08	0.23	0.40	1.02	1.09	0.96	0.65	0.57
Race/ethnicity[2]								
American Indian or Alaska Native	†	2.98	3.01	8.84	6.50	5.40	2.73	1.12
Asian or Pacific Islander	0.27	0.48	0.41	1.46	1.83	1.76	1.34	2.26
Black or African American	0.31	0.71	0.64	1.83	2.16	1.66	1.06	0.80
Hispanic or Latino	0.25	0.73	0.99	1.87	1.72	1.77	0.77	0.54
White	0.09	0.33	0.39	1.06	1.05	0.97	0.70	0.64
Socioeconomic status								
Lowest quarter	0.27	0.57	0.77	1.53	1.43	0.90	0.80	0.52
Middle two quarters	0.11	0.34	0.44	1.12	1.10	0.87	0.65	0.51
Highest quarter	0.11	0.30	0.33	0.87	1.30	1.31	0.83	1.04
Native language[3]								
English	0.09	0.30	0.36	0.90	0.92	0.85	0.57	0.51
Non-English	0.22	0.65	0.77	1.81	1.72	1.51	0.96	1.11
Parents' education								
High school or less	0.22	0.56	0.67	1.42	1.32	0.88	0.77	0.50
Some college	0.12	0.37	0.55	1.19	1.17	0.91	0.74	0.54
4-year college degree or more	0.12	0.29	0.35	0.87	1.12	1.13	0.68	0.83
Family composition								
Mother and father	0.09	0.27	0.39	0.97	1.03	0.95	0.65	0.65
Mother or father and guardian	0.22	0.52	0.63	1.57	1.54	1.08	0.87	0.82
Single parent (mother or father)	0.22	0.53	0.58	1.28	1.38	1.09	0.80	0.62
Other[4]	1.01	1.44	1.23	3.02	2.95	1.86	1.61	0.91
Extracurricular participation								
No participation	0.21	0.56	0.77	1.30	1.26	0.86	0.85	0.55
< 1 hour a week	0.28	0.55	0.57	1.87	1.79	1.46	1.05	1.08
1–4 hours a week	0.10	0.44	0.44	1.20	1.41	1.36	0.82	0.80
> 4 hours a week	0.08	0.23	0.35	1.02	1.14	1.08	0.73	0.71

See notes at end of table.

Table B-6. Standard errors for table 6 estimates (percentage distribution of high school graduates completing various science course levels since 9th grade, by selected student characteristics): Academic year 2003–04—Continued

Characteristic	Highest science course level taken since 9th grade[1]							
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8
Employment								
No employment	0.15	0.42	0.52	1.21	1.28	1.18	0.79	0.85
1–15 hours a week	0.12	0.33	0.42	1.33	1.30	1.13	0.83	0.82
> 15 hours a week	0.10	0.40	0.48	1.08	1.10	0.87	0.71	0.55
School control[5]								
Public	0.09	0.31	0.39	0.94	0.95	0.86	0.57	0.54
Catholic	0.19	0.35	0.74	2.37	2.70	3.00	1.62	1.15
Other private	†	†	0.25	2.12	3.72	4.74	2.09	3.33
Mixed	†	†	0.47	3.13	4.86	3.19	4.43	2.44
School location[5]								
Urban	0.18	0.55	0.52	1.50	1.68	1.69	0.93	0.94
Suburban	0.12	0.37	0.53	1.17	1.24	1.10	0.80	0.81
Rural	0.17	0.68	0.91	2.49	2.09	1.77	1.26	0.71
Mixed	0.72	1.15	1.48	3.18	3.11	2.10	1.74	0.81
School region[5,6]								
Northeast	0.15	0.93	1.20	1.89	1.98	2.01	1.04	1.22
Midwest	0.16	0.41	0.71	1.93	1.83	1.57	1.23	1.16
South	0.15	0.27	0.44	1.25	1.54	1.40	0.85	0.75
West	0.22	0.79	0.65	2.06	1.84	1.67	1.22	1.02
Mixed	†	†	5.76	6.14	7.74	6.66	3.25	6.74

† Not applicable.

[1] Course levels are: Level 1—no science; Level 2—primary physical science; Level 3—secondary physical science and basic biology; Level 4—general biology; Level 5—chemistry I or physics I; Level 6—chemistry I and physics I; Level 7—chemistry II or physics II or advanced biology; Level 8—both Levels 6 and 7.

[2] All race categories exclude Hispanic or Latino origin.

[3] The first language students learned to speak when they were children.

[4] Other includes two guardians, female guardian only, male guardian only, and guardian who lives with the student less than half of the time.

[5] Information about the students' base-year (BY) school and, if applicable, their final transfer school, was used to construct the school sector, region, and urbanicity variables. If students were enrolled in the same school in the BY interview and at the time of high school exit, information is given for only one school: the BY school. If students transferred out of their BY school and transcripts were provided by their final transfer school, information is from both schools: the BY school and the final transfer school. Transfer students were classified into groups in terms of school category consistency. Students who were in the same type of school for both schools were assigned to that group (e.g., a public school student who transferred to a public school was coded as public). If not, they were classified as "mixed" (e.g., a Catholic school student who transferred to a public school was coded as mixed).

[6] Region is defined by the U.S. Census Bureau based on the state in which the school is located.

NOTE: Highest mathematics course taken is based on a taxonomy of course types for which the student received a nonzero credit while in high school. The academic year extended from September 1, 2003 to August 31, 2004.

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

Table B-7. Standard errors for table 7 estimates (percentage distribution of high school graduates demonstrating mastery of specific mathematics knowledge and skills, by credit earned in selected courses): Academic year 2003–04

Credits earned in selected courses	Mathematics proficiency levels[1]				
	Level 1	Level 2	Level 3	Level 4	Level 5
Total	0.16	0.60	0.79	0.77	0.24
Total course credits earned					
Low	0.34	1.14	1.41	1.21	0.34
Middle	0.18	0.77	1.05	1.07	0.32
High	0.23	0.91	1.31	1.33	0.40
Total course credits earned in academic subjects					
Low	0.39	1.17	1.30	0.96	0.20
Middle	0.14	0.69	0.97	0.94	0.29
High	0.11	0.60	0.95	1.33	0.54
Total course credits earned in occupational subjects					
Low	0.18	0.77	1.06	1.36	0.62
Middle	0.19	0.76	1.01	0.97	0.28
High	0.36	1.13	1.24	0.93	0.18
Total course credits earned in mathematics					
Low	1.17	3.68	3.81	2.93	0.44
Middle	0.28	0.96	1.16	0.92	0.18
High	0.16	0.59	0.83	0.96	0.35
Total course credits earned in science					
Low	1.27	2.90	2.75	1.63	0.12
Middle	0.21	0.76	1.00	0.89	0.19
High	0.15	0.61	0.89	1.03	0.42
Total course credits earned in English					
Low	4.03	10.17	12.64	9.59	4.80
Middle	0.56	1.83	2.51	2.33	0.61
High	0.16	0.62	0.80	0.79	0.24
Total course credits earned in social studies					
Low	3.06	4.99	4.60	2.24	0.26
Middle	0.34	1.14	1.44	1.34	0.38
High	0.16	0.65	0.84	0.84	0.27

[1] Mathematics proficiency levels are: Level 1—simple arithmetical operations on whole numbers, including single-step operations that rely on rote memory; Level 2—simple operations with decimals, fractions, powers, and roots; Level 3—simple problem solving, requiring the understanding of low-level mathematical concepts; Level 4—understanding of intermediate-level mathematical concepts and/or having the ability to formulate multistep solutions to word problems; and Level 5—proficiency in solving complex multistep word problems and/or having the ability to demonstrate knowledge of material found in advanced mathematics courses.

NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Core courses represent all courses in mathematics, science, English, and social studies. Noncore courses represent all other courses not defined as core courses. Level of mastery is reported at the group level by calculating the mean of the probability scores in the given area. Since the means are on a decimal scale between 0 and 1, they represent the proportions of members of a subgroup falling within a performance level. For course credits earned, “low” refers to students whose percentile rank on the distribution of course credits was below 25th, “medium” refers to students whose percentile rank on the distribution of course credits was at least 25th and below 75th, and “high” refers to students whose percentile rank on the distribution of course credits was at least 75th. The academic year extended from September 1, 2003 to August 31, 2004.

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

Table B-8. Standard errors for table 8 estimates (percentage of high school graduates demonstrating mastery of specific mathematics knowledge and skills, by academic program): Academic year 2003–04

Academic program	Mathematics proficiency levels[1]				
	Level 1	Level 2	Level 3	Level 4	Level 5
Total	0.16	0.60	0.79	0.77	0.24
Academic (only)	0.05	0.49	0.79	1.11	0.56
Occupational (only)	0.48	1.40	1.53	1.09	0.22
Both academic and occupational	0.34	1.59	2.58	3.27	1.25
General	0.23	0.80	1.03	0.90	0.20

[1] Mathematics proficiency levels are: Level 1—simple arithmetical operations on whole numbers, including single-step operations that rely on rote memory; Level 2—simple operations with decimals, fractions, powers, and roots; Level 3—simple problem solving, requiring the understanding of low-level mathematical concepts; Level 4—understanding of intermediate-level mathematical concepts and/or having the ability to formulate multistep solutions to word problems; and Level 5—proficiency in solving complex multistep word problems and/or having the ability to demonstrate knowledge of material found in advanced mathematics courses.
NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Level of mastery is reported at the group level by calculating the mean of the probability scores in the given area. Since the means are on a decimal scale between 0 and 1, they represent the proportions of members of a subgroup falling within a performance level. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table B-9. Standard errors for table 9 estimates (percentage of high school graduates demonstrating mastery of specific mathematics knowledge and skills, by highest mathematics course level taken): Academic year 2003–04

Highest mathematics course level taken	Mathematics proficiency levels[1]				
	Level 1	Level 2	Level 3	Level 4	Level 5
Total	0.16	0.60	0.79	0.77	0.24
No math	5.32	5.60	4.65	1.25	†
Basic math/pre-algebra	1.53	2.47	1.71	0.81	0.02
Core secondary through algebra II	0.23	0.93	1.04	0.66	0.05
Trigonometry, statistics, pre-calculus	0.14	0.73	1.02	1.10	0.17
Calculus	0.04	0.10	0.25	0.88	1.15

† Not applicable.
[1] Mathematics proficiency levels are: Level 1—simple arithmetical operations on whole numbers, including single-step operations that rely on rote memory; Level 2—simple operations with decimals, fractions, powers, and roots; Level 3—simple problem solving, requiring the understanding of low-level mathematical concepts; Level 4—understanding of intermediate-level mathematical concepts and/or having the ability to formulate multistep solutions to word problems; and Level 5—proficiency in solving complex multistep word problems and/or having the ability to demonstrate knowledge of material found in advanced mathematics courses.
NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Core courses represent all courses in mathematics, science, English, and social studies. Noncore courses represent all other courses not defined as core courses. Level of mastery is reported at the group level by calculating the mean of the probability scores in the given area. Since the means are on a decimal scale between 0 and 1, they represent the proportions of members of a subgroup falling within a performance level. The academic year extended from September 1, 2003 to August 31, 2004.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), "High School Transcript Study."

Table B-10. Standard errors for table 10 estimates (grade point average [GPA] for high school graduates, by credits earned in selected courses): Academic year 2003–04

Credits earned in selected courses	Mean GPA[1]	Percent with at least a 3.0 GPA[1]	Mean academic GPA[1]	Percent with at least a 3.0 academic GPA[1]
Total	0.01	0.74	0.01	0.70
Total course credits earned				
Low	0.02	1.38	0.02	1.30
Middle	0.01	1.08	0.02	1.04
High	0.02	1.43	0.02	1.46
Total course credits earned in academic subjects				
Low	0.02	1.38	0.02	1.21
Middle	0.01	1.03	0.02	1.04
High	0.02	1.25	0.02	1.38
Total course credits earned in occupational subjects				
Low	0.02	1.48	0.02	1.39
Middle	0.01	0.91	0.01	0.90
High	0.02	1.30	0.02	1.18
Total course credits earned in mathematics				
Low	0.08	4.10	0.09	3.38
Middle	0.02	1.16	0.02	0.97
High	0.01	0.95	0.01	0.95
Total course credits earned in science				
Low	0.04	2.20	0.04	1.96
Middle	0.02	1.04	0.02	0.95
High	0.01	0.94	0.01	1.00
Total course credits earned in English				
Low	0.16	9.92	0.18	9.66
Middle	0.04	2.65	0.05	2.59
High	0.01	0.78	0.01	0.74
Total course credits earned in social studies				
Low	0.09	4.85	0.10	4.13
Middle	0.02	1.49	0.02	1.38
High	0.01	0.81	0.01	0.79

[1] GPA is based on all courses. Academic GPA is based only on math, English, science, social studies, fine arts, and non-English courses.

NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Core courses represent all courses in mathematics, science, English, and social studies. Noncore courses represent all other courses not defined as core courses. For course credits earned, “low” refers to students whose percentile rank on the distribution of course credits was below 25th, “medium” refers to students whose percentile rank on the distribution of course credits was at least 25th and below 75th, and “high” refers to students whose percentile rank on the distribution of course credits was at least 75th. The academic year extended from September 1, 2003 to August 31, 2004.

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

Table B-11. Standard errors for table 11 estimates (grade point average [GPA] for high school graduates, by academic and occupational program): Academic year 2003–04

Academic program	Mean GPA[1]	Percent with at least a 3.0 GPA[1]	Mean academic GPA[1]	Percent with at least a 3.0 academic GPA[1]
Total	0.01	0.74	0.01	0.70
Academic (only)	0.02	1.21	0.02	1.31
Occupational (only)	0.02	1.69	0.03	1.52
Both academic and occupational	0.05	3.42	0.05	3.74
General	0.02	1.00	0.02	0.94

[1] GPA is based on all courses. Academic GPA is based only on math, English, science, and social studies courses.

NOTE: The academic year extended from September 1, 2003 to August 31, 2004. Highest mathematics course taken is based on a taxonomy of course types for which the student received a nonzero credit while in high school.

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

Table B-12. Standard errors for table 12 estimates (grade point average [GPA] for high school graduates, by highest mathematics course level taken): Academic year 2003–04

Highest mathematics course level taken	Mean GPA[1]	Percent with at least a 3.0 GPA[1]	Mean academic GPA[1]	Percent with at least a 3.0 academic GPA[1]
Total	0.01	0.74	0.01	0.70
No math	0.13	7.25	0.14	7.16
Basic math/pre-algebra	0.03	1.83	0.03	1.51
Core secondary through algebra II	0.01	0.95	0.02	0.80
Trigonometry, statistics, pre-calculus	0.02	1.25	0.02	1.23
Calculus	0.01	1.03	0.02	1.21

[1] GPA is based on all courses. Academic GPA is based only on math, English, science, social studies, fine arts, and non-English courses.

NOTE: Highest mathematics course taken is based on a taxonomy of course types for which the student received a nonzero credit while in high school. The academic year extended from September 1, 2003 to August 31, 2004.

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

Table B-13. Standard errors for table 13 estimates (mean credits earned in selected courses for high school graduates, by educational expectations): Academic year 2003–04

	Course credits				
Educational expectation	Mean course credits earned	Mean course credits earned in academic subjects	Mean course credits earned in mathematics	Mean course credits earned in AP/IB courses	Mean course credits earned in vocational subjects
Total	0.10	0.09	0.02	0.03	0.06
High school or less	0.21	0.20	0.05	0.01	0.20
Some college	0.15	0.13	0.03	0.01	0.12
College graduation	0.12	0.10	0.02	0.03	0.06
Graduate/professional degree	0.11	0.09	0.02	0.06	0.06

NOTE: "Course credits" refer to standardized Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets one period per day for one year. Core courses represent all courses in mathematics, science, English, and social studies. Noncore courses represent all other courses not defined as core courses. AP/IB = Advanced Placement/International Baccalaureate. The academic year extended from September 1, 2003 to August 31, 2004.

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

Table B-14. Standard errors for table 14 estimates (percentage distribution of high school graduates completing various mathematics course levels since 9th grade, by educational expectations: Academic year 2003–04

	Highest mathematics course level taken since 9th grade[1]				
Educational expectation	Level 1	Level 2	Level 3	Level 4	Level 5
Total	0.10	0.33	0.91	0.82	0.53
High school or less	0.81	2.07	2.71	1.97	0.34
Some college	0.29	0.99	1.52	1.25	0.28
College graduation	0.13	0.32	1.20	1.20	0.63
Graduate/professional degree	0.05	0.28	1.07	1.15	1.04

[1] Course levels are: Level 1—no math; Level 2—basic math/pre-algebra; Level 3—core secondary through algebra II; Level 4—trigonometry, statistics, pre-calculus; and Level 5—calculus.

NOTE: Highest mathematics course taken is based on a taxonomy of course types for which the student received a nonzero credit while in high school. The academic year extended from September 1, 2003 to August 31, 2004.

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