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the highest performers in mathematics, and another Advanced Placement subgroup shared the highest tier in physics with five countries.

In 1999, the First in the World Consortium again participated in TIMSS, joined this time by Chicago Public Schools and Naperville District 203.⁶⁹ Naperville and the First in the World Consortium performed in the second tier in mathematics and were only outperformed by Singapore, Korea, Chinese Taipei, Hong Kong, and Japan. In science, Naperville and the First in the World Consortium performed in the top-tier along with Chinese Taipei, Singapore, and a consortium of Michigan schools. Chicago Public School students performed below the U.S and international averages in mathematics and science.

The consortium implemented teacher learning networks and collaborative learning communities to improve students' performance through professional development and activities using new curriculum models, instructional practices, assessment strategies, and technology.

The TIMSS project collected additional data to identify factors associated with student achievement. The top performers came from homes with high levels of educational resources. Students from the Chicago Public Schools, similar to other large inner city districts with high levels of low-income students, performed at a lower level.

The 1997 TIMSS and the 1999 TIMSS Benchmarking study highlight a theme that will recur in the following sections on student indicators of STEM performance: **Illinois has some of the highest performing students and some of the lowest performers. Keeping Illinois competitive requires that the gap between the achievements of these students be reduced, if not eliminated. The single factor that has the highest correlation to achievement is the income status of the student; e.g., low-income students are struggling to reach even average levels of performance.**

Illinois and U.S. Comparisons - NAEP

The National Assessment of Educational Progress (NAEP) tests, which sometimes are called "the gold standard" of U.S. assessments, provide an external benchmark for academic achievement for all of the states. The results of these tests are disseminated on the "Nation's Report Card" and include measures of 4th and 8th grade student academic achievement in mathematics and science.

Student results are reported in both numerical scores and by the performance levels "basic", "proficient", and "advanced". "Basic" is defined as partial mastery of the skills and knowledge, but not competence in the subject. "Proficient" represents a solid academic performance for the grade assessed. "Advanced" describes superior performance.⁷⁰ Using standards and frameworks that are internationally respected, the National Assessment Governing Board that oversees NAEP regards "proficient" as the acceptable level.

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Illinois needs its students to place at or above the “proficient” level in all grade levels. Building this foundation begins in a child’s early years, and a child who lags behind his peers has a difficult time catching up. Underdeveloped mathematics and science skills are critical barriers to higher education, especially in the higher-paying STEM occupations.

NAEP tests were given at the state level to 4th and 8th grade students in mathematics (2000, 2003, 2005) and in science (2000). This section reviews how Illinois students are doing compared to the nation as a whole and to students in states that are demographically and economically similar, including

- Results of NAEP mathematics and science tests
- Comparisons of NAEP performance by ethnicity and low-income status

Illinois students are not measuring up satisfactorily. **Less than one-third of the Illinois 4th and 8th graders are reaching the “proficient” level in mathematics or science.** Unfortunately, this less-than-stellar performance is comparable to the U.S. average. The following sections describe the NAEP results in more detail, and Appendix B includes additional information.

Illinois NAEP Mathematics and Science Results

In mathematics and science, the percentages of Illinois students at or above the “proficient” level were similar to the national averages. From 2000 to 2005, both Illinois and U.S. students improved their performance on the mathematics test; however, much faster progress is needed.

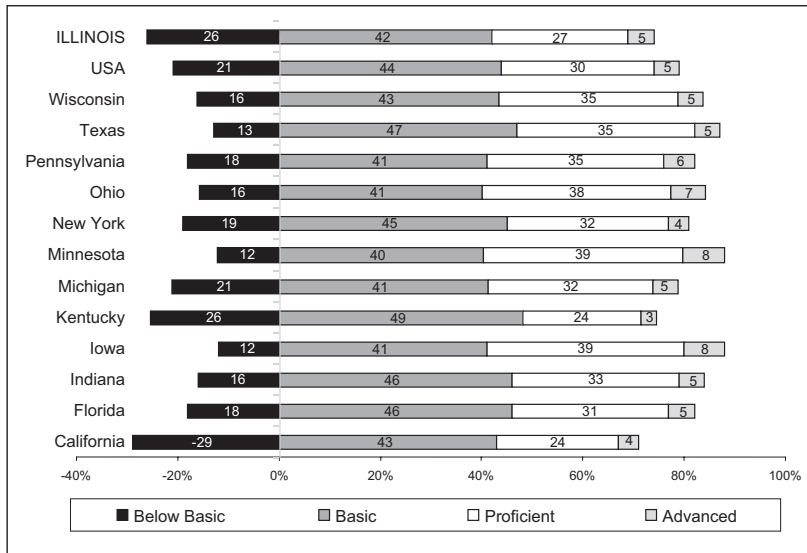
Table 4 Percentages of Students at “Proficient” Level or Higher on NAEP⁷¹

	Mathematics						Science	
	4th Grade			8th Grade			4th Grade	8th Grade
	2000	2003	2005	2000	2003	2005	2000	2000
U.S.	22	31	35	25	27	28	27	30
Illinois	20	32	32	26	29	29	31	30

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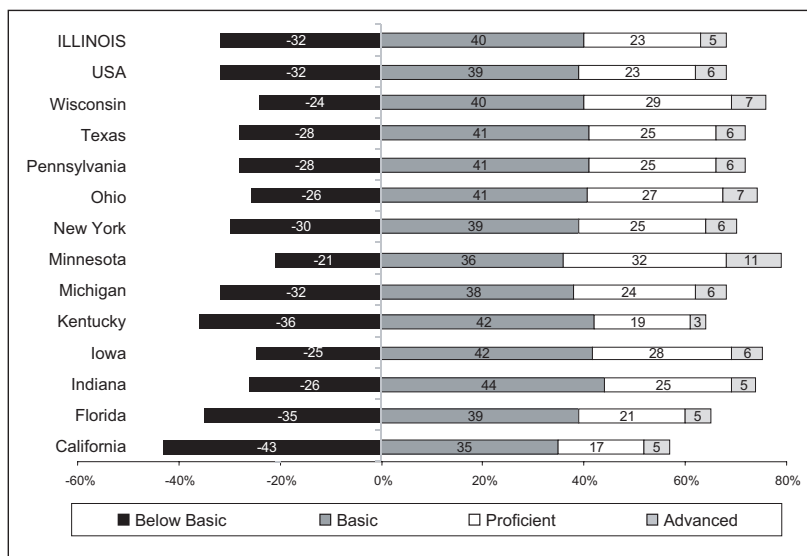
The next four figures compare the performances of Illinois 4th and 8th graders on the NAEP to the mathematics performance of students in other selected states. The states were selected because they were neighbors or large states similar to Illinois in demographics and/or economics.

Figure 10 4th Grade NAEP Mathematics Comparisons⁷²



In general, Illinois had the same or more students scoring at the “below basic” level in 4th grade mathematics than the other states, except California.

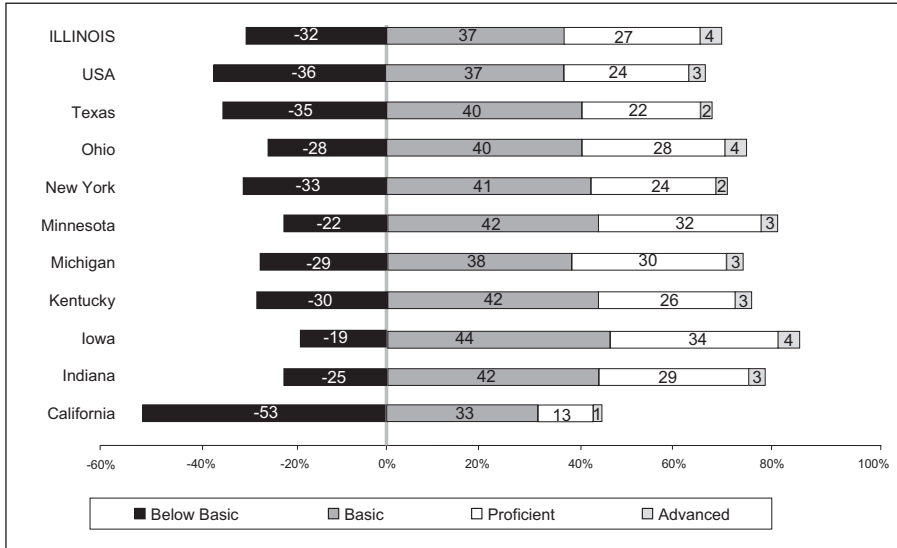
Figure 11 8th Grade NAEP Mathematics Comparisons⁷³



At the 8th grade in mathematics, Illinois again had the same or more students scoring at the “below basic” level for most of the states, except California, Florida, and Kentucky.

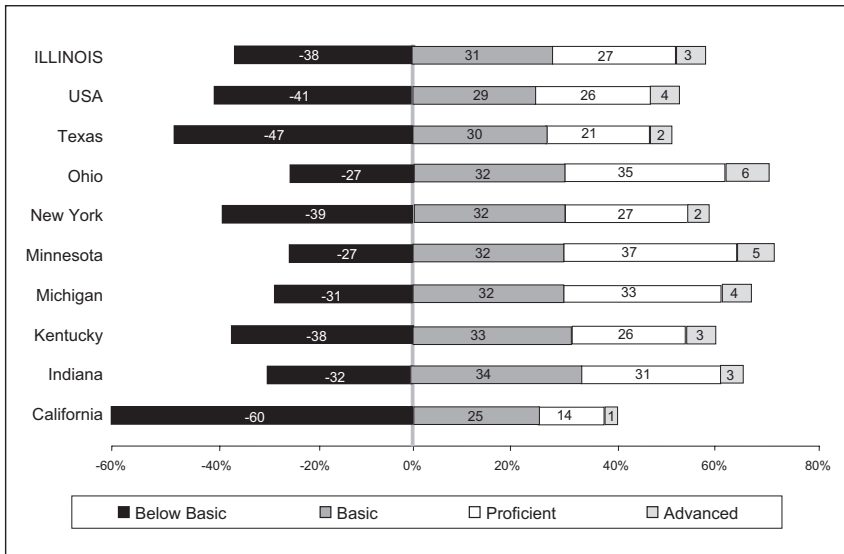
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Figure 12 4th Grade NAEP Science Comparisons⁷⁴



Compared to the other selected states, Illinois had similar percentages of 4th grade students performing below the “basic” level in science, except for California, which had considerably more students at the lowest level.

Figure 13 8th Grade NAEP Science Comparison⁷⁵



In 8th grade science, Ohio, Minnesota, Michigan, and Indiana had higher percentages of students at the “proficient” or higher levels of achievement.

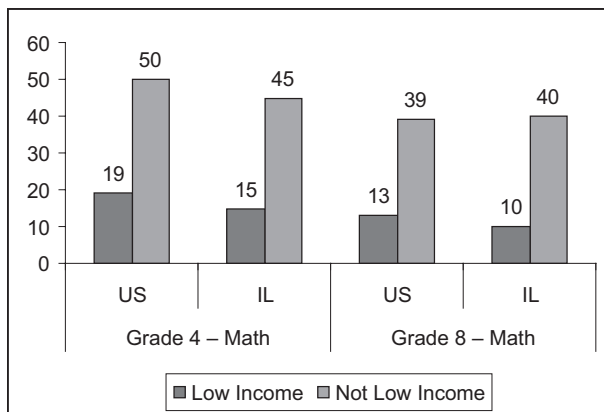
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NAEP Mathematics Performance By Ethnicity and Income Status

There is great disparity among the mathematics performances of students in the U.S., and especially in Illinois, by ethnicity and income level. These two demographic characteristics are interrelated – students from the ethnic minority groups are often also low-income students. In this report “low-income” means a student who qualifies for a free or reduced-price lunch.

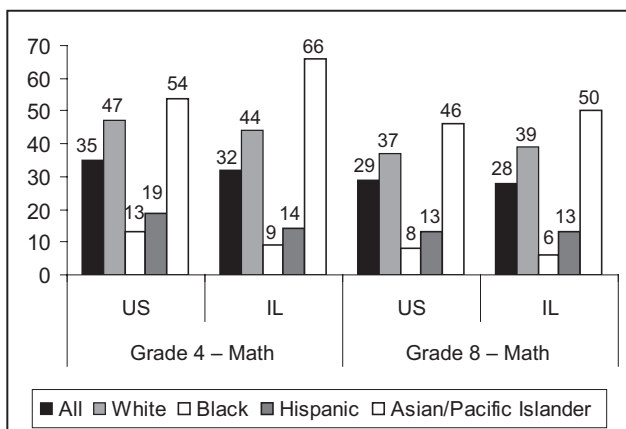
Not only are there significant achievement gaps for low-income students, the performance of these students decreases as they progress through school.

Figure 14 Percentages of Students Scoring At or Above “Proficient” Level on 2005 NAEP Mathematics Test by Income Level⁷⁶



- On the 2005 NAEP, the gap between the 4th grade mathematics scores of Illinois low-income students and those who were not low-income was the largest such gap in the entire U.S. The 4th grade low-income students were three times less likely to be at the “proficient” level in mathematics than those who were not low-income.
- The low-income gap at the 8th grade was the second largest such gap in the nation. In 8th grade the low-income students were four times less likely to reach the “proficient” level.

Figure 15 Percentages of Students Scoring At or Above “Proficient” Level on 2005 NAEP Mathematics Test by Ethnicity⁷⁷



Several critical gaps were found among the ethnic groups. There were two mathematics bright spots:

- Asian students in Illinois outperformed all other Illinois and U.S. students
- Hispanic students in 8th grade had higher scores than their U.S. Hispanic peers; however, only 13% of both groups were at the “proficient” or higher level.

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The following two tables summarize the comparisons in the scores, the differences in the scores (gaps), and the levels of achievement for 4th and 8th grade students on the NAEP mathematics test. In addition to the previous findings are the following:

- Illinois white students performed comparably to their U.S. peers.
- In 4th grade mathematics, the Illinois gap between white students and black students is tied for the 3rd largest such gap in the nation. Only 9% of the 4th grade Illinois black students achieved a “proficient” level and over half did not even reach the “basic” level.
- In 8th grade mathematics, the Illinois gap between the scores of white students and black students is the 5th largest in the nation.⁷⁸ Only 6% of the Illinois black students reached the “basic” level and two-thirds did not even reach the “basic” level.

Table 5 2005 NAEP Mathematics Comparisons⁷⁹

	4th Grade- Math NAEP	8th Grade - Math NAEP
Illinois Raw Score Compared to U.S. Raw Scores		
White	Same	Same
Asian	Higher	Higher
Black	Lower	Lower
Hispanic	Lower	Higher
Low Income	Lower	Lower
Illinois Gaps in Raw Scores Compared to U.S. Gaps		
Gap White-Black	Larger	Larger
Gap White-Hispanic	Same	Same
Gap Low Income–Not Low Income	Larger	Larger

Statistically Significant Differences $p < .05$

Table 6 Percentages of Students Scoring At or Above Proficient Level on 2005 NAEP Mathematics Test⁸⁰

	Grade 4 - Math		Grade 8 - Math	
	US	IL	US	IL
All	35	32	29	28
White	47	44	37	39
Black	13	9	8	6
Hispanic	19	14	13	13
Asian/Pacific Islander	54	66	46	50
Low Income	19	15	13	10
Not Low Income	50	45	39	40
Male	37	33	30	30
Female	33	30	27	27

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Figure 16 Comparison of Achievement on NAEP Mathematics 4th Grade in Public Schools by Ethnicity⁸¹

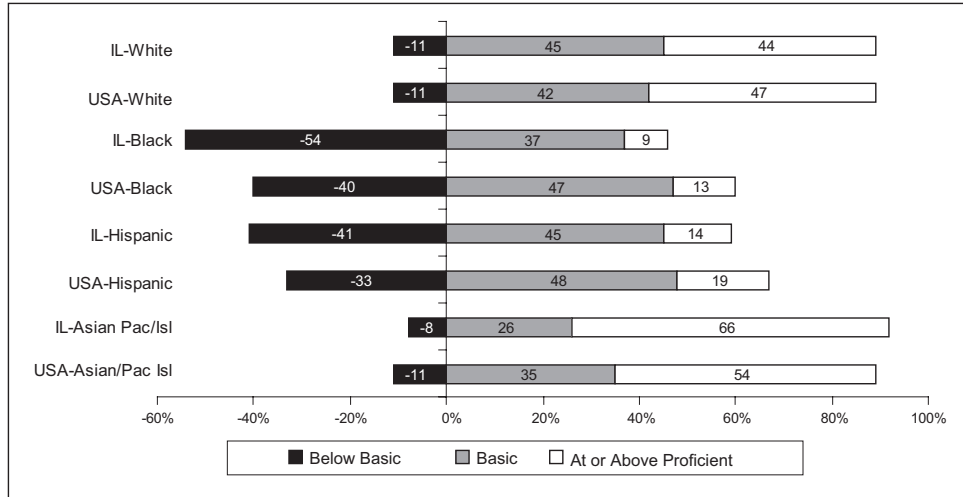
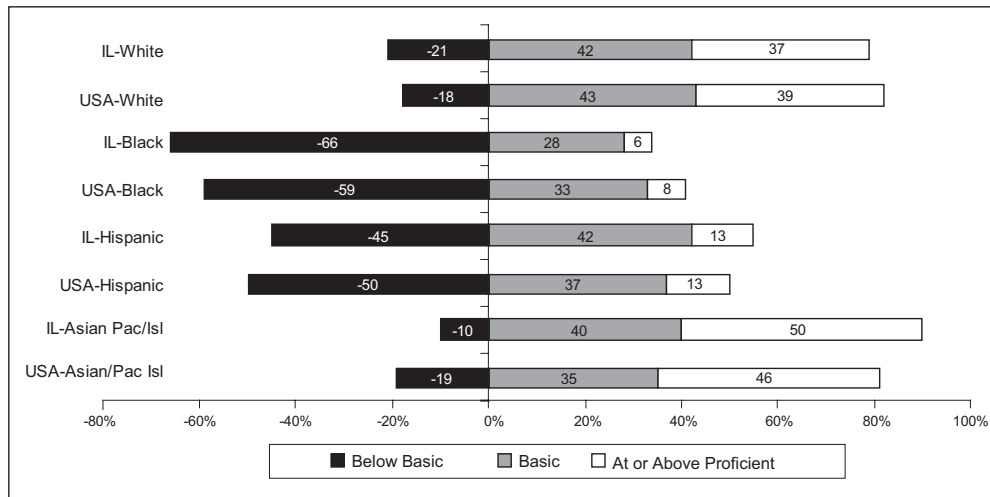


Figure 17 Comparison of Achievement on NAEP Mathematics 8th Grade in Public Schools by Ethnicity⁸²



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Illinois and U.S. Gaps in Science Levels of Achievement by Ethnicity and Income Status
 Similar to the findings for mathematics, there were wide achievement gaps in science for low-income students compared to those who were not low-income. Black, Hispanic, and low-income students were less likely to reach the “proficient” level than were the white students and those who were not low income. Female students were less likely to reach the “proficient” level than were male students.

Figure 18 Percentages of Students on 2000 NAEP Science Exam Who Are At or Above Proficient Level by Ethnicity⁸³

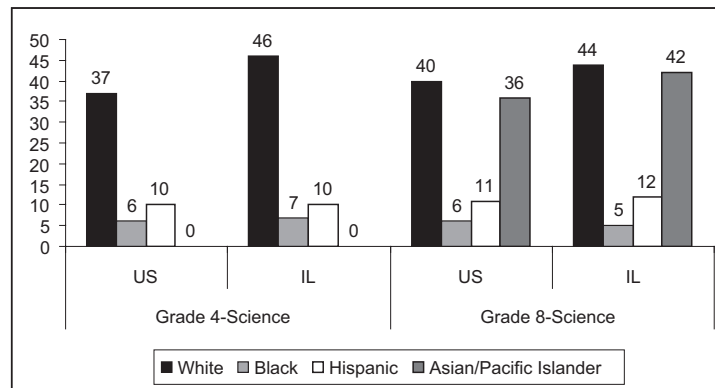
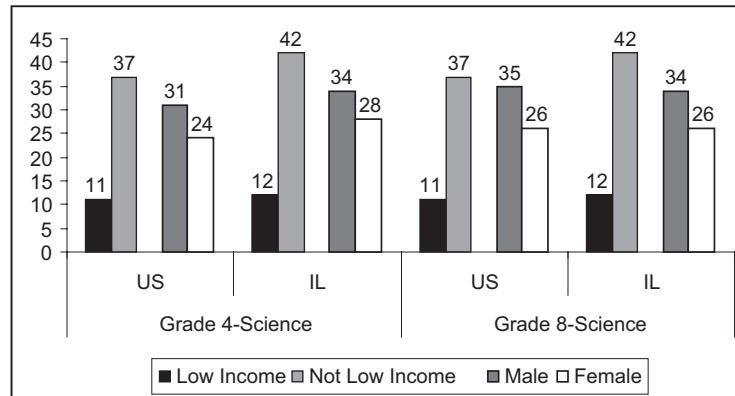


Figure 19 Percentages of Students on 2000 NAEP Science Exam Who Are At or Above Proficient Level by Ethnicity⁸⁴



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In summary, on the NAEP, a nationally recognized assessment, **less than one-third of the Illinois students met the “proficient” level of competency. Similar to the international studies, Illinois’ low-income students have extremely low levels of performance. As students progress through school, the level of achievement decreases.**

According to the NCES’ *Projections of Education Statistics to 2014*, the number of Illinois public high school graduates is projected to increase by 8.3% between 2002 and 2014, compared to a national increase of 9%. In Illinois, there is a disproportionate projected growth in the traditionally underrepresented ethnic categories, especially the Hispanic population. In fact, projections estimate that 40% of the Illinois high school graduating class of 2013-2014 will be from traditionally underrepresented groups.⁸⁵

If these projections hold true, and if the performances of the ethnic minority groups does not improve, Illinois will face a situation in which increasing numbers of students fail to meet the state standards and, therefore, are seriously under-prepared for postsecondary education or work.