



E&R Report No. 05.12

December 2005

ADVANCED PLACEMENT (AP) COURSE-TAKING, EXAM PARTICIPATION, AND EXAM RESULTS, 2004-05

Authors: Brad McMillen and Chuck Dulaney

ABSTRACT

The first section of this bulletin summarizes Advanced Placement (AP) course participation and AP exam data for the Wake County Public School System for the 2004-05 school year. Overall, the percentage of high school students who took at least one AP course increased from 14.1% in 2003-04 to 15.7% in 2004-05. About 59% of students who took an AP course took the corresponding AP exam for that course, and about 78% of those exam scores were 3 or higher, which is the College Board's threshold for mastery. The second section reports on a more in-depth study of AP results for students from the 2003-04 school year that looks at the relationship between 8th-grade achievement and success in AP courses.

BACKGROUND

The purpose of the Advanced Placement (AP) program is to offer college-level courses to high school students. Administered by the College Board, the AP program includes both courses as well as a testing program which colleges and universities may utilize to grant credit to students who have done well on AP examinations. More than 15,000 U.S. high schools offer AP coursework of some kind, and more than 1.2 million U.S. high school students took at least one AP exam during the 2004-05 school year (College Board, 2005).

Administered each May, the 34 different AP examinations test students' ability to perform at college level in 19 subject areas. AP examinations are scored on a five-point scale.

Key Topics

AP Course Participation.....	p. 2
AP Exam Performance.....	p. 10
Eighth Grade Achievement Study ...	p. 15
Conclusions.....	p. 22

The scale is defined by the College Board as follows:

- 1—no recommendation
- 2—possibly qualified
- 3—qualified
- 4—well qualified
- 5—extremely well qualified

Many colleges and universities provide course credit to students scoring a 3 or higher on some AP exams. For additional information about AP courses and the AP testing program, consult the College Board's Web site at <http://www.collegeboard.com>.

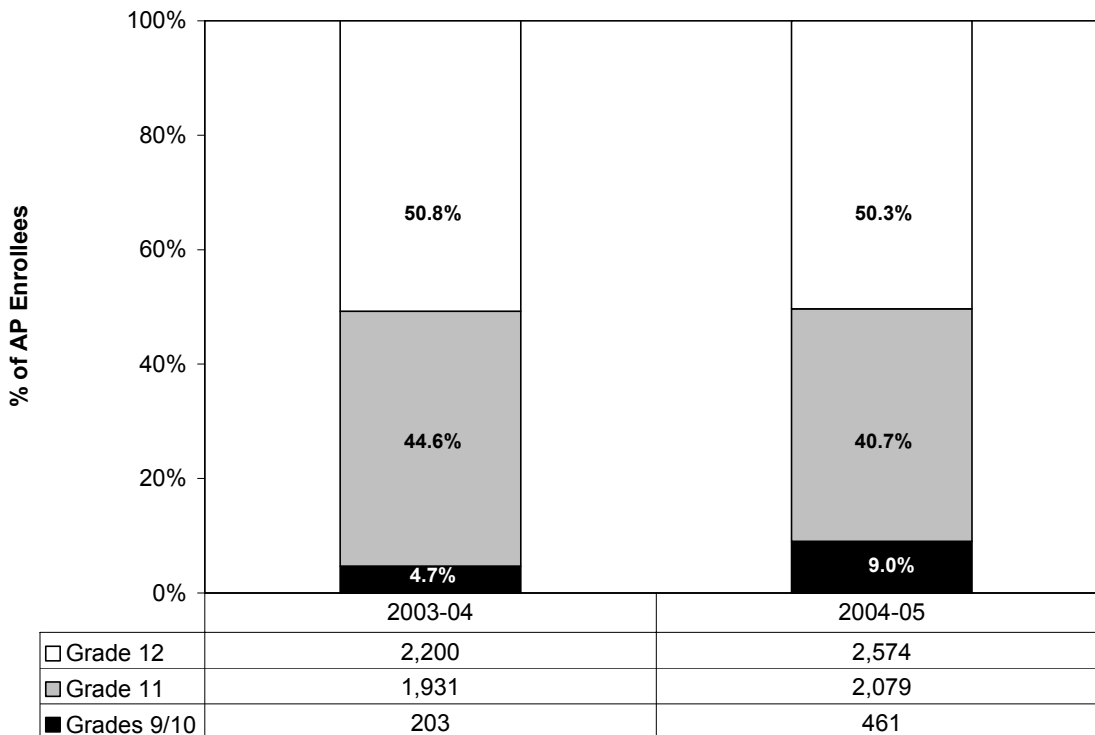
AP COURSE PARTICIPATION

While all comprehensive high schools in the Wake County Public School System (WCPSS) offer AP courses, the availability of specific courses varies widely. Not all high schools offer the same type or number of AP courses, and enrollment in AP courses is higher at some schools than others. The most popular AP courses in WCPSS in 2004-05 were Environmental Science, English III - Language, English IV - Literature, Statistics, and Calculus AB. The three high schools with the most AP enrollments were Enloe, Broughton, and Green Hope (see Appendix A, Table A1 for AP enrollments by course and school).

Overall enrollments in AP courses in WCPSS increased from 9,280 in 2003-04 to 10,804 in 2004-05, an increase of 16% (during this same time, district-wide student membership in grades 11 and 12 rose only 7%). Increases in AP enrollment were seen across most types of courses, but were particularly evident in World History, Spanish Language, and U.S. Government and Politics (Appendix A, Table A1). The largest decreases in enrollment in 2004-05 were in Computer Science AB, Physics, and Calculus BC, but these decreases were accompanied by increases in Calculus AB and Physics BC.

The number of individual students taking at least one AP course during the school year increased 18%, from 4,334 in 2003-04 to 5,114 in 2004-05. As shown in Figure 1, the number of AP students increased at every grade level, but was particularly pronounced among students in grades 9 and 10, where the number of AP course-takers more than doubled. As noted above, this increase cannot be solely attributed to the increasing overall student population, since the *percentage* of high school students (grades 9-12) who took at least one AP course also increased from 14.1% in 2003-04 to 15.7% in 2004-05.

Figure 1
Number and Percentage of AP Course Takers by Grade Level, 2003-04 and 2004-05



While many students do not take AP courses for a variety of reasons, others take several AP courses during their high school careers. On average, students who take AP courses take about two per year, with some taking as many as seven or eight in a single year (Table 1).

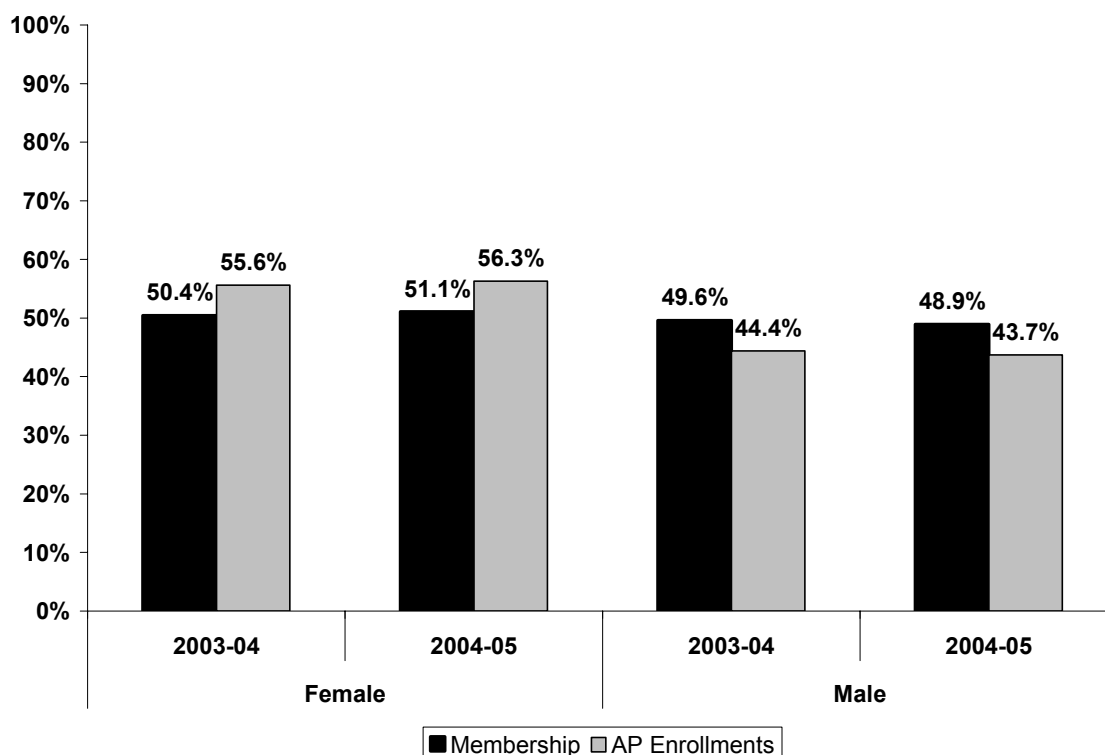
Table 1
Number of AP Courses Taken by AP Enrollees, 2004-05

# Courses	# Students	Percentage
1	2,160	42.2%
2	1,343	26.3%
3	851	16.6%
4	493	9.6%
5	187	3.7%
6	67	1.3%
7	8	0.2%
8	5	0.1%
TOTAL	5,114	100%

Although the number of AP courses taken is rising overall, AP course-taking still varies widely among different student subgroups. For example, although they represent only about half of the student population, female students account for slightly more than half of AP enrollments (Figure 2). Asian students and White students are over-represented in the AP population relative to their presence in the overall student population, while Black/African American and Hispanic/Latino students are under-represented.

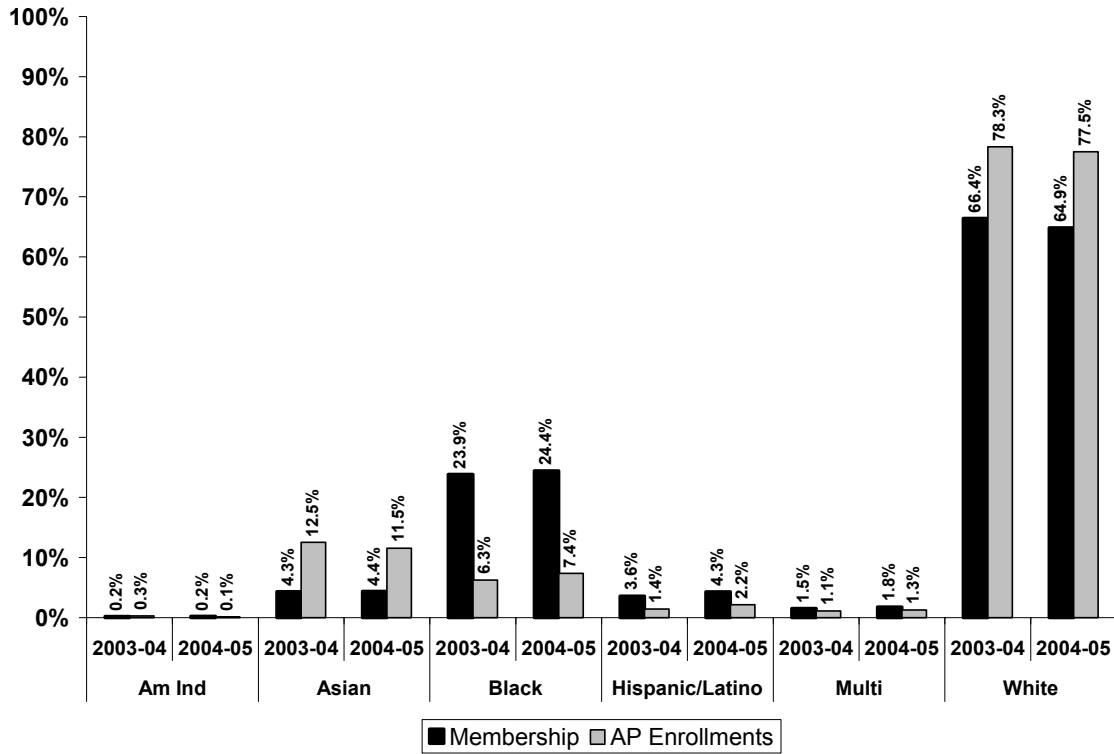
It should be noted, however, that this “enrollment gap” for Black/African American students did appear to close slightly in 2004-05. Figure 3 shows that the percentage of AP enrollments accounted for by Black/African American students increased by 1.1%, while their presence in the student population increased by only 0.5%. Note also that AP enrollment rates for subgroups with smaller numbers of students (e.g., Asian students, American Indian students, etc.) will tend to fluctuate more from year to year, making it difficult to reliably compare their data to data for other subgroups.

Figure 2
Percentage of Student Membership and AP Enrollments by Gender
2003-04 and 2004-05



Note. Since the vast majority of AP enrollees are in grades 11 and 12, the membership data in this figure are based on the total number of students in grades 11 and 12 as of September of each school year.

Figure 3
Percentage of Student Membership and AP Enrollments by Ethnicity
2003-04 and 2004-05

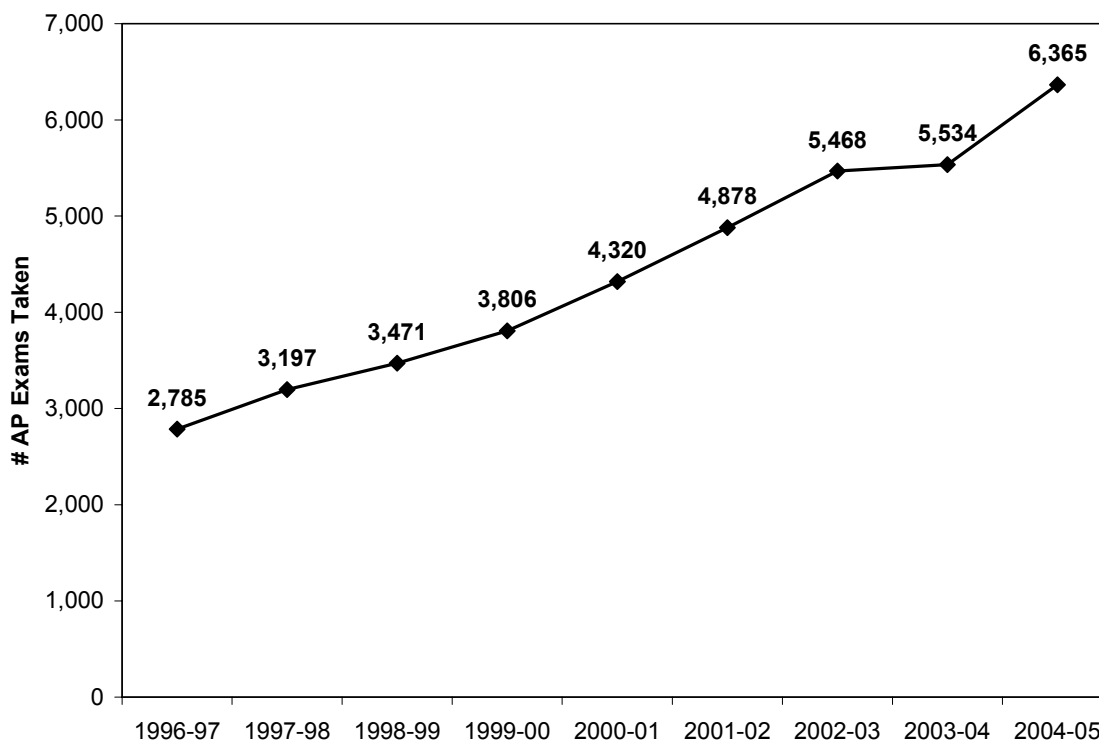


Note. Since the vast majority of AP enrollees are in grades 11 and 12, the membership data in this figure are based on the total number of students in grades 11 and 12 as of September of each school year.

AP EXAM PARTICIPATION

Not all high school students take AP courses, not all students who take AP courses take the corresponding AP exams for those courses. In addition, there are a small number of students each year who take AP exams without taking the corresponding AP course. As the number of AP enrollments has increased, the total number of AP tests taken in WCPSS has increased as well over the past several years (Figure 4).

Figure 4
Total Number of AP Exams Taken, 1996-97 to 2004-05



As was true for AP course enrollment, AP exam participation is also increasing in WCPSS at a rate that exceeds enrollment growth. The percentage of WCPSS high school students who took at least one AP exam rose from 9.0% in 2003-04 to 9.9% in 2004-05.

Although the number of exams taken is rising overall, test-taking varies widely among student subgroups. These patterns in some cases differ from the patterns seen for course enrollment. For example, although female students were more likely to take AP courses than male students (Figure 2), male enrollees are more likely than female enrollees to take AP exams (Figure 5). Also, although Figure 3 shows that Hispanic/Latino students are not as likely as students from most other ethnic groups to enroll in an AP course, their AP test-taking rate is relatively high (Figure 6). Figure 6 also shows that Black/African American students, in addition to being the least-likely ethnic group to enroll in AP courses, are also the least likely to take the AP test when they do enroll.

As with the aforementioned AP enrollment charts, it should again be noted that AP test-taking for subgroups with smaller numbers of students (e.g., Asian students, American Indian students, etc.) will tend to fluctuate more from year to year, making it difficult to compare their rates to other subgroups that contain many more students.

Figure 5
Number of AP Tests Taken by Gender, 2003-04 and 2004-05

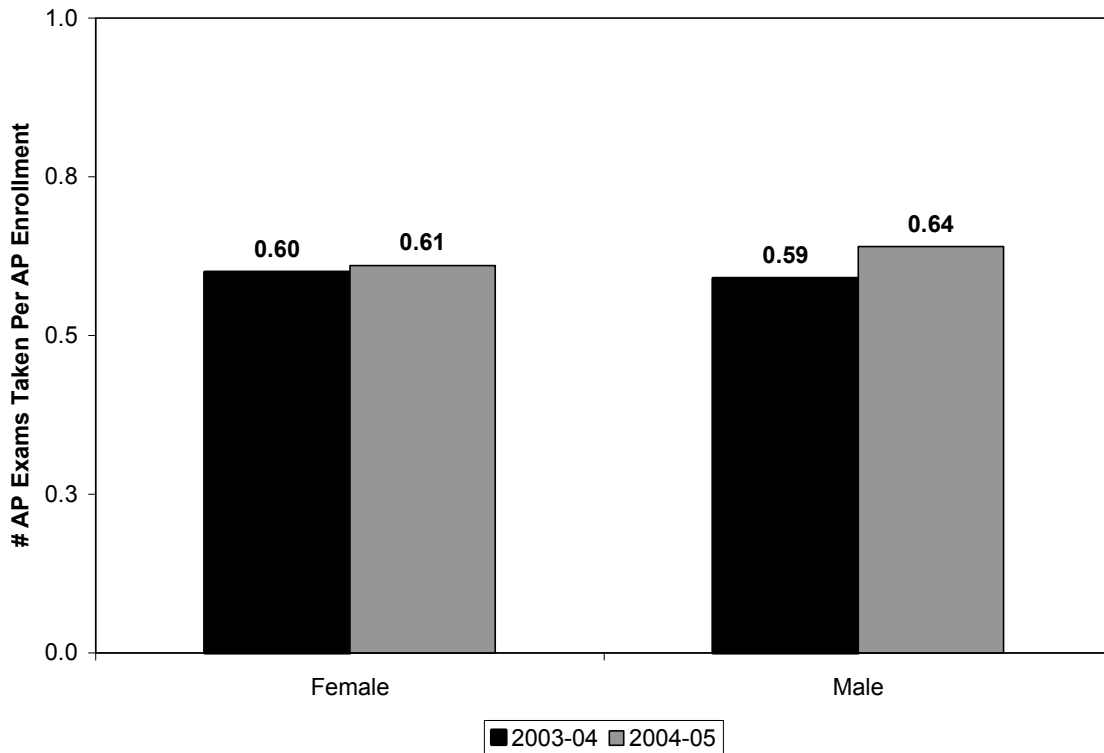
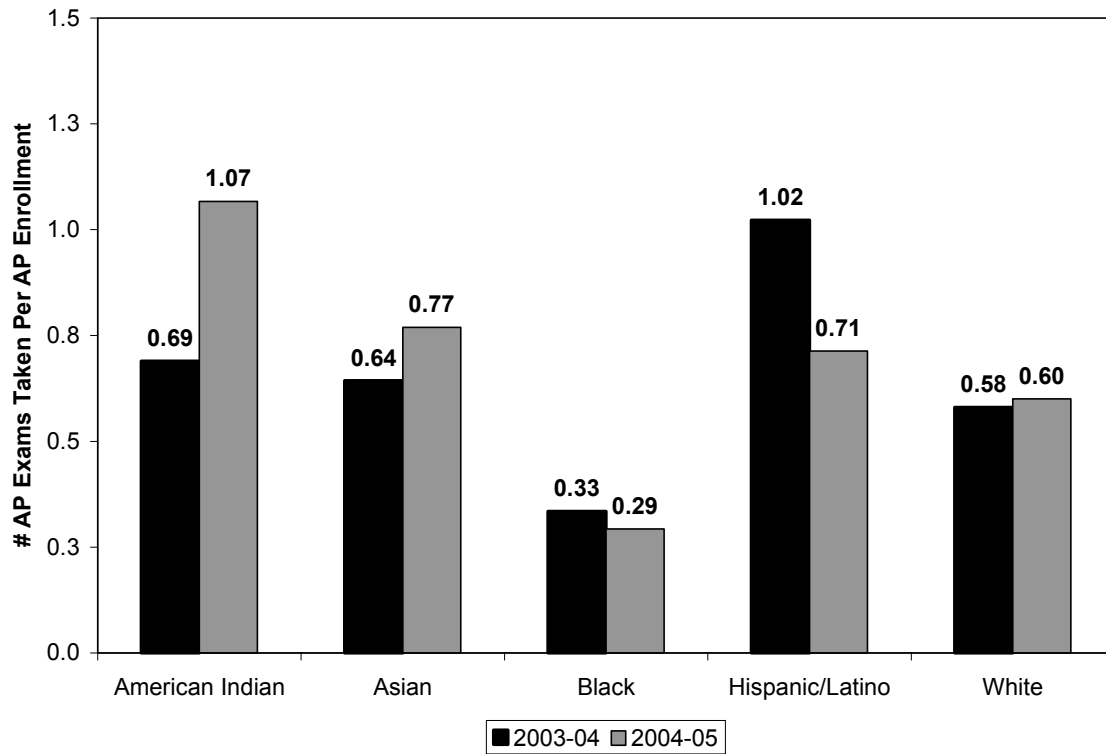


Figure 6
Number of AP Tests Taken by Ethnicity, 2003-04 and 2004-05



Note. Each student reports her/his ethnicity when taking the AP test, this may or may not match the ethnicity listed for the student in WCPSS course enrollment databases. Test-taking rates may exceed 1 due to either this discrepancy or due to students taking a test without taking the accompanying course.

Participation in AP exams also varies widely by course. Table 2 details AP exam participation over the past five years. The increase in AP exam participation in recent years is evident across a number of courses, including World History, Calculus BC, Environmental Science, Psychology, and Statistics, while participation in Calculus AB has trended downward (possibly due to the increased participation in BC, which is a higher-level exam).

Table 2
AP Exam Participation by Course, 2000-01 to 2004-05

AP Exam	Number of Tests Taken					Enrollments 04-05	Test –Taking Rate 04-05 ¹
	00-01	01-02	02-03	03-04	04-05		
Art History	16	16	11	15	23	39	59%
Biology	227	238	206	135	188	330	57%
Calculus AB	366	418	499	188	198	878	23%
Calculus BC	192	202	226	526	532	584	91%
Chemistry	185	206	146	120	148	245	60%
Computer Science A	17	38	14	30	23	27	85%
Computer Science AB	31	20	56	25	11	38	29%
Economics: Macro	10	28	7	61	49	83	99% ²
Economics: Micro	6	12	8	29	33		
English III - Language & Composition	824	788	794	870	857	1,173	73%
English IV - Literature & Composition	462	537	510	380	437	1,182	37%
Environmental Science	177	299	690	787	836	1,658	50%
European History	178	197	204	200	231	508	45%
French Language	28	48	43	41	49	101	53% ²
French Literature	6	9	6	5	5		
German Language	7	7	13	12	16	15	107%
Government & Politics: Comparative	5	20	24	43	50	446	66% ²
Government & Politics: U. S.	49	100	216	164	245		
Human Geography	0	0	0	1	13	40	33%
Latin: Literature	2	0	0	5	0	36	14% ²
Latin: Virgil	0	0	9	10	5		
Music Theory	17	18	11	33	34	91	37%
Physics B	131	140	153	149	118	192	61%
Physics C: Elec. & Mag.	53	84	65	55	58	122	63% ²
Physics C: Mechanics	59	19	79	67	77		
Psychology	145	167	196	315	447	640	70%
Spanish Language	83	93	90	110	183	258	71%
Spanish Literature	29	11	20	23	27	61	44%
Statistics	310	364	347	379	565	904	63%
Studio Art- Drawing	8	9	9	9	11	49	27% ²
Studio Art – 2D Design	6	11	10	3	2		
Studio Art – 3D Design	0	0	0	0	0		
U. S. History	691	724	729	696	652	824	79%
World History	0	55	77	48	242	280	86%
TOTAL	4,320	4,878	5,468	5,534	6,365	10,804	59%

¹ - Some percentages may be inflated (and may exceed 100%) due to students taking an AP test without taking the course.

² - Some students enrolled in an AP course with the same name will sometimes take different AP tests; hence those enrollments are grouped into larger categories for purposes of this analysis.

Table 2 also highlights the variation in test-taking rates across different AP courses. In addition to examining the total number of tests taken by course, looking at these rates (i.e., the number of test-takers divided by the number of enrolled students) yields additional information about AP students' test-taking behavior. Relatively high test-taking rates for some courses may be the result of an easier exam or the desire to earn college credit by virtue of a high score. Relatively low rates, however, may indicate that the test is perceived as too difficult or that the perceived benefits of taking the test may not be worth the effort (e.g., does not affect the student's course grade, does not qualify for college credit, etc.). Table 2 shows that the highest test-taking rates for AP enrollees in 2004-05 were in Calculus BC, Economics, World History, and German. The lowest rates of test-taking in 2004-05 were in Studio Art, Calculus AB, Computer Science AB, and Latin. When compared to the total number of enrollments, the percentage of students who took the corresponding AP exam over the past two years has been approximately 59-60%.

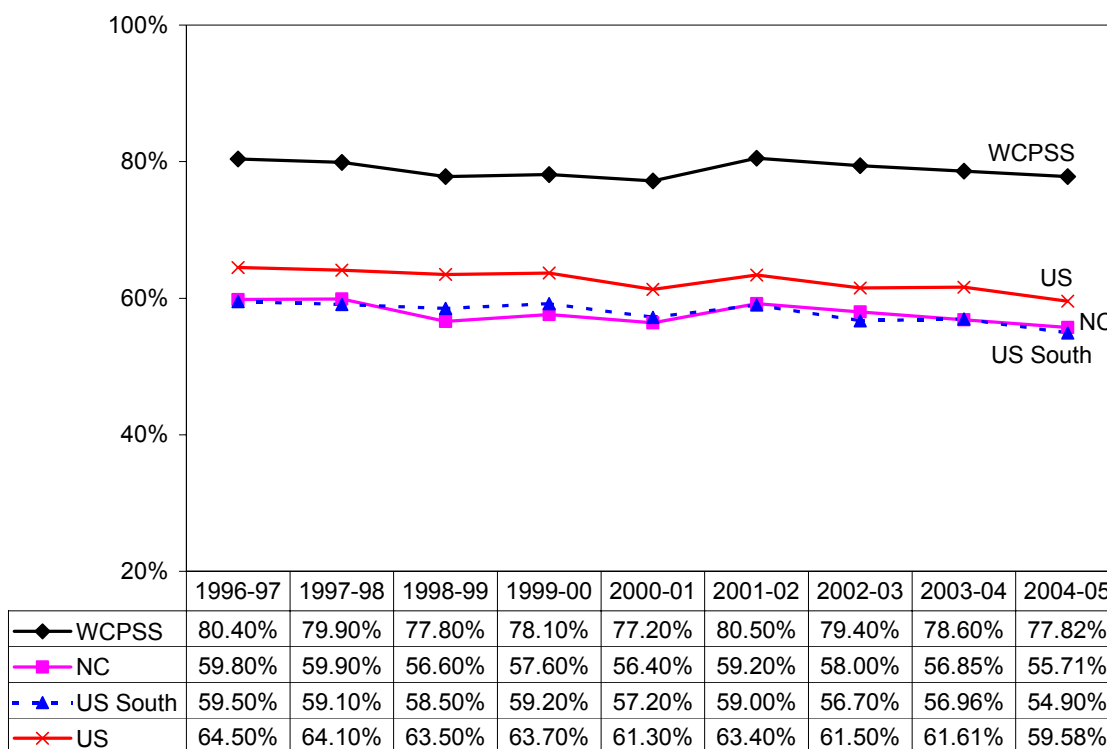
There is some variation in test-taking rates by school. The three high schools with the largest AP enrollments—Enloe, Broughton, and Green Hope—also accounted for the largest number of AP exams taken, and had the highest test-taking rates as well (Appendix A, Table A2).

AP EXAM PERFORMANCE

Scores on AP exams range from 1 to 5, and many colleges and universities award course credit for a score of 3 or higher. According to the College Board, an AP exam score of 3 or higher “indicates sufficient mastery of course content to grant a student exemption from a college course, credit, or both” (p. 6; College Board, 2004). Thus, one common measure of performance on AP exams is the percentage of exams with a score of 3 or higher.

In WCPSS, the percentage of all AP exams with a score of 3 or higher declined to 77.8% in 2004-05, a decrease of less than one percentage point from the previous year. The WCPSS success rate was significantly higher than the rates for students in North Carolina, the U.S. South, and the entire U.S., where overall passing rates in 2004-05 showed similar declines (Figure 7). The WCPSS figures have hovered between 77 and 80 percent over the past nine years while, as noted above, the number of test-takers has grown significantly.

Figure 7
Trends in the Percentage of AP Exam Scores of 3 or Higher
1996-97 to 2004-05



Note. The U.S. South as defined by the College Board includes Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia.

AP exam results also vary by gender and race. Male test-takers have performed slightly better than females over recent years, but the difference in 2004-05 fell to less than two percentage points (Figure 8). With respect to ethnic groups, White, Asian and Hispanic/Latino students have historically had the highest success rate on exams, with Black/African American students usually falling about 15-20 percentage points below those three groups (Figure 9).

Figure 8
Percentage of AP Exam Scores of 3 or Higher by Gender, 1999-00 to 2004-05

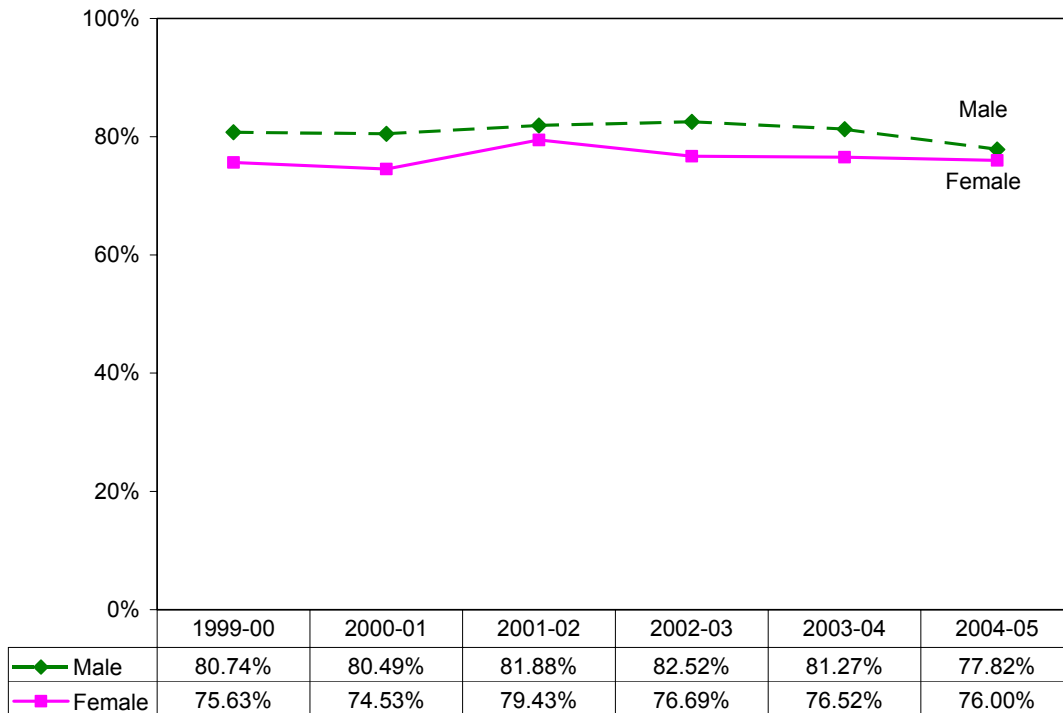
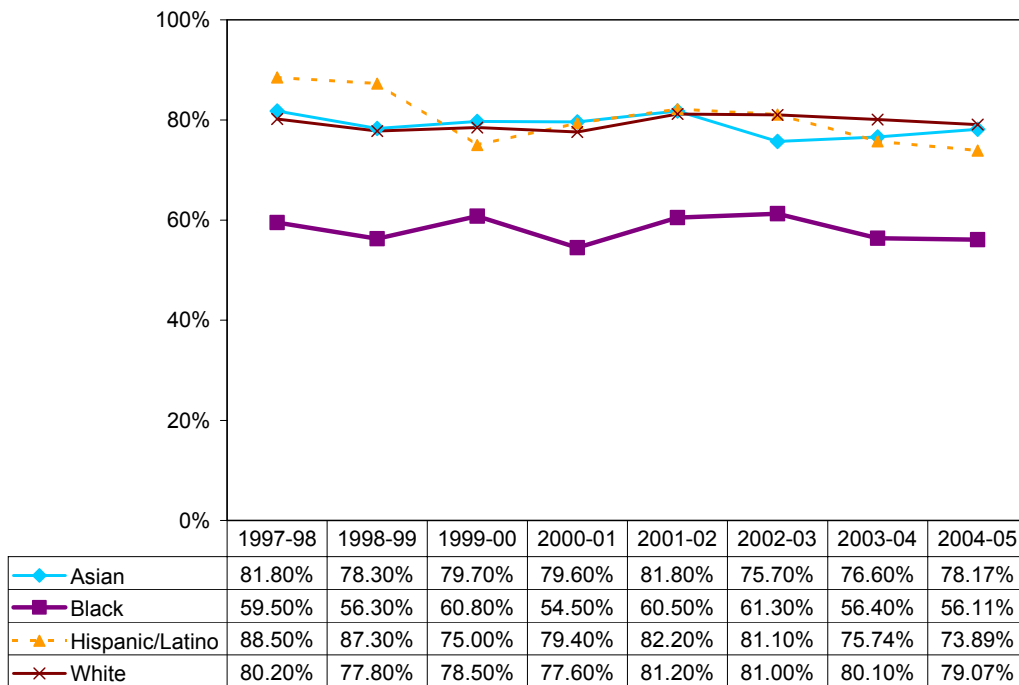


Figure 9
Percentage of AP Exam Scores of 3 or Higher by Ethnicity, 1999-00 to 2004-05



INDIVIDUAL COURSE RESULTS

Passing rates (i.e., percentages of students scoring 3 or higher) vary by AP exam, and also tend to fluctuate over time. Table 3 shows 2004-05 results for exams that were taken by at least 100 WCPSS students.

Across all courses for the past several years, passing rates have generally hovered between 70 and 90 percent. The only significant change in performance among courses where students take at least 100 exams per year has been in Calculus AB, where the passing rate since 2003-04 is approximately 20 points lower than in prior years. This drop in performance coincided with a large drop in the number of students taking that exam (and a concurrent rise in the number of students taking the Calculus BC exam). Table A3 in Appendix A details results for all AP exams administered in WCPSS since 1998.

Table 3
Passing Rates for Selected AP Exams, 2004-05

Exam	# Taken	% Scoring 3 or Higher
Calculus BC	532	87.2
Physics B	118	85.6
European History	231	84.0
Gov't & Politics: U. S.	245	82.0
Spanish Language	183	82.0
Biology	188	81.9
Psychology	447	81.0
Statistics	565	80.2
World History	242	79.8
English IV – Literature	437	79.6
U. S. History	652	74.8
English III- Language	857	72.9
Environmental Science	836	71.5
Calculus AB	198	69.2
Chemistry	148	68.9

Note. Passing rates for exams taken by fewer than 100 students are not shown.

INDIVIDUAL SCHOOL RESULTS

There was large variation across WCPSS high schools in the numbers of exams taken in 2004-05. While all comprehensive high schools had students taking AP exams in 2004-05, students at Enloe (a magnet high school that serves a large number of academically gifted students), Cary, and Green Hope accounted for almost half of them (Table A2, Appendix A).

The percentage of AP exam scores of 3 or higher also varied widely from school to school in 2004-05, from 13% at East Wake to 89% at Apex. Fourteen of the 16 high schools in WCPSS that gave AP exams had passing rates of 70% or higher (Table A2, Appendix A).

SUMMARY OF 2004-05 AP RESULTS

The number of students taking AP courses and AP exams in WCPSS appears to be rising. Significant disparities by ethnic groups remain, however, in terms of AP course-taking, AP test-taking, and AP exam results. In particular, Black/African American students are less likely than students in most other ethnic groups to:

- take an AP course,
- take an AP exam when they do take an AP course, and
- obtain a score of 3 or higher on an AP exam.

With respect to gender differences, female students are more likely than male students to take an AP course, but they are slightly less likely than male students to take an AP exam.

Approximately 60% of AP course enrollees in WCPSS end up taking the AP exam for the course, and about 78% of those students earn a score of 3 or higher on those exams, which has remained well above the corresponding state and national passing rates. These test-taking and passing rate figures vary considerably by course and, to a lesser extent, by school.

EIGHTH GRADE ACHIEVEMENT, AP COURSE-TAKING, AND SUCCESS IN AP COURSES

Taking an AP course in high school is one way to expose students to more challenging material and also to prepare them for the kind of work they will be expected to do if they choose to continue their education beyond high school. While most of the courses in the AP program can be taken in a “non-AP” format, taking the AP version of that course often means that students will be asked to learn the subject with greater breadth and depth. Students taking the AP version of a course should be better prepared to take the official AP exam for that course, which may help them earn college credits if they achieve a score on that exam that exceeds the standards for the college they choose to attend. Even for students who do not choose to take the exam, just being exposed to the more rigorous material and expectations of an AP course has been associated with college persistence and success (e.g., Adelman, 1999; Horn & Kojaku, 2001). However, other research has suggested that simple exposure to high-level courses such as AP without demonstrating mastery of the material is not necessarily predictive of later success, at least in highly selective colleges (e.g., Geiser & Santelices, 2004).

This study was undertaken using data from the 2003-04 school year to answer a specific set of questions:

1. What is the relationship between academic achievement in 8th grade and participation in AP courses, and are these relationships different for different courses?
2. What is the relationship between academic achievement in 8th grade and success in AP courses, and are these relationships different for different courses?

To address these questions, AP testing results for WCPSS students in 2003-04 were matched to district databases that contained additional information on those students including AP course-taking. Since the identification codes that students use on AP exams do not always match their identification codes in WCPSS databases, there were a small number (about 2%) of students that could not be matched. The results of these analyses, therefore, are based on about 98% of WCPSS students who were involved in the AP program in 2003-04.

EIGHTH GRADE ACHIEVEMENT AND AP PARTICIPATION

With respect to the first of these two questions, it appears that there is a relationship between a student’s achievement level in 8th grade and AP participation in high school. As demonstrated in Table 4, the vast majority of AP enrollees in 2003-04 had End-of-Grade (EOG) scores in the Level IV range in 8th grade. In most courses, over 90% of enrollees had demonstrated Level IV achievement in 8th grade. While almost all students in World History, Calculus and Computer Science scored in Level IV on the 8th grade EOG tests, there were other courses – Economics, Statistics, Biology, European History and Psychology – where more than 10% of the enrolled students had 8th grade EOG scores that were below Level IV in one subject or the other.

Table 4
Percentage of AP Enrollees with Level IV EOG Scores from 8th Grade, 2003-04

Course	% Enrollees Scoring at Level IV in Reading in 8th Grade	% Enrollees Scoring at Level IV in Math in 8th Grade	Total Enrollments, 2003-04
World History	98%	98%	48
Calculus BC (also AB/BC)	97%	99%	580
Computer Science A	95%	100%	22
Calculus AB	95%	99%	630
Computer Science AB	94%	99%	69
English III - Language	94%	95%	965
Physics	93%	99%	270
U.S. History	92%	95%	734
Economics	92%	88%	59
French Language/Literature	91%	95%	65
English IV - Literature	91%	93%	871
U.S. Government & Politics	90%	92%	228
Chemistry	90%	97%	144
Spanish Language/Literature	90%	94%	139
Environmental Science	90%	94%	1,467
Statistics	89%	97%	536
Biology	87%	94%	170
European History	87%	90%	378
Psychology	85%	91%	422

Note: AP courses with very small enrollments are either combined with similar courses (e.g., Physics B and C, etc.) or are not shown. Enrollment totals only reflect students who have 8th grade EOG test data in their records.

EIGHTH GRADE ACHIEVEMENT AND SUCCESS IN AP COURSES

To address the second question, “success in AP courses” was defined in two ways – course grades and AP test results. Not all students who take an AP course take the corresponding exam, but all students receive course grades. Looking at grades in addition to exam scores gives us one outcome measure that is more reliable but based only on selected enrollees (exams), and a second that is less reliable but includes all enrollees (grades).

Grades

With respect to course grades, it appears that AP students who scored at Level IV on their 8th grade reading and/or math EOG tests were more likely to receive a grade of C or higher across nearly all AP courses in 2003-04. For some courses, however, this difference was very small or nonexistent (Table 5).

The percentage of students obtaining a C or higher in English IV - Literature, Spanish, and Statistics did not vary much between students with and without a Level IV score in 8th grade

reading. Additionally, the percentage of students obtaining a C or higher in English IV - Literature, Statistics, and U. S. Government and Politics did not vary much between students with and without a Level IV score in 8th grade math. In one case (Economics), the seven students with below Level IV scores in 8th grade math who took the AP course all received grades of C or higher in 2003-04. Overall, the majority of students who did not score in Level IV in 8th grade and who chose to take an AP course received passing grades in those courses.

Table 5
Percentage of Students Earning a Grade of C or Higher in Selected AP Courses, 2003-04

Course	Below Level IV 8th Gr. Reading		Level IV 8th Gr. Reading		Below Level IV 8th Gr. Math		Level IV 8th Gr. Math	
	%	n	%	n	%	n	%	n
English IV – Literature	94%	77	99%	793	98%	60	98%	811
Spanish Lang./Literature	93%	14	94%	125	67%	9	96%	130
Statistics	91%	57	95%	478	89%	18	95%	518
Calculus BC*	89%	18	97%	562	---	2	97%	577
English III – Language	87%	60	97%	905	83%	48	97%	917
Gov't & Politics: U.S.	86%	21	96%	206	89%	19	95%	209
Psychology	86%	64	97%	358	78%	36	97%	386
European History	84%	49	91%	329	84%	37	91%	341
French Lang./Literature	83%	6	97%	59	---	3	95%	62
Economics	80%	5	94%	54	100%	7	92%	52
Calculus AB	79%	29	93%	601	---	3	92%	626
Environmental Science	74%	152	92%	1,315	70%	83	92%	1,383
Biology	68%	22	93%	148	70%	10	91%	160
Chemistry	67%	15	96%	129	---	4	95%	140
U.S. History	64%	58	92%	676	58%	38	92%	696
Physics	63%	19	95%	250	---	2	93%	268
World History	---	1	98%	47	---	1	98%	47
Computer Science A	---	1	76%	21	---	0	73%	22
Computer Science AB	---	4	97%	65	---	1	97%	68

Note: * - Calculus BC also includes AB/BC. The symbol '---' indicates that fewer than five students were in that group; therefore, no data are reported. AP courses with very small enrollments are either combined with similar courses (e.g., Physics B and C, etc.) or are not shown.

AP Exam Results

AP exam takers who scored at Level IV on their 8th grade reading and/or math EOG tests were more likely to receive a score of 3 or higher across nearly all AP exams in 2003-04. In most cases, the differences in passing rates are rather large, with the exception of Spanish Language. It should be noted, however, that all but one of the students with 8th grade EOG scores below Level IV who passed the AP Spanish Language exam were of Hispanic/Latino origin (Table 6).

Students with 8th grade EOG scores below Level IV who took AP exams did fairly well on a few exams, such as Psychology, European History, and English Literature. Students also did fairly well on several math and science-related AP exams if the subject in which they were below Level IV in 8th grade was reading. The overall number of students with 8th grade EOG scores below Level IV who actually take AP exams is very small, however, and when they do take them their passing rate in most courses is not high. Only about 33% of AP students with 8th grade EOG scores below Level IV actually take the corresponding exam, compared to about 61% of AP students with Level IV 8th grade EOG scores.

Table 6
Percentage of AP Exam Takers Scoring 3 or Higher on Selected AP Exams, 2003-04

Exam	Below Level IV 8th Gr. Reading		Level IV 8th Gr. Reading		Below Level IV 8th Gr. Math		Level IV 8th Gr. Math	
	%	n	%	n	%	n	%	n
Spanish Language	89%	9	91%	78	80%	5	91%	82
Physics B	71%	7	88%	113	---	1	87%	120
Calculus BC	67%	12	90%	426	---	1	90%	436
Calculus AB	63%	8	66%	157	---	1	66%	164
European History	60%	10	80%	152	50%	10	81%	152
Psychology	52%	27	85%	233	58%	12	83%	248
Statistics	50%	18	82%	300	---	2	80%	317
English IV – Literature	40%	15	83%	293	83%	12	80%	296
Chemistry	40%	5	84%	93	---	0	82%	98
Biology	36%	11	87%	103	---	2	83%	112
English III – Language	34%	32	76%	724	30%	20	76%	736
Environmental Science	32%	44	78%	630	14%	14	77%	660
U.S. History	21%	34	76%	567	11%	19	75%	582
Govt. & Politics: U.S.	0%	5	85%	135	40%	5	84%	136
Spanish Literature	---	1	67%	18	---	0	63%	19
Govt. & Politics: Comp.	---	1	97%	32	---	1	94%	32
French Literature	---	0	65%	5	---	0	68%	5
French Language	---	1	40%	31	---	1	40%	31
Economics: Micro	---	3	69%	16	---	2	71%	17
Economics: Macro	---	3	62%	39	---	4	63%	38
Physics C: Elec. & Mag.	---	1	77%	52	---	0	77%	53
World History	---	1	88%	41	---	1	85%	41
Computer Science A	---	1	92%	24	---	0	88%	25
Computer Science AB	---	1	13%	23	---	0	13%	24
Physics C: Mechanics	--	2	74%	62	---	1	75%	63

Notes. The symbol “---” indicates that fewer than 5 students were in that group; therefore, no data are reported. AP exams with very small test-taking populations are not shown.

Relationships among Measures of Success

In addition to looking at how these two measures of AP success – course grades and exam scores – relate to students' 8th grade achievement, additional analyses were conducted to see how well the two success measures related to each other. Presumably, students who are receiving high grades in the course would be more likely to take the corresponding exam and to do well on it compared to students who were not doing as well in the course.

In addition to the fact that the AP test-taking rate varies between courses (see Table 2), this analysis also found variation in test-taking between students based on how well they do in the course. In every course except Latin, the AP test-taking rate for students earning an A or B grade in the course in 2003-04 was higher than for students earning a grade of C or below (Table 7). In every course except Comparative Government and Politics, the AP exam passing rates were also higher for A and B students. Neither of these results was unexpected. Table 7 also shows, however, that there are large percentages of students earning A's and B's in AP courses who are choosing not to take the corresponding exam for whatever reason. In fact, there are only 10 exams where the test-taking rate for A and B students in those corresponding courses exceeded 70% in 2003-04.

There are also some subjects where the test-taking rate and the exam passing rate are either relatively high for students who are receiving grades of C or lower in the course (Computer Science A, Calculus BC) or where their rates are nearly identical to the rates for A and B students (Physics B). Overall, it seems that both test-taking rates and passing rates for AP exams generally correspond to the grades that students receive in those courses, with the few exceptions noted above.

Table 7
AP Test-Taking and Passing Rates by Course and Course Grade, 2003-04

Exam	Test-Taking Rate - A/B Students	Test-Taking Rate - C/D/F Students	% 3 or Higher - A/B Students	% 3 or Higher - C/D/F Students
Comp. Science A	100%	78%	100%	86%
Economics: Macro	86%	44%	69%	10%
World History	85%	80%	94%	58%
English - Language	82%	48%	79%	40%
U.S. History	82%	52%	84%	40%
Physics C: Mech.	81%	---	73%	---
Spanish Language	81%	35%	94%	83%
Calculus BC	79%	67%	93%	70%
Biology	78%	38%	88%	57%
Chemistry	74%	25%	82%	58%
Gov't & Politics: U.S.	69%	36%	89%	52%
Physics C: Elec. & Mag.	68%	---	79%	---
Statistics	66%	31%	84%	69%
Spanish Literature	65%	0%	68%	---
Art History	63%	0%	92%	---
French Literature	63%	0%	40%	---
Physics B	63%	61%	90%	83%
Psychology	63%	22%	85%	60%
Envir. Science	56%	23%	83%	44%
German	56%	---	80%	---
European History	49%	33%	85%	63%
Economics: Micro	46%	13%	69%	33%
French Language	46%	11%	75%	---
Comp. Science AB	41%	0%	12%	---
English - Literature	37%	20%	83%	54%
Studio Art (All)	29%	0%	82%	---
Calculus AB	26%	21%	76%	40%
Gov't & Politics: Comp.	17%	8%	94%	100%
Latin: Vergil	0%	0%	---	---
Latin: Literature	0%	0%	---	---

DISCUSSION OF PRIOR ACHIEVEMENT STUDY RESULTS

This study was intended to shed additional light on who enters AP courses and the extent to which students with differing levels of prior achievement are successful in those courses. It appears that, based on data from the 2003-04 school year, very few students who enter high school without demonstrating Level IV achievement in reading and math end up taking AP courses. Six courses were identified, however, in which 10% or more of the enrolled students had scores at or below Level III in 8th grade, implying that Level IV achievement is not necessarily a prerequisite for enrollment in all AP courses.

Level IV achievement in 8th grade also does not appear to be a prerequisite for successfully completing an AP course. When students who had scores at or below Level III in 8th grade did enroll in AP courses in 2003-04, they received passing grades most of the time, although not always at the same rate as higher-achieving students. With respect to exam performance, AP students with EOG scores below Level IV in 8th grade were less likely to take AP exams than their Level IV counterparts, and their passing rates on AP exams were generally lower as well, with a couple of exceptions.

Overall, these analyses imply that students who do not have high levels of prior achievement can still be successful in certain AP courses. English IV-Literature, Psychology, and European History appear to be courses where students with below Level IV achievement in 8th grade are more likely to enroll, where they appear to enjoy a high likelihood of passing the course, and where they may have a reasonable chance of success on the accompanying AP exam. Given the particularly low AP course-taking rates among Black/African American and Hispanic/Latino students cited in the first section of this report, these courses may provide an important entree to the AP experience for students from subpopulations that, as a group, tend to have lower standardized test scores coming into high school. The importance of identifying and nurturing students who may not “fit the mold” of a typical AP student and providing encouragement and support for more rigorous course-taking pathways as early as middle school will help increase AP representation among those who otherwise might not seek out the experience on their own.

Another concern raised by these analyses is the low test-taking rate in many AP courses, especially among students who are receiving grades of A and B in those courses. If students' course grades are indicating a high level of mastery of the material, why do so many of them decline to take AP exams? Lack of available college credit for high scores on some exams and at some colleges, as well as the fees associated with taking AP exams (currently \$82 per exam) are two possible explanations, but additional studies could shed light on the specific reasons.

There are some important limitations as to how broadly the conclusions of this study can be applied. It is likely that those students who do not demonstrate Level IV achievement in 8th grade and take AP courses are not necessarily representative of all students who are below Level IV. There are many students whose scores are very close to Level IV, and/or who have a Level IV 8th grade score in one subject but not the other. Since taking an AP course or an AP exam is strictly a choice, it could also be that students who make that choice are different in important ways from those who do not in terms of their level of motivation, level of interest in a subject, or other factors. Just because some students who are below Level IV in 8th grade are successful in

AP courses does not therefore mean that those courses or exams are appropriate for all students. Finding ways to enroll and support more students in the AP program is an important goal, and the analyses presented here should provide some guidance as to how (and for whom) the AP program can be made more accessible.

OVERALL CONCLUSIONS

Indicators related to the Advanced Placement (AP) program are showing improvement. The AP exam-passing rate in the Wake County Public School System (WCPSS) continues to be significantly higher than the corresponding state and national rates. The overall WCPSS passing rate in 2003-04 remained largely unchanged from 2003-04 levels, while AP course-taking and test-taking continued to rise significantly. Significant gaps in AP course-taking and test-taking remain, however, with Black/African American students in particular being less likely to take AP courses, take AP tests, and pass those tests when they do take them.

Further analyses of the relationship between success in AP courses and prior achievement found that many students who do not demonstrate Level IV achievement in 8th grade do succeed in selected AP courses when they take them, and that many students who are successful in AP courses choose not to take the corresponding exams. These analyses suggest that there are students who could be successful in AP courses but are not enrolling in them. Finding ways to get more students into the AP program represents a particularly important challenge that could help expand learning opportunities to subgroups who have traditionally been under-represented in these courses.

References

- Adelman, C. (1999). *Answers in the tool box: Academic intensity, attendance patterns, and bachelor's degree attainment*. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.
- College Board. (2004). *Interpreting and using AP grades*. New York, NY: Author [Retrieved from http://apcentral.collegeboard.com/repository/2003_interpreting_pdf_7925.pdf on October 11, 2005].
- College Board. (2005). *AP program summary report*. New York, NY: Author [Retrieved from http://apcentral.collegeboard.com/repository/programsummaryreport_47033.pdf on October 18, 2005].
- Geiser, S., & Santelices, V. (2004). *The role of advance placement and honors courses in college admissions*. Berkeley, CA: Center for Studies in Higher Education. [Retrieved from <http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1036&context=cshe> on October 18, 2005].
- Horn, L., & Kojaku, L. (2001). *High school academic curriculum and the persistence path through college*. Washington, DC: U.S. Department of Education. National Center for Education Statistics, NCES 2001-163.

Appendix A

Additional Tables

Table A1
AP Course Enrollments by Course and School

AP Course	Apex	Athens Drive	Broughton	Cary	East Wake	Enloe	Fuquay-Varina	Garner	Green Hope	Leesville	Middle Creek	Millbrook	Sanderson	SE Raleigh	WF-Rolesville	Wakefield	2004-05 Total	2003-04 Total	% Change
Art History			9			22								8			39	23	70%
Biology	27	23	25	38	11	40	15		23	15	10	15	18	36	10	24	330	201	64%
Calculus AB	53	34	57	58	21	217	13	21	123	72	27	39	45	38	17	43	878	729	20%
Calculus BC	45	34	24	30	15	101	9	7	92	71	14	25	41	34	5	37	584	671	-13%
Chemistry	10	9		15	11	23		11	29	37	5	13	19	16	37	10	245	186	32%
Computer Science A								3		14			2	8			27	26	4%
Computer Science AB						19						9		2		8	38	73	-48%
Economics	1		14	15								34				19	83	80	4%
English III – Language	77	23	128	35	26	311	16	35	86	67	83	24	43	70	59	90	1,173	1,090	8%
English IV – Literature	28	19	144	98	25	305	24	67	72	55	79	16	34	80	54	82	1,182	1,023	16%
Envir. Science	81	123	218	133	23	290	41	43	130	88	35	45	104	88	78	138	1,658	1,701	-3%
European History	90		45	33	7	42	11	9	15	19	54	59	62	14	32	16	508	448	13%
French Language/Lit.	4	8	22	14	2	23					4	3		3		18	101	82	23%
German	6	1				5				3							15	10	50%
Human Geography			11													29	40	0	---
Latin		5	31														36	35	3%
Music Theory			1	7		20	9		18			21	5	4		6	91	94	-3%
Physics	11	29	20	18				5	58	16		25				10	192	245	-22%
Physics B/C						87								35			122	72	69%
Psychology		133		71	20	209			27			1		102		77	640	463	38%
Spanish Language	24	6	36	18	6	50	6	4	27	25	7	14		9	7	19	258	140	84%
Spanish Literature	9		15			16	2		17							2	61	38	61%
Statistics	78	46	147	96		46	26	10	71	132	24	64	32	52	12	68	904	643	41%
U.S. Govt. & Politics			49	32		94	40		79	23		50	17	40		22	446	263	70%
U.S. History	48	52	43	92	8	200	7	11	99	7	46	51	26	34	17	83	824	851	-3%
Visual Arts		6		1		15	7		3			7	3			7	49	37	32%
World History			48			232											280	56	400%
TOTAL	592	551	1,087	804	175	2,367	226	226	969	644	388	515	451	673	328	808	10,804	9,280	16%

Note: Course titles used in WCPSS schools in some cases do not exactly match the course titles used by the College Board.

Table A2
AP Exam Results by Course and School, 2004-05

AP Course	Apex	Athens Drive	Broughton	Cary	East Wake	Enloe	Fuquay-Varina	Garner	Green Hope	Leesville Road	Middle Creek	Millbrook	Sanderson	SE Raleigh	WF-Rolesville	Wakefield	2004-05 Total
Art History			5			15								3			23
Biology	9	14	21	11	11	24	1	2	24	5	10	6	5	23	7	15	188
Calculus AB	5		37	13	2	107	2	8	9		8	2	2	1	2		198
Calculus BC	45	33	31	25	13	90	7	2	81	69	11	21	36	29	3	36	532
Chemistry	9	4	14	10	4	22		8	25	18	1	5	5	13	4	6	148
Computer Science A						6				13		2	1			1	23
Computer Science AB						8						1	1	1			11
Economics: Macro			12	10					1			15			1	10	49
Economics: Micro			12	6					1			11			1	2	33
English III – Language	42	21	107	17	22	236	21	26	88	40	59	20	20	52	14	72	857
English IV - Literature	6	13	47	11	12	129	13	17	30	23	25	13	4	31	32	31	437
Environmental Science	43	62	122	22	13	188	20	25	87	33	32	18	40	13	22	96	836
European History	22		30	9	7	31	11	3	13	15	16	33	4	8	18	11	231
French Language	7	8	7	4	2	10				2	5			2		2	49
French Literature						1										4	5
German Language	7					2	1			4						2	16
Govt. & Politics: Comparative			33	2		4			5	4		1		1			50
Govt. & Politics: U.S.			34	12		62	8		67	19		14	2	20		7	245
Human Geography			1									1		1	1	9	13
Latin: Literature																	0
Latin: Virgil		2	3														5
Music Theory			1	5		13	3		8			3	1				34

Table A2 (Cont.)

AP Course	Apex	Athens Drive	Broughton	Cary	East Wake	Enloe	Fuquay-Varina	Garner	Green Hope	Leesville Road	Middle Creek	Millbrook	Sanderson	SE Raleigh	WF-Rolesville	Wakefield	2004-05 Total
Physics B	4	10	15	1		8		4	51	4		8		6		7	118
Physics C: Elec. & Mag.						46			1	1		2		8			58
Physics C: Mechanics			1			63			1	2		2		8			77
Psychology		72	66	48	4	166			19					38	6	28	447
Spanish Language	21	6	17	16	1	30	4	4	30	22	6	13		1	3	9	183
Spanish Literature	8		8			8			3								27
Statistics	59	43	87	70		36	18	3	45	68	12	30	17	30	5	42	565
Studio Art - Drawing				1					2			4				4	11
Studio Art – 2D Design		1					1										2
Studio Art – 3D Design																	0
U.S. History	37	39	46	84	5	171	3	9	86	8	34	25	9	17	12	67	652
World History			43			198			1								242
Total Exams	324	328	800	377	96	1,674	113	111	678	350	219	250	147	306	131	461	6,365
Percent of Exams with Score Of 3 or Higher	89%	87%	74%	81%	31%	82%	69%	47%	81%	85%	70%	74%	80%	70%	72%	75%	78%
Total AP Enrollments	592	551	1,087	804	175	2,367	226	226	969	644	388	515	451	673	328	808	10,804
Test-Taking Rate	55%	60%	74%	47%	55%	71%	50%	49%	70%	54%	56%	49%	33%	45%	40%	57%	59%

Table A3
AP Exam Results by Year, 1997-98 through 2004-05

Exam	# Schools Administering Exam								Number of Exams Taken								Percent of Exams With Scores of 3 or Higher							
	98	99	00	01	02	03	04	05	98	99	00	01	02	03	04	05	98	99	00	01	02	03	04	05
All Exams	13	13	13	15	15	15	16	16	3,197	3,471	3,806	4,320	4,878	5,468	5,534	6,365	79.9	77.8	78.1	77.2	80.5	79.4	78.6	77.8
Art History	2	2	2	3	3	3	2	3	21	24	13	16	16	11	15	23	90.5	87.5	84.6	93.8	75.0	72.7	93.3	95.7
Biology	11	13	13	15	13	14	14	16	185	211	248	227	238	206	135	188	81.6	75.4	72.6	73.1	85.7	75.7	83.0	81.9
Calculus AB	13	13	13	15	14	15	12	13	404	354	374	336	418	499	188	198	85.9	84.5	86.6	83.9	92.6	89.6	66.5	69.2
Calculus BC	10	10	10	11	11	11	14	16	117	150	152	192	202	226	526	532	93.2	81.3	90.1	95.3	89.1	84.5	89.7	87.2
Chemistry	11	10	10	14	15	12	12	15	147	133	197	185	206	146	120	148	81.0	74.4	81.7	73.5	72.8	82.2	79.2	68.9
Computer Science A	2	3	3	6	5	6	4	5	8	12	12	17	38	14	30	23	62.5	75.0	91.7	88.2	84.2	85.7	90.0	87.0
Computer Science AB	4	2	2	4	5	8	4	4	12	11	13	31	20	56	25	11	33.3	72.7	69.2	96.8	75.0	71.4	12.0	72.7
Economics: Macro	2	2	2	2	4	1	6	6	10	23	15	10	28	7	61	49	60.0	82.6	86.7	50.0	71.4	85.7	60.7	77.6
Economics: Micro	3	1	1	2	4	2	4	6	11	22	15	6	12	8	29	33	63.6	50.0	86.7	66.7	87.5	87.5	65.5	54.5
English - Lang. & Comp.	12	13	13	15	15	15	16	16	536	558	651	824	788	794	870	857	77.4	78.3	80.6	72.8	81.5	80.1	74.7	72.9
English - Lit. & Comp.	12	13	13	13	15	15	15	16	373	355	364	462	537	510	380	437	81.3	78.3	77.5	74.2	79.7	74.7	80.3	79.6
Environmental Science	2	5	5	7	11	13	15	16	38	87	115	177	299	690	787	836	81.6	55.2	76.5	82.5	75.3	79.4	76.4	71.5
European History	11	11	11	11	14	13	14	15	154	189	194	178	197	204	200	231	89.0	88.4	88.7	82.6	86.8	85.3	80.5	84.0
French Language	6	6	6	6	9	7	5	10	39	36	25	28	48	43	41	49	56.4	69.4	68.0	82.1	85.4	76.7	65.9	81.6
French Literature	2	2	2	2	2	2	1	2	4	11	8	6	9	6	5	5	50.0	81.8	87.5	66.7	100.0	100.0	40.0	60.0
German Language	5	4	4	3	5	7	5	5	18	11	10	7	7	13	12	16	61.1	90.9	80.0	85.7	100.0	69.2	91.7	100.0
Gov't & Politics: Comp.	0	1	1	2	2	4	4	7	0	1	1	5	20	24	43	50	---	0.0	100.0	40.0	100.0	79.2	95.3	88.0
Gov't & Politics: U. S.	4	6	6	4	4	8	8	10	21	25	37	49	100	216	164	245	81.0	88.0	86.5	98.0	94.0	87.0	84.1	82.0
Human Geography	0	0	0	0	0	0	1	5	0	0	0	0	0	0	1	13	---	---	---	---	---	---	100.0	100.0
Latin: Literature	0	1	1	1	0	0	1	0	0	5	0	2	0	0	5	0	---	40.0	---	50.0	---	---	20.0	---
Latin: Virgil	4	2	2	0	0	2	2	2	15	15	7	0	0	9	10	5	46.7	33.3	42.9	---	---	66.7	10.0	40.0
Music Theory	2	3	3	3	4	4	9	7	13	17	14	17	18	11	33	34	76.9	94.1	92.9	88.2	88.9	90.9	87.9	73.5
Physics B	9	10	10	8	12	11	12	11	107	150	118	131	140	153	149	118	87.9	86.7	76.3	86.3	70.7	79.7	86.6	85.6
Physics C: Elec. & Mag.	2	2	2	3	4	4	4	6	60	45	42	53	84	65	55	58	81.7	68.9	76.2	79.2	82.1	72.3	76.4	69.0
Physics C: Mechanics	3	4	4	3	3	4	4	6	63	54	60	59	19	79	67	77	92.1	90.7	85.0	93.2	100.0	73.4	74.6	77.9
Psychology	2	3	3	4	3	5	6	9	47	71	47	145	167	196	315	447	72.3	74.6	91.5	82.8	85.0	76.5	83.8	81.0
Spanish Language	8	10	10	10	13	12	13	9	74	55	103	83	93	90	110	183	85.1	78.2	81.6	88.0	81.7	74.4	91.0	82.0
Spanish Literature	3	4	4	3	3	5	6	4	20	19	9	29	11	20	23	27	85.0	78.9	77.8	86.2	90.9	85.0	69.6	77.8
Statistics	12	12	12	11	13	13	14	15	203	288	290	310	364	347	379	565	85.7	88.9	69.0	82.9	78.0	83.0	81.5	80.2
Studio Art- Drawing	3	1	1	1	6	4	4	4	3	4	4	8	9	9	9	11	66.7	50.0	75.0	87.5	100.0	88.9	100.0	100.0
Studio Art – 2D Design	3	4	5	3	3	4	3	2	7	12	24	6	11	10	3	2	85.7	66.7	83.3	83.3	81.8	50.0	33.3	100.0
Studio Art – 3D Design	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	---	---	---	---	---	---	---	---
U. S. History	13	13	13	15	15	14	16	16	487	523	644	691	724	729	696	652	68.6	66.5	67.5	64.0	70.4	71.9	74.4	74.8
World History	0	0	0	0	2	1	1	3	0	0	0	0	55	77	48	242	---	---	---	---	74.5	77.9	83.3	79.8