

The   
Nation's  
Report Card

# Science 2005

**TRIAL URBAN DISTRICT ASSESSMENT OF GRADES 4 AND 8**

**National Assessment of Educational Progress**

## Contents

NOVEMBER 2006

- 1 Executive Summary
- 2 Trial Urban District Assessment
- 4 4th Grade Results
- 14 8th Grade Results
- 24 A Closer Look at Individual Districts
- 46 Technical Notes and Data Appendix

# What is The Nation's Report Card™?

The Nation's Report Card™ informs the public about the academic achievement of elementary and secondary students in the United States. Report cards communicate the findings of the National Assessment of Educational Progress (NAEP), the only continuing and nationally representative measure of achievement in various subjects over time. The Nation's Report Card™ compares performance among states, urban districts, public and private schools, and student demographic groups.

For over three decades, NAEP assessments have been conducted periodically in reading, mathematics, science, writing, history, geography, and other subjects. By making objective information available on student performance at the national, state, and local levels, NAEP is an integral part of our nation's evaluation of the condition and progress of education. Only information related to academic achievement and relevant variables is collected. The privacy of individual students is protected,

and the identities of participating schools are not released. NAEP is a congressionally mandated project of the National Center for Education Statistics (NCES) within the Institute of Education Sciences of the U.S. Department of Education. The Commissioner of Education Statistics is responsible for carrying out the NAEP project. The National Assessment Governing Board oversees and sets policy for NAEP.

# Executive Summary

In 2005, NAEP conducted its first Trial Urban District Assessment (TUDA) in science. The assessment included public school students in the following districts:

Atlanta	Cleveland
Austin	Houston
Boston	Los Angeles
Charlotte	New York City
Chicago	San Diego

## Fourth-Grade Results

- In 7 of the 10 districts, fourth-graders scored as well as, or better than, students in large central cities across the country.
- The percentage of fourth-graders performing at or above *Basic* ranged from 35 to 60 percent in the districts, compared to 66 percent for the nation.
- The percentage of fourth-graders performing at or above *Proficient* ranged from 6 to 26 percent in the districts, compared to 27 percent for the nation.

A fourth-grade student whose score falls in the *Basic* achievement-level range would likely be able to identify two organs that work together to supply oxygen to the body. Relating the relative amount of time a candle burns to the amount of air available is an example of the type of skill that falls in the *Proficient* range.

## Eighth-Grade Results

- In 6 of the 10 districts, eighth-graders scored as well as, or better than, students in large central cities across the country.
- The percentage of eighth-graders performing at or above *Basic* ranged from 22 to 52 percent in the districts, compared to 57 percent for the nation.
- The percentage of eighth-graders performing at or above *Proficient* ranged from 5 to 27 percent in the districts, compared to 27 percent for the nation.

An eighth-grade student whose score falls within the *Basic* achievement-level range would likely be able to identify changes that occur in heart rate before, during, and after exercise. Identifying the energy conversions that occur in an electric fan is the type of skill that falls in the *Proficient* range.



## Comparisons by Race/Ethnicity and Income Level

All of the 10 participating districts have a majority of students who are not White, and nearly all have high proportions of low-income students. Because the demographic makeup of these districts differs from that of public schools in the nation overall, it is important to compare student groups in the districts with their peers in large central cities and in the nation.

- In many of the districts, average scores for White, Black, Hispanic, and Asian/Pacific Islander students were either higher or not significantly different from the national average for their peers.
- At both grades 4 and 8, the gap in average scores between the nation and the individual districts for all students ranged from 2 to 30 points, with the nation's score higher.
- When the comparison between nation and district at both grades is based only on low-income students, the gaps in average scores ranged from almost none to 19 points, with the nation's score higher.

## About this report

Only public schools participated, so throughout the report scores for the 10 participating districts are compared to public school averages for the nation and large central cities. Large central cities (population 250,000 or more) provide a comparison that is more reflective of these student populations than the nation as a whole. Because this is the first science TUDA assessment, NAEP cannot compare student performance in the districts to prior years to determine whether districts are making progress.

# The Trial Urban District Assessment

In 2005, ten urban public school districts participated in a part of the NAEP science assessment at grades 4 and 8 called the Trial Urban District Assessment (TUDA). The participating districts were Atlanta, Austin, Boston, Charlotte-Mecklenburg, Chicago, Cleveland, Houston, Los Angeles, New York City, and San Diego. Representative samples of public schools and students from each district participated at each grade. The data from these same schools and students were also included as a part of the sample for their state and for the nation.

About 1,000 to 2,000 students in each TUDA district participated in the science assessment at each grade. The results provide estimates of the performance of students for each urban district and are compared to the performance of their peers attending public schools in the nation and large central cities. Large central cities have populations of 250,000 or more. The comparison with large central cities is made because these schools represent a peer group that is similar to these urban districts (see tables 1 and 2 on pages 24 and 25). As this was the first science TUDA assessment, NAEP cannot compare student performance in the districts to prior years to determine whether the districts are making progress.

## Reporting Science Results

In this report, NAEP science results are reported in two ways: as average scale scores and as a percentage of students performing at or above three performance standards called “achievement levels.” NAEP science scores are reported on a 0–300 scale for each grade. Percentages are presented for three achievement levels: *Basic*, *Proficient*, and *Advanced*. Percentages below *Basic* are also reported. Descriptions of the NAEP science achievement levels for each grade can be found in the grade sections of this report.

The National Assessment Governing Board sets specific achievement levels for each subject area and grade assessed, based on recommendations from panels of educators and members of the public, to provide a context for interpreting student performance on NAEP. As provided by law, the National Center for Education

Statistics (NCES), upon review of congressionally mandated evaluations of NAEP, has determined that achievement levels are to be used on a trial basis and should be interpreted with caution. However, NCES and the Governing Board have affirmed the usefulness of these performance standards for understanding trends in achievement. NAEP achievement levels have been widely used by national and state officials.



**The three NAEP achievement levels, from lowest to highest, are**

***Basic***—denotes partial mastery of the knowledge and skills that are fundamental for proficient work at a given grade.

***Proficient***—represents solid academic performance. Students reaching this level have demonstrated competency over challenging subject matter.

***Advanced***—signifies superior performance.

## The Science Framework

Like every NAEP assessment, the science assessment is based on a blueprint called a “framework,” which specifies what should be assessed. Under the direction of the Governing Board, the framework was developed in a comprehensive and inclusive process, including subject experts, scientists, school administrators, policymakers, teachers, parents, and others.

The framework requires assessment in three broad fields (Earth science, physical science, and life science) and three elements of knowing and doing science (conceptual understanding, scientific investigation, and practical reasoning). More detail on the assessment content can be found on page 10 for grade 4 and page 20 for grade 8.

The current science framework was used to guide the national and state 1996, 2000, and 2005 assessments. A new framework, approved in 2005, will be used to direct future science assessments. For more information on the framework, see <http://www.nagb.org/pubs/pubs.html>.

### The Fields of Science

**Earth science** includes concepts related to solid Earth, water, air, and Earth in space.

**Physical science** (physics and chemistry) includes matter and its transformations, energy and its transformations, and motion.

**Life science** includes the nature and function of living things.

### Elements of Knowing and Doing Science

**Conceptual understanding** means understanding the principles of science used to explain and predict observations of the natural world.

**Scientific investigation** means using scientific knowledge and skills to plan investigations and acquire new knowledge.

**Practical reasoning** means using science understanding to solve everyday problems.

## Interpreting Results

NAEP uses widely accepted statistical standards in analyzing data. The text of this report discusses only findings that are statistically significant at the .05 level. In the tables and charts of this report, the symbol (\*) is used to indicate that scores or percentages are significantly different from each other.

In addition to overall results, performance at the district level is presented for students categorized by different demographic and educational background characteristics (for example, by race/ethnicity). Results of more variables for the urban districts are available on the NAEP website (<http://nces.ed.gov/nationsreportcard/nde/>).

Simple associations between background characteristics and achievement cannot be used to establish cause-and-effect relationships. A complex mix of educational and socioeconomic factors may interact to affect student performance. For additional information, see the Technical Notes on page 46 or <http://nationsreportcard.gov>.

