

**National Assessment of Educational Progress**  
***NAEP High School Transcript Study 2009***

**Jack Buckley**  
**Commissioner**

**National Center for Education Statistics**

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Good morning. I am here today to present the results from the 2009 High School Transcript Study, or HSTS, conducted periodically as part of the National Assessment of Educational Progress, or NAEP. The NAEP High School Transcript Study report provides detailed information on the academic experiences and performance of America's high school graduates.

Before describing the results, I'd like to remind you that all HSTS results—whether percentages, averages, scale scores, or achievement level percentages—are based on samples. This means that there is a margin of error associated with every score and percentage. Results for private school students are included within the overall results presented today. Not enough private schools participated, however, to allow us to release separate results for private schools.

**About the 2009 High School Transcript Study (HSTS)**

The 2009 NAEP High School Transcript Study is the sixth study in a series that began in 1990. The 2009 HSTS results are derived from a nationally representative sample of students who graduated from high school in 2009. The 2009 results are based on a sample of 37,700 graduates and their transcripts. Transcripts were collected from 740 public and private schools across the country and transcript collection took place from June 2009 through January 2010.

The study examines student coursetaking patterns and grades, showing trends in coursetaking over time. Most of the time, we compare 2009 with the earliest assessment, in 1990, and the prior assessment in 2005, but in some cases we use a shorter time line, only going back to 1998 or 2000. In addition to overall results, I'll be describing gender and racial/ethnic differences.

**Courses, Credits and GPA**

First, let's consider information on credits earned based on student transcripts. HSTS identifies three types of courses:

- Core academic courses are the main classes high school students take such as English, mathematics, science and social studies.
- Other academic courses include fine arts, foreign languages and computer-related studies.
- Other courses include courses in vocational education, personal health and physical education.

To standardize our reports of coursetaking, we use the “Carnegie” definition of a “credit”—120 hours of classroom instruction. HSTS reports on the average course credits earned, as well as grade point average. In both cases, we have overall results and separate results for each course type.

### *Graduates Earn More Course Credits*

The data results indicate that the average number of course credits earned by high school graduates has changed since 1990. The 2009 graduates earned more credits in “core” academic courses than in any past study year, increasing from an average of 13.7 credits in 1990 to 16.0 credits in 2009. Graduates also earned more credits overall in “other academic” courses, increasing from 3.6 credits in 1990 to 5.3 credits in 2009. When “other” credits are included, the total average credits increased from 23.6 in 1990 to 27.2 in 2009, more than any previous graduation class for which we conducted a study.

Factors that may be related to increasing credits include:

- **Online courses** - With the rise of online courses, students may have more opportunities outside of the traditional classroom. Information from the HSTS indicates that about 5 percent of graduates took online courses for credit.
- **Credit for classes taken in middle school** - Students are taking what were once considered high school courses before entering high school (e.g., Algebra I, Biology, Spanish I). A substantial number of these students are earning high school credit for these courses. Among 2009 graduates, 26 percent took Algebra I before entering high school.
- **Summer school** – About 21 percent of 2009 high school graduates earned credits while in summer school. While many graduates who attend summer school are making up credits, others may be attending to earn additional credits.

There have also been changes over time in the average number of credits earned by graduates in each of the four major racial/ethnic groups for which there are sufficient data to report reliable results—Asian/Pacific Islander, Black, Hispanic, and White. Comparing 1990 to 2009, all four racial/ethnic groups earned a higher number of credits. Comparing 2009 to 2005, only White and Black students had increases in the number of credits earned. The average number of credits for Black students increased from 23.5 in 1990 to 26.9 in 2005 and to 27.4 in 2009.

### *GPA's Increase from 1990 to 2009*

The 2009 HSTS data indicate that graduates' grade point averages have changed over time. From 1990 to 2009, overall GPA increased, from 2.68 to 3.00. Over the same time period, GPA increased for each of the three course types—"other" courses, "other academic" courses, and "core academic" courses. From 2005 to 2009, GPAs did not change measurably for core courses or other academic courses.

### **Perspectives on Coursetaking**

HSTS examines coursetaking patterns in two ways: (1) by looking at the level of the curriculum a student takes, whether "standard," which is the least demanding, midlevel, or rigorous; and (2) by looking at coursetaking in science, technology, engineering and mathematics, what we call "STEM." In particular, the report addresses "STEM advanced mathematics," "STEM advanced science and engineering," and "STEM-related technical" courses.

The first perspective on coursetaking is curriculum level—what academic courses a graduate takes during high school. Curriculum levels are a measure of high school graduates' overall academic achievement. They can help measure how well graduates are prepared for postsecondary education, based on the number and type of academic courses taken. We define three curriculum levels for this study:

- The "standard" level includes four credits in English and three each in the three remaining core subjects.
- The "midlevel" includes all of the standard credits plus more challenging requirements for mathematics and science, along with a foreign language requirement.
- The "rigorous" level includes all of the midlevel requirements plus additional requirements for mathematics, science, and foreign language.

Any curriculum that does not meet the requirements for the standard level is considered "below standard."

Since 1990, graduates have been completing more challenging curricula. From 1990 to 2009, the percentage of graduates completing a below standard curriculum decreased from 60 percent to 25 percent (a change of 35 points). The percentage completing a standard curriculum rose 6 points. There was an increase of 20 percentage points for graduates completing a midlevel curriculum, from 26 percent in 1990 to 46 percent in 2009. There was an 8 point increase for graduates completing a rigorous curriculum, from 5 percent in 1990 to 13 percent in 2009.

### *White-Black Curriculum Gaps*

When we compare the changes over time in the percentages of graduates completing the various curriculum levels by race/ethnicity, we see a variety of patterns. The percentages of Black and White graduates completing a midlevel curriculum since 1998 have increased for both groups. In 1998, 35 percent of White graduates, and 34 percent of Black graduates had completed a midlevel curriculum. The difference in the two percentages was not statistically significant. In 2009, however, a greater percentage of Black than White graduates completed a midlevel curriculum, 51 percent compared to 45 percent. This 6-point gap was statistically significant, as was the 6-point gap in 2005.

Looking at the percentages completing a rigorous curriculum since 1998, we see increases for White graduates only. Fourteen percent of White students completed this highest curriculum level, compared to 6 percent of Black students. This 8-point gap is larger than the previous gap of 5 points in 2005 and the two previous assessments.

### *White-Hispanic Curriculum Gaps*

The percentages of both White and Hispanic graduates completing a midlevel curriculum were higher in 2009 than in 1998. The increase for Hispanic graduates was larger than the increase for White graduates, eliminating the 10-point gap that existed in 1998. The 2-point difference in 2009, favoring Hispanic graduates, was not statistically significant.

For the rigorous level, however, only White graduates showed a statistically significant increase in their percentage of completion from 1998 to 2009. Although the gap increased from 5 to 6 points, the increase was not statistically significant.

### *White-Asian/Pacific Islander Curriculum Gaps*

The percentage of both White and Asian/Pacific Islander graduates completing a midlevel curriculum was 35 percent in 1998. In 2009 the percentage for White graduates was 45 percent, 7 points higher than the percentage for Asian/Pacific Islander graduates.

A greater percentage of Asian/Pacific Islander than White graduates, however, completed a rigorous curriculum. This was true in all four comparison years. In 2009 29 percent of Asian/Pacific Islander graduates completed a rigorous curriculum, compared to 14 percent of White graduates. The 15-point gap in 2009 was larger than the 7-point gap in 1998.

### *Science Key to Attaining a Midlevel Curriculum*

For the 2009 HSTS report, we examined the requirements that students lacked to reach the next higher curriculum level. Among graduates who attained a standard curriculum, but did not attain a midlevel curriculum, 35 percent lacked only the science requirements needed to achieve a midlevel curriculum. This percentage was higher than the percentage of graduates who lacked only a mathematics or foreign language course, and higher than

the percentage who lacked more than one required course. Of the 29 percent of graduates who lacked more than one required course, a majority were lacking a science course.

### *More Graduates Taking Algebra I before High School*

For the 2009 HSTS, we also looked at factors that might be associated with achieving higher curriculum levels. Algebra I coursetaking before high school is one of those factors. From 2005 and 2009, the percentage of all graduates who took Algebra 1 before high school increased from 20 to 26 percent. All four racial/ethnic groups showed an increase as well. In 2009, nearly half (48 percent) of Asian/Pacific Islander graduates took algebra I before high school, compared with 29 percent of White graduates, 12 percent of Black graduates, and 17 percent of Hispanic graduates.

### **HSTS and NAEP Mathematics**

Graduates completing a below standard curriculum had an average score of 142, placing them at the cutpoint for students at the NAEP *Basic* Achievement Level. The average NAEP score for graduates completing the standard and midlevel curricula also fell in the *Basic* range. Graduates completing a rigorous curriculum scored in the *Proficient* range.

### *Race/Ethnicity and NAEP Mathematics*

Within each of the four major racial/ethnic groups, graduates completing a rigorous curriculum earned higher NAEP scores than graduates completing lower-level curricula. However, the completion of a rigorous curriculum did not eliminate racial/ethnic gaps in NAEP mathematics performance. The average scores for Black and Hispanic graduates completing a rigorous curriculum were lower than the average score for White graduates, which in turn was lower than the average score for Asian/Pacific Islander graduates.

This pattern holds true for each of the remaining curriculum levels. While the differences are statistically significant, this does not mean that race/ethnicity is the determining factor in creating these differences. Differences in student performance are influenced by many factors.

### *Gender and NAEP Mathematics*

Male graduates completing a rigorous curriculum on average had higher 12<sup>th</sup> grade NAEP mathematics scores than female graduates. In 2009, these male graduates had an average 12<sup>th</sup> grade NAEP mathematics score of 192, compared to 185 for female graduates. Male graduates taking midlevel and below standard curricula also scored higher on average than female graduates at these curriculum levels.

## **STEM**

To compete globally and keep up with expanding scientific and technical expertise, educators and policymakers have called for increasing emphasis on science, technology, engineering, and mathematics (STEM) coursetaking in our schools. As part of the 2009 High School Transcript Study, we took a closer look at STEM coursetaking.

The following are the definitions we used for STEM courses:

- STEM advanced mathematics courses include Algebra II, other advanced mathematics (trigonometry, statistics/probability), pre-calculus, and calculus.
- STEM Advanced Science and Engineering courses include advanced biology, chemistry, advanced environmental/earth science, physics, and engineering.
- STEM-related technical courses include engineering/science technologies, health/science technology, and computer science courses.

### *STEM Advanced Mathematics Coursetaking*

I'll first describe STEM advanced mathematics coursetaking, focusing in particular on differences by gender. In 2009, the percentage of female graduates taking STEM advanced mathematics was higher than that for males—85 percent as compared to 82 percent. Higher percentages of female graduates also took algebra II and pre-calculus/analysis. For “other advanced mathematics” and “calculus,” there were no statistically significant differences.

### *STEM Advanced Science/Engineering Coursetaking*

Overall, a higher percentage of female graduates also took STEM advanced science/engineering courses. However, this was not always the case for individual courses. A higher percentage of female than male graduates took advanced biology and chemistry. But a higher percentage of male graduates took both advanced environmental/earth science and engineering courses. For physics, there was no gender difference.

### *STEM-Related Technical Coursetaking*

Higher percentages of male than female graduates took STEM-related technical courses, particularly engineering/science technology and computer science courses. For health science/technology courses, the percentage for female graduates was higher.

### *AP/IB Coursetaking*

Now I'll turn to Advanced Placement or International Baccalaureate coursetaking in 2009, by race/ethnicity. For both types of courses, the percentages for Asian/Pacific Islander graduates—42 percent for mathematics and 38 percent for science—were higher

than for any other group. The percentages for White graduates were higher than the percentages for either Black or Hispanic graduates.

When we look at AP/IB mathematics and science coursetaking according to gender, we see no significant difference for mathematics. For science, the percentage for female graduates is higher, 15 percent as compared to 13 percent.

### *Conclusion*

That completes my overview of results from the 2009 NAEP High School Transcript Study. There is much more information in the full report. In addition, the NAEP website (<http://www.nationsreportcard.gov>) will give you access to more information on the 2009 study and earlier studies, as well as access to the NAEP High School Transcript Study Data Explorer, which allows you to perform your own analyses of the topics discussed here, as well as many others.

In closing, I would like to thank the students and schools who participated in these assessments. Thank you very much.