FOCUS On Children
Boston Public Schools

Report on 2009 Trial Urban District Assessment (TUDA) National Assessment of Educational Progress (NAEP)

Grades 4 and 8 Mathematics

Office of Research, Assessment, and Evaluation
December 2009

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EXECUTIVE SUMMARY

The Trial Urban District Assessment (TUDA) was started in 2002 as part of the National Assessment of Educational Progress (NAEP). In 2009, Boston Public Schools was one of eighteen urban districts that voluntarily participated in the NAEP assessment. Boston participated in grades 4 and 8 reading and mathematics assessments in 2003, 2005, 2007 and 2009, as well as in the Science assessments in 2005 and 2009, and Writing in 2007. This report examines the 2009 Mathematics results of the TUDA districts and compares their performance to each other, to Large Central Cities (LC), and to the Nation.

Boston's Performance over Time:

- Boston's average scores in both grades 4 and 8 have continued to increase each year since the district first participated in NAEP/TUDA in 2003.
- In grade 4, while the Nation's average score remained unchanged since 2007, Boston's average scaled score in 2009 was up 3 points, making it one of only two TUDA districts to experience a gain since the last assessment. Boston's gain since 2003 is even more impressive, totaling 16 points and surpassing the 5-point gain nationally and 7-point gain experienced by Large Cities.
- Boston's 8th grade students also experienced a significant gain in average scores since 2003: the 2009 score was up 17 points, compared to a 6-point increase nationally and a 9-point increase for Large Cities.

Boston's Performance Compared to other TUDA Districts, Large Cities, and the Nation:

- While Boston's average scores were 3 points lower than the Nation in both grades 4 and 8, the district performed significantly better than Large Cities across the country (with a population over 250,000): the average score was 5 points higher in grade 4 and 8 points higher in grade 8.
- Of the 18 participating TUDA districts, Boston was one of only five to score significantly higher than Large Cities nationwide in both the grade 4 and grade 8 math assessments.
- Compared to other TUDA districts, Boston's average scores in both grades 4 and 8 were higher than or equal to those of 15 other districts. Only two districts scored higher than Boston.

Performance by Racial/Ethnic Group:

- From 2003 to 2009, students in all racial groups made statistically significant gains in their average scores on the 4th grade test. Black students saw a 15-point gain while Asian, Hispanic, and White students experienced a 17-point gain.
- The gains made by Boston's 8th grade students between 2003 and 2009 were also statistically significant across all ethnic groups.

- Despite consistent performance gains for students of all ethnic backgrounds, the gaps in performance between Boston's Asian/White students and Black/Hispanic students persist in both 4th and 8th grade.
- However, Boston's Black students outperformed their peers across the nation: 4th graders in Boston had an average score of 231, compared to the national average of 222. Similarly, Black students in Boston had an average score 12 points higher than the average for Large Cities. Importantly, **Boston's Black students had the highest scaled scores of all TUDA districts in 4th grade**.
- Boston's Hispanic students in 4th grade also had higher average scores than Hispanic students across the Nation and in Large Cities. Compared to other TUDA districts, Boston's Hispanic 4th graders performed as well as or significantly better than all other districts, with only one exception.
- Eighth grade results for Black and Hispanic students also show that Boston students performed better than their peers in Large Cities and in most other TUDA districts.

Low-Income Students:

- In grade 4, low-income students in Boston scored significantly higher than the Nation (by 5 points) and Large Cities (by 8 points). Boston's average was also the second highest among the TUDA districts.
- Among 8th graders, the performance of Boston's low-income students was the highest of all TUDA districts, higher than the Nation, and higher than the Large City average.

Students with Disabilities:

- In both 4th and 8th grade, students with disabilities in Boston outperformed their peers in Large Cities. Their average score was not significantly different form the national average. Boston's special education students also performed better than most TUDA districts.

English Language Learners:

- Boston's English Language Learners (ELLs) had an average scaled score in 4th grade higher than the national average and higher than their peers in Large Cities.
- ELL students in 8th grade had the same average score as their peers in Large Cities. However, Boston's ELLs scored somewhat lower than the national average, although the difference was not statistically significant.

Performance by Achievement Level:

- In 2009, 80% of Boston's 4th grade students scored at the basic level or above on the math assessment. Only one TUDA district had a higher percentage. Boston's performance was also better compared to Large Cities (72%) and not statistically different from the Nation (82%).
- In grade 8, the percentage of students in Boston who performed at or above Basic was 68%, higher than Large Cities (61%) but 2 points lower than the Nation (71%).

- For both grades 4 and 8, Boston made significant improvements in the percentage of students performing at or above Proficient since 2003. Boston also saw a significant improvement in grade 8 from 2007 to 2009, with a 4-point increase. Since 2003, the percentage of 4th graders who are proficient/advanced increased 19 points, compared to 9 points for large cities; and the percentage proficient/advanced in 8th grade increased 14 points, compared to 8 points for Large Cities.

OVERVIEW AND BACKGROUND

Developed in 1969, the National Assessment of Educational Progress (NAEP), also referred to as the Nation's Report Card, is the largest nationally representative assessment of what America's students know and can do. It provides a common yardstick for measuring the progress of students' education across the country. While each state has its own unique assessment, NAEP asks the same questions in every state, making state comparisons possible.

In 2001, following discussions between the National Center for Education Statistics (NCES), the National Assessment Governing Board (NAGB), and the Council of the Great City Schools (CGCS), Congress appropriated funds for district-level assessments on a trial basis, similar to the trial for state assessments that began in 1990. As a result, the NAGB passed a resolution approving the selection of urban districts for participation in the Trial Urban District Assessment (TUDA), a special project within NAEP that would make assessment results available at the district level. Representatives of the Council of Great City Schools worked with the staff of NAGB to identify districts to be invited for the trial assessment. Districts were selected based on a number of characteristics, including size, minority concentrations, federal program participation, socioeconomic conditions, and percentages of students with disabilities (SD) and English Language Learners (ELL).

In 2002, five urban school districts participated in NAEP's first Trial Urban District Assessment (TUDA) in reading and writing. In 2003, ten urban districts (including the original five) participated in the TUDA program in reading and mathematics in grades 4 and 8: Atlanta, Boston, Charlotte-Mecklenburg, Chicago, Cleveland, Houston, Los Angeles, New York City, San Diego, and Washington, D.C. (District of Columbia Public Schools-DCPS). In 2005, Austin was added to the group of school systems that participated in the reading, math and science testing. These eleven large urban school districts continued participating in TUDA in 2007. In 2009, seven more districts (Baltimore City, Detroit, Fresno Unified, Jefferson County (KY), Miami-Dade County, Milwaukee, and Philadelphia) joined the TUDA project. A total of 18 urban school districts nationwide are now part of the TUDA program. Prior to 2009, only public-school students, excluding charters, were sampled in the TUDA. However, beginning in 2009, charter schools were included in the NAEP TUDA results if they were also included in a district's Adequate Yearly Progress (AYP) reports.

Average scores on the NAEP are reported on a 0-500 scale. "Large Central Cities" refers to public schools located in cities with populations of 250,000 or more (as defined by NCES). Comparisons between national, district, and large city results are limited to public school students. In NAEP reports, the category "nation (public)" does not include Department of Defense or Bureau of Indian Education schools. It should also be noted that among the TUDA districts, fifteen of the eighteen consist entirely of schools in cities with a population of 250,000 or more; three of them however – Austin, Charlotte and Los Angeles— also include a number of fourth and eighth grade students enrolled in surrounding suburban or rural areas. Results for these three districts include data from all students, both urban and suburban/rural, a fact that must be kept in mind when comparing their performance to other districts, large cities, or the nation.

This report provides results for Boston's public school students in grades 4 and 8 from the National Assessment of Educational Progress (NAEP) assessment in mathematics. Results are reported by average scaled scores and by achievement levels (Basic, Proficient, and Advanced).

An overview of the mathematics assessment framework and comparisons with the MCAS relative to design, reporting and format are included in Appendices A and B. Appendix C presents sample questions from the 2009 fourth- and eighth grade NAEP assessment.

DEMOGRAPHIC CONTEXT

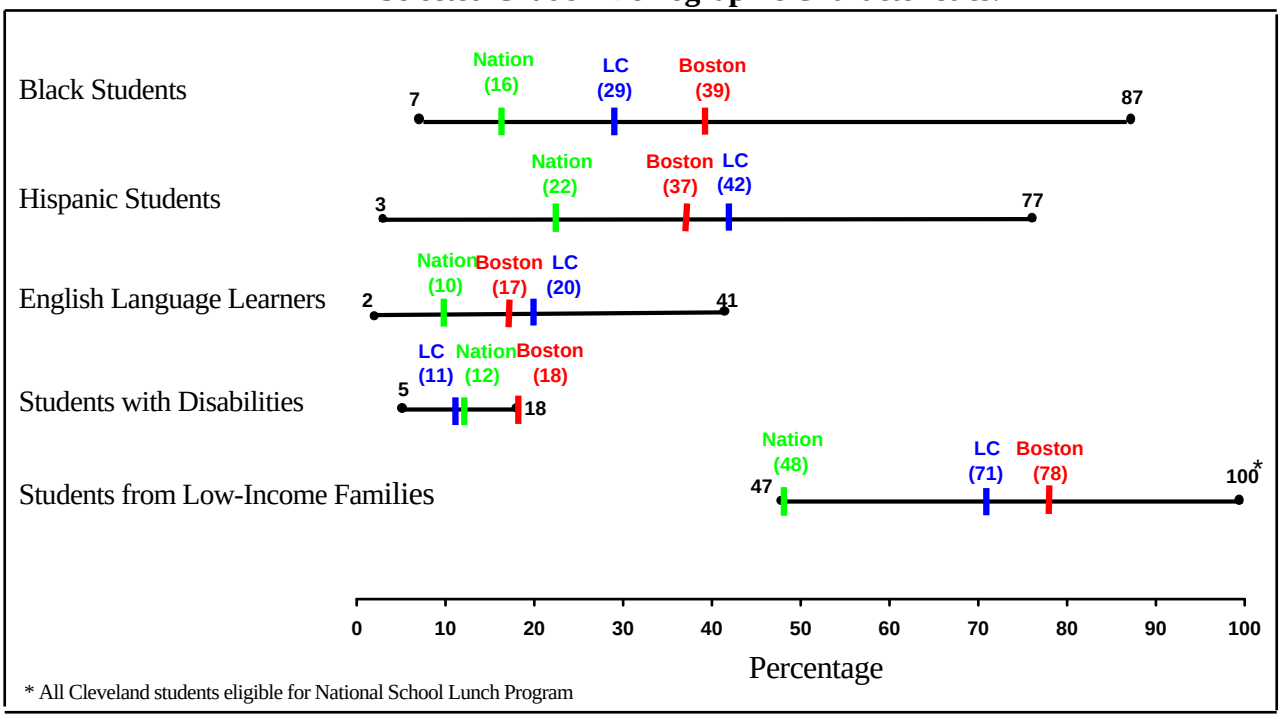
The charts below display the percentage of students who participated in the 2009 TUDA NAEP Math test by their racial/ethnic identification, disability, English Language Learner status, and Low-Income status. The charts display not only Boston's participation rates, but also the Nation's and Large Cities', as well as the TUDA minimums and maximums.

In both grades 4 and 8, Boston's percentages for Black, Hispanic, and English Language Learner students fall in the middle range of the other TUDA districts. However, almost 80% of students in Boston receive free/reduced-price lunch, far larger than the national average, and significantly higher than Large Cities. Boston also has the highest participation rates for students with disabilities compared to other TUDA districts. These differences are important to consider in comparing results across jurisdictions.

In addition, because results are based on samples rather than entire populations, examining statistical significance is essential in determining differences across groups.

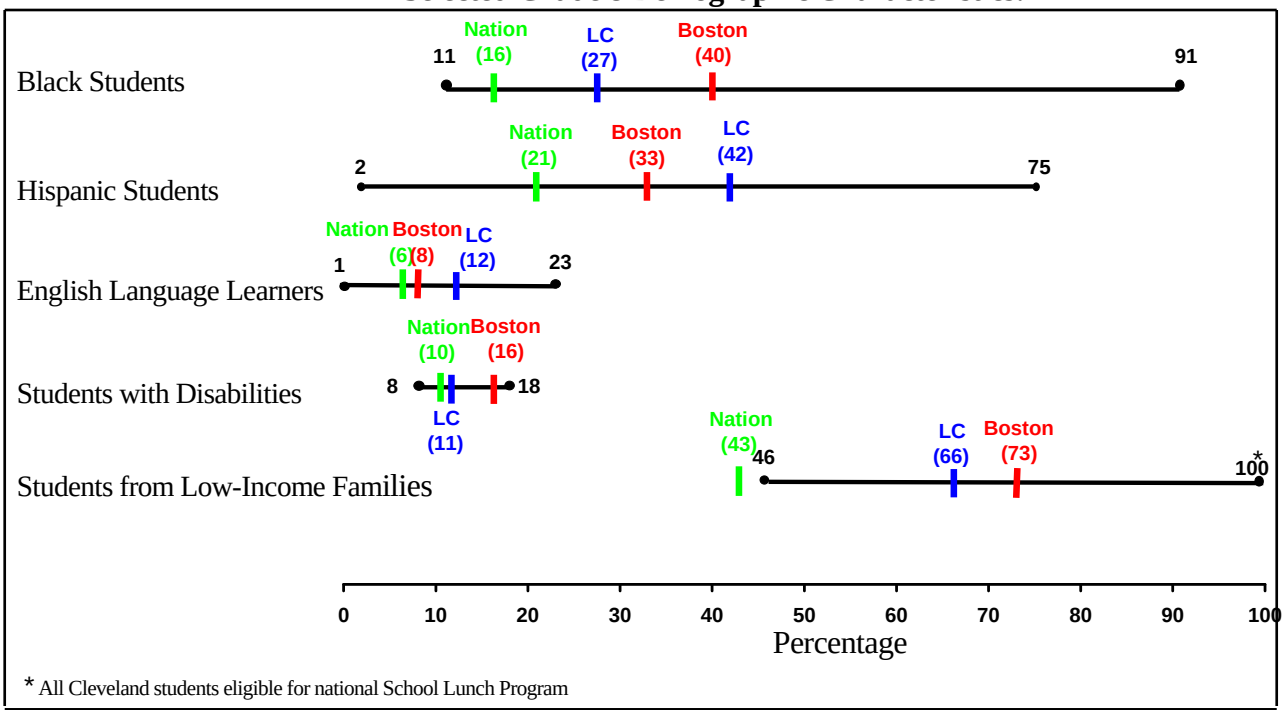
Distribution of Selected Student Groups for TUDA Districts

Selected Grade 4 Demographic Characteristics:



* All Cleveland students eligible for National School Lunch Program

Selected Grade 8 Demographic Characteristics:

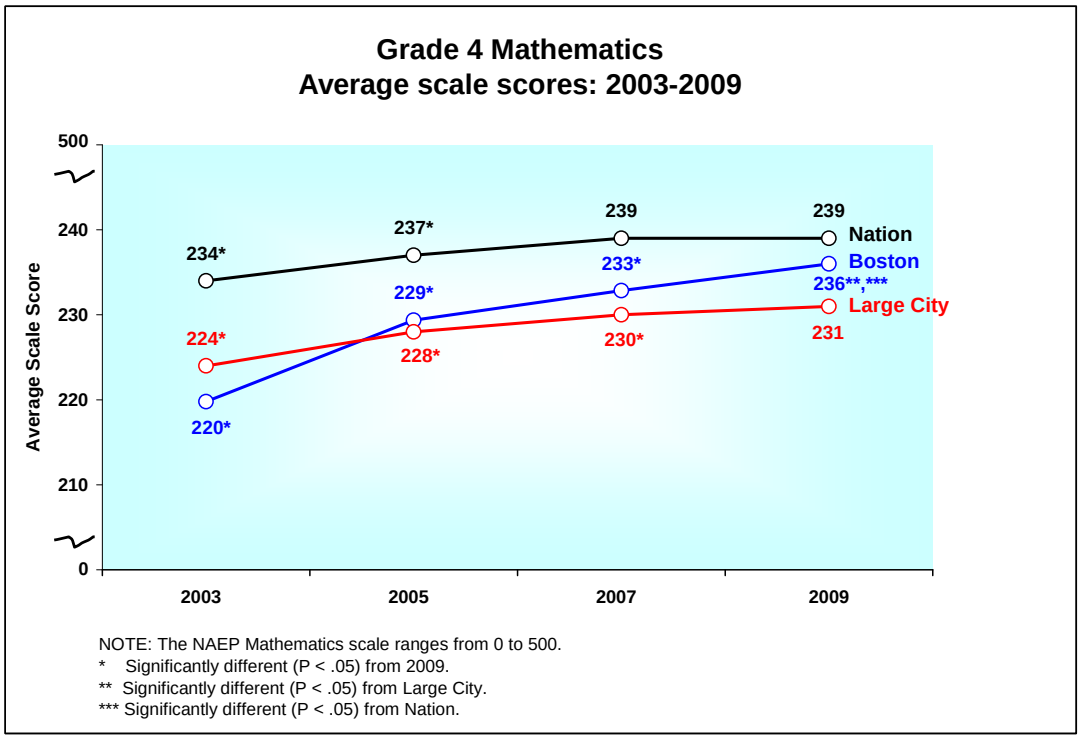


* All Cleveland students eligible for national School Lunch Program

ANALYSES

(1) Average Math Scaled Scores Over Time: 2003 - 2009

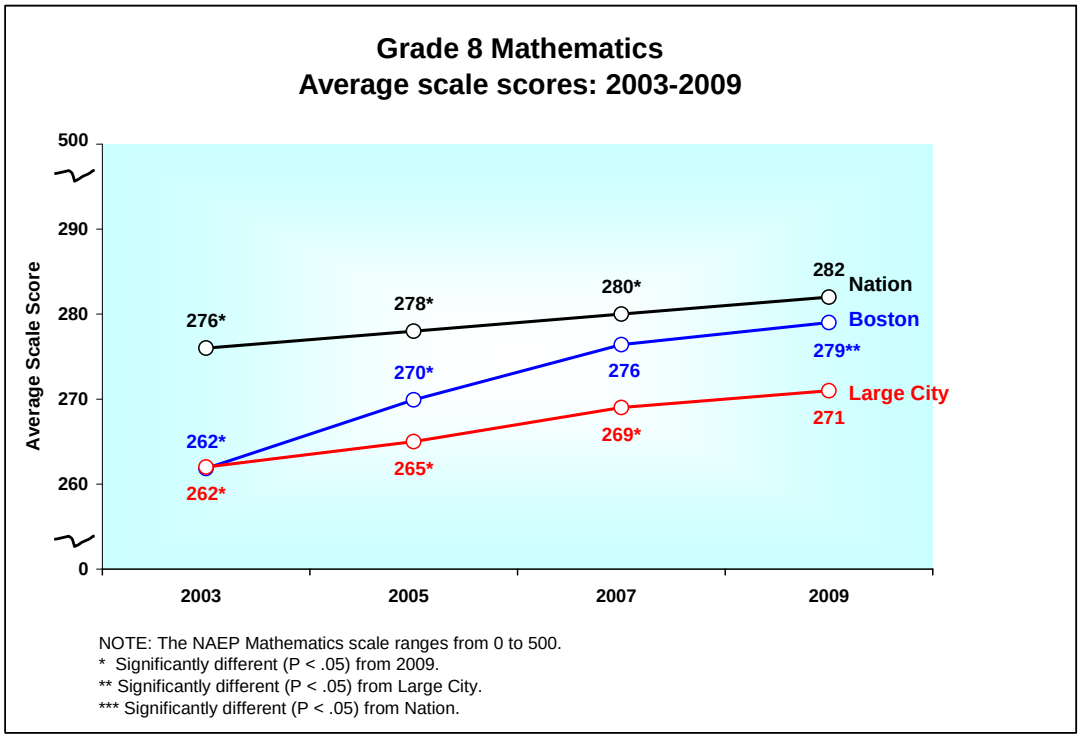
Grade 4



- Boston's average score in 2009 was **significantly higher than in the three previous administrations** of the NAEP, beginning in 2003.
- While the Nation's average score remained unchanged since 2007, Boston's average scaled score in 2009 was 236, up 3 points, **making it one of only two TUDA districts to experience a gain since the last assessment** (Washington DC was the second). Boston's gain since 2003 is even more impressive, totaling 16 points and surpassing the 5-point gain nationally and 7-point gain experienced by large cities.
- Although Boston's performance in 2009 was 3 points lower than the national average, it was **significantly better compared to Large Cities**[*].

[*] Cities with populations greater than 250,000

Grade 8



- Boston's 8th grade students had an average score significantly higher (8 points) than the average for Large Cities, and not significantly different than the national average.

- Boston's 8th grade average score in 2009 was significantly higher than in 2003 and 2005, and continued to increase since 2007, though the gain was not statistically significant. Since 2003, Boston's average score has increased 17 points, compared to a 6-point increase nationally and a 9-point increase for Large Cities.

(2) 2009 Scaled Score Comparisons Across Jurisdictions

2009 Average Scale Score Comparisons - Large City (LC) vs TUDA Districts

Grade Level	Atlanta	Austin	Baltimore City	BOSTON	Charlotte	Chicago	Cleveland	Detroit	Dist. of Columbia	Fresno	Houston	Jefferson County (KY)	Los Angeles	Miami-Dade	Milwaukee	N.Y.C.	Philadelphia	San Diego
Grade 4	↓	↑	↓	↑	↑	↓	↓	↓	↓	↓	↑	=	↓	↑	↓	↑	↓	↑
Grade 8	↓	↑	↓	↑	↑	↓	↓	↓	↓	↓	↑	=	↓	=	↓	=	↓	↑

Relative to each district listed at the top of the figure:

↑ : That Distict had significantly (P < .05) higher average scale score than Large City

= : No significant difference between that District and Large City

↓ : That District had significantly (P < .05) lower average scale score than Large City

- Of the 18 participating TUDA districts, Boston was one of only five to score significantly higher than other Large Cities nationwide in **both** the grade 4 and grade 8 math assessments. (The other districts were Austin, Charlotte, Houston, and San Diego).

Boston's scaled scores for all students as well as for student subgroups are provided in Appendix D. Scaled scores for all TUDA districts are provided in appendix E.

2009 Average Scale Score Comparisons - Boston vs TUDA Districts

Grade Level	LARGE CITY	Atlanta	Austin	Baltimore City	Charlotte	Chicago	Cleveland	Detroit	Dist. of Columbia	Fresno	Houston	Jefferson County (KY)	Los Angeles	Miami-Dade	Milwaukee	N.Y.C.	Philadelphia	San Diego
Grade 4	↑	↑	↓	↑	↓	↑	↑	↑	↑	↑	=	=	↑	=	↑	=	↑	=
Grade 8	↑	↑	↓	↑	↓	↑	↑	↑	↑	↑	=	↑	↑	↑	↑	↑	↑	=

Relative to each district listed at the top of the figure:

↑ : Boston had significantly (P < .05) higher average scale score than that District

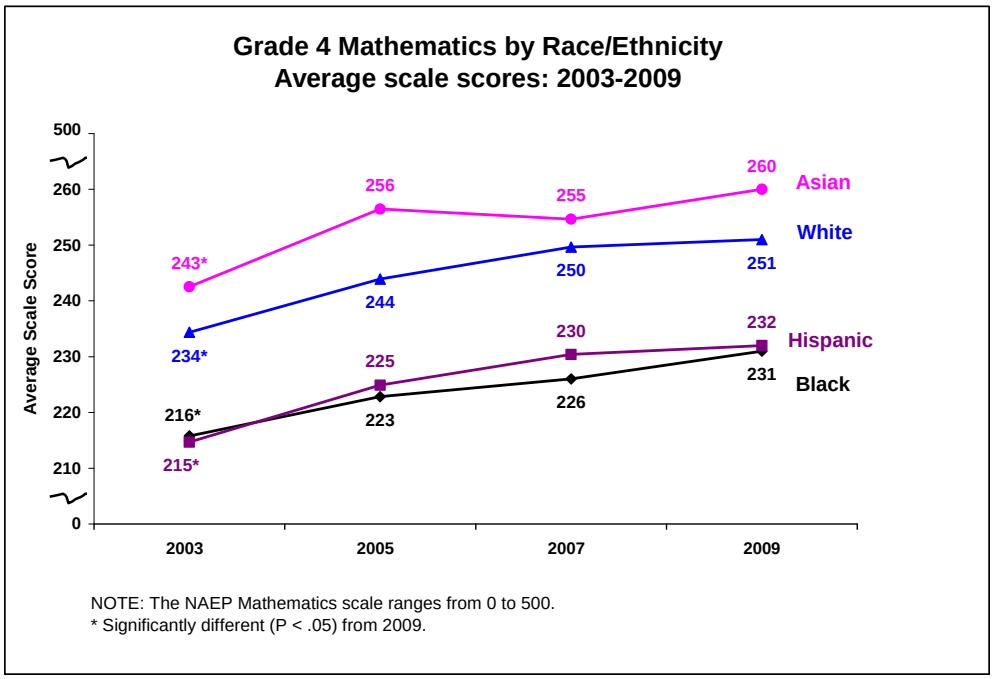
= : No significant difference between Boston and that District

↓ : Boston had significantly (P < .05)lower average scale score than that District

- In addition to its higher scores compared to Large Cities, Boston's performance also stands out in comparison to other TUDA districts: in both grades 4 and 8, average scaled scores were higher than or equal to 15 other districts. Only two districts, Charlotte and Austin, scored higher than Boston in both grades 4 and 8 Mathematics.

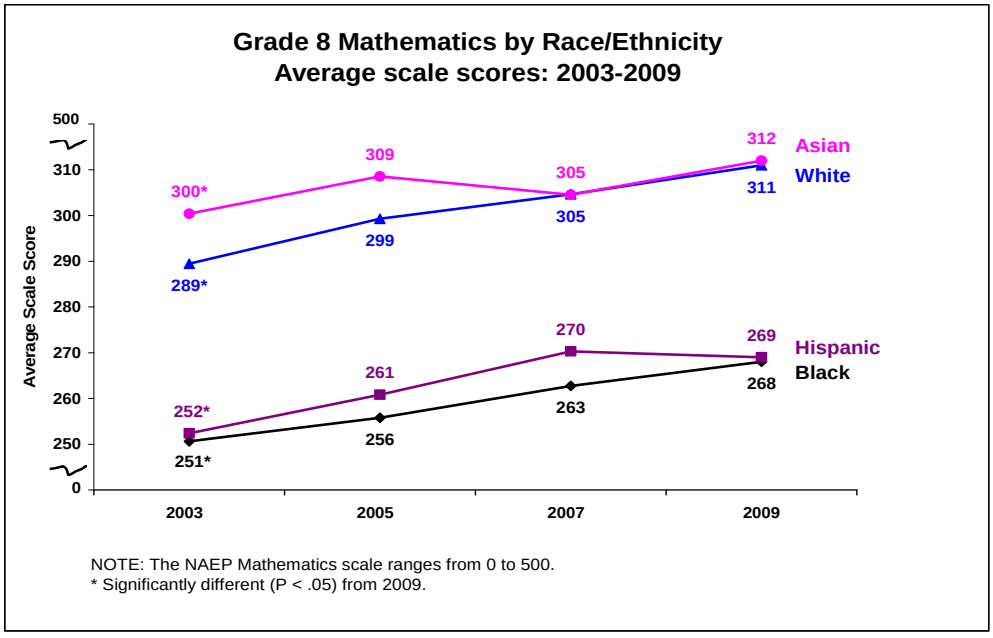
(3) Average Math Scaled Scores by Race/Ethnicity

Boston's Grade 4 Students: 2003-2009



- From 2003 to 2009, students in all racial groups made statistically significant gains in their average scores on the 4th grade test. Black students saw a 15-point gain, while Asian, Hispanic, and White students experienced a 17-point gain.

Boston's Grade 8 Students: 2003-2009

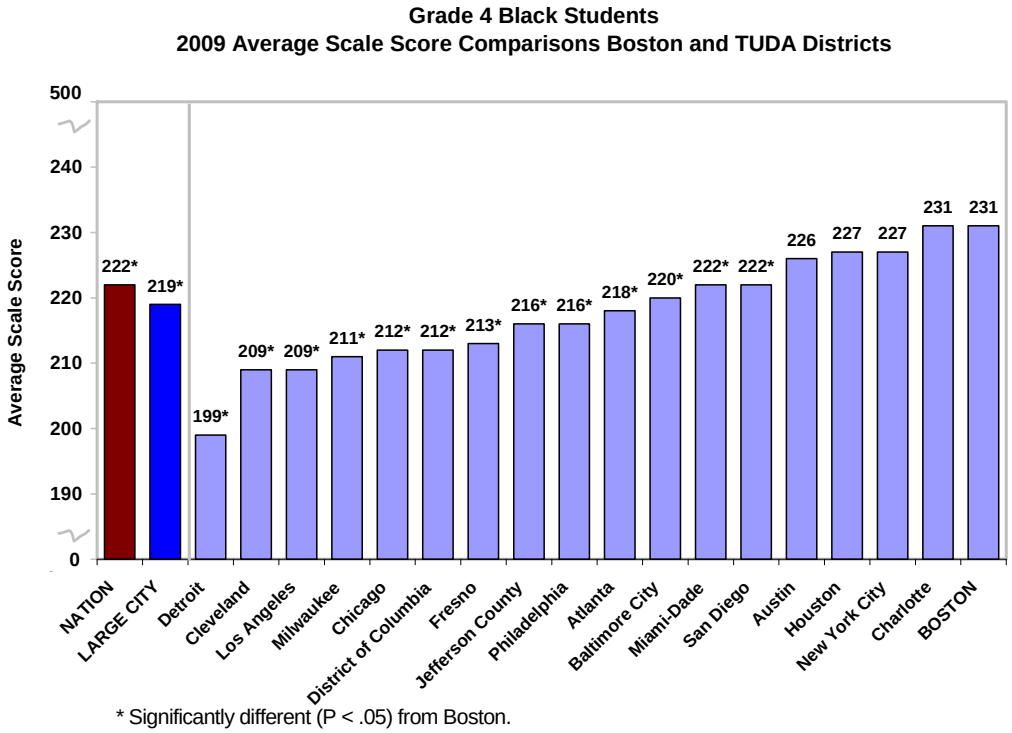


- The gains made by Boston's 8th grade students between 2003 and 2009 were also statistically significant across all ethnic groups: improvements ranged from 12 points for Asian students, to 22 points for White students.

- Despite consistent performance gains for students of all ethnic backgrounds, the gaps in performance between Boston's Asian/White students and Black/Hispanic students persist in both 4th and 8th grade.

Appendix F provides detailed information on the performance of students by racial group.

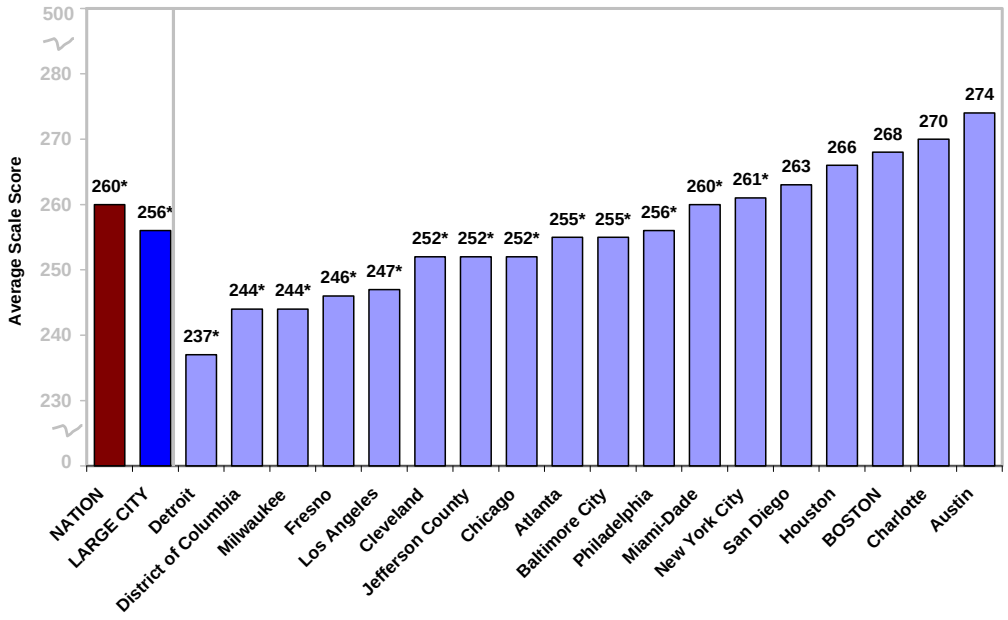
Boston's Black Students Compared to the Nation, Large Cities, and other TUDA Districts



* Significantly different (P < .05) from Boston.

- Despite continued disparity in the performance of Black students compared to their White and Asian peers, the district's Black students outperformed their peers across the nation: 4th graders in Boston had an average score of 231, compared to the national average of 222. Similarly, Black students in Boston had an average score 12 points higher than the average for Large Cities. Importantly, **Boston's Black students had the highest scaled scores of all TUDA districts**, tied with Charlotte's.

Grade 8 Black Students
2009 Average Scale Score Comparisons Between Boston and TUDA Districts

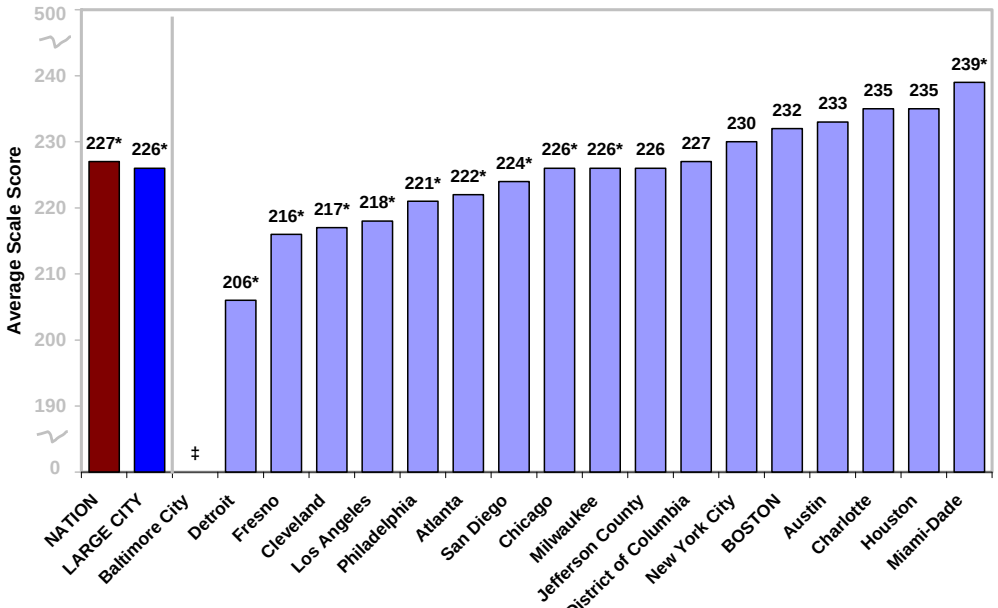


* Significantly different (P < .05) from Boston.

- In Grade 8, Boston's black students again outperformed their peers across the Nation and in Large Cities. Compared to the TUDA districts, Boston's black students performed better than 13 jurisdictions and were not significantly surpassed by any.

Boston's Hispanic Students Compared to the Nation, Large Cities, and other TUDA Districts

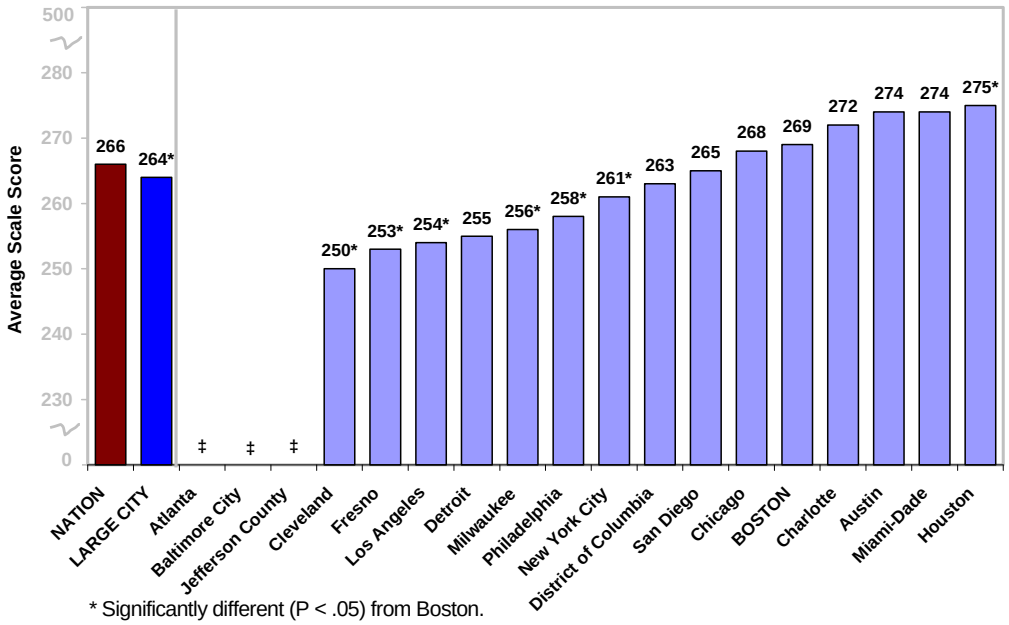
Grade 4 Hispanic Students
2009 Average Scale Score Comparisons Between Boston and TUDA Districts



* Significantly different (P < .05) from Boston.
‡ Reporting standard not met. Sample size insufficient to permit a reliable estimate.

- Boston's Hispanic students in 4th grade also had higher average scores (232) than Hispanic students across the Nation (227) and in Large Cities (226). Compared to other TUDA districts, Boston's Hispanic 4th graders performed as well as or significantly better than all other districts, with only one exception. (Miami-Dade's average score was significantly higher than Boston's).

Grade 8 Hispanic Students
2009 Average Scale Score Comparisons Between Boston and TUDA Districts



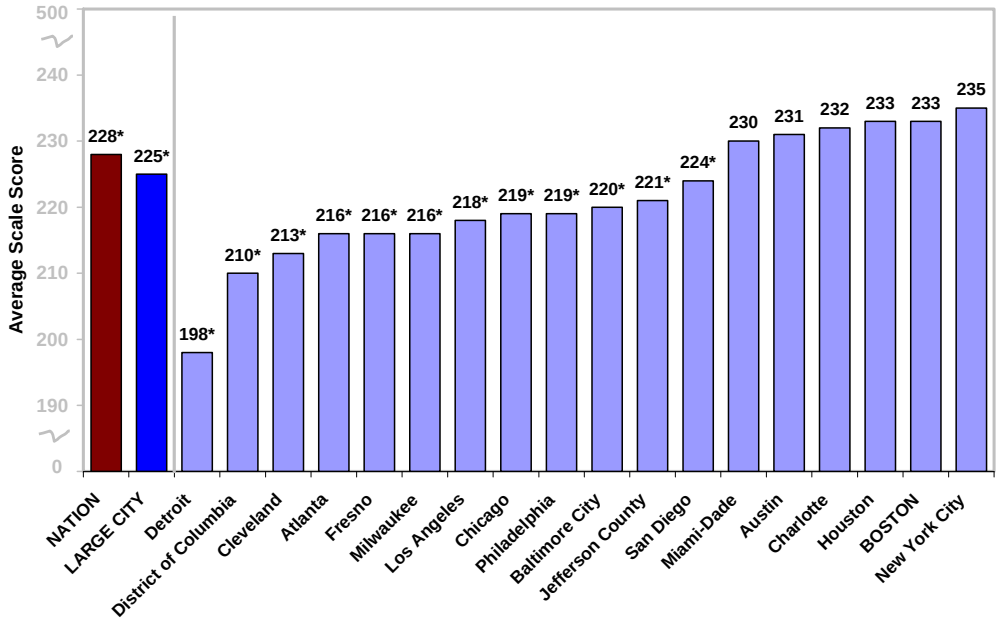
* Significantly different (P < .05) from Boston.
‡ Reporting standard not met. Sample size insufficient to permit a reliable estimate.

- In Grade 8, Boston's Hispanic students performed as well as their national peers, and better than Hispanic students in Large Cities. Among TUDA districts, only Houston's Hispanic student group had a significantly higher average than Boston's.

(4) Average Math Scaled Scores for Other Student Groups

Students eligible for Free/Reduced Lunch

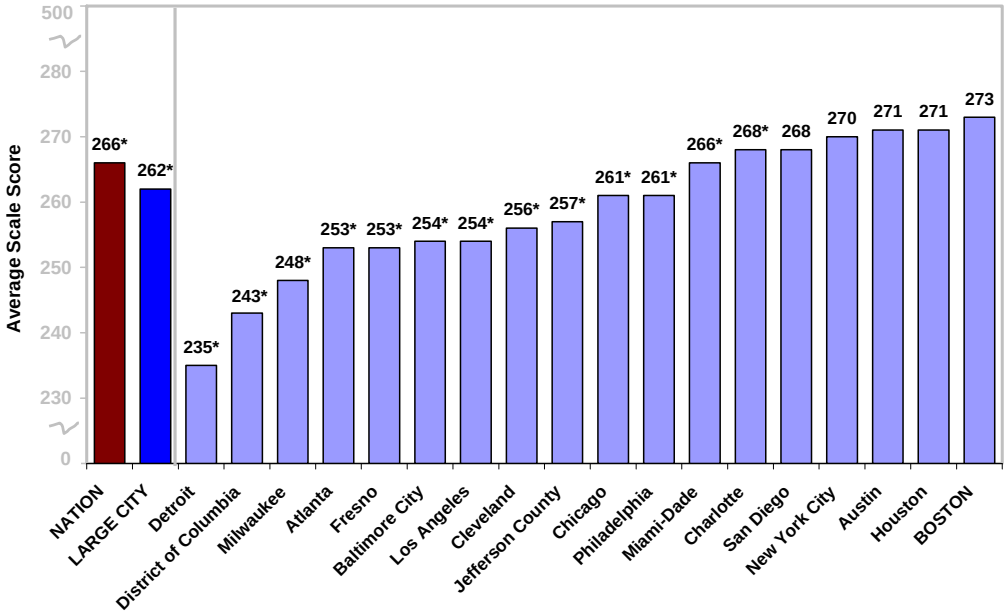
Grade 4 Low-Income Students
2009 Average Scale Score Comparisons Between Boston and TUDA Districts



* Significantly different (P < .05) from Boston.

- In grade 4, low-income students in Boston scored significantly higher than the Nation (by 5 points) and Large Cities (by 8 points). Boston's average was also the second highest among the TUDA districts and not significantly different from New York City's.

Grade 8 Low-Income Students
2009 Average Scale Score Comparisons Between Boston and TUDA Districts

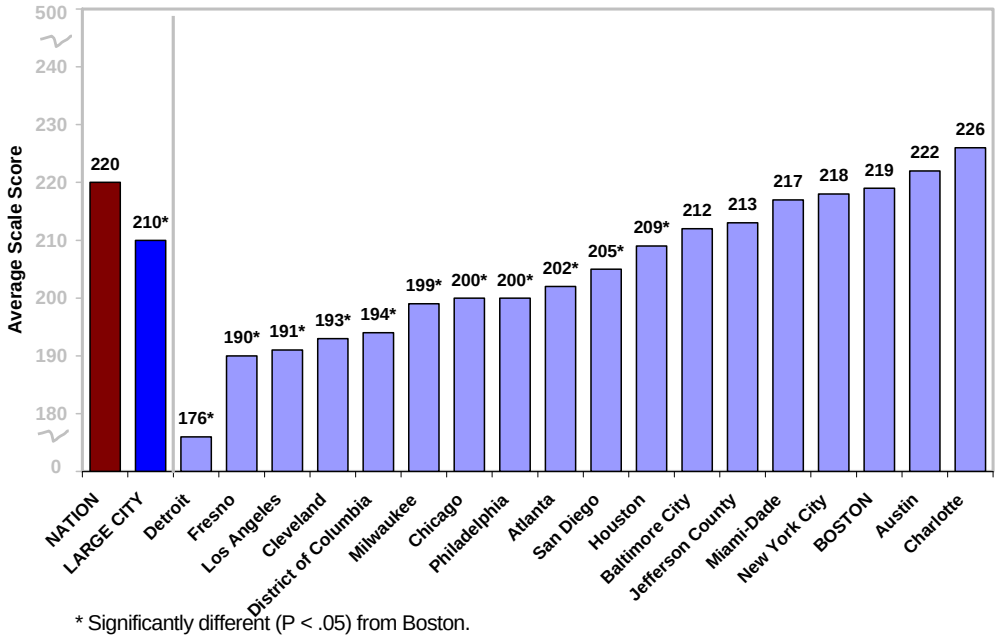


* Significantly different (P < .05) from Boston.

- Among 8th graders, the performance of Boston's low-income students was the highest of all TUDA districts, higher than the Nation, and higher than the Large City average.

Students with Disabilities

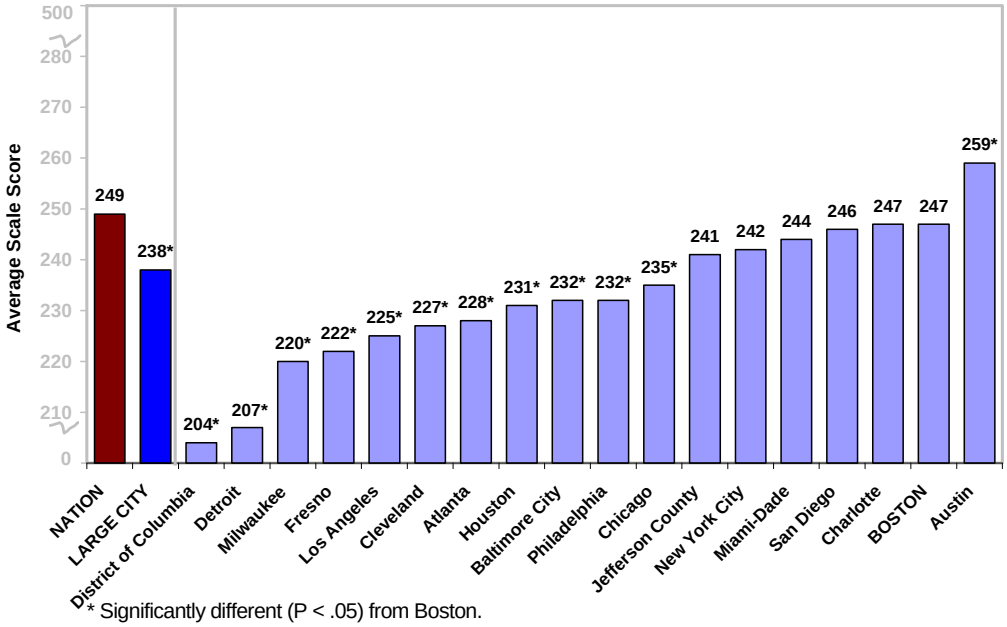
Grade 4 Students with Disabilities
2009 Average Scale Score Comparisons Between Boston and TUDA Districts



* Significantly different (P < .05) from Boston.

- In 4th grade, students with disabilities in Boston outperformed their peers in Large Cities. Their average score was not significantly different form the national average. Boston's special education students also performed better than most TUDA districts, scoring lower than only two, though the differences were not statistically significant.

Grade 8 Students with Disabilities
2009 Average Scale Score Comparisons Between Boston and TUDA Districts

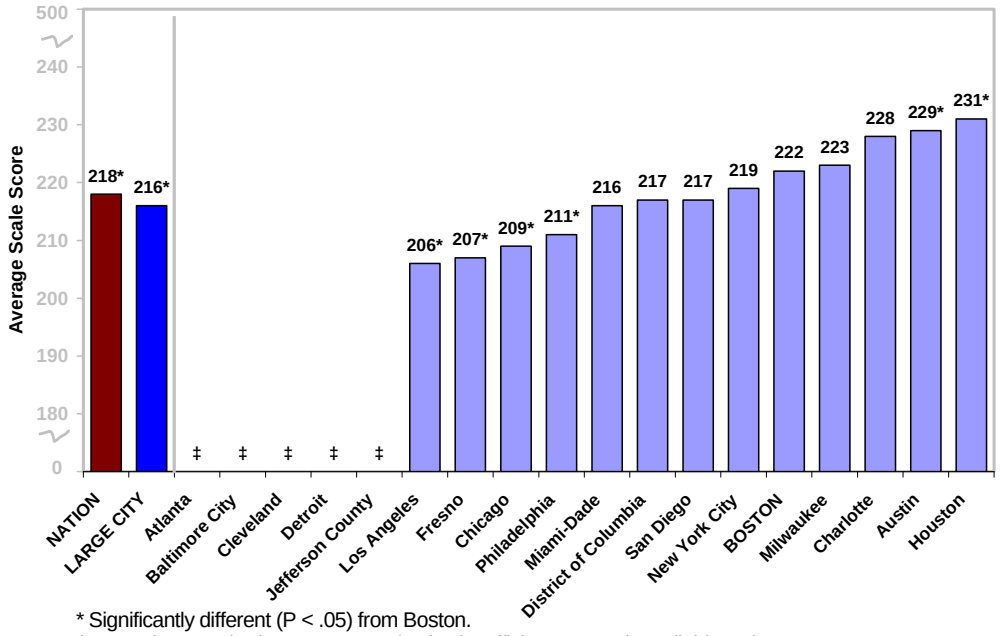


* Significantly different (P < .05) from Boston.

- In 8th grade, students with disabilities in Boston outperformed their peers in Large Cities. Their average score was not significantly different form the national average. Compared to other TUDA districts, Boston's special education students also scored higher than most, with only Austin's average being significantly better.

English Language Learners

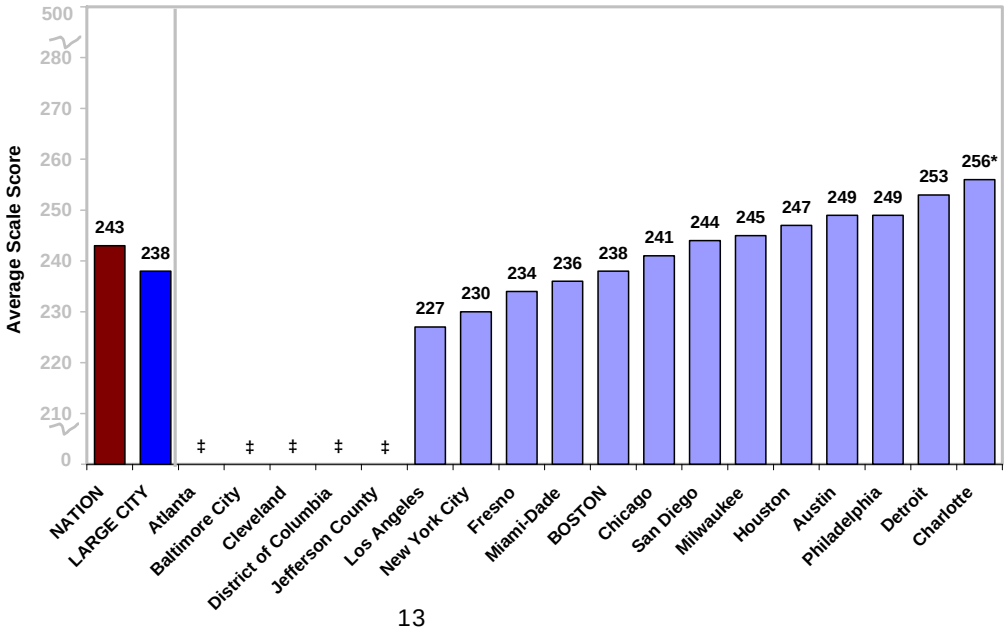
Grade 4 English Language Learners
2009 Average Scale Score Comparisons Between Boston and TUDA Districts



* Significantly different (P < .05) from Boston.
‡ Reporting standard not met. Sample size insufficient to permit a reliable estimate.

- Boston's English Language Learners (ELLs) had an average scaled score in 4th grade higher than the national average and higher than their peers in Large Cities. Compared to other TUDA districts, only two out of the 13 districts with a sufficient ELL sample had significantly higher averages than Boston.

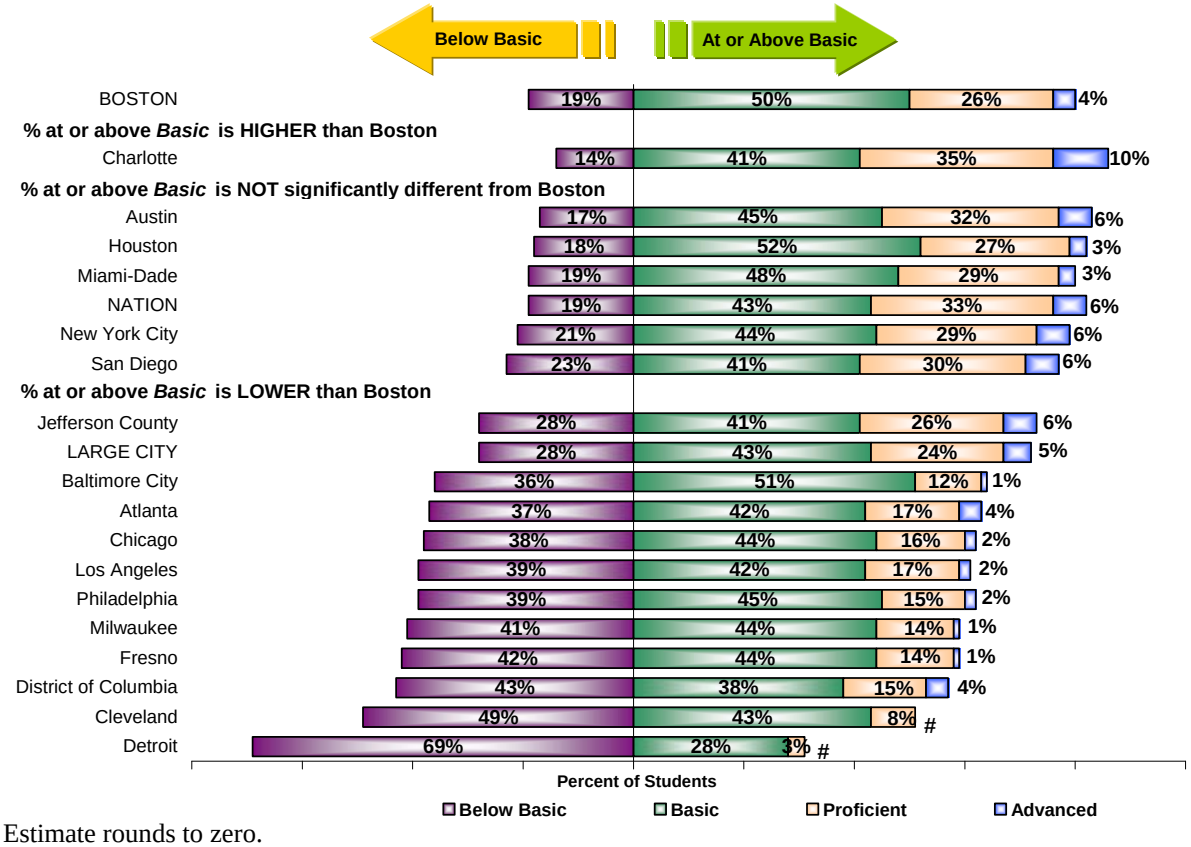
Grade 8 English Language Learners
2009 Average Scale Score Comparisons Between Boston and TUDA Districts



- ELL students in 8th grade had the same average score as their peers in Large Cities and lower than the national average, though the difference was not statistically significant. Boston's ELL average was lower than that of 8 TUDA districts, but only Charlotte's performance was significantly better.

(5) Performance by Achievement Level: Boston vs. Nation, Large Cities, and TUDA Districts

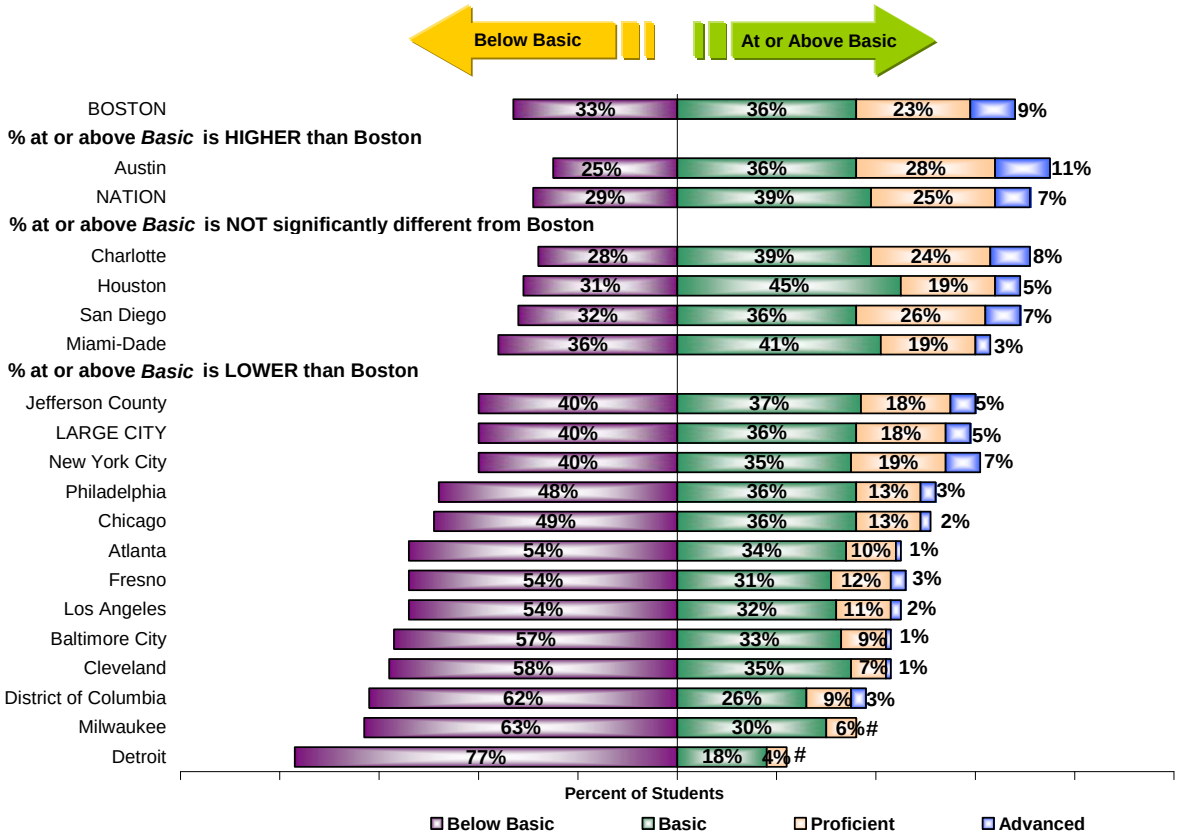
Grade 4 Percentage of Students Scoring at or Above Basic:



Estimate rounds to zero.
NOTE: Detail may not sum to totals because of rounding.

- In 2009, 80% of Boston's 4th grade students scored at the basic level or above on the math assessment. This percentage was significantly higher or equal to that in all but one other TUDA district. Boston's performance was not significantly different from the Nation overall (82%). However, a higher percentage of Boston students performed at the Basic level or above compared to students in Large Cities (72%).

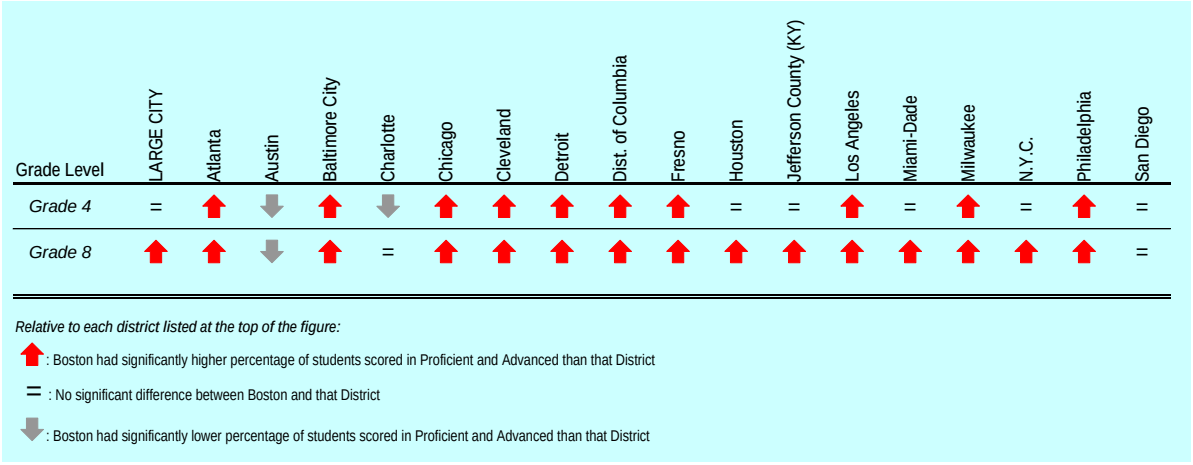
Grade 8 Percentage of Students Scoring at or Above Basic:



Estimate rounds to zero.
NOTE: Detail may not sum to totals because of rounding.

- In grade 8, the percentage of students in Boston who performed at or above Basic (68%) was higher compared to 12 other TUDA districts, as well as Large Cities (61%). Boston's percentage was significantly lower only as compared to Austin (75%) and the Nation (71%).

Percentage of Students Scoring at or Above Proficient in 2009: Boston vs. TUDA Districts



- In 2009, Boston's 4th grade proficient/advanced rate (30%) was significantly higher than that of nine TUDA districts. Boston's rate was about the same as that of Large Cities; and lower than just two districts, Austin and Charlotte.
- Boston's 8th graders performed significantly better than students in Large Cities, with a proficient/advanced rate of 32%. Compared to all the other TUDA districts, Boston's performance was second only to Austin's.

Percentage of Students Scoring at or Above Proficient, 2003-2009

	Grade 4				Grade 8			
	2003	2005	2007	2009	2003	2005	2007	2009
LARGE CITY	*20***	*24***	*28*	*29*	*16***	*19***	*22***	*24*
Atlanta	13**	17**	20	21*	6**	7**	11	11*
Austin	--	40	40	38*	--	33**	34**	39*
Baltimore	--	--	--	13*	--	--	--	10*
Boston	**12****	**22****	**27**	**31**	**17****	**23****	**27****	**31***
Charlotte	41	44	44	45*	32	33	34	33*
Chicago	10**	13	16	18*	9**	11**	13	15*
Cleveland	10	13	10	8*	6	6	7	8*
Detroit	--	--	--	3*	--	--	--	4*
District of Columbia	7**	10**	14	19*	6**	7**	8**	12*
Fresno	--	--	--	14*	--	--	--	15*
Houston	18**	26	28	30	12**	16**	21	24
Jefferson County	--	--	--	31	--	--	--	22
Los Angeles	13**	18	19	19*	7**	11**	14	13*
Miami-Dade	--	--	--	33	--	--	--	22
Milwaukee	--	--	--	15*	--	--	--	7*
N.Y.C.	21**	26**	34	35*	20**	20	22	26
Philadelphia	--	--	--	16*	--	--	--	17*
San Diego	20**	29**	35	36*	18**	22**	24**	32*

* Significantly different (P < .05) from Large City in 2009.
** Significantly different (P < .05) from 2009.

- The percentage of students scoring at or above Proficient in mathematics in 2009 for Boston was higher than that for Large Cities in both grades (4 percentage points in

grade 4 and 7 percentage points in grade 8); however, only the grade 8 improvement was statistically significant.

- For both grades 4 and 8, Boston made significant improvements in the percentage of students performing at or above Proficient since 2003 and 2005. Boston also saw a significant improvement in grade 8 from 2007 to 2009, with a 4-point increase. Since 2003, the percentage of 4th graders who are proficient/advanced increased 19 points, compared to 9 points for large cities; and the percentage proficient/advanced in 8th grade increased 14 points, compared to 8 points for Large Cities.

APPENDIX A: Mathematics Assessment Framework

Mathematics

The 2005 NAEP mathematics framework, which defines the content and format for the 2009 assessment in grades 4 and 8, was developed through a comprehensive national consultative process and approved by NAGB. The mathematics framework calls for the assessment to include questions based on five mathematics content areas: 1) Number Properties and Operations; 2) Measurement; 3) Geometry; 4) Data Analysis, Statistics, and Probability; and 5) Algebra. In addition, the framework specifies that each question should measure one of three levels of mathematical complexity (refers to the cognitive demands of the item) – low, moderate, and high. By considering these two criteria (mathematical content and mathematical complexity) for each question, the framework ensures that NAEP assesses an appropriate balance of content along with a variety of ways of knowing and doing mathematics.

Accommodations

It is NAEP's intent to assess all selected students from the target population. Beginning in 2002, students with disabilities and English language learners who require accommodations have been permitted to use them in NAEP, unless a particular accommodation would alter the skills and knowledge being tested. For example, calculators are not permitted on non-calculator sections of the NAEP mathematics test for students who would otherwise require non-standard accommodations provided on state assessment.

Population Tested

Results from the 2003, 2005, 2007, and 2009 Trial Urban District Assessment are reported for the participating districts for public-school students at grades 4 and 8. The TUDA assessment employed larger-than-usual samples within the districts, making reliable district-level data possible. The samples were also large enough to provide reliable estimates on subgroups within the districts, such as female students or Hispanic students. Because students were sampled, all analyses are examined for statistical significance.

In Boston, students from 77 schools at grade 4 and 33 schools at grade 8 participated in the 2009 NAEP assessments. A total of 2,192 students were assessed in mathematics (1,127 at grade 4 and 1,065 at grade 8).

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Appendix B

FOCUS On Children
Boston Public Schools

NAEP vs. MCAS

Introduction

Under the federal *No Child Left Behind Law* (NCLB) and state *Education Reform Law of 1993*, Boston Public School students are required to participate in two testing programs: the National Assessment for Educational Progress (NAEP) and the Massachusetts Comprehensive Assessment System (MCAS). The biennial NAEP Trial Urban School District Assessment (TUDA) provides important information for understanding the effectiveness of the BPS school system relative to other large urban school districts. By contrast, the annual MCAS test provides critical information about the academic performance of BPS compared to other Mass. Public schools, as well as a measure of how well BPS students have mastered the Mass. Curriculum standards.

This appendix provides a brief comparison of MCAS with NAEP, and serves as a guide for understanding and interpreting the test results.

Overview

NAEP

- The National Assessment of Educational Progress (NAEP), known as the Nation's Report Card, is a Congressionally-mandated assessment introduced in 1969. It includes state wide assessments since 1990, and the first Trial Urban School District Assessment (TUDA) since 2002. Based on policy set by the National Assessment Governing Board (NAGB), NAEP measures what students know and can do in key subject areas.

MCAS

- The Massachusetts Comprehensive Assessment System (MCAS), fulfilling requirements of the Education Reform Act of 1993, is the Commonwealth's statewide assessment program for public schools since 1998.

Requirements for Student Participation

Student Selection

NAEP

- Based on sampling, a representative sample from randomly selected schools must participate in NAEP testing. For Trial District Assessment, the target sample sizes per subject per grade is 1200-1400 students. About 60 students, 30 per subject, at each participating school are tested.

MCAS

- All Massachusetts public school students in the grades tested must take the MCAS tests.

Student Participation

NAEP

- Beginning in 2003, schools receiving Title I funding are required to participate in the biennial NAEP assessments in reading and mathematics at grades 4 & 8 if selected for the NAEP sample. Under NCLB, parental notification prior to testing is mandatory to inform parents of students who are sampled that their child's participation is voluntary.

MCAS

- Every public school student is mandated to take the test. For Class of 2003 through Class of 2009, passing grade 10 ELA and Math tests is a part of the graduation requirement. Beginning with the Class of 2010, students must either achieve *Proficient or Advanced* on both ELA and Math tests, or pass both tests and fulfill the requirements of an Educational Proficiency Plan (EPP). Also, students must pass one of the high school MCAS Science and Technology/Engineering (STE) tests: Biology, Chemistry, Introductory Physics, or Technology/Engineering.

Inclusions & Accommodations

NAEP

Includes students with disabilities and English Language Learners (ELL) students in the assessment.

- **ELL:** NAEP includes all ELL students who have received instruction in English for at least three years. ELL students who have received instruction in English for less than three years are included as well unless school staff judged them to be incapable of participating in the assessment in English. In the NAEP mathematics assessment, bilingual test booklets (English and Spanish) are provided where needed.
- **Students with Disabilities:** Based on their IEP, students with disabilities are tested with appropriate accommodations unless the student's IEP team judges that he or she cannot participate or if NAEP does not allow an accommodation that the student requires.

MCAS

Includes students with disabilities and limited English Proficient (LEP) students in the assessment.

- **LEP**: Beginning in 2003, the new laws, *No Child Left Behind Law* as well as *Question 2*, the Massachusetts ballot initiative approved by voters in November 2002, require that all LEP students participate in state administered academic assessments, with the sole exception of LEP students in their first year of enrollment in U.S. schools. Schools have the option of administering the reading, LEP and History/Social Science tests to first-year LEP students.
- **Students with Disabilities:** The vast majority of students with disabilities take standard MCAS tests, either with or without accommodations as specified in their IEP plan. Only a very small number of students with the most significant disabilities take the MCAS Alternate Assessment.

Test Content/Instrument Design

Framework

NAEP	MCAS
The content and design of NAEP assessments were constructed based on the Assessment Frameworks that were developed by the National Assessment Governing Board (NAGB). ■ **Math:** The 2009 NAEP Mathematic Framework (New framework for grade 12, content objectives for grades 4 & 8 remain the same as the 2005 framework.)	The content knowledge and skills tested by MCAS were based on the learning standards in the Massachusetts Curriculum Framework for these content areas. ■ **Math:** Massachusetts Mathematics Curriculum Framework, November 2000 and May 2004 Supplement

Content Standards Tested and Distribution of Test Items

NAEP		MCAS	
Content Area	**(Gr. 4; Gr. 8)**	**Content Area**	**(Gr. 4; Gr. 8)**
■ Number Properties and Operations	(40%; 20%)	■ Number Sense and Operations	(34%, 26%);
■ Measurement	(20%, 15%);	■ Patterns, Relations, and Algebra	(20%, 28%);
■ Geometry	(15%, 20%);	■ Geometry	(13%, 13%);
■ Data Analysis, Statistics, and Probability	(10%, 15%);	■ Measurement	(13%, 13%);
■ Algebra	(15%, 30%)	■ Data analysis, Statistics and Probability	(20%, 20%)

Test Construction

NAEP	MCAS
■ Matrix sampling, Long test short booklet, each student gets a small part of the test. Thus, no individual student scores.	■ Every student gets the same test booklet that contains both common items and matrix sampling items. All students receive scores based on common items only.

Type of Questions

NAEP

- **Math:** Multiple-choice, Short-answer constructed-response, Extended constructed-response.

MCAS

- **Math:** Multiple-Choice, short-answer, open-response items.

Test Questions release

NAEP

- For each subject, only selected test questions are released to the public. For current year and historical released test questions, please visit: http://nces.ed.gov/nationsreportcard/itmrls/

MCAS

- Prior to 2009, for each subject and test grade, all common items are released to the public. Beginning in 2009 and onward only approximately 50% of common test items in grades 3-8 are released each year. For current year and historical released test items, please visit: http://www.doe.mass.edu/mcas/testitems.html

Testing Administration

2009 NAEP

Same for National NAEP, State NAEP, and Trial Urban District Assessment (TUDA) NAEP

Testing Date: 1/26/2009 – 3/6/2009

Testing Time (per subject): 50 minutes

Test Grade:
- Reading - Grades 4, 8, & 12 (state pilot)
- Mathematics – Grades 4, 8, & 12 (state pilot)
- Science – Grades 4, 8, & 12 (state pilot)

Test Administration: The NAEP Representative from NAEP data collection contractor is responsible for all assessment activities including coordinating, conducting, and sending test materials to the scoring facility.

Test Sequence: All tests are conducted simultaneously in the same classroom; some students take Reading, other students take either mathematics or Science test.

2009 MCAS

Testing Date:
- ELA Composition test: 3/31/2009 (make-up 4/7/2009)
- ELA Reading Comprehension (G3-8, & 10): 3/30/2009 – 4/14/2009
- Math: 5/11/2009 – 5/28/2009
- Science: 5/12/2009 – 5/28/2009

Testing Time (per subject): Un-timed

Subjects & Test Grade:
- ELA Reading Comprehension – Grades 3, 5, 6, & 8
- English Language Arts – Grades 4, 7, & 10
- Mathematics – Grades 3-8 & 10
- Science & Technology/Engineering – Grades 5, 8, & 9/10

Test Administration: School teachers/personnel are responsible for all assessment activities.

Test Sequence: All students take the same test in the same classroom.

Scoring

NAEP

- Short constructed-response questions are scored according to a three-level rubric:
  Math: Correct, Partial, & incorrect.
  Reading: Evidence of full comprehension, Evidence of partial or surface comprehension, & Evidence of little or no comprehension
- The extended constructed-response questions are rated based on a four-level rubric :
  Math: Extended, Satisfactory, Partial, Minimal, & Incorrect.
  Reading: Extensive, Essential, Partial, & Unsatisfactory

MCAS

- Multiple-choice and short-answer questions are scored blank/0 or 1.
- Open-response questions are scored on a 0 to 4 scale based on the scoring rubrics. Grade 3 Math that is scored using a 0 to 2 rubric.
- Student compositions are independently scored by two scorers on the following criteria: (1) a score of 1–6 in topic development, and (2) a score of 1-4 for the use of standard English writing conventions. Students receive the sum of the scores from each of the two readers.

Data Availability

NAEP

- No student-level results
- No school-level results
- No district-level results (except TUDA)
- Not designed to assess a specific curriculum

MCAS

- Student-level results
- School-level results
- District-level results
- Designed to measure the state's curriculum

Reporting

Performance Standard

NAEP

Three Achievement Levels:

- **Advanced:** Represents superior performance
- **Proficient:** Represents solid academic performance for each grade assessed
- **Basic:** Denotes partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at each grade.

MCAS

Four Performance Levels:

- **Advanced/Above Proficient:** Students at this level demonstrate a comprehensive and in-depth understanding of rigorous subject matter, and provide sophisticated solutions to complex problems.
- **Proficient:** Students at this level demonstrate a solid understanding of challenging subject matter and solve a wide variety of problems.
- **Needs Improvement:** Students at this level demonstrate a partial understanding of subject matter and solve some simple problems.
- **Warning/Failing:** Students at this level demonstrate a minimal understanding of subject matter and do not solve simple problems.

Scaled Score

NAEP

- **Range:** 0 – 500
- **Scaled Score Corresponding to Performance Level:** vary by subject and test grade

  Reading:

	Grade 4	*Grade 8*
Advanced	268 – 500	323 – 500
Proficient	238 – 267	281 – 322
Basic	208 – 237	243 – 280
*Below Basic**	0 – 207	0 – 242

  Mathematics:

	Grade 4	*Grade 8*
Advanced	282 – 500	333 – 500
Proficient	249 – 281	299 – 332
Basic	214 – 248	262 – 298
*Below Basic**	0 – 213	0 – 261

  ** Below Basic is not an Achievement level*

- Average scaled scores cannot be compared across grades.

MCAS

- **Range:** 200 – 280
- **Scaled Score Corresponding to Performance Level:** same for all subjects and test grade

Performance Level	*Scaled Score*
Advanced/Above Proficient	260 – 280
Proficient	240 – 258
Needs Improvement	220 – 238
Warning/Failing	0 – 218

- No scaled score is reported for Grade 3 Reading Comprehension test; only raw scores are reported.
- Averages must be calculated from raw scores, then converted to the corresponding scaled score.

Interpreting Results

NAEP

- The NAEP results as reported as average scores, and percentages are ***estimates*** because they are based on samples rather than the entire population(s).
- Differences in scores must be statistically significant in order to report a change.

MCAS

- Comparisons of performance on subject area subscores across years must be made with caution because the number of items contributing to each subscore is relatively small and the difficulty of the items may very somewhat from year to year.

Additional Information

NAEP

The Nation's Report Card (NAEP) (NCES)
National Center for Education Statistics
1990 K Street, NW
Washington, DC 20006
Phone: (202) 502-7300
Web site:
http://nces.ed.gov/nationsreportcard/

MCAS

The Massachusetts Department of Elementary and Secondary Education
Student Assessment Services Unit
75 Pleasant Street
Malden, MA 02148-4906
Phone: (781) 338-3625
Web site: http://www.doe.mass.edu/MCAS

Appendix C

Selected Sample of 2009 NAEP Mathematics Questions

Because of differences in curricular emphasis, the proportion of the assessment devoted to each content area varies by grade. The following are selected sample released questions from the 2009 NAEP assessment which represent content areas given more emphasis in grades 4 and 8.

Grade 4:

1. Susie said, "I have 83¢ but fewer than 10 coins." Show in the chart how many of each coin she could have to total 83¢.

Total Number of Coins	 25¢	 10¢	 5¢	 1¢

- **Question Description:** Determine one possible way to have a sum of money
- **Type of Question:** Short Constructed Response
- **Difficulty:** Easy (60.37% Correct – National data)
- **Content Area:** Number properties and operations
- **Complexity:** Moderate
- **Sample Correct Responses:**

Total Number of coins	25¢	10¢	5¢	1¢
7	3	0	1	3
8	2	3	0	3
9	2	2	2	3

- **Score & Description**

Correct

Gives one or more correct solutions.

Partial

Combination of coins equals $.83 but total number of coins is incorrect (has 10 or more)
OR
Has at least one correct solution but one or more incorrect solutions (half or more of the solutions are incorrect).

Incorrect

Incorrect response

- **Jurisdiction Data**

Percentage of Students in Each Response Category by TUDA Districts (Sorted by % Correct)

Jurisdiction	Incorrect Row Pct.	Partial Row Pct.	Correct Row Pct.	Omitted Row Pct.	Off task Row Pct.
NATIONAL PUBLIC	35	9	55	1	#
Charlotte	37	7	54	1	#
San Diego	35	10	52	2	1
New York City	35	12	51	2	#
Austin	40	9	51	#	#
Jefferson County (KY)	42	8	48	2	#
BOSTON	**38**	**16**	**46**	**#**	**#**
Atlanta	44	9	46	1	#
Baltimore City	43	11	45	1	#
Houston	46	8	45	1	#
Miami-Dade	43	10	44	3	#
Chicago	46	9	44	1	#
Milwaukee	47	8	43	1	1
Philadelphia	45	10	41	3	1
District of Columbia	49	12	36	3	#
Fresno	56	8	33	2	1
Los Angeles	55	12	31	3	#
Cleveland	56	9	31	4	#
Detroit	62	6	27	4	#

Rounds to zero.
‡ Reporting standards not met.
† Not applicable.
NOTE: The NAEP Mathematics scale ranges from 0 to 500.
Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Mathematics Assessment.

2. A turkey is put in the oven at 10:30 a.m. If the turkey takes $2\frac{3}{4}$ hours to cook, at what time should it be taken out of the oven?

A. 12:15 p.m.
B. 12:45 p.m.
C. 1:15 p.m.
D. 1:45 p.m.

- **Question Description:** Solve arithmetic problem involving time
- **Type of Question:** Multiple Choice

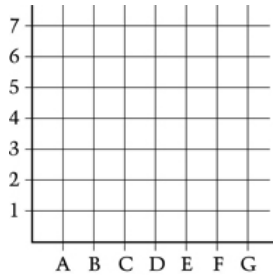
- **Difficulty:** Hard (27.92% Correct– National data)
- **Content Area:** Measurement
- **Complexity:** Low
- **Correct Responses:** The correct answer is C.
- **Jurisdiction Data**

Percentage of Students in Each Response Category by TUDA Districts (Sorted by % Correct - C)

Jurisdiction	A Row Pct.	B Row Pct.	C * Row Pct.	D Row Pct.	Omitted Row Pct.
Austin	16	37	34	9	3
Charlotte	13	48	33	4	2
Houston	17	44	30	9	2
BOSTON	**18**	**45**	**29**	**7**	**1**
Jefferson County (KY)	20	41	29	8	3
San Diego	20	40	29	9	2
NATIONAL PUBLIC	19	42	27	9	3
Miami-Dade	18	47	25	8	2
New York City	21	46	25	6	3
Atlanta	26	39	24	10	2
District of Columbia	27	35	22	12	5
Chicago	23	41	21	12	2
Fresno	28	38	21	10	4
Los Angeles	19	44	21	14	2
Philadelphia	24	38	21	11	6
Baltimore City	26	41	18	9	5
Milwaukee	29	40	18	13	1
Cleveland	23	44	15	13	4
Detroit	30	39	14	15	1

Rounds to zero.
‡ Reporting standards not met.
† Not applicable.
NOTE: The NAEP Mathematics scale ranges from 0 to 500.
Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Mathematics Assessment.

3. On the grid below, plot the points that have coordinates (B, 1), (B, 3), and (D, 5).



Plot 3 more points on the grid so that when you connect all 6 points you will make a rectangle.

List the coordinates for the 3 new points. _____ _____ _____

Connect the 6 points to show your rectangle.

- **Question Description:** Plot points on grid to satisfy given conditions
- **Type of Question:** Extended Constructed Response
- **Difficulty:** Medium (44.33% Correct – National data)
- **Content Area:** Geometry
- **Complexity:** Moderate
- **Sample Correct Responses:**
  - Correctly plots the points (B, 1), (B, 3), and (D, 5)
  - Correctly plots 3 other points that form a rectangle and gives their coordinates
  - Connects the dots to form a rectangle
- **Score & Description**

Extended

Correct response

Satisfactory

Plots 3 given points and plots 3 new points to form a rectangle, gives correct coordinates of new points, but does not draw the rectangle.
OR
Draws rectangle that contains the 3 given points and gives coordinates of 3 other points on the rectangle but one point is not clearly plotted.
OR
Plots 3 given points, plots 3 new points, draws rectangle, gives coordinates for 3 new points but one of the coordinates given does not match the point plotted. (e.g., gives (D, 2) instead of (D, 3)).

Partial

Plots 3 given points and plots 2 or 3 new points that clearly form a rectangle; gives correct coordinates of 1 or 2 of the new points; may or may not draw the rectangle correctly.
OR
Plots 3 given points correctly and gives coordinates of 3 new points that clearly form a rectangle (but does not plot the new points).
OR
Plots 3 given points and 3 new points and plots/identifies additional point(s) on rectangle.

Minimal

Plots 3 points clearly (either given points or new points or a combination).
OR
Plots 2 of the given points correctly and draws a rectangle using those 2 points. Points must be clearly marked.
OR
Lists coordinates for 3 new points that would clearly form a rectangle (e.g., (D, 1), (D, 3), (B, 5)) when connected; points may not be plotted.

OR
Draws a rectangle that includes the 3 given points, but points may not be clearly plotted.

Incorrect
Incorrect response

- **Jurisdiction Data**

Percentage of Students in Each Response Category by TUDA Districts (Sorted by % Extended - Correct Response)

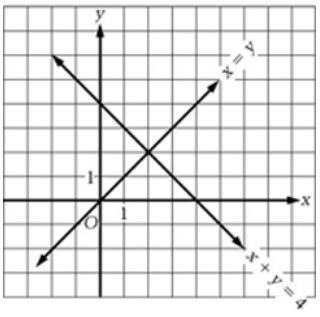
Jurisdiction	Incorrect Row Pct.	Minimal Row Pct.	Parital Row Pct.	Satisfacto Row Pct.	Extended Row Pct.	Omitted Row Pct.	Off task Row Pct.
Charlotte	14	31	4	13	36	2	#
NATIONAL PUBLIC	24	32	3	10	27	3	#
Atlanta	27	34	4	9	24	2	#
Miami-Dade	19	37	4	14	24	2	#
New York City	35	29	4	7	22	3	#
BOSTON	**30**	**32**	**2**	**6**	**20**	**10**	**1**
Chicago	34	33	4	5	20	3	1
San Diego	32	31	1	10	20	6	#
Jefferson County (KY)	39	23	2	7	19	8	2
Austin	43	24	2	6	18	7	1
District of Columbia	31	37	4	6	18	4	#
Cleveland	38	29	3	8	16	5	1
Los Angeles	32	35	4	7	14	8	1
Milwaukee	37	35	5	6	14	2	#
Baltimore City	33	38	2	8	11	6	#
Philadelphia	45	27	4	7	11	6	#
Fresno	45	33	5	4	10	3	#
Houston	46	29	2	8	9	5	1
Detroit	50	32	2	5	6	4	#

Rounds to zero.
‡ Reporting standards not met.
† Not applicable.
NOTE: The NAEP Mathematics scale ranges from 0 to 500.
Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Mathematics Assessment.

Grade 8:

1. Which point is the solution to both equations shown on the graph above?

A. (0, 0)
B. (0, 4)
C. (1, 1)
D. (2, 2)
E. (4, 0)



- **Question Description:** Identify solution from graph of linear equations
- **Type of Question:** Multiple Choice

- **Difficulty:** Easy (70.82% Correct – National data)
- **Content Area:** Algebra
- **Complexity:** Low
- **Correct Responses:** The correct answer is D.
- **Jurisdiction Data**

Percentage of Students in Each Response Category by TUDA Districts (Sorted by % Correct - D)

Jurisdiction	A Row Pct.	B Row Pct.	C Row Pct.	D * Row Pct.	E Row Pct.	Omitted Row Pct.
Austin	3	10	7	74	6	1
San Diego	1	10	7	72	9	1
BOSTON	**2**	**12**	**7**	**70**	**7**	**2**
NATIONAL PUBLIC	3	10	9	70	7	1
Philadelphia	2	11	8	70	6	3
Houston	1	8	12	69	8	1
Charlotte	3	9	12	67	8	1
Los Angeles	3	12	11	66	9	#
New York City	2	10	12	66	8	3
Fresno	3	9	13	64	10	1
Jefferson County (KY)	2	13	11	64	8	1
Miami-Dade	4	13	13	61	9	1
Chicago	3	15	12	59	10	1
Atlanta	4	18	14	58	6	1
Cleveland	4	12	18	51	9	5
District of Columbia	2	18	18	51	10	2
Baltimore City	1	20	12	47	18	2
Milwaukee	3	16	19	47	16	#
Detroit	3	20	21	39	14	2

Rounds to zero.
‡ Reporting standards not met.
† Not applicable.
NOTE: The NAEP Mathematics scale ranges from 0 to 500.
Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Mathematics Assessment.

2. A certain even number is divisible by 9. This number is between 100 and 120. What is the number?

_____

- **Question Description:** Determine number that satisfies given conditions
- **Type of Question:** Short Constructed Response
- **Difficulty:** Medium (50.38% Correct – National data)
- **Content Area:** Number properties and operations
- **Complexity:** Moderate
- **Sample Correct Responses:** 108

- **Jurisdiction Data**

Percentage of Students in Each Response Category by TUDA Districts (Sorted by % Correct)

Jurisdiction	Incorrect Row Pct.	Correct Row Pct.	Omitted Row Pct.	Off task Row Pct.
Austin	37	52	9	1
BOSTON	**38**	**49**	**12**	**1**
NATIONAL PUBLIC	45	49	6	1
Charlotte	46	49	5	#
New York City	41	47	11	1
Atlanta	46	47	5	2
San Diego	48	46	4	1
Houston	48	45	7	1
Fresno	49	44	6	1
Miami-Dade	47	43	8	2
Baltimore City	49	43	8	1
District of Columbia	51	39	10	#
Los Angeles	51	39	9	#
Philadelphia	51	38	11	#
Chicago	55	36	8	#
Jefferson County (KY)	56	36	7	1
Milwaukee	65	28	7	#
Cleveland	65	27	7	1
Detroit	62	25	11	1

Rounds to zero.
‡ Reporting standards not met.
† Not applicable.
NOTE: The NAEP Mathematics scale ranges from 0 to 500.
Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Mathematics Assessment.

3. The Morrisons are going to build a new one-story house. The floor of the house will be rectangular with a length of 30 feet and a width of 20 feet.

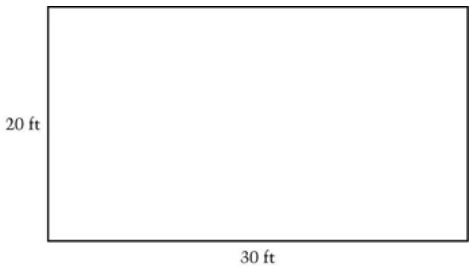
   The house will have a living room, a kitchen, two bedrooms, and a bathroom. In part (a) below create a floor plan that shows these five rooms by dividing the rectangle into rooms.

   Your floor plan should meet the following conditions.

   - Each one of the five rooms must share at least one side with the rectangle in part (a); that is, each room must have at least one outside wall.
   - The floor area of the bathroom should be 50 square feet.
   - Each of the other four rooms (not the bathroom) should have a length of at least 10 feet and a width of at least 10 feet.

   Be sure to label each room by name (living room, kitchen, bedroom, etc.) and include its length and width, in feet. (Do not draw any hallways on your floor plan.)

   (a) Draw your floor plan on the figure below. Remember to label your rooms by name and include the length and width, in feet, for each room.



(b) Complete the table below by filling in the floor area, in square feet, for each room in your floor plan.

Room	Floor Area (in square feet)
Living	
Kitchen	
Bedroom	
Bedroom	
Bathroom	
Total Floor Area	600

- **Question Description:** Draw floor plan given conditions and compute areas
- **Type of Question:** Extended Constructed Response
- **Difficulty:** Hard (27.55% Correct) – National data)
- **Content Area:** Geometry
- **Complexity:** High
- **Sample Correct Responses:**

  There are many possible correct responses. All should contain square or rectangular rooms, a bathroom with an area of 50 square feet, and meet the other required conditions.

  <u>For a table to be correct, it must:</u>

  1. have entries that add up to 600, and
  2. have an area of 50 for the bathroom, and
  3. have dimensions for other rooms of at least 10 by 10.

  <u>For labeling of the drawing to be considered correct, it must:</u>

  1. have name of room, and
  2. have room dimensions.

- **Score & Description**

  Extended

  Correct response (complete and correctly labeled)

  Satisfactory

  Correct table and correct drawing (in correct proportion) but drawing is missing some or all labels.
  OR

Correct drawing (in correct proportion) with all labels correct but table is missing or incomplete.

Partial

Correct table but drawing is not presented in proportion that is consistent with table (may be because drawing includes an incorrect label).
OR
Correct drawing (in correct proportion) with some correct labeling but table may be incomplete and/or not in agreement with drawing in some respect.
OR
Table adds to 600, rooms are in proportion to table, but bathroom area may not necessarily be 50.

Minimal

Correct table only.
OR
50 sq. ft. for bathroom represented in some way.
OR
Obtains room areas in table that total to 600.
OR
Drawing contains 5 rooms, each with at least one outside wall, and no hallways.

Incorrect

Incorrect response

- **Jurisdiction Data**

Percentage of Students in Each Response Category by TUDA Districts (Sorted by % Extended - Correct Response)

Jurisdiction	Incorrect Row Pct.	Minimal Row Pct.	Partial Row Pct.	Satisfactory Row Pct.	Extended Row Pct.	Omitted Row Pct.	Off task Row Pct.
Austin	24	37	13	3	11	12	#
BOSTON	**20**	**40**	**14**	**3**	**8**	**13**	**2**
Jefferson County (KY)	21	50	13	3	7	6	1
San Diego	25	42	12	3	6	11	1
NATIONAL PUBLIC	19	51	15	2	5	7	1
Charlotte	25	48	10	3	5	9	1
New York City	19	45	14	2	4	14	1
Houston	24	45	8	1	3	15	3
District of Columbia	23	48	5	1	3	18	1
Philadelphia	21	47	10	2	2	17	#
Fresno	34	43	9	#	2	10	1
Chicago	25	53	11	1	2	6	1
Atlanta	32	47	7	2	1	10	1
Miami-Dade	27	48	9	1	1	12	2
Los Angeles	25	52	7	1	1	12	1
Cleveland	22	57	7	1	1	12	1
Milwaukee	24	60	5	#	#	9	1
Detroit	26	47	9	#	#	17	1
Baltimore City	31	48	7	1	#	12	1

Rounds to zero.
‡ Reporting standards not met.
† Not applicable.
NOTE: The NAEP Mathematics scale ranges from 0 to 500.
Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Mathematics Assessment.

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Appendix D

2009 NAEP Mathematics Results by Student Group

Scaled Scores and Percents of Students at Each Achievement Level

	Boston					Large Cities (National Avg.)				
	Average Scale Score	Percent of Students			% Students	Average Scale Score	Percent of Students			% Students
		At or Above *Proficient*	At or Above *Basic*	Below *Basic*			At or Above *Proficient*	At or Above *Basic*	Below *Basic*	
GRADE 4										
All Students	**236**	**31**	**81**	**19**	**100**	**231**	**29**	**72**	**28**	**100**
Student Status										
Students with Disabilities	219	10	57	43	18	210	12	45	55	11
English Language Learners	222	13	65	35	17	216	11	55	45	20
Gender										
Female	236	29	81	19	49	231	28	73	27	49
Male	237	32	80	20	51	231	30	72	28	51
Race/Ethnicity										
African American / Black	231	23	78	22	39	219	14	59	41	29
Asian / Pacific Islander	260	65	94	6	8	253	58	90	10	7
Hispanic	232	24	77	23	37	226	21	69	31	42
White	251	52	92	8	14	250	55	90	10	20
Free/Reduced-Price Lunch										
Eligible	233	25	78	22	78	225	20	66	34	71
GRADE 8										
All Students	**279**	**31**	**67**	**33**	**100**	**271**	**24**	**60**	**40**	**100**
Student Status										
Students with Disabilities	247	5	32	68	16	238	6	24	76	11
English Language Learners	238	6	22	78	8	238	4	23	77	12
Gender										
Female	280	32	67	33	50	270	22	59	41	51
Male	279	30	68	32	50	272	25	60	40	49
Race/Ethnicity										
African American / Black	268	18	57	43	40	256	10	44	56	27
Asian / Pacific Islander	312	68	92	8	11	299	52	83	17	8
Hispanic	269	20	61	39	33	264	16	54	46	42
White	311	67	93	7	14	294	46	81	19	21
Free/Reduced-Price Lunch										
Eligible	273	23	62	38	73	262	15	51	49	66

 # Estimate rounds to zero.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Mathematics Assessment.

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APPENDIX E: Summary of Scaled Score Comparisons

2009 NAEP Mathematics Average Scale Scores by Grade level for Large City and TUDA Districts

Grade Level	LARGE CITY*	Atlanta	Austin	Baltimore City	BOSTON	Charlotte	Chicago	Cleveland	Detroit	District of Columbia	Fresno	Houston	Jefferson County	Los Angeles	Miami-Dade	Milwaukee	New York City	Philadelphia	San Diego
Grade 4	231	225	240	222	236	245	222	213	200	220	219	236	233	222	236	220	237	222	236
Grade 8	271	259	287	257	279	283	264	256	238	251	258	277	271	258	273	251	273	265	280

** Large City (LC): Nation-wide schools in cities with a population of 250,000 or more as defined by National Center for Education Sattistics (NCES)*

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Appendix F

Grade 4 Mathematics 2009

Table **A-9.** Average scores and achievement-level results for fourth-grade public school students in NAEP mathematics, by selected race/ethnicity categories and jurisdiction: Various years, 2003–09

	Average scale score				Percentage of students: At or above *Basic*				Percentage of students: At or above *Proficient*			
Race/ethnicity and jurisdiction	2003	2005	2007	2009	2003	2005	2007	2009	2003	2005	2007	2009
White												
Nation	243***	246***	248	248*	87***	89***	91	90	42***	47***	51	50
Large city	243***	247***	249	250**	86***	88	90	90	42***	50	54	55
Atlanta	258	263	266	266*,**	89	96	99	98*,**	70	72	81	79*,**
Austin	—	262	263	262*,**	—	99	98	97*,**	—	75	76	74*,**
Baltimore City	—	—	—	240*,**	—	—	—	84	—	—	—	34*,**
Boston	234***	244	250	251	77***	88	93	92	32***	43	52	52
Charlotte	257***	261	261	263*,**	96	97	98	97*,**	66	70	72	72*,**
Chicago	235	243	244	242*	82	88	84	83	31	43	47	44
Cleveland	233	233	233	228*,**	80	81	80	73*,**	27	25	25	17*,**
Detroit	—	—	—	‡	—	—	—	‡	—	—	—	‡
District of Columbia (DCPS)	262***	266	262***	270*,**	97	99	91	99	71	78	73	81*,**
Fresno	—	—	—	237*,**	—	—	—	79*,**	—	—	—	36*,**
Houston	254	262	263	260*,**	96	97	96	99	63	73	76	71*,**
Jefferson County (KY)	—	—	—	243*,**	—	—	—	84*,**	—	—	—	44*
Los Angeles	241	247	247	245	83	87	90	87	44	49	50	45
Miami-Dade	—	—	—	253**	—	—	—	96*,**	—	—	—	61**
Milwaukee	—	—	—	242*	—	—	—	86	—	—	—	42
New York City	244***	245***	249	254**	88***	87	91	94*,**	42***	46	53	58
Philadelphia	—	—	—	239*,**	—	—	—	80*,**	—	—	—	37*,**
San Diego	243***	249	252	255**	87***	94	90	94	41***	50	59	62**
Black												
Nation	216***	220***	222	222*	54***	60***	63	63*	10***	13***	15	15
Large city	212***	217***	219	219**	47***	55***	58	59**	8***	11***	13	14
Atlanta	211***	215***	217	218**	45***	51	55	57**	7***	9	11	11**
Austin	—	228	226	226	—	74	68	71*	—	18	17	13
Baltimore City	—	—	—	220	—	—	—	61	—	—	—	10*,**
Boston	216***	223***	226***	231*,**	55***	65***	71	78*,**	6***	13***	18	23*,**
Charlotte	229	230	230	231*,**	73	74	75	75*,**	20	21	23	24*,**
Chicago	207***	208	213	212*,**	39***	41	48	48*,**	4***	6	8	9*,**
Cleveland	210	215***	210	209*,**	44	52	45	44*,**	5	8	5	5*,**
Detroit	—	—	—	199*,**	—	—	—	29*,**	—	—	—	3*,**
District of Columbia (DCPS)	202***	207***	209***	212*,**	33***	41***	45	49*,**	4***	5***	8	9*,**
Fresno	—	—	—	213**	—	—	—	46*,**	—	—	—	12
Houston	221	224	225	227*,**	62***	67	69	72*,**	12	14	16	17
Jefferson County (KY)	—	—	—	216**	—	—	—	54**	—	—	—	11
Los Angeles	208	209	216	209*,**	42	42	54	41*,**	6	9	13	10
Miami-Dade	—	—	—	222	—	—	—	64	—	—	—	12
Milwaukee	—	—	—	211*,**	—	—	—	46*,**	—	—	—	7*,**
New York City	219***	222***	227	227*,**	58***	63	72	70*,**	12***	14	20	21*,**
Philadelphia	—	—	—	216**	—	—	—	54**	—	—	—	10**
San Diego	216	221	222	222	54	60	65	64	8	15	21	15

See notes at end of table.

Table **A-9.** Average scores and achievement-level results for fourth-grade public school students in NAEP mathematics, by selected race/ethnicity categories and jurisdiction: Various years, 2003–09—Continued

Race/ethnicity and jurisdiction	Average scale score				Percentage of students: At or above *Basic*				Percentage of students: At or above *Proficient*			
	2003	2005	2007	2009	2003	2005	2007	2009	2003	2005	2007	2009
Hispanic												
Nation	221***	225***	227	227	62***	67***	69	70	15***	19***	22	21
Large city	219***	223***	224	226	59***	64***	66	69	13***	17***	21	21
Atlanta	‡	‡	223	222	‡	‡	60	66	‡	‡	16	16
Austin	—	234	233	233*,**	—	80	78	79*,**	—	27	26	25
Baltimore City	—	—	—	‡	—	—	—	‡	—	—	—	‡
Boston	215***	225***	230	232*,**	51***	70	76	77*,**	7***	14***	23	24
Charlotte	233	234	234	235*,**	80	81	80	82*,**	26	27	26	27
Chicago	217***	217***	219***	226	55***	55***	60***	70	10***	13	16	18
Cleveland	220	224	215	217*,**	58	68	53	56*,**	14	18	10	13**
Detroit	—	—	—	206*,**	—	—	—	39*,**	—	—	—	5*,**
District of Columbia (DCPS)	205***	215***	220***	227	39***	51***	57	69	7***	11***	19	25
Fresno	—	—	—	216*,**	—	—	—	55*,**	—	—	—	10*,**
Houston	226***	232	234	235*,**	70***	78	82	83*,**	15***	23	25	28*,**
Jefferson County (KY)	—	—	—	226	—	—	—	65	—	—	—	23
Los Angeles	211***	216	217	218*,**	46***	53	55	58*,**	7***	13	14	14*,**
Miami-Dade	—	—	—	239*,**	—	—	—	84*,**	—	—	—	35*,**
Milwaukee	—	—	—	226	—	—	—	71	—	—	—	16
New York City	220***	226***	230	230*,**	60***	70	74	74*,**	13***	18	26	24
Philadelphia	—	—	—	221*,**	—	—	—	60**	—	—	—	15
San Diego	216***	222	223	224	53***	63	64	66	9***	16	21	19
Asian/Pacific Islander												
Nation	246***	251***	254	255	87***	89***	91	91	48***	54***	59	61
Large city	246	247***	251	253	86	87	89	90	47	49***	57	58
Atlanta	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Austin	—	‡	268	‡	—	‡	99	‡	—	‡	83	‡
Baltimore City	—	—	—	‡	—	—	—	‡	—	—	—	‡
Boston	243***	256	255	260	87	98	91	94	43***	65	61	65
Charlotte	252	256	263	257	90	96	98	91	60	62	75	63
Chicago	‡	‡	249	255	‡	‡	92	96	‡	‡	53	60
Cleveland	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Detroit	—	—	—	‡	—	—	—	‡	—	—	—	‡
District of Columbia (DCPS)	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Fresno	—	—	—	220*,**	—	—	—	59*,**	—	—	—	16*,**
Houston	‡	‡	265	264*,**	‡	‡	100	98*,**	‡	‡	75	78*
Jefferson County (KY)	—	—	—	‡	—	—	—	‡	—	—	—	‡
Los Angeles	241	246	246	248**	86	88	92	87	38	45	49	50
Miami-Dade	—	—	—	‡	—	—	—	‡	—	—	—	‡
Milwaukee	—	—	—	231*,**	—	—	—	77	—	—	—	28*,**
New York City	247***	253	257	258	89	92	93	93	47***	60	65	68
Philadelphia	—	—	—	243**	—	—	—	87	—	—	—	40
San Diego	238***	245	247	247**	84	87	88	86	32***	46	50	50

— Not available. District did not participate.
‡ Reporting standards not met.
* Significantly different ($p < .05$) from large city in 2009.
** Significantly different ($p < .05$) from nation in 2009.
*** Significantly different ($p < .05$) from 2009.
NOTE: Beginning in 2009, results for charter schools not under the jurisdiction of a district are excluded from NAEP district results. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. DCPS = District of Columbia Public Schools.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), various years, 2003–09 Mathematics Assessments.

Table **A-10.** Average scores and achievement-level results for eighth-grade public school students in NAEP mathematics, by selected race/ethnicity categories and jurisdiction: Various years, 2003-09

Race/ethnicity and jurisdiction	Average scale score				Percentage of students: At or above *Basic*				Percentage of students: At or above *Proficient*			
	2003	2005	2007	2009	2003	2005	2007	2009	2003	2005	2007	2009
White												
Nation	287***	288***	290***	292	79***	79***	81***	82	36***	37***	41***	43*
Large city	285***	288***	292	294	77***	78***	81	81	36***	39***	44	46**
Atlanta	298	‡	‡	‡	83	‡	‡	‡	54	‡	‡	‡
Austin	—	305***	308	312*,**	—	90	91	94*,**	—	61***	65	70*,**
Baltimore City	—	—	—	‡	—	—	—	‡	—	—	—	‡
Boston	289***	299***	305	311*,**	77***	83***	89	93*,**	48***	54	58	67*,**
Charlotte	301	304	308	304*,**	91	90	90	91*,**	55	60	62	58*,**
Chicago	276***	281	287	289	68	71	79	76	25	33	35	39
Cleveland	269	265	269	275*,**	63	54	64	67*,**	14	17	12	21*,**
Detroit	—	—	—	‡	—	—	—	‡	—	—	—	‡
District of Columbia (DCPS)	‡	317	‡	‡	‡	94	‡	‡	‡	69	‡	‡
Fresno	—	—	—	282*,**	—	—	—	70*,**	—	—	—	38
Houston	293***	294***	308	311*,**	80***	85***	94	94*,**	47***	50***	63	67*,**
Jefferson County (KY)	—	—	—	284*,**	—	—	—	75*,**	—	—	—	33*,**
Los Angeles	277	280	285	287	67	68	73	74	29	32	40	41
Miami-Dade	—	—	—	291	—	—	—	84	—	—	—	40
Milwaukee	—	—	—	271*,**	—	—	—	61*,**	—	—	—	20*,**
New York City	289	286	289	295	79	77	77	84	40	38	39	47
Philadelphia	—	—	—	284	—	—	—	71**	—	—	—	35
San Diego	284***	292***	294	301*,**	76***	83	85	89*,**	35***	42	42	55**
Black												
Nation	252***	254***	259	260*	39***	41***	47***	49*	7***	8***	11	12*
Large city	247***	250***	254	256**	34***	36***	41	44**	5***	7***	9	10**
Atlanta	241***	242***	253	255**	26***	28***	38	42**	3***	4***	8	7**
Austin	—	262***	265	274*,**	—	52	57	62*,**	—	12	14	21*,**
Baltimore City	—	—	—	255**	—	—	—	41**	—	—	—	7**
Boston	251***	256***	263	268*,**	36***	45***	51	57*,**	6***	9***	12	18*,**
Charlotte	258***	264***	267	270*,**	47***	54	58	60*,**	11***	14	15	17*,**
Chicago	245***	245***	248	252**	29	28	35	38**	4	3***	6	7**
Cleveland	249	244***	253	252*,**	32	29***	41	38*,**	5	3	5	5*,**
Detroit	—	—	—	237*,**	—	—	—	21*,**	—	—	—	4*,**
District of Columbia (DCPS)	240***	241	245	244*,**	26***	27***	31	32*,**	3***	4	6	6*,**
Fresno	—	—	—	246*,**	—	—	—	32*,**	—	—	—	7
Houston	259***	257***	265	266*,**	47***	47***	58	59*,**	7***	7***	13	13
Jefferson County (KY)	—	—	—	252*,**	—	—	—	38*,**	—	—	—	7**
Los Angeles	234***	239	245	247*,**	21	29	28	34**	2	7	7	5
Miami-Dade	—	—	—	260	—	—	—	48	—	—	—	12
Milwaukee	—	—	—	244*,**	—	—	—	28*,**	—	—	—	3*,**
New York City	253***	257	258	261*	40	44	45	49	9	10	10	12
Philadelphia	—	—	—	256**	—	—	—	43**	—	—	—	8**
San Diego	252***	253	258	263	39	40	48	50	7	8	11	16

See notes at end of table.

Table **A-10.** Average scores and achievement-level results for eighth-grade public school students in NAEP mathematics, by selected race/ethnicity categories and jurisdiction: Various years, 2003-09—Continued

Race/ethnicity and jurisdiction	Average scale score				Percentage of students: At or above *Basic*				Percentage of students: At or above *Proficient*			
	2003	2005	2007	2009	2003	2005	2007	2009	2003	2005	2007	2009
Hispanic												
Nation	258***	261***	264	266	47***	50***	54	56	11***	13***	15	17
Large city	256***	258***	261	264	43***	46***	50	54	10***	11***	13	16
Atlanta	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Austin	—	267***	271	274*,**	—	56***	64	65*,**	—	17	19	22*,**
Baltimore City	—	—	—	‡	—	—	—	‡	—	—	—	‡
Boston	252***	261***	270	269*	38***	51***	60	61	7***	12***	20	20
Charlotte	262	262***	264	272*,**	46	53	50	63	18	15	19	21
Chicago	259***	263***	265	268	48	52	55	59	8***	11***	12	18
Cleveland	249	251	258	250*,**	35	33	44	35*,**	2	7	6	4*,**
Detroit	—	—	—	255	—	—	—	44	—	—	—	8
District of Columbia (DCPS)	246***	252	251	263	33***	39***	38***	56	3***	9	9	17
Fresno	—	—	—	253*,**	—	—	—	40*,**	—	—	—	10*,**
Houston	261***	265***	270***	275*,**	49***	56***	62***	70*,**	9***	12***	15	21
Jefferson County (KY)	—	—	—	‡	—	—	—	‡	—	—	—	‡
Los Angeles	240***	245***	253	254*,**	26***	32***	40	41*,**	3***	6***	9	8*,**
Miami-Dade	—	—	—	274*,**	—	—	—	65*,**	—	—	—	23*,**
Milwaukee	—	—	—	256**	—	—	—	43	—	—	—	8*,**
New York City	260	259	262	261**	48	47	52	50	15	12	14	14
Philadelphia	—	—	—	258**	—	—	—	48	—	—	—	12
San Diego	248***	258***	259	265	34***	49	48	54	6***	11	13	14
Asian/Pacific Islander												
Nation	289***	294***	296	300	77***	81***	82	84	42***	46***	49	53
Large city	281***	289***	291***	299	71***	76***	78	83	33***	40***	44	52
Atlanta	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Austin	—	‡	‡	‡	—	‡	‡	‡	—	‡	‡	‡
Baltimore City	—	—	—	‡	—	—	—	‡	—	—	—	‡
Boston	300***	309	305	312*,**	87	92	91	92*	57	61	57	68*,**
Charlotte	293	‡	305	‡	81	‡	88	‡	43	‡	56	‡
Chicago	286***	292	‡	301	78	83	‡	88	36	38	‡	54
Cleveland	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Detroit	—	—	—	‡	—	—	—	‡	—	—	—	‡
District of Columbia (DCPS)	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Fresno	—	—	—	266*,**	—	—	—	54*,**	—	—	—	17*,**
Houston	‡	299	310	‡	‡	85	87	‡	‡	55	63	‡
Jefferson County (KY)	—	—	—	‡	—	—	—	‡	—	—	—	‡
Los Angeles	275***	291	292	291**	64	82	82	78	25***	43	45	44
Miami-Dade	—	—	—	‡	—	—	—	‡	—	—	—	‡
Milwaukee	—	—	—	‡	—	—	—	‡	—	—	—	‡
New York City	286***	295	299	309*,**	74***	79	83	89*	38***	50	53	64*,**
Philadelphia	—	—	—	295	—	—	—	85	—	—	—	46
San Diego	278***	282***	289	292**	69***	74	77	81	28***	31***	40	48

— Not available. District did not participate.
‡ Reporting standards not met.
* Significantly different ($p < .05$) from large city in 2009.
** Significantly different ($p < .05$) from nation in 2009.
*** Significantly different ($p < .05$) from 2009.
NOTE: Beginning in 2009, results for charter schools not under the jurisdiction of a district are excluded from NAEP district results. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. DCPS = District of Columbia Public Schools.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), various years, 2003-09 Mathematics Assessments.