

# Mathematics



The NAEP mathematics assessment was designed to measure students' knowledge and skills in mathematics and their ability to apply their knowledge and skills in problem-solving situations.

## The Mathematics Framework

The NAEP mathematics framework serves as the blueprint for the assessment, describing the specific mathematical skills that should be assessed at grades 4 and 8. Developed under the direction of the National Assessment Governing Board, the framework embraces ideas and input from mathematicians, school administrators, policy-makers, teachers, parents, and others.

The current NAEP mathematics framework was first used to guide the development of the 1990 assessment and has continued to be used through 2007. Updates to the framework over the years have provided more detail regarding the assessment design but have not changed the content, allowing student performance in 2007 to be compared with previous years. For more information on the framework, visit [http://www.nagb.org/frameworks/math\\_07.pdf](http://www.nagb.org/frameworks/math_07.pdf).

The framework details the mathematics objectives appropriate for grades 4 and 8. The topics covered by the framework include properties of numbers and operations, proportional reasoning, systems of measurement, relationships between geometric figures, data representation, probability, algebraic representations, equations and inequalities, and mathematical reasoning in various content areas.

Two dimensions of mathematics, *content areas* and *mathematical complexity*, are used to guide the assessment. Although each item is designed to measure one of the five content areas, the items will, in many cases, cross some of the boundaries of these content areas. The level of complexity of a mathematics question is determined by the cognitive demands that it places on students.

## MATHEMATICS CONTENT AREAS

**Number properties and operations** measures students' understanding of ways to represent, calculate, and estimate with numbers.

**Measurement** measures students' knowledge of measurement attributes, such as capacity and temperature, and geometric attributes, such as length, area, and volume.

**Geometry** measures students' knowledge and understanding of shapes in a plane and in space.

**Data analysis and probability** measures students' understanding of data representation, characteristics of data sets, experiments and samples, and probability.

**Algebra** measures students' understanding of patterns, using variables, algebraic representation, and functions.

## Assessment Design

Because of the breadth of the content covered in the NAEP mathematics assessment, each student took just a portion of the test, consisting of two 25-minute sections. Testing time was divided evenly between multiple-choice and constructed-response (i.e., open-ended) questions. Some questions incorporated the use of rulers (at grade 4) or ruler/protractors (at grade 8), and some questions incorporated the use of geometric shapes or other manipulatives that are provided for students. For approximately one-third of the assessment, a four-function calculator was provided for students at grade 4, and a scientific calculator was provided for students at grade 8.

The distribution of items among each content area differs somewhat by grade to reflect the knowledge and skills appropriate for each grade level. Table 13 shows the distribution across the content areas for grades 4 and 8, as recommended in the framework.

Table 13. Target percentage of NAEP mathematics questions, by grade and content area: 2007

Content areas	Grade 4	Grade 8
Number properties and operations	40%	20%
Measurement	20%	15%
Geometry	15%	20%
Data analysis and probability	10%	15%
Algebra	15%	30%

SOURCE: U.S. Department of Education, National Assessment Governing Board, Mathematics Framework for the 2007 National Assessment of Educational Progress (NAEP), 2006.

## LEVELS OF MATHEMATICAL COMPLEXITY

**Low complexity** questions typically specify what a student is to do, which is often to carry out some routine or mathematical procedure.

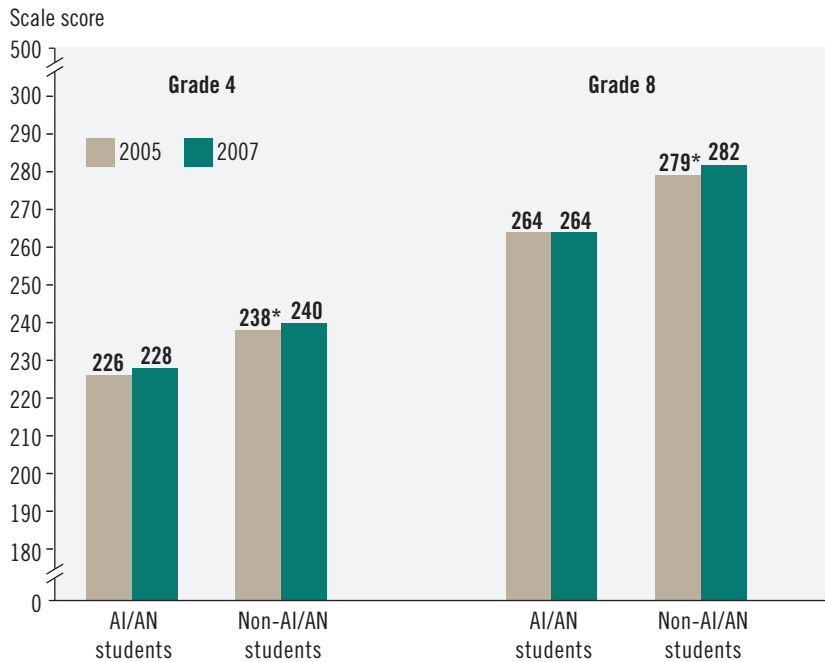
**Moderate complexity** questions involve more flexibility of thinking and often require a response with multiple steps.

**High complexity** questions make heavier demands and often require abstract reasoning or analysis in a novel situation.



# American Indian/Alaska Native fourth-graders show gains in percentage at or above *Proficient*

Figure 21. Average scores in NAEP mathematics, by grade and student group: 2005 and 2007

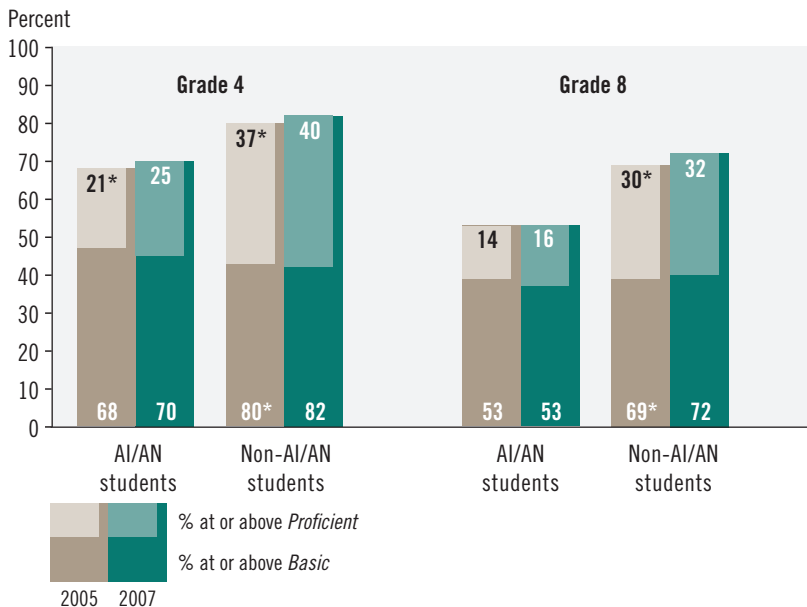


\* Significantly different ( $p < .05$ ) from 2007.  
 NOTE: AI/AN = American Indian/Alaska Native.  
 SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 and 2007 National Indian Education Studies.

Overall, the average mathematics scores for AI/AN fourth- and eighth-graders did not change significantly between 2005 and 2007, while the scores over the same two-year period increased for their non-AI/AN peers (figure 21). AI/AN students had lower average scores than non-AI/AN students at both grades in 2007.

Between 2005 and 2007, AI/AN fourth-graders showed an increase in the percentage of students performing at or above *Proficient*, but eighth-graders did not (figure 22). Over the same time period, non-AI/AN students at both grades showed gains in the percentages performing at or above *Basic* and at or above *Proficient*. The percentages of AI/AN students performing at or above *Basic* and at or above *Proficient* were lower than for non-AI/AN students at both grades in 2007.

Figure 22. Achievement-level results in NAEP mathematics, by grade and student group: 2005 and 2007



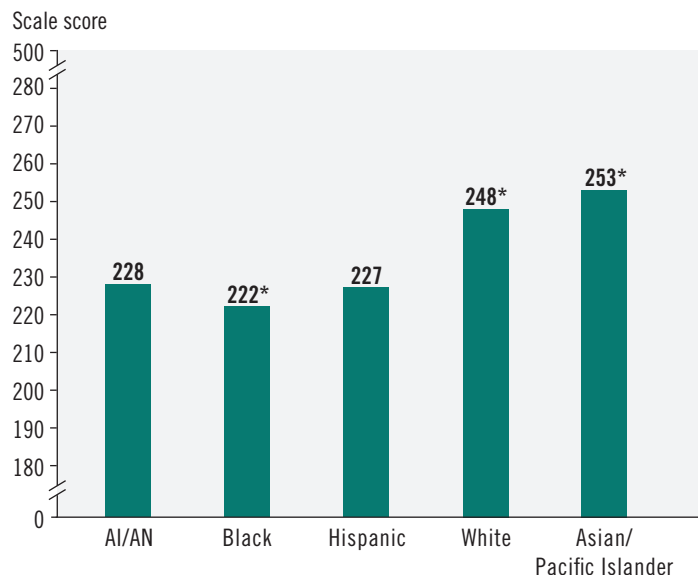
\* Significantly different ( $p < .05$ ) from 2007.  
 NOTE: AI/AN = American Indian/Alaska Native.  
 SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 and 2007 National Indian Education Studies.

While there was no significant change in average scores for AI/AN fourth- or eighth-graders since 2005, Black, Hispanic, and White students at both grades made gains. Asian/Pacific Islander fourth-graders also made gains (data not shown).

# AI/AN students score higher than Black students, but lower than White and Asian/Pacific Islander students

AI/AN fourth- and eighth-graders scored higher than their Black peers and lower than their White and Asian/Pacific Islander peers in 2007. There was no significant difference in scores compared with their Hispanic peers at either grade (figures 23 and 24).

Figure 23. Average scores in NAEP mathematics at grade 4, by race/ethnicity: 2007

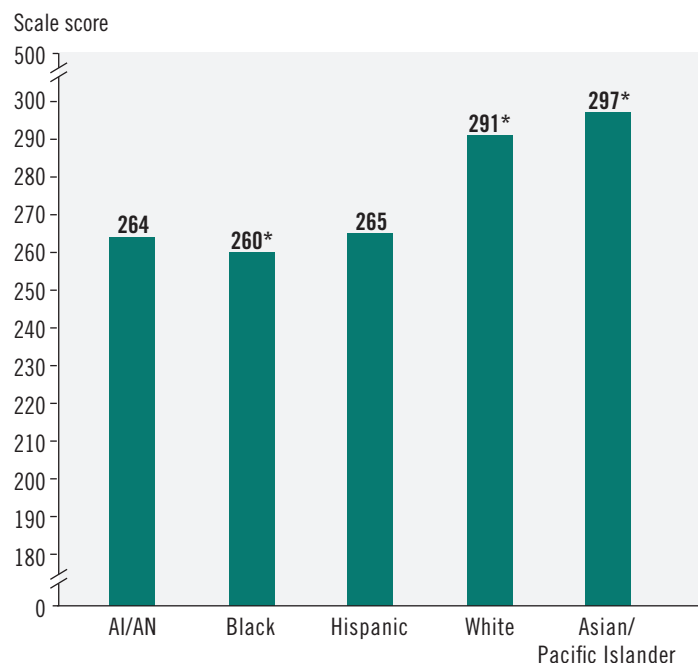


\* Significantly different ( $p < .05$ ) from AI/AN students.

NOTE: AI/AN = American Indian/Alaska Native. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

Figure 24. Average scores in NAEP mathematics at grade 8, by race/ethnicity: 2007



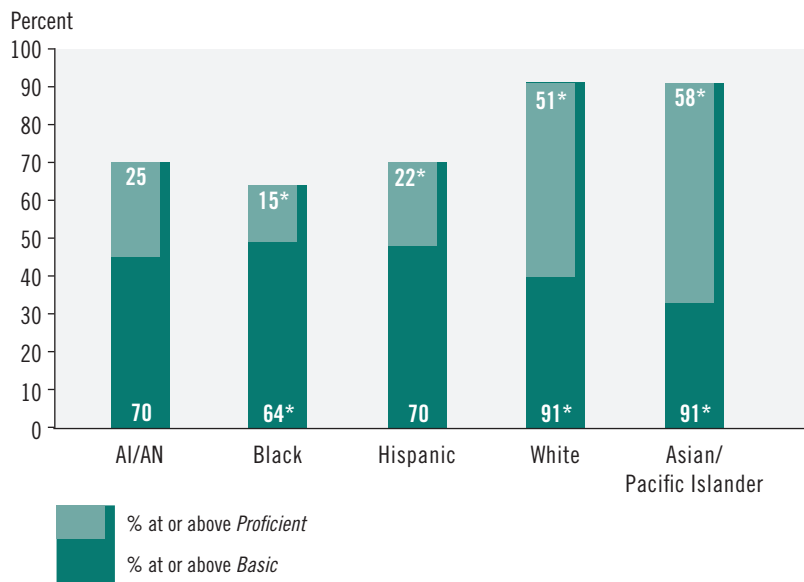
\* Significantly different ( $p < .05$ ) from AI/AN students.

NOTE: AI/AN = American Indian/Alaska Native. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

# Higher percentage of AI/AN fourth-graders perform at or above *Proficient* than their Black and Hispanic peers

Figure 25. Achievement-level results in NAEP mathematics at grade 4, by race/ethnicity: 2007



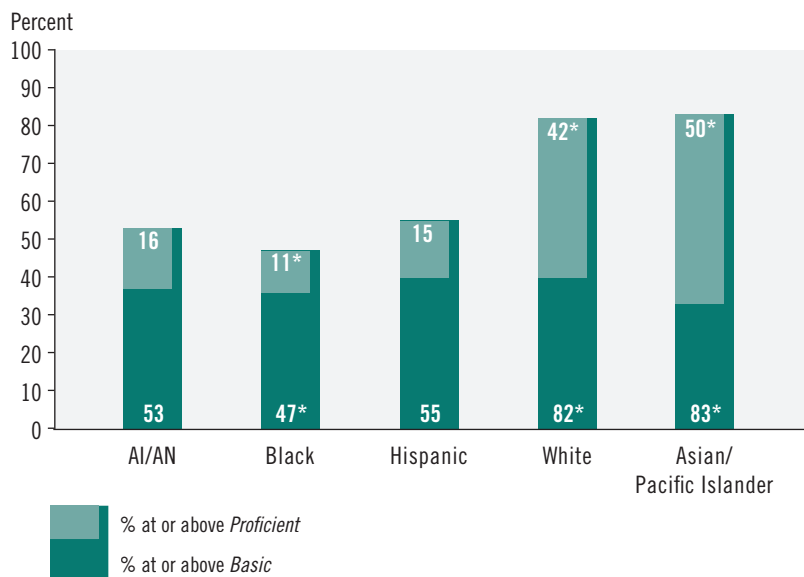
In 2007, AI/AN students at both grades had lower percentages at both achievement levels than either White or Asian/Pacific Islander students, but they had higher percentages at both achievement levels when compared to Black students (figures 25 and 26). AI/AN students at grade 4 had a higher percentage performing at or above *Proficient* compared to Hispanic students.

\* Significantly different ( $p < .05$ ) from AI/AN students.

NOTE: AI/AN = American Indian/Alaska Native. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

Figure 26. Achievement-level results in NAEP mathematics at grade 8, by race/ethnicity: 2007



\* Significantly different ( $p < .05$ ) from AI/AN students.

NOTE: AI/AN = American Indian/Alaska Native. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

# Highest-performing AI/AN students score higher than their Black peers

Examining performance at selected percentiles can indicate when the overall picture diverges by lower-, middle-, or higher-performing students. A percentile indicates the percentage of students whose scores fell at or below a particular score on the NAEP mathematics scale. For example, 50 percent of grade 4 AI/AN students scored at or below 230 (table 14), and 50 percent of grade 8 AI/AN students scored at or below 264 (table 15).

Compared to grade 4 students from other racial/ethnic groups, higher-performing AI/AN students (those at the 75th and 90th percentiles) scored higher than their Black and Hispanic peers. AI/AN students also scored higher than their Black peers at the 25th and 50th percentiles.

At grade 8, AI/AN students scored higher than their Black peers at the 50th, 75th, and 90th percentiles.

At each of the five percentiles analyzed, the score for AI/AN students was lower than the score for White and Asian/Pacific Islander students at both grades 4 and 8.

Table 14. Percentile scores in NAEP mathematics at grade 4, by race/ethnicity: 2007

Race/ethnicity	Percentile				
	10th	25th	50th	75th	90th
AI/AN	188	209	230	249	265
Black	188	205*	223*	241*	256*
Hispanic	190	209	229	247*	261*
White	216*	233*	250*	265*	279*
Asian/Pacific Islander	216*	236*	255*	273*	288*

\* Significantly different ( $p < .05$ ) from AI/AN students.

NOTE: AI/AN = American Indian/Alaska Native. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

Table 15. Percentile scores in NAEP mathematics at grade 8, by race/ethnicity: 2007

Race/ethnicity	Percentile				
	10th	25th	50th	75th	90th
AI/AN	216	240	264	288	309
Black	218	239	260*	282*	301*
Hispanic	221	243	266	288	307
White	249*	270*	292*	314*	332*
Asian/Pacific Islander	247*	273*	299*	323*	344*

\* Significantly different ( $p < .05$ ) from AI/AN students.

NOTE: AI/AN = American Indian/Alaska Native. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

# No significant score difference between male and female AI/AN students

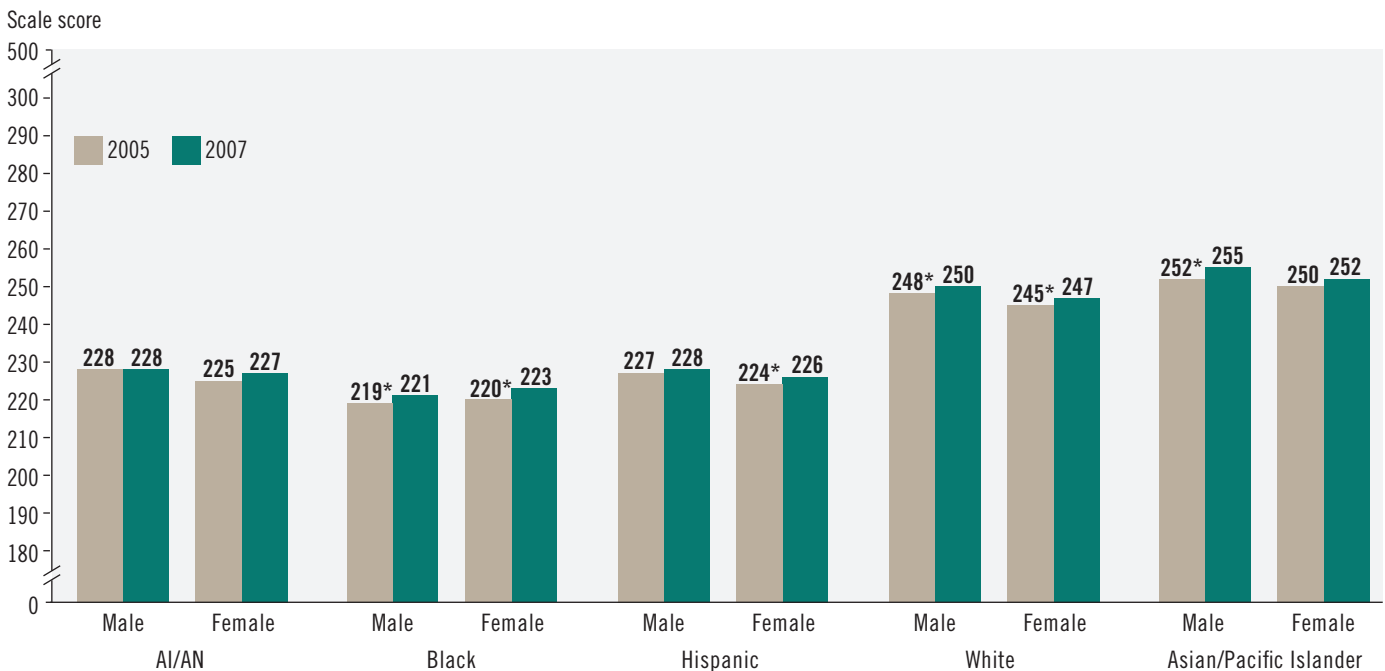
At both grades 4 and 8, neither male nor female AI/AN students showed significant changes in mathematics average scores since 2005 (figures 27 and 28). The 2007 results for other racial/ethnic groups varied as is described below.

In 2007, at grade 4, AI/AN male and female students had higher average scores than their Black peers in 2007 and lower scores than their White and Asian/Pacific Islander peers. The average scores for AI/AN male and female students were not significantly

different from their Hispanic counterparts in 2007. In addition, a male – female performance gap in mathematics was not consistently displayed across racial/ethnic groups. Hispanic, White, and Asian/Pacific Islander male fourth-graders had higher scores than their female peers. AI/AN male and female students showed no significant difference in their mathematics average scores, and Black male students scored lower than Black female students.

In 2007, at grade 8, AI/AN male students scored higher than Black male students, with no significant difference in the scores of AI/AN and Black female students. Only among White students did male eighth-graders outscore their female peers. For AI/AN, Black, Hispanic, and Asian/Pacific Islander eighth-graders, there was no significant difference between male and female students' average scores.

Figure 27. Average scores in NAEP mathematics at grade 4, by race/ethnicity and gender: 2005 and 2007



\* Significantly different ( $p < .05$ ) from 2007.

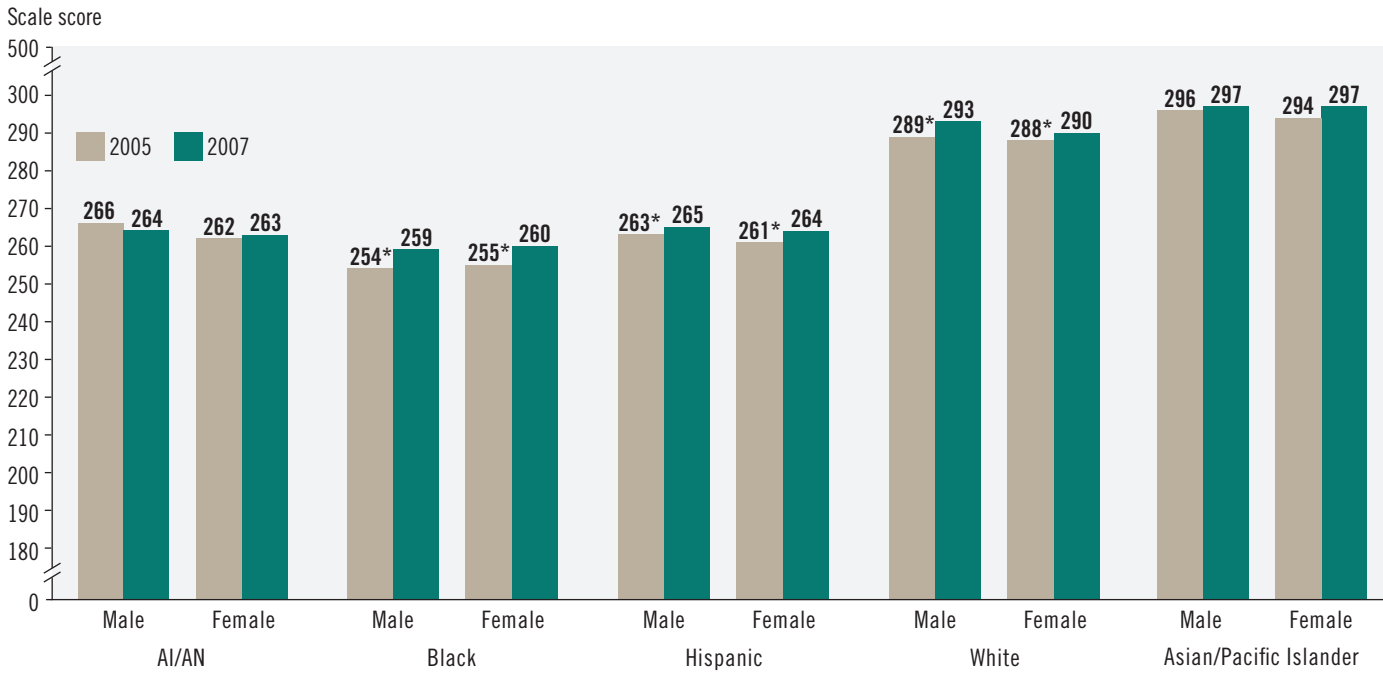
NOTE: AI/AN = American Indian/Alaska Native. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 and 2007 National Indian Education Studies.





Figure 28. Average scores in NAEP mathematics at grade 8, by race/ethnicity and gender: 2005 and 2007



\* Significantly different ( $p < .05$ ) from 2007.

NOTE: AI/AN = American Indian/Alaska Native. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 and 2007 National Indian Education Studies.







## Fifty-five to sixty-four percent of AI/AN, Black, and Hispanic students eligible for free school lunch

Table 16 shows the percentage of students assessed in NAEP mathematics by grade, race/ethnicity, and eligibility for free or reduced-price school lunch in 2007. Among fourth-graders, 59 percent of AI/AN students, 64 percent of Black students, and 64 percent of Hispanic students assessed in mathematics in 2007 were eligible for free lunch. Among eighth-graders, 55 percent of AI/AN students, 58 percent of Black students, and 58 percent of Hispanic students assessed in mathematics in 2007 were eligible for free lunch. See Technical Notes for more information about the National School Lunch Program.

Table 16. Percentage of students in NAEP mathematics, by eligibility for National School Lunch Program, grade, and race/ethnicity: 2007

Grade and race/ethnicity	Eligible for free lunch	Eligible for reduced-price lunch	Not eligible	Information not available
<b>Grade 4</b>				
AI/AN	59	7	32	2
Black	64	7	26	3
Hispanic	64	9	23	5
White	19	5	68	8
Asian/Pacific Islander	25	6	60	10
<b>Grade 8</b>				
AI/AN	55	6	35	4
Black	58	7	31	4
Hispanic	58	9	28	5
White	16	5	71	9
Asian/Pacific Islander	27	6	57	10

NOTE: AI/AN = American Indian/Alaska Native. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. Detail may not sum to totals because of rounding.  
 SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

# AI/AN students not eligible for school lunch program score higher than Black and Hispanic peers

There was no significant change between 2005 and 2007 in average mathematics scores for AI/AN fourth- or eighth-graders who were eligible for free or reduced-price school lunch (figures 29 and 30).

In 2007, the average mathematics score for AI/AN students eligible for free school lunch at grade 4 was higher than that of their Black peers and lower than that of their Hispanic peers. At eighth-grade, AI/AN students eligible for free school lunch scored lower than their Hispanic

peers and not significantly different from their Black peers.

At both grades, AI/AN students who were not eligible for free or reduced-price school lunch scored higher than their Black and Hispanic counterparts.

Figure 29. Average scores in NAEP mathematics at grade 4, by eligibility for National School Lunch Program and selected race/ethnicity categories: 2005 and 2007

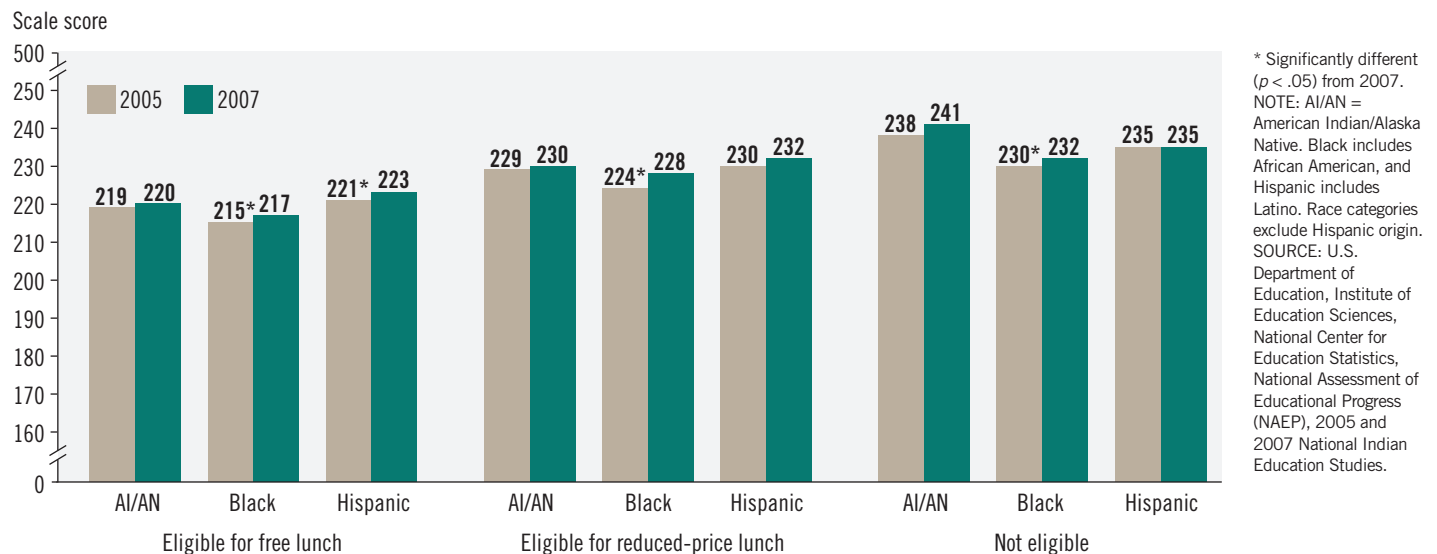
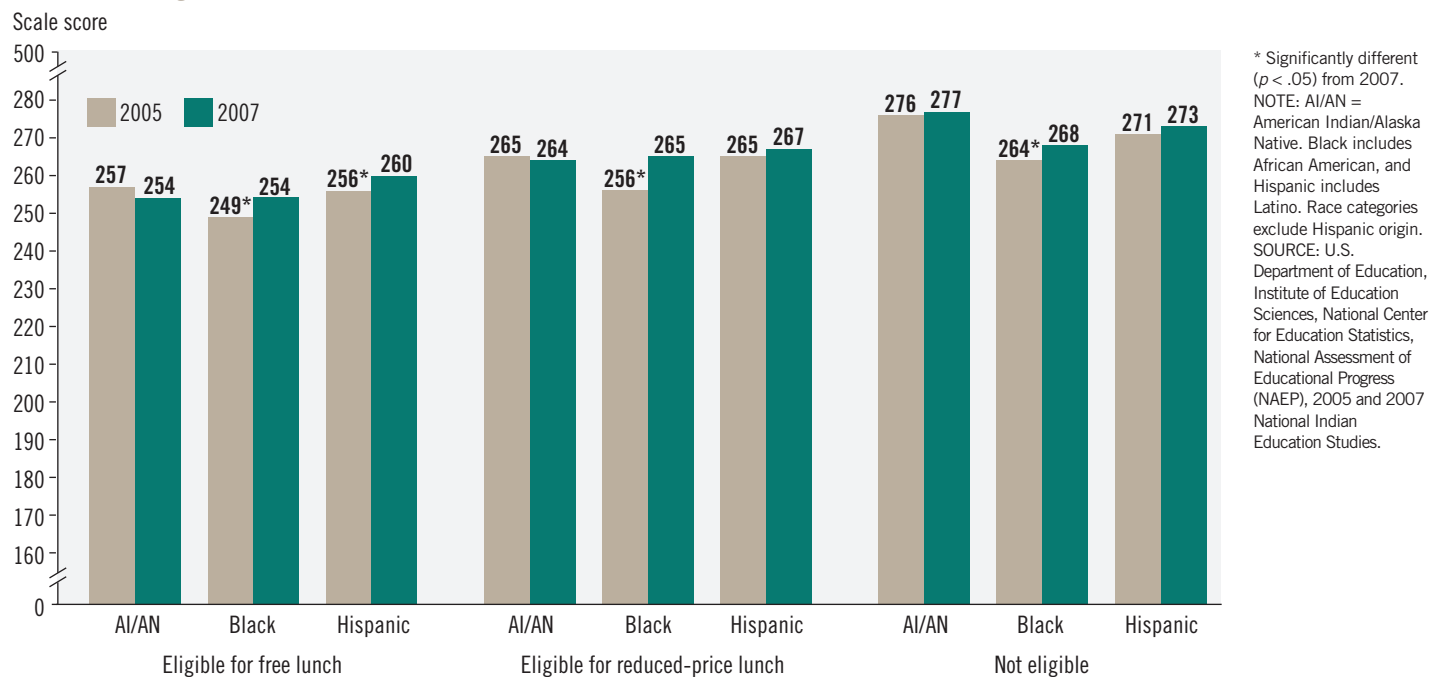


Figure 30. Average scores in NAEP mathematics at grade 8, by eligibility for National School Lunch Program and selected race/ethnicity categories: 2005 and 2007



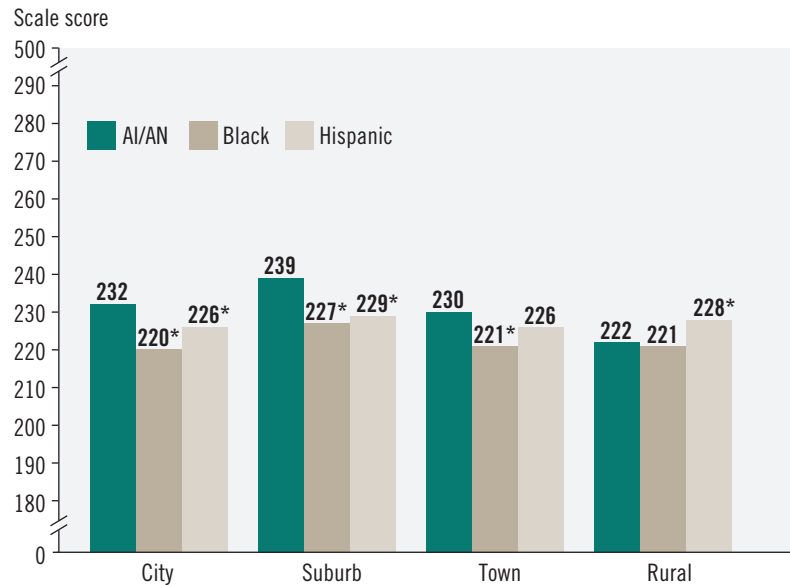
# AI/AN students in city schools score higher than Black and Hispanic peers

The mathematics performance of AI/AN students and their Black and Hispanic peers varied depending on the location of the students' schools. In city and suburban schools, AI/AN fourth-graders had higher average scores than Black and Hispanic students in similar schools. In schools in town locations, AI/AN fourth-graders scored higher than their Black peers. AI/AN fourth-graders attending schools in rural locations had lower scores than their Hispanic peers (figure 31).

In city schools at grade 8, AI/AN students had higher scores than their Black and Hispanic counterparts in similar schools. AI/AN eighth-graders attending schools in rural locations had lower scores than their Hispanic peers (figure 32).

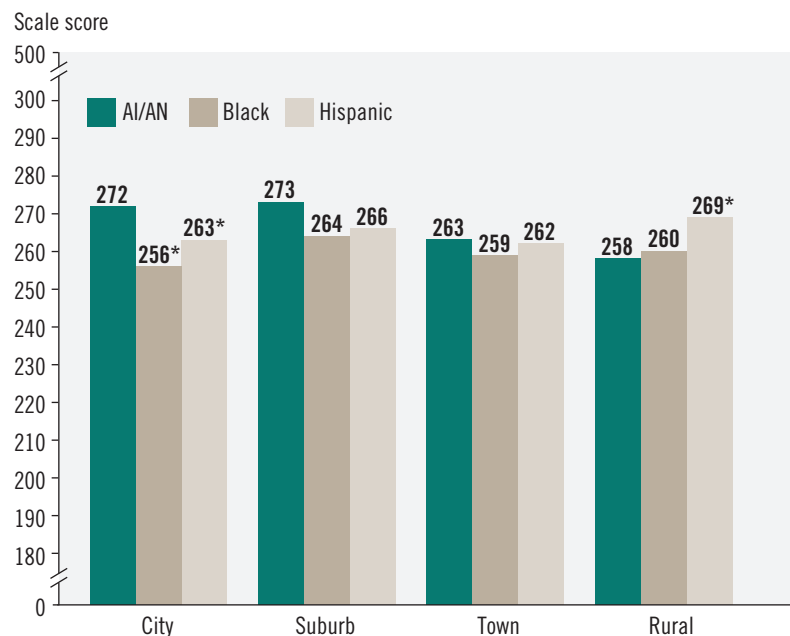
AI/AN fourth-graders attending schools in rural locations scored lower than AI/AN students in all other types of locations, and AI/AN students attending schools in suburban locations scored higher than their AI/AN counterparts in all other types of locations. At the eighth grade, AI/AN students attending schools in city locations scored higher than those in town and rural locations. See Technical Notes for more information on school locations (see also table A-4).

Figure 31. Average scores in NAEP mathematics at grade 4, by type of school location and selected race/ethnicity categories: 2007



\* Significantly different ( $p < .05$ ) from AI/AN students.  
 NOTE: AI/AN = American Indian/Alaska Native. Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin.  
 SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

Figure 32. Average scores in NAEP mathematics at grade 8, by type of school location and selected race/ethnicity categories: 2007



\* Significantly different ( $p < .05$ ) from AI/AN students.  
 NOTE: AI/AN = American Indian/Alaska Native. Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin.  
 SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

# AI/AN fourth-graders in low density schools gain

School density refers to the percentage of AI/AN students enrolled in the school. Although not shown, 44 percent of AI/AN fourth-graders and 43 percent of AI/AN eighth-graders assessed in NAEP mathematics attended high density schools (those with at least a 25 percent AI/AN population).

High density schools were concentrated in rural locations (table 17). Compared to AI/AN students in low density schools, higher percentages of AI/AN students in high density schools were identified as eligible for free/reduced-priced school lunch and as English language learners.

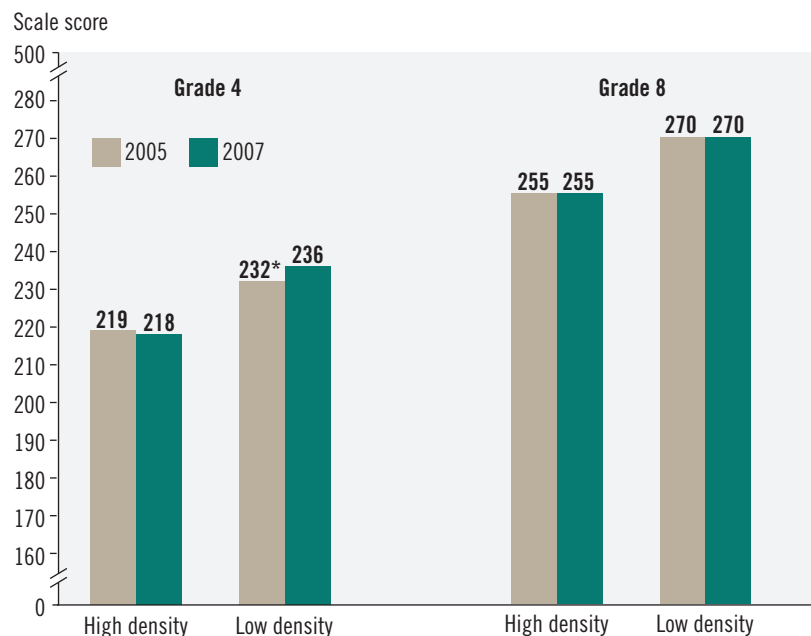
When looking at school density, the only significant change between 2005 and 2007 for AI/AN students in either grade was an increase in scores for fourth-graders in low density schools (figure 33). At both grades, AI/AN students at low density schools had higher average scores than their counterparts enrolled at high density schools in 2007.

Table 17. Percentage of AI/AN students in NAEP mathematics, by grade, school density, and selected school and student characteristics: 2007

School/student characteristics	Grade 4		Grade 8	
	High density	Low density	High density	Low density
School location				
City	2*	31	2*	29
Suburb	1*	24	1*	23
Town	23	19	20	21
Rural	74*	26	77*	26
Eligible for free/reduced-price lunch	81*	54	80*	47
Students with disabilities	12*	15	11	13
English language learners	17*	3	16*	2

\* Significantly different ( $p < .05$ ) from AI/AN students attending low density schools.  
 NOTE: AI/AN = American Indian/Alaska Native. School density indicates the proportion of AI/AN students enrolled. High density schools have 25 percent or more AI/AN students. Low density schools have less than 25 percent. Detail may not sum to totals because of rounding.  
 SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

Figure 33. Average scores in NAEP mathematics for AI/AN students, by grade and school density: 2005 and 2007



\* Significantly different ( $p < .05$ ) from 2007.  
 NOTE: AI/AN = American Indian/Alaska Native. School density indicates the proportion of AI/AN students enrolled. High density schools have 25 percent or more AI/AN students. Low density schools have less than 25 percent.  
 SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 and 2007 National Indian Education Studies.

# AI/AN students in public schools score higher than their peers in BIE schools

Tables 18-A and 18-B show a brief profile of AI/AN fourth- and eighth-graders who attended public and BIE schools and were assessed in NAEP mathematics. While 87 to 89 percent of AI/AN students attended public schools, 6 to 7 percent of AI/AN students attended BIE schools. Ninety-three percent of AI/AN students enrolled

in BIE schools attended schools in rural locations, and ninety-four percent were eligible for free/reduced-price school lunch. AI/AN students who attended public schools had higher average mathematics scores than their AI/AN peers attending BIE schools at both grades.

Table 18-A. Percentage of AI/AN students and average scores in NAEP mathematics, by grade and type of school: 2007

Type of school	Grade 4		Grade 8	
	Percentage	Average score	Percentage	Average score
Public	89	229	87	265
BIE	7*	207*	6*	244*

\* Significantly different ( $p < .05$ ) from AI/AN students attending public schools.

NOTE: AI/AN = American Indian/Alaska Native. BIE = Bureau of Indian Education. The percentages do not sum to 100 because results are not shown for Department of Defense and private schools.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

Table 18-B. Percentage of AI/AN students and average scores in NAEP mathematics, by type of school, grade, and selected school and student characteristics: 2007

Grade and school/student characteristics	Public schools		BIE schools	
	Percentage	Average score	Percentage	Average score
<b>Grade 4</b>				
School location				
City	19	232	#	‡
Suburb	14	239	4*	‡
Town	23	230	2*	‡
Rural	43	225	93*	207*
Eligible for free/reduced-price lunch	66	223	94*	207*
Students with disabilities	14	210	13	186*
English language learners	8	204	29*	197*
<b>Grade 8</b>				
School location				
City	18	270	#	‡
Suburb	14	274	3*	‡
Town	23	263	4*	‡
Rural	45	262	93*	244*
Eligible for free/reduced-price lunch	60	258	94*	243*
Students with disabilities	12	235	15	216*
English language learners	8	238	20*	230*

# Rounds to zero.

‡ Reporting standards not met. Sample size was insufficient to permit a reliable estimate.

\* Significantly different ( $p < .05$ ) from AI/AN students attending public schools.

NOTE: AI/AN = American Indian/Alaska Native. BIE = Bureau of Indian Education. Results are not shown for Department of Defense and private schools. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

## State Mathematics Results

Results for 11 states with relatively large populations of American Indian/Alaska Native (AI/AN) students are reported for NIES 2007. The AI/AN student enrollment in these states represents more than 50 percent of the AI/AN student enrollment in the nation. NIES state-level data include results from AI/AN students who attended public and BIE schools. The national AI/AN sample referenced as a point of comparison to these state results was also made up of public and BIE school students only.

In examining the results for the selected states, the variations in educational contexts, such as different school types, demographic factors, and socioeconomic factors, should be considered.





## School and student characteristics vary by state

The following two tables show the percentage of AI/AN students within each of the selected states by a variety of school and demographic categories including different school types and socioeconomic factors that should be considered when interpreting the results. The data in these two tables provide a snapshot of the diverse settings represented by the selected states.

For example, at grades 4 and 8, in four of the states (Arizona, New Mexico, North Dakota, and South Dakota) at least 17 percent of AI/AN students attended BIE schools (table 19-A). In the other seven selected states, 6 percent or less of AI/AN students attended BIE schools.

Table 19-A. Percentage of AI/AN students assessed in NAEP mathematics, by various school characteristics, grade, and selected states: 2007

Grade and state	Type of school		School location				School density	
	Public	BIE	City	Suburb	Town	Rural	High	Low
<b>Grade 4</b>								
<b>Nation</b>	92	8	18	14	21	47	44	56
Alaska	100	#	23*	2*	15	59*	68*	32*
Arizona	75*	25*	23	4*	10	63*	68*	32*
Minnesota	97*	3*	15	21	18	46	31	69
Montana	100	#	14	1*	23	62	73*	27*
New Mexico	71*	29*	17	5*	19	59	69*	31*
North Carolina	100	#	7*	5*	17	71	64*	36*
North Dakota	80*	20*	14	6*	12	68*	74*	26*
Oklahoma	100	#	10*	8*	36*	46	58*	42*
Oregon	100	#	22	#	39*	39	15*	85*
South Dakota	72*	28*	13	1	8*	77*	81*	19*
Washington	94	6	20	32*	15	33*	25*	75*
<b>Grade 8</b>								
<b>Nation</b>	93	7	17	14	22	48	43	57
Alaska	100	#	20	2	14*	65*	60*	40*
Arizona	83*	17*	18	7	15	60	71*	29*
Minnesota	97*	3*	11	7	31	50	25*	75*
Montana	99*	1*	13	2*	23	63*	63*	37*
New Mexico	80*	20*	10*	4*	10*	76*	78*	22*
North Carolina	100	#	10	#	35	55	60*	40
North Dakota	72*	28*	10*	5*	14*	71*	70*	30*
Oklahoma	99*	1*	6*	11	32*	50	67*	33*
Oregon	100	#	26	9	42*	23*	13*	87*
South Dakota	63*	37*	13	#	9*	78*	78*	22*
Washington	95	5	21	43*	13*	24*	16*	84*

# Rounds to zero.

\* Significantly different ( $p < .05$ ) from AI/AN students in the nation.

NOTE: AI/AN = American Indian/Alaska Native. BIE = Bureau of Indian Education. School density indicates the proportion of AI/AN students enrolled. High density schools have 25 percent or more AI/AN students. Low density schools have less than 25 percent. The percentages under the type of school category may not sum to 100 because results are not shown for Department of Defense and private schools. The percentages under the school location and school density categories may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.



In most of the selected states at both grades, more than 50 percent of AI/AN students attended rural schools. In comparison to the national percentage, most of the selected states had higher percentages of AI/AN students at both grades attending high density schools.

The percentages of AI/AN students eligible for free school lunch ranged from 45 percent in grade 8 in

Oregon to 91 percent in grade 4 in South Dakota (table 19-B). The percentages of grade 4 AI/AN students identified as English language learners ranged from 1 percent (Minnesota, Oklahoma, and Washington) to 38 percent (New Mexico). At grade 8, the percentages of AI/AN students identified as English language learners ranged from 2 percent (Washington) to 37 percent (Alaska).

Table 19-B. Percentage of AI/AN students assessed in NAEP mathematics, by various student characteristics, grade, and selected states: 2007

Grade and state	Eligibility for National School Lunch Program			Students with disabilities	English language learners
	Eligible for free lunch	Eligible for reduced-price lunch	Not eligible		
<b>Grade 4</b>					
<b>Nation</b>	60	8	32	14	9
Alaska	62	6	30	17	28*
Arizona	74*	10	15*	12	21*
Minnesota	62	#	38	16	1*
Montana	77*	8	15*	12	24*
New Mexico	88*	1*	12*	9*	38*
North Carolina	56	9	35	16	#
North Dakota	86*	2*	11*	19	7
Oklahoma	52*	11*	37*	12	1*
Oregon	55	12	32	20	6
South Dakota	91*	1*	8*	16	14*
Washington	52	3	45*	17	1*
<b>Grade 8</b>					
<b>Nation</b>	56	7	36	13	9
Alaska	60	4*	36	14	37*
Arizona	70*	6	23*	10	12
Minnesota	54	#	46	25	#
Montana	59	10	31	16	32*
New Mexico	83*	1*	16*	11	35*
North Carolina	60	11	29	21	#
North Dakota	82*	3*	15*	17	14
Oklahoma	52	10*	38	9	3*
Oregon	45	14	41	14	5
South Dakota	83*	2*	16*	14	6*
Washington	55	#	43	12	2*

# Rounds to zero.

\* Significantly different ( $p < .05$ ) from AI/AN students in the nation.

NOTE: AI/AN = American Indian/Alaska Native. The percentages under the eligibility for National School Lunch Program category may not sum to 100 percent because results are not shown for students whose eligibility status was not available.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.




# AI/AN fourth-graders in Oklahoma and Minnesota score higher than AI/AN peers in the nation

At grade 4, AI/AN students in Oklahoma and Minnesota had higher average scores than their peers in the nation, while AI/AN students in 6 out of the 11 selected states had scores that were lower. Figure 34 shows the average mathematics scores for grade 4 AI/AN students from the selected states and the nation.

Figure 35 shows achievement-level results for the selected states. The percentages of AI/AN students performing at or above the *Basic* level ranged from 51 percent in Arizona to 80 percent in Oklahoma.

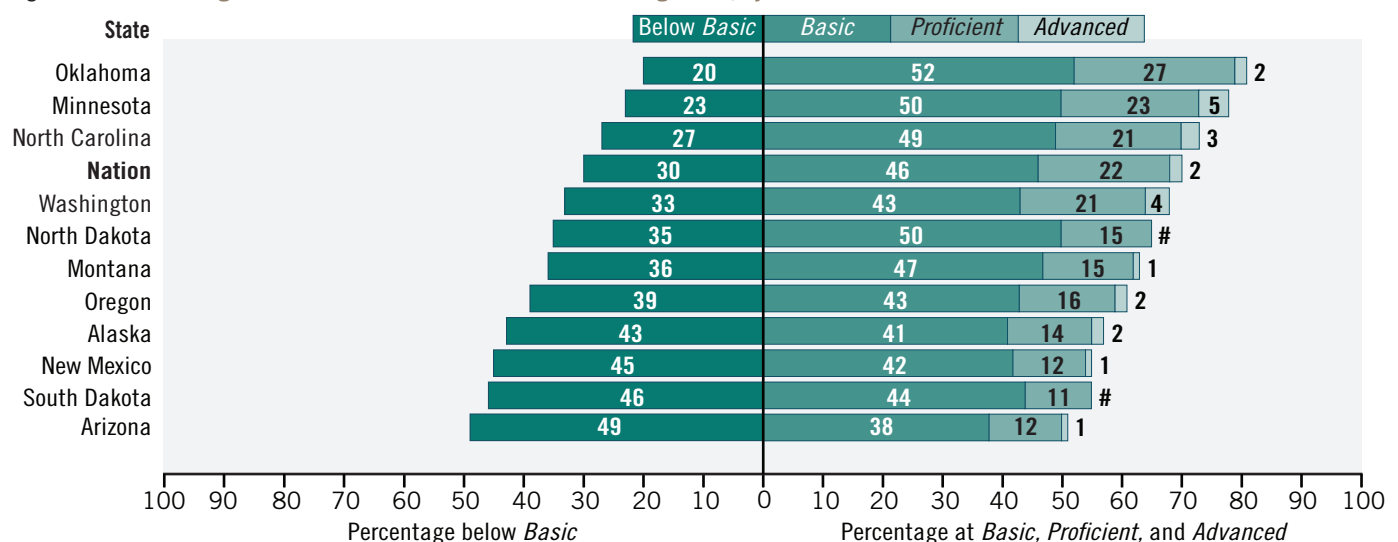
Figure 34. Cross-state comparison of average scores in NAEP mathematics for AI/AN students at grade 4: 2007

Jurisdiction (Average score)	Nation	Other 39 states <sup>1</sup>	Oklahoma	Minnesota	North Carolina	Washington	North Dakota	Montana	Oregon	Alaska	New Mexico	South Dakota	Arizona
Nation (228)		▼	▼	▼			▲	▲		▲	▲	▲	▲
Other 39 states <sup>1</sup> (235)	▲						▲	▲	▲	▲	▲	▲	▲
Oklahoma (234)	▲						▲	▲	▲	▲	▲	▲	▲
Minnesota (234)	▲						▲	▲	▲	▲	▲	▲	▲
North Carolina (229)										▲	▲	▲	▲
Washington (226)											▲	▲	▲
North Dakota (223)	▼	▼	▼	▼								▲	▲
Montana (222)	▼	▼	▼	▼								▲	▲
Oregon (220)		▼	▼	▼									
Alaska (218)	▼	▼	▼	▼	▼								
New Mexico (217)	▼	▼	▼	▼	▼	▼							
South Dakota (215)	▼	▼	▼	▼	▼	▼	▼	▼					
Arizona (213)	▼	▼	▼	▼	▼	▼	▼	▼					

-  The jurisdiction had a higher average score than the jurisdiction listed at the top of the column.
-  No statistically significant difference detected from the jurisdiction listed at the top of the column.
-  The jurisdiction had a lower average score than the jurisdiction listed at the top of the column.

<sup>1</sup> The "other 39 states" category includes all states not shown and the District of Columbia. NOTE: AI/AN = American Indian/Alaska Native. Read across the row corresponding to a jurisdiction listed to the left of the chart. Match the shading intensity (and arrow direction) to the chart's key to determine whether the average score for students in this jurisdiction was found to be higher than (up arrow), not significantly different from (blank cell), or lower than (down arrow) the average score for students in the jurisdiction in the column heading. SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

Figure 35. Percentage of AI/AN students in NAEP mathematics at grade 4, by achievement level and selected states: 2007



# Rounds to zero.

NOTE: AI/AN = American Indian/Alaska Native. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

# AI/AN eighth-graders in Oklahoma score higher than AI/AN peers in the nation

Compared to AI/AN grade 8 students in the nation, AI/AN students in Oklahoma had higher average scores, and their AI/AN peers in Arizona, South Dakota, and New Mexico had lower average scores (figure 36). The average scores of AI/AN eighth-graders in the other seven selected states were not significantly different from the scores of AI/AN students in the nation.

Figure 37 shows achievement-level results for the selected states. The percentages of AI/AN students performing at or above the *Basic* level ranged from 37 percent in New Mexico to 60 percent in Oklahoma.

Figure 36. Cross-state comparison of average scores in NAEP mathematics for AI/AN students at grade 8: 2007

Jurisdiction (Average score)	Nation	Other 39 states <sup>1</sup>	Oklahoma	Minnesota	Washington	Oregon	North Carolina	Alaska	North Dakota	Montana	Arizona	South Dakota	New Mexico
Nation (264)		▼	▼								▲	▲	▲
Other 39 states <sup>1</sup> (270)	▲							▲	▲	▲	▲	▲	▲
Oklahoma (269)	▲							▲	▲		▲	▲	▲
Minnesota (266)													▲
Washington (264)													▲
Oregon (264)													▲
North Carolina (261)													
Alaska (260)		▼	▼										▲
North Dakota (260)		▼	▼										▲
Montana (260)		▼											▲
Arizona (255)	▼	▼	▼										
South Dakota (254)	▼	▼	▼										
New Mexico (250)	▼	▼	▼	▼	▼	▼		▼	▼	▼			

<sup>1</sup> The "other 39 states" category includes all states not shown and the District of Columbia. NOTE: AI/AN = American Indian/Alaska Native. Read across the row corresponding to a jurisdiction listed to the left of the chart. Match the shading intensity (and arrow direction) to the chart's key to determine whether the average score for students in this jurisdiction was found to be higher than (up arrow), not significantly different from (blank cell), or lower than (down arrow) the average score for students in the jurisdiction in the column heading. SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.




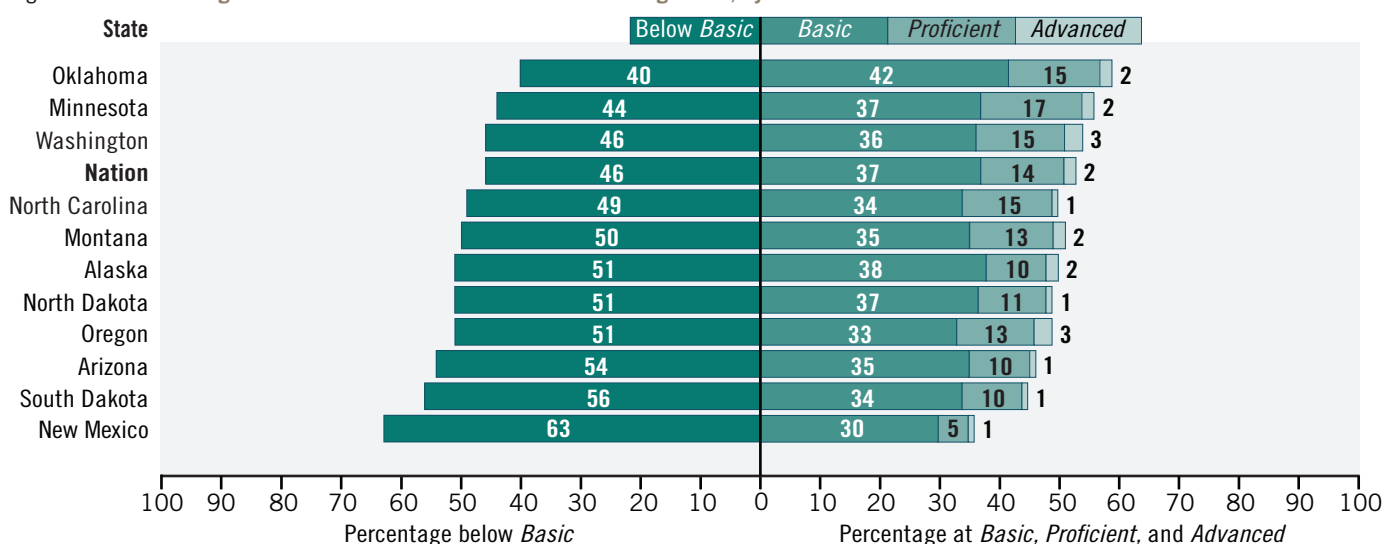
-  The jurisdiction had a higher average score than the jurisdiction listed at the top of the column.
-  No statistically significant difference detected from the jurisdiction listed at the top of the column.
-  The jurisdiction had a lower average score than the jurisdiction listed at the top of the column.

Figure 37. Percentage of AI/AN students in NAEP mathematics at grade 8, by achievement level and selected states: 2007



NOTE: AI/AN = American Indian/Alaska Native. Detail may not sum to totals because of rounding. SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

# Regional Mathematics Results

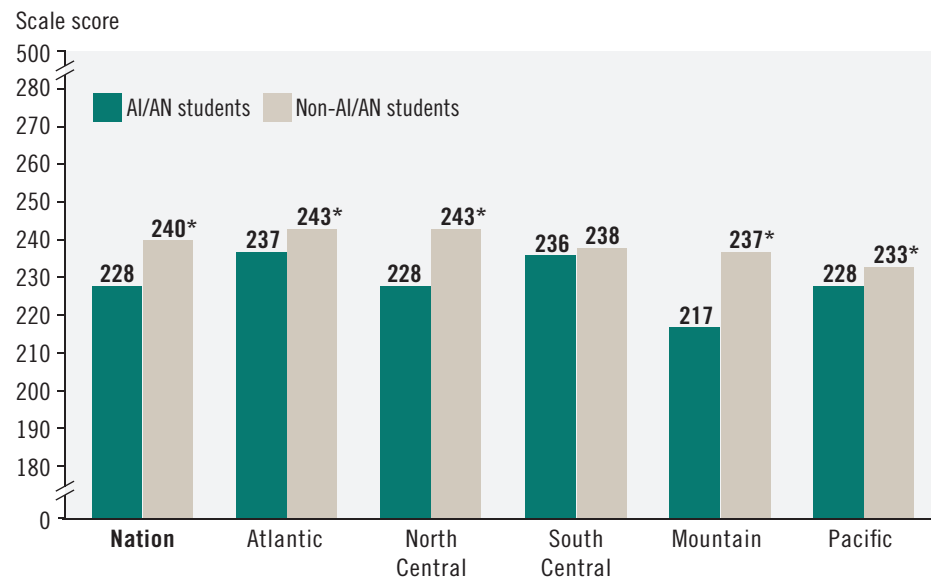
Mathematics results are also reported for the five NIES-defined regions: Atlantic, North Central, South Central, Mountain, and Pacific. These regions, which differ from the typical regions used in other NAEP reports, are based on U.S. Census divisions and are configured to align with the overall distribution of the American Indian/Alaska Native student population. The regional results are based on samples from students enrolled in all types of schools (public, private, BIE, and Department of Defense) and reflect the combined samples from all of the states within each region.

## AI/AN results vary across regions

At grade 4, AI/AN students scored lower on average than non-AI/AN students in each of the regions except for South Central (figure 38). The score difference between non-AI/AN and AI/AN students was 12 points at the national level. The score differences in the regions ranged from 2 points (not statistically significant) in the South Central region to 20 points in the Mountain region.

Approximately 74 percent of the grade 4 AI/AN students assessed in mathematics attended schools in the South Central, Mountain, and Pacific regions combined (table 20).

Figure 38. Average scores in NAEP mathematics at grade 4, by region and student group: 2007



\* Significantly different ( $p < .05$ ) from AI/AN students in the same region.

NOTE: AI/AN = American Indian/Alaska Native.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

Table 20. Percentage of AI/AN and non-AI/AN students assessed in NAEP mathematics at grade 4, by region: 2007

Region	AI/AN students	Non-AI/AN students
Atlantic	9	36*
North Central	17	22*
South Central	28	19*
Mountain	28	7*
Pacific	18	17

\* Significantly different ( $p < .05$ ) from AI/AN students.

NOTE: AI/AN = American Indian/Alaska Native. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

With the exception of the Atlantic region (in which there was no significant difference in average scores), AI/AN eighth-graders in each of the regions had lower average scores than non-AI/AN students (figure 39). At the national level, the score difference between non-AI/AN and AI/AN eighth-graders was 18 points. The difference in average scores within the regions ranged from 7 points (not statistically significant) in the Atlantic region to 26 points in the Mountain region.

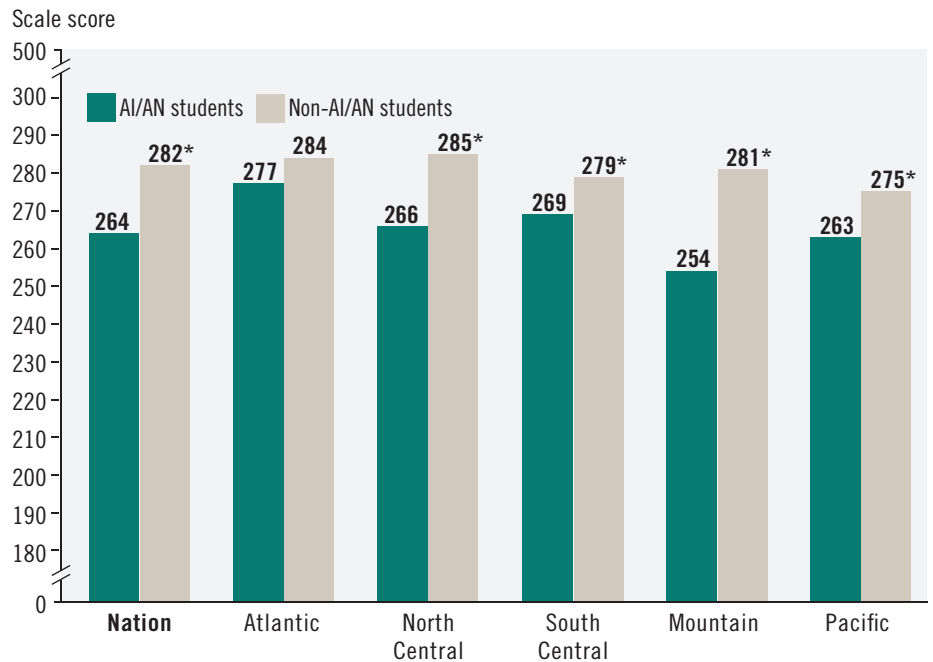
Approximately 74 percent of the grade 8 AI/AN students assessed in mathematics attended schools in the South Central, Mountain, and Pacific regions combined (table 21).

Table 21. **Percentage of AI/AN and non-AI/AN students assessed in NAEP mathematics at grade 8, by region: 2007**

Region	AI/AN students	Non-AI/AN students
Atlantic	10	37*
North Central	16	22*
South Central	23	17*
Mountain	31	7*
Pacific	20	17

\* Significantly different ( $p < .05$ ) from AI/AN students.  
 NOTE: AI/AN = American Indian/Alaska Native. Detail may not sum to totals because of rounding.  
 SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

Figure 39. **Average scores in NAEP mathematics at grade 8, by region and student group: 2007**



\* Significantly different ( $p < .05$ ) from AI/AN students in the same region.

NOTE: AI/AN = American Indian/Alaska Native.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 National Indian Education Study.

