Chapter 8
State Indicators

Financial Research and Development Inputs

R&D Outputs

Science and Technology in the Economy

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Introduction

Chapter Overview

In response to increasing interest in both the policy and research communities about the role of science and technology (S&T) in state and regional economic development, a new experimental chapter devoted to the subject was introduced in the 2004 edition of *Science and Engineering Indicators*. This chapter has been expanded in the 2006 edition from the original 24 state indicators to 42.

The chapter focuses on the performance of individual states, the District of Columbia, and Puerto Rico. Although data for Puerto Rico are reported whenever available, they frequently were collected by a different source, making it unclear whether the methodology used for data collection and analysis is comparable with that used for the states. For this reason, Puerto Rico was neither ranked with the states nor assigned a quartile value that could be displayed on the maps. Including data for U.S. territories and protectorates, such as American Samoa, Guam, Northern Mariana Islands, and Virgin Islands, was considered; however, data for these areas were available only on a sporadic basis and for fewer than one-quarter of the indicators, so they were not included.

These indicators are designed to present information about various aspects of state S&T infrastructure and to stimulate discussion about appropriate uses of state-level S&T indicators. The data used to calculate the indicators were gathered from both public and private sources. Whenever possible, data covering a 10-year span are provided to identify meaningful trends. However, because consistent data were not always available for the 10-year period, data for certain indicators are given only for the years in which comparisons are appropriate.

Ready access to accurate and timely information is an important tool for formulating effective S&T policies at the state level. By studying the programs and performance of their peers, state policymakers may be able to better assess and enhance their own programs and performance. The tables are intended to give the user a convenient listing of some of the quantitative data that may be relevant to technology-based economic development. In addition to describing the behavior of an indicator, the "Findings" section frequently presents an interpretation of the behavior's relevance and meaning. The interpretation is sometimes speculative, with the objective of motivating further thought and discussion.

Types of Indicators

Forty-two indicators are included in this chapter and grouped into the following areas:

- Elementary and secondary education
- Higher education
- Workforce
- Financial research and development inputs
- Research and development outputs
- S&T in the economy

The first two areas address state educational attainment. In this edition of *Indicators*, emphasis has been increased on the science and mathematics skills students develop at the elementary and middle school levels. Student achievement is expressed in terms of performance, which refers to the average state score on a standardized test, and proficiency, which is expressed as the percentage of students who have achieved at least the expected level of competence on the standardized test. Other indicators in educational attainment focus on state spending, student costs, and undergraduate and graduate degrees in science and engineering.

Workforce indicators focus on the level of S&E training in the employed labor force. These indicators reflect the higher education level of the labor force and the degree of specialization in S&E disciplines and occupations.

Financial indicators address the sources and level of funding for R&D. They show how much R&D is being performed relative to the size of a state's business base. Comparison of these indicators illustrates the extent to which R&D is conducted by industrial or academic performers.

The final two sections provide measures of outputs. The first focuses on the work products of the academic community and includes the production of new doctorate holders, the publication of academic articles, and patent activity both from the academic community and from all sources in the state.

The second section of output indicators examines the robustness of a region's S&T activity. These indicators include venture capital activity, Small Business Innovation Research awards, and high-technology business activity. Although data that adequately address both the quantity and quality of R&D results are difficult to find, these indicators offer a reasonable information base.

Data Sources and Considerations

Raw data for each indicator are presented in the tables. The first entry in each table represents the average value for the states. For most indicators, the state average was calculated by summing the values for the 50 states and the District of Columbia for both the numerator and the denominator and then dividing the two. Any alternate approach is indicated in the notes at the bottom of the table.

The values for most indicators are expressed as ratios or percentages to remove the effect of state size and facilitate comparison between large and small states or heavily and sparsely populated states. For example, an indicator of higher education achievement is not defined as the absolute number of degrees conferred in a state because sparsely populated states are neither likely to have nor need as extensive a higher education system as states with larger populations. Instead, the indicator is defined as the number of degrees per number of residents in the college-age cohort, which measures the intensity of educational services relative to the size of the resident population.

No official list of high-technology industries or sanctioned methodology to identify the most technology-intensive industries exists in the United States. The definition used here was developed by the U.S. Department of Commerce's Technology Administration in concert with the U.S. Department of Labor's Bureau of Labor Statistics. See "Technical Note: Defining High-Technology Industries."

Key Elements for Indicators

Six key elements are provided for each indicator. The first element is a map that is color-coded to show in which quartile each state placed on that indicator for the latest year that data are available. This helps the reader quickly grasp geographic trends. The sample map below shows the outline of each state. On the indicator maps, the darkest color indicates states ranking in the first or highest quartile, and white indicates states ranking in the fourth or lowest quartile. Cross-hatching indicates states for which no data are available.

The second element is a quartiles table. States are listed alphabetically by quartile. The range of indicator values for that quartile is shown at the top of the column. Ties at quartile breaks were resolved by moving the tied states into one quartile. All of the indicators are broad measures, and several rely on sample estimates that have a margin of error. Small differences in state values generally carry little useful information.

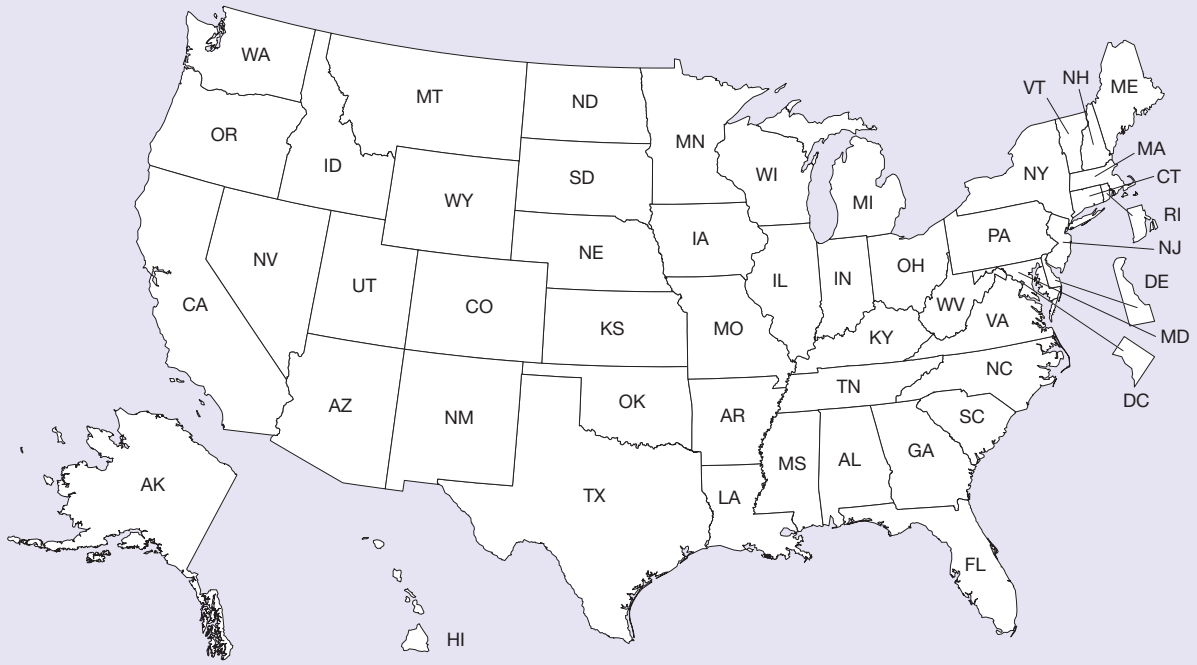
The third element, at the bottom of the map box, is a short citation for the data source. The full citation appears under the table on the facing page.

The fourth element, in a shaded box on the lower left side of the page, is a summary of findings that includes the national average and comments on trends and patterns for the particular indicator. Although most of the findings are directly related to the data, some represent interpretations that are meant to stimulate further investigation and discussion.

The fifth element, on the lower right side of the page, is a description of the indicator, a brief note about the nature of the data, and other information pertaining to the data.

The final element is the data table that appears on the facing page. Up to 3 years of data and the calculated values of the indicator are presented for each state, the District of Columbia, and Puerto Rico. Puerto Rico is included in the data table only when data are available.

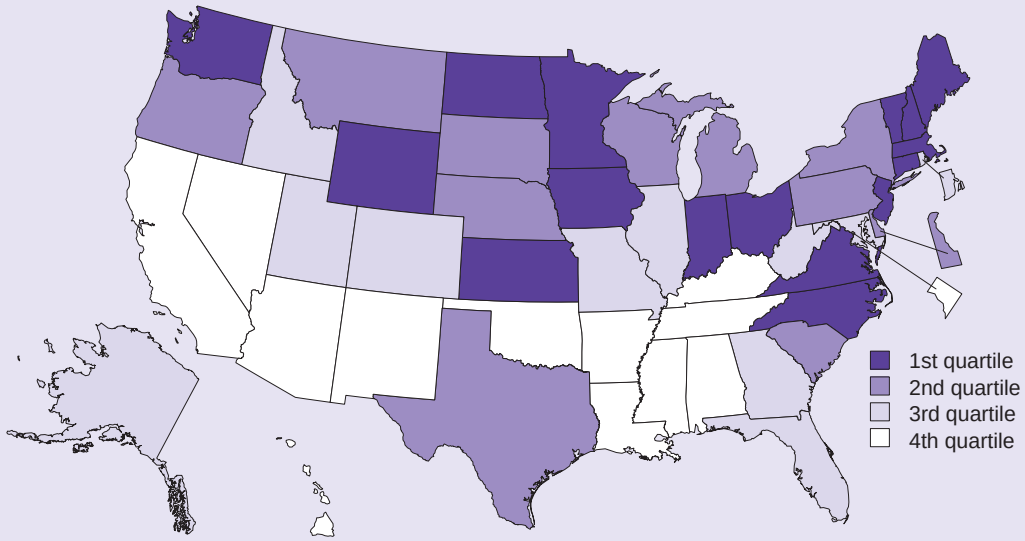
U.S. Map and List of Abbreviations



AK	Alaska	HI	Hawaii	ME	Maine	NJ	New Jersey	SD	South Dakota
AL	Alabama	IA	Iowa	MI	Michigan	NM	New Mexico	TN	Tennessee
AR	Arkansas	ID	Idaho	MN	Minnesota	NV	Nevada	TX	Texas
AZ	Arizona	IL	Illinois	MO	Missouri	NY	New York	UT	Utah
CA	California	IN	Indiana	MS	Mississippi	OH	Ohio	VA	Virginia
CO	Colorado	KS	Kansas	MT	Montana	OK	Oklahoma	VT	Vermont
CT	Connecticut	KY	Kentucky	NC	North Carolina	OR	Oregon	WA	Washington
DC	District of Columbia	LA	Louisiana	ND	North Dakota	PA	Pennsylvania	WI	Wisconsin
DE	Delaware	MA	Massachusetts	NE	Nebraska	RI	Rhode Island	WV	West Virginia
FL	Florida	MD	Maryland	NH	New Hampshire	SC	South Carolina	WY	Wyoming
GA	Georgia								

Fourth Grade Mathematics Performance

Figure 8-1
Fourth grade mathematics performance: 2003



1st quartile (243–238)	2nd quartile (237–236)	3rd quartile (235–230)	4th quartile (229–205)
Connecticut	Delaware	Alaska	Alabama
Indiana	Michigan	Colorado	Arizona
Iowa	Montana	Florida	Arkansas
Kansas	Nebraska	Georgia	California
Maine	New York	Idaho	District of Columbia
Massachusetts	Oregon	Illinois	Hawaii
Minnesota	Pennsylvania	Maryland	Kentucky
New Hampshire	South Carolina	Missouri	Louisiana
New Jersey	South Dakota	Rhode Island	Mississippi
North Carolina	Texas	Utah	Nevada
North Dakota	Wisconsin	West Virginia	New Mexico
Ohio			Oklahoma
Vermont			Tennessee
Virginia			
Washington			
Wyoming			

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress. See table 8-1.

Findings

- Nationwide, fourth grade students in public schools showed improvement in mathematics mastery as average scale scores for testing with accommodations rose from 222 in 1996 and 224 in 2000 to 234 in 2003.
- Within the limits of statistical significance, 24 states exceeded the 2003 national average mathematics score, 11 had average scores, and 15 fell below the national average.
- All states for which 2000 and 2003 mathematics scores were obtained showed increases in 2003 when the results of testing with accommodations were compared.
- Gains in scores between 2000 and 2003 were detected throughout the entire student sample at all levels of performance.

Mathematics achievement at the fourth grade level lays the foundation for future mathematics education. The National Assessment of Educational Progress (NAEP) is a federally authorized ongoing assessment of student performance in various subjects on a state and national scale. All 50 states and the District of Columbia participated in the 2003 assessment of fourth grade achievement in mathematics. This indicator reports the average score in mathematics for fourth grade students in public schools across each state.

National and state results are reported for only public school students. Beginning in 2002, NAEP obtained the national sample by aggregating the samples from each state rather than by selecting an independent national sample. In 1996, NAEP started permitting students with disabilities or limited English proficiency to use certain accommodations (e.g., extended time, small-group testing). National data with and without accommodations were published beginning in 1996, but state-level data with accommodations were not published until 2000. In math, only accommodations-permitted data are available at the state level for 2003. These data are not comparable with data from students who were not permitted accommodations.

Student performance is described in terms of average scores on a scale from 0 to 500.

Table 8-1
Fourth grade mathematics performance, by state: 1996, 2000, and 2003
(Score)

State	1996[a]	2000[a]	2000	2003
National average	222	226	224	234
Alabama	212	218	217	223
Alaska	224	NA	NA	233
Arizona	218	219	219	229
Arkansas	216	217	216	229
California	209	214	213	227
Colorado	226	NA	NA	235
Connecticut	232	234	234	241
Delaware	215	NA	NA	236
District of Columbia	187	193	192	205
Florida	216	NA	NA	234
Georgia	215	220	219	230
Hawaii	215	216	216	227
Idaho	NA	227	224	235
Illinois	NA	225	223	233
Indiana	229	234	233	238
Iowa	229	233	231	238
Kansas	NA	232	232	242
Kentucky	220	221	219	229
Louisiana	209	218	218	226
Maine	232	231	230	238
Maryland	221	222	222	233
Massachusetts	229	235	233	242
Michigan	226	231	229	236
Minnesota	232	235	234	242
Mississippi	208	211	211	223
Missouri	225	229	228	235
Montana	228	230	228	236
Nebraska	228	226	225	236
Nevada	218	220	220	228
New Hampshire	NA	NA	NA	243
New Jersey	227	NA	NA	239
New Mexico	214	214	213	223
New York	223	227	225	236
North Carolina	224	232	230	242
North Dakota	231	231	230	238
Ohio	NA	231	230	238
Oklahoma	NA	225	224	229
Oregon	223	227	224	236
Pennsylvania	226	NA	NA	236
Rhode Island	220	225	224	230
South Carolina	213	220	220	236
South Dakota	NA	NA	NA	237
Tennessee	219	220	220	228
Texas	229	233	231	237
Utah	227	227	227	235
Vermont	225	232	232	242
Virginia	223	230	230	239
Washington	225	NA	NA	238
West Virginia	223	225	223	231
Wisconsin	231	NA	NA	237
Wyoming	223	229	229	241

NA = not available

[a]Accommodations not permitted.

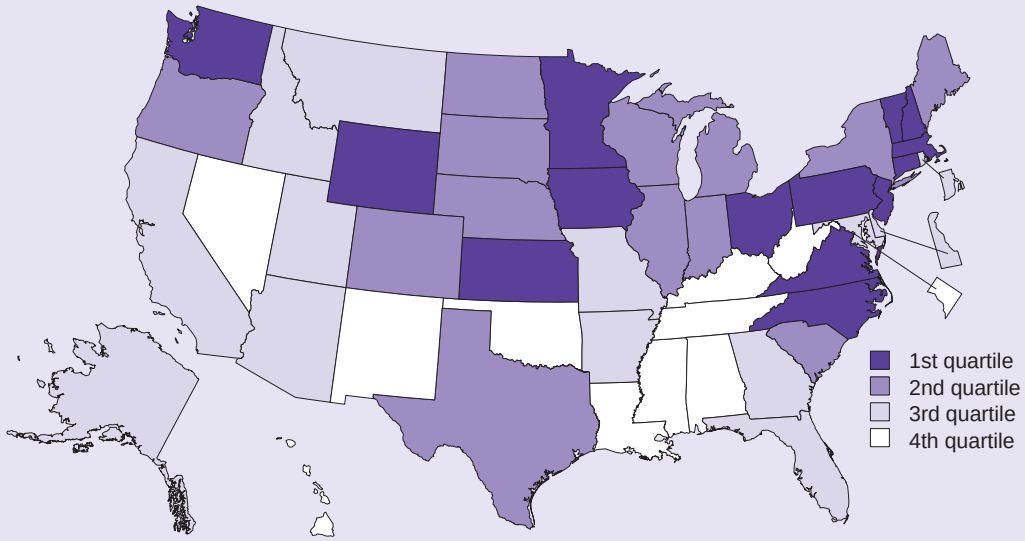
NOTES: National average is reported value in National Assessment of Educational Progress (NAEP) reports. NAEP grade 4 mathematics scores are for public schools only. Comparative performance results may be affected by changes in exclusion rates for students with disabilities and limited English proficiency students in NAEP samples. In addition to allowing for accommodations, the accommodations-permitted results for national public schools (2000 and 2003) differ slightly from previous years' results and from previously reported results for 2000 because of changes in sample weighting procedures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, various years.

Science and Engineering Indicators 2006

Fourth Grade Mathematics Proficiency

Figure 8-2
Fourth grade mathematics proficiency: 2003



1st quartile (43%–36%)	2nd quartile (35%–32%)	3rd quartile (31%–25%)	4th quartile (24%–7%)
Connecticut	Colorado	Alaska	Alabama
Iowa	Illinois	Arizona	District of Columbia
Kansas	Indiana	Arkansas	Hawaii
Massachusetts	Maine	California	Kentucky
Minnesota	Michigan	Delaware	Louisiana
New Hampshire	Nebraska	Florida	Mississippi
New Jersey	New York	Georgia	Nevada
North Carolina	North Dakota	Idaho	New Mexico
Ohio	Oregon	Maryland	Oklahoma
Pennsylvania	South Carolina	Missouri	Tennessee
Vermont	South Dakota	Montana	West Virginia
Virginia	Texas	Rhode Island	
Washington	Wisconsin	Utah	
Wyoming			

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress. See table 8-2.

Findings

- In 2003, the nationwide percentage of fourth grade public school students who performed at or above the proficient level in mathematics was 31%, which represented a significant increase from 22% in 2000 and 19% in 1996 based on testing with accommodations.
- The proportion of fourth graders reaching the proficient achievement level was 43% for whites, 10% for blacks, 16% for Hispanics, 48% for Asians/Pacific Islanders, and 17% for American Indians/Alaska Natives.
- Gender differences in mathematics proficiency were observed among fourth grade students; 34% of males reached the proficient level compared with 29% of females.

This indicator provides a measure of the extent to which a state's fourth grade students in public schools have achieved proficiency in mathematics. High values show that a high percentage of a state's fourth graders have demonstrated a solid foundation for adult mathematics competency. Such competency is an important characteristic of a state's future workforce.

Proficiency in mathematics is based on achievement level in the National Assessment of Educational Progress (NAEP) 2003 Mathematics Assessment. Achievement levels represent performance standards set by the National Assessment Governing Board to provide a context for interpreting student performance on NAEP.

The basic level (scores of 214–248) denotes partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at the fourth grade level. The proficient level (249–281) represents solid academic performance at the fourth grade level. Students who reach this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter. The advanced level (282–500) signifies superior performance. Approximately 190,100 fourth grade students participated in the NAEP assessment.

Table 8-2
Fourth grade mathematics proficiency, by state: 1996, 2000, and 2003
(Percent)

State	1996[a]	2000[a]	2000	2003
National average	20	25	22	31
Alabama	11	14	13	19
Alaska	21	NA	NA	30
Arizona	15	17	16	25
Arkansas	13	13	14	26
California	11	15	13	25
Colorado	22	NA	NA	34
Connecticut	31	32	31	41
Delaware	16	NA	NA	31
District of Columbia	5	6	5	7
Florida	15	NA	NA	31
Georgia	13	18	17	27
Hawaii	16	14	14	23
Idaho	NA	21	20	31
Illinois	NA	21	20	32
Indiana	24	31	30	35
Iowa	22	28	26	36
Kansas	NA	30	29	41
Kentucky	16	17	17	22
Louisiana	8	14	14	21
Maine	27	25	23	34
Maryland	22	22	21	31
Massachusetts	24	33	31	41
Michigan	23	29	28	34
Minnesota	29	34	33	42
Mississippi	8	9	9	17
Missouri	20	23	23	30
Montana	22	25	24	31
Nebraska	24	24	24	34
Nevada	14	16	16	23
New Hampshire	NA	NA	NA	43
New Jersey	25	NA	NA	39
New Mexico	13	12	12	17
New York	20	22	21	33
North Carolina	21	28	25	41
North Dakota	24	25	25	34
Ohio	NA	26	25	36
Oklahoma	NA	16	16	23
Oregon	21	23	23	33
Pennsylvania	20	NA	NA	36
Rhode Island	17	23	22	28
South Carolina	12	18	18	32
South Dakota	NA	NA	NA	34
Tennessee	17	18	18	24
Texas	25	27	25	33
Utah	23	24	23	31
Vermont	23	29	29	42
Virginia	19	25	24	36
Washington	21	NA	NA	36
West Virginia	19	18	17	24
Wisconsin	27	NA	NA	35
Wyoming	19	25	25	39

NA = not available

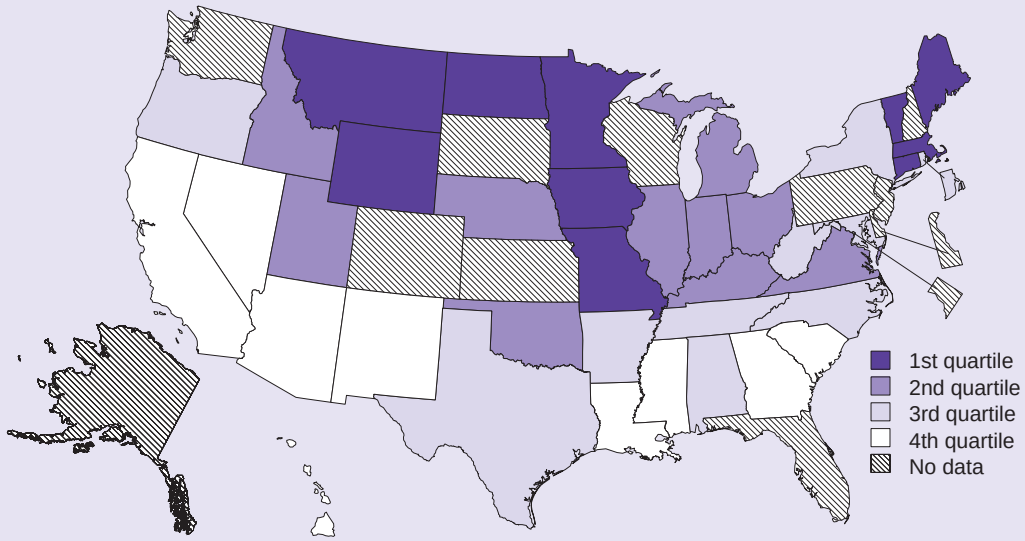
[a]Accommodations not permitted.

NOTES: National average is reported value in National Assessment of Educational Progress (NAEP) reports. NAEP grade 4 mathematics scores are for public schools only. Comparative performance results may be affected by changes in exclusion rates for students with disabilities and limited English proficiency students in NAEP samples. In addition to allowing for accommodations, accommodations-permitted results for national public schools (2000 and 2003) differ slightly from previous years' results and from previously reported results for 2000 because of changes in sample weighting procedures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, various years.

Fourth Grade Science Performance

Figure 8-3
Fourth grade science performance: 2000



1st quartile (161–156)	2nd quartile (155–150)	3rd quartile (149–143)	4th quartile (142–129)	No data
Connecticut	Idaho	Alabama	Arizona	Alaska
Iowa	Illinois	Arkansas	California	Colorado
Maine	Indiana	Maryland	Georgia	Delaware
Massachusetts	Kentucky	New York	Hawaii	District of Columbia
Minnesota	Michigan	North Carolina	Louisiana	Florida
Missouri	Nebraska	Oregon	Mississippi	Kansas
Montana	Ohio	Rhode Island	Nevada	New Hampshire
North Dakota	Oklahoma	Tennessee	New Mexico	New Jersey
Vermont	Utah	Texas	South Carolina	Pennsylvania
Wyoming	Virginia	West Virginia		South Dakota
				Washington
				Wisconsin

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress. See table 8-3.

Findings

- Nationally, fourth graders in public schools had an average score of 148 in both the 1996 and 2000 science assessments when accommodations were not permitted.
- State-level data are available only for 2000 when 11 states and the District of Columbia did not meet minimum participation guidelines.
- Within the limits of statistical significance, 18 states exceeded the 2000 national average science score, 11 had average scores, and 10 fell below the national average.
- Between the 1996 and 2000 assessments, the average scale scores for various percentiles of student performance remained unchanged.

Science achievement at the fourth grade level lays the foundation for future science education. The National Assessment of Educational Progress (NAEP) is a federally authorized ongoing assessment of student performance in various subjects on a state and national scale. State participation is optional. NAEP does not compute scores for states that do not meet the minimum guidelines for the percentage of students or schools participating. This indicator reports the average scores in science for fourth grade students in public schools across each state.

For the fourth grade, a national sample and separate state-by-state samples were used. Both national and state results are reported only for public school students. In 1996, NAEP started permitting students with disabilities or limited English proficiency to use certain accommodations (e.g., extended time, small-group testing). At grade 4, the accommodations-permitted average score was one point lower than the accommodations-not-permitted average score for national data in 2000. The differences in state-level data were not statistically significant.

The NAEP science scale ranges from 0 to 300.

Table 8-3
Fourth grade science performance, by state: 2000
(Score)

State	2000[a]	2000
National average	148	147
Alabama	143	143
Alaska	NA	NA
Arizona	141	140
Arkansas	144	145
California	131	129
Colorado	NA	NA
Connecticut	156	156
Delaware	NA	NA
District of Columbia	NA	NA
Florida	NA	NA
Georgia	143	142
Hawaii	136	136
Idaho	153	152
Illinois	151	150
Indiana	155	154
Iowa	160	159
Kansas	NA	NA
Kentucky	152	152
Louisiana	139	139
Maine	161	161
Maryland	146	145
Massachusetts	162	161
Michigan	154	152
Minnesota	157	157
Mississippi	133	133
Missouri	156	157
Montana	160	160
Nebraska	150	150
Nevada	142	142
New Hampshire	NA	NA
New Jersey	NA	NA
New Mexico	138	140
New York	149	148
North Carolina	148	147
North Dakota	160	160
Ohio	154	155
Oklahoma	152	151
Oregon	150	148
Pennsylvania	NA	NA
Rhode Island	148	148
South Carolina	141	140
South Dakota	NA	NA
Tennessee	147	145
Texas	147	145
Utah	155	154
Vermont	159	160
Virginia	156	155
Washington	NA	NA
West Virginia	150	149
Wisconsin	NA	NA
Wyoming	158	156

NA = not available (did not meet minimum participation guidelines)

[a]Accommodations not permitted.

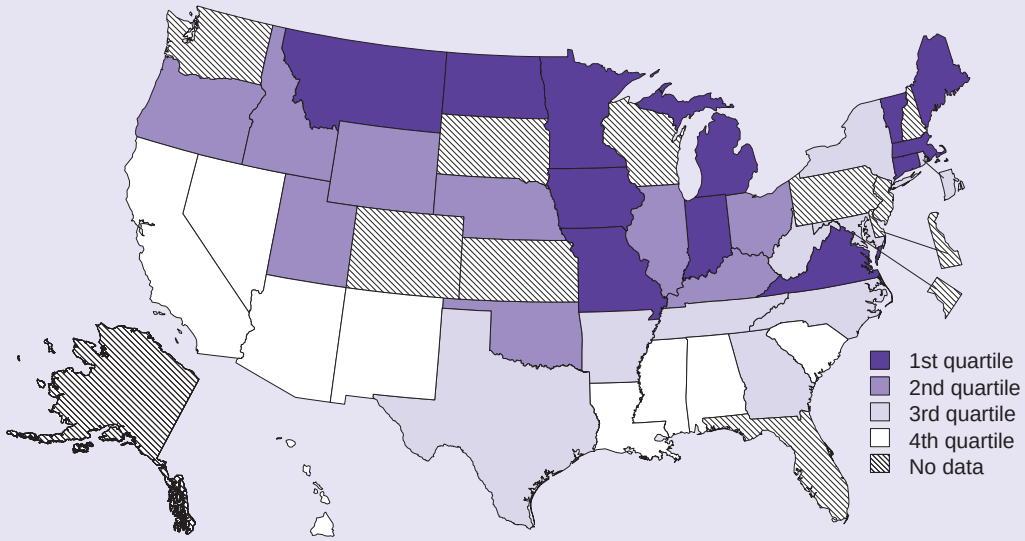
NOTES: National average is reported value in National Assessment of Educational Progress (NAEP) report. NAEP grade 4 science scores are for public schools only. California, Idaho, Illinois, Indiana, Iowa, Maine, Michigan, Minnesota, Montana, New York, Ohio, Oregon, and Vermont met minimum participation guidelines but did not meet one or more guidelines for school participation.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress.

Science and Engineering Indicators 2006

Fourth Grade Science Proficiency

Figure 8-4
Fourth grade science proficiency: 2000



1st quartile (42%–32%)	2nd quartile (31%–26%)	3rd quartile (25%–23%)	4th quartile (22%–13%)	No data
Connecticut	Idaho	Arkansas	Alabama	Alaska
Indiana	Illinois	Georgia	Arizona	Colorado
Iowa	Kentucky	Maryland	California	Delaware
Maine	Nebraska	New York	Hawaii	District of Columbia
Massachusetts	Ohio	North Carolina	Louisiana	Florida
Michigan	Oklahoma	Rhode Island	Mississippi	Kansas
Minnesota	Oregon	Tennessee	Nevada	New Hampshire
Missouri	Utah	Texas	New Mexico	New Jersey
Montana	Wyoming	West Virginia	South Carolina	Pennsylvania
North Dakota				South Dakota
Vermont				Washington
Virginia				Wisconsin

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress. See table 8-4.

Findings

- The nationwide percentage of fourth grade public school students who performed at or above the proficient level in science was 28% in 2000 and 27% in 1996 in testing without accommodations.
- The proportion of fourth graders reaching the proficient achievement level in science was 38% for whites, 7% for blacks, 11% for Hispanics, and 19% for American Indians/Alaska Natives in 2000. Data for Asians/Pacific Islanders were not reported.
- Gender differences in science proficiency were observed among fourth grade students; 33% of males reached the proficient level compared with 26% of females.

This indicator provides a measure of the extent to which a state's fourth grade students in public schools have achieved proficiency in science. High values show that a high percentage of a state's fourth grade students have demonstrated a solid foundation for adult science competency. Such competency is an important characteristic of a state's future workforce.

Proficiency in science is based on achievement level in the National Assessment of Educational Progress (NAEP) 2000 Science Assessment. Achievement levels represent performance standards set by the National Assessment Governing Board to provide a context for interpreting student performance on NAEP.

The basic level (138–169) denotes partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at the fourth grade level. The proficient level (170–204) represents solid academic performance at the fourth grade level. Students who reach this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter. The advanced level (205–300) signifies superior performance in science.

A National Academy of Sciences panel evaluated the process used to establish the achievement levels for the science assessment and urged that they be considered developmental and interpreted with caution.

Table 8-4
Fourth grade science proficiency, by state: 2000
(Percent)

State	2000[a]	2000
National average	28	27
Alabama	22	22
Alaska	NA	NA
Arizona	22	22
Arkansas	24	23
California	14	13
Colorado	NA	NA
Connecticut	35	35
Delaware	NA	NA
District of Columbia	NA	NA
Florida	NA	NA
Georgia	23	23
Hawaii	16	16
Idaho	30	29
Illinois	31	31
Indiana	32	32
Iowa	37	36
Kansas	NA	NA
Kentucky	29	28
Louisiana	19	18
Maine	38	37
Maryland	26	24
Massachusetts	43	42
Michigan	33	32
Minnesota	35	34
Mississippi	14	13
Missouri	35	34
Montana	37	36
Nebraska	26	26
Nevada	19	19
New Hampshire	NA	NA
New Jersey	NA	NA
New Mexico	18	17
New York	26	24
North Carolina	24	23
North Dakota	38	36
Ohio	31	31
Oklahoma	26	26
Oregon	28	27
Pennsylvania	NA	NA
Rhode Island	27	25
South Carolina	21	20
South Dakota	NA	NA
Tennessee	26	24
Texas	24	23
Utah	32	31
Vermont	39	38
Virginia	33	32
Washington	NA	NA
West Virginia	25	24
Wisconsin	NA	NA
Wyoming	33	31

NA = not available (did not meet minimum participation guidelines)

[a]Accommodations not permitted.

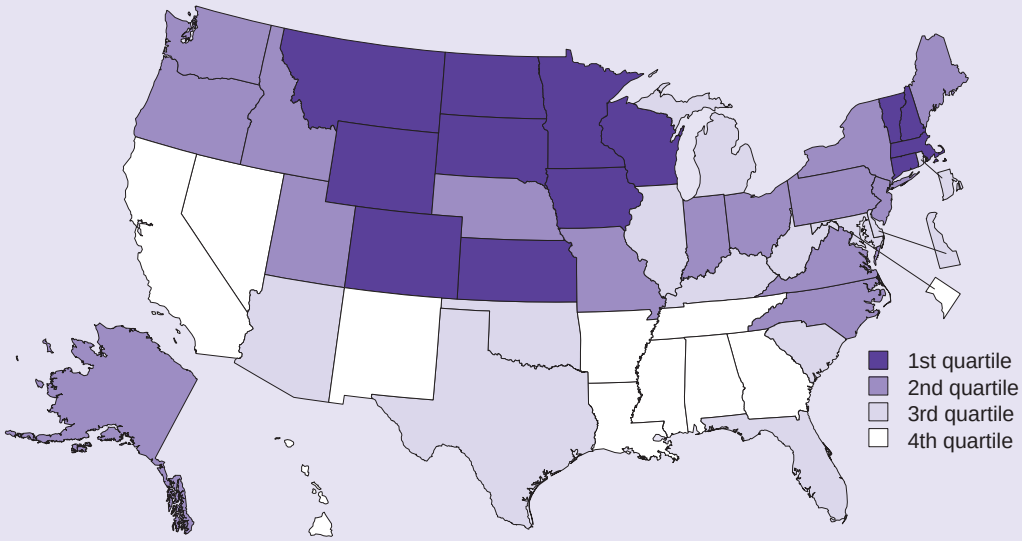
NOTES: National average is reported value in National Assessment of Educational Progress (NAEP) report. NAEP grade 4 science scores are for public schools only. California, Idaho, Illinois, Indiana, Iowa, Maine, Michigan, Minnesota, Montana, New York, Ohio, Oregon, and Vermont met minimum participation guidelines but did not meet one or more guidelines for school participation.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress.

Science and Engineering Indicators 2006

Eighth Grade Mathematics Performance

Figure 8-5
Eighth grade mathematics performance: 2003



1st quartile (291–283)	2nd quartile (282–279)	3rd quartile (278–271)	4th quartile (270–243)
Colorado	Alaska	Arizona	Alabama
Connecticut	Idaho	Delaware	Arkansas
Iowa	Indiana	Florida	California
Kansas	Maine	Illinois	District of Columbia
Massachusetts	Missouri	Kentucky	Georgia
Minnesota	Nebraska	Maryland	Hawaii
Montana	New Jersey	Michigan	Louisiana
New Hampshire	New York	Oklahoma	Mississippi
North Dakota	North Carolina	Rhode Island	Nevada
South Dakota	Ohio	South Carolina	New Mexico
Vermont	Oregon	Texas	Tennessee
Wisconsin	Pennsylvania	West Virginia	
Wyoming	Utah		
	Virginia		
	Washington		

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress. See table 8-5.

Findings

- Nationwide, eighth grade students in public schools showed increases in mathematics mastery as average scale scores for the accommodations-permitted sample rose from 269 in 1996 and 272 in 2000 to 276 in 2003.
- Within the limits of statistical significance, 28 states exceeded the 2003 national average mathematics score, 7 had average scores, and 15 fell below the national average.
- Gains in score between 2000 and 2003 occurred throughout the entire student sample at all levels of performance. They ranged from 3 scale points for students who performed at the 90th percentile to 7 scale points for students who performed at the 10th percentile.

Mathematics achievement at the eighth grade level indicates how prepared students are to undertake high school mathematics studies and acquire key skills needed for careers in science and technology. The National Assessment of Educational Progress (NAEP), a federally authorized ongoing assessment of student performance in various subjects on a state and national scale, assessed eighth grade achievement in mathematics in 2003. All 50 states participated.

National and state results are based on only public school students. Beginning in 2002, NAEP obtained the national sample by aggregating state samples rather than by selecting an independent national sample. Since 1996, NAEP permitted students with disabilities or limited English proficiency to use certain accommodations (e.g., extended time, small-group testing). National-level data with and without accommodations were published beginning in 1996, but state-level data with accommodations were not published until 2000. In math, only accommodations-permitted data are available at the state level for 2003. These data are not comparable with data from students who were not permitted accommodations.

Student performance is described in terms of average scores on a scale from 0 to 500.

Table 8-5
Eighth grade mathematics performance, by state: 1996, 2000, and 2003
(Score)

State	1996[a]	2000[a]	2000	2003
National average	271	274	272	276
Alabama	257	262	264	262
Alaska	278	NA	NA	279
Arizona	268	271	269	271
Arkansas	262	261	257	266
California	263	262	260	267
Colorado	276	NA	NA	283
Connecticut	280	282	281	284
Delaware	267	NA	NA	277
District of Columbia	233	234	235	243
Florida	264	NA	NA	271
Georgia	262	266	265	270
Hawaii	262	263	262	266
Idaho	NA	278	277	280
Illinois	NA	277	275	277
Indiana	276	283	281	281
Iowa	284	NA	NA	284
Kansas	NA	284	283	284
Kentucky	267	272	270	274
Louisiana	252	259	259	266
Maine	284	284	281	282
Maryland	270	276	272	278
Massachusetts	278	283	279	287
Michigan	277	278	277	276
Minnesota	284	288	287	291
Mississippi	250	254	254	261
Missouri	273	274	271	279
Montana	283	287	285	286
Nebraska	283	281	280	282
Nevada	NA	268	265	268
New Hampshire	NA	NA	NA	286
New Jersey	NA	NA	NA	281
New Mexico	262	260	259	263
New York	270	276	271	280
North Carolina	268	280	276	281
North Dakota	284	283	282	287
Ohio	NA	283	281	282
Oklahoma	NA	272	270	272
Oregon	276	281	280	281
Pennsylvania	NA	NA	NA	279
Rhode Island	269	273	269	272
South Carolina	261	266	265	277
South Dakota	NA	NA	NA	285
Tennessee	263	263	262	268
Texas	270	275	273	277
Utah	277	275	274	281
Vermont	279	283	281	286
Virginia	270	277	275	282
Washington	276	NA	NA	281
West Virginia	265	271	266	271
Wisconsin	283	NA	NA	284
Wyoming	275	277	276	284

NA = not available

[a]Accommodations not permitted.

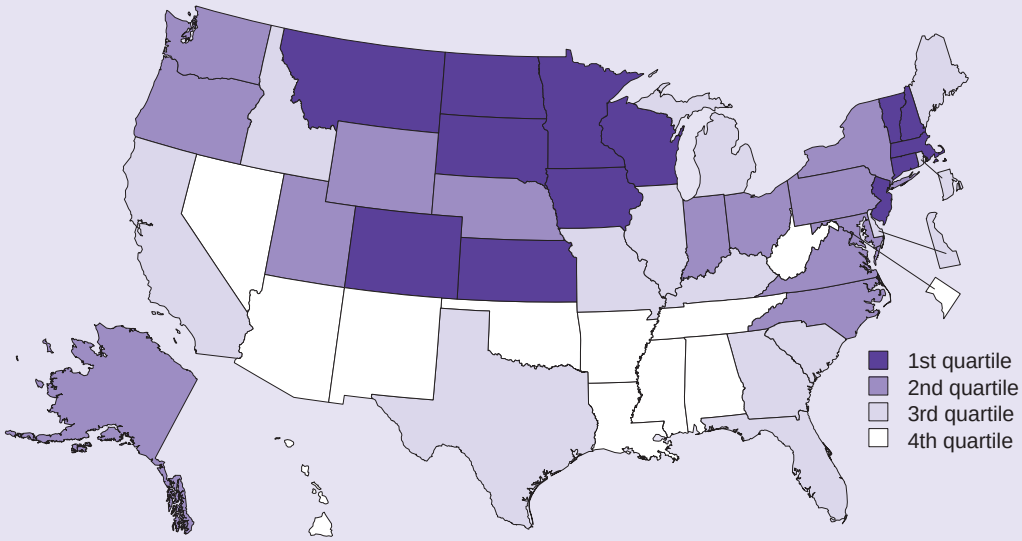
NOTES: National average is reported value in National Assessment of Educational Progress (NAEP) reports. NAEP grade 8 mathematics scores are for public schools only. Comparative performance results may be affected by changes in exclusion rates for students with disabilities and limited English proficiency students in NAEP samples. In addition to allowing for accommodations, accommodations-permitted results for national public schools (2000 and 2003) differ slightly from previous years' results and from previously reported results for 2000 because of changes in sample weighting procedures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, various years.

Science and Engineering Indicators 2006

Eighth Grade Mathematics Proficiency

Figure 8-6
Eighth grade mathematics proficiency: 2003



1st quartile (44%–33%)	2nd quartile (32%–30%)	3rd quartile (29%–22%)	4th quartile (21%–6%)
Colorado	Alaska	California	Alabama
Connecticut	Indiana	Delaware	Arizona
Iowa	Maryland	Florida	Arkansas
Kansas	Nebraska	Georgia	District of Columbia
Massachusetts	New York	Idaho	Hawaii
Minnesota	North Carolina	Illinois	Louisiana
Montana	Ohio	Kentucky	Mississippi
New Hampshire	Oregon	Maine	Nevada
New Jersey	Pennsylvania	Michigan	New Mexico
North Dakota	Utah	Missouri	Oklahoma
South Dakota	Virginia	Rhode Island	Tennessee
Vermont	Washington	South Carolina	West Virginia
Wisconsin	Wyoming	Texas	

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress. See table 8-6.

Findings

- In 2003, the nationwide percentage of eighth grade public school students who performed at or above the proficient level in mathematics was 27%, an increase from 25% in 2000 and 22% in 1996 based on testing with accommodations.
- The proportion of eighth grade students who reached the proficient achievement level was 35% for whites, 7% for blacks, 10% for Hispanics, 41% for Asians/Pacific Islanders, and 9% for American Indians/Alaska Natives.
- Gender differences in mathematics proficiency were smaller in the eighth grade (3%) than in the fourth grade (5%). Among eighth grade students, 29% of males reached the proficient level in mathematics compared with 26% of females.

This indicator provides a measure of the extent to which a state's eighth grade students in public schools have achieved proficiency in mathematics. High values show that a high percentage of a state's eighth graders have demonstrated the ability to undertake the study of high school mathematics, a prerequisite to the further study of science and engineering and a necessary life skill.

Proficiency in mathematics is based on achievement level in the National Assessment of Educational Progress (NAEP) 2003 Mathematics Assessment. Achievement levels represent performance standards set by the National Assessment Governing Board to provide a context for interpreting student performance on NAEP.

The basic level (262–298) denotes partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at the eighth grade level. The proficient level (299–332) represents solid academic performance at the eighth grade level. Students who reach this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter. The advanced level (333–500) signifies superior performance. Approximately 153,200 eighth graders participated in the NAEP assessment.

Table 8-6
Eighth grade mathematics proficiency, by state: 1996, 2000, and 2003
(Percent)

State	1996[a]	2000[a]	2000	2003
National average	23	26	25	27
Alabama	12	16	16	16
Alaska	30	NA	NA	30
Arizona	18	21	20	21
Arkansas	13	14	13	19
California	17	18	17	22
Colorado	25	NA	NA	34
Connecticut	31	34	33	35
Delaware	19	NA	NA	26
District of Columbia	5	6	6	6
Florida	17	NA	NA	23
Georgia	16	19	19	22
Hawaii	16	16	16	17
Idaho	NA	27	26	28
Illinois	NA	27	26	29
Indiana	24	31	29	31
Iowa	31	NA	NA	33
Kansas	NA	34	34	34
Kentucky	16	21	20	24
Louisiana	7	12	11	17
Maine	31	32	30	29
Maryland	24	29	27	30
Massachusetts	28	32	30	38
Michigan	28	28	28	28
Minnesota	34	40	39	44
Mississippi	7	8	9	12
Missouri	22	22	21	28
Montana	32	37	36	35
Nebraska	31	31	30	32
Nevada	NA	20	18	20
New Hampshire	NA	NA	NA	35
New Jersey	NA	NA	NA	33
New Mexico	14	13	12	15
New York	22	26	24	32
North Carolina	20	30	27	32
North Dakota	33	31	30	36
Ohio	NA	31	30	30
Oklahoma	NA	19	18	20
Oregon	26	32	31	32
Pennsylvania	NA	NA	NA	30
Rhode Island	20	24	22	24
South Carolina	14	18	17	26
South Dakota	NA	NA	NA	35
Tennessee	15	17	16	21
Texas	21	24	24	25
Utah	24	26	25	31
Vermont	27	32	31	35
Virginia	21	26	25	31
Washington	26	NA	NA	32
West Virginia	14	18	17	20
Wisconsin	32	NA	NA	35
Wyoming	22	25	23	32

NA = not available

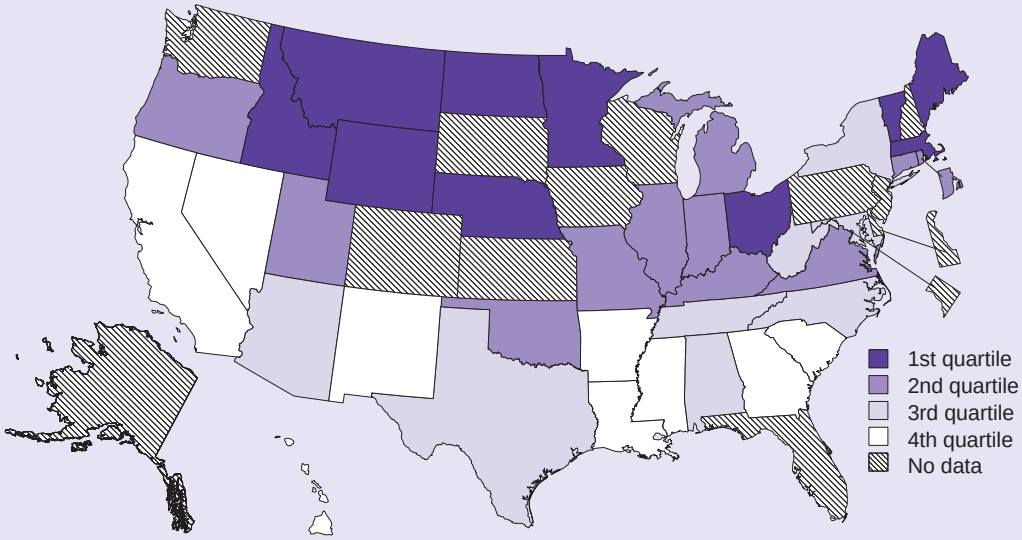
[a]Accommodations not permitted.

NOTES: National average is reported value in National Assessment of Educational Progress (NAEP) reports. NAEP grade 8 mathematics scores are for public schools only. Comparative performance results may be affected by changes in exclusion rates for students with disabilities and limited English proficiency students in NAEP samples. In addition to allowing for accommodations, accommodations-permitted results for national public schools (2000 and 2003) differ slightly from previous years' results and from previously reported results for 2000 because of changes in sample weighting procedures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, various years.

Eighth Grade Science Performance

Figure 8-7
Eighth grade science performance: 2000



1st quartile (164–156)	2nd quartile (155–148)	3rd quartile (146–143)	4th quartile (142–129)	No data
Idaho	Connecticut	Alabama	Arkansas	Alaska
Maine	Illinois	Arizona	California	Colorado
Massachusetts	Indiana	Maryland	Georgia	Delaware
Minnesota	Kentucky	New York	Hawaii	District of Columbia
Montana	Michigan	North Carolina	Louisiana	Florida
Nebraska	Missouri	Tennessee	Mississippi	Iowa
North Dakota	Oklahoma	Texas	Nevada	Kansas
Ohio	Oregon	West Virginia	New Mexico	New Hampshire
Vermont	Rhode Island		South Carolina	New Jersey
Wyoming	Utah			Pennsylvania
	Virginia			South Dakota
				Washington
				Wisconsin

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress. See table 8-7.

Findings

- Nationally, eighth grade students in public schools had an average score of 149 in the 2000 science assessment, which is not statistically different from the 1996 average science score of 148. Both scores represent samples in which accommodations were not permitted.
- Within the limits of statistical significance, 16 states exceeded the 2000 national average science score, 11 had average scores, and 11 fell below the national average.
- A statistically significant increase was observed in the scale score of the 90th percentile of the national sample, which indicates that the top performing students improved between the 1996 and 2000 assessments. Scale scores for the remaining students were not significantly different in the two assessments.

Science achievement at the eighth grade level is important because it represents how prepared students are to undertake high school courses in biology, chemistry, and physics. This indicator measures the knowledge of a state's eighth grade students in science.

The National Assessment of Educational Progress (NAEP) is a federally authorized ongoing assessment of student achievement in various subjects on a state and national scale. State participation is optional. NAEP does not compute scores for states that do not meet the minimum guidelines for the percentage of students or schools participating. For the eighth grade, a national sample and separate state-by-state samples were conducted. Both national and state results are reported only for public school students. Since 1996, NAEP permitted students with disabilities or limited English proficiency to use certain accommodations (e.g., extended time, small-group testing). At grade 8, the accommodations-permitted average score was identical to the accommodations-not-permitted average score for national data. The differences in state-level data were not statistically significant.

The NAEP science scale ranges from 0 to 300.

Table 8-7
Eighth grade science performance, by state: 1996 and 2000
(Score)

State	1996[a]	2000[a]	2000
National average	148	149	149
Alabama	139	141	143
Alaska	NA	NA	NA
Arizona	145	146	145
Arkansas	144	143	142
California	138	132	129
Colorado	NA	NA	NA
Connecticut	155	154	153
Delaware	NA	NA	NA
District of Columbia	NA	NA	NA
Florida	NA	NA	NA
Georgia	142	144	142
Hawaii	135	132	130
Idaho	NA	159	158
Illinois	NA	150	148
Indiana	153	156	154
Iowa	NA	NA	NA
Kansas	NA	NA	NA
Kentucky	147	152	150
Louisiana	132	136	134
Maine	163	160	158
Maryland	145	149	146
Massachusetts	157	161	158
Michigan	153	156	155
Minnesota	159	160	159
Mississippi	133	134	134
Missouri	151	156	154
Montana	162	165	164
Nebraska	157	157	158
Nevada	NA	143	141
New Hampshire	NA	NA	NA
New Jersey	NA	NA	NA
New Mexico	141	140	139
New York	146	149	145
North Carolina	147	147	145
North Dakota	162	161	159
Ohio	NA	161	159
Oklahoma	NA	149	149
Oregon	155	154	154
Pennsylvania	NA	NA	NA
Rhode Island	149	150	148
South Carolina	139	142	140
South Dakota	NA	NA	NA
Tennessee	143	146	145
Texas	145	144	143
Utah	156	155	154
Vermont	157	161	159
Virginia	149	152	151
Washington	NA	NA	NA
West Virginia	147	150	146
Wisconsin	NA	NA	NA
Wyoming	158	158	156

NA = not available (did not meet minimum participation guidelines)

[a]Accommodations not permitted.

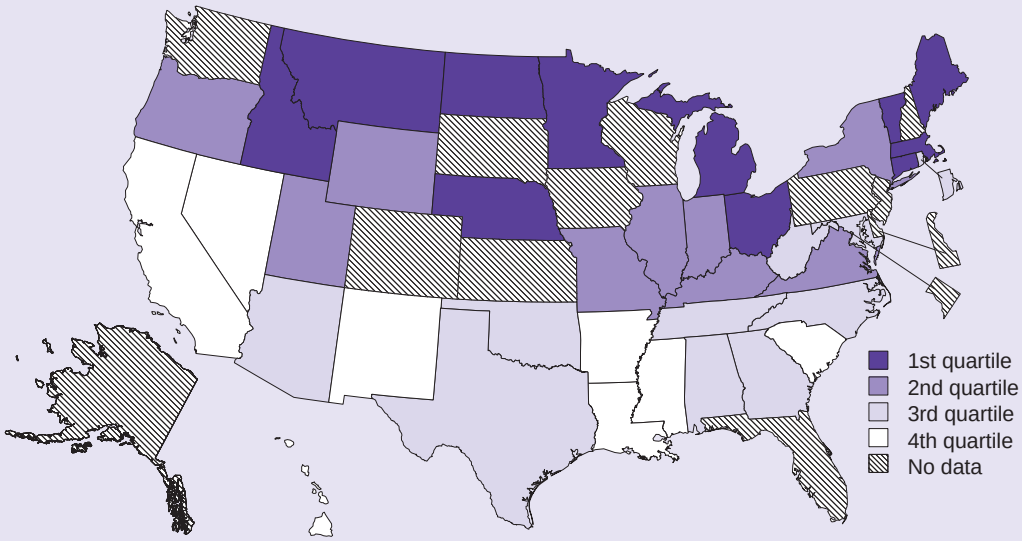
NOTES: National average is reported value in National Assessment of Educational Progress (NAEP) reports. NAEP grade 8 science scores are for public schools only. In 2000, Arizona, California, Idaho, Illinois, Indiana, Maine, Michigan, Minnesota, Montana, New York, Oregon, and Vermont met the minimum participation guidelines but did not satisfy one or more school participation rate guidelines for school sample(s).

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, various years.

Science and Engineering Indicators 2006

Eighth Grade Science Proficiency

Figure 8-8
Eighth grade science proficiency: 2000



1st quartile (44%–35%)	2nd quartile (34%–28%)	3rd quartile (27%–23%)	4th quartile (22%–14%)	No data
Connecticut	Illinois	Alabama	Arkansas	Alaska
Idaho	Indiana	Arizona	California	Colorado
Maine	Kentucky	Georgia	Hawaii	Delaware
Massachusetts	Missouri	Maryland	Louisiana	District of Columbia
Michigan	New York	North Carolina	Mississippi	Florida
Minnesota	Oregon	Oklahoma	Nevada	Iowa
Montana	Utah	Rhode Island	New Mexico	Kansas
Nebraska	Virginia	Tennessee	South Carolina	New Hampshire
North Dakota	Wyoming	Texas		New Jersey
Ohio		West Virginia		Pennsylvania
Vermont				South Dakota
				Washington
				Wisconsin

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress. See table 8-8.

Findings

- In 2000, the nationwide percentage of eighth grade public school students who performed at or above the proficient level in science was 30%, an increase from 27% in 1996 in testing without accommodations.
- In 2000, the percentage of public school students who performed at the proficient level in science was slightly higher in the eighth grade (30%) than in the fourth grade (28%).
- The proportion of eighth grade students who reached the proficient achievement level was 41% for whites, 7% for blacks, 12% for Hispanics, 37% for Asians/Pacific Islanders, and 14% for American Indians/Alaska Natives.
- Sex differences in science proficiency were larger in the eighth grade (9%) than in the fourth grade (7%).

This indicator provides a measure of the extent to which a state's eighth grade students in public schools have achieved proficiency in science. High values show that a high percentage of a state's eighth grade students have demonstrated the ability to undertake the study of high school science, a prerequisite to the further study of science and engineering and a necessary life skill.

Proficiency in science is based on achievement level in the National Assessment of Educational Progress (NAEP) 2000 Science Assessment. Achievement levels represent performance standards set by the National Assessment Governing Board to provide a context for interpreting student performance on NAEP.

The basic level (143–169) denotes partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at the eighth grade level. The proficient level (170–207) represents solid academic performance at the eighth grade level. Students who reach this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter. The advanced level (208–300) signifies superior performance in science.

A National Academy of Sciences panel evaluated the process used to establish the achievement levels for the science assessment and urged that they be considered developmental and interpreted with caution.

Table 8-8
Eighth grade science proficiency, by state: 1996 and 2000
(Percent)

State	1996[a]	2000[a]	2000
National average	27	30	30
Alabama	18	22	23
Alaska	NA	NA	NA
Arizona	23	24	23
Arkansas	22	23	22
California	20	15	14
Colorado	NA	NA	NA
Connecticut	36	35	35
Delaware	NA	NA	NA
District of Columbia	NA	NA	NA
Florida	NA	NA	NA
Georgia	21	23	23
Hawaii	15	15	14
Idaho	NA	38	37
Illinois	NA	30	29
Indiana	30	35	33
Iowa	NA	NA	NA
Kansas	NA	NA	NA
Kentucky	23	29	28
Louisiana	13	18	18
Maine	41	37	35
Maryland	25	28	27
Massachusetts	37	42	39
Michigan	32	37	35
Minnesota	37	42	41
Mississippi	12	15	15
Missouri	28	36	33
Montana	41	46	44
Nebraska	35	36	38
Nevada	NA	23	22
New Hampshire	NA	NA	NA
New Jersey	NA	NA	NA
New Mexico	19	20	20
New York	27	30	28
North Carolina	24	27	25
North Dakota	41	40	38
Ohio	NA	41	39
Oklahoma	NA	26	25
Oregon	32	33	34
Pennsylvania	NA	NA	NA
Rhode Island	26	29	27
South Carolina	17	20	20
South Dakota	NA	NA	NA
Tennessee	22	25	24
Texas	23	23	23
Utah	32	34	34
Vermont	34	40	39
Virginia	27	31	29
Washington	NA	NA	NA
West Virginia	21	26	24
Wisconsin	NA	NA	NA
Wyoming	34	36	34

NA = not available (did not meet minimum participation guidelines)

[a]Accommodations not permitted.

NOTES: National average is reported value in National Assessment of Educational Progress (NAEP) reports. NAEP grade 8 science scores are for public schools only. In 2000, Arizona, California, Idaho, Illinois, Indiana, Maine, Michigan, Minnesota, Montana, New York, Oregon, and Vermont met the minimum participation guidelines but did not satisfy one or more school participation rate guidelines for school sample(s).

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, various years.

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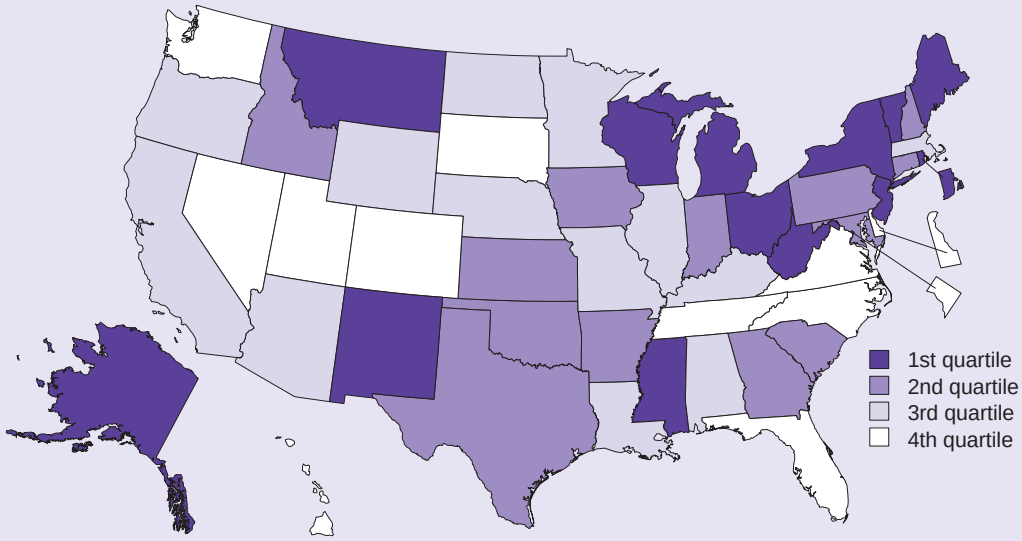
Elementary and Secondary Public School Current Expenditures as Share of Gross State Product

Figure 8-9
Elementary and secondary public school current expenditures as share of gross state product: 2003



1st quartile (5.09%–3.97%)	2nd quartile (3.92%–3.57%)	3rd quartile (3.56%–3.21%)	4th quartile (3.19%–1.28%)
Alaska	Arkansas	Alabama	Colorado
Maine	Connecticut	Arizona	Delaware
Michigan	Georgia	California	District of Columbia
Mississippi	Idaho	Illinois	Florida
Montana	Indiana	Kentucky	Hawaii
New Jersey	Iowa	Louisiana	Nevada
New Mexico	Kansas	Massachusetts	North Carolina
New York	Maryland	Minnesota	South Dakota
Ohio	New Hampshire	Missouri	Tennessee
Rhode Island	Oklahoma	Nebraska	Utah
Vermont	Pennsylvania	North Dakota	Virginia
West Virginia	South Carolina	Oregon	Washington
Wisconsin	Texas	Wyoming	

SOURCES: U.S. Department of Education, National Center for Education Statistics (NCES), NCES Common Core of Data, National Public Education Financial Survey; and U.S. Department of Commerce, Bureau of Economic Analysis, Gross State Product data. See table 8-9.

Findings

- The 2003 national average for spending on elementary and secondary education was 3.55% of gross domestic product, an increase from 3.37% in 1994.
- Among individual states, it ranged from 2.23% to 5.09% of GSP.
- States spending the highest percentage of their GSP on elementary and secondary education tended to have relatively small student populations (100,000–300,000 students), indicating that some level of state spending may be required regardless of the size of the student population or the GSP.
- Actual spending for elementary and secondary current expenditures as a share of GSP decreased in 17 states during the 1994–2003 period.

The priority that state residents place on their elementary and secondary schools is reflected in the percentage of a state's wealth spent for these purposes. Nationally, state support represented the largest source of revenue for elementary and secondary education: 49% in 2002–03; local sources made up 43%; and the remaining 8% came from the federal government. In this indicator, current expenditures for public education in prekindergarten through grade 12 are reported as a share of gross state product (GSP).

In school year 2002–03, current expenditures (excluding capital projects and interest on debt) totaled approximately $388 billion, or 88% of the $440 billion in total spending for public education in prekindergarten through grade 12.

Financial data on public elementary and secondary education are reported by the National Center for Educational Statistics (NCES), U.S. Department of Education. The data are part of the National Public Education Financial Survey and are included in the Common Core of Data, a comprehensive annual national statistical database covering all 94,000 public elementary and secondary schools. Current expenditures are expressed in actual dollars. The year is the latter date of the academic year.

Table 8-9
Elementary and secondary public school current expenditures as share of gross state product, by state: 1994, 1999, and 2003

State	Public school expenditures ($ thousands)			GSP ($ millions)			School expenditures/ GSP (%)		
	1994	1999	2003	1994	1999	2003	1994	1999	2003
United States	231,542,764	302,876,294	387,592,494	6,865,515	9,201,138	10,923,851	3.37	3.29	3.55
Alabama	2,809,713	3,880,188	4,657,643	88,581	111,777	130,792	3.17	3.47	3.56
Alaska	1,002,515	1,137,610	1,326,226	23,110	24,621	31,704	4.34	4.62	4.18
Arizona	2,911,304	3,963,455	5,891,105	95,292	147,871	183,272	3.06	2.68	3.21
Arkansas	1,782,645	2,241,244	2,923,401	50,179	65,174	74,540	3.55	3.44	3.92
California	25,140,639	34,379,878	47,983,402	862,481	1,183,578	1,438,134	2.91	2.90	3.34
Colorado	2,954,793	4,140,699	5,551,506	100,434	156,603	188,397	2.94	2.64	2.95
Connecticut	3,943,891	5,075,580	6,302,988	111,171	150,713	174,085	3.55	3.37	3.62
Delaware	643,915	872,786	1,127,745	25,128	39,752	50,486	2.56	2.20	2.23
District of Columbia	713,427	693,712	902,318	46,842	56,082	70,668	1.52	1.24	1.28
Florida	10,331,896	13,534,374	16,355,123	322,073	442,476	553,709	3.21	3.06	2.95
Georgia	5,643,843	8,537,177	11,630,576	184,256	277,324	321,199	3.06	3.08	3.62
Hawaii	998,143	1,143,713	1,489,092	36,256	38,702	46,671	2.75	2.96	3.19
Idaho	859,088	1,239,755	1,511,862	24,817	32,846	40,358	3.46	3.77	3.75
Illinois	10,076,889	13,602,965	17,271,301	343,363	443,718	499,731	2.93	3.07	3.46
Indiana	5,064,685	6,697,468	8,088,684	141,157	185,925	213,342	3.59	3.60	3.79
Iowa	2,527,434	3,110,585	3,652,022	69,150	86,531	102,400	3.66	3.59	3.57
Kansas	2,325,247	2,841,147	3,510,675	61,805	79,159	93,263	3.76	3.59	3.76
Kentucky	2,952,119	3,696,331	4,401,627	86,283	114,423	128,315	3.42	3.23	3.43
Louisiana	3,309,018	4,264,981	5,056,583	101,943	125,413	144,321	3.25	3.40	3.50
Maine	1,208,411	1,510,024	1,909,268	26,204	33,519	40,829	4.61	4.50	4.68
Maryland	4,783,023	6,165,934	7,933,055	132,052	171,046	213,073	3.62	3.60	3.72
Massachusetts	5,637,337	7,948,502	10,281,820	185,335	254,042	297,113	3.04	3.13	3.46
Michigan	9,816,830	12,785,480	15,674,698	246,064	326,731	359,440	3.99	3.91	4.36
Minnesota	4,328,093	5,836,186	6,867,403	124,733	173,303	210,184	3.47	3.37	3.27
Mississippi	1,725,386	2,293,188	2,853,531	50,642	62,934	71,872	3.41	3.64	3.97
Missouri	3,981,614	5,348,366	6,793,957	128,473	168,999	193,828	3.10	3.16	3.51
Montana	822,015	955,695	1,124,291	16,961	20,420	25,584	4.85	4.68	4.39
Nebraska	1,513,971	1,821,310	2,304,223	42,838	53,612	65,399	3.53	3.40	3.52
Nevada	1,099,685	1,738,009	2,251,044	44,855	69,470	89,711	2.45	2.50	2.51
New Hampshire	1,007,129	1,316,946	1,781,594	29,456	40,230	48,202	3.42	3.27	3.70
New Jersey	10,448,096	12,874,579	17,185,966	254,546	326,106	394,040	4.10	3.95	4.36
New Mexico	1,323,459	1,788,382	2,281,608	41,143	49,258	57,078	3.22	3.63	4.00
New York	22,059,949	26,885,444	34,546,965	569,398	725,709	838,035	3.87	3.70	4.12
North Carolina	5,145,416	7,097,882	8,766,968	179,574	257,604	315,456	2.87	2.76	2.78
North Dakota	522,377	625,428	716,007	14,036	17,168	21,597	3.72	3.64	3.32
Ohio	9,612,678	12,138,937	15,868,494	278,508	360,109	398,918	3.45	3.37	3.98
Oklahoma	2,680,113	3,332,697	3,804,570	67,137	83,896	101,168	3.99	3.97	3.76
Oregon	2,852,723	3,706,044	4,150,747	74,435	104,620	119,973	3.83	3.54	3.46
Pennsylvania	11,236,417	13,532,211	16,344,439	298,329	377,019	443,709	3.77	3.59	3.68
Rhode Island	990,094	1,283,859	1,647,587	24,375	31,019	39,363	4.06	4.14	4.19
South Carolina	2,790,878	3,759,042	4,888,250	81,033	109,231	127,963	3.44	3.44	3.82
South Dakota	584,894	696,785	851,429	17,014	21,681	27,337	3.44	3.21	3.11
Tennessee	3,305,579	4,638,924	5,674,773	128,905	169,373	203,071	2.56	2.74	2.79
Texas	16,193,722	22,430,153	30,399,603	478,143	667,644	821,943	3.39	3.36	3.70
Utah	1,511,205	2,025,714	2,366,897	42,218	64,143	76,674	3.58	3.16	3.09
Vermont	643,828	792,664	1,045,213	13,717	16,726	20,544	4.69	4.74	5.09
Virginia	5,441,384	7,137,419	9,208,329	177,008	241,909	304,116	3.07	2.95	3.03
Washington	4,892,690	6,098,008	7,359,566	146,726	214,223	245,143	3.33	2.85	3.00
West Virginia	1,663,868	1,986,562	2,349,833	34,855	41,306	46,726	4.77	4.81	5.03
Wisconsin	5,170,343	6,620,653	7,934,755	128,394	169,338	198,096	4.03	3.91	4.01
Wyoming	558,353	651,622	791,732	14,087	16,062	22,279	3.96	4.06	3.55
Puerto Rico	1,360,762	2,024,499	2,541,385	39,691	57,841	74,362	3.43	3.50	3.42

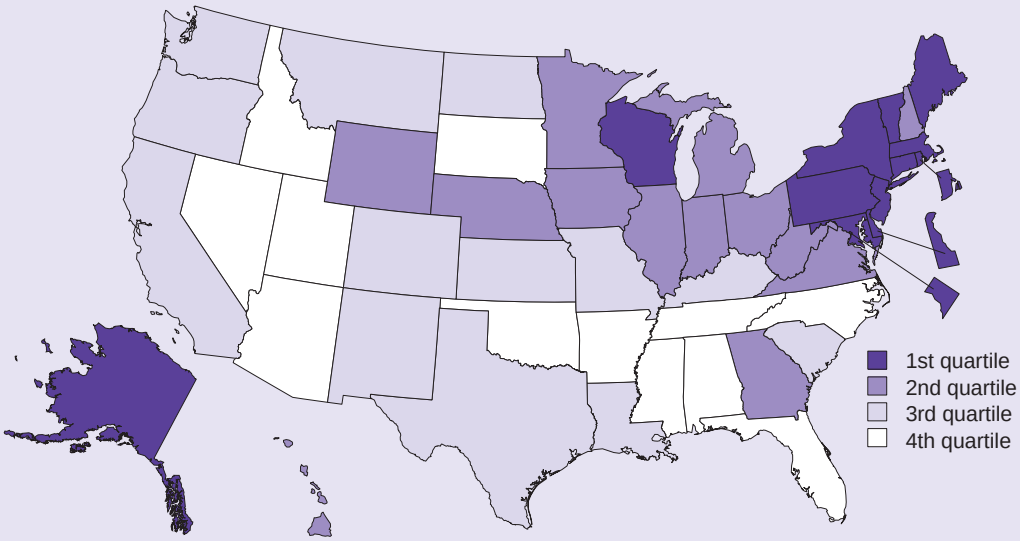
GSP = gross state product

NOTES: Public school expenditures for Missouri, Tennessee, and Washington for 2003 are affected by redistribution of reported values to correct for missing data items. GSP is reported in current dollars.

SOURCES: U.S. Department of Education, National Center for Education Statistics (NCES), NCES Common Core of Data, National Public Education Financial Survey; U.S. Department of Commerce, Bureau of Economic Analysis, Gross State Product data; and Government of Puerto Rico, Office of the Governor.

Current Expenditures per Pupil for Elementary and Secondary Public Schools

Figure 8-10
Current expenditures per pupil for elementary and secondary public schools: 2003



1st quartile ($12,568–$8,997)	2nd quartile ($8,985–$7,574)	3rd quartile ($7,552–$6,661)	4th quartile ($6,562–$4,838)
Alaska	Georgia	California	Alabama
Connecticut	Hawaii	Colorado	Arizona
Delaware	Illinois	Kansas	Arkansas
District of Columbia	Indiana	Kentucky	Florida
Maine	Iowa	Louisiana	Idaho
Maryland	Michigan	Missouri	Mississippi
Massachusetts	Minnesota	Montana	Nevada
New Jersey	Nebraska	New Mexico	North Carolina
New York	New Hampshire	North Dakota	Oklahoma
Pennsylvania	Ohio	Oregon	South Dakota
Rhode Island	Virginia	South Carolina	Tennessee
Vermont	West Virginia	Texas	Utah
Wisconsin	Wyoming	Washington	

SOURCES: U.S. Department of Education, National Center for Education Statistics, NCES Common Core of Data, State Nonfiscal Survey of Public Elementary/Secondary Education and National Public Education Financial Survey. See table 8-10.

Findings

- Expenditures per student in public schools rose during the late 1980s, remained stable during the first part of the 1990s, then rose again in the late 1990s.
- In academic year 2002–03, expenditures for public education totaled approximately $388 billion, a 5.2% increase over the previous year.
- Instructional costs accounted for 61%, support services were 35%, and noninstructional costs accounted for 4% of 2002–03 expenditures for elementary and secondary schools.
- A direct correlation between spending and academic performance cannot be made because several states that ranked in the lower two quartiles of this indicator ranked in the upper quartiles of the NAEP indicators.

Investment in education at the elementary and secondary levels is important in creating a well-educated populace and preparing individual students for their careers. One measure used to compare states' investment in elementary and secondary education is current expenditures per student at the elementary and secondary levels. Current expenditures per pupil include three major components: instructional costs, support services, and noninstructional costs. Current expenditures do not include longer-term financing, building construction, and the costs of programs outside the scope of preschool to grade 12, such as adult education, community colleges, and community services.

Current expenditures per pupil are calculated by dividing the total current expenditures for prekindergarten through grade 12 for the entire academic year by the number of pupils enrolled in those grades during the fall of the academic year. All figures represent actual spending and have not been adjusted for inflation. The year is the latter date of the academic year.

Table 8-10
Current expenditures per pupil for elementary and secondary public schools, by state: 1994, 1999, and 2003

State	Public school expenditures ($ thousands)			Student enrollment			Per-pupil expenditures ($)		
	1994	1999	2003	1994	1999	2003	1994	1999	2003
United States	231,542,764	302,876,294	387,592,494	43,464,916	46,538,585	48,201,032	5,327	6,508	8,041
Alabama	2,809,713	3,880,188	4,657,643	734,288	747,980	739,366	3,826	5,188	6,300
Alaska	1,002,515	1,137,610	1,326,226	125,948	135,373	134,364	7,960	8,404	9,870
Arizona	2,911,304	3,963,455	5,891,105	709,453	848,262	937,755	4,104	4,672	6,282
Arkansas	1,782,645	2,241,244	2,923,401	444,271	452,256	450,985	4,013	4,956	6,482
California	25,140,639	34,379,878	47,983,402	5,327,231	5,926,037	6,353,667	4,719	5,801	7,552
Colorado	2,954,793	4,140,699	5,551,506	625,062	699,135	751,862	4,727	5,923	7,384
Connecticut	3,943,891	5,075,580	6,302,988	496,298	544,698	570,023	7,947	9,318	11,057
Delaware	643,915	872,786	1,127,745	105,547	113,262	116,342	6,101	7,706	9,693
District of Columbia	713,427	693,712	902,318	80,678	71,889	76,166	8,843	9,650	11,847
Florida	10,331,896	13,534,374	16,355,123	2,040,763	2,337,633	2,539,929	5,063	5,790	6,439
Georgia	5,643,843	8,537,177	11,630,576	1,235,304	1,401,291	1,496,012	4,569	6,092	7,774
Hawaii	998,143	1,143,713	1,489,092	180,410	188,069	183,829	5,533	6,081	8,100
Idaho	859,088	1,239,755	1,511,862	236,774	244,722	248,604	3,628	5,066	6,081
Illinois	10,076,889	13,602,965	17,271,301	1,893,078	2,011,530	2,084,187	5,323	6,762	8,287
Indiana	5,064,685	6,697,468	8,088,684	965,633	989,001	1,003,875	5,245	6,772	8,057
Iowa	2,527,434	3,110,585	3,652,022	498,519	498,214	482,210	5,070	6,243	7,574
Kansas	2,325,247	2,841,147	3,510,675	457,614	472,353	470,957	5,081	6,015	7,454
Kentucky	2,952,119	3,696,331	4,401,627	655,265	655,687	660,782	4,505	5,637	6,661
Louisiana	3,309,018	4,264,981	5,056,583	800,560	768,734	730,464	4,133	5,548	6,922
Maine	1,208,411	1,510,024	1,909,268	216,995	211,051	204,337	5,569	7,155	9,344
Maryland	4,783,023	6,165,934	7,933,055	772,638	841,671	866,743	6,191	7,326	9,153
Massachusetts	5,637,337	7,948,502	10,281,820	877,726	962,317	982,989	6,423	8,260	10,460
Michigan	9,816,830	12,785,480	15,674,698	1,599,377	1,720,287	1,785,160	6,138	7,432	8,781
Minnesota	4,328,093	5,836,186	6,867,403	810,233	856,455	846,891	5,342	6,814	8,109
Mississippi	1,725,386	2,293,188	2,853,531	505,907	502,379	492,645	3,410	4,565	5,792
Missouri	3,981,614	5,348,366	6,793,957	866,378	913,494	924,445	4,596	5,855	7,349
Montana	822,015	955,695	1,124,291	163,009	159,988	149,995	5,043	5,974	7,496
Nebraska	1,513,971	1,821,310	2,304,223	285,097	291,140	285,402	5,310	6,256	8,074
Nevada	1,099,685	1,738,009	2,251,044	235,800	311,061	369,498	4,664	5,587	6,092
New Hampshire	1,007,129	1,316,946	1,781,594	185,360	204,713	207,671	5,433	6,433	8,579
New Jersey	10,448,096	12,874,579	17,185,966	1,151,307	1,268,996	1,367,438	9,075	10,145	12,568
New Mexico	1,323,459	1,788,382	2,281,608	322,292	328,753	320,234	4,106	5,440	7,125
New York	22,059,949	26,885,444	34,546,965	2,733,813	2,877,143	2,888,233	8,069	9,344	11,961
North Carolina	5,145,416	7,097,882	8,766,968	1,133,231	1,254,821	1,335,954	4,540	5,656	6,562
North Dakota	522,377	625,428	716,007	119,127	114,927	104,225	4,385	5,442	6,870
Ohio	9,612,678	12,138,937	15,868,494	1,807,319	1,842,163	1,838,285	5,319	6,590	8,632
Oklahoma	2,680,113	3,332,697	3,804,570	604,076	628,492	624,548	4,437	5,303	6,092
Oregon	2,852,723	3,706,044	4,150,747	516,611	542,809	554,071	5,522	6,828	7,491
Pennsylvania	11,236,417	13,532,211	16,344,439	1,744,082	1,816,414	1,816,747	6,443	7,450	8,997
Rhode Island	990,094	1,283,859	1,647,587	145,676	154,785	159,205	6,797	8,294	10,349
South Carolina	2,790,878	3,759,042	4,888,250	643,696	664,600	694,389	4,336	5,656	7,040
South Dakota	584,894	696,785	851,429	142,825	132,495	130,048	4,095	5,259	6,547
Tennessee	3,305,579	4,638,924	5,674,773	866,557	905,454	927,608	3,815	5,123	6,118
Texas	16,193,722	22,430,153	30,399,603	3,608,262	3,945,367	4,259,823	4,488	5,685	7,136
Utah	1,511,205	2,025,714	2,366,897	471,365	481,176	489,262	3,206	4,210	4,838
Vermont	643,828	792,664	1,045,213	102,755	105,120	99,978	6,266	7,541	10,454
Virginia	5,441,384	7,137,419	9,208,329	1,045,471	1,124,022	1,177,229	5,205	6,350	7,822
Washington	4,892,690	6,098,008	7,359,566	915,952	998,053	1,014,798	5,342	6,110	7,252
West Virginia	1,663,868	1,986,562	2,349,833	314,383	297,530	282,455	5,292	6,677	8,319
Wisconsin	5,170,343	6,620,653	7,934,755	844,001	879,542	881,231	6,126	7,527	9,004
Wyoming	558,353	651,622	791,732	100,899	95,241	88,116	5,534	6,842	8,985
Puerto Rico	1,360,762	2,024,499	2,541,385	631,460	613,862	596,502	2,155	3,298	4,260

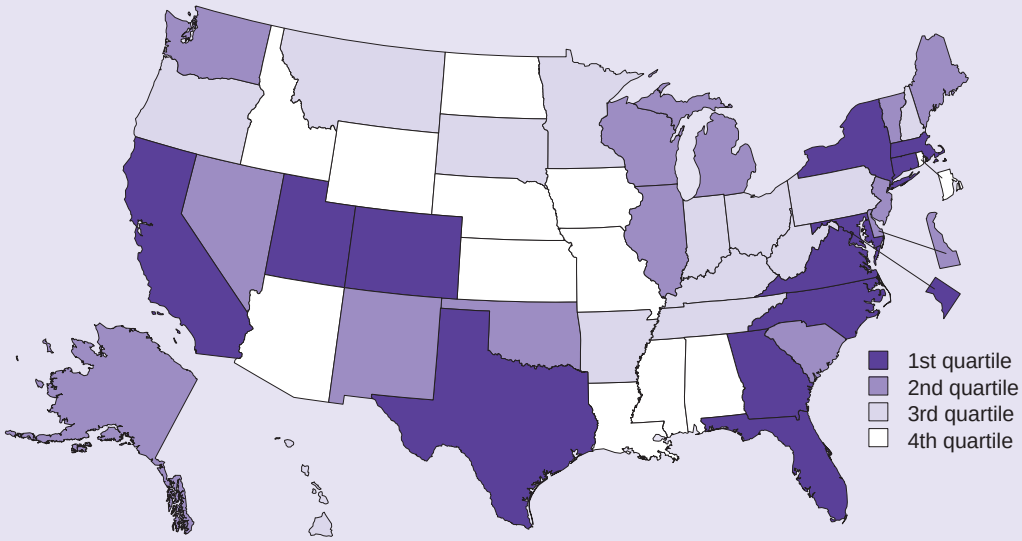
NOTES: Public school expenditures for Missouri, Tennessee, and Washington for 2003 are affected by redistribution of reported values to correct for missing data items. Both the District of Columbia and Hawaii have only one school district each; therefore, their data for 2003 are not comparable to other states.

SOURCES: U.S. Department of Education, National Center for Education Statistics (NCES), NCES Common Core of Data, State Nonfiscal Survey of Public Elementary/Secondary Education; and National Public Education Financial Survey.

Science and Engineering Indicators 2006

Share of Public High School Students Taking Advanced Placement Exams

Figure 8-11
Share of public high school students taking Advanced Placement Exams: 2004



1st quartile (33.5%–21.5%)	2nd quartile (21.3%–16.7%)	3rd quartile (16.4%–13.0%)	4th quartile (12.9%–5.0%)
California	Alaska	Arkansas	Alabama
Colorado	Delaware	Hawaii	Arizona
Connecticut	Illinois	Indiana	Idaho
District of Columbia	Maine	Kentucky	Iowa
Florida	Michigan	Minnesota	Kansas
Georgia	Nevada	Montana	Louisiana
Maryland	New Jersey	New Hampshire	Mississippi
Massachusetts	New Mexico	Ohio	Missouri
New York	Oklahoma	Oregon	Nebraska
North Carolina	South Carolina	Pennsylvania	North Dakota
Texas	Vermont	South Dakota	Rhode Island
Utah	Washington	Tennessee	Wyoming
Virginia	Wisconsin	West Virginia	

SOURCE: College Board, A*dvanced Placement Report to the Nation: 2005*. See table 8-11.

Findings

- Nationwide, the percentage of public school students who took an AP Exam rose from 15.9% of the class of 2000 to 20.9% of the class of 2004.
- The percentage of public school students taking an AP Exam varied greatly among states and ranged from 5.0% to 33.5% of the class of 2004, with 15 states exceeding the national average.
- Values were higher for all states in 2004 than in 2000. Florida and Maryland showed the largest increases; class of 2004 members in the two states exceeded the performance of class of 2000 participants by 9 or more percentage points.
- The ratio of the percentage of public school students who took an AP Exam to the percentage who achieved a grade of 3 or higher was consistent across many of the states, which may indicate a consistent degree of rigor in the AP curriculum.

More than 1.1 million students took nearly 1.9 million Advanced Placement (AP) Exams in 2004. Generally, students who take AP Exams have completed a rigorous course of study in a specific subject area in high school with the expectation of obtaining college credit or advanced placement. AP Exams were taken most frequently in U.S. history, English literature and composition, English language and composition, calculus AB, and U.S. government and politics.

In the 50 states and the District of Columbia, 14,144 schools—about 40% of the schools that provide secondary education—participated in the AP program. Approximately 79% were public schools. The schools offered students an average of seven different AP courses. High school students' participation in AP Exams is likely to reflect the access they had to AP courses and their willingness to undertake the more rigorous curriculum.

Table 8-11
Share of public high school students taking Advanced Placement Exams, by state: 2000 and 2004
(Percent)

State	2000	2004
National average	15.9	20.9
Alabama	7.2	8.8
Alaska	15.4	16.7
Arizona	11.3	12.9
Arkansas	8.1	13.0
California	22.2	28.5
Colorado	18.6	25.3
Connecticut	19.1	24.6
Delaware	13.3	19.6
District of Columbia	17.3	23.1
Florida	22.7	33.5
Georgia	17.2	21.5
Hawaii	10.6	14.8
Idaho	9.6	12.5
Illinois	13.4	18.6
Indiana	11.9	15.5
Iowa	6.9	10.0
Kansas	7.0	9.2
Kentucky	10.6	15.5
Louisiana	3.2	5.0
Maine	14.8	19.9
Maryland	20.2	29.2
Massachusetts	19.6	25.3
Michigan	13.9	16.8
Minnesota	13.4	16.4
Mississippi	5.6	7.0
Missouri	5.5	8.1
Montana	10.1	13.0
Nebraska	5.0	6.3
Nevada	15.1	19.8
New Hampshire	13.3	16.0
New Jersey	17.9	21.3
New Mexico	11.1	17.0
New York	27.3	32.4
North Carolina	19.7	26.9
North Dakota	5.9	8.4
Ohio	11.3	15.2
Oklahoma	9.5	17.0
Oregon	10.5	13.6
Pennsylvania	12.4	14.9
Rhode Island	10.7	12.1
South Carolina	17.7	19.2
South Dakota	9.6	13.5
Tennessee	10.4	13.6
Texas	16.6	23.2
Utah	24.5	27.6
Vermont	16.6	21.2
Virginia	25.0	28.1
Washington	11.5	18.5
West Virginia	8.4	13.0
Wisconsin	15.2	20.0
Wyoming	6.1	11.2

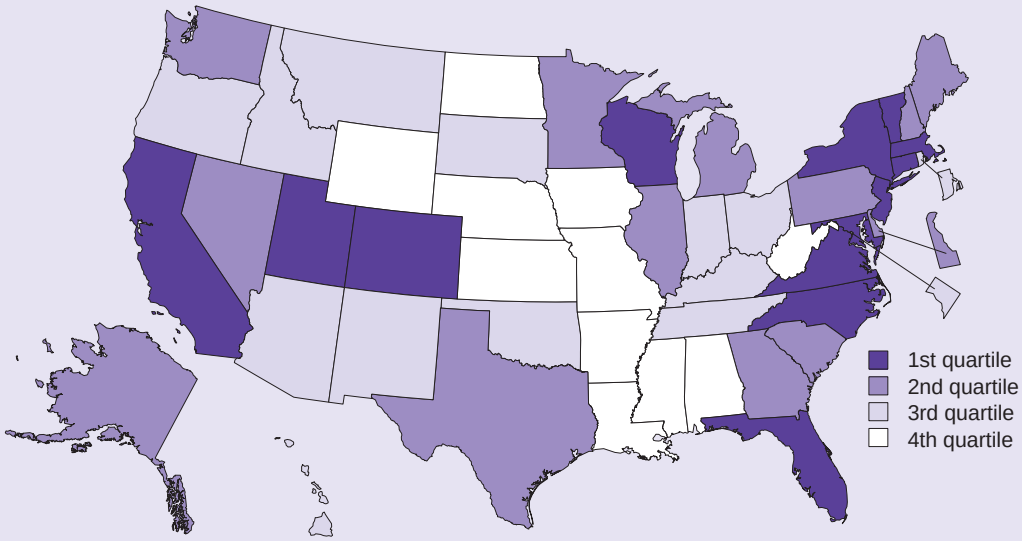
NOTE: National average is reported value in *Advanced Placement Report to the Nation: 2005.*

SOURCE: College Board, *Advanced Placement Report to the Nation: 2005.*

Science and Engineering Indicators 2006

Share of Public High School Students Scoring 3 or Higher on at Least One Advanced Placement Exam

Figure 8-12
Share of public high school students scoring 3 or higher on at least one Advanced Placement Exam: 2004



1st quartile (21.2%–13.7%)	2nd quartile (13.3%–10.1%)	3rd quartile (9.4%–7.7%)	4th quartile (6.7%–2.5%)
California	Alaska	Arizona	Alabama
Colorado	Delaware	District of Columbia	Arkansas
Connecticut	Georgia	Hawaii	Iowa
Florida	Illinois	Idaho	Kansas
Maryland	Maine	Indiana	Louisiana
Massachusetts	Michigan	Kentucky	Mississippi
New Jersey	Minnesota	Montana	Missouri
New York	Nevada	New Mexico	Nebraska
North Carolina	New Hampshire	Ohio	North Dakota
Utah	Pennsylvania	Oklahoma	West Virginia
Vermont	South Carolina	Oregon	Wyoming
Virginia	Texas	Rhode Island	
Wisconsin	Washington	South Dakota	
		Tennessee	

SOURCE: College Board, *Advanced Placement Report to the Nation: 2005*. See table 8-12.

Findings

- Nationally, 13.2% of public school students in the class of 2004 demonstrated the ability to do college level work by obtaining a score of 3 or higher on at least one AP Exam, compared with 10.2% of the class of 2000.
- Values for public school students in individual states for the class of 2004 ranged from a low of 2.5% to a high of 21.2%. Fourteen states exceeded the national average.
- Values were higher for all states in 2004 than in 2000. Florida and Maryland showed the largest increases; class of 2004 members in the two states exceeded the performance of class of 2000 participants by more than 5 percentage points.

High school students can demonstrate their ability to master college-level material through their performance on Advanced Placement (AP) Exams that cover specific subject areas. A total of 34 different AP Exams are offered each spring by the College Board. The exams are scored on a scale of 1 to 5, with 3 representing a range of work equivalent to midlevel B to midlevel C performance in college. Many colleges and universities grant college credit or advanced placement for AP Exam grades of 3 or higher.

To prepare for the AP Exam in a subject area, most students enroll in an AP class that employs a curriculum of high academic intensity. Scoring a 3 or higher indicates that the student has mastered the content of at least one such course of rigorous academic intensity at a level that would be acceptable in college. Performance on AP Exams is considered by many colleges and universities to be one of the best predictors of success in college. A high value on this indicator shows the extent to which the class of 2004 has been offered access to a rigorous curriculum and has successfully mastered the requirements.

Table 8-12
Share of public high school students scoring 3 or higher on at least one Advanced Placement Exam, by state: 2000 and 2004
(Percent)

State	2000	2004
National average	10.2	13.2
Alabama	3.9	5.0
Alaska	10.1	10.8
Arizona	7.2	8.0
Arkansas	4.3	6.1
California	15.0	18.7
Colorado	12.2	16.2
Connecticut	13.6	17.6
Delaware	7.6	11.1
District of Columbia	6.6	8.2
Florida	13.5	19.2
Georgia	9.7	12.0
Hawaii	5.8	7.7
Idaho	6.5	8.1
Illinois	9.9	13.3
Indiana	6.0	7.7
Iowa	4.9	6.6
Kansas	4.4	6.3
Kentucky	5.5	7.7
Louisiana	1.9	2.5
Maine	10.1	12.8
Maryland	14.1	19.4
Massachusetts	14.5	18.1
Michigan	8.8	10.9
Minnesota	8.1	10.6
Mississippi	2.3	2.9
Missouri	3.7	5.3
Montana	6.8	8.8
Nebraska	3.2	4.0
Nevada	9.1	12.4
New Hampshire	9.2	10.9
New Jersey	12.9	15.5
New Mexico	6.1	8.1
New York	17.9	21.2
North Carolina	11.3	15.8
North Dakota	4.4	5.7
Ohio	7.1	9.4
Oklahoma	5.4	8.3
Oregon	7.1	8.8
Pennsylvania	8.3	10.1
Rhode Island	6.9	7.8
South Carolina	10.0	11.2
South Dakota	5.9	8.3
Tennessee	6.2	7.9
Texas	9.9	13.1
Utah	17.4	19.3
Vermont	11.5	14.0
Virginia	15.9	17.7
Washington	7.6	11.6
West Virginia	4.6	6.4
Wisconsin	10.5	13.7
Wyoming	3.8	6.7

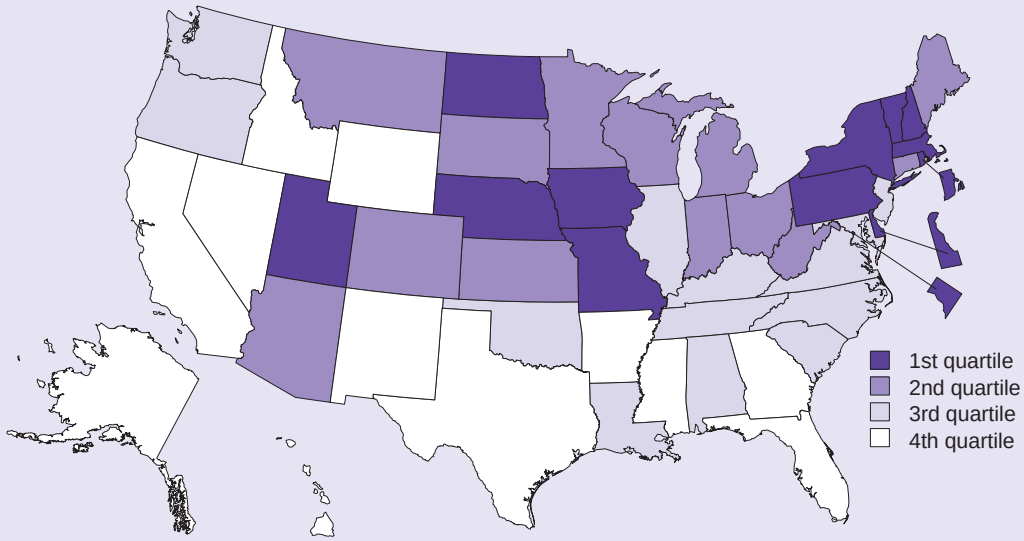
NOTE: National average is reported value in *Advanced Placement Report to the Nation: 2005.*

SOURCE: College Board, *Advanced Placement Report to the Nation: 2005.*

Science and Engineering Indicators 2006

Bachelor's Degrees Conferred per 1,000 Individuals 18–24 Years Old

Figure 8-13
Bachelor's degrees conferred per 1,000 individuals 18–24 years old: 2003



1st quartile (137.4–57.3)	2nd quartile (55.6–49.1)	3rd quartile (47.8–39.7)	4th quartile (39.3–19.6)
Delaware	Arizona	Alabama	Alaska
District of Columbia	Colorado	Illinois	Arkansas
Iowa	Connecticut	Kentucky	California
Massachusetts	Indiana	Louisiana	Florida
Missouri	Kansas	Maryland	Georgia
Nebraska	Maine	New Jersey	Hawaii
New Hampshire	Michigan	North Carolina	Idaho
New York	Minnesota	Oklahoma	Mississippi
North Dakota	Montana	Oregon	Nevada
Pennsylvania	Ohio	South Carolina	New Mexico
Rhode Island	South Dakota	Tennessee	Texas
Utah	West Virginia	Virginia	Wyoming
Vermont	Wisconsin	Washington	

SOURCES: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, various years; and U.S. Census Bureau, Population Division. See table 8-13.

Findings

- In 2003, 1.34 million bachelor's degrees were conferred nationally in all fields, up from 1.17 million in 1993.
- Over the past decade, the number of bachelor's degrees awarded in the United States has remained essentially constant relative to the size of the 18–24-year-old population.
- Across the United States, approximately 46 bachelor's degrees were conferred per 1,000 18–24-year-olds, ranging from about 20 to 82 across the states; the District of Columbia exceeded 137 (an outlier reflecting a large concentration of academic institutions relative to the size of the resident population).

Earning a bachelor's degree gives people greater opportunities to work in higher-paying jobs than are generally available to those with less education; it also prepares them for advanced education. In addition, the capacity to produce degrees generates resources for the state. The ratio of bachelor's degrees awarded to a state's 18–24-year-old population is a broad measure of a state's relative success in producing degrees at this level. The 18–24-year-old cohort was chosen to approximate the age range of most students who are pursuing an undergraduate degree.

A high value for this indicator may suggest the successful provision of educational opportunity at this level. Student and graduate mobility after graduation, however, may make this indicator less meaningful in predicting the qualifications of a state's future workforce. The indicator's value may also be high when a higher education system draws a large percentage of out-of-state students, a situation that sometimes occurs in states with small resident populations and the District of Columbia.

Table 8-13
Bachelor's degrees conferred per 1,000 individuals 18–24 years old, by state: 1993, 1998, and 2003

State	Bachelor's degrees			Population 18–24 years old			Degrees/1,000 individuals 18–24 years old		
	1993	1998	2003	1993	1998	2003	1993	1998	2003
United States	1,165,168	1,185,030	1,342,686	25,739,925	25,476,201	28,900,513	45.3	46.5	46.5
Alabama	20,525	20,318	20,336	454,770	438,019	453,710	45.1	46.4	44.8
Alaska	1,260	1,476	1,363	60,022	68,962	69,574	21.0	21.4	19.6
Arizona	15,809	21,746	27,862	395,208	444,734	552,538	40.0	48.9	50.4
Arkansas	8,449	9,222	10,591	246,273	250,431	276,347	34.3	36.8	38.3
California	110,876	109,097	130,593	3,170,388	3,171,047	3,569,122	35.0	34.4	36.6
Colorado	19,808	20,624	23,559	342,578	376,366	454,558	57.8	54.8	51.8
Connecticut	15,116	13,750	16,038	295,584	256,388	303,176	51.1	53.6	52.9
Delaware	4,067	4,383	5,123	70,787	67,054	81,585	57.5	65.4	62.8
District of Columbia	8,095	7,973	8,834	64,384	43,865	64,273	125.7	181.8	137.4
Florida	43,202	48,304	55,544	1,180,537	1,209,003	1,493,632	36.6	40.0	37.2
Georgia	25,390	29,263	31,703	730,881	754,676	889,162	34.7	38.8	35.7
Hawaii	4,186	4,588	4,922	116,670	119,378	125,284	35.9	38.4	39.3
Idaho	3,923	4,602	5,974	114,637	139,586	153,101	34.2	33.0	39.0
Illinois	51,482	51,932	59,732	1,155,733	1,125,624	1,254,527	44.5	46.1	47.6
Indiana	31,453	30,985	35,251	602,192	572,453	634,269	52.2	54.1	55.6
Iowa	17,598	17,510	19,839	279,421	276,610	316,933	63.0	63.3	62.6
Kansas	14,453	14,182	16,135	251,584	263,410	295,852	57.4	53.8	54.5
Kentucky	14,396	14,972	16,325	403,547	400,137	411,637	35.7	37.4	39.7
Louisiana	17,825	18,532	21,064	461,025	473,066	500,616	38.7	39.2	42.1
Maine	5,976	5,442	6,143	118,437	110,125	120,783	50.5	49.4	50.9
Maryland	21,494	21,715	24,277	452,016	433,031	507,475	47.6	50.1	47.8
Massachusetts	42,747	40,676	44,612	599,360	505,584	596,934	71.3	80.5	74.7
Michigan	45,711	44,152	49,758	967,872	922,891	992,111	47.2	47.8	50.2
Minnesota	24,737	22,999	25,634	421,533	439,358	520,699	58.7	52.3	49.2
Mississippi	10,673	10,290	11,797	304,375	300,061	322,505	35.1	34.3	36.6
Missouri	26,929	28,806	33,115	504,892	509,453	577,581	53.3	56.5	57.3
Montana	4,194	4,932	5,238	77,645	88,262	96,129	54.0	55.9	54.5
Nebraska	9,522	10,071	11,028	157,809	166,811	188,391	60.3	60.4	58.5
Nevada	3,029	3,852	4,616	119,846	148,028	199,143	25.3	26.0	23.2
New Hampshire	7,524	7,297	7,572	103,606	95,661	119,503	72.6	76.3	63.4
New Jersey	25,185	25,056	29,604	707,317	669,415	726,145	35.6	37.4	40.8
New Mexico	5,654	6,219	6,379	159,007	174,353	198,398	35.6	35.7	32.2
New York	98,357	96,187	108,441	1,766,276	1,601,269	1,826,944	55.7	60.1	59.4
North Carolina	31,852	34,086	37,345	751,837	702,132	824,233	42.4	48.5	45.3
North Dakota	4,555	4,588	4,882	66,568	67,835	76,213	68.4	67.6	64.1
Ohio	51,651	49,244	55,020	1,105,197	1,056,810	1,119,732	46.7	46.6	49.1
Oklahoma	15,002	15,881	16,102	329,713	336,797	382,078	45.5	47.2	42.1
Oregon	13,139	13,513	15,053	276,672	303,895	347,267	47.5	44.5	43.3
Pennsylvania	65,125	63,501	72,787	1,149,074	1,022,583	1,180,592	56.7	62.1	61.7
Rhode Island	9,396	8,323	9,389	104,444	83,023	114,254	90.0	100.2	82.2
South Carolina	15,199	15,034	18,299	404,863	385,887	426,854	37.5	39.0	42.9
South Dakota	4,387	4,476	4,460	70,155	76,172	85,043	62.5	58.8	52.4
Tennessee	20,371	21,538	24,199	522,815	515,066	571,200	39.0	41.8	42.4
Texas	67,598	71,755	82,507	1,907,830	2,038,563	2,351,723	35.4	35.2	35.1
Utah	12,728	16,405	18,338	225,001	290,363	313,689	56.6	56.5	58.5
Vermont	4,707	4,441	4,510	58,910	52,029	63,895	79.9	85.4	70.6
Virginia	30,858	30,350	34,623	685,233	656,887	735,711	45.0	46.2	47.1
Washington	20,784	23,403	25,558	493,660	539,707	618,757	42.1	43.4	41.3
West Virginia	8,606	8,290	9,335	191,056	182,025	174,583	45.0	45.5	53.5
Wisconsin	27,709	27,343	29,538	493,627	498,268	566,174	56.1	54.9	52.2
Wyoming	1,856	1,706	1,739	47,058	53,048	55,878	39.4	32.2	31.1
Puerto Rico	13,756	13,932	NA	NA	NA	418,390	NA	NA	NA

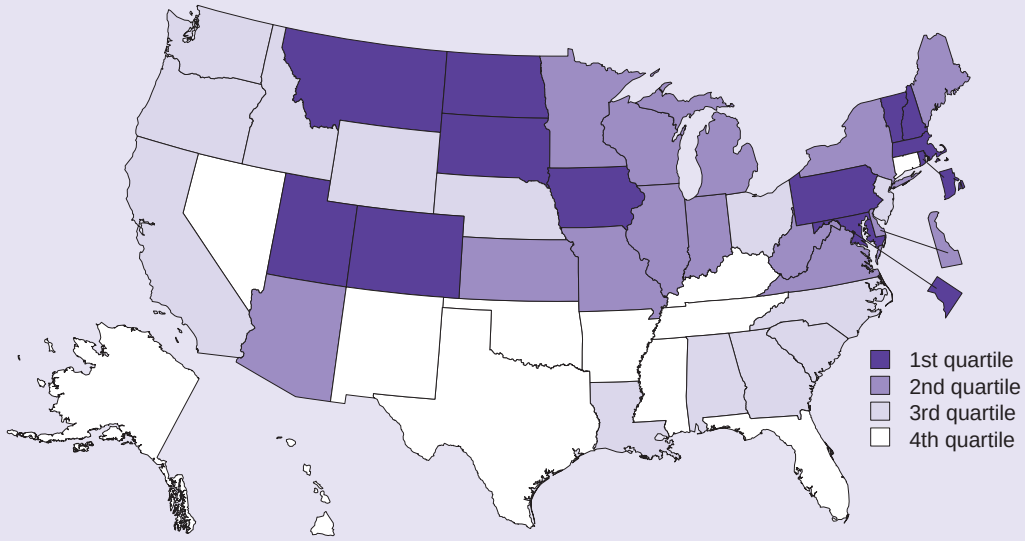
NA = not available

SOURCES: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, various years; and U.S. Census Bureau, Population Division.

Science and Engineering Indicators 2006

Bachelor's Degrees in Natural Sciences and Engineering Conferred per 1,000 Individuals 18–24 Years Old

Figure 8-14
Bachelor's degrees in natural sciences and engineering conferred per 1,000 individuals 18–24 years old: 2003



1st quartile (27.26–9.85)	2nd quartile (9.69–7.95)	3rd quartile (7.88–6.80)	4th quartile (6.54–3.23)
Colorado	Arizona	Alabama	Alaska
District of Columbia	Delaware	California	Arkansas
Iowa	Illinois	Georgia	Connecticut
Maryland	Indiana	Idaho	Florida
Massachusetts	Kansas	Louisiana	Hawaii
Montana	Maine	Nebraska	Kentucky
New Hampshire	Michigan	New Jersey	Mississippi
North Dakota	Minnesota	North Carolina	Nevada
Pennsylvania	Missouri	Ohio	New Mexico
Rhode Island	New York	Oregon	Oklahoma
South Dakota	Virginia	South Carolina	Tennessee
Utah	West Virginia	Washington	Texas
Vermont	Wisconsin	Wyoming	

SOURCES: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, various years; and U.S. Census Bureau, Population Division. See Table 8-14.

Findings

- During the past decade, the value of this indicator increased across the nation as the number of NS&E bachelor's degrees awarded increased by roughly 28%, from nearly 177,000 in 1993 to nearly 226,000 in 2003, while the number of 18–24-year-olds increased by 12%.
- In 2003, NS&E bachelor's degrees accounted for nearly 17% of all bachelor's degrees, an increase from 15% in 1993.
- The value of this indicator for the United States was 7.8 in 2003, ranging from 3.2 to 14.1 for individual states. However, the value for the District of Columbia exceeded 27 (an outlier reflecting a large concentration of academic institutions relative to the size of the resident population).
- State ratings were generally in the same quartile for this indicator as for the number of bachelor's degrees conferred per 1,000 18–24-year-olds.

Natural sciences and engineering (NS&E) fields include physical, earth, ocean, atmospheric, biological, agricultural, and computer sciences; mathematics; and engineering. NS&E fields differ from science and engineering fields because NS&E fields do not include degrees in social sciences or psychology. The ratio of new NS&E bachelor's degrees to the 18–24-year-old population indicates the degree to which a state prepares young people to enter the types of technology-intensive occupations that are fundamental to a knowledge-based, technology-driven economy. The capacity to produce NS&E degrees also generates resources for the state. The 18–24-year-old cohort was chosen to approximate the age range of most students who are pursuing an undergraduate degree.

A high value for this indicator may suggest relative success in providing a technical undergraduate education. Student and graduate mobility after graduation, however, may make this indicator less meaningful in predicting the qualifications of a state's future workforce. The indicator's value may also be high when a higher education system draws a large percentage of out-of-state students to study in NS&E fields, a situation that sometimes occurs in states with small resident populations and the District of Columbia.

Table 8-14
Bachelor's degrees in natural sciences and engineering conferred per 1,000 individuals 18–24 years old, by state: 1993, 1998, and 2003

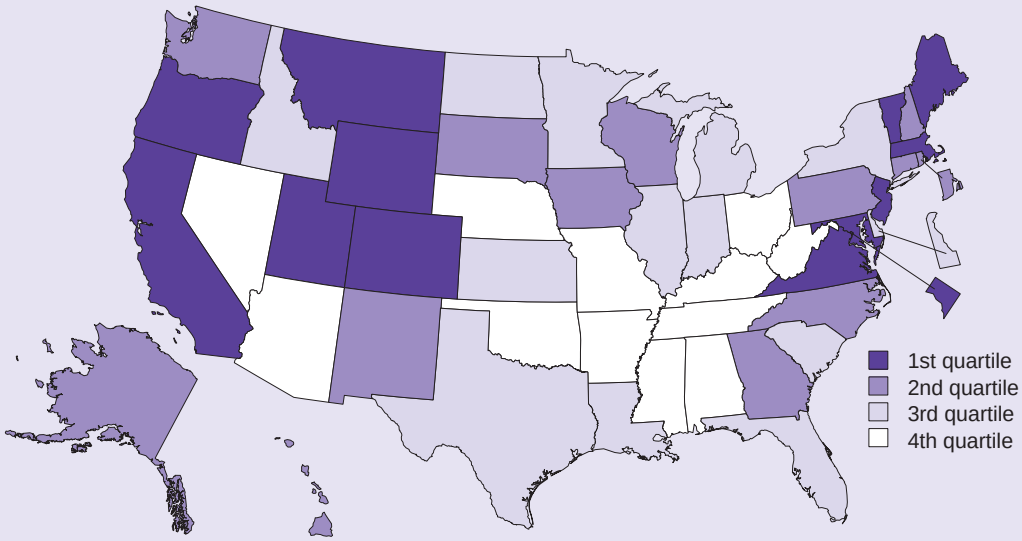
State	NS&E bachelor's degrees			Population 18–24 years old			Degrees/1,000 individuals 18–24 years old		
	1993	1998	2003	1993	1998	2003	1993	1998	2003
United States	177,288	202,470	225,874	25,739,925	25,476,201	28,900,513	6.89	7.95	7.82
Alabama	3,447	3,601	3,244	454,770	438,019	453,710	7.58	8.22	7.15
Alaska	186	314	247	60,022	68,962	69,574	3.10	4.55	3.55
Arizona	2,192	3,084	4,403	395,208	444,734	552,538	5.55	6.93	7.97
Arkansas	1,152	1,364	1,632	246,273	250,431	276,347	4.68	5.45	5.91
California	19,329	21,808	24,610	3,170,388	3,171,047	3,569,122	6.10	6.88	6.90
Colorado	3,870	4,632	4,959	342,578	376,366	454,558	11.30	12.31	10.91
Connecticut	2,116	1,970	1,984	295,584	256,388	303,176	7.16	7.68	6.54
Delaware	590	679	704	70,787	67,054	81,585	8.33	10.13	8.63
District of Columbia	1,081	1,311	1,752	64,384	43,865	64,273	16.79	29.89	27.26
Florida	5,350	6,776	7,552	1,180,537	1,209,003	1,493,632	4.53	5.60	5.06
Georgia	3,761	4,963	6,049	730,881	754,676	889,162	5.15	6.58	6.80
Hawaii	540	576	651	116,670	119,378	125,284	4.63	4.83	5.20
Idaho	681	896	1,104	114,637	139,586	153,101	5.94	6.42	7.21
Illinois	7,611	8,434	10,043	1,155,733	1,125,624	1,254,527	6.59	7.49	8.01
Indiana	4,990	5,118	5,364	602,192	572,453	634,269	8.29	8.94	8.46
Iowa	2,693	2,940	3,408	279,421	276,610	316,933	9.64	10.63	10.75
Kansas	2,203	2,241	2,538	251,584	263,410	295,852	8.76	8.51	8.58
Kentucky	1,832	2,221	1,961	403,547	400,137	411,637	4.54	5.55	4.76
Louisiana	2,485	3,319	3,550	461,025	473,066	500,616	5.39	7.02	7.09
Maine	911	995	1,137	118,437	110,125	120,783	7.69	9.04	9.41
Maryland	3,793	4,364	5,278	452,016	433,031	507,475	8.39	10.08	10.40
Massachusetts	6,639	7,193	7,500	599,360	505,584	596,934	11.08	14.23	12.56
Michigan	7,749	8,323	9,300	967,872	922,891	992,111	8.01	9.02	9.37
Minnesota	3,314	3,921	4,283	421,533	439,358	520,699	7.86	8.92	8.23
Mississippi	1,624	1,726	1,553	304,375	300,061	322,505	5.34	5.75	4.82
Missouri	3,737	4,565	5,358	504,892	509,453	577,581	7.40	8.96	9.28
Montana	848	1,108	1,275	77,645	88,262	96,129	10.92	12.55	13.26
Nebraska	1,205	1,479	1,485	157,809	166,811	188,391	7.64	8.87	7.88
Nevada	361	578	644	119,846	148,028	199,143	3.01	3.90	3.23
New Hampshire	1,137	1,314	1,196	103,606	95,661	119,503	10.97	13.74	10.01
New Jersey	3,927	4,806	5,605	707,317	669,415	726,145	5.55	7.18	7.72
New Mexico	1,041	1,147	1,197	159,007	174,353	198,398	6.55	6.58	6.03
New York	13,430	13,856	17,094	1,766,276	1,601,269	1,826,944	7.60	8.65	9.36
North Carolina	5,307	6,378	6,411	751,837	702,132	824,233	7.06	9.08	7.78
North Dakota	767	855	956	66,568	67,835	76,213	11.52	12.60	12.54
Ohio	7,167	8,115	8,330	1,105,197	1,056,810	1,119,732	6.48	7.68	7.44
Oklahoma	2,026	2,348	2,230	329,713	336,797	382,078	6.14	6.97	5.84
Oregon	1,726	2,240	2,490	276,672	303,895	347,267	6.24	7.37	7.17
Pennsylvania	10,582	11,323	13,521	1,149,074	1,022,583	1,180,592	9.21	11.07	11.45
Rhode Island	1,088	1,202	1,615	104,444	83,023	114,254	10.42	14.48	14.14
South Carolina	2,285	2,710	2,946	404,863	385,887	426,854	5.64	7.02	6.90
South Dakota	839	976	961	70,155	76,172	85,043	11.96	12.81	11.30
Tennessee	3,086	3,598	3,400	522,815	515,066	571,200	5.90	6.99	5.95
Texas	9,973	11,641	12,988	1,907,830	2,038,563	2,351,723	5.23	5.71	5.52
Utah	2,010	2,838	3,091	225,001	290,363	313,689	8.93	9.77	9.85
Vermont	660	766	861	58,910	52,029	63,895	11.20	14.72	13.48
Virginia	5,046	5,474	5,846	685,233	656,887	735,711	7.36	8.33	7.95
Washington	3,108	3,918	4,231	493,660	539,707	618,757	6.30	7.26	6.84
West Virginia	1,045	1,197	1,451	191,056	182,025	174,583	5.47	6.58	8.31
Wisconsin	4,375	4,838	5,488	493,627	498,268	566,174	8.86	9.71	9.69
Wyoming	373	431	398	47,058	53,048	55,878	7.93	8.12	7.12
Puerto Rico	2,137	2,841	NA	NA	NA	418,390	NA	NA	NA

NA = not available
NS&E = natural sciences and engineering

SOURCES: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, various years; and U.S. Census Bureau, Population Division.

S&E Degrees as Share of Higher Education Degrees Conferred

Figure 8-15
S&E degrees as share of higher education degrees conferred: 2003



1st quartile (42.7%–32.5%)	2nd quartile (32.0%–29.1%)	3rd quartile (28.9%–26.1%)	4th quartile (25.9%–19.5%)
California	Alaska	Delaware	Alabama
Colorado	Connecticut	Florida	Arizona
District of Columbia	Georgia	Idaho	Arkansas
Maine	Hawaii	Illinois	Kentucky
Maryland	Iowa	Indiana	Mississippi
Massachusetts	New Hampshire	Kansas	Missouri
Montana	New Mexico	Louisiana	Nebraska
New Jersey	North Carolina	Michigan	Nevada
Oregon	Pennsylvania	Minnesota	Ohio
Utah	Rhode Island	New York	Oklahoma
Vermont	South Dakota	North Dakota	Tennessee
Virginia	Washington	South Carolina	West Virginia
Wyoming	Wisconsin	Texas	

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System. See Table 8-15.

Findings

- In 2003, more than 564,000 S&E bachelor's, master's, and doctoral degrees were conferred nationwide; since 1993, S&E degrees have represented about 30% of all higher education degrees.
- There is a significant difference in the emphasis that states place on technical higher education. In some states, nearly 40% of their degrees are awarded in S&E fields; in others, fewer than 20% of their degrees are awarded in these fields.
- The District of Columbia has a high value of 43% because of the large S&E graduate programs in political science and public administration at several of its academic institutions.

This indicator is a measure of the extent to which a state's higher education programs are concentrated in science and engineering fields. The indicator is expressed as the percentage of higher education degrees that were conferred in S&E fields. High values for this indicator are from states that emphasize S&E fields in their higher education systems.

S&E fields include physical, life, earth, ocean, atmospheric, computer, and social sciences; mathematics; engineering; and psychology. For both S&E degrees and higher education degrees conferred, bachelor's, master's, and doctoral degrees are included; associate's degrees are excluded. Geographic location refers to the location of the degree-granting institution and does not reflect the state where students permanently reside. The year is the latter date of the academic year. For example, data for 2003 represent degrees conferred during the 2002–03 academic year.

Table 8-15
S&E degrees as share of higher education degrees conferred, by state: 1993, 1998, and 2003

State	S&E degrees			All higher education degrees			S&E/higher education degrees (%)		
	1993	1998	2003	1993	1998	2003	1993	1998	2003
United States	473,414	506,827	564,444	1,576,838	1,661,105	1,897,322	30.0	30.5	29.7
Alabama	6,676	6,872	6,919	26,567	27,205	29,363	25.1	25.3	23.6
Alaska	476	714	605	1,633	2,028	1,905	29.1	35.2	31.8
Arizona	5,984	7,298	8,669	22,212	33,186	44,485	26.9	22.0	19.5
Arkansas	2,341	2,827	3,137	10,422	11,572	13,167	22.5	24.4	23.8
California	56,919	58,687	68,369	153,400	153,238	182,805	37.1	38.3	37.4
Colorado	10,348	11,460	12,692	26,967	29,100	33,280	38.4	39.4	38.1
Connecticut	7,000	7,012	7,776	22,336	21,603	24,948	31.3	32.5	31.2
Delaware	1,817	1,806	2,027	5,154	5,981	7,054	35.3	30.2	28.7
District of Columbia	5,953	6,545	7,201	14,716	15,891	16,870	40.5	41.2	42.7
Florida	14,658	17,462	20,638	57,848	66,845	76,775	25.3	26.1	26.9
Georgia	9,126	11,470	13,427	34,247	40,778	44,271	26.6	28.1	30.3
Hawaii	1,710	2,034	2,000	5,715	6,178	6,598	29.9	32.9	30.3
Idaho	1,383	1,660	2,146	4,993	5,719	7,592	27.7	29.0	28.3
Illinois	20,620	21,888	25,263	76,596	80,329	93,032	26.9	27.2	27.2
Indiana	11,799	11,498	12,186	39,441	40,026	45,871	29.9	28.7	26.6
Iowa	6,155	6,394	7,060	21,798	21,747	24,284	28.2	29.4	29.1
Kansas	4,914	5,135	5,816	18,894	19,293	22,294	26.0	26.6	26.1
Kentucky	4,420	5,034	5,062	18,919	20,155	22,308	23.4	25.0	22.7
Louisiana	5,754	6,940	7,212	22,976	24,730	27,336	25.0	28.1	26.4
Maine	2,237	2,211	2,546	6,933	6,600	7,548	32.3	33.5	33.7
Maryland	10,683	11,778	13,985	30,463	32,918	37,229	35.1	35.8	37.6
Massachusetts	20,745	22,001	24,047	64,238	66,924	73,802	32.3	32.9	32.6
Michigan	18,024	18,615	21,001	62,168	63,482	74,158	29.0	29.3	28.3
Minnesota	8,755	9,358	9,873	30,741	31,068	35,094	28.5	30.1	28.1
Mississippi	3,400	3,376	3,311	13,648	14,046	15,554	24.9	24.0	21.3
Missouri	8,949	10,947	12,521	36,961	41,264	49,805	24.2	26.5	25.1
Montana	1,541	2,073	2,279	5,007	5,852	6,292	30.8	35.4	36.2
Nebraska	2,777	3,213	3,277	11,767	13,400	14,995	23.6	24.0	21.9
Nevada	910	1,372	1,520	3,913	5,037	5,994	23.3	27.2	25.4
New Hampshire	2,890	3,037	3,050	9,589	9,514	9,848	30.1	31.9	31.0
New Jersey	11,988	13,023	15,234	34,260	34,904	41,796	35.0	37.3	36.4
New Mexico	2,544	2,669	2,628	8,039	8,910	8,985	31.6	30.0	29.2
New York	43,020	42,658	49,108	144,939	146,141	170,122	29.7	29.2	28.9
North Carolina	12,952	14,576	15,558	39,696	43,291	48,705	32.6	33.7	31.9
North Dakota	1,354	1,543	1,583	5,278	5,425	5,900	25.7	28.4	26.8
Ohio	19,026	19,596	19,706	69,415	69,467	76,541	27.4	28.2	25.7
Oklahoma	4,938	5,747	5,654	19,875	21,590	21,828	24.8	26.6	25.9
Oregon	5,779	6,297	6,869	17,324	18,128	21,022	33.4	34.7	32.7
Pennsylvania	25,350	26,174	29,675	85,052	86,601	99,234	29.8	30.2	29.9
Rhode Island	3,065	2,933	3,446	11,735	10,500	11,691	26.1	27.9	29.5
South Carolina	5,499	5,836	6,493	19,852	20,053	23,393	27.7	29.1	27.8
South Dakota	1,677	1,962	1,796	5,352	5,484	5,605	31.3	35.8	32.0
Tennessee	7,173	8,080	8,359	26,091	29,254	32,993	27.5	27.6	25.3
Texas	25,466	27,773	31,303	91,031	98,209	113,409	28.0	28.3	27.6
Utah	5,323	6,572	7,187	15,905	19,875	22,124	33.5	33.1	32.5
Vermont	2,146	2,215	2,042	5,863	6,013	5,957	36.6	36.8	34.3
Virginia	14,834	14,786	16,379	41,181	42,110	46,845	36.0	35.1	35.0
Washington	8,639	9,847	10,852	27,973	31,360	33,890	30.9	31.4	32.0
West Virginia	2,266	2,590	2,839	10,621	11,010	11,974	21.3	23.5	23.7
Wisconsin	10,589	10,328	11,299	34,846	34,914	38,539	30.4	29.6	29.3
Wyoming	822	905	819	2,248	2,157	2,212	36.6	42.0	37.0
Puerto Rico	3,675	4,425	NA	15,207	15,798	NA	24.2	28.0	NA

NA = not available

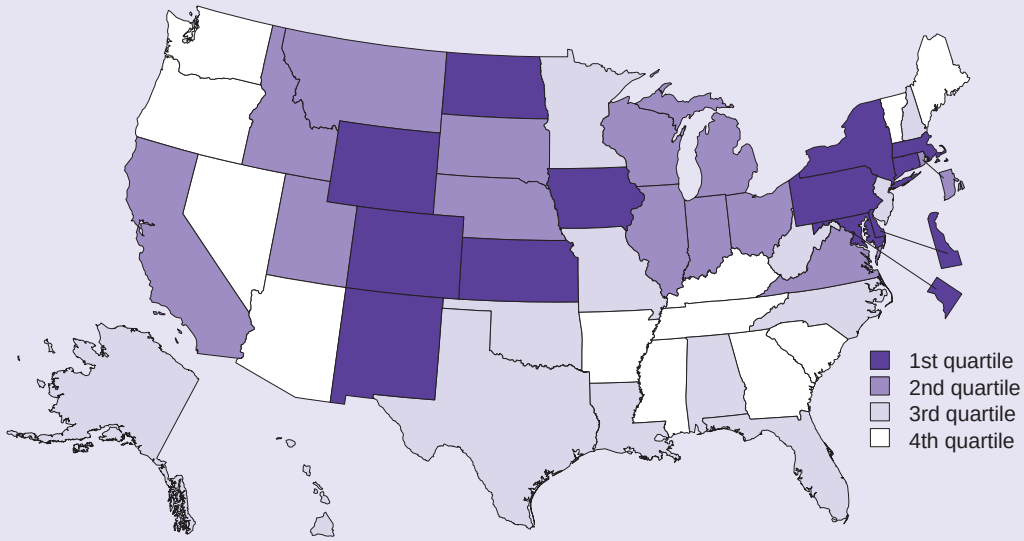
NOTES: S&E degrees conferred include bachelor's, master's, and doctoral degrees. S&E degrees include physical, computer, agricultural, biological, earth, atmospheric, ocean, and social sciences; psychology; mathematics; and engineering. All degrees conferred include bachelor's, master's, and doctoral degrees.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, various years.

Science and Engineering Indicators 2006

S&E Graduate Students per 1,000 Individuals 25–34 Years Old

Figure 8-16
S&E graduate students per 1,000 individuals 25–34 years old: 2003



1st quartile (70.33–13.93)	2nd quartile (13.91–10.98)	3rd quartile (10.79–8.85)	4th quartile (8.84–4.65)
Colorado	California	Alabama	Arizona
Connecticut	Idaho	Alaska	Arkansas
Delaware	Illinois	Florida	Georgia
District of Columbia	Indiana	Hawaii	Kentucky
Iowa	Michigan	Louisiana	Maine
Kansas	Montana	Minnesota	Mississippi
Maryland	Nebraska	Missouri	Nevada
Massachusetts	Ohio	New Hampshire	Oregon
New Mexico	Rhode Island	New Jersey	South Carolina
New York	South Dakota	North Carolina	Tennessee
North Dakota	Utah	Oklahoma	Vermont
Pennsylvania	Virginia	Texas	Washington
Wyoming	Wisconsin	West Virginia	

SOURCES: National Science Foundation, Division of Science Resources Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering; and U.S. Census Bureau, Population Division. See table 8-16.

Findings

- The number of S&E graduate students in the United States grew 8% over the last decade, rising from approximately 434,000 in 1993 to nearly 469,000 in 2003.
- Individual states showed varying levels of graduate level S&E training, with 0.46% to 2.48% of their 25–34-year-old population pursuing S&E graduate studies.
- The District of Columbia is an outlier, with more than 7% of its 25–34-year-old population enrolled as S&E graduate students, reflecting a large concentration of S&E graduate programs in political science and public administration and a small resident population.
- Maine and Vermont show different involvement in undergraduate- and graduate-level S&E education as their rankings on these two indicators shift from the first to the fourth quartiles. These states emphasize undergraduate S&E education at the state level, and their students pursue graduate-level S&E education regionally and nationally.

Graduate students in science and engineering fields are a source of the technical leaders of the future. The ratio of S&E graduate students to a state's 25–34-year-old population is a broad measure of a state's investment in producing high-level scientists and engineers. The 25–34-year-old cohort was chosen to approximate the age of most graduate students. This cohort includes U.S. citizens and noncitizens as well as graduate students who come from other states and countries.

Data on S&E graduate students were collected by surveying all academic institutions in the United States that offer doctorate or master's degree programs in any science or engineering field, including physical, life, earth, ocean, atmospheric, computer, and social sciences; mathematics; engineering; and psychology. Graduate students who are enrolled in schools of nursing, public health, dentistry, veterinary medicine, and other health-related disciplines are not included.

Table 8-16
S&E graduate students per 1,000 individuals 25–34 years old, by state: 1993, 1998, and 2003

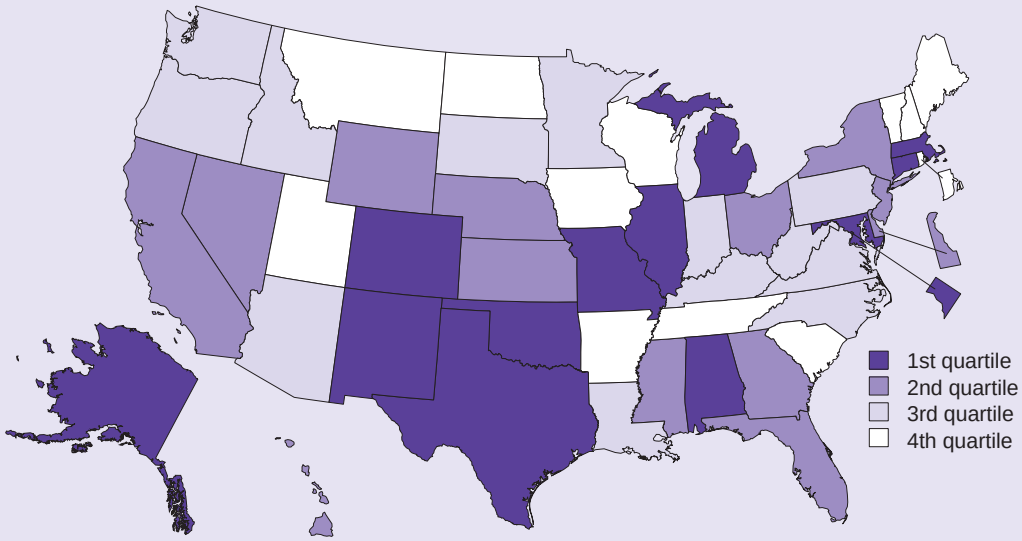
State	S&E graduate students			Population 25–34 years old			S&E graduate students/ 1,000 individuals 25–34 years old		
	1993	1998	2003	1993	1998	2003	1993	1998	2003
United States	433,630	402,268	468,837	41,797,082	38,743,134	39,872,598	10.37	10.38	11.76
Alabama	5,820	5,118	5,859	637,081	621,468	595,804	9.14	8.24	9.83
Alaska	829	695	761	102,465	75,618	82,478	8.09	9.19	9.23
Arizona	6,974	6,417	7,104	638,087	641,023	803,477	10.93	10.01	8.84
Arkansas	2,018	2,038	2,173	344,514	331,366	353,978	5.86	6.15	6.14
California	54,281	51,615	63,595	5,650,931	5,203,609	5,296,858	9.61	9.92	12.01
Colorado	8,793	8,385	10,386	580,405	531,951	716,024	15.15	15.76	14.51
Connecticut	6,505	5,889	7,013	542,514	467,651	416,710	11.99	12.59	16.83
Delaware	1,533	1,459	1,664	120,081	116,487	107,029	12.77	12.53	15.55
District of Columbia	8,979	7,214	7,686	117,025	100,486	109,290	76.73	71.79	70.33
Florida	14,273	13,897	18,690	2,079,987	1,928,332	2,111,800	6.86	7.21	8.85
Georgia	8,677	8,466	9,907	1,196,457	1,211,587	1,349,465	7.25	6.99	7.34
Hawaii	1,747	1,575	1,761	189,366	154,881	164,500	9.23	10.17	10.71
Idaho	1,479	1,474	1,979	149,057	151,433	179,230	9.92	9.73	11.04
Illinois	22,573	21,822	23,866	1,926,485	1,743,624	1,805,301	11.72	12.52	13.22
Indiana	9,278	7,952	8,964	883,464	838,946	816,357	10.50	9.48	10.98
Iowa	4,996	4,331	5,145	399,918	364,603	362,158	12.49	11.88	14.21
Kansas	4,960	5,645	6,326	388,218	348,681	352,433	12.78	16.19	17.95
Kentucky	3,640	3,442	4,478	583,619	549,127	562,218	6.24	6.27	7.96
Louisiana	5,379	5,161	6,382	655,495	586,604	591,648	8.21	8.80	10.79
Maine	786	586	679	188,363	169,350	146,110	4.17	3.46	4.65
Maryland	9,124	9,160	10,667	882,453	789,089	720,652	10.34	11.61	14.80
Massachusetts	19,991	19,597	22,016	1,061,596	979,008	888,560	18.83	20.02	24.78
Michigan	15,982	14,405	16,937	1,498,084	1,393,047	1,312,899	10.67	10.34	12.90
Minnesota	7,035	6,662	7,205	738,253	647,066	673,520	9.53	10.30	10.70
Mississippi	2,635	2,943	2,511	381,258	380,593	382,352	6.91	7.73	6.57
Missouri	6,289	5,658	7,175	806,964	736,889	737,924	7.79	7.68	9.72
Montana	1,319	1,225	1,446	108,799	95,376	103,918	12.12	12.84	13.91
Nebraska	2,843	2,252	2,784	237,918	211,365	225,838	11.95	10.65	12.33
Nevada	1,406	1,461	1,868	241,481	251,140	343,535	5.82	5.82	5.44
New Hampshire	1,144	1,141	1,458	191,727	181,466	149,659	5.97	6.29	9.74
New Jersey	11,312	10,316	11,959	1,292,830	1,137,612	1,116,460	8.75	9.07	10.71
New Mexico	3,577	2,950	3,774	241,534	216,029	231,163	14.81	13.66	16.33
New York	42,348	38,646	41,532	3,027,979	2,701,240	2,670,831	13.99	14.31	15.55
North Carolina	9,290	9,820	11,543	1,132,784	1,129,041	1,227,593	8.20	8.70	9.40
North Dakota	920	958	1,534	93,082	80,870	77,532	9.88	11.85	19.79
Ohio	19,254	16,364	17,966	1,704,983	1,566,982	1,465,077	11.29	10.44	12.26
Oklahoma	4,301	3,840	4,553	469,762	424,994	461,427	9.16	9.04	9.87
Oregon	4,215	3,585	4,369	440,878	427,402	500,562	9.56	8.39	8.73
Pennsylvania	19,901	18,325	20,555	1,788,478	1,617,666	1,475,595	11.13	11.33	13.93
Rhode Island	2,022	1,550	1,878	163,192	150,218	136,881	12.39	10.32	13.72
South Carolina	3,877	3,342	3,440	581,100	566,157	560,094	6.67	5.90	6.14
South Dakota	947	829	1,000	100,108	87,577	90,400	9.46	9.47	11.06
Tennessee	6,474	5,891	6,646	797,271	787,562	820,123	8.12	7.48	8.10
Texas	29,886	26,525	32,820	2,992,253	2,811,983	3,284,470	9.99	9.43	9.99
Utah	4,127	3,729	4,710	284,718	291,726	380,431	14.50	12.78	12.38
Vermont	669	610	613	87,896	84,759	70,529	7.61	7.20	8.69
Virginia	11,332	11,202	12,892	1,136,797	1,069,562	1,017,047	9.97	10.47	12.68
Washington	6,057	5,813	6,689	850,276	802,313	854,311	7.12	7.25	7.83
West Virginia	2,129	2,145	2,390	238,946	227,943	224,273	8.91	9.41	10.66
Wisconsin	8,827	7,354	8,620	787,430	706,440	686,324	11.21	10.41	12.56
Wyoming	877	789	869	62,720	53,192	59,750	13.98	14.83	14.54
Puerto Rico	2,004	2,464	3,366	NA	NA	543,455	NA	NA	6.19

NA = not available

SOURCES: National Science Foundation, Division of Science Resources Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering; and U.S. Census Bureau, Population Division.

Advanced S&E Degrees as Share of S&E Degrees Conferred

Figure 8-17
Advanced S&E degrees as share of S&E degrees conferred: 2003



1st quartile (42.3%–25.4%)	2nd quartile (25.2%–21.5%)	3rd quartile (21.1%–17.3%)	4th quartile (17.2%–7.9%)
Alabama	California	Arizona	Arkansas
Alaska	Delaware	Idaho	Iowa
Colorado	Florida	Indiana	Maine
Connecticut	Georgia	Kentucky	Montana
District of Columbia	Hawaii	Louisiana	New Hampshire
Illinois	Kansas	Minnesota	North Dakota
Maryland	Mississippi	North Carolina	Rhode Island
Massachusetts	Nebraska	Oregon	South Carolina
Michigan	Nevada	Pennsylvania	Tennessee
Missouri	New Jersey	South Dakota	Utah
New Mexico	New York	Virginia	Vermont
Oklahoma	Ohio	Washington	Wisconsin
Texas	Wyoming	West Virginia	

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System. See Table 8-17.

Findings

- In 2003, nearly 132,000 advanced S&E degrees were awarded nationwide; this total represented approximately 19% more than in 1993, but the share of advanced degrees remained stable at 23% of all S&E degrees conferred.
- Some states specialize in providing graduate-level technical training, with just over 30% of their S&E graduates completing training at the master's or doctoral level; other states have much smaller graduate S&E programs, with values as low as 8%.
- The District of Columbia is an outlier, with 42% reflecting large S&E graduate programs in political science and public administration at several of its academic institutions.
- States that emphasize advanced S&E education are not necessarily the same states as those that emphasize undergraduate-level S&E education; only about half of the states in the top two quartiles for intensity of advanced S&E degree production would appear in the top two quartiles for a similar indicator showing intensity of S&E bachelor's degree production.

This indicator shows the extent to which a state's higher education programs in science and engineering are concentrated at the graduate level. S&E fields include physical, life, earth, ocean, atmospheric, computer, and social sciences; mathematics; engineering; and psychology. Advanced S&E degrees include master's and doctoral degrees. All degrees include bachelor's, master's, and doctoral degrees. Associate's degrees are excluded from this indicator.

The indicator value is obtained by dividing the number of advanced S&E degrees by the total number of S&E degrees awarded by the higher education institutions within the state. A high value shows that a state is significantly investing its S&E training budget at the graduate level.

Table 8-17
Advanced S&E degrees as share of S&E degrees conferred, by state: 1993, 1998, and 2003

State	Advanced S&E degrees			All S&E degrees			Advanced/ all S&E degrees (%)		
	1993	1998	2003	1993	1998	2003	1993	1998	2003
United States	110,701	120,203	131,656	473,414	506,827	564,444	23.4	23.7	23.3
Alabama	1,420	1,504	1,897	6,676	6,872	6,919	21.3	21.9	27.4
Alaska	135	235	194	476	714	605	28.4	32.9	32.1
Arizona	1,618	2,023	1,785	5,984	7,298	8,669	27.0	27.7	20.6
Arkansas	367	449	487	2,341	2,827	3,137	15.7	15.9	15.5
California	14,445	14,166	15,796	56,919	58,687	68,369	25.4	24.1	23.1
Colorado	2,583	2,949	3,230	10,348	11,460	12,692	25.0	25.7	25.4
Connecticut	1,668	1,793	2,078	7,000	7,012	7,776	23.8	25.6	26.7
Delaware	369	376	448	1,817	1,806	2,027	20.3	20.8	22.1
District of Columbia	2,448	2,989	3,045	5,953	6,545	7,201	41.1	45.7	42.3
Florida	3,372	3,908	4,593	14,658	17,462	20,638	23.0	22.4	22.3
Georgia	2,078	2,532	3,081	9,126	11,470	13,427	22.8	22.1	22.9
Hawaii	428	532	473	1,710	2,034	2,000	25.0	26.2	23.7
Idaho	350	343	405	1,383	1,660	2,146	25.3	20.7	18.9
Illinois	5,782	6,390	7,691	20,620	21,888	25,263	28.0	29.2	30.4
Indiana	2,372	2,534	2,458	11,799	11,498	12,186	20.1	22.0	20.2
Iowa	1,097	1,211	1,127	6,155	6,394	7,060	17.8	18.9	16.0
Kansas	987	1,176	1,302	4,914	5,135	5,816	20.1	22.9	22.4
Kentucky	827	954	1,067	4,420	5,034	5,062	18.7	19.0	21.1
Louisiana	1,206	1,509	1,403	5,754	6,940	7,212	21.0	21.7	19.5
Maine	188	217	201	2,237	2,211	2,546	8.4	9.8	7.9
Maryland	2,969	3,431	4,096	10,683	11,778	13,985	27.8	29.1	29.3
Massachusetts	5,827	6,514	7,218	20,745	22,001	24,047	28.1	29.6	30.0
Michigan	4,189	4,823	5,696	18,024	18,615	21,001	23.2	25.9	27.1
Minnesota	1,390	1,679	1,809	8,755	9,358	9,873	15.9	17.9	18.3
Mississippi	714	664	712	3,400	3,376	3,311	21.0	19.7	21.5
Missouri	2,135	2,869	3,257	8,949	10,947	12,521	23.9	26.2	26.0
Montana	276	380	384	1,541	2,073	2,279	17.9	18.3	16.8
Nebraska	551	626	706	2,777	3,213	3,277	19.8	19.5	21.5
Nevada	210	341	370	910	1,372	1,520	23.1	24.9	24.3
New Hampshire	417	406	472	2,890	3,037	3,050	14.4	13.4	15.5
New Jersey	3,092	2,928	3,569	11,988	13,023	15,234	25.8	22.5	23.4
New Mexico	799	801	721	2,544	2,669	2,628	31.4	30.0	27.4
New York	11,202	10,753	12,372	43,020	42,658	49,108	26.0	25.2	25.2
North Carolina	2,117	2,454	2,898	12,952	14,576	15,558	16.3	16.8	18.6
North Dakota	191	228	231	1,354	1,543	1,583	14.1	14.8	14.6
Ohio	5,030	5,281	4,625	19,026	19,596	19,706	26.4	26.9	23.5
Oklahoma	1,334	1,756	1,793	4,938	5,747	5,654	27.0	30.6	31.7
Oregon	1,207	1,298	1,307	5,779	6,297	6,869	20.9	20.6	19.0
Pennsylvania	5,326	5,489	6,134	25,350	26,174	29,675	21.0	21.0	20.7
Rhode Island	614	579	532	3,065	2,933	3,446	20.0	19.7	15.4
South Carolina	920	1,007	1,032	5,499	5,836	6,493	16.7	17.3	15.9
South Dakota	281	379	373	1,677	1,962	1,796	16.8	19.3	20.8
Tennessee	1,270	1,475	1,440	7,173	8,080	8,359	17.7	18.3	17.2
Texas	6,434	7,445	8,080	25,466	27,773	31,303	25.3	26.8	25.8
Utah	1,013	1,006	1,060	5,323	6,572	7,187	19.0	15.3	14.7
Vermont	330	457	181	2,146	2,215	2,042	15.4	20.6	8.9
Virginia	2,853	3,092	3,374	14,834	14,786	16,379	19.2	20.9	20.6
Washington	1,899	1,777	1,953	8,639	9,847	10,852	22.0	18.0	18.0
West Virginia	355	501	492	2,266	2,590	2,839	15.7	19.3	17.3
Wisconsin	1,803	1,712	1,809	10,589	10,328	11,299	17.0	16.6	16.0
Wyoming	213	262	199	822	905	819	25.9	29.0	24.3
Puerto Rico	415	536	NA	3,675	4,425	NA	11.3	12.1	NA

NA = not avaiablle

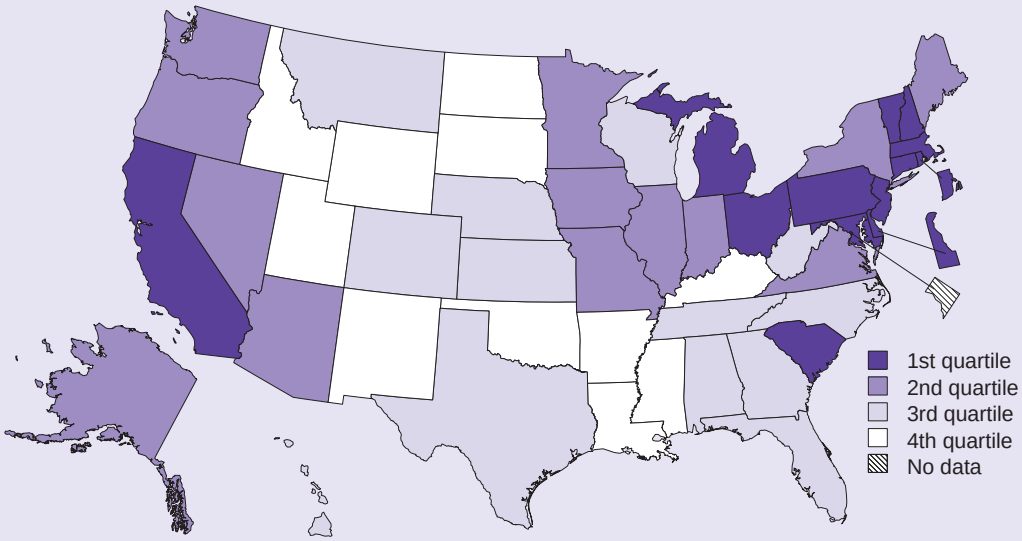
NOTES: All degrees include bachelor's, master's, and doctoral degrees; advanced degrees include only master's and doctoral degrees. S&E degrees include physical, computer, agricultural, biological, earth, atmospheric, ocean, and social sciences; psychology; mathematics; and engineering.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, various years.

Science and Engineering Indicators 2006

Average Undergraduate Charge at Public 4-Year Institutions

Figure 8-18
Average undergraduate charge at public 4-year institutions: 2004



1st quartile ($15,109–$12,208)	2nd quartile ($12,002–$10,118)	3rd quartile ($9,751–$8,604)	4th quartile ($8,547–$7,494)	No data
California	Alaska	Alabama	Arkansas	District of Columbia
Connecticut	Arizona	Colorado	Idaho	
Delaware	Illinois	Florida	Kentucky	
Maryland	Indiana	Georgia	Louisiana	
Massachusetts	Iowa	Hawaii	Mississippi	
Michigan	Maine	Kansas	New Mexico	
New Hampshire	Minnesota	Montana	North Dakota	
New Jersey	Missouri	Nebraska	Oklahoma	
Ohio	Nevada	North Carolina	South Dakota	
Pennsylvania	New York	Tennessee	Utah	
Rhode Island	Oregon	Texas	Wyoming	
South Carolina	Virginia	West Virginia		
Vermont	Washington	Wisconsin		

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System. See table 8-18.

Findings

- During 2004, the total annual nominal charge for a full-time undergraduate student to attend a public 4-year institution averaged $10,720 nationally, an increase of 9% from the previous year.
- Total annual nominal charges at a private 4-year institution averaged $25,204, an increase of 5% from the previous year.
- State averages for public 4-year institutions ranged from a low of $7,494 to a high of $15,109.
- Tuition and required fees averaged approximately 40% of the total charges at public 4-year institutions, but individual states had different cost structures.

The average annual charge for an undergraduate student to attend a public 4-year academic institution is one indicator of how accessible higher education in science and engineering is to a state's less-affluent students. The annual charge includes standard in-state charges for tuition, required fees, room, and board for a full-time undergraduate student who is a resident of that state. These charges were weighted by the number of full-time undergraduates at public institutions. The total charge for all public 4-year institutions in the state was divided by the total number of full-time undergraduates attending public 4-year institutions in the state. The year is the latter date of the academic year. For example, data for 2004 represent costs for the 2003–04 academic year.

To improve the educational attainment of their residents, many states have chosen to reduce the charge to students by providing state subsidies or direct financial aid. Additional financial aid is provided by the federal government and by the academic institutions. The data in this indicator do not include any adjustment for financial aid that a student might receive.

Table 8-18
Average undergraduate charge at public 4-year institutions, by state: 1994, 1999, and 2004
(Dollars)

State	1994	1999	2004
National average	6,365	8,024	10,720
Alabama	5,295	6,558	8,983
Alaska	5,978	8,403	10,118
Arizona	5,463	6,985	10,140
Arkansas	5,296	6,172	8,349
California	7,524	9,035	12,275
Colorado	6,190	7,840	9,751
Connecticut	7,915	9,902	12,772
Delaware	7,790	9,515	12,496
District of Columbia	NA	NA	NA
Florida	5,861	7,283	9,207
Georgia	5,063	7,457	9,090
Hawaii	1,452	8,182	8,760
Idaho	4,977	6,321	8,091
Illinois	6,999	8,812	11,804
Indiana	6,640	8,584	11,637
Iowa	5,439	6,762	10,878
Kansas	5,137	6,236	8,604
Kentucky	5,027	6,222	8,521
Louisiana	5,214	5,919	7,494
Maine	7,503	8,926	11,010
Maryland	8,147	10,512	13,419
Massachusetts	8,503	9,099	12,250
Michigan	7,668	9,205	12,208
Minnesota	5,929	7,561	10,845
Mississippi	5,088	6,015	8,547
Missouri	5,833	7,728	10,320
Montana	5,668	7,054	9,348
Nebraska	4,925	6,482	9,620
Nevada	6,379	7,596	10,333
New Hampshire	7,801	10,532	13,852
New Jersey	8,251	10,977	15,109
New Mexico	5,062	6,433	8,238
New York	7,721	9,698	12,002
North Carolina	4,706	6,525	8,805
North Dakota	5,253	6,615	8,028
Ohio	6,992	9,428	13,319
Oklahoma	4,027	5,740	7,901
Oregon	6,630	8,755	11,626
Pennsylvania	8,277	10,085	13,754
Rhode Island	8,604	10,284	12,763
South Carolina	6,206	7,989	12,710
South Dakota	4,917	6,264	8,379
Tennessee	5,019	6,386	8,936
Texas	4,934	6,756	9,202
Utah	5,125	6,196	7,865
Vermont	10,054	12,238	14,766
Virginia	7,725	8,980	10,900
Washington	6,476	7,985	11,353
West Virginia	5,687	6,755	8,751
Wisconsin	5,249	6,730	9,066
Wyoming	4,900	6,830	8,485

NA = not available

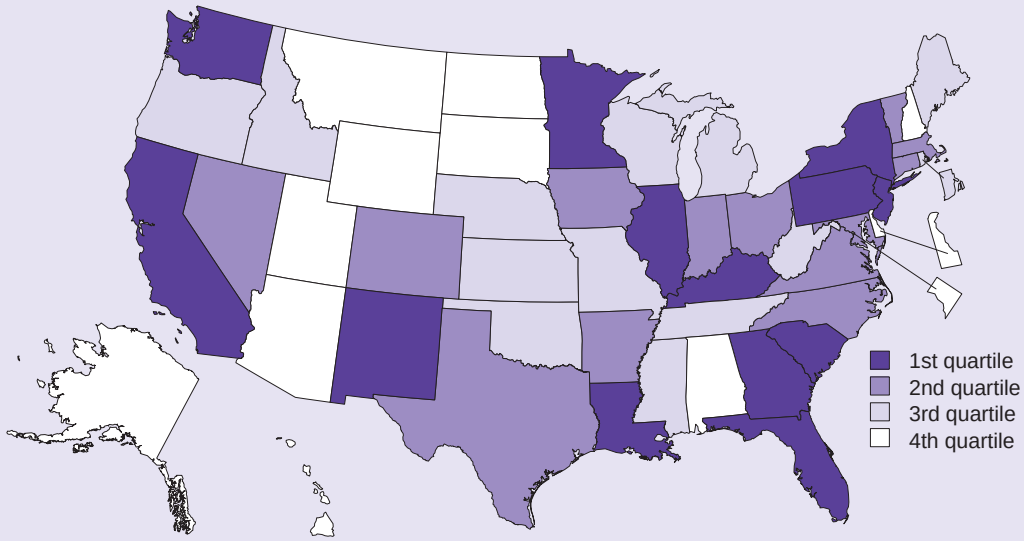
NOTES: National average is reported value in *Digest of Education Statistics* data tables. Data are for entire academic year and are average charges. Tuition and fees were weighted by number of full-time-equivalent undergraduates but are not adjusted to reflect student residency. Room and board are based on full-time students.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, various years.

Science and Engineering Indicators 2006

State Expenditures on Student Aid per Full-Time Undergraduate Student

Figure 8-19
State expenditures on student aid per full-time undergraduate student: 2002



1st quartile ($1,827–$712)	2nd quartile ($682–$424)	3rd quartile ($399–$94)	4th quartile ($84–$0)
California	Arkansas	Idaho	Alabama
Florida	Colorado	Kansas	Alaska
Georgia	Connecticut	Maine	Arizona
Illinois	Indiana	Michigan	Delaware
Kentucky	Iowa	Mississippi	District of Columbia
Louisiana	Maryland	Missouri	Hawaii
Minnesota	Massachusetts	Nebraska	Montana
New Jersey	Nevada	Oklahoma	New Hampshire
New Mexico	North Carolina	Oregon	North Dakota
New York	Ohio	Rhode Island	South Dakota
Pennsylvania	Texas	Tennessee	Utah
South Carolina	Vermont	West Virginia	Wyoming
Washington	Virginia	Wisconsin	

SOURCES: National Association of State Scholarship and Grant Programs, Annual Survey Report; and U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System. See table 8-19.

Findings

- In the United States, the total amount of state financial aid from grants that were provided to undergraduates rose from nearly $2.8 billion in 1995 to nearly $5.0 billion in 2002, an average annual increase of 8.7%. On a per-student basis, this represented an average annual increase of 7.1%, rising from $414 in 1995 to $671 in 2002.
- The amount of financial assistance provided by the states and the District of Columbia varied greatly; 13 averaged less than $100 per undergraduate student, and 6 provided more than $1,000 per student.
- Most states showed rather small increases in the amount of state aid they provided to undergraduates between 1995 and 2002.

The cost of an undergraduate education can be reduced with financial assistance from the state, federal government, or academic institution. This indicator measures the amount of financial support from state grants that go to undergraduate students at both public and private institutions in the state. It is calculated by dividing the total state grant aid to undergraduates by the number of full-time undergraduates who are attending school in the state. A high value is one indicator of state efforts to provide access to higher education at a time of escalating undergraduate costs.

This indicator should be viewed relative to the level of tuition charged to undergraduates in a state because some states have chosen to subsidize tuition for all students at public institutions rather than provide grants.

Total state grant expenditures for financial aid include both need-based and non-need-based grants. State assistance through subsidized or unsubsidized loans and awards to students at the graduate and first professional degree levels are not included. The number of undergraduate students represents the total full-time undergraduate enrollment in both public and private 4-year institutions in the state. The year is the latter date of the academic year. For example, data for 2002 represent costs for the 2001–02 academic year.

Table 8-19
State expenditures on student aid per full-time undergraduate student, by state: 1995, 1999, and 2002

State	State expenditures on student aid ($ thousands)			Undergraduate enrollment at 4-year institutions			State expenditures on student aid/ undergraduate ($)		
	1995	1999	2002	1995	1999	2002	1995	1999	2002
United States	2,782,809	3,595,204	4,999,047	6,718,904	6,946,479	7,450,520	414	518	671
Alabama	9,087	7,665	7,335	120,585	121,407	127,475	75	63	58
Alaska	444	0	0	26,256	24,882	24,939	17	0	0
Arizona	3,482	2,731	2,812	89,595	97,317	124,389	39	28	23
Arkansas	9,647	20,235	37,897	65,790	69,246	73,369	147	292	517
California	232,067	331,636	514,348	511,753	566,462	636,105	453	585	809
Colorado	30,873	54,151	60,013	120,787	130,146	138,846	256	416	432
Connecticut	20,905	33,117	45,175	79,583	79,499	87,335	263	417	517
Delaware	1,235	1,692	1,626	26,940	27,107	28,125	46	62	58
District of Columbia	1,022	728	1,321	43,623	40,163	52,262	23	18	25
Florida	98,710	169,947	321,447	231,199	258,869	310,145	427	656	1,036
Georgia	116,557	221,350	362,201	170,969	182,796	198,254	682	1,211	1,827
Hawaii	732	493	531	27,945	27,345	27,637	26	18	19
Idaho	1,043	1,053	4,810	36,007	37,751	50,969	29	28	94
Illinois	270,322	338,128	407,622	259,977	269,283	281,619	1,040	1,256	1,447
Indiana	68,162	100,824	126,390	207,468	210,951	222,510	329	478	568
Iowa	36,111	48,719	51,668	91,540	96,438	99,468	394	505	519
Kansas	11,920	11,774	13,099	80,616	81,270	86,126	148	145	152
Kentucky	25,517	38,441	86,325	108,355	109,480	112,935	235	351	764
Louisiana	13,079	55,237	104,117	143,355	145,791	146,230	91	379	712
Maine	5,787	7,701	12,021	41,113	40,585	43,082	141	190	279
Maryland	31,635	45,339	51,910	107,952	110,860	122,430	293	409	424
Massachusetts	61,945	92,173	114,600	231,396	233,905	235,697	268	394	486
Michigan	81,340	92,299	106,244	263,243	275,495	295,912	309	335	359
Minnesota	97,960	113,429	130,408	139,479	143,570	152,381	702	790	856
Mississippi	1,306	926	21,481	56,057	59,660	62,595	23	16	343
Missouri	23,186	35,178	43,488	167,120	175,718	182,463	139	200	238
Montana	419	1,396	2,810	31,318	32,508	33,462	13	43	84
Nebraska	2,726	4,692	7,380	62,187	59,602	59,388	44	79	124
Nevada	342	5,900	19,899	25,138	26,944	34,274	14	219	581
New Hampshire	1,493	1,753	3,075	40,633	42,964	42,534	37	41	72
New Jersey	169,824	176,843	212,195	146,273	149,904	161,329	1,161	1,180	1,315
New Mexico	14,031	28,637	39,395	41,719	41,833	43,285	336	685	910
New York	643,863	628,246	699,481	568,788	558,962	581,671	1,132	1,124	1,203
North Carolina	42,714	94,886	134,196	178,074	187,603	196,748	240	506	682
North Dakota	2,312	2,322	1,776	28,432	27,340	29,951	81	85	59
Ohio	124,132	144,646	194,039	307,053	306,685	309,285	404	472	627
Oklahoma	16,311	26,462	31,464	92,153	91,467	102,808	177	289	306
Oregon	13,761	16,027	19,866	66,039	70,883	80,385	208	226	247
Pennsylvania	218,668	270,724	337,014	353,751	364,879	386,220	618	742	873
Rhode Island	6,340	5,717	6,077	46,611	48,231	50,452	136	119	120
South Carolina	17,297	22,853	102,039	85,494	89,909	95,652	202	254	1,067
South Dakota	661	0	0	32,873	30,884	33,125	20	0	0
Tennessee	19,146	21,499	37,915	131,281	137,237	142,697	146	157	266
Texas	29,102	61,728	199,523	406,673	411,305	449,177	72	150	444
Utah	2,660	1,957	4,069	101,974	106,939	128,285	26	18	32
Vermont	11,838	12,837	15,636	25,640	26,983	26,395	462	476	592
Virginia	71,224	95,322	110,467	165,321	174,801	180,228	431	545	613
Washington	54,210	75,692	102,458	96,388	101,282	110,310	562	747	929
West Virginia	13,081	13,103	21,054	66,783	67,762	69,795	196	193	302
Wisconsin	52,355	56,841	68,167	160,494	164,978	170,859	326	345	399
Wyoming	225	155	163	9,111	8,598	8,907	25	18	18
Puerto Rico	22,074	18,510	35,602	122,844	157,988	156,795	180	117	227

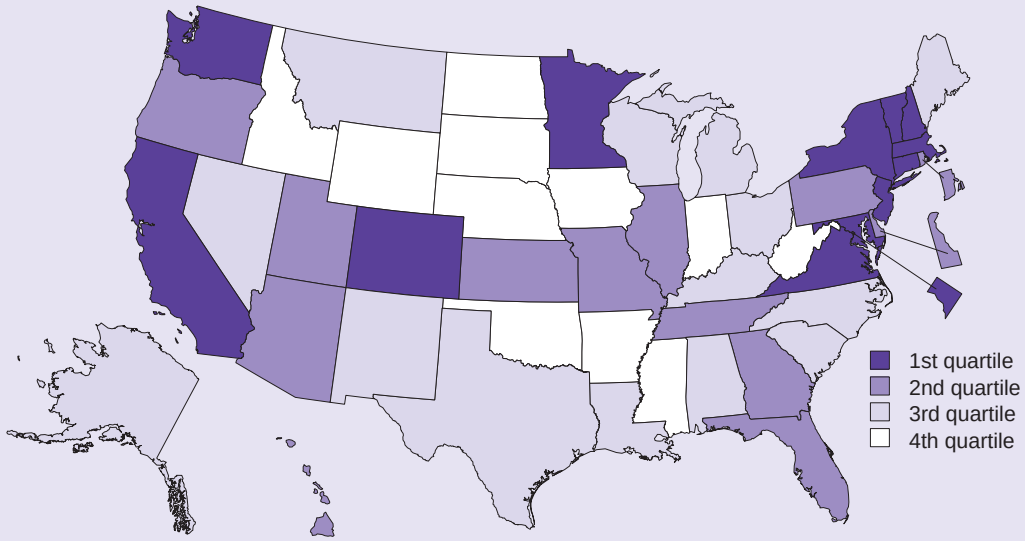
NOTE: Enrollment data are for 4-year degree-granting institutions that participated in Title IV federal financial aid programs.

SOURCE: National Association of State Scholarship and Grant Programs, Annual Survey Report, various years; and U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, various years.

Science and Engineering Indicators 2006

Bachelor's Degree Holders as Share of Workforce

Figure 8-20
Bachelor's degree holders as share of workforce: 2004



1st quartile (65.9%–38.6%)	2nd quartile (37.4%–34.9%)	3rd quartile (34.4%–30.9%)	4th quartile (30.5%–25.3%)
California	Arizona	Alabama	Arkansas
Colorado	Delaware	Alaska	Idaho
Connecticut	Florida	Kentucky	Indiana
District of Columbia	Georgia	Louisiana	Iowa
Maryland	Hawaii	Maine	Mississippi
Massachusetts	Illinois	Michigan	Nebraska
Minnesota	Kansas	Montana	North Dakota
New Hampshire	Missouri	Nevada	Oklahoma
New Jersey	Oregon	New Mexico	South Dakota
New York	Pennsylvania	North Carolina	West Virginia
Vermont	Rhode Island	Ohio	Wyoming
Virginia	Tennessee	South Carolina	
Washington	Utah	Texas	
		Wisconsin	

SOURCES: U.S. Census Bureau, Population Division, Education and Social Stratification Branch, *Educational Attainment in the United States*; and U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics. See table 8-20.

Findings

- In 2004, 51.8 million individuals held bachelor's degrees in the United States, up from 36.5 million in 1994.
- Nationwide, the percentage of the workforce with at least a bachelor's degree rose from 29.5% in 1994 to 37.2% in 2004. The proportion of the workforce with a bachelor's degree increased considerably in many states. This may reflect a replacement of older cohorts of workers with younger, more-educated ones. It may also indicate the restructuring of state economies to emphasize work that requires more education or credentialism.
- The geographic distribution of bachelor's degree holders in the workforce bears little resemblance to any of the degree-production indicators, which attests to the considerable mobility of the college-educated population in the United States.

The proportion of a state's workers with bachelor's, graduate, and professional degrees is an indicator of the educational and skill levels of its workforce. These workers have a clear advantage over less-educated workers in terms of expected lifetime earnings. A high value for this indicator denotes that a state has a large percentage of workers who completed an undergraduate education.

Degree data, based on the U.S. Census Bureau's Current Population Survey (CPS), are limited to individuals who are age 25 years and older. Civilian workforce data are Bureau of Labor Statistics estimates based on CPS. Estimates for sparsely populated states and the District of Columbia may be imprecise because of their small representation in the survey samples.

Table 8-20
Bachelor's degree holders as share of workforce, by state: 1994, 1999, and 2004

State	Bachelor's degree holders (thousands)			Employed workforce			Bachelor's degree holders in workforce (%)		
	1994	1999	2004	1994	1999	2004	1994	1999	2004
United States	36,538	43,812	51,751	123,901,653	135,145,914	139,253,285	29.5	32.4	37.2
Alabama	402	610	645	1,909,881	2,070,210	2,029,314	21.0	29.5	31.8
Alaska	86	95	99	278,198	297,019	307,704	30.9	32.0	32.2
Arizona	508	715	983	1,976,722	2,355,357	2,636,773	25.7	30.4	37.3
Arkansas	190	276	331	1,148,393	1,198,016	1,232,126	16.5	23.0	26.9
California	4,803	5,593	7,004	13,953,855	15,566,900	16,459,862	34.4	35.9	42.6
Colorado	657	1,008	1,014	1,953,111	2,269,668	2,382,873	33.6	44.4	42.6
Connecticut	579	738	778	1,670,083	1,695,174	1,709,836	34.7	43.5	45.5
Delaware	99	119	144	360,866	387,808	405,669	27.4	30.7	35.5
District of Columbia	141	150	181	285,207	288,016	274,465	49.4	52.1	65.9
Florida	1,943	2,162	2,987	6,502,124	7,401,659	7,997,077	29.9	29.2	37.4
Georgia	1,085	1,048	1,525	3,412,606	3,951,684	4,188,271	31.8	26.5	36.4
Hawaii	188	199	219	555,749	576,314	595,772	33.8	34.5	36.8
Idaho	147	155	203	552,354	620,962	669,728	26.6	25.0	30.3
Illinois	1,749	1,939	2,217	5,766,671	6,143,130	6,000,140	30.3	31.6	36.9
Indiana	526	691	846	2,911,781	3,046,922	3,005,247	18.1	22.7	28.2
Iowa	339	394	467	1,510,253	1,560,848	1,545,412	22.4	25.2	30.2
Kansas	353	443	515	1,279,098	1,359,908	1,383,654	27.6	32.6	37.2
Kentucky	400	501	578	1,729,483	1,854,270	1,870,249	23.1	27.0	30.9
Louisiana	439	556	618	1,785,654	1,926,732	1,940,315	24.6	28.9	31.9
Maine	166	199	213	589,073	641,351	667,223	28.2	31.0	31.9
Maryland	872	1,209	1,270	2,545,413	2,687,843	2,761,015	34.3	45.0	46.0
Massachusetts	1,205	1,253	1,594	2,989,123	3,245,761	3,219,487	40.3	38.6	49.5
Michigan	1,144	1,313	1,572	4,508,900	4,897,144	4,719,343	25.4	26.8	33.3
Minnesota	737	954	1,085	2,471,516	2,686,942	2,813,831	29.8	35.5	38.6
Mississippi	310	329	359	1,159,959	1,223,725	1,248,056	26.7	26.9	28.8
Missouri	711	821	1,039	2,622,286	2,819,853	2,858,897	27.1	29.1	36.3
Montana	131	134	159	410,957	440,646	461,746	31.9	30.4	34.4
Nebraska	209	214	274	862,659	916,270	947,882	24.2	23.4	28.9
Nevada	161	238	359	764,451	978,969	1,126,346	21.1	24.3	31.9
New Hampshire	192	212	293	594,935	666,066	695,739	32.3	31.8	42.1
New Jersey	1,472	1,604	1,957	3,789,960	4,092,714	4,176,230	38.8	39.2	46.9
New Mexico	242	268	296	725,387	793,052	859,962	33.4	33.8	34.4
New York	2,996	3,205	3,827	8,080,243	8,657,431	8,811,784	37.1	37.0	43.4
North Carolina	852	1,173	1,243	3,511,339	3,921,244	4,020,788	24.3	29.9	30.9
North Dakota	76	89	104	327,377	336,481	342,221	23.2	26.5	30.4
Ohio	1,396	1,850	1,811	5,254,199	5,534,376	5,523,037	26.6	33.4	32.8
Oklahoma	415	514	496	1,469,487	1,590,838	1,627,828	28.2	32.3	30.5
Oregon	492	585	629	1,546,552	1,697,288	1,718,504	31.8	34.5	36.6
Pennsylvania	1,545	1,887	2,093	5,529,551	5,809,824	5,926,978	27.9	32.5	35.3
Rhode Island	156	176	193	480,669	518,848	533,313	32.5	33.9	36.2
South Carolina	412	537	656	1,729,363	1,876,895	1,906,572	23.8	28.6	34.4
South Dakota	75	111	117	364,452	394,898	413,121	20.6	28.1	28.3
Tennessee	535	626	965	2,511,085	2,722,124	2,751,755	21.3	23.0	35.1
Texas	2,294	2,965	3,272	8,778,660	9,766,299	10,362,982	26.1	30.4	31.6
Utah	228	316	398	945,389	1,080,441	1,140,498	24.1	29.2	34.9
Vermont	107	112	142	301,836	325,581	340,374	35.4	34.4	41.7
Virginia	1,074	1,383	1,610	3,265,139	3,441,589	3,674,434	32.9	40.2	43.8
Washington	848	1,068	1,205	2,566,663	2,917,577	3,032,299	33.0	36.6	39.7
West Virginia	138	215	189	712,664	762,395	746,542	19.4	28.2	25.3
Wisconsin	665	791	906	2,713,392	2,879,024	2,919,201	24.5	27.5	31.0
Wyoming	48	69	71	236,885	251,828	270,810	20.3	27.4	26.2
Puerto Rico	NA	NA	NA	1,032,283	1,142,466	1,226,251	NA	NA	NA

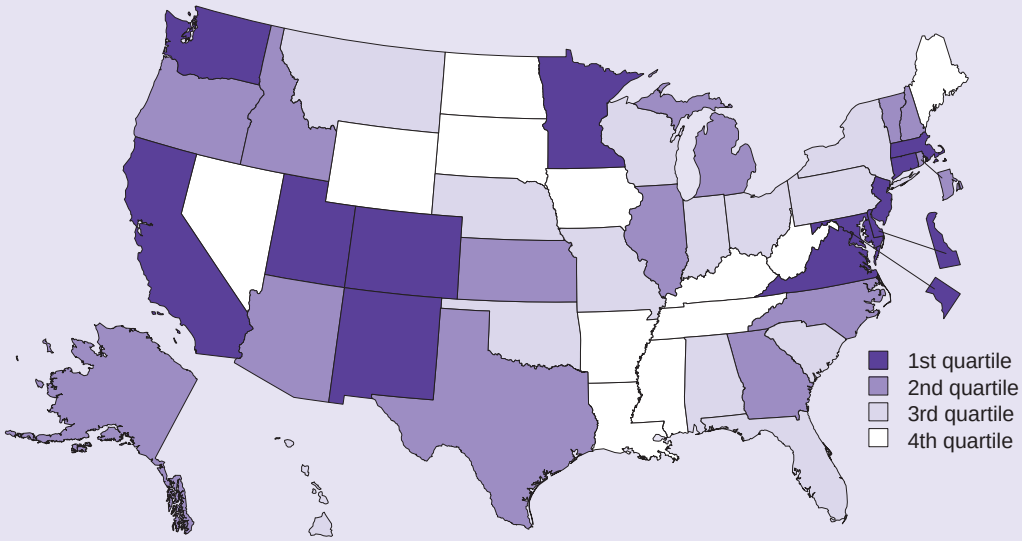
NA = not available

NOTES: Bachelor's degree holders include those who have completed a bachelor's or higher degree. Workforce represents employed component of civilian labor force and is reported as annual data, not seasonally adjusted.

SOURCES: U.S. Census Bureau, Population Division, Education and Social Stratification Branch, *Educational Attainment in the United States*, various years; and U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics.

Individuals in S&E Occupations as Share of Workforce

Figure 8-21
Individuals in S&E occupations as share of workforce: 2003



1st quartile (19.84%–3.92%)	2nd quartile (3.90%–3.35%)	3rd quartile (3.28%–2.53%)	4th quartile (2.49%–1.77%)
California	Alaska	Alabama	Arkansas
Colorado	Arizona	Florida	Iowa
Connecticut	Georgia	Hawaii	Kentucky
Delaware	Idaho	Indiana	Louisiana
District of Columbia	Illinois	Missouri	Maine
Maryland	Kansas	Montana	Mississippi
Massachusetts	Michigan	Nebraska	Nevada
Minnesota	New Hampshire	New York	North Dakota
New Jersey	North Carolina	Ohio	South Dakota
New Mexico	Oregon	Oklahoma	Tennessee
Utah	Rhode Island	Pennsylvania	West Virginia
Virginia	Texas	South Carolina	Wyoming
Washington	Vermont	Wisconsin	

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wage Estimates; and Local Area Unemployment Statistics. See table 8-21.

Findings

- In 2003, 3.6% of the U.S. workforce, or about 5 million people, worked in occupations classified as S&E.
- In individual states in 2003, the percentage of the workforce engaged in S&E occupations ranged from 1.77% to 5.79%.
- The District of Columbia was an outlier at 19.84%, reflecting the many S&E jobs it provides for individuals who work there but live in neighboring states.
- States located in the Northeast, Southwest, and West Coast tended to be in the top two quartiles on this indicator, signifying a high concentration of S&E jobs.

This indicator shows the extent to which a state's workforce is college educated and employed in science and engineering occupations. A high value for this indicator shows that a state's economy has a high percentage of technical jobs relative to other states.

S&E occupations are defined by 77 standard occupational codes that encompass mathematical, computer, life, physical, and social scientists; engineers; and postsecondary teachers in any of these S&E fields. People with job titles such as manager are excluded.

The location of S&E occupations primarily reflects where the individuals work and is based on estimates from the Occupational Employment Statistics survey, a cooperative program between the Bureau of Labor Statistics (BLS) and state employment security agencies. Civilian workforce data are BLS estimates based on the Current Population Survey, which assigns workers to a location based on residence. Because of this difference and the sample-based nature of the data, estimates for sparsely populated states and the District of Columbia may be imprecise.

Table 8-21
Individuals in S&E occupations as share of workforce, by state: 2003

State	S&E occupations	Employed workforce	Workforce in S&E occupations (%)
United States	4,961,550	137,406,413	3.61
Alabama	56,380	2,009,039	2.81
Alaska	10,600	305,063	3.47
Arizona	92,120	2,553,169	3.61
Arkansas	21,340	1,204,539	1.77
California	676,180	16,223,451	4.17
Colorado	124,140	2,325,210	5.34
Connecticut	81,380	1,706,170	4.77
Delaware	17,370	403,759	4.30
District of Columbia	54,890	276,595	19.84
Florida	221,070	7,763,860	2.85
Georgia	144,170	4,134,525	3.49
Hawaii	16,090	588,637	2.73
Idaho	22,150	654,222	3.39
Illinois	211,230	5,934,131	3.56
Indiana	78,410	3,000,784	2.61
Iowa	37,320	1,548,215	2.41
Kansas	51,970	1,366,061	3.80
Kentucky	45,230	1,856,204	2.44
Louisiana	41,900	1,914,550	2.19
Maine	15,020	659,579	2.28
Maryland	149,250	2,751,455	5.42
Massachusetts	184,690	3,215,624	5.74
Michigan	182,940	4,695,148	3.90
Minnesota	117,120	2,786,091	4.20
Mississippi	22,190	1,237,198	1.79
Missouri	84,150	2,845,802	2.96
Montana	11,450	452,493	2.53
Nebraska	30,710	936,736	3.28
Nevada	22,330	1,089,709	2.05
New Hampshire	23,430	685,366	3.42
New Jersey	161,420	4,115,123	3.92
New Mexico	33,600	840,858	4.00
New York	272,440	8,705,319	3.13
North Carolina	132,440	3,957,077	3.35
North Dakota	8,430	338,809	2.49
Ohio	177,100	5,506,038	3.22
Oklahoma	44,360	1,614,418	2.75
Oregon	61,230	1,701,577	3.60
Pennsylvania	185,560	5,835,076	3.18
Rhode Island	18,740	537,873	3.48
South Carolina	48,740	1,878,397	2.59
South Dakota	9,150	408,805	2.24
Tennessee	63,680	2,742,225	2.32
Texas	365,270	10,195,950	3.58
Utah	45,570	1,121,088	4.06
Vermont	11,420	335,823	3.40
Virginia	209,280	3,612,229	5.79
Washington	150,230	2,926,836	5.13
West Virginia	16,220	747,637	2.17
Wisconsin	93,320	2,896,670	3.22
Wyoming	6,130	265,200	2.31
Puerto Rico	19,940	1,200,322	1.66

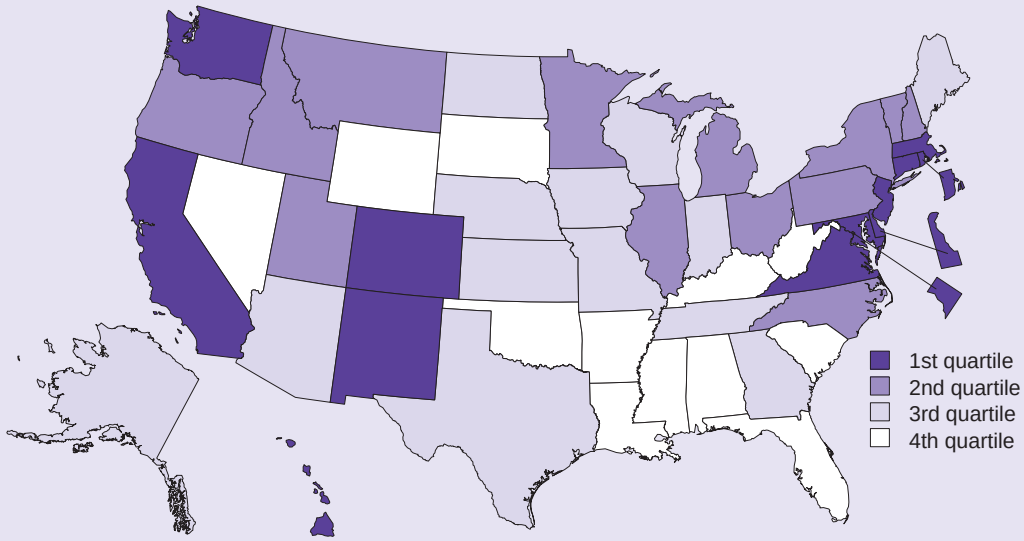
NOTE: Workforce represents employed component of civilian labor force and is reported as annual data, not seasonally adjusted.

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wage Estimates; and Local Area Unemployment Statistics.

Science and Engineering Indicators 2006

S&E Doctorate Holders as Share of Workforce

Figure 8-22
S&E doctorate holders as share of workforce: 2003



1st quartile (2.35%–0.50%)	2nd quartile (0.49%–0.35%)	3rd quartile (0.34%–0.28%)	4th quartile (0.27%–0.17%)
California	Idaho	Alaska	Alabama
Colorado	Illinois	Arizona	Arkansas
Connecticut	Michigan	Georgia	Florida
Delaware	Minnesota	Indiana	Kentucky
District of Columbia	Montana	Iowa	Louisiana
Hawaii	New Hampshire	Kansas	Mississippi
Maryland	New York	Maine	Nevada
Massachusetts	North Carolina	Missouri	Oklahoma
New Jersey	Ohio	Nebraska	South Carolina
New Mexico	Oregon	North Dakota	South Dakota
Rhode Island	Pennsylvania	Tennessee	West Virginia
Virginia	Utah	Texas	Wyoming
Washington	Vermont	Wisconsin	

SOURCES: National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients; and U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics. See Table 8-22.

Findings

- The number of S&E doctorate holders in the United States rose from 503,000 in 1997 to 568,000 in 2003, an increase of nearly 13%.
- For the United States, the value of this indicator climbed from 0.38% to 0.41% of the workforce because the number of S&E doctorate holders increased more rapidly than the size of the workforce during this period.
- In 2003, the values for this indicator in individual states ranged from 0.17% to 0.98% of the state's workforce; the District of Columbia was an outlier at 2.35%, reflecting a high concentration of S&E doctorate holders who work there but live in neighboring states.
- States in the top quartile tend to be home to major research laboratories, research universities, or research-intensive industries.

This indicator shows a state's tendency to attract and retain highly trained scientists and engineers. These individuals often conduct research and development, manage R&D activities, or are otherwise engaged in knowledge-intensive activities. A high value for this indicator in a state suggests employment opportunities for individuals with highly advanced training in science and engineering.

S&E fields include physical, life, earth, ocean, atmospheric, computer, and social sciences; mathematics; engineering; and psychology. S&E doctorate holders exclude those with doctorates from foreign institutions. The location of the doctorate holders primarily reflects the state in which the individuals work. Civilian workforce data are Bureau of Labor Statistics estimates from the Current Population Survey, which bases location on residence. Because of this difference and the sample-based nature of the data, estimates for sparsely populated states and the District of Columbia may be imprecise.

Table 8-22
S&E doctorate holders as share of workforce, by state: 1997, 2001, and 2003

State	S&E doctorate holders			Employed workforce			S&E doctorate holders in workforce (%)		
	1997	2001	2003	1997	2001	2003	1997	2001	2003
United States	503,290	555,360	567,690	130,988,267	137,107,740	137,406,413	0.38	0.41	0.41
Alabama	6,440	5,170	5,500	2,035,156	2,033,230	2,009,039	0.32	0.25	0.27
Alaska	1,110	1,160	1,050	289,963	300,917	305,063	0.38	0.39	0.34
Arizona	6,130	6,800	7,110	2,196,901	2,453,066	2,553,169	0.28	0.28	0.28
Arkansas	2,250	2,460	2,670	1,177,143	1,193,249	1,204,539	0.19	0.21	0.22
California	68,390	78,020	83,150	14,780,791	16,217,495	16,223,451	0.46	0.48	0.51
Colorado	10,350	11,450	12,180	2,154,294	2,301,155	2,325,210	0.48	0.50	0.52
Connecticut	8,470	9,340	10,140	1,674,937	1,698,274	1,706,170	0.51	0.55	0.59
Delaware	3,520	3,470	2,600	378,117	405,111	403,759	0.93	0.86	0.64
District of Columbia	11,580	13,840	6,490	262,789	287,552	276,595	4.41	4.81	2.35
Florida	12,820	15,040	15,590	7,040,660	7,633,728	7,763,860	0.18	0.20	0.20
Georgia	9,640	11,710	12,060	3,751,699	4,107,109	4,134,525	0.26	0.29	0.29
Hawaii	2,420	2,570	2,960	566,766	586,754	588,637	0.43	0.44	0.50
Idaho	1,990	2,160	2,480	598,004	642,908	654,222	0.33	0.34	0.38
Illinois	21,020	21,670	21,410	5,988,296	6,121,940	5,934,131	0.35	0.35	0.36
Indiana	7,460	9,490	8,980	3,014,499	3,020,287	3,000,784	0.25	0.31	0.30
Iowa	4,030	4,280	4,450	1,555,837	1,569,541	1,548,215	0.26	0.27	0.29
Kansas	3,720	3,890	4,050	1,329,797	1,348,506	1,366,061	0.28	0.29	0.30
Kentucky	3,980	4,380	4,740	1,809,785	1,854,296	1,856,204	0.22	0.24	0.26
Louisiana	5,210	5,000	5,180	1,890,102	1,921,056	1,914,550	0.28	0.26	0.27
Maine	2,140	1,940	2,000	624,410	649,955	659,579	0.34	0.30	0.30
Maryland	20,660	22,090	27,050	2,646,200	2,719,498	2,751,455	0.78	0.81	0.98
Massachusetts	22,960	28,390	28,950	3,158,851	3,274,561	3,215,624	0.73	0.87	0.90
Michigan	14,750	16,940	16,280	4,748,691	4,864,600	4,695,148	0.31	0.35	0.35
Minnesota	9,660	11,070	10,770	2,605,673	2,764,353	2,786,091	0.37	0.40	0.39
Mississippi	2,970	3,120	3,080	1,200,845	1,229,964	1,237,198	0.25	0.25	0.25
Missouri	9,300	8,860	8,730	2,780,185	2,856,402	2,845,802	0.33	0.31	0.31
Montana	1,580	1,330	1,660	427,504	447,213	452,493	0.37	0.30	0.37
Nebraska	2,930	2,840	2,730	904,492	926,926	936,736	0.32	0.31	0.29
Nevada	1,620	2,010	1,820	895,258	1,043,911	1,089,709	0.18	0.19	0.17
New Hampshire	2,190	2,320	2,710	635,469	680,587	685,366	0.34	0.34	0.40
New Jersey	19,970	22,130	21,900	4,031,022	4,111,546	4,115,123	0.50	0.54	0.53
New Mexico	7,120	7,370	7,640	768,596	819,413	840,858	0.93	0.90	0.91
New York	38,830	42,570	40,510	8,416,544	8,729,849	8,705,319	0.46	0.49	0.47
North Carolina	13,470	16,250	17,130	3,809,601	3,948,692	3,957,077	0.35	0.41	0.43
North Dakota	1,330	1,080	1,110	335,854	336,939	338,809	0.40	0.32	0.33
Ohio	18,200	19,270	20,130	5,448,161	5,570,389	5,506,038	0.33	0.35	0.37
Oklahoma	4,430	4,110	4,160	1,543,105	1,615,033	1,614,418	0.29	0.25	0.26
Oregon	5,980	6,900	7,280	1,652,997	1,708,957	1,701,577	0.36	0.40	0.43
Pennsylvania	23,110	25,520	26,900	5,775,178	5,870,495	5,835,076	0.40	0.43	0.46
Rhode Island	2,400	2,600	3,060	504,147	520,008	537,873	0.48	0.50	0.57
South Carolina	4,620	5,030	4,810	1,819,508	1,850,436	1,878,397	0.25	0.27	0.26
South Dakota	1,000	970	940	383,216	400,574	408,805	0.26	0.24	0.23
Tennessee	8,350	8,570	8,680	2,640,005	2,728,496	2,742,225	0.32	0.31	0.32
Texas	27,990	31,710	32,430	9,395,279	10,003,723	10,195,950	0.30	0.32	0.32
Utah	4,670	4,720	4,160	1,034,429	1,103,028	1,121,088	0.45	0.43	0.37
Vermont	1,750	1,630	1,660	315,806	329,460	335,823	0.55	0.49	0.49
Virginia	14,860	16,880	20,890	3,323,266	3,524,335	3,612,229	0.45	0.48	0.58
Washington	12,860	14,270	14,960	2,822,223	2,861,417	2,926,836	0.46	0.50	0.51
West Virginia	1,930	1,840	2,040	746,442	762,107	747,637	0.26	0.24	0.27
Wisconsin	8,320	8,290	8,060	2,855,830	2,898,949	2,896,670	0.29	0.29	0.28
Wyoming	810	840	670	243,944	259,750	265,200	0.33	0.32	0.25
Puerto Rico	650	1,400	1,610	1,132,658	1,133,988	1,200,322	0.06	0.12	0.13

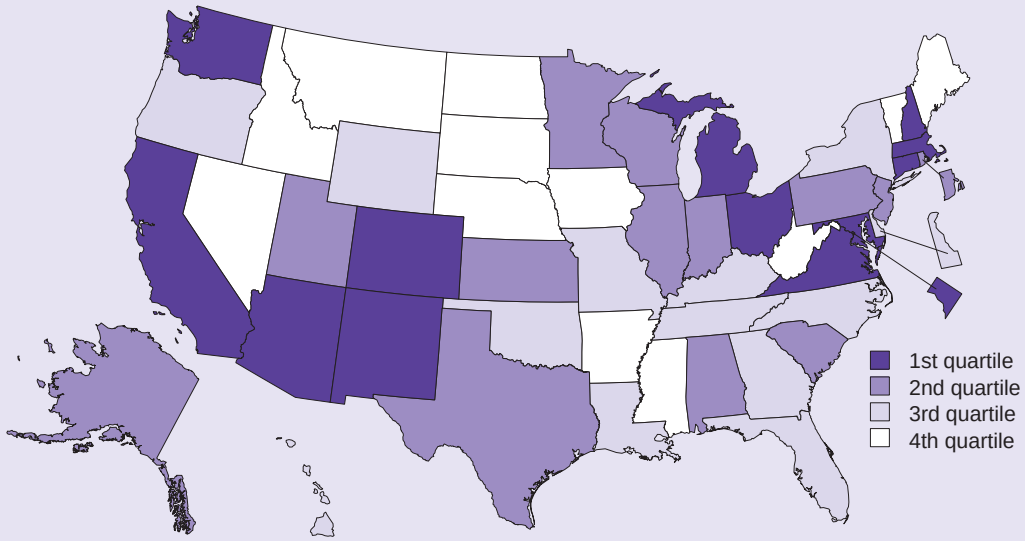
NOTES: Survey of Doctorate Recipients sample design does not include geography. Data on S&E doctorate holders are classified by employment location, and workforce data are based on respondents' residence. Thus, the reliability of data for areas with smaller populations is lower than for more populous states. Workforce represents employed component of civilian labor force and is reported as annual data, not seasonally adjusted.

SOURCES: National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients; and U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics.

Science and Engineering Indicators 2006

Engineers as Share of Workforce

Figure 8-23
Engineers as share of workforce: 2003



1st quartile (3.09%–1.08%)	2nd quartile (1.06%–0.87%)	3rd quartile (0.86%–0.64%)	4th quartile (0.63%–0.45%)
Arizona	Alabama	Delaware	Arkansas
California	Alaska	Florida	Idaho
Colorado	Illinois	Georgia	Iowa
Connecticut	Indiana	Hawaii	Maine
District of Columbia	Kansas	Kentucky	Mississippi
Maryland	Minnesota	Louisiana	Montana
Massachusetts	New Jersey	Missouri	Nebraska
Michigan	Pennsylvania	New York	Nevada
New Hampshire	Rhode Island	North Carolina	North Dakota
New Mexico	South Carolina	Oklahoma	South Dakota
Ohio	Texas	Oregon	Vermont
Virginia	Utah	Tennessee	West Virginia
Washington	Wisconsin	Wyoming	

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wage Estimates; and Local Area Unemployment Statistics. See table 8-23.

Findings

- In the United States, 1.4 million individuals, or 1.0% of the workforce, were employed in engineering occupations in 2003.
- The concentration of engineers in individual states ranged from 0.45% to 1.54% in 2003.
- The District of Columbia was an outlier at 3.09%, reflecting the number of engineers who work there but live in neighboring states.
- States in the top quartile for this indicator tended to have a relatively high concentration of high-technology businesses.

This indicator shows the extent to which a state's workforce includes trained engineers. The indicator encompasses 20 standard occupational codes for engineering fields such as aerospace, agricultural, biomedical, chemical, civil, computer hardware, electrical and electronics, environmental, industrial, marine and naval architectural, materials, mechanical, mining and geological, nuclear, and petroleum. Engineers design and operate production processes and create new products and services.

The location of engineering occupations primarily reflects where the individuals work and is based on estimates from the Occupational Employment Statistics survey, a cooperative program between the Bureau of Labor Statistics (BLS) and state employment security agencies. The size of a state's civilian workforce is estimated from the BLS Current Population Survey, which assigns workers to a location based on residence. Because of this difference and the sample-based nature of the data, estimates for sparsely populated states and the District of Columbia may be imprecise.

Table 8-23
Engineers as share of workforce, by state: 2003

State	Engineers	Employed workforce	Engineers in workforce (%)
United States	1,359,120	137,406,413	0.99
Alabama	20,950	2,009,039	1.04
Alaska	3,080	305,063	1.01
Arizona	30,410	2,553,169	1.19
Arkansas	5,380	1,204,539	0.45
California	212,610	16,223,451	1.31
Colorado	34,020	2,325,210	1.46
Connecticut	24,770	1,706,170	1.45
Delaware	3,050	403,759	0.76
District of Columbia	8,540	276,595	3.09
Florida	58,270	7,763,860	0.75
Georgia	30,040	4,134,525	0.73
Hawaii	3,970	588,637	0.67
Idaho	3,680	654,222	0.56
Illinois	57,780	5,934,131	0.97
Indiana	29,650	3,000,784	0.99
Iowa	9,520	1,548,215	0.61
Kansas	12,540	1,366,061	0.92
Kentucky	11,940	1,856,204	0.64
Louisiana	15,350	1,914,550	0.80
Maine	4,160	659,579	0.63
Maryland	33,550	2,751,455	1.22
Massachusetts	49,440	3,215,624	1.54
Michigan	55,090	4,695,148	1.17
Minnesota	29,490	2,786,091	1.06
Mississippi	6,410	1,237,198	0.52
Missouri	19,960	2,845,802	0.70
Montana	2,600	452,493	0.57
Nebraska	5,840	936,736	0.62
Nevada	6,070	1,089,709	0.56
New Hampshire	7,430	685,366	1.08
New Jersey	35,690	4,115,123	0.87
New Mexico	11,030	840,858	1.31
New York	62,720	8,705,319	0.72
North Carolina	28,880	3,957,077	0.73
North Dakota	1,800	338,809	0.53
Ohio	60,890	5,506,038	1.11
Oklahoma	12,810	1,614,418	0.79
Oregon	14,550	1,701,577	0.86
Pennsylvania	51,840	5,835,076	0.89
Rhode Island	5,000	537,873	0.93
South Carolina	19,880	1,878,397	1.06
South Dakota	1,850	408,805	0.45
Tennessee	20,770	2,742,225	0.76
Texas	107,810	10,195,950	1.06
Utah	10,350	1,121,088	0.92
Vermont	1,620	335,823	0.48
Virginia	46,100	3,612,229	1.28
Washington	34,850	2,926,836	1.19
West Virginia	4,610	747,637	0.62
Wisconsin	28,600	2,896,670	0.99
Wyoming	1,880	265,200	0.71
Puerto Rico	7,150	1,200,322	0.60

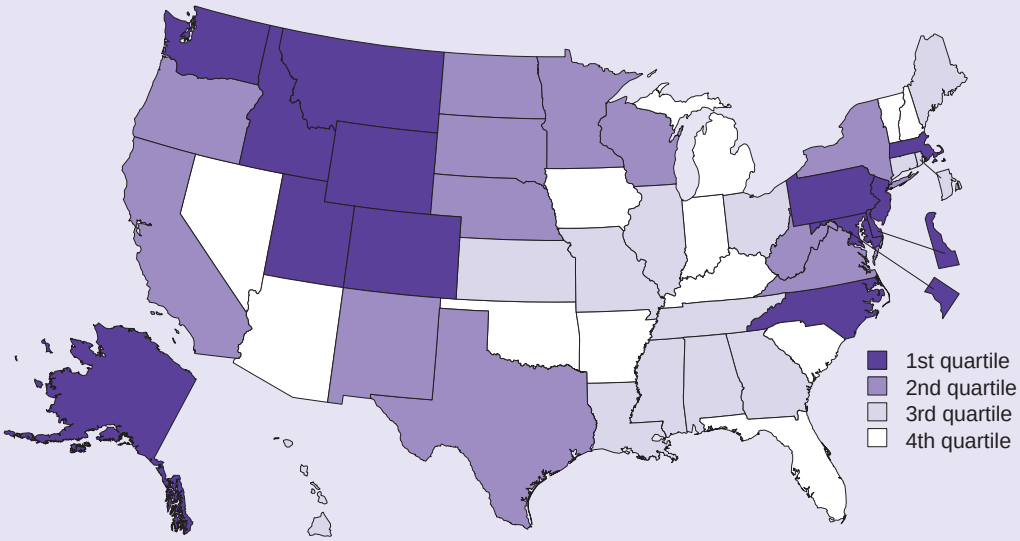
NOTE: Workforce represents employed component of civilian labor force and is reported as annual data, not seasonally adjusted.

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wage Estimates; and Local Area Unemployment Statistics.

Science and Engineering Indicators 2006

Life and Physical Scientists as Share of Workforce

Figure 8-24
Life and physical scientists as share of workforce: 2003



1st quartile (1.88%–0.43%)	2nd quartile (0.42%–0.34%)	3rd quartile (0.33%–0.26%)	4th quartile (0.25%–0.14%)
Alaska	California	Alabama	Arizona
Colorado	Minnesota	Connecticut	Arkansas
Delaware	Nebraska	Georgia	Florida
District of Columbia	New Mexico	Hawaii	Indiana
Idaho	New York	Illinois	Iowa
Maryland	North Dakota	Kansas	Kentucky
Massachusetts	Oregon	Louisiana	Michigan
Montana	South Dakota	Maine	Nevada
New Jersey	Texas	Mississippi	New Hampshire
North Carolina	Virginia	Missouri	Oklahoma
Pennsylvania	West Virginia	Ohio	South Carolina
Utah	Wisconsin	Rhode Island	Vermont
Washington		Tennessee	
Wyoming			

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wage Estimates; and Local Area Unemployment Statistics. See table 8-24.

Findings

- Nearly 500,000 individuals, or 0.36% of the workforce, were employed as life and physical scientists in the United States in 2003.
- In 2003, individual states had indicator values ranging from 0.14% to 0.92%, which showed major differences in the concentration of jobs in the life and physical sciences.
- The District of Columbia was an outlier at 1.88%, reflecting the number of individuals who work there but live in neighboring states.

This indicator shows a state's ability to attract and retain life and physical scientists. Life scientists are identified from nine standard occupational codes that include agricultural and food scientists, biological scientists, conservation scientists and foresters, and medical scientists. Physical scientists are identified from 16 standard occupational codes that include astronomers, physicists, atmospheric and space scientists, chemists, materials scientists, environmental scientists, geoscientists, and postsecondary teachers in these subject areas. A high share of life and physical scientists could indicate several scenarios ranging from a robust cluster of life science companies to a high percentage of acreage in forests or national parks. The latter requires foresters, wildlife specialists, and conservationists to manage the natural assets in an area with low population density.

The location of life and physical scientists reflects where the individuals work and is based on estimates from the Occupational Employment Statistics survey, a cooperative program between the Bureau of Labor Statistics (BLS) and state employment security agencies. The size of a state's civilian workforce is estimated from the BLS Current Population Survey, which assigns workers to a location based on residence. Because of this difference and the sample-based nature of the data, estimates for sparsely populated states and the District of Columbia may be imprecise.

Table 8-24
Life and physical scientists as share of workforce, by state: 2003

State	Life and physical scientists	Employed workforce	Life and physical scientists in workforce (%)
United States	490,850	137,406,413	0.36
Alabama	5,170	2,009,039	0.26
Alaska	2,800	305,063	0.92
Arizona	5,580	2,553,169	0.22
Arkansas	2,700	1,204,539	0.22
California	64,390	16,223,451	0.40
Colorado	11,710	2,325,210	0.50
Connecticut	5,670	1,706,170	0.33
Delaware	2,020	403,759	0.50
District of Columbia	5,210	276,595	1.88
Florida	19,440	7,763,860	0.25
Georgia	11,410	4,134,525	0.28
Hawaii	1,790	588,637	0.30
Idaho	3,100	654,222	0.47
Illinois	18,300	5,934,131	0.31
Indiana	4,070	3,000,784	0.14
Iowa	3,130	1,548,215	0.20
Kansas	3,910	1,366,061	0.29
Kentucky	2,660	1,856,204	0.14
Louisiana	5,540	1,914,550	0.29
Maine	1,830	659,579	0.28
Maryland	17,910	2,751,455	0.65
Massachusetts	20,380	3,215,624	0.63
Michigan	9,390	4,695,148	0.20
Minnesota	11,200	2,786,091	0.40
Mississippi	3,650	1,237,198	0.30
Missouri	9,240	2,845,802	0.32
Montana	2,790	452,493	0.62
Nebraska	3,920	936,736	0.42
Nevada	2,510	1,089,709	0.23
New Hampshire	1,480	685,366	0.22
New Jersey	17,530	4,115,123	0.43
New Mexico	3,200	840,858	0.38
New York	30,330	8,705,319	0.35
North Carolina	17,770	3,957,077	0.45
North Dakota	1,420	338,809	0.42
Ohio	15,100	5,506,038	0.27
Oklahoma	3,350	1,614,418	0.21
Oregon	5,870	1,701,577	0.34
Pennsylvania	25,080	5,835,076	0.43
Rhode Island	1,580	537,873	0.29
South Carolina	4,610	1,878,397	0.25
South Dakota	1,420	408,805	0.35
Tennessee	7,130	2,742,225	0.26
Texas	42,440	10,195,950	0.42
Utah	5,060	1,121,088	0.45
Vermont	850	335,823	0.25
Virginia	13,030	3,612,229	0.36
Washington	16,940	2,926,836	0.58
West Virginia	2,510	747,637	0.34
Wisconsin	11,220	2,896,670	0.39
Wyoming	1,510	265,200	0.57
Puerto Rico	4,440	1,200,322	0.37

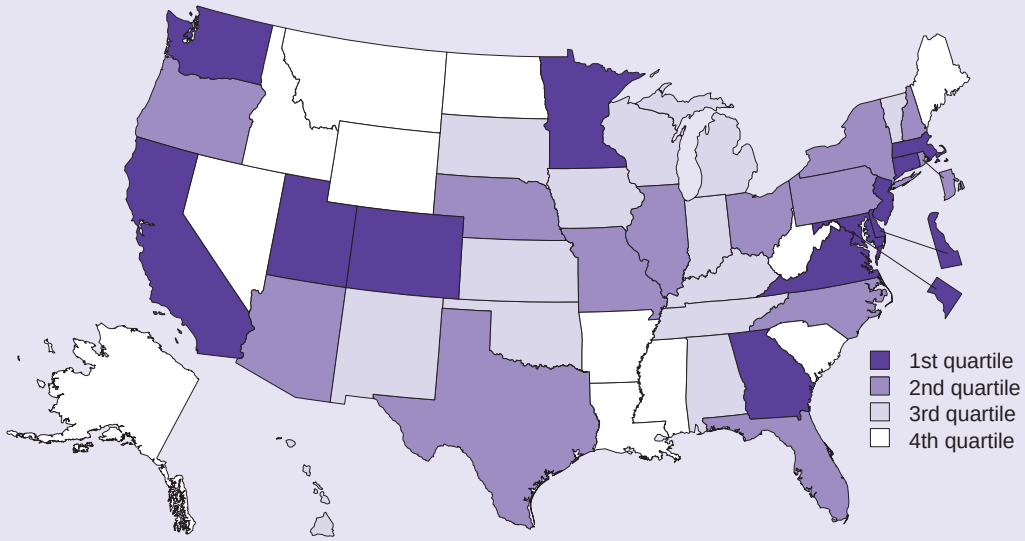
NOTE: Workforce represents employed component of civilian labor force and is reported as annual data, not seasonally adjusted.

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wage Estimates; and Local Area Unemployment Statistics.

Science and Engineering Indicators 2006

Computer Specialists as Share of Workforce

Figure 8-25
Computer specialists as share of workforce: 2003



1st quartile (9.61%–2.10%)	2nd quartile (2.04%–1.67%)	3rd quartile (1.53%–1.20%)	4th quartile (1.18%–0.63%)
California	Arizona	Alabama	Alaska
Colorado	Florida	Hawaii	Arkansas
Connecticut	Illinois	Indiana	Idaho
Delaware	Missouri	Iowa	Louisiana
District of Columbia	Nebraska	Kansas	Maine
Georgia	New Hampshire	Kentucky	Mississippi
Maryland	New York	Michigan	Montana
Massachusetts	North Carolina	New Mexico	Nevada
Minnesota	Ohio	Oklahoma	North Dakota
New Jersey	Oregon	South Dakota	South Carolina
Utah	Pennsylvania	Tennessee	West Virginia
Virginia	Rhode Island	Vermont	Wyoming
Washington	Texas	Wisconsin	

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wage Estimates; and Local Area Unemployment Statistics. See table 8-25.

Findings

- In the United States, 2.7 million individuals, or 2.0% of the workforce, were employed as computer specialists in 2003.
- Individual states showed significant differences in the intensity of computer-related operations in their economies, with 0.63% to 3.94% of their workforce employed in computer-related occupations in 2003.
- There was a significant concentration of computer-intensive occupations in the District of Columbia, where the indicator value of 9.61% was affected by the large number of individuals who specialize in computer work there but live in neighboring states.

This indicator shows the extent to which a state's workforce makes use of specialists with advanced computer training. Computer specialists are identified from 10 standard occupational codes that include computer and information scientists, programmers, software engineers, support specialists, systems analysts, database administrators, and network and computer system administrators. States with higher values may indicate a state workforce that is better able to thrive in an information economy or to embrace and utilize computer technology.

The location of computer specialists reflects where the individuals work and is based on estimates from the Occupational Employment Statistics survey, a cooperative program between the Bureau of Labor Statistics (BLS) and state employment security agencies. The size of a state's civilian workforce is estimated from the BLS Current Population Survey, which assigns workers to a location based on residence. Because of this difference and the sample-based nature of the data, estimates for sparsely populated states and the District of Columbia may be imprecise.

Table 8-25
Computer specialists as share of workforce, by state: 2003

State	Computer specialists	Employed workforce	Computer specialists in workforce (%)
United States	2,688,080	137,406,413	1.96
Alabama	28,010	2,009,039	1.39
Alaska	3,170	305,063	1.04
Arizona	45,020	2,553,169	1.76
Arkansas	11,770	1,204,539	0.98
California	361,640	16,223,451	2.23
Colorado	73,490	2,325,210	3.16
Connecticut	42,600	1,706,170	2.50
Delaware	8,930	403,759	2.21
District of Columbia	26,590	276,595	9.61
Florida	132,520	7,763,860	1.71
Georgia	86,970	4,134,525	2.10
Hawaii	7,170	588,637	1.22
Idaho	7,720	654,222	1.18
Illinois	120,840	5,934,131	2.04
Indiana	36,440	3,000,784	1.21
Iowa	20,640	1,548,215	1.33
Kansas	19,980	1,366,061	1.46
Kentucky	24,370	1,856,204	1.31
Louisiana	18,190	1,914,550	0.95
Maine	6,730	659,579	1.02
Maryland	87,350	2,751,455	3.17
Massachusetts	102,180	3,215,624	3.18
Michigan	71,830	4,695,148	1.53
Minnesota	67,110	2,786,091	2.41
Mississippi	8,200	1,237,198	0.66
Missouri	55,730	2,845,802	1.96
Montana	4,790	452,493	1.06
Nebraska	15,960	936,736	1.70
Nevada	10,490	1,089,709	0.96
New Hampshire	12,780	685,366	1.86
New Jersey	109,960	4,115,123	2.67
New Mexico	11,380	840,858	1.35
New York	167,790	8,705,319	1.93
North Carolina	68,320	3,957,077	1.73
North Dakota	3,050	338,809	0.90
Ohio	92,040	5,506,038	1.67
Oklahoma	21,600	1,614,418	1.34
Oregon	31,430	1,701,577	1.85
Pennsylvania	98,860	5,835,076	1.69
Rhode Island	9,190	537,873	1.71
South Carolina	19,560	1,878,397	1.04
South Dakota	4,910	408,805	1.20
Tennessee	35,700	2,742,225	1.30
Texas	197,310	10,195,950	1.94
Utah	25,930	1,121,088	2.31
Vermont	5,080	335,823	1.51
Virginia	142,270	3,612,229	3.94
Washington	79,320	2,926,836	2.71
West Virginia	6,960	747,637	0.93
Wisconsin	36,530	2,896,670	1.26
Wyoming	1,680	265,200	0.63
Puerto Rico	7,070	1,200,322	0.59

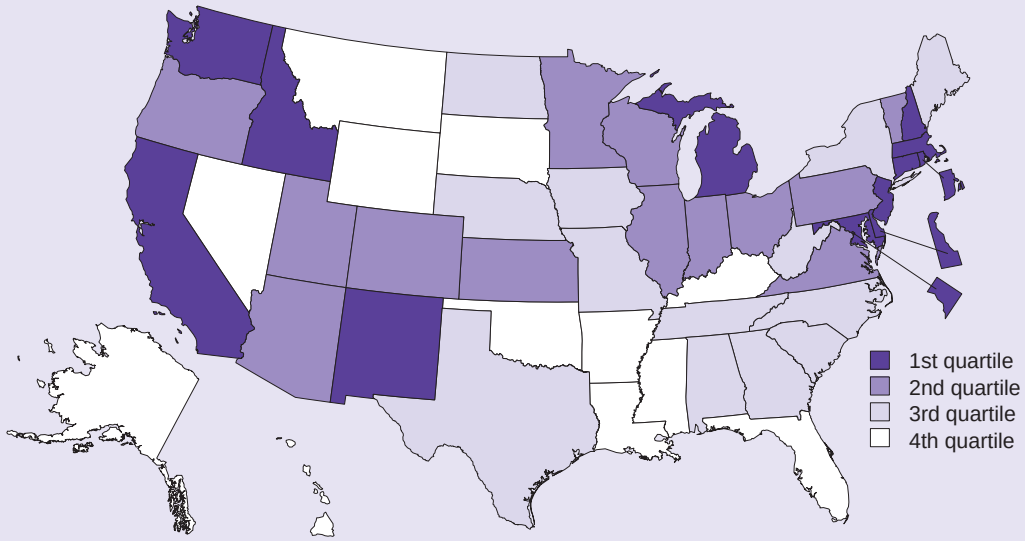
NOTE: Workforce represents employed component of civilian labor force and is reported as annual data, not seasonally adjusted.

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wage Estimates; and Local Area Unemployment Statistics.

Science and Engineering Indicators 2006

R&D as Share of Gross State Product

Figure 8-26
R&D as share of gross state product: 2002



1st quartile (8.76%–2.80%)	2nd quartile (2.62%–1.88%)	3rd quartile (1.85%–1.09%)	4th quartile (1.06%–0.39%)
California	Arizona	Alabama	Alaska
Connecticut	Colorado	Georgia	Arkansas
Delaware	Illinois	Iowa	Florida
District of Columbia	Indiana	Maine	Hawaii
Idaho	Kansas	Missouri	Kentucky
Maryland	Minnesota	Nebraska	Louisiana
Massachusetts	Ohio	New York	Mississippi
Michigan	Oregon	North Carolina	Montana
New Hampshire	Pennsylvania	North Dakota	Nevada
New Jersey	Utah	South Carolina	Oklahoma
New Mexico	Vermont	Tennessee	South Dakota
Rhode Island	Virginia	Texas	Wyoming
Washington	Wisconsin	West Virginia	

SOURCES: National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*; and U.S. Department of Commerce, Bureau of Economic Analysis, Gross State Product data. See table 8-26.

Findings

- The national value of this indicator has not changed significantly over the past decade, varying from 2.48% in 1993 to 2.46% in 2002.
- In 2002, state values for this indicator ranged from 0.39% to 8.76%, indicating large differences in the geographic concentration of R&D.
- New Mexico is an outlier on this indicator because of the presence of large federal R&D activities and a relatively small GSP.
- States with high rankings on this indicator also tended to rank high on S&E doctorate holders as a share of the workforce.

This indicator shows the extent to which research and development play a role in a state's economy. A high value indicates that the state has a high intensity of R&D activity, which may support future growth in knowledge-based industries. Industries that have a high percentage of R&D activity include pharmaceuticals, chemicals, computer equipment and services, electronic components, aerospace, and motor vehicles. R&D refers to R&D activities performed by federal agencies, industry, universities, and other nonprofit organizations. At the national level in 2002, industry performed roughly 71% of total R&D, followed by colleges and universities at 14% and government facilities, including federally funded R&D centers, at 13%. Data for the value of gross state product (GSP) and for R&D expenditures are shown in current dollars.

The methodology for assigning R&D activity at the state level was modified in 2001, and data back to 1998 were recalculated using the new methodology. State-level R&D data from years before 1998 are not comparable.

Table 8-26
R&D as share of gross state product, by state: 1998, 2000, and 2002

State	R&D performed ($ thousands)			GSP ($ millions)			R&D performed/GSP (%)		
	1998	2000	2002	1998	2000	2002	1998	2000	2002
United States	161,560,028	214,751,949	255,707,431	6,513,028	8,679,660	10,407,146	2.48	2.47	2.46
Alabama	1,967,533	1,926,127	2,323,165	84,497	107,825	125,567	2.33	1.79	1.85
Alaska	129,211	NA	307,812	23,014	22,942	29,708	0.56	NA	1.04
Arizona	1,607,378	2,317,552	4,096,021	85,483	137,457	171,781	1.88	1.69	2.38
Arkansas	301,143	283,161	427,127	47,188	61,759	71,929	0.64	0.46	0.59
California	33,721,294	43,919,295	51,388,310	847,879	1,090,979	1,367,785	3.98	4.03	3.76
Colorado	2,864,058	4,565,357	4,217,633	93,588	142,701	179,410	3.06	3.20	2.35
Connecticut	2,808,827	3,558,775	6,774,167	107,924	143,232	165,744	2.60	2.48	4.09
Delaware	1,248,672	2,555,543	1,318,622	23,827	36,993	47,150	5.24	6.91	2.80
District of Columbia	2,543,172	2,606,128	2,705,839	46,596	51,364	66,440	5.46	5.07	4.07
Florida	3,525,284	4,773,060	5,497,618	305,036	416,598	520,500	1.16	1.15	1.06
Georgia	1,577,360	2,491,906	3,934,608	172,220	254,453	305,829	0.92	0.98	1.29
Hawaii	380,150	241,560	455,679	36,308	37,568	43,998	1.05	0.64	1.04
Idaho	477,563	1,126,774	1,370,496	22,758	29,895	38,558	2.10	3.77	3.55
Illinois	6,777,207	8,830,457	10,190,059	317,248	425,049	486,139	2.14	2.08	2.10
Indiana	2,560,252	3,088,634	4,326,337	131,485	179,458	204,946	1.95	1.72	2.11
Iowa	902,050	1,053,690	1,346,336	62,764	84,499	98,232	1.44	1.25	1.37
Kansas	463,570	1,518,063	1,865,261	58,380	76,220	89,508	0.79	1.99	2.08
Kentucky	428,684	645,079	1,128,308	80,882	110,731	122,282	0.53	0.58	0.92
Louisiana	469,705	542,408	857,637	95,587	116,412	131,584	0.49	0.47	0.65
Maine	113,937	159,268	428,771	25,358	31,722	39,039	0.45	0.50	1.10
Maryland	7,530,401	8,018,944	9,030,106	126,442	161,485	201,879	5.96	4.97	4.47
Massachusetts	9,497,975	13,382,495	14,316,139	175,729	236,347	288,088	5.40	5.66	4.97
Michigan	10,777,535	13,655,250	15,082,389	222,886	310,004	351,287	4.84	4.40	4.29
Minnesota	2,922,121	3,817,731	5,247,399	115,420	166,146	200,061	2.53	2.30	2.62
Mississippi	324,189	366,465	691,444	47,384	61,065	69,136	0.68	0.60	1.00
Missouri	1,788,896	1,867,905	2,478,355	119,680	162,666	187,543	1.49	1.15	1.32
Montana	90,438	190,675	236,144	16,151	20,004	23,773	0.56	0.95	0.99
Nebraska	294,531	314,645	663,135	38,665	52,152	60,962	0.76	0.60	1.09
Nevada	218,503	570,509	524,417	39,929	63,826	81,182	0.55	0.89	0.65
New Hampshire	438,620	1,339,951	1,435,074	27,507	38,818	46,448	1.59	3.45	3.09
New Jersey	9,180,997	11,368,389	13,020,435	246,727	314,604	380,169	3.72	3.61	3.42
New Mexico	2,751,608	3,031,678	4,689,090	37,110	45,972	53,515	7.41	6.59	8.76
New York	10,973,876	13,730,588	13,354,226	551,161	679,189	792,058	1.99	2.02	1.69
North Carolina	2,745,087	4,559,996	5,135,001	168,830	241,095	300,216	1.63	1.89	1.71
North Dakota	91,534	119,450	294,630	12,855	17,268	19,780	0.71	0.69	1.49
Ohio	6,397,650	6,969,763	8,309,769	260,891	349,611	388,224	2.45	1.99	2.14
Oklahoma	533,398	512,899	793,412	65,035	80,141	95,126	0.82	0.64	0.83
Oregon	773,855	1,910,443	2,891,509	69,810	101,092	115,138	1.11	1.89	2.51
Pennsylvania	8,277,907	8,761,617	9,763,237	288,154	365,343	428,950	2.87	2.40	2.28
Rhode Island	484,236	1,677,063	1,638,666	23,627	29,620	36,988	2.05	5.66	4.43
South Carolina	713,450	989,452	1,668,245	75,955	103,422	122,354	0.94	0.96	1.36
South Dakota	58,634	59,766	110,632	16,261	20,721	25,003	0.36	0.29	0.44
Tennessee	1,212,807	2,502,826	2,568,240	119,758	161,653	190,122	1.01	1.55	1.35
Texas	6,965,939	10,774,067	14,222,536	452,649	628,415	773,455	1.54	1.71	1.84
Utah	751,165	1,494,808	1,571,691	38,395	59,996	72,974	1.96	2.49	2.15
Vermont	342,809	175,486	398,291	13,154	16,014	19,604	2.61	1.10	2.03
Virginia	2,938,617	4,933,647	5,894,686	170,754	223,638	287,589	1.72	2.21	2.05
Washington	5,421,959	8,465,553	10,511,415	138,225	194,566	232,940	3.92	4.35	4.51
West Virginia	279,583	420,704	542,120	32,240	40,497	45,518	0.87	1.04	1.19
Wisconsin	1,851,751	2,501,029	3,585,099	119,508	161,261	190,650	1.55	1.55	1.88
Wyoming	62,907	65,318	80,093	14,114	15,172	20,285	0.45	0.43	0.39
Puerto Rico	NA	NA	NA	36,923	54,086	71,306	NA	NA	NA

NA = not available

GSP = gross state product

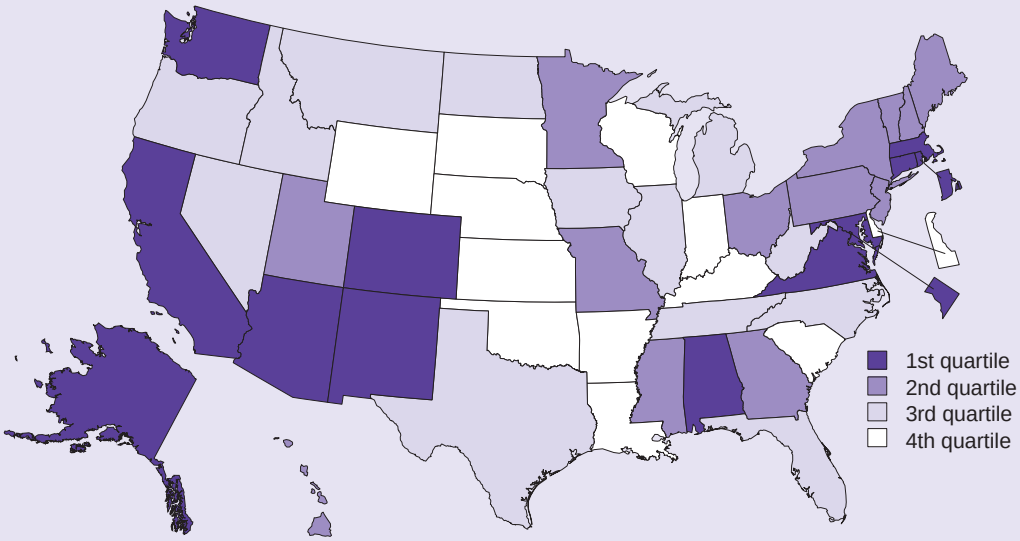
NOTES: Total R&D includes R&D performed by federal agencies, industry, universities, and other nonprofit organizations. Total R&D and GSP are reported in current dollars.

SOURCES: National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources,* various years; U.S. Department of Commerce, Bureau of Economic Analysis, Gross State Product data; and Government of Puerto Rico, Office of the Governor.

Science and Engineering Indicators 2006

Federal R&D Obligations per Civilian Worker

Figure 8-27
Federal R&D obligations per civilian worker: 2002



1st quartile ($10,166–$694)	2nd quartile ($642–$369)	3rd quartile ($357–$252)	4th quartile ($227–$117)
Alabama	Georgia	Florida	Arkansas
Alaska	Hawaii	Idaho	Delaware
Arizona	Maine	Illinois	Indiana
California	Minnesota	Iowa	Kansas
Colorado	Mississippi	Michigan	Kentucky
Connecticut	Missouri	Montana	Louisiana
District of Columbia	New Hampshire	Nevada	Nebraska
Maryland	New Jersey	North Carolina	Oklahoma
Massachusetts	New York	North Dakota	South Carolina
New Mexico	Ohio	Oregon	South Dakota
Rhode Island	Pennsylvania	Tennessee	Wisconsin
Virginia	Utah	Texas	Wyoming
Washington	Vermont	West Virginia	

SOURCES: National Science Foundation, Division of Science Resources Statistics, *Federal Funds for Research and Development*; and U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics. See table 8-27.

Findings

- Federal R&D obligations rose from $64 billion in 1992 to $84 billion in 2002, an increase of 31%.
- The increase in federal R&D obligations (unadjusted for inflation) was greater than the increase in the civilian workforce, and the value of this indicator rose from $536 per worker in 1992 to $612 per worker in 2002.
- Federal R&D obligations in 2002 varied greatly among the states, ranging from $117 to $3,318 per worker. Higher values were found in the states surrounding the District of Columbia and in sparsely populated states with national laboratories.
- The District of Columbia was an outlier with $10,166 per worker, possibly because many federal employees work there but live in neighboring states.

This indicator shows how federal research and development funding is disbursed geographically relative to the size of states' civilian workforces. Because the Department of Defense is the primary source for federal R&D obligations, much of this funding is used for development, but it also may provide direct and indirect benefits to a state's economy and may stimulate the conduct of basic research. A high value may indicate the existence of major federally funded R&D facilities in the state.

Federal R&D dollars are attributed to the states in which the recipients of federal obligations are located. The size of a state's civilian workforce is estimated based on the Bureau of Labor Statistics Current Population Survey, which assigns workers to a location based on residence. Because of these differences and the sample-based nature of the population data, estimates for sparsely populated states and the District of Columbia may be imprecise.

Table 8-27
Federal R&D obligations per civilian worker, by state: 1992, 1997, and 2002

State	Federal R&D obligations ($ millions)			Civilian workers			Federal R&D obligations/ civilian worker ($)		
	1992	1997	2002	1992	1997	2002	1992	1997	2002
United States	63,818	68,363	83,629	118,984,370	130,988,267	136,716,756	536	522	612
Alabama	2,152	2,214	2,705	1,809,337	2,035,156	1,996,920	1,189	1,088	1,354
Alaska	93	100	274	262,980	289,963	302,622	354	345	905
Arizona	638	732	2,057	1,753,764	2,196,901	2,494,153	364	333	825
Arkansas	69	95	141	1,073,382	1,177,143	1,205,232	64	81	117
California	15,999	13,731	15,686	13,874,246	14,780,791	16,165,052	1,153	929	970
Colorado	1,479	1,340	1,609	1,744,235	2,154,294	2,300,065	848	622	700
Connecticut	578	847	1,917	1,693,563	1,674,937	1,706,066	341	505	1,124
Delaware	43	49	79	347,194	378,117	403,017	124	130	196
District of Columbia	2,185	2,232	2,850	290,103	262,789	280,302	7,532	8,495	10,166
Florida	2,832	3,326	2,301	6,133,417	7,040,660	7,615,730	462	472	302
Georgia	2,513	3,920	2,019	3,182,777	3,751,699	4,100,119	789	1,045	492
Hawaii	151	151	375	551,563	566,766	584,054	273	266	642
Idaho	300	206	231	493,767	598,004	645,958	607	344	357
Illinois	922	1,140	1,694	5,546,722	5,988,296	5,961,248	166	190	284
Indiana	367	410	526	2,703,403	3,014,499	2,989,544	136	136	176
Iowa	195	228	405	1,441,414	1,555,837	1,573,701	135	147	257
Kansas	91	256	291	1,244,438	1,329,797	1,351,738	73	192	215
Kentucky	72	91	321	1,658,511	1,809,785	1,838,151	43	50	175
Louisiana	170	211	432	1,787,541	1,890,102	1,902,957	95	112	227
Maine	61	69	255	594,082	624,410	654,522	102	110	389
Maryland	5,780	7,329	7,192	2,484,910	2,646,200	2,735,130	2,326	2,770	2,630
Massachusetts	3,228	3,438	4,659	2,899,718	3,158,851	3,247,094	1,113	1,088	1,435
Michigan	876	735	1,244	4,234,783	4,748,691	4,724,036	207	155	263
Minnesota	456	609	1,151	2,341,011	2,605,673	2,767,058	195	234	416
Mississippi	256	290	623	1,097,672	1,200,845	1,219,060	233	241	511
Missouri	734	1,130	1,203	2,502,779	2,780,185	2,837,544	293	406	424
Montana	72	79	113	390,362	427,504	448,459	183	185	252
Nebraska	71	83	145	817,915	904,492	923,620	87	92	157
Nevada	466	295	336	677,076	895,258	1,061,900	688	330	316
New Hampshire	156	279	297	568,909	635,469	681,509	274	439	435
New Jersey	1,647	1,319	2,022	3,709,471	4,031,022	4,117,644	444	327	491
New Mexico	2,211	1,933	2,746	680,463	768,596	827,533	3,250	2,515	3,318
New York	3,059	2,471	3,747	7,979,726	8,416,544	8,732,103	383	294	429
North Carolina	701	900	1,390	3,372,068	3,809,601	3,921,819	208	236	355
North Dakota	54	53	102	305,056	335,854	336,430	178	158	303
Ohio	1,863	1,880	2,103	5,072,649	5,448,161	5,500,016	367	345	382
Oklahoma	126	160	272	1,432,081	1,543,105	1,612,228	88	104	168
Oregon	227	320	502	1,448,017	1,652,997	1,699,742	156	193	296
Pennsylvania	1,794	1,894	3,162	5,455,450	5,775,178	5,897,438	329	328	536
Rhode Island	386	404	501	483,329	504,147	527,991	799	801	949
South Carolina	172	167	371	1,673,620	1,819,508	1,849,036	103	92	201
South Dakota	24	42	59	345,996	383,216	404,090	69	110	145
Tennessee	666	566	961	2,316,661	2,640,005	2,733,702	287	214	352
Texas	2,873	3,640	3,374	8,307,176	9,395,279	10,065,924	346	387	335
Utah	314	320	409	845,398	1,034,429	1,107,379	371	309	369
Vermont	51	50	136	292,288	315,806	333,703	176	158	409
Virginia	3,231	4,850	5,756	3,146,997	3,323,266	3,560,462	1,027	1,459	1,617
Washington	901	1,226	1,999	2,445,866	2,822,223	2,881,443	368	434	694
West Virginia	166	193	254	689,628	746,442	753,108	241	259	338
Wisconsin	308	332	595	2,556,294	2,855,830	2,877,047	120	116	207
Wyoming	41	28	40	224,562	243,944	261,357	184	116	152
Puerto Rico	NA	59	135	991,960	1,132,658	1,169,760	NA	52	116

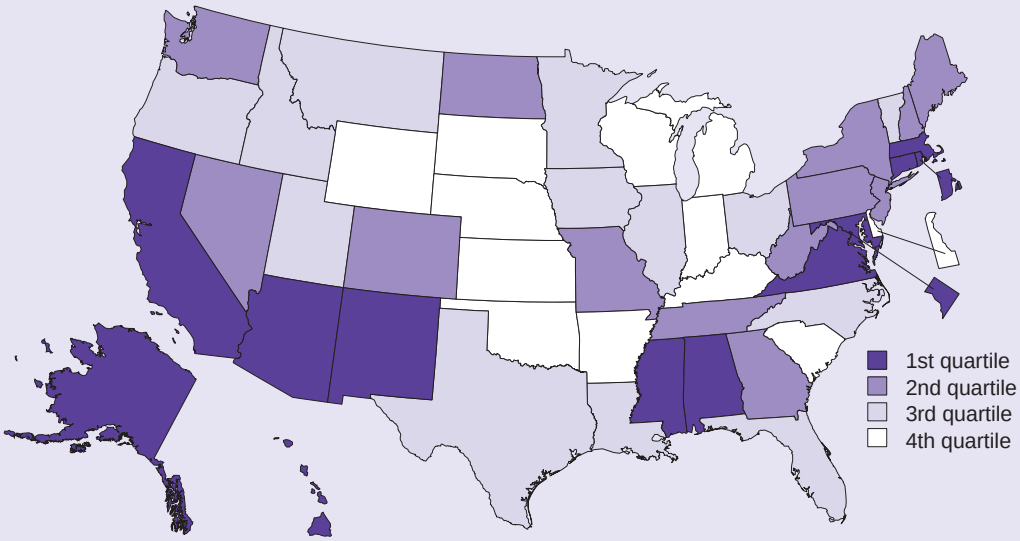
NA = not available

NOTES: Only the following 10 agencies were required to report federal R&D obligations: Departments of Agriculture, Commerce, Defense, Energy, Health and Human Services, Interior, and Transportation; Environmental Protection Agency; National Aeronautics and Space Administration; and National Science Foundation. These obligations represent approximately 98% of total federal R&D obligations in FY 1992, 1997, and 2002. Civilian workers represent employed component of civilian labor force and are reported as annual data, not seasonally adjusted.

SOURCES: National Science Foundation, Division of Science Resources Statistics, *Federal Funds for Research and Development,* various years; and U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics.

Federal R&D Obligations per Individual in S&E Occupation

Figure 8-28
Federal R&D obligations per individual in S&E occupation: 2002–03



1st quartile ($81,729–$22,333)	2nd quartile ($17,040–$12,112)	3rd quartile ($11,944–$8,019)	4th quartile ($7,612–$4,537)
Alabama	Colorado	Florida	Arkansas
Alaska	Georgia	Idaho	Delaware
Arizona	Maine	Illinois	Indiana
California	Missouri	Iowa	Kansas
Connecticut	Nevada	Louisiana	Kentucky
District of Columbia	New Hampshire	Minnesota	Michigan
Hawaii	New Jersey	Montana	Nebraska
Maryland	New York	North Carolina	Oklahoma
Massachusetts	North Dakota	Ohio	South Carolina
Mississippi	Pennsylvania	Oregon	South Dakota
New Mexico	Tennessee	Texas	Wisconsin
Rhode Island	Washington	Utah	Wyoming
Virginia	West Virginia	Vermont	

SOURCES: National Science Foundation, Division of Science Resources Statistics, *Federal Funds for Research and Development*; and U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wage Estimates. See table 8-28.

Findings

- The federal government obligated $83.6 billion for R&D in 2002, nearly $17,000 for each person employed in an S&E occupation.
- The state distribution of federal R&D obligations per person employed in an S&E occupation ranged from $4,537 to $81,729.
- The state distribution for this indicator was highly skewed, with only 14 states above the national average.
- High values occurred in the District of Columbia and adjoining states and in states where federal facilities or major defense contractors were located.

This indicator demonstrates how federal research and development obligations are distributed geographically based on individuals with a bachelor's or higher degree who work in science and engineering occupations. These positions include mathematical, computer, life, physical, and social scientists; engineers; and postsecondary teachers in any of these fields. Positions such as managers and elementary and secondary schoolteachers are excluded. A high value may indicate the existence of major federally funded R&D facilities or the presence of large defense or other federal contractors in the state.

Federal R&D dollars are counted where they are obligated but may be expended in many locations. Data on people in S&E occupations are sample based. For these reasons, estimates for sparsely populated states and the District of Columbia may be imprecise.

This indicator contains 2002 data in the numerator and 2003 data in the denominator, each representing the most recent data release. The 2003 numerator data are not scheduled for release before the time of printing, and the 2002 denominator data contain suppressed data.

Table 8-28
Federal R&D obligations per individual in S&E occupation, by state: 2002–03

State	2002 federal R&D obligations ($ millions)	2003 individuals in S&E occupations	2002 federal R&D obligations/2003 individual in S&E occupation ($)
United States	83,629	4,961,550	16,855
Alabama	2,705	56,380	47,974
Alaska	274	10,600	25,830
Arizona	2,057	92,120	22,333
Arkansas	141	21,340	6,621
California	15,686	676,180	23,198
Colorado	1,609	124,140	12,961
Connecticut	1,917	81,380	23,555
Delaware	79	17,370	4,537
District of Columbia	2,850	54,890	51,913
Florida	2,301	221,070	10,407
Georgia	2,019	144,170	14,006
Hawaii	375	16,090	23,319
Idaho	231	22,150	10,424
Illinois	1,694	211,230	8,019
Indiana	526	78,410	6,705
Iowa	405	37,320	10,839
Kansas	291	51,970	5,590
Kentucky	321	45,230	7,104
Louisiana	432	41,900	10,310
Maine	255	15,020	16,944
Maryland	7,192	149,250	48,189
Massachusetts	4,659	184,690	25,224
Michigan	1,244	182,940	6,801
Minnesota	1,151	117,120	9,826
Mississippi	623	22,190	28,062
Missouri	1,203	84,150	14,292
Montana	113	11,450	9,860
Nebraska	145	30,710	4,712
Nevada	336	22,330	15,047
New Hampshire	297	23,430	12,659
New Jersey	2,022	161,420	12,523
New Mexico	2,746	33,600	81,729
New York	3,747	272,440	13,753
North Carolina	1,390	132,440	10,498
North Dakota	102	8,430	12,112
Ohio	2,103	177,100	11,877
Oklahoma	272	44,360	6,123
Oregon	502	61,230	8,203
Pennsylvania	3,162	185,560	17,040
Rhode Island	501	18,740	26,750
South Carolina	371	48,740	7,612
South Dakota	59	9,150	6,415
Tennessee	961	63,680	15,093
Texas	3,374	365,270	9,238
Utah	409	45,570	8,969
Vermont	136	11,420	11,944
Virginia	5,756	209,280	27,505
Washington	1,999	150,230	13,306
West Virginia	254	16,220	15,672
Wisconsin	595	93,320	6,374
Wyoming	40	6,130	6,460
Puerto Rico	135	19,940	6,785

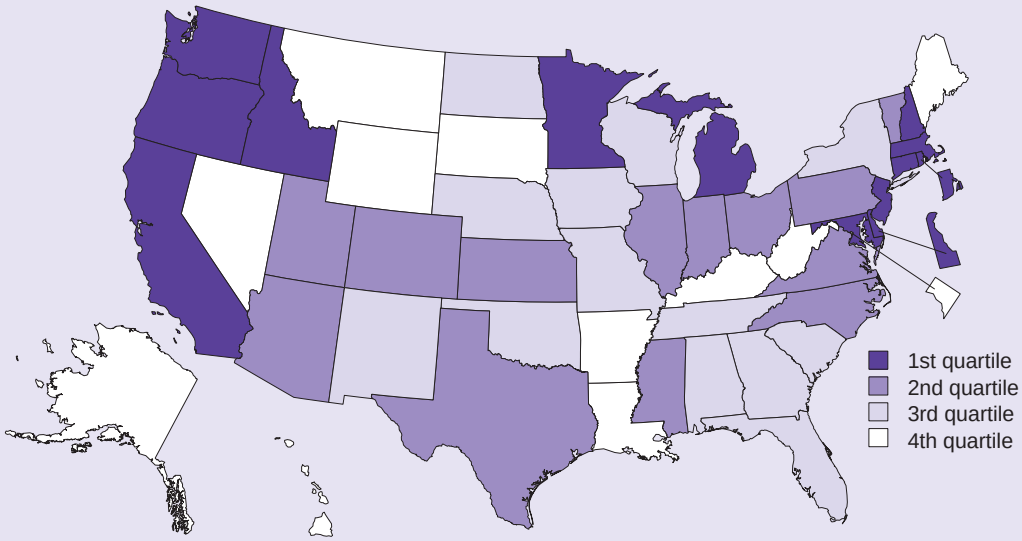
NOTES: Only the following 10 agencies were required to report federal R&D obligations: Departments of Agriculture, Commerce, Defense, Energy, Health and Human Services, Interior, and Transportation; Environmental Protection Agency; National Aeronautics and Space Administration; and National Science Foundation. These obligations represent approximately 98% of total federal R&D obligations in FY 2002.

SOURCES: National Science Foundation, Division of Science Resources Statistics, *Federal Funds for Research and Development;* and U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wage Estimates.

Science and Engineering Indicators 2006

Industry-Performed R&D as Share of Private-Industry Output

Figure 8-29
Industry-performed R&D as share of private-industry output: 2003



1st quartile (4.73%–2.15%)	2nd quartile (2.14%–1.52%)	3rd quartile (1.49%–0.65%)	4th quartile (0.57%–0.14%)
California	Arizona	Alabama	Alaska
Connecticut	Colorado	Florida	Arkansas
Delaware	Illinois	Georgia	District of Columbia
Idaho	Indiana	Iowa	Hawaii
Maryland	Kansas	Missouri	Kentucky
Massachusetts	Mississippi	Nebraska	Louisiana
Michigan	North Carolina	New Mexico	Maine
Minnesota	Ohio	New York	Montana
New Hampshire	Pennsylvania	North Dakota	Nevada
New Jersey	Texas	Oklahoma	South Dakota
Oregon	Utah	South Carolina	West Virginia
Rhode Island	Vermont	Tennessee	Wyoming
Washington	Virginia	Wisconsin	

SOURCES: National Science Foundation, Division of Science Resources Statistics, Survey of Industrial Research and Development; and U.S. Department of Commerce, Bureau of Economic Analysis, Gross State Product data. See Table 8-29.

Findings

- The amount of R&D performed by industry rose from $164 billion in 1998 to $198 billion in 2003, an increase of 21% (unadjusted for inflation).
- The value of this indicator for the United States has been variable over the past 5 years; starting at 2.14% in 1998, it rose to 2.23% in 2000 before declining to 2.06% in 2003.
- Industrial R&D is concentrated in a few states—only 15 states had indicator values exceeding the national average in 2003.
- States with high values for this indicator were usually located on the West Coast or the northern half of the East Coast.

This indicator measures the emphasis that private industry places on research and development. Industrial R&D focuses on projects that are expected to yield new or improved products, processes, or services and to bring direct benefits to the company. A high value for this indicator shows that the companies and industries within a state are making a significant investment in their R&D activities.

Differences among states on this indicator should be interpreted with caution. Because industries differ in their reliance on R&D, the indicator reflects state differences in industrial structure as much as the behavior of individual companies. Furthermore, industrial R&D data for states with small economies may be based on data imputed from previous years' survey results and imprecise estimates.

The methodology for making state-level assignments of the industrial R&D reported by companies with operations in multiple states changed in 1998. Industrial R&D data from previous years are not comparable.

Table 8-29
Industry-performed R&D as share of private-industry output, by state: 1998, 2000, and 2003

State	Industry-performed R&D ($ millions)			Private-industry output ($ millions)			Industry-performed R&D/ private-industry output (%)		
	1998	2000	2003	1998	2000	2003	1998	2000	2003
United Sates	163,658	192,197	198,244	7,652,499	8,614,286	9,604,156	2.14	2.23	2.06
Alabama	845	821	999	89,502	96,446	109,488	0.94	0.85	0.91
Alaska	37	48	36	18,237	22,381	25,436	0.20	0.21	0.14
Arizona	1,801	2,182	2,605	120,035	138,624	160,429	1.50	1.57	1.62
Arkansas	213	400	270	53,761	57,763	64,871	0.40	0.69	0.42
California	32,856	45,455	47,142	966,679	1,154,900	1,277,809	3.40	3.94	3.69
Colorado	3,180	3,143	3,544	126,281	152,455	165,462	2.52	2.06	2.14
Connecticut	3,346	4,132	5,834	132,902	146,985	158,610	2.52	2.81	3.68
Delaware	1,356	1,468	1,298	33,754	38,804	46,257	4.02	3.78	2.81
District of Columbia	598	196	235	32,759	38,167	45,698	1.83	0.51	0.51
Florida	3,265	3,773	3,181	364,872	412,849	487,364	0.89	0.91	0.65
Georgia	1,617	2,159	2,108	224,738	256,521	279,185	0.72	0.84	0.76
Hawaii	55	93	133	29,267	31,480	36,088	0.19	0.30	0.37
Idaho	1,103	1,363	745	25,577	30,379	34,716	4.31	4.49	2.15
Illinois	7,318	8,393	8,319	384,210	420,225	450,635	1.90	2.00	1.85
Indiana	2,922	2,888	3,658	161,609	175,724	192,583	1.81	1.64	1.90
Iowa	750	762	833	74,011	80,129	90,438	1.01	0.95	0.92
Kansas	1,384	1,327	1,675	65,938	72,176	80,287	2.10	1.84	2.09
Kentucky	606	762	601	95,206	97,146	109,376	0.64	0.78	0.55
Louisiana	377	364	295	103,955	118,914	125,610	0.36	0.31	0.23
Maine	137	255	200	27,554	30,757	35,023	0.50	0.83	0.57
Maryland	1,905	2,213	3,998	133,268	148,859	176,766	1.43	1.49	2.26
Massachusetts	10,367	10,857	11,094	215,743	253,492	271,137	4.81	4.28	4.09
Michigan	12,554	17,489	15,241	278,288	303,519	322,098	4.51	5.76	4.73
Minnesota	3,367	3,971	5,003	149,615	166,186	188,601	2.25	2.39	2.65
Mississippi	183	242	1,021	50,730	53,308	59,392	0.36	0.45	1.72
Missouri	1,505	1,978	1,742	145,297	156,173	171,295	1.04	1.27	1.02
Montana	63	78	65	16,567	17,732	21,324	0.38	0.44	0.30
Nebraska	195	335	363	44,564	47,831	55,868	0.44	0.70	0.65
Nevada	476	433	383	57,324	67,247	80,672	0.83	0.64	0.47
New Hampshire	1,138	722	1,349	35,751	39,815	43,768	3.18	1.81	3.08
New Jersey	11,107	10,580	11,401	282,444	310,296	354,537	3.93	3.41	3.22
New Mexico	1,450	1,203	349	37,472	41,188	45,734	3.87	2.92	0.76
New York	10,283	11,622	8,556	613,413	690,213	750,468	1.68	1.68	1.14
North Carolina	3,483	4,535	4,424	212,757	240,723	275,309	1.64	1.88	1.61
North Dakota	46	83	216	14,777	15,263	18,178	0.31	0.54	1.19
Ohio	5,742	6,245	6,260	312,482	331,986	354,891	1.84	1.88	1.76
Oklahoma	369	463	577	66,514	74,965	83,942	0.55	0.62	0.69
Oregon	1,345	1,533	2,973	88,720	99,265	104,523	1.52	1.54	2.84
Pennsylvania	7,393	8,473	7,091	325,705	353,120	400,842	2.27	2.40	1.77
Rhode Island	1,332	1,167	1,203	25,933	29,695	34,648	5.14	3.93	3.47
South Carolina	996	1,059	976	88,159	95,381	108,091	1.13	1.11	0.90
South Dakota	40	89	75	17,968	20,103	23,857	0.22	0.44	0.31
Tennessee	2,440	1,644	1,507	142,328	154,830	178,359	1.71	1.06	0.84
Texas	8,984	10,048	11,057	557,215	642,236	725,112	1.61	1.56	1.52
Utah	1,119	1,063	996	51,737	58,280	65,577	2.16	1.82	1.52
Vermont	114	389	360	13,912	15,426	17,838	0.82	2.52	2.02
Virginia	2,540	2,683	4,152	186,167	215,600	251,770	1.36	1.24	1.65
Washington	7,072	8,235	9,222	167,584	192,049	209,977	4.22	4.29	4.39
West Virginia	335	329	219	33,632	34,801	38,755	1.00	0.95	0.57
Wisconsin	1,929	2,415	2,623	142,961	157,044	176,351	1.35	1.54	1.49
Wyoming	20	37	37	12,625	14,835	19,111	0.16	0.25	0.19

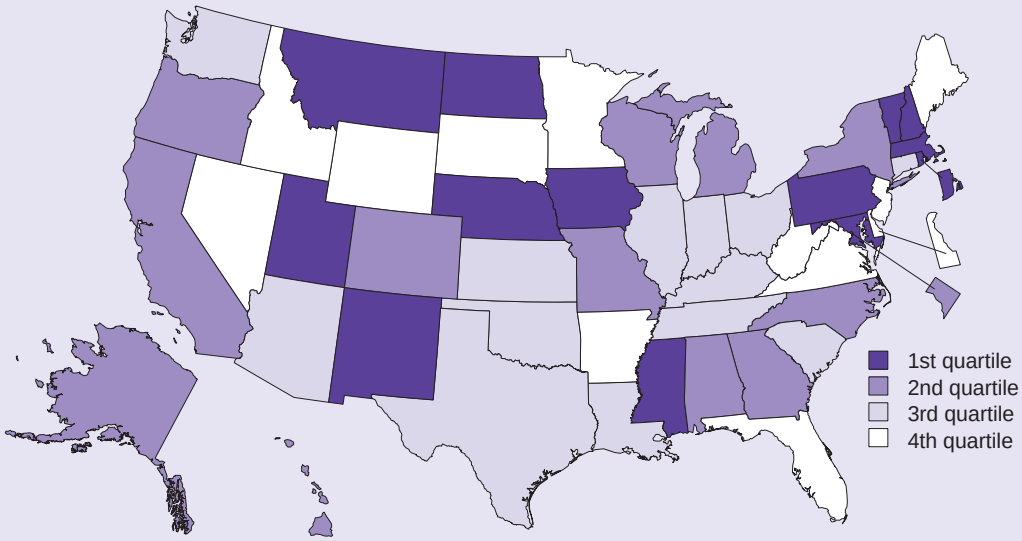
NOTES: In 1998, more than 50% of industrial R&D value imputed because of raking of state data for Alaska, Arkansas, Hawaii, Louisiana, Mississippi, Nebraska, North Dakota, South Dakota, and Wyoming. In 1998, more than 50% of industrial R&D value imputed for Delaware, District of Columbia, Idaho, Kansas, New Mexico, Rhode Island, and Washington. In 2000, more than 50% of industrial R&D value imputed because of raking of state data for Alaska, District of Columbia, Hawaii, Louisiana, Mississippi, Montana, Nebraska, North Dakota, South Dakota, and Wyoming. In 2000, more than 50% of industrial R&D value imputed for Alabama, Arizona, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Kansas, Michigan, New Mexico, Rhode Island, and Washington. In 2003, more than 50% of industrial R&D value imputed because of raking of state data for Alaska. In 2003, more than 50% of industrial R&D value imputed for Kansas and Rhode Island. Private-industry output is reported in current dollars.

SOURCES: National Science Foundation, Division of Science Resources Statistics, Survey of Industrial Research and Development, various years; and U.S. Department of Commerce, Bureau of Economic Analysis, Gross State Product data.

Science and Engineering Indicators 2006

Academic R&D per $1,000 of Gross State Product

Figure 8-30
Academic R&D per $1,000 of gross state product: 2003



1st quartile ($6.68–$4.51)	2nd quartile ($4.45–$3.64)	3rd quartile ($3.63–$2.92)	4th quartile ($2.70–$1.72)
Iowa	Alabama	Arizona	Arkansas
Maryland	Alaska	Connecticut	Delaware
Massachusetts	California	Illinois	Florida
Mississippi	Colorado	Indiana	Idaho
Montana	District of Columbia	Kansas	Maine
Nebraska	Georgia	Kentucky	Minnesota
New Hampshire	Hawaii	Louisiana	Nevada
New Mexico	Michigan	Ohio	New Jersey
North Dakota	Missouri	Oklahoma	South Dakota
Pennsylvania	New York	South Carolina	Virginia
Rhode Island	North Carolina	Tennessee	West Virginia
Utah	Oregon	Texas	Wyoming
Vermont	Wisconsin	Washington	

SOURCES: National Science Foundation, Division of Science Resources Statistics, *Academic Research and Development Expenditures*; and U.S. Department of Commerce, Bureau of Economic Analysis, Gross State Product data. See Table 8-30.

Findings

- Expenditures for research performed in academic institutions have doubled in a decade, rising from $19.4 billion in 1993 to $39.4 billion in 2003 (unadjusted for inflation).
- Academic research increased more rapidly than gross domestic product (GDP), causing the value of this indicator to increase from $3.01 to $3.60 per $1,000 of GDP.
- Most states showed increases in the value of this indicator over the past decade, although declines were observed in seven states.
- States ranking high on the intensity of academic research usually did not rank high on the intensity of industrial research.

This indicator measures the extent of spending on academic research performed in a state relative to the size of the state's economy. Academic research and development is more basic and less product oriented than R&D performed by industry. It can be a valuable basis for future economic development. High values for this indicator may reflect an academic R&D system that can compete for funding from federal, state, and industrial sources.

In this indicator, Maryland data exclude expenditures by the Applied Physics Laboratory (APL) at Johns Hopkins University. APL employs more than 3,000 people and supports the Department of Defense, the National Aeronautics and Space Administration, and other government agencies rather than focusing on academic research. Data for the value of gross state product and for R&D expenditures are shown in current dollars.

Table 8-30
Academic R&D per $1,000 of gross state product, by state: 1993, 1998, and 2003

State	Academic R&D ($ thousands)			GSP ($ millions)			Academic R&D/ $1,000 GSP ($)		
	1993	1998	2003	1993	1998	2003	1993	1998	2003
United States	19,438,022	25,316,788	39,368,880	5,857,335	7,659,648	10,407,146	3.01	2.92	3.60
Alabama	287,849	442,088	557,859	75,293	97,941	125,567	3.45	4.16	4.27
Alaska	66,855	76,358	140,641	22,164	26,083	29,708	2.91	3.29	4.44
Arizona	310,721	405,999	617,978	72,263	113,138	171,781	3.65	2.96	3.37
Arkansas	79,299	116,778	183,183	40,950	56,455	71,929	1.70	1.90	2.46
California	2,445,089	3,389,742	5,362,683	801,193	958,476	1,367,785	2.93	3.12	3.73
Colorado	335,475	489,419	694,862	78,624	116,045	179,410	3.63	3.41	3.69
Connecticut	367,466	406,618	594,541	100,229	126,744	165,744	3.46	2.80	3.42
Delaware	53,889	72,779	104,650	21,925	28,885	47,150	2.28	1.97	2.07
District of Columbia	151,808	232,922	263,342	41,806	47,560	66,440	3.32	4.50	3.73
Florida	492,317	712,704	1,204,592	267,851	362,950	520,500	1.63	1.71	2.18
Georgia	558,188	804,151	1,175,852	146,334	215,128	305,829	3.30	3.15	3.66
Hawaii	73,961	148,007	184,602	33,579	36,959	43,998	2.06	3.93	3.96
Idaho	50,404	72,395	105,039	18,601	28,152	38,558	2.22	2.42	2.60
Illinois	776,412	1,030,819	1,613,691	286,582	377,271	486,139	2.45	2.43	3.23
Indiana	304,140	426,328	725,752	113,831	155,512	204,946	2.33	2.39	3.40
Iowa	299,528	358,613	498,669	57,677	77,244	98,232	4.78	4.28	4.87
Kansas	154,655	213,096	310,052	53,345	67,965	89,508	2.67	2.79	3.32
Kentucky	127,742	241,520	377,635	70,536	94,987	122,282	1.59	2.20	2.94
Louisiana	263,960	353,261	524,262	94,298	114,967	131,584	2.83	2.98	3.63
Maine	26,025	35,265	75,092	23,398	28,636	39,039	1.04	1.10	1.84
Maryland	701,637	887,473	1,423,186	116,226	142,910	201,879	5.62	5.49	6.68
Massachusetts	1,121,126	1,348,220	1,821,817	160,193	208,288	288,088	6.47	5.69	6.13
Michigan	705,430	882,141	1,388,284	194,253	263,871	351,287	3.19	2.86	3.86
Minnesota	336,954	367,779	517,346	103,791	141,664	200,061	2.93	2.21	2.46
Mississippi	110,963	152,683	324,298	40,839	55,997	69,136	2.38	2.53	4.51
Missouri	351,845	484,502	806,907	109,548	145,044	187,543	2.97	2.97	4.16
Montana	50,420	76,655	141,220	14,057	17,998	23,773	3.13	3.86	5.52
Nebraska	137,194	186,320	300,540	35,619	48,317	60,962	3.51	3.57	4.60
Nevada	79,124	83,888	154,515	33,599	54,085	81,182	1.98	1.31	1.72
New Hampshire	99,475	117,323	252,210	24,778	34,823	46,448	3.60	3.01	5.23
New Jersey	374,583	484,942	747,481	221,678	281,806	380,169	1.54	1.55	1.90
New Mexico	187,108	228,740	306,623	30,454	43,658	53,515	5.12	4.98	5.37
New York	1,596,699	1,925,264	3,089,988	508,889	630,003	792,058	2.91	2.81	3.69
North Carolina	633,916	901,995	1,397,371	146,502	201,329	300,216	3.79	3.71	4.43
North Dakota	54,175	56,945	133,615	11,664	16,075	19,780	4.20	3.27	6.19
Ohio	597,195	810,225	1,268,784	234,736	305,413	388,224	2.31	2.32	3.18
Oklahoma	174,981	208,873	295,098	59,468	74,936	95,126	2.69	2.62	2.92
Oregon	227,246	314,355	436,958	60,078	91,166	115,138	3.29	3.11	3.64
Pennsylvania	1,029,195	1,348,265	2,013,453	258,127	325,515	428,950	3.61	3.72	4.54
Rhode Island	103,194	111,979	187,131	21,607	26,665	36,988	4.37	3.79	4.75
South Carolina	185,431	248,474	435,328	68,380	89,260	122,354	2.46	2.40	3.40
South Dakota	22,565	25,474	49,977	13,832	19,073	25,003	1.41	1.22	1.83
Tennessee	279,896	346,466	599,723	101,378	141,335	190,122	2.35	2.16	2.95
Texas	1,422,062	1,697,344	2,765,634	398,935	550,014	773,455	3.17	2.70	3.36
Utah	194,685	249,147	385,158	33,691	51,442	72,974	5.07	4.13	5.02
Vermont	50,627	58,585	106,581	11,722	14,632	19,604	3.87	3.69	5.19
Virginia	408,527	494,005	773,200	152,673	196,638	287,589	2.42	2.18	2.54
Washington	434,885	542,411	869,695	122,657	161,760	232,940	3.13	2.78	3.55
West Virginia	55,282	63,446	120,514	29,352	37,346	45,518	1.71	1.60	2.58
Wisconsin	453,263	535,507	881,214	104,859	141,755	190,650	3.79	3.34	4.45
Wyoming	32,556	48,500	60,054	13,271	15,732	20,285	2.34	3.24	2.70
Puerto Rico	47,848	87,592	78,410	36,923	54,086	74,362	1.30	1.62	1.05

GSP = gross state product

NOTES: In 1998 and 2003, academic R&D was reported for all institutions. In 1993, it was reported for doctorate-granting institutions only. For Maryland, academic R&D excludes R&D performed by Applied Physics Laboratory at Johns Hopkins University. GSP is reported in current dollars.

SOURCES: National Science Foundation, Division of Science Resources Statistics, *Academic Research and Development Expenditures,* various years; U.S. Department of Commerce, Bureau of Economic Analysis, Gross State Product data; and Government of Puerto Rico, Office of the Governor.

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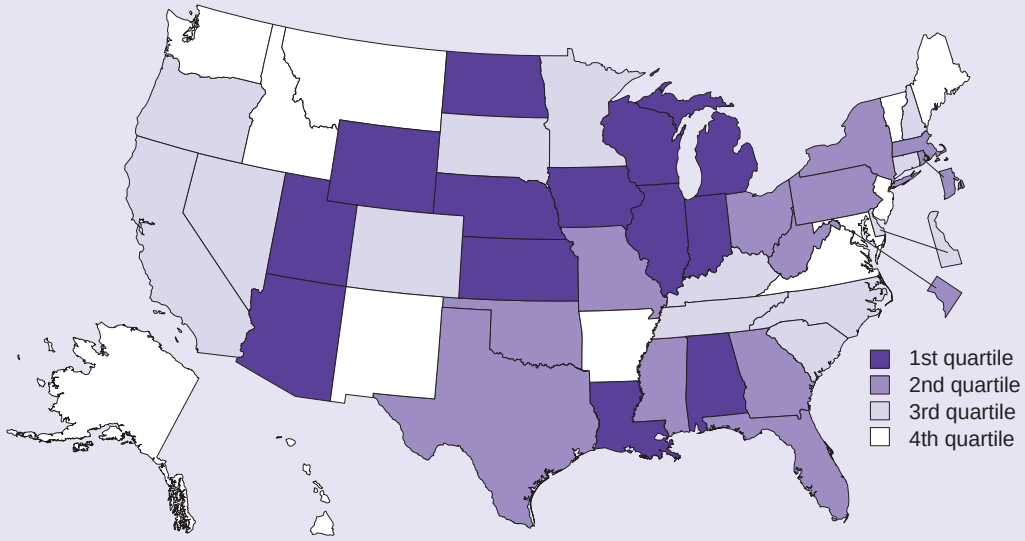
S&E Doctorates Conferred per 1,000 S&E Doctorate Holders

Figure 8-31
S&E doctorates conferred per 1,000 S&E doctorate holders: 2003



1st quartile (72.9–55.4)	2nd quartile (52.6–45.3)	3rd quartile (43.8–35.1)	4th quartile (34.3–17.5)
Alabama	District of Columbia	California	Alaska
Arizona	Florida	Colorado	Arkansas
Illinois	Georgia	Connecticut	Hawaii
Indiana	Massachusetts	Delaware	Idaho
Iowa	Mississippi	Kentucky	Maine
Kansas	Missouri	Minnesota	Maryland
Louisiana	New York	Nevada	Montana
Michigan	Ohio	New Hampshire	New Jersey
Nebraska	Oklahoma	North Carolina	New Mexico
North Dakota	Pennsylvania	Oregon	Vermont
Utah	Rhode Island	South Carolina	Virginia
Wisconsin	Texas	South Dakota	Washington
Wyoming	West Virginia	Tennessee	

SOURCES: National Science Foundation, Division of Science Resources Statistics, Survey of Earned Doctorates; and Survey of Doctorate Recipients. See Table 8-31.

Findings

- In 2003, 25,000 S&E doctorates were awarded by U.S. academic institutions, essentially the same as in 2001 but lower than the nearly 27,000 S&E doctorates awarded in 1997.
- The state average of this indicator decreased between 1997 and 2003, reflecting both a decline in the production of new S&E doctorate holders and an increase in the stock of S&E doctorate holders living in the United States.
- This indicator is volatile for many states and may reflect the migration patterns of existing S&E doctorate holders.

This indicator provides a measure of the rate at which the states are training new science and engineering doctorate recipients for entry into the workforce. High values indicate relatively large production of new doctorate holders compared with the existing stock. Some states with relatively low values may need to attract S&E doctorate holders from elsewhere to meet the needs of local employers.

This indicator does not account for the mobility of recent S&E doctorate recipients, which is very high. Foreign-born graduate students may decide to return home after graduation to begin their careers. Most recent doctorate recipients are influenced by the location of employment opportunities.

U.S. S&E doctorate holders include those in the physical, life, earth, ocean, atmospheric, computer, and social sciences; mathematics; engineering; and psychology. Medical doctorates are excluded. The population of doctorate holders for this indicator consisted of all individuals under age 76 years who received a research doctorate in science or engineering from a U.S. institution and were residing in the United States.

Table 8-31
S&E doctorates conferred per 1,000 S&E doctorate holders, by state: 1997, 2001, and 2003

State	S&E doctorates conferred			S&E doctorate holders			S&E doctorates/ 1,000 doctorate holders		
	1997	2001	2003	1997	2001	2003	1997	2001	2003
United States	26,789	25,342	25,151	503,290	555,360	567,690	53.2	45.6	44.3
Alabama	327	287	314	6,440	5,170	5,500	50.8	55.5	57.1
Alaska	20	26	36	1,110	1,160	1,050	18.0	22.4	34.3
Arizona	486	403	451	6,130	6,800	7,110	79.3	59.3	63.4
Arkansas	68	62	82	2,250	2,460	2,670	30.2	25.2	30.7
California	3,415	3,334	3,405	68,390	78,020	83,150	49.9	42.7	41.0
Colorado	566	485	533	10,350	11,450	12,180	54.7	42.4	43.8
Connecticut	395	370	385	8,470	9,340	10,140	46.6	39.6	38.0
Delaware	130	128	102	3,520	3,470	2,600	36.9	36.9	39.2
District of Columbia	319	291	313	11,580	13,840	6,490	27.5	21.0	48.2
Florida	828	781	818	12,820	15,040	15,590	64.6	51.9	52.5
Georgia	543	608	620	9,640	11,710	12,060	56.3	51.9	51.4
Hawaii	130	107	92	2,420	2,570	2,960	53.7	41.6	31.1
Idaho	57	51	70	1,990	2,160	2,480	28.6	23.6	28.2
Illinois	1,347	1,323	1,262	21,020	21,670	21,410	64.1	61.1	58.9
Indiana	681	667	655	7,460	9,490	8,980	91.3	70.3	72.9
Iowa	401	376	299	4,030	4,280	4,450	99.5	87.9	67.2
Kansas	284	264	269	3,720	3,890	4,050	76.3	67.9	66.4
Kentucky	214	172	185	3,980	4,380	4,740	53.8	39.3	39.0
Louisiana	318	334	287	5,210	5,000	5,180	61.0	66.8	55.4
Maine	41	30	37	2,140	1,940	2,000	19.2	15.5	18.5
Maryland	676	664	634	20,660	22,090	27,050	32.7	30.1	23.4
Massachusetts	1,478	1,448	1,363	22,960	28,390	28,950	64.4	51.0	47.1
Michigan	970	906	954	14,750	16,940	16,280	65.8	53.5	58.6
Minnesota	471	455	425	9,660	11,070	10,770	48.8	41.1	39.5
Mississippi	152	129	140	2,970	3,120	3,080	51.2	41.3	45.5
Missouri	474	439	435	9,300	8,860	8,730	51.0	49.5	49.8
Montana	59	42	51	1,580	1,330	1,660	37.3	31.6	30.7
Nebraska	179	164	184	2,930	2,840	2,730	61.1	57.7	67.4
Nevada	24	52	77	1,620	2,010	1,820	14.8	25.9	42.3
New Hampshire	94	76	100	2,190	2,320	2,710	42.9	32.8	36.9
New Jersey	619	621	584	19,970	22,130	21,900	31.0	28.1	26.7
New Mexico	142	147	163	7,120	7,370	7,640	19.9	19.9	21.3
New York	2,302	2,128	2,131	38,830	42,570	40,510	59.3	50.0	52.6
North Carolina	726	726	723	13,470	16,250	17,130	53.9	44.7	42.2
North Dakota	50	43	66	1,330	1,080	1,110	37.6	39.8	59.5
Ohio	1,210	1,061	989	18,200	19,270	20,130	66.5	55.1	49.1
Oklahoma	237	238	190	4,430	4,110	4,160	53.5	57.9	45.7
Oregon	291	262	256	5,980	6,900	7,280	48.7	38.0	35.2
Pennsylvania	1,376	1,247	1,219	23,110	25,520	26,900	59.5	48.9	45.3
Rhode Island	161	162	142	2,400	2,600	3,060	67.1	62.3	46.4
South Carolina	222	216	181	4,620	5,030	4,810	48.1	42.9	37.6
South Dakota	36	34	33	1,000	970	940	36.0	35.1	35.1
Tennessee	391	377	340	8,350	8,570	8,680	46.8	44.0	39.2
Texas	1,633	1,598	1,548	27,990	31,710	32,430	58.3	50.4	47.7
Utah	196	236	239	4,670	4,720	4,160	42.0	50.0	57.5
Vermont	42	52	29	1,750	1,630	1,660	24.0	31.9	17.5
Virginia	702	628	620	14,860	16,880	20,890	47.2	37.2	29.7
Washington	482	457	441	12,860	14,270	14,960	37.5	32.0	29.5
West Virginia	78	67	101	1,930	1,840	2,040	40.4	36.4	49.5
Wisconsin	681	530	535	8,320	8,290	8,060	81.9	63.9	66.4
Wyoming	65	38	43	810	840	670	80.2	45.2	64.2
Puerto Rico	58	97	80	650	1,400	1,610	89.2	69.3	49.7

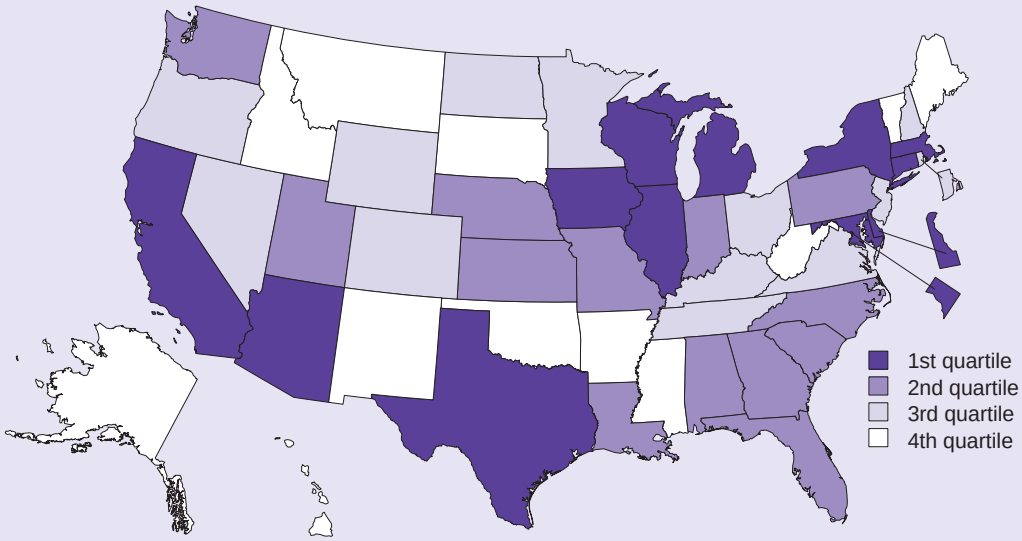
NOTES: Survey of Doctorate Recipients sample design does not include geography. Data on U.S. S&E doctorate holders are classified by employment location. Thus, reliability of data for areas with smaller populations is lower than for more populous states. Reliability of estimates by state for S&E doctorate holders may be poor for some states because of small sample size.

SOURCES: National Science Foundation, Division of Science Resources Statistics, Survey of Earned Doctorates; and Survey of Doctorate Recipients.

Science and Engineering Indicators 2006

Academic Article Output per 1,000 S&E Doctorate Holders in Academia

Figure 8-32
Academic article output per 1,000 S&E doctorate holders in academia: 2003



1st quartile (926–657)	2nd quartile (639–571)	3rd quartile (561–424)	4th quartile (419–251)
Arizona	Alabama	Colorado	Alaska
California	Florida	Kentucky	Arkansas
Connecticut	Georgia	Minnesota	Hawaii
Delaware	Indiana	Nevada	Idaho
District of Columbia	Kansas	New Hampshire	Maine
Illinois	Louisiana	New Jersey	Mississippi
Iowa	Missouri	North Dakota	Montana
Maryland	Nebraska	Ohio	New Mexico
Massachusetts	North Carolina	Oregon	Oklahoma
Michigan	Pennsylvania	Rhode Island	South Dakota
New York	South Carolina	Tennessee	Vermont
Texas	Utah	Virginia	West Virginia
Wisconsin	Washington	Wyoming	

SOURCES: Thomson ISI, *Science Citation Index* and *Social Sciences Citation Index*; ipIQ, Inc.; and National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients. See Table 8-32.

Findings

- Between 1997 and 2003, the number of scientific and technical articles increased by 8%, and the number of S&E doctorate holders increased by the same percentage, causing the value of this indicator to remain almost unchanged for the United States.
- The publication rate for academic S&E doctorate holders in states in the top quartile of this indicator was approximately twice as high as for states in the bottom quartile.
- States with the greatest volatility on this indicator frequently had larger changes in academic employment than in number of publications.
- In 2003, the states with the highest values for this indicator were distributed across the nation.

The volume of peer-reviewed articles per 1,000 academic science and engineering doctorate holders is an approximate measure of their contribution to scientific knowledge. Publications are only one measure of academic productivity, which includes trained personnel, patents, and other outputs. A high value on this indicator shows that the S&E faculty in a state's academic institutions are generating a high volume of publications relative to other states.

Publication counts are based on the number of articles appearing in a set of journals listed in Thomson ISI's *Science Citation Index* and *Social Sciences Citation Index*. The number of journals in this set was 5,029 in 1997, 5,255 in 2001, and 5,315 in 2003. Articles with authors in different institutions were counted fractionally. For a publication with *N* authors, each author's institution was credited with 1/*N* articles.

S&E doctorates include physical, life, earth, ocean, atmospheric, computer, and social sciences; mathematics; engineering; and psychology. Medical doctorates and S&E doctorates from foreign institutions are excluded.

Table 8-32
Academic article output per 1,000 S&E doctorate holders in academia, by state: 1997, 2001, and 2003

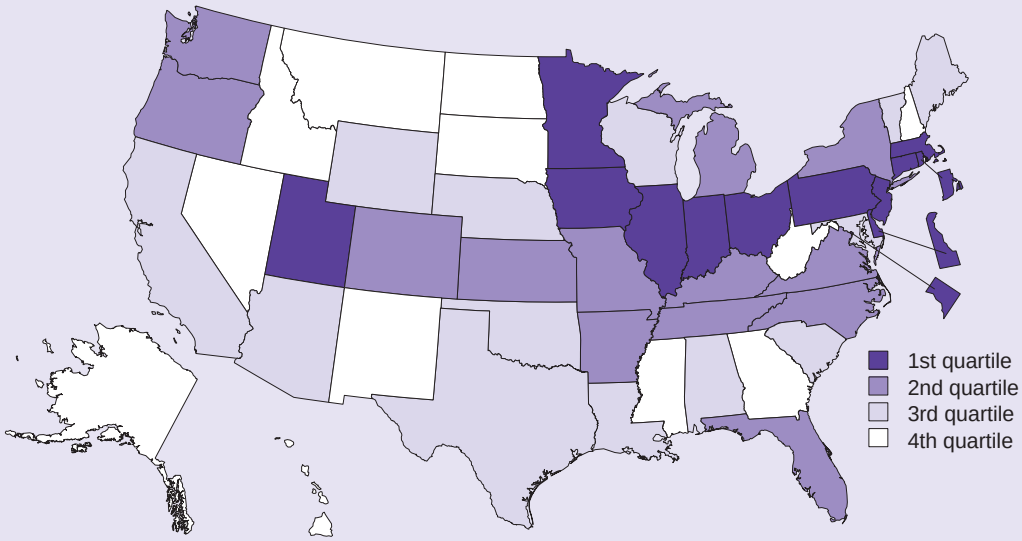
State	Academic article output			S&E doctorate holders in academia			Academic articles/ 1,000 academic doctorate holders		
	1997	2001	2003	1997	2001	2003	1997	2001	2003
United States	144,441	147,582	156,373	231,690	244,390	250,020	623	604	625
Alabama	1,911	1,896	1,903	4,460	2,940	3,160	428	645	602
Alaska	163	186	196	450	530	600	362	351	327
Arizona	2,256	2,199	2,251	2,850	3,100	2,910	792	709	774
Arkansas	603	608	704	1,450	1,570	1,740	416	387	405
California	17,525	18,147	19,533	24,000	24,220	25,790	730	749	757
Colorado	2,524	2,630	2,736	4,250	4,780	5,030	594	550	544
Connecticut	2,820	2,767	2,897	3,750	4,090	4,310	752	677	672
Delaware	499	560	611	690	760	660	723	737	926
District of Columbia	1,224	1,213	1,225	1,830	2,440	1,380	669	497	888
Florida	4,186	4,256	4,831	6,440	7,510	7,560	650	567	639
Georgia	3,255	3,576	3,851	5,450	6,230	6,500	597	574	592
Hawaii	574	538	606	1,200	1,490	1,640	478	361	370
Idaho	295	309	320	780	910	1,170	378	340	274
Illinois	6,893	7,009	7,428	10,120	10,350	9,880	681	677	752
Indiana	3,103	3,095	3,243	4,500	5,570	5,560	690	556	583
Iowa	2,289	2,239	2,371	3,060	3,090	3,170	748	725	748
Kansas	1,199	1,251	1,308	2,240	2,180	2,290	535	574	571
Kentucky	1,380	1,356	1,505	2,890	3,080	3,240	478	440	465
Louisiana	1,895	1,828	1,845	3,390	3,220	3,180	559	568	580
Maine	247	234	281	1,290	1,150	1,120	191	203	251
Maryland	4,389	4,935	5,099	5,840	5,660	6,650	752	872	767
Massachusetts	9,235	9,676	9,974	11,190	12,630	13,700	825	766	728
Michigan	4,880	5,078	5,396	7,600	8,520	8,210	642	596	657
Minnesota	2,435	2,388	2,421	4,260	5,110	5,190	572	467	466
Mississippi	628	692	747	1,930	1,900	1,910	325	364	391
Missouri	3,159	3,230	3,251	5,600	5,430	5,340	564	595	609
Montana	272	328	371	940	730	980	289	449	379
Nebraska	1,030	1,011	1,040	2,250	1,910	1,790	458	529	581
Nevada	370	447	513	970	1,260	1,060	381	355	484
New Hampshire	607	615	653	1,090	1,160	1,190	557	530	549
New Jersey	3,102	3,055	3,300	4,750	5,210	6,290	653	586	525
New Mexico	808	780	829	2,120	2,690	2,650	381	290	313
New York	12,382	12,427	12,904	19,080	19,570	18,830	649	635	685
North Carolina	4,958	5,141	5,579	7,480	8,440	8,770	663	609	636
North Dakota	269	271	322	880	660	760	306	411	424
Ohio	5,169	5,078	5,385	9,390	9,480	9,600	550	536	561
Oklahoma	919	925	996	2,630	2,620	2,500	349	353	398
Oregon	1,614	1,540	1,713	2,570	3,070	3,140	628	502	546
Pennsylvania	8,194	8,362	8,718	11,620	13,130	14,380	705	637	606
Rhode Island	852	862	904	1,670	1,640	1,770	510	526	511
South Carolina	1,202	1,343	1,478	3,040	2,920	2,540	395	460	582
South Dakota	140	131	168	660	600	620	212	218	271
Tennessee	2,254	2,284	2,463	4,530	4,560	4,820	498	501	511
Texas	8,756	9,039	9,777	13,180	13,310	13,680	664	679	715
Utah	1,570	1,570	1,631	2,940	3,000	2,760	534	523	591
Vermont	380	412	398	1,080	960	950	352	429	419
Virginia	3,014	3,104	3,254	5,290	6,320	7,020	570	491	464
Washington	3,206	3,339	3,557	5,110	6,120	6,000	627	546	593
West Virginia	417	388	385	1,120	1,080	1,160	372	359	332
Wisconsin	3,189	3,044	3,287	5,230	4,920	4,400	610	619	747
Wyoming	200	190	215	560	570	470	357	333	457
Puerto Rico	168	186	214	630	1,030	1,250	267	181	171

NOTES: Survey of Doctorate Recipients sample design does not include geography. Data on U.S. S&E doctorate holders are classified by employment location. Thus, reliability of data for areas with smaller populations is lower than for more populous states. Reliability of estimates by state for S&E doctorate holders may be poor for some states because of small sample size.

SOURCES: Thomson ISI, *Science Citation Index* and *Social Sciences Citation Index;* ipIQ, Inc.; and National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients.

Academic Article Output per $1 Million of Academic R&D

Figure 8-33
Academic article output per $1 million of academic R&D: 2003



1st quartile (5.84–4.23)	2nd quartile (4.22–3.84)	3rd quartile (3.74–3.38)	4th quartile (3.36–1.39)
Connecticut	Arkansas	Alabama	Alaska
Delaware	Colorado	Arizona	Georgia
District of Columbia	Florida	California	Hawaii
Illinois	Kansas	Louisiana	Idaho
Indiana	Kentucky	Maine	Mississippi
Iowa	Michigan	Maryland	Montana
Massachusetts	Missouri	Nebraska	Nevada
Minnesota	New York	Oklahoma	New Hampshire
New Jersey	North Carolina	South Carolina	New Mexico
Ohio	Oregon	Texas	North Dakota
Pennsylvania	Tennessee	Vermont	South Dakota
Rhode Island	Virginia	Wisconsin	West Virginia
Utah	Washington	Wyoming	

SOURCES: Thomson ISI, *Science Citation Index* and *Social Sciences Citation Index*; ipIQ, Inc.; and National Science Foundation, Division of Science Resources Statistics, *Academic Research and Development Expenditures*. See Table 8-33.

Findings

- From 1993 to 2003, the number of academic publications rose from 142,000 to 156,000, an increase of 10%.
- In 2003, academic researchers produced an average of 4.0 publications per $1 million of academic R&D, compared with 7.3 in 1993. This partly reflects the effects of general price inflation (27% during this period) but may also indicate rising academic research costs.
- The value for this indicator decreased for all states between 1993 and 2003.

This indicator shows the relationship between the number of academic publications and the expenditure for academic research and development. A high value for this indicator means that a state's academic institutions have a high publication output relative to their R&D spending. This indicator is not an efficiency measure; it is affected by the highly variable costs of R&D and by publishing conventions in different fields and institutions. It may reflect variations in field emphasis among states and institutions.

Publication counts are based on the number of articles appearing in a set of journals listed in Thomson ISI's *Science Citation Index* and *Social Sciences Citation Index*. The number of journals in this set was 4,601 in 1993, 5,084 in 1998, and 5,315 in 2003. Articles with authors in different institutions were counted fractionally. For a publication with N authors, each author's institution was credited with $1/N$ articles. In this indicator, Maryland data exclude expenditures by the Applied Physics Laboratory (APL) at Johns Hopkins University. APL employs more than 3,000 workers and supports the Department of Defense, the National Aeronautics and Space Administration, and other government agencies rather than focusing on academic research.

Table 8-33
Academic article output per $1 million of academic R&D, by state: 1993, 1998, and 2003

State	Academic article output			Academic R&D ($ millions)			Academic articles/ $1 million academic R&D		
	1993	1998	2003	1993	1998	2003	1993	1998	2003
United States	142,134	144,980	156,373	19,438	25,317	39,369	7.31	5.73	3.97
Alabama	1,787	1,882	1,903	288	442	558	6.21	4.26	3.41
Alaska	169	160	196	67	76	141	2.53	2.10	1.39
Arizona	2,249	2,069	2,251	311	406	618	7.24	5.10	3.64
Arkansas	562	597	704	79	117	183	7.09	5.11	3.84
California	18,013	17,789	19,533	2,445	3,390	5,363	7.37	5.25	3.64
Colorado	2,355	2,563	2,736	335	489	695	7.02	5.24	3.94
Connecticut	2,723	2,924	2,897	367	407	595	7.41	7.19	4.87
Delaware	530	519	611	54	73	105	9.84	7.13	5.84
District of Columbia	1,187	1,260	1,225	152	233	263	7.82	5.41	4.65
Florida	4,146	4,299	4,831	492	713	1,205	8.42	6.03	4.01
Georgia	2,880	3,248	3,851	558	804	1,176	5.16	4.04	3.28
Hawaii	585	559	606	74	148	185	7.91	3.78	3.28
Idaho	297	283	320	50	72	105	5.89	3.91	3.05
Illinois	7,103	6,863	7,428	776	1,031	1,614	9.15	6.66	4.60
Indiana	3,077	3,122	3,243	304	426	726	10.12	7.32	4.47
Iowa	2,292	2,306	2,371	300	359	499	7.65	6.43	4.75
Kansas	1,244	1,169	1,308	155	213	310	8.04	5.49	4.22
Kentucky	1,310	1,311	1,505	128	242	378	10.26	5.43	3.99
Louisiana	1,787	1,887	1,845	264	353	524	6.77	5.34	3.52
Maine	245	259	281	26	35	75	9.41	7.34	3.74
Maryland	4,303	4,549	5,099	702	887	1,423	6.13	5.13	3.58
Massachusetts	8,624	9,226	9,974	1,121	1,348	1,822	7.69	6.84	5.47
Michigan	4,892	4,865	5,396	705	882	1,388	6.93	5.51	3.89
Minnesota	2,491	2,405	2,421	337	368	517	7.39	6.54	4.68
Mississippi	507	642	747	111	153	324	4.57	4.20	2.30
Missouri	2,946	3,158	3,251	352	485	807	8.37	6.52	4.03
Montana	265	313	371	50	77	141	5.26	4.08	2.63
Nebraska	1,067	1,048	1,040	137	186	301	7.78	5.62	3.46
Nevada	375	381	513	79	84	155	4.74	4.54	3.32
New Hampshire	586	621	653	99	117	252	5.89	5.29	2.59
New Jersey	2,898	2,952	3,300	375	485	747	7.74	6.09	4.41
New Mexico	734	771	829	187	229	307	3.92	3.37	2.70
New York	12,779	12,581	12,904	1,597	1,925	3,090	8.00	6.53	4.18
North Carolina	4,676	5,006	5,579	634	902	1,397	7.38	5.55	3.99
North Dakota	281	273	322	54	57	134	5.19	4.79	2.41
Ohio	5,216	5,139	5,385	597	810	1,269	8.73	6.34	4.24
Oklahoma	892	919	996	175	209	295	5.10	4.40	3.38
Oregon	1,574	1,577	1,713	227	314	437	6.93	5.02	3.92
Pennsylvania	7,784	8,203	8,718	1,029	1,348	2,013	7.56	6.08	4.33
Rhode Island	872	839	904	103	112	187	8.45	7.49	4.83
South Carolina	1,137	1,227	1,478	185	248	435	6.13	4.94	3.40
South Dakota	140	141	168	23	25	50	6.20	5.54	3.36
Tennessee	2,082	2,306	2,463	280	346	600	7.44	6.66	4.11
Texas	8,670	8,717	9,777	1,422	1,697	2,766	6.10	5.14	3.54
Utah	1,508	1,590	1,631	195	249	385	7.75	6.38	4.23
Vermont	393	370	398	51	59	107	7.76	6.32	3.73
Virginia	3,042	3,100	3,254	409	494	773	7.45	6.28	4.21
Washington	2,988	3,184	3,557	435	542	870	6.87	5.87	4.09
West Virginia	395	410	385	55	63	121	7.15	6.46	3.19
Wisconsin	3,258	3,201	3,287	453	536	881	7.19	5.98	3.73
Wyoming	218	197	215	33	49	60	6.70	4.06	3.58
Puerto Rico	168	192	214	48	88	78	3.51	2.19	2.73

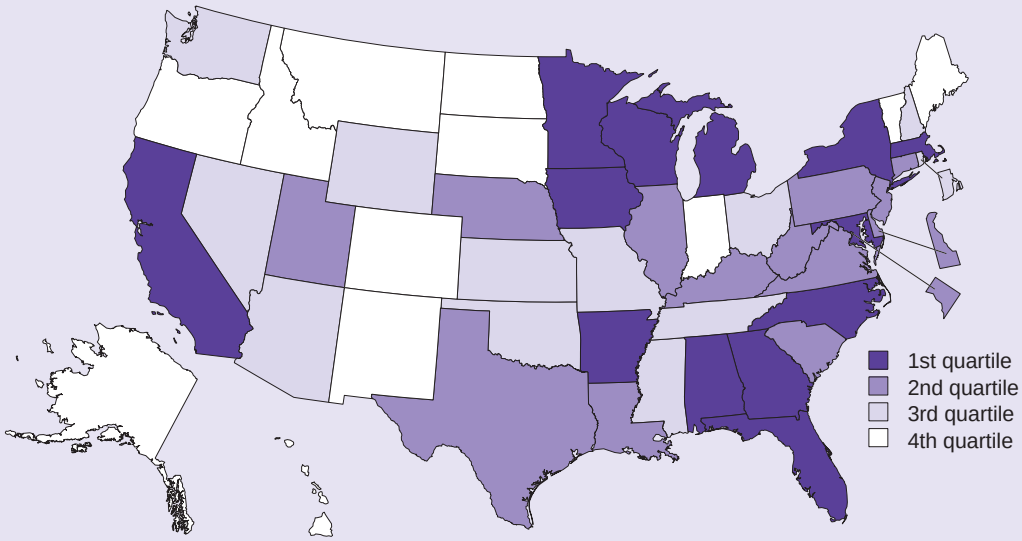
NOTES: In 1998 and 2003, academic R&D was reported for all institutions. In 1993, academic R&D was reported for doctorate-granting institutions only.

SOURCES: Thomson ISI, *Science Citation Index* and *Social Sciences Citation Index;* ipIQ, Inc.; and National Science Foundation, Division of Science Resources Statistics, *Academic Research and Development Expenditures,* various years.

Science and Engineering Indicators 2006

Academic Patents Awarded per 1,000 S&E Doctorate Holders in Academia

Figure 8-34
Academic patents awarded per 1,000 S&E doctorate holders in academia: 2003



1st quartile (27.3–12.6)	2nd quartile (12.1–8.3)	3rd quartile (8.2–5.7)	4th quartile (5.4–0.0)
Alabama	Connecticut	Arizona	Alaska
Arkansas	Delaware	Kansas	Colorado
California	District of Columbia	Mississippi	Hawaii
Florida	Illinois	Missouri	Idaho
Georgia	Kentucky	Nevada	Indiana
Iowa	Louisiana	New Hampshire	Maine
Maryland	Nebraska	Ohio	Montana
Massachusetts	New Jersey	Oklahoma	New Mexico
Michigan	Pennsylvania	Rhode Island	North Dakota
Minnesota	South Carolina	Tennessee	Oregon
New York	Texas	Washington	South Dakota
North Carolina	Utah	Wyoming	Vermont
Wisconsin	Virginia		
	West Virginia		

SOURCES: U.S. Patent and Trademark Office, Technology Assessment and Forecast Branch, *U.S. Colleges and Universities—Utility Patent Grants, Calendar Years 1969–2003*; and National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients. See Table 8-34.

Findings

- Throughout the United States, the number of patents awarded to academic institutions increased from more than 2,400 in 1997 to nearly 3,300 in 2003, an increase of 33%, while the number of academic S&E doctorate holders rose by 8% over the same period.
- In 2003, 13 patents were produced nationally for each 1,000 S&E doctorate holders employed in academia, which was significantly higher than the 10.5 patents produced in 1997.
- The rise in this indicator suggests that states and their universities are increasing their focus on academic patenting.
- In 2003, states varied widely on this indicator, with values ranging from 0 to 27.3 patents per 1,000 S&E doctorate holders employed in academia, indicating a difference in patenting philosophy or mix of industries supported by the academic institutions.

Since the early 1980s, academic institutions have increasingly been viewed as engines of economic growth. Growing attention has been paid to the results of academic research and development in terms of their role in creating new products, processes, and services. One indicator of such R&D results is volume of academic patents. Academic patenting is highly concentrated and partly reflects the resources devoted to institutional patenting offices.

This indicator relates the volume of academic patents to the size of the doctoral science and engineering workforce in academia. It is an approximate measure of the degree to which results with perceived economic value are generated by the doctoral academic workforce.

S&E doctorates include physical, life, earth, ocean, atmospheric, computer, and social sciences; mathematics; engineering; and psychology. Medical doctorates and S&E doctorates from foreign institutions are excluded.

Table 8-34
Academic patents awarded per 1,000 S&E doctorate holders in academia, by state: 1997, 2001, and 2003

State	Patents awarded to academic institutions			S&E doctorate holders in academia			Academic patents/ 1,000 academic S&E doctorate holders		
	1997	2001	2003	1997	2001	2003	1997	2001	2003
United States	2,439	3,203	3,252	231,690	244,390	250,020	10.5	13.1	13.0
Alabama	23	40	48	4,460	2,940	3,160	5.2	13.6	15.2
Alaska	2	0	0	450	530	600	4.4	0.0	0.0
Arizona	21	17	21	2,850	3,100	2,910	7.4	5.5	7.2
Arkansas	8	28	26	1,450	1,570	1,740	5.5	17.8	14.9
California	409	638	703	24,000	24,220	25,790	17.0	26.3	27.3
Colorado	30	14	27	4,250	4,780	5,030	7.1	2.9	5.4
Connecticut	34	37	41	3,750	4,090	4,310	9.1	9.0	9.5
Delaware	4	5	7	690	760	660	5.8	6.6	10.6
District of Columbia	28	13	16	1,830	2,440	1,380	15.3	5.3	11.6
Florida	94	103	126	6,440	7,510	7,560	14.6	13.7	16.7
Georgia	45	75	82	5,450	6,230	6,500	8.3	12.0	12.6
Hawaii	6	4	6	1,200	1,490	1,640	5.0	2.7	3.7
Idaho	0	0	3	780	910	1,170	0.0	0.0	2.6
Illinois	78	109	104	10,120	10,350	9,880	7.7	10.5	10.5
Indiana	38	17	24	4,500	5,570	5,560	8.4	3.1	4.3
Iowa	51	67	61	3,060	3,090	3,170	16.7	21.7	19.2
Kansas	7	18	17	2,240	2,180	2,290	3.1	8.3	7.4
Kentucky	16	20	27	2,890	3,080	3,240	5.5	6.5	8.3
Louisiana	26	42	31	3,390	3,220	3,180	7.7	13.0	9.7
Maine	0	2	2	1,290	1,150	1,120	0.0	1.7	1.8
Maryland	66	114	115	5,840	5,660	6,650	11.3	20.1	17.3
Massachusetts	188	218	227	11,190	12,630	13,700	16.8	17.3	16.6
Michigan	104	105	121	7,600	8,520	8,210	13.7	12.3	14.7
Minnesota	50	65	68	4,260	5,110	5,190	11.7	12.7	13.1
Mississippi	6	12	12	1,930	1,900	1,910	3.1	6.3	6.3
Missouri	40	55	44	5,600	5,430	5,340	7.1	10.1	8.2
Montana	4	4	4	940	730	980	4.3	5.5	4.1
Nebraska	27	21	19	2,250	1,910	1,790	12.0	11.0	10.6
Nevada	2	4	6	970	1,260	1,060	2.1	3.2	5.7
New Hampshire	3	10	9	1,090	1,160	1,190	2.8	8.6	7.6
New Jersey	52	81	73	4,750	5,210	6,290	10.9	15.5	11.6
New Mexico	18	17	14	2,120	2,690	2,650	8.5	6.3	5.3
New York	224	285	284	19,080	19,570	18,830	11.7	14.6	15.1
North Carolina	96	148	138	7,480	8,440	8,770	12.8	17.5	15.7
North Dakota	5	4	4	880	660	760	5.7	6.1	5.3
Ohio	75	93	73	9,390	9,480	9,600	8.0	9.8	7.6
Oklahoma	17	22	15	2,630	2,620	2,500	6.5	8.4	6.0
Oregon	27	23	16	2,570	3,070	3,140	10.5	7.5	5.1
Pennsylvania	138	213	174	11,620	13,130	14,380	11.9	16.2	12.1
Rhode Island	9	19	13	1,670	1,640	1,770	5.4	11.6	7.3
South Carolina	14	14	28	3,040	2,920	2,540	4.6	4.8	11.0
South Dakota	2	2	0	660	600	620	3.0	3.3	0.0
Tennessee	25	42	31	4,530	4,560	4,820	5.5	9.2	6.4
Texas	125	155	157	13,180	13,310	13,680	9.5	11.6	11.5
Utah	37	48	26	2,940	3,000	2,760	12.6	16.0	9.4
Vermont	3	3	5	1,080	960	950	2.8	3.1	5.3
Virginia	49	41	58	5,290	6,320	7,020	9.3	6.5	8.3
Washington	42	56	44	5,110	6,120	6,000	8.2	9.2	7.3
West Virginia	2	4	12	1,120	1,080	1,160	1.8	3.7	10.3
Wisconsin	65	74	87	5,230	4,920	4,400	12.4	15.0	19.8
Wyoming	4	2	3	560	570	470	7.1	3.5	6.4
Puerto Rico	0	5	7	630	1,030	1,250	0.0	4.9	5.6

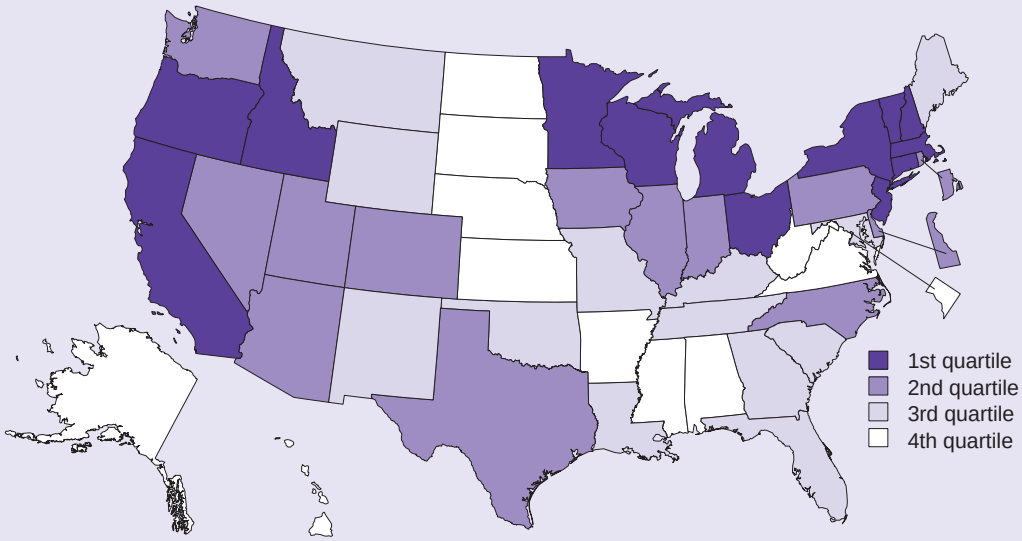
NOTES: Survey of Doctorate Recipients sample design does not include geography. Data on U.S. S&E doctorate holders are classified by employment location. Thus, reliability of data for areas with smaller populations is lower than for more populous states. Reliability of estimates by state for S&E doctorate holders may be poor for some states because of small sample size.

SOURCES: U.S. Patent and Trademark Office, Technology Assessment and Forecast Branch, *U.S. Colleges and Universities—Utility Patent Grants, Calendar Years 1969–2003;* and National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients.

Science and Engineering Indicators 2006

Patents Awarded per 1,000 Individuals in S&E Occupations

Figure 8-35
Patents awarded per 1,000 individuals in S&E occupations: 2003



1st quartile (83.5–22.0)	2nd quartile (21.4–15.9)	3rd quartile (15.3–10.5)	4th quartile (9.7–0.9)
California	Arizona	Florida	Alabama
Connecticut	Colorado	Georgia	Alaska
Idaho	Delaware	Kentucky	Arkansas
Massachusetts	Illinois	Louisiana	District of Columbia
Michigan	Indiana	Maine	Hawaii
Minnesota	Iowa	Maryland	Kansas
New Hampshire	Nevada	Missouri	Mississippi
New Jersey	North Carolina	Montana	Nebraska
New York	Pennsylvania	New Mexico	North Dakota
Ohio	Rhode Island	Oklahoma	South Dakota
Oregon	Texas	South Carolina	Virginia
Vermont	Utah	Tennessee	West Virginia
Wisconsin	Washington	Wyoming	

SOURCES: U.S. Patent and Trademark Office, Office of Electronic Information Products, *Patent Counts by Country/State and Year, All Patents, All Types, January 1, 1977–December 31, 2003*; and U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wage Estimates. See table 8-35.

Findings

- Nearly 100,000 patents were awarded in the United States in 2003 with more than 22% going to residents of California.
- In 2003, the national average for this indicator was 19.9 patents per 1,000 individuals in an S&E occupation.
- The District of Columbia and Idaho were outliers, at 0.9 and 83.5, respectively; the latter reflects the presence of a high-patenting Department of Energy National Laboratory in this sparsely populated state.
- Values for the remaining states varied widely, ranging from 4.1 to 40.7 patents per 1,000 individuals in S&E occupations in 2003.

This indicator shows state patent activity normalized to the size of its science and engineering workforce, specifically employees in S&E occupations. People in S&E occupations include mathematical, computer, life, physical, and social scientists; engineers; and postsecondary teachers in any of these fields. Managers, elementary and secondary schoolteachers, and medical personnel are excluded.

The U.S. Patent and Trademark Office classifies patents based on the residence of the first-named inventor. Only U.S.-origin patents are included.

The location of S&E occupations primarily reflects where the individuals work and is based on estimates from the Occupational Employment Statistics survey, a cooperative program between the Bureau of Labor Statistics (BLS) and state employment security agencies. Because of the different methods of assigning geographic location, this indicator is of limited applicability for sparsely populated states or for locations where a large percentage of the population lives in one state or region and works in another.

Table 8-35
Patents awarded per 1,000 individuals in S&E occupations, by state: 2003

State	Patents awarded	Individuals in S&E occupations	Patents/1,000 individuals in S&E occupations
United States	98,564	4,961,550	19.9
Alabama	459	56,380	8.1
Alaska	43	10,600	4.1
Arizona	1,714	92,120	18.6
Arkansas	176	21,340	8.2
California	22,079	676,180	32.7
Colorado	2,304	124,140	18.6
Connecticut	1,844	81,380	22.7
Delaware	372	17,370	21.4
District of Columbia	50	54,890	0.9
Florida	3,119	221,070	14.1
Georgia	1,537	144,170	10.7
Hawaii	96	16,090	6.0
Idaho	1,850	22,150	83.5
Illinois	3,964	211,230	18.8
Indiana	1,679	78,410	21.4
Iowa	711	37,320	19.1
Kansas	491	51,970	9.4
Kentucky	495	45,230	10.9
Louisiana	439	41,900	10.5
Maine	165	15,020	11.0
Maryland	1,579	149,250	10.6
Massachusetts	4,192	184,690	22.7
Michigan	4,220	182,940	23.1
Minnesota	3,262	117,120	27.9
Mississippi	184	22,190	8.3
Missouri	946	84,150	11.2
Montana	125	11,450	10.9
Nebraska	240	30,710	7.8
Nevada	455	22,330	20.4
New Hampshire	731	23,430	31.2
New Jersey	3,923	161,420	24.3
New Mexico	405	33,600	12.1
New York	6,921	272,440	25.4
North Carolina	2,174	132,440	16.4
North Dakota	62	8,430	7.4
Ohio	3,894	177,100	22.0
Oklahoma	563	44,360	12.7
Oregon	1,867	61,230	30.5
Pennsylvania	3,555	185,560	19.2
Rhode Island	325	18,740	17.3
South Carolina	650	48,740	13.3
South Dakota	89	9,150	9.7
Tennessee	975	63,680	15.3
Texas	6,378	365,270	17.5
Utah	724	45,570	15.9
Vermont	465	11,420	40.7
Virginia	1,250	209,280	6.0
Washington	2,516	150,230	16.7
West Virginia	141	16,220	8.7
Wisconsin	2,082	93,320	22.3
Wyoming	84	6,130	13.7
Puerto Rico	29	19,940	1.5

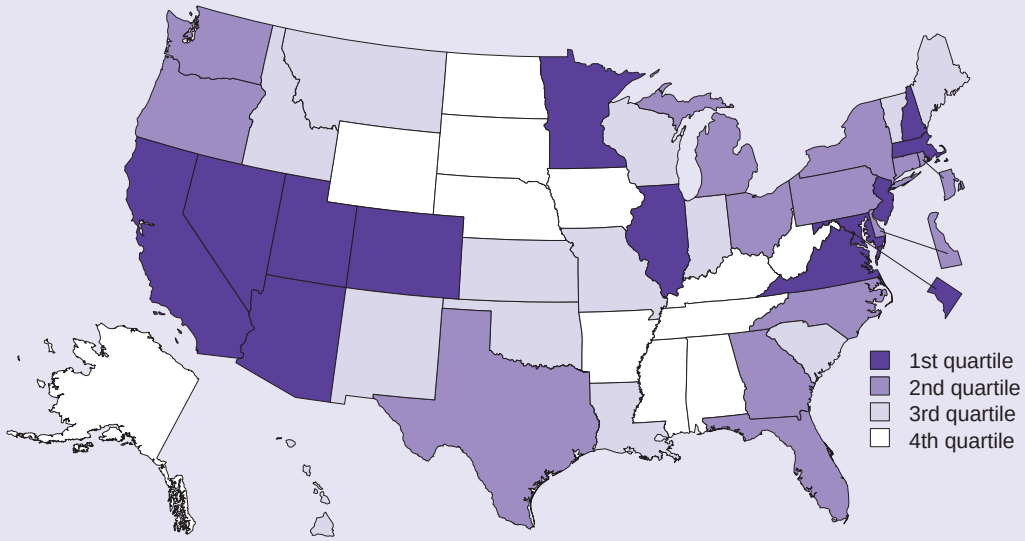
NOTES: Patents issued include utility patents and other types of U.S. documents (i.e., design patents, plant patents, reissues, defensive publications, and statutory invention registrations). Origin of patent determined by residence of first-named inventor.

SOURCES: U.S. Patent and Trademark Office, Office of Electronic Information Products, *Patent Counts by Country/State and Year, All Patents, All Types, January 1, 1977–December 31, 2003;* and U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wage Estimates.

Science and Engineering Indicators 2006

High-Technology Share of All Business Establishments

Figure 8-36
High-technology share of all business establishments: 2002



1st quartile (11.10%–6.99%)	2nd quartile (6.90%–5.60%)	3rd quartile (5.48%–4.48%)	4th quartile (4.40%–3.18%)
Arizona	Connecticut	Hawaii	Alabama
California	Delaware	Idaho	Alaska
Colorado	Florida	Indiana	Arkansas
District of Columbia	Georgia	Kansas	Iowa
Illinois	Michigan	Louisiana	Kentucky
Maryland	New York	Maine	Mississippi
Massachusetts	North Carolina	Missouri	Nebraska
Minnesota	Ohio	Montana	North Dakota
Nevada	Oregon	New Mexico	South Dakota
New Hampshire	Pennsylvania	Oklahoma	Tennessee
New Jersey	Rhode Island	South Carolina	West Virginia
Utah	Texas	Vermont	Wyoming
Virginia	Washington	Wisconsin	

SOURCES: U.S. Census Bureau, 1989–2002 Business Information Tracking Series, special tabulations; and *County Business Patterns*. See table 8-36.

Findings

- The number of establishments in high-technology industries rose from 402,000 in 1998 to 454,000 in 2002, an increase of about 13% within 4 years.
- The percentage of U.S. establishments in high-technology industries grew from 5.8% to 6.3% of the total business establishments during the 1998–2002 period.
- Between 1998 and 2002, the largest growth in the number of establishments in high-technology industries occurred in California and Florida, which added 9,400 and 5,200 establishments, respectively.
- The state distribution of this indicator is similar to that of three other indicators: bachelor's degree holders, science and engineering doctoral degree holders, and S&E occupations, all expressed as a share of the workforce.

This indicator measures the portion of a state's business establishments that are classified as high-technology industries. High-technology industries are defined as those in which the proportion of employees both in research and development and in all technology occupations is at least twice the average proportion for all industries. State economies with a high percentage of their business establishments in high-technology industries are likely to be well positioned to take advantage of new technological developments.

The data pertaining to establishments for 1998 through 2002 were based on their classification according to the 1997 edition of the North American Industry Classification System.

Table 8-36
High-technology share of all business establishments, by state: 1998, 2000, and 2002

State	High-technology establishments			All business establishments			High-technology/ all business establishments		
	1998	2000	2002	1998	2000	2002	1998	2000	2002
United States	402,096	428,061	453,903	6,941,739	7,070,048	7,200,770	5.79	6.05	6.30
Alabama	4,068	4,208	4,383	100,314	99,817	99,931	4.06	4.22	4.39
Alaska	730	783	823	18,212	18,501	18,856	4.01	4.23	4.36
Arizona	6,877	7,493	8,368	110,245	114,804	119,740	6.24	6.53	6.99
Arkansas	2,003	2,170	2,329	62,348	63,185	63,869	3.21	3.43	3.65
California	54,998	60,799	64,348	773,922	799,863	820,997	7.11	7.60	7.84
Colorado	10,472	11,361	12,400	130,351	137,528	142,247	8.03	8.26	8.72
Connecticut	6,376	6,356	6,376	92,361	92,436	92,375	6.90	6.88	6.90
Delaware	1,327	1,426	1,537	22,871	23,771	24,377	5.80	6.00	6.31
District of Columbia	1,906	2,069	2,212	19,571	19,655	19,930	9.74	10.53	11.10
Florida	23,982	25,873	29,149	420,637	428,438	450,188	5.70	6.04	6.47
Georgia	12,234	13,110	14,188	194,210	200,442	206,323	6.30	6.54	6.88
Hawaii	1,162	1,256	1,463	29,603	29,853	30,633	3.93	4.21	4.78
Idaho	1,435	1,632	1,889	35,961	37,429	38,842	3.99	4.36	4.86
Illinois	20,643	21,479	21,962	304,525	308,067	309,980	6.78	6.97	7.08
Indiana	6,790	7,049	7,345	146,195	146,321	147,304	4.64	4.82	4.99
Iowa	2,604	2,677	2,904	80,838	80,890	81,042	3.22	3.31	3.58
Kansas	3,309	3,611	3,736	74,018	74,939	75,077	4.47	4.82	4.98
Kentucky	3,381	3,491	3,698	89,591	89,921	90,493	3.77	3.88	4.09
Louisiana	4,132	4,223	4,622	100,662	101,016	101,885	4.10	4.18	4.54
Maine	1,585	1,708	1,838	38,334	39,466	40,292	4.13	4.33	4.56
Maryland	9,337	10,030	11,008	126,577	128,467	131,815	7.38	7.81	8.35
Massachusetts	13,949	14,598	14,669	167,925	176,222	175,991	8.31	8.28	8.34
Michigan	12,839	13,255	13,721	235,401	236,912	237,616	5.45	5.59	5.77
Minnesota	9,384	10,014	10,232	134,980	139,080	143,953	6.95	7.20	7.11
Mississippi	1,832	1,866	1,925	59,771	59,788	59,902	3.07	3.12	3.21
Missouri	6,355	6,667	6,903	143,908	144,755	147,977	4.42	4.61	4.66
Montana	1,206	1,321	1,545	30,955	31,849	32,972	3.90	4.15	4.69
Nebraska	1,834	1,955	2,045	48,655	49,623	50,259	3.77	3.94	4.07
Nevada	2,814	3,233	3,741	44,613	48,178	51,383	6.31	6.71	7.28
New Hampshire	2,840	2,874	2,932	36,842	37,414	37,928	7.71	7.68	7.73
New Jersey	18,964	20,089	20,621	230,857	233,559	237,505	8.21	8.60	8.68
New Mexico	2,143	2,227	2,368	42,607	42,782	43,213	5.03	5.21	5.48
New York	25,289	27,507	28,552	481,956	492,073	498,921	5.25	5.59	5.72
North Carolina	10,078	10,887	11,633	198,689	203,903	207,562	5.07	5.34	5.60
North Dakota	570	606	671	20,288	20,139	20,422	2.81	3.01	3.29
Ohio	14,234	14,566	15,202	270,339	270,509	271,181	5.27	5.38	5.61
Oklahoma	3,752	3,810	4,101	84,880	85,094	86,029	4.42	4.48	4.77
Oregon	5,468	5,693	6,009	99,183	100,645	101,933	5.51	5.66	5.90
Pennsylvania	15,320	16,090	17,121	292,655	294,741	297,257	5.23	5.46	5.76
Rhode Island	1,444	1,516	1,628	28,244	28,534	28,860	5.11	5.31	5.64
South Carolina	3,942	4,119	4,406	94,985	97,146	98,357	4.15	4.24	4.48
South Dakota	684	723	779	23,521	23,783	24,439	2.91	3.04	3.19
Tennessee	5,421	5,561	5,739	131,108	130,876	130,556	4.13	4.25	4.40
Texas	27,094	28,410	30,421	462,866	471,509	482,169	5.85	6.03	6.31
Utah	3,399	3,750	4,243	52,025	55,379	58,788	6.53	6.77	7.22
Vermont	1,068	1,109	1,169	21,261	21,564	21,624	5.02	5.14	5.41
Virginia	12,767	14,015	15,122	172,182	175,582	180,501	7.41	7.98	8.38
Washington	9,627	10,175	10,642	161,472	164,018	165,933	5.96	6.20	6.41
West Virginia	1,208	1,224	1,288	41,703	41,047	40,488	2.90	2.98	3.18
Wisconsin	6,497	6,655	7,080	138,635	140,415	142,086	4.69	4.74	4.98
Wyoming	723	742	817	17,887	18,120	18,769	4.04	4.09	4.35
Puerto Rico	NA	NA	NA	42,577	44,015	45,642	NA	NA	NA

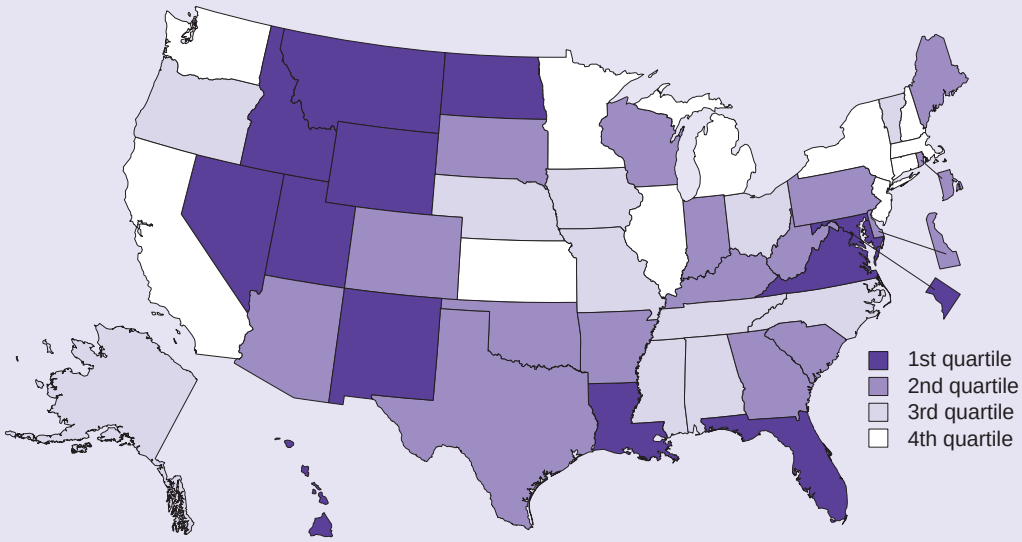
NA = not available

SOURCES: U.S. Census Bureau, 1989–2002 Business Information Tracking Series, special tabulations; and *County Business Patterns,* various years.

Science and Engineering Indicators 2006

Net High-Technology Business Formations as Share of All Business Establishments

Figure 8-37
Net high-technology business formations as share of all business establishments: 2002



1st quartile (0.35%–0.10%)	2nd quartile (0.06%–0.01%)	3rd quartile (0.00% to –0.03%)	4th quartile (–0.04% to –0.28%)
District of Columbia	Arizona	Alabama	California
Florida	Arkansas	Alaska	Connecticut
Hawaii	Colorado	Iowa	Illinois
Idaho	Delaware	Mississippi	Kansas
Louisiana	Georgia	Missouri	Massachusetts
Maryland	Indiana	Nebraska	Michigan
Montana	Kentucky	North Carolina	Minnesota
Nevada	Maine	Ohio	New Hampshire
New Mexico	Oklahoma	Oregon	New Jersey
North Dakota	Pennsylvania	Tennessee	New York
Utah	Rhode Island	Vermont	Washington
Virginia	South Carolina		
Wyoming	South Dakota		
	Texas		
	West Virginia		
	Wisconsin		

SOURCES: U.S. Census Bureau, 1989–2002 Business Information Tracking Series, special tabulations; and *County Business Patterns*. See table 8-37.

Findings

- In 2002, from a base of approximately 7 million total business establishments, 60,000 new business establishments were formed in high-technology industries and 61,000 ceased operation in those same industries, indicating a net loss of more than 1,000 businesses in high-technology industries in the United States.
- This represented a significant change from 2000, when nearly 10,000 net business formations in high-technology industries occurred in the United States.
- The number of states that reported net losses of business establishments in high-technology industries rose from 3 in 2000 to 21 in 2002, indicating a more challenging business environment.
- Nevada, California, Virginia, and Utah showed unusually high rates of net high-technology business formations in 2000, but because of significant fluctuations in this indicator, only Utah continued to show a high value in 2002.

The business base of a state is constantly changing as new businesses form and others cease to function. The term "net business formations" refers to the difference between the number of businesses that are formed and the number that cease operations during any particular year. This difference can be small and can vary significantly from year to year.

The ratio of the number of net business formations that occur in high-technology industries to the number of business establishments in a state indicates the changing role of high-technology industries in a state's economy. High positive values indicate an increasingly prominent role for these industries.

The data on business establishments in high-technology industries for 1998 through 2002 were based on their classification according to the 1997 edition of the North American Industry Classification System. Company births and deaths are determined from their Employer Identification Numbers in the U.S. Census Bureau records; thus, changes in company name, ownership, or address are not counted as business formations or business deaths.

Table 8-37
Net high-technology business formations as share of all business establishments, by state: 1999, 2000, and 2002

State	Net high-technology business formations			All business establishments			High-technology formations/business establishments (%)		
	1999	2000	2002	1999	2000	2002	1999	2000	2002
United States	13,208	9,741	–1,166	7,008,444	7,070,048	7,200,770	0.19	0.14	–0.02
Alabama	81	92	–5	100,507	99,817	99,931	0.08	0.09	–0.01
Alaska	22	–6	–3	18,433	18,501	18,856	0.12	–0.03	–0.02
Arizona	246	210	57	112,545	114,804	119,740	0.22	0.18	0.05
Arkansas	67	46	31	62,737	63,185	63,869	0.11	0.07	0.05
California	1,947	2,452	–508	784,935	799,863	820,997	0.25	0.31	–0.06
Colorado	367	378	41	133,743	137,528	142,247	0.27	0.27	0.03
Connecticut	66	6	–170	92,454	92,436	92,375	0.07	0.01	–0.18
Delaware	74	55	5	23,381	23,771	24,377	0.32	0.23	0.02
District of Columbia	81	78	70	19,469	19,655	19,930	0.42	0.40	0.35
Florida	950	595	555	424,089	428,438	450,188	0.22	0.14	0.12
Georgia	524	246	15	197,759	200,442	206,323	0.26	0.12	0.01
Hawaii	42	32	44	29,569	29,853	30,633	0.14	0.11	0.14
Idaho	47	66	62	36,975	37,429	38,842	0.13	0.18	0.16
Illinois	830	248	–626	306,899	308,067	309,980	0.27	0.08	–0.20
Indiana	220	86	9	146,528	146,321	147,304	0.15	0.06	0.01
Iowa	55	35	–2	81,213	80,890	81,042	0.07	0.04	0.00
Kansas	102	116	–41	74,486	74,939	75,077	0.14	0.15	–0.05
Kentucky	128	28	56	89,946	89,921	90,493	0.14	0.03	0.06
Louisiana	–2	47	101	101,020	101,016	101,885	0.00	0.05	0.10
Maine	75	51	5	38,878	39,466	40,292	0.19	0.13	0.01
Maryland	414	270	140	127,431	128,467	131,815	0.32	0.21	0.11
Massachusetts	339	300	–367	173,267	176,222	175,991	0.20	0.17	–0.21
Michigan	148	196	–147	236,456	236,912	237,616	0.06	0.08	–0.06
Minnesota	393	218	–318	137,305	139,080	143,953	0.29	0.16	–0.22
Mississippi	0	56	–5	59,834	59,788	59,902	0.00	0.09	–0.01
Missouri	171	101	–32	144,874	144,755	147,977	0.12	0.07	–0.02
Montana	41	63	37	31,365	31,849	32,972	0.13	0.20	0.11
Nebraska	43	34	–17	48,968	49,623	50,259	0.09	0.07	–0.03
Nevada	216	153	83	46,890	48,178	51,383	0.46	0.32	0.16
New Hampshire	50	31	–33	37,180	37,414	37,928	0.13	0.08	–0.09
New Jersey	856	290	–661	231,823	233,559	237,505	0.37	0.12	–0.28
New Mexico	48	26	49	42,918	42,782	43,213	0.11	0.06	0.11
New York	913	841	–413	485,954	492,073	498,921	0.19	0.17	–0.08
North Carolina	453	238	6	201,706	203,903	207,562	0.22	0.12	0.00
North Dakota	10	20	35	20,380	20,139	20,422	0.05	0.10	0.17
Ohio	402	129	–42	270,766	270,509	271,181	0.15	0.05	–0.02
Oklahoma	50	–25	34	84,854	85,094	86,029	0.06	–0.03	0.04
Oregon	100	102	–12	99,945	100,645	101,933	0.10	0.10	–0.01
Pennsylvania	476	257	102	293,491	294,741	297,257	0.16	0.09	0.03
Rhode Island	39	46	17	28,240	28,534	28,860	0.14	0.16	0.06
South Carolina	151	70	29	96,440	97,146	98,357	0.16	0.07	0.03
South Dakota	11	33	3	23,693	23,783	24,439	0.05	0.14	0.01
Tennessee	31	69	–3	131,116	130,876	130,556	0.02	0.05	0.00
Texas	765	306	202	467,087	471,509	482,169	0.16	0.06	0.04
Utah	132	167	139	53,809	55,379	58,788	0.25	0.30	0.24
Vermont	35	22	–6	21,598	21,564	21,624	0.16	0.10	–0.03
Virginia	600	550	257	173,550	175,582	180,501	0.35	0.31	0.14
Washington	203	253	–66	162,932	164,018	165,933	0.12	0.15	–0.04
West Virginia	50	–4	24	41,451	41,047	40,488	0.12	–0.01	0.06
Wisconsin	144	54	68	139,646	140,415	142,086	0.10	0.04	0.05
Wyoming	2	14	35	17,909	18,120	18,769	0.01	0.08	0.19
Puerto Rico	NA	NA	NA	43,464	44,015	45,642	NA	NA	NA

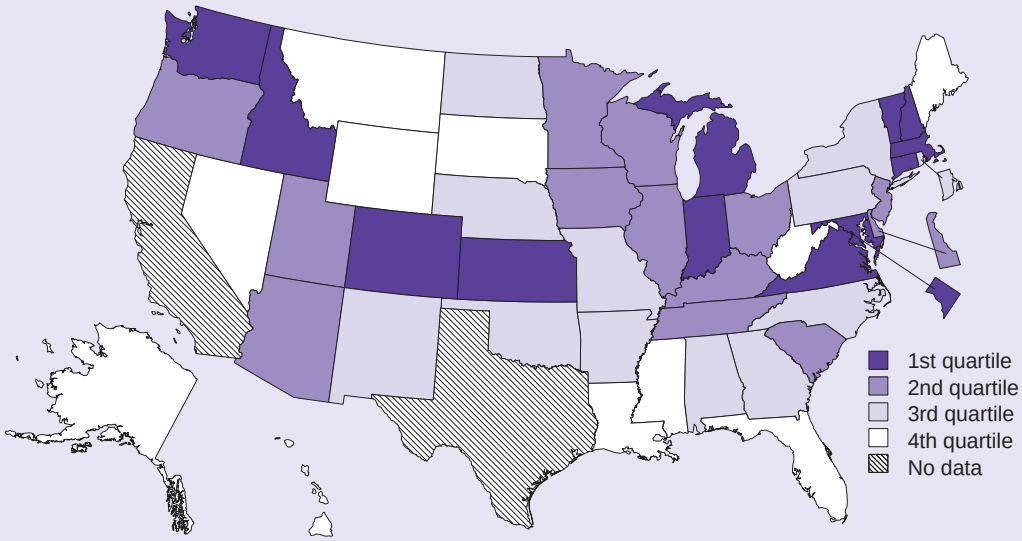
NA = not available

SOURCES: U.S. Census Bureau, 1989–2002 Business Information Tracking Series, special tabulations; and *County Business Patterns,* various years.

Science and Engineering Indicators 2006

Employment in High-Technology Establishments as Share of Total Employment

Figure 8-38
Employment in high-technology establishments as share of total employment: 2002



1st quartile (11.73%–9.13%)	2nd quartile (8.90%–7.55%)	3rd quartile (7.47%–5.78%)	4th quartile (5.47%–2.56%)	No data
Colorado	Arizona	Alabama	Alaska	California
Connecticut	Delaware	Arkansas	Florida	Texas
District of Columbia	Illinois	Georgia	Hawaii	
Idaho	Iowa	Missouri	Louisiana	
Indiana	Kentucky	Nebraska	Maine	
Kansas	Minnesota	New Mexico	Mississippi	
Maryland	New Jersey	New York	Montana	
Massachusetts	Ohio	North Carolina	Nevada	
Michigan	Oregon	North Dakota	South Dakota	
New Hampshire	South Carolina	Oklahoma	West Virginia	
Vermont	Tennessee	Pennsylvania	Wyoming	
Virginia	Utah	Rhode Island		
Washington	Wisconsin			

SOURCES: U.S. Census Bureau, 1989–2002 Business Information Tracking Series, special tabulations; and *County Business Patterns*. See table 8-38.

Findings

- Employment in high-technology establishments grew from 9.6 to 10.1 million workers between 1998 and 2000 but declined to 9.3 million workers by 2002.
- Nearly 7% of the jobs in high-technology industries in the United States disappeared between 2000 and 2002.
- On the high-technology employment indicator, states varied greatly in 2002, ranging from 2.6% to 11.7% of their workforce.
- Not surprisingly, states were distributed similarly on the high-technology employment and high-technology establishment indicators.

This indicator measures the extent to which the workforce in a state is employed in high-technology industries. High-technology industries are defined as those in which the proportion of employees both in research and development and in all technology occupations is at least twice the average proportion for all industries. State economies with a high value are probably well positioned to take advantage of new technological developments because they have a relatively larger pool of experienced high-technology workers.

The data pertaining to establishments for the years 1998 through 2002 were based on their classification according to the 1997 edition of the North American Industry Classification System.

Table 8-38
Employment in high-technology establishments as share of total employment, by state: 1998, 2000, and 2002

State	Employment in high-technology establishments			All employment			High-technology/ all employment (%)		
	1998	2000	2002	1998	2000	2002	1998	2000	2002
United States	9,649,938	10,086,689	9,381,708	108,116,064	114,064,976	112,400,654	8.93	8.84	8.35
Alabama	113,340	119,207	114,035	1,604,084	1,653,074	1,581,117	7.07	7.21	7.21
Alaska	6,518	7,772	9,987	196,135	204,887	213,600	3.32	3.79	4.68
Arizona	157,010	166,678	154,931	1,763,508	1,919,353	1,945,472	8.90	8.68	7.96
Arkansas	62,620	64,564	61,486	944,906	990,830	974,969	6.63	6.52	6.31
California	1,312,754	1,397,776	NA	12,026,963	12,884,692	12,856,426	10.92	10.85	NA
Colorado	166,494	190,282	179,894	1,757,604	1,913,302	1,912,152	9.47	9.95	9.41
Connecticut	160,575	166,788	158,919	1,493,929	1,546,250	1,555,595	10.75	10.79	10.22
Delaware	29,932	29,208	29,374	354,643	377,277	389,304	8.44	7.74	7.55
District of Columbia	32,038	36,111	38,375	402,070	414,983	418,755	7.97	8.70	9.16
Florida	316,257	339,093	348,552	5,756,348	6,217,386	6,366,964	5.49	5.45	5.47
Georgia	228,511	256,208	239,611	3,198,912	3,483,500	3,381,244	7.14	7.35	7.09
Hawaii	8,258	10,292	11,267	416,571	432,092	439,934	1.98	2.38	2.56
Idaho	41,044	43,356	41,418	423,615	450,788	453,552	9.69	9.62	9.13
Illinois	476,305	491,433	430,581	5,221,571	5,501,036	5,224,293	9.12	8.93	8.24
Indiana	291,151	302,599	258,783	2,540,730	2,650,774	2,517,180	11.46	11.42	10.28
Iowa	100,990	101,015	94,006	1,213,285	1,265,064	1,229,609	8.32	7.98	7.65
Kansas	117,366	116,476	108,809	1,081,925	1,128,732	1,098,894	10.85	10.32	9.90
Kentucky	116,730	126,237	115,466	1,442,873	1,513,722	1,462,517	8.09	8.34	7.90
Louisiana	94,915	89,305	84,639	1,577,069	1,592,357	1,583,308	6.02	5.61	5.35
Maine	22,534	26,310	25,145	456,715	491,780	486,766	4.93	5.35	5.17
Maryland	192,782	203,618	204,505	1,938,727	2,058,304	2,062,515	9.94	9.89	9.92
Massachusetts	357,070	388,928	349,205	2,924,872	3,087,044	3,023,126	12.21	12.60	11.55
Michigan	507,762	514,017	452,606	3,919,556	4,072,786	3,889,825	12.95	12.62	11.64
Minnesota	201,359	210,453	192,165	2,271,668	2,395,361	2,359,593	8.86	8.79	8.14
Mississippi	60,182	56,283	46,135	937,023	956,781	904,252	6.42	5.88	5.10
Missouri	201,038	178,522	175,851	2,310,043	2,398,979	2,354,230	8.70	7.44	7.47
Montana	10,312	12,256	13,395	277,144	296,220	300,636	3.72	4.14	4.46
Nebraska	57,718	59,228	53,739	720,252	751,076	749,098	8.01	7.89	7.17
Nevada	26,300	31,814	33,411	800,861	902,775	936,225	3.28	3.52	3.57
New Hampshire	58,282	53,475	58,635	518,526	546,400	550,725	11.24	9.79	10.65
New Jersey	299,146	322,935	304,723	3,368,359	3,548,429	3,596,919	8.88	9.10	8.47
New Mexico	43,681	43,137	34,228	540,182	549,352	554,156	8.09	7.85	6.18
New York	486,679	513,472	491,094	6,993,790	7,353,209	7,234,915	6.96	6.98	6.79
North Carolina	260,203	268,284	246,059	3,223,167	3,385,492	3,322,004	8.07	7.92	7.41
North Dakota	15,542	15,916	14,678	249,476	255,178	253,980	6.23	6.24	5.78
Ohio	479,462	484,110	406,756	4,806,025	5,001,980	4,743,151	9.98	9.68	8.58
Oklahoma	86,402	85,533	82,096	1,167,707	1,201,606	1,200,477	7.40	7.12	6.84
Oregon	108,322	108,254	103,806	1,310,750	1,355,442	1,329,235	8.26	7.99	7.81
Pennsylvania	375,364	394,786	353,631	4,906,117	5,087,237	5,046,442	7.65	7.76	7.01
Rhode Island	23,134	24,809	24,125	402,476	415,168	415,970	5.75	5.98	5.80
South Carolina	140,065	137,014	127,447	1,526,106	1,601,532	1,538,750	9.18	8.56	8.28
South Dakota	24,438	23,346	16,308	289,422	306,704	303,646	8.44	7.61	5.37
Tennessee	189,396	195,796	180,788	2,299,343	2,390,322	2,291,504	8.24	8.19	7.89
Texas	685,349	703,206	NA	7,570,292	8,026,438	7,993,559	9.05	8.76	NA
Utah	84,581	89,486	80,153	866,146	917,089	900,428	9.77	9.76	8.90
Vermont	20,766	22,761	25,317	239,034	253,541	258,058	8.69	8.98	9.81
Virginia	308,922	348,426	341,935	2,700,589	2,903,548	2,914,804	11.44	12.00	11.73
Washington	241,200	258,234	242,943	2,134,597	2,267,485	2,185,658	11.30	11.39	11.12
West Virginia	31,065	30,903	30,351	547,234	558,171	561,478	5.68	5.54	5.41
Wisconsin	211,695	220,093	188,024	2,319,343	2,414,834	2,355,816	9.13	9.11	7.98
Wyoming	6,379	6,884	8,082	163,781	174,614	177,828	3.89	3.94	4.54
Puerto Rico	NA	NA	NA	687,707	727,449	691,110	NA	NA	NA

NA = not available

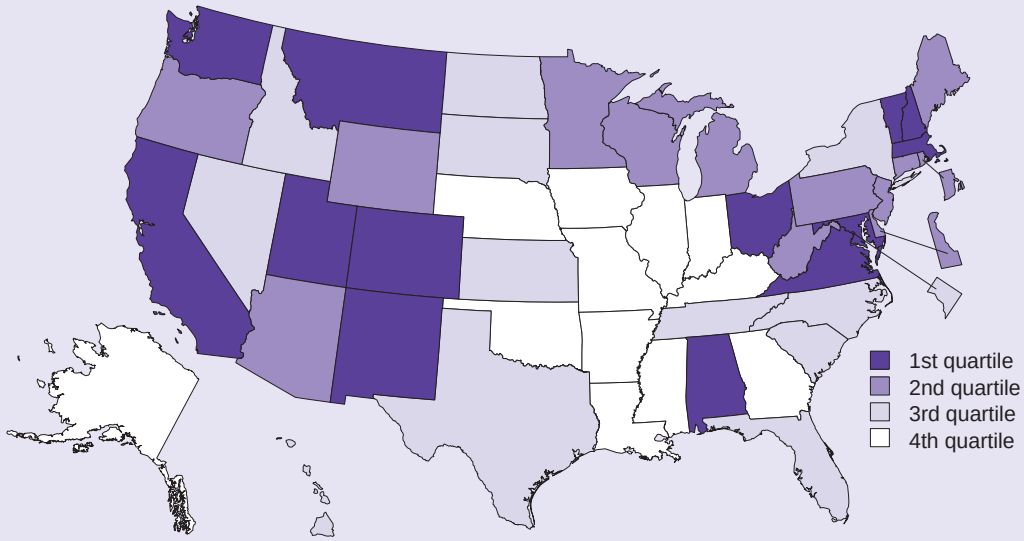
NOTE: U.S. total represents the reported value because 2002 data for California and Texas were suppressed.

SOURCES: U.S. Census Bureau, 1989–2002 Business Information Tracking Series, special tabulations; and *County Business Patterns,* various years.

Science and Engineering Indicators 2006

Average SBIR Program Award Dollars per $1 Million of Gross State Product

Figure 8-39
Average SBIR program award dollars per $1 million of gross state product: 2001–03



1st quartile ($721–$161)	2nd quartile ($158–$84)	3rd quartile ($83–$47)	4th quartile ($46–$21)
Alabama	Arizona	District of Columbia	Alaska
California	Connecticut	Florida	Arkansas
Colorado	Delaware	Hawaii	Georgia
Maryland	Maine	Idaho	Illinois
Massachusetts	Michigan	Kansas	Indiana
Montana	Minnesota	Nevada	Iowa
New Hampshire	New Jersey	New York	Kentucky
New Mexico	Oregon	North Carolina	Louisiana
Ohio	Pennsylvania	North Dakota	Mississippi
Utah	Rhode Island	South Carolina	Missouri
Vermont	West Virginia	South Dakota	Nebraska
Virginia	Wisconsin	Tennessee	Oklahoma
Washington	Wyoming	Texas	

SOURCES: U.S. Small Business Administration, Office of Technology, SBIR Program Statistics, various years; and U.S. Department of Commerce, Bureau of Economic Analysis, Gross State Product data. See table 8-39.

Findings

- Significant growth has occurred in the SBIR program in recent years as total awards have increased from $590 million in 1992–94 to $1.5 billion in 2001–03. The value of SBIR awards is not evenly distributed but is concentrated in relatively few states; the total of annual state awards may range from under $1 million to more than $300 million.
- Many of the states with the highest rankings on this indicator are locations of federal laboratories or well-recognized academic research institutions from which innovative small businesses have emerged.
- States with a high ranking on this indicator also tend to rank high on the high-technology and venture capital indicators.

Funds awarded through the federal Small Business Innovation Research (SBIR) program support technological innovation in small companies (i.e., companies with 500 or fewer employees). Awards are made to evaluate the feasibility and scientific merit of new technology (up to $100,000) and to develop the technology to a point where it can be commercialized (up to $750,000).

Because of year-to-year fluctuations, this indicator is calculated using 3-year averages. The average annual SBIR award dollars won by the small businesses in a state are divided by the average annual gross state product. A high value indicates that companies in a state are doing cutting-edge development work that attracts federal support.

Table 8-39
Average SBIR program award dollars per $1 million of gross state product, by state: 1992–94, 1997–99, and 2001–03

State	Average SBIR awards ($ thousands)			Average GSP ($ millions)			SBIR awards/$1 million GSP		
	1992–94	1997–99	2001–03	1992–94	1997–99	2001–03	1992–94	1997–99	2001–03
United States	589,878	1,070,869	1,472,509	6,497,777	8,706,261	10,464,751	91	123	141
Alabama	9,461	20,269	25,734	84,161	106,791	124,273	112	190	207
Alaska	164	159	715	22,889	24,292	29,601	7	7	24
Arizona	7,963	20,063	26,840	86,715	137,458	173,529	92	146	155
Arkansas	522	808	1,881	47,030	61,906	71,445	11	13	26
California	135,384	227,108	314,505	838,509	1,096,445	1,369,864	161	207	230
Colorado	23,019	52,442	70,313	92,695	144,304	182,390	248	363	386
Connecticut	20,966	25,019	23,399	107,220	144,576	168,918	196	173	139
Delaware	1,843	3,206	4,184	23,916	37,391	47,509	77	86	88
District of Columbia	1,400	3,907	5,456	45,437	52,747	67,022	31	74	81
Florida	11,887	22,221	31,500	302,645	416,717	524,303	39	53	60
Georgia	3,769	12,022	14,228	170,493	256,758	309,383	22	47	46
Hawaii	2,464	2,811	3,678	35,796	37,954	44,066	69	74	83
Idaho	377	872	3,074	22,615	30,408	38,402	17	29	80
Illinois	8,664	14,069	20,882	321,523	423,807	487,588	27	33	43
Indiana	1,961	5,843	8,218	131,763	177,586	204,136	15	33	40
Iowa	544	1,307	4,235	64,391	84,074	97,700	8	16	43
Kansas	1,008	3,223	4,242	58,607	75,825	90,115	17	43	47
Kentucky	740	2,847	2,806	81,072	110,029	122,164	9	26	23
Louisiana	1,251	1,165	2,861	94,699	119,123	138,749	13	10	21
Maine	1,822	1,627	3,453	25,152	32,105	38,983	72	51	89
Maryland	29,383	51,092	74,933	125,417	162,308	202,779	234	315	370
Massachusetts	97,176	162,934	208,446	175,051	237,599	289,242	555	686	721
Michigan	10,671	23,952	29,292	224,901	311,523	347,416	47	77	84
Minnesota	7,068	14,162	23,017	117,199	165,231	200,007	60	86	115
Mississippi	394	701	2,072	47,012	60,412	68,716	8	12	30
Missouri	1,817	4,693	4,725	120,668	163,437	187,655	15	29	25
Montana	1,153	2,241	7,073	16,039	19,802	24,044	72	113	294
Nebraska	1,140	1,177	1,831	39,962	52,103	61,247	29	23	30
Nevada	1,430	2,167	5,822	40,465	64,450	83,397	35	34	70
New Hampshire	7,612	13,209	17,764	27,874	38,613	46,234	273	342	384
New Jersey	19,682	31,599	39,682	243,698	313,545	378,067	81	101	105
New Mexico	12,884	19,682	20,599	36,756	47,545	53,800	351	414	383
New York	29,135	42,363	59,884	550,414	688,790	812,682	53	62	74
North Carolina	6,769	14,195	19,679	168,673	243,113	301,330	40	58	65
North Dakota	349	505	1,595	13,244	16,973	20,135	26	30	79
Ohio	,538	41,007	62,315	262,320	346,929	386,449	63	118	161
Oklahoma	1,185	3,053	4,257	64,697	80,591	96,373	18	38	44
Oregon	8,035	15,433	16,608	69,102	100,783	115,479	116	153	144
Pennsylvania	18,355	40,177	56,851	285,616	361,014	425,470	64	111	134
Rhode Island	1,893	2,112	5,897	23,526	29,701	37,297	80	71	158
South Carolina	78	1,418	6,670	76,048	103,321	122,672	1	14	54
South Dakota	33	1,089	1,661	15,976	20,764	25,756	2	52	64
Tennessee	6,248	8,071	9,793	119,705	161,180	191,566	52	50	51
Texas	18,242	38,567	54,863	449,808	631,798	782,936	41	61	70
Utah	8,344	9,628	14,192	38,762	60,342	73,603	215	160	193
Vermont	1,155	2,764	3,940	13,126	15,921	19,540	88	174	202
Virginia	30,506	64,357	85,948	168,708	226,707	290,057	181	284	296
Washington	13,118	26,209	37,722	138,903	195,837	234,923	94	134	161
West Virginia	17	1,153	4,292	32,745	39,931	45,166	1	29	95
Wisconsin	4,251	8,951	16,544	120,260	160,387	189,992	35	56	87
Wyoming	11	1,220	2,339	13,774	15,315	20,581	1	80	114
Puerto Rico	0	73	82	37,081	53,372	71,626	0	1	1

GSP = gross state product; SBIR = Small Business Innovation Research

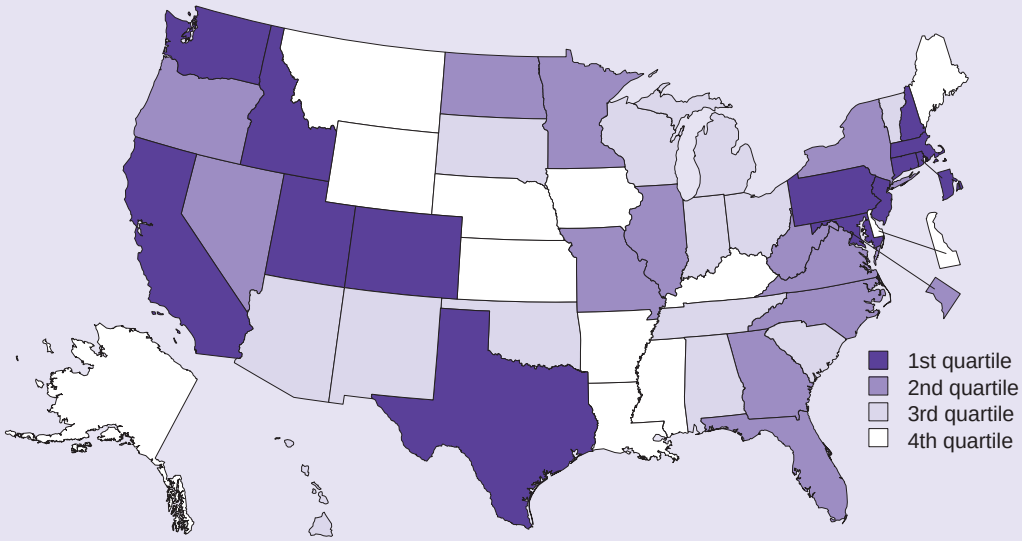
NOTE: GSP is reported in current dollars.

SOURCES: U.S. Small Business Administration, Office of Technology, SBIR program statistics, various years; U.S. Department of Commerce, Bureau of Economic Analysis, Gross State Product data; and Government of Puerto Rico, Office of the Governor.

Science and Engineering Indicators 2006

Venture Capital Disbursed per $1,000 of Gross State Product

Figure 8-40
Venture capital disbursed per $1,000 of gross state product: 2003



1st quartile ($8.70–$1.25)	2nd quartile ($1.24–$0.42)	3rd quartile ($0.38–$0.11)	4th quartile ($0.06–$0.00)
California	District of Columbia	Alabama	Alaska
Colorado	Florida	Arizona	Arkansas
Connecticut	Georgia	Hawaii	Delaware
Idaho	Illinois	Indiana	Iowa
Maryland	Minnesota	Michigan	Kansas
Massachusetts	Missouri	New Mexico	Kentucky
New Hampshire	Nevada	Ohio	Louisiana
New Jersey	New York	Oklahoma	Maine
Pennsylvania	North Carolina	South Carolina	Mississippi
Rhode Island	North Dakota	South Dakota	Montana
Texas	Oregon	Tennessee	Nebraska
Utah	Virginia	Vermont	Wyoming
Washington	West Virginia	Wisconsin	

SOURCES: PricewaterhouseCoopers, Venture Economics, and National Venture Capital Association, MoneyTree Survey™ special tabulations; and U.S. Department of Commerce, Bureau of Economic Analysis, Gross State Product data. See table 8-40.

Findings

- The amount of venture capital invested in the United States increased more than 10-fold, from nearly $8 billion in 1995 to a record $106 billion in 2000, before falling to $19 billion in 2003 (in current dollars).
- In 2003, the state average for venture capital disbursed per $1,000 GSP was $1.73, which was larger than the $1.13 invested in 1995 but only about one-sixth the fraction of GSP invested in 2000.
- Companies in California received 43% of the total venture capital disbursed in the United States in 2003, followed by companies in Massachusetts with 14%.
- The state distribution of venture capital was similar to that for the high-technology indicators.

Venture capital represents an important source of funding for start-up companies. This indicator shows the relative magnitude of venture capital investments in a state after adjusting for the size of the state's economy. The indicator is expressed as dollars of venture capital disbursed per $1,000 of gross state product (GSP).

Venture capital investments represent a method of funding the growth and expansion of companies early in their development before establishing a predictable sales history that would qualify them for other types of financing. Access to this type of financing varies greatly in different states.

Table 8-40
Venture capital disbursed per $1,000 of gross state product, by state: 1995, 2000, and 2003

State	Venture capital disbursed ($ thousands)			GSP ($ millions)			Venture capital/ $1,000 GSP		
	1995	2000	2003	1995	2000	2003	1995	2000	2003
United States	8,147,907	105,689,617	18,946,148	7,232,723	9,749,103	10,923,851	1.13	10.84	1.73
Alabama	36,622	279,600	24,825	94,021	114,204	130,792	0.39	2.45	0.19
Alaska	0	3,500	0	24,805	27,590	31,704	0.00	0.13	0.00
Arizona	96,016	678,972	67,199	104,036	157,639	183,272	0.92	4.31	0.37
Arkansas	5,012	10,300	1,150	53,303	66,176	74,540	0.09	0.16	0.02
California	3,255,681	43,527,816	8,246,602	908,963	1,291,113	1,438,134	3.58	33.71	5.73
Colorado	314,397	4,333,008	628,225	108,043	171,363	188,397	2.91	25.29	3.33
Connecticut	129,202	1,461,764	259,068	120,800	160,685	174,085	1.07	9.10	1.49
Delaware	4,432	134,650	400	27,507	42,359	50,486	0.16	3.18	0.01
District of Columbia	50	444,003	57,050	47,123	58,425	70,668	0.00	7.60	0.81
Florida	234,919	2,592,944	292,281	340,501	470,120	553,709	0.69	5.52	0.53
Georgia	161,494	2,138,960	311,266	199,138	291,014	321,199	0.81	7.35	0.97
Hawaii	0	196,000	16,585	36,572	40,176	46,671	0.00	4.88	0.36
Idaho	15,200	19,485	52,160	27,099	35,206	40,358	0.56	0.55	1.29
Illinois	197,790	2,406,127	380,274	359,723	464,257	499,731	0.55	5.18	0.76
Indiana	9,103	253,975	24,500	147,984	194,683	213,342	0.06	1.30	0.11
Iowa	14,188	20,751	4,200	71,905	90,815	102,400	0.20	0.23	0.04
Kansas	6,600	262,671	2,935	63,699	83,427	93,263	0.10	3.15	0.03
Kentucky	16,979	198,483	7,100	90,459	112,737	128,315	0.19	1.76	0.06
Louisiana	30,450	87,883	1,250	109,153	134,755	144,321	0.28	0.65	0.01
Maine	1,500	140,200	925	27,648	35,662	40,829	0.05	3.93	0.02
Maryland	118,439	1,886,185	353,896	137,391	179,978	213,073	0.86	10.48	1.66
Massachusetts	691,829	10,393,199	2,584,981	195,277	276,786	297,113	3.54	37.55	8.70
Michigan	70,697	331,959	91,941	251,017	337,185	359,440	0.28	0.98	0.26
Minnesota	161,730	1,079,037	222,454	131,357	185,431	210,184	1.23	5.82	1.06
Mississippi	2,749	19,500	850	53,816	64,133	71,872	0.05	0.30	0.01
Missouri	83,202	656,693	103,703	137,528	176,443	193,828	0.60	3.72	0.54
Montana	0	16,680	250	17,393	21,367	25,584	0.00	0.78	0.01
Nebraska	16,102	17,500	610	44,505	55,727	65,399	0.36	0.31	0.01
Nevada	575	27,371	38,200	48,974	74,797	89,711	0.01	0.37	0.43
New Hampshire	30,510	724,986	161,055	32,149	43,584	48,202	0.95	16.63	3.34
New Jersey	257,346	3,225,923	896,890	266,724	343,959	394,040	0.96	9.38	2.28
New Mexico	3,550	21,108	6,630	41,459	50,419	57,078	0.09	0.42	0.12
New York	276,813	7,256,427	680,713	594,444	769,403	838,035	0.47	9.43	0.81
North Carolina	300,994	1,887,982	373,968	191,579	274,306	315,456	1.57	6.88	1.19
North Dakota	9,835	6,054	14,500	14,515	18,076	21,597	0.68	0.33	0.67
Ohio	68,670	961,401	88,148	293,260	371,228	398,918	0.23	2.59	0.22
Oklahoma	6,100	52,529	31,136	69,580	89,851	101,168	0.09	0.58	0.31
Oregon	40,211	814,607	100,031	80,099	112,964	119,973	0.50	7.21	0.83
Pennsylvania	142,698	3,089,954	556,223	314,504	391,501	443,709	0.45	7.89	1.25
Rhode Island	6,020	91,042	51,660	25,666	33,835	39,363	0.23	2.69	1.31
South Carolina	53,385	415,211	19,342	86,053	112,831	127,963	0.62	3.68	0.15
South Dakota	0	300	3,500	17,807	23,230	27,337	0.00	0.01	0.13
Tennessee	175,176	387,451	77,252	135,655	174,349	203,071	1.29	2.22	0.38
Texas	459,604	6,207,846	1,164,607	507,441	722,832	821,943	0.91	8.59	1.42
Utah	11,200	659,601	106,525	46,303	67,889	76,674	0.24	9.72	1.39
Vermont	12,008	46,394	5,193	13,892	17,661	20,544	0.86	2.63	0.25
Virginia	280,430	3,290,193	376,418	185,490	260,257	304,116	1.51	12.64	1.24
Washington	329,507	2,727,478	400,032	151,338	221,314	245,143	2.18	12.32	1.63
West Virginia	0	5,000	19,800	36,362	41,690	46,726	0.00	0.12	0.42
Wisconsin	8,891	198,916	37,647	134,096	176,244	198,096	0.07	1.13	0.19
Wyoming	0	0	0	14,567	17,427	22,279	0.00	0.00	0.00
Puerto Rico	7,760	31,115	100	42,647	61,702	74,362	0.18	0.50	0.00

GSP = gross state product

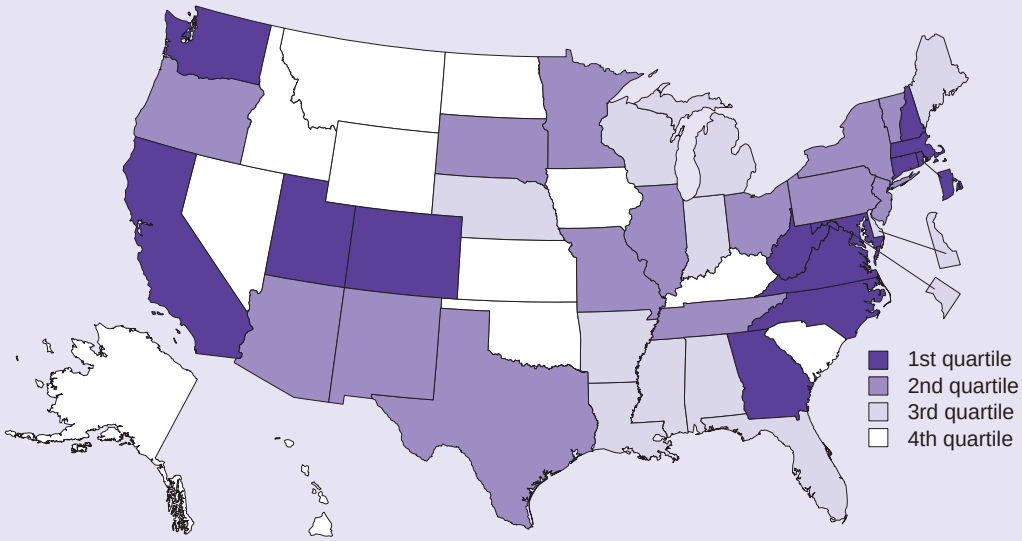
NOTE: GSP is reported in current dollars.

SOURCES: PricewaterhouseCoopers, Venture Economics, and National Venture Capital Association, MoneyTree Survey™, special tabulations; U.S. Department of Commerce, Bureau of Economic Analysis, Gross State Product data; and Government of Puerto Rico, Office of the Governor.

Science and Engineering Indicators 2006

Venture Capital Deals as Share of High-Technology Business Establishments

Figure 8-41
Venture capital deals as share of high-technology business establishments: 2002



1st quartile (2.43%–0.57%)	2nd quartile (0.55%–0.30%)	3rd quartile (0.27%–0.14%)	4th quartile (0.13%–0.00%)
California	Arizona	Alabama	Alaska
Colorado	Illinois	Arkansas	Hawaii
Connecticut	Minnesota	Delaware	Idaho
Georgia	Missouri	District of Columbia	Iowa
Maryland	New Jersey	Florida	Kansas
Massachusetts	New Mexico	Indiana	Kentucky
New Hampshire	New York	Louisiana	Montana
North Carolina	Ohio	Maine	Nevada
Rhode Island	Oregon	Michigan	North Dakota
Utah	Pennsylvania	Mississippi	Oklahoma
Virginia	South Dakota	Nebraska	South Carolina
Washington	Tennessee	Wisconsin	Wyoming
West Virginia	Texas		
	Vermont		

SOURCES: PricewaterhouseCoopers, Venture Economics, and National Venture Capital Association, MoneyTree Survey™, special tabulations; and U.S. Census Bureau, 1989–2002 Business Information Tracking Series, special tabulations. See table 8-41.

Findings

- The number of venture capital deals that involved U.S. companies fell from 8,000 to 3,000 between 2000 and 2002, a decline of more than 50%.
- In 2002, the distribution of venture capital among high-technology companies was uneven. Companies in only 10 states exceeded the national average of 0.67%.
- The high-technology companies located in Massachusetts were the most successful in accessing venture capital investments in 2002 with a 2.4% success rate. This was less than half the rate of Massachusetts companies that received such funding in 2000.
- In 2002, no venture capital deals were reported in four states.

This indicator provides a measure of the extent to which high-technology companies in a state receive venture capital investments. The value of the indicator is calculated by dividing the number of venture capital deals by the number of companies operating in high-technology industries in that state. In most cases, a company will not receive more than one infusion of venture capital in a given year.

Venture capital investment can bring needed capital and management expertise that can help to grow a high-technology company. High values indicate that high-technology companies in a state are frequently using venture capital to facilitate their growth and development.

Table 8-41
Venture capital deals as share of high-technology business establishments, by state: 1998, 2000, and 2002

State	Venture capital deals			High-technology establishments			Venture capital deals/ high-technology establishments (%)		
	1998	2000	2002	1998	2000	2002	1998	2000	2002
United States	3,676	8,044	3,049	402,096	428,061	453,903	0.91	1.88	0.67
Alabama	16	27	10	4,068	4,208	4,383	0.39	0.64	0.23
Alaska	0	1	0	730	783	823	0.00	0.13	0.00
Arizona	37	73	25	6,877	7,493	8,368	0.54	0.97	0.30
Arkansas	3	4	5	2,003	2,170	2,329	0.15	0.18	0.21
California	1,419	2,996	1,056	54,998	60,799	64,348	2.58	4.93	1.64
Colorado	128	238	90	10,472	11,361	12,400	1.22	2.09	0.73
Connecticut	75	126	46	6,376	6,356	6,376	1.18	1.98	0.72
Delaware	0	4	3	1,327	1,426	1,537	0.00	0.28	0.20
District of Columbia	6	42	6	1,906	2,069	2,212	0.31	2.03	0.27
Florida	65	176	55	23,982	25,873	29,149	0.27	0.68	0.19
Georgia	93	229	81	12,234	13,110	14,188	0.76	1.75	0.57
Hawaii	3	2	1	1,162	1,256	1,463	0.26	0.16	0.07
Idaho	3	4	2	1,435	1,632	1,889	0.21	0.25	0.11
Illinois	68	202	72	20,643	21,479	21,962	0.33	0.94	0.33
Indiana	7	25	10	6,790	7,049	7,345	0.10	0.35	0.14
Iowa	7	3	1	2,604	2,677	2,904	0.27	0.11	0.03
Kansas	4	20	5	3,309	3,611	3,736	0.12	0.55	0.13
Kentucky	16	12	4	3,381	3,491	3,698	0.47	0.34	0.11
Louisiana	12	14	8	4,132	4,223	4,622	0.29	0.33	0.17
Maine	12	15	5	1,585	1,708	1,838	0.76	0.88	0.27
Maryland	58	175	91	9,337	10,030	11,008	0.62	1.74	0.83
Massachusetts	396	783	357	13,949	14,598	14,669	2.84	5.36	2.43
Michigan	30	57	29	12,839	13,255	13,721	0.23	0.43	0.21
Minnesota	80	111	56	9,384	10,014	10,232	0.85	1.11	0.55
Mississippi	2	3	3	1,832	1,866	1,925	0.11	0.16	0.16
Missouri	18	53	32	6,355	6,667	6,903	0.28	0.79	0.46
Montana	1	3	0	1,206	1,321	1,545	0.08	0.23	0.00
Nebraska	4	3	3	1,834	1,955	2,045	0.22	0.15	0.15
Nevada	12	8	5	2,814	3,233	3,741	0.43	0.25	0.13
New Hampshire	25	56	35	2,840	2,874	2,932	0.88	1.95	1.19
New Jersey	80	188	86	18,964	20,089	20,621	0.42	0.94	0.42
New Mexico	4	8	7	2,143	2,227	2,368	0.19	0.36	0.30
New York	193	638	152	25,289	27,507	28,552	0.76	2.32	0.53
North Carolina	88	162	90	10,078	10,887	11,633	0.87	1.49	0.77
North Dakota	1	1	0	570	606	671	0.18	0.17	0.00
Ohio	58	71	46	14,234	14,566	15,202	0.41	0.49	0.30
Oklahoma	11	10	4	3,752	3,810	4,101	0.29	0.26	0.10
Oregon	19	69	26	5,468	5,693	6,009	0.35	1.21	0.43
Pennsylvania	140	255	88	15,320	16,090	17,121	0.91	1.58	0.51
Rhode Island	3	12	13	1,444	1,516	1,628	0.21	0.79	0.80
South Carolina	16	11	5	3,942	4,119	4,406	0.41	0.27	0.11
South Dakota	0	1	3	684	723	779	0.00	0.14	0.39
Tennessee	26	44	21	5,421	5,561	5,739	0.48	0.79	0.37
Texas	177	477	165	27,094	28,410	30,421	0.65	1.68	0.54
Utah	35	61	25	3,399	3,750	4,243	1.03	1.63	0.59
Vermont	2	4	6	1,068	1,109	1,169	0.19	0.36	0.51
Virginia	99	281	88	12,767	14,015	15,122	0.78	2.00	0.58
Washington	111	260	108	9,627	10,175	10,642	1.15	2.56	1.01
West Virginia	0	3	9	1,208	1,224	1,288	0.00	0.25	0.70
Wisconsin	13	23	11	6,497	6,655	7,080	0.20	0.35	0.16
Wyoming	0	0	0	723	742	817	0.00	0.00	0.00
Puerto Rico	2	10	1	NA	NA	NA	NA	NA	NA

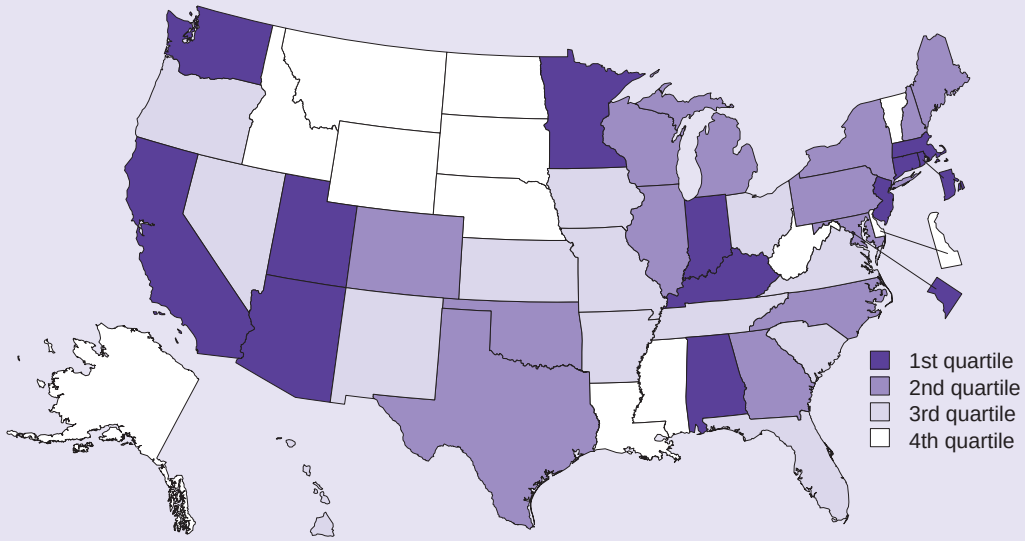
NA = not available

SOURCES: PricewaterhouseCoopers, Venture Economics, and National Venture Capital Association, MoneyTree Survey™, special tabulations; and U.S. Census Bureau, 1989–2002 Business Information Tracking Series, special tabulations.

Science and Engineering Indicators 2006

Venture Capital Disbursed per Venture Capital Deal

Figure 8-42
Venture capital disbursed per venture capital deal: 2004



1st quartile ($12.17–$7.39)	2nd quartile ($7.22–$5.08)	3rd quartile ($5.02–$2.72)	4th quartile ($2.15–$0.00)
Alabama	Colorado	Arkansas	Alaska
Arizona	Georgia	Florida	Delaware
California	Illinois	Hawaii	Idaho
Connecticut	Maine	Iowa	Louisiana
District of Columbia	Maryland	Kansas	Mississippi
Indiana	Michigan	Missouri	Montana
Kentucky	New Hampshire	Nevada	Nebraska
Massachusetts	New York	New Mexico	North Dakota
Minnesota	North Carolina	Ohio	South Dakota
New Jersey	Oklahoma	Oregon	Vermont
Rhode Island	Pennsylvania	South Carolina	West Virginia
Utah	Texas	Tennessee	Wyoming
Washington	Wisconsin	Virginia	

SOURCES: PricewaterhouseCoopers, Venture Economics, and National Venture Capital Association, MoneyTree Survey™, special tabulations. See table 8-42.

Findings

- The size of the average venture capital investment in the United States rose over the past decade to slightly more than $7 million per deal in 2004. This represents an increase in investment size from $4 million per deal in 1995 and $5 million per deal in 1998 but a decline from $13 million per deal in 2000.
- The total number of venture capital deals has stabilized during the past few years at 3,049 in 2002 and 2,872 in 2004.
- The state distribution on this indicator was skewed in 2004; only 12 states and the District of Columbia were above the national average, and 2 states reported no venture capital investments.
- Several states with high values in 2004 did not show consistent values in earlier years; their 2004 performance resulted from a small number of later-stage investments.

This indicator provides a measure of the average size of the venture capital investments being made in a state. The indicator is expressed as the total dollars of venture capital invested in millions divided by the number of companies receiving venture capital. The availability of venture capital may vary widely based on local business climate and entrepreneurial activity. The amount also will vary by stage of investment.

This indicator provides some measure of the magnitude of investment that developing companies in a specific state have attracted from venture capital sources. High values indicate a large average deal size.

Some states have relatively few venture capital deals taking place in a given year; thus, the value of this indicator may show large fluctuations on a year-to-year basis. This variation is further compounded by the large change in total venture capital investments that has occurred since 2000, making the use of a 3-year average of state investments misleading. Twenty-four states and the District of Columbia reported fewer than 10 venture capital deals in 2004. In such states, a single large or small venture capital investment can significantly affect the value of this indicator.

Table 8-42
Venture capital disbursed per venture capital deal, by state: 1995, 2000, and 2004

State	Venture capital disbursed ($ thousands)			Venture capital deals			Venture capital/ deal ($ millions)		
	1995	2000	2004	1995	2000	2004	1995	2000	2004
United States	8,147,907	105,689,617	20,937,629	1,866	8,044	2,872	4.37	13.14	7.29
Alabama	36,622	279,600	37,975	11	27	4	3.33	10.36	9.49
Alaska	0	3,500	0	0	1	0	0.00	3.50	0.00
Arizona	96,016	678,972	103,491	28	73	14	3.43	9.30	7.39
Arkansas	5,012	10,300	3,700	2	4	1	2.51	2.58	3.70
California	3,255,681	43,527,816	9,345,925	694	2,996	1,117	4.69	14.53	8.37
Colorado	314,397	4,333,008	443,599	57	238	70	5.52	18.21	6.34
Connecticut	129,202	1,461,764	274,789	44	126	35	2.94	11.60	7.85
Delaware	4,432	134,650	2,383	4	4	2	1.11	33.66	1.19
District of Columbia	50	444,003	73,000	1	42	6	0.05	10.57	12.17
Florida	234,919	2,592,944	263,574	49	176	56	4.79	14.73	4.71
Georgia	161,494	2,138,960	584,832	48	229	81	3.36	9.34	7.22
Hawaii	0	196,000	25,555	0	2	6	0.00	98.00	4.26
Idaho	15,200	19,485	2,500	1	4	2	15.20	4.87	1.25
Illinois	197,790	2,406,127	271,522	41	202	45	4.82	11.91	6.03
Indiana	9,103	253,975	65,750	7	25	7	1.30	10.16	9.39
Iowa	14,188	20,751	10,300	10	3	3	1.42	6.92	3.43
Kansas	6,600	262,671	37,670	3	20	8	2.20	13.13	4.71
Kentucky	16,979	198,483	54,410	9	12	7	1.89	16.54	7.77
Louisiana	30,450	87,883	3,190	8	14	3	3.81	6.28	1.06
Maine	1,500	140,200	26,000	2	15	4	0.75	9.35	6.50
Maryland	118,439	1,886,185	512,349	29	175	87	4.08	10.78	5.89
Massachusetts	691,829	10,393,199	2,774,904	201	783	337	3.44	13.27	8.23
Michigan	70,697	331,959	148,065	13	57	22	5.44	5.82	6.73
Minnesota	161,730	1,079,037	351,243	50	111	46	3.23	9.72	7.64
Mississippi	2,749	19,500	2,622	1	3	3	2.75	6.50	0.87
Missouri	83,202	656,693	62,469	14	53	13	5.94	12.39	4.81
Montana	0	16,680	400	0	3	1	0.00	5.56	0.40
Nebraska	16,102	17,500	0	2	3	0	8.05	5.83	0.00
Nevada	575	27,371	9,500	1	8	2	0.58	3.42	4.75
New Hampshire	30,510	724,986	145,993	10	56	23	3.05	12.95	6.35
New Jersey	257,346	3,225,923	720,399	56	188	77	4.60	17.16	9.36
New Mexico	3,550	21,108	28,148	2	8	9	1.78	2.64	3.13
New York	276,813	7,256,427	721,130	66	638	142	4.19	11.37	5.08
North Carolina	300,994	1,887,982	335,312	38	162	56	7.92	11.65	5.99
North Dakota	9,835	6,054	2,000	2	1	1	4.92	6.05	2.00
Ohio	68,670	961,401	70,719	36	71	26	1.91	13.54	2.72
Oklahoma	6,100	52,529	63,901	2	10	11	3.05	5.25	5.81
Oregon	40,211	814,607	155,658	19	69	31	2.12	11.81	5.02
Pennsylvania	142,698	3,089,954	526,066	66	255	91	2.16	12.12	5.78
Rhode Island	6,020	91,042	80,400	4	12	8	1.51	7.59	10.05
South Carolina	53,385	415,211	16,052	6	11	5	8.90	37.75	3.21
South Dakota	0	300	1,900	0	1	3	0.00	0.30	0.63
Tennessee	175,176	387,451	81,025	20	44	23	8.76	8.81	3.52
Texas	459,604	6,207,846	1,096,485	92	477	157	5.00	13.01	6.98
Utah	11,200	659,601	188,641	6	61	25	1.87	10.81	7.55
Vermont	12,008	46,394	4,500	4	4	3	3.00	11.60	1.50
Virginia	280,430	3,290,193	272,132	40	281	67	7.01	11.71	4.06
Washington	329,507	2,727,478	868,280	60	260	117	5.49	10.49	7.42
West Virginia	0	5,000	8,600	0	3	4	0.00	1.67	2.15
Wisconsin	8,891	198,916	57,068	7	23	10	1.27	8.65	5.71
Wyoming	0	0	1,500	0	0	1	0.00	0.00	1.50
Puerto Rico	7,760	31,115	1,450	4	10	1	1.94	3.11	1.45

SOURCE: PricewaterhouseCoopers, Venture Economics, and National Venture Capital Association, MoneyTree Survey™, special tabulations.

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Technical Note: Defining High-Technology Industries

The Bureau of Labor Statistics (BLS) developed a list of high-technology industries based on Standard Industrial Classification (SIC) codes in 1999 (Heckler 1999). The list was based on measures of industry employment in both R&D and technology-oriented occupations, using Occupational Employment Statistics surveys from 1993 to 1995 in which employers were asked to explicitly report the number of workers engaged in R&D activity. The researchers identified 31 three-digit SIC R&D-intensive industries in which the number of R&D workers and technology-oriented occupations accounted for a proportion of employment that was at least twice the average for all industries surveyed. These industries had at least 6 R&D and 76 technology-oriented workers per 1,000 workers. The BLS list included 27 manufacturing and 4 service industries.

The Office of Technology Policy, with assistance from the Census Bureau, converted the BLS list of SIC codes to the 1997 edition of the North American Industrial Classification System (NAICS) codes using the concordance between the two classification systems. The process necessitated both splitting and combining codes. The resulting list of high-technology NAICS codes includes 39 categories that range from four- to six-digit detail. Twenty-nine categories identify manufacturing industries, and 10 identify service industries. The industry categories included in the high-technology segment are shown in table 8-43.

All high-technology data in this chapter were collected based on the 1997 NAICS codes. The NAICS codes were updated in 2002, and this revised coding system was used beginning with 2003 data.

Reference

Heckler D. 1999. High-technology employment: A broader view. *Monthly Labor Review* 122(6):18.

Table 8-43
1997 NAICS codes that constitute high-technology industries

NAICS code	Industry
32411	Petroleum refineries
3251	Basic chemical manufacturing
3252	Resin, synthetic rubber, and artificial and synthetic fibers and filaments manufacturing
3253	Pesticide, fertilizer, and other agricultural chemical manufacturing
3254	Pharmaceutical and medicine manufacturing
3255	Paint, coating, and adhesive manufacturing
3256	Soap, cleaning compound, and toilet preparation manufacturing
3259	Other chemical product and preparation manufacturing
332992	Ordnance & accessories manufacturing—small arms ammunition manufacturing
332993	Ordnance & accessories manufacturing—ammunition (except small arms) manufacturing
332994	Ordnance & accessories manufacturing—small arms manufacturing
332995	Ordnance & accessories manufacturing—other ordnance and accessories manufacturing
3331	Agriculture, construction, and mining machinery manufacturing
3332	Industrial machinery manufacturing
3333	Commercial and service industry machinery manufacturing
3336	Engine, turbine, and power transmission equipment manufacturing
3339	Other general purpose machinery manufacturing
3341	Computer and peripheral equipment manufacturing
3342	Communications equipment manufacturing
3343	Audio and video equipment manufacturing
3344	Semiconductor and other electronic component manufacturing
3345	Navigational, measuring, electromedical, and control instruments manufacturing
3346	Manufacturing and reproducing magnetic and optical media
3353	Electrical equipment manufacturing
33599	All other electrical equipment and component manufacturing
3361	Motor vehicle manufacturing
3362	Motor vehicle body and trailer manufacturing
3363	Motor vehicle parts manufacturing
3364	Aerospace product and parts manufacturing
3391	Medical equipment and supplies manufacturing
5112	Software publishers
514191	On-line information services
5142	Data processing services
5413	Architectural, engineering, and related services
5415	Computer systems design and related services
5416	Management, scientific, and technical consulting services
5417	Scientific research and development services
6117	Educational support services
811212	Computer and office machine repair and maintenance

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