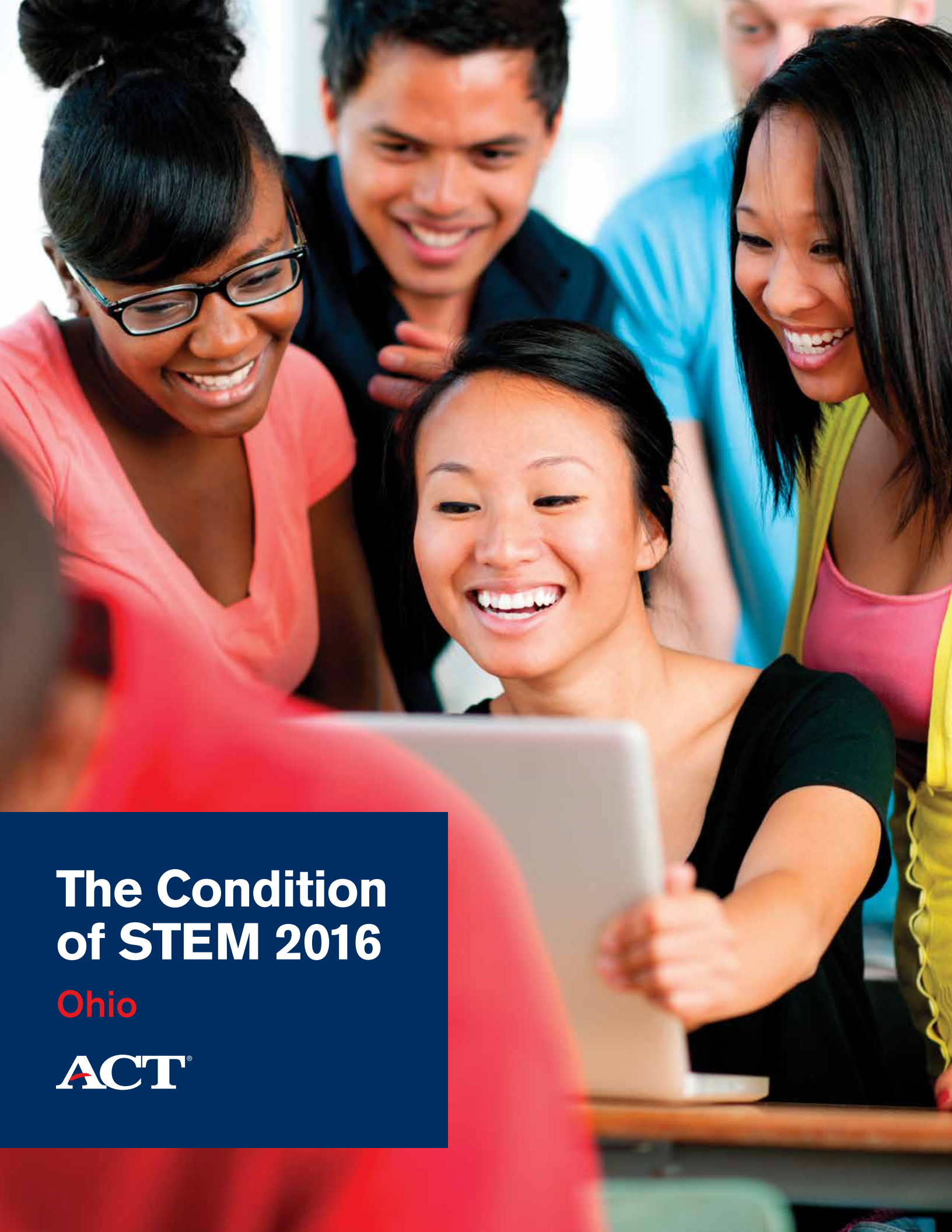


The Condition of STEM 2016

Ohio

ACT®

The Condition of STEM 2016

ACT has been a leader in measuring college and career readiness trends for over 55 years. Each August, ACT releases *The Condition of College & Career Readiness*, our annual report on the progress of the ACT-tested graduating class relative to college readiness. Nationally, a record 64% of the 2016 graduating class took the ACT® test. The continued increase in the number of ACT test takers enhances the breadth and depth of our data pool, providing a comprehensive picture of the current college readiness levels of the graduating class as well as offering a glimpse of the emerging general and STEM (Science, Technology, Engineering, Math) education pipeline in the United States.

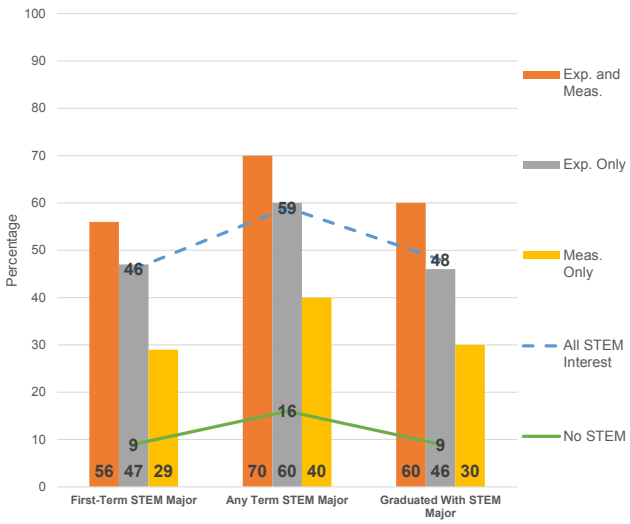
This report reviews the graduating class in the context of STEM-related fields. ACT is uniquely positioned to deliver this report for two key reasons. First is our commitment to science through the inclusion of a science test in our assessments. ACT leadership is unmatched in providing a definitive assessment in the science area. Second is the research-based ACT Interest Inventory, which is completed by ACT-tested students and measures their interest in a wide range of educational and occupational fields.

With answers to the ACT Interest Inventory and responses to the Student Profile Section of the ACT, we can determine interest levels (both expressed and measured) in specific STEM fields. We can then assess college readiness in math and science among STEM-interested students using ACT test scores. Students with an expressed interest are those who chose a major or occupation (out of the 294 possibilities listed) that is classified as a STEM field. Students are designated to have a measured interest when their responses to the ACT Interest Inventory items result in high science and technology interest scores.

Interest Inventory

Validity evidence for this two-factor model of identifying STEM interest was provided in an ACT research study (Crouse, Harmston, & Radunzel, 2016). Figure 1 highlights some of the findings. Those students who were identified as having expressed and measured STEM interest were the most likely to pursue a STEM major, regardless of where they were in their college experience. Those students were also the most likely to graduate with a STEM major. When compared to students with an expressed and measured interest in STEM, students who were identified as having expressed-only or measured-only STEM interest had lower rates of pursuing and graduating with STEM majors while students who had no STEM interest had the lowest rates of all groups. Overall, the results suggest the ACT method for identifying STEM-interested students is valid and can be helpful for predicting whether students will pursue and graduate with STEM-related majors in college.

Figure 1: Percentage of Students with STEM College Majors by STEM Interest Group and Time Period



The ACT Definition of STEM

To create our STEM categories, we used our list of occupations and majors to define four key areas: Science, Computer Science and Mathematics, Medical and Health, and Engineering and Technology. This report will show achievement levels and trend data in each of those areas on a national level. In addition, the actual number and percentage of students interested in specific majors and occupations are provided. As the percentage of high school graduates taking the ACT continues to grow, these data present an excellent opportunity for state officials to document success of STEM initiatives within their state in an attempt to meet the goal of generating interest and more thoroughly preparing students for STEM fields.

Key Findings

from the National *Condition of STEM 2016* Report

- Students with an interest in STEM continue to show higher levels of college readiness than ACT-tested students as a whole.
- Approximately half of ACT-tested US graduates in the class of 2016 have expressed interest in STEM majors and careers. The level of interest has stayed steady over the last five years.
- Average ACT math scores have stayed flat between 2012 and 2016 for students meeting the ACT STEM Benchmark. In contrast, the average ACT science score has gone up among those meeting the ACT STEM Benchmark over the same timeframe. The scores steadily increased from 27.9 to 28.6 since 2012 (see Table 1.6 of the 2016 national ACT profile report at: www.act.org/research/np16).
- Over 1 million ACT-tested students demonstrated an interest in STEM in the 2016 graduating class.
- Only 1,258 students out of the nearly 2.1 million tested students—less than 1% of the total—had an expressed and measured interest in teaching math or science.
- Students demonstrating only one type of STEM interest, either expressed or measured, fall far short in terms of benchmark attainment and preparedness for STEM majors and careers when compared to peers who have both expressed and measured interest.
- Underserved learners have a high interest in STEM, but ACT STEM Benchmark attainment lags far behind their peers, especially for those students with more than one of the underserved characteristics used in this report.

ACT STEM Benchmark

To provide students and educators with more insight into the critical aspects of college readiness, ACT introduced a STEM score on ACT student score reports in fall 2015. This score is derived from the ACT mathematics and science scores and represents students' overall performance in these subject areas. For the 2016–17 academic year, students, parents, and educators will also note that the ACT College Readiness Benchmark in STEM has been added to the ACT score report. The ACT STEM Benchmark is based on recent research indicating that academic readiness for students pursuing a STEM major may require higher scores than the current ACT College Readiness Benchmarks in math and science (Mattern, Radunzel, & Westrick, 2015).

The ACT STEM Benchmark was developed using the same methodology as each single subject area ACT College Readiness Benchmark. Typical grades in first-year college STEM courses (calculus, general biology, general chemistry, and physics) were combined in a single course success model to determine the ACT STEM score associated with a 50% chance of earning a B or higher and about a 75% chance of earning a C or higher in those courses. The resulting ACT STEM Benchmark is 26. Based on that benchmark, only 20% of students in the 2016 ACT-tested high school graduating class were ready for first-year STEM college courses.

ACT STEM scores are related not only to succeeding in individual math and science courses, but also to achieving longer-term outcomes. Mattern et al. (2015) showed that students pursuing STEM majors who met the ACT STEM Benchmark were more likely to earn a cumulative grade point average of 3.0 or higher, persist in a STEM major, and earn a STEM-related bachelor's degree than those who failed to meet the benchmark. Additionally, ongoing research suggests that providing STEM readiness information to prospective students may help to facilitate the transition to college by aligning students' expectations with course demands.

Ohio STEM Report

Attainment of College and Career Readiness

Overall STEM Interest

- Between 2012 and 2016, the percent of students interested in STEM increased by 1%.

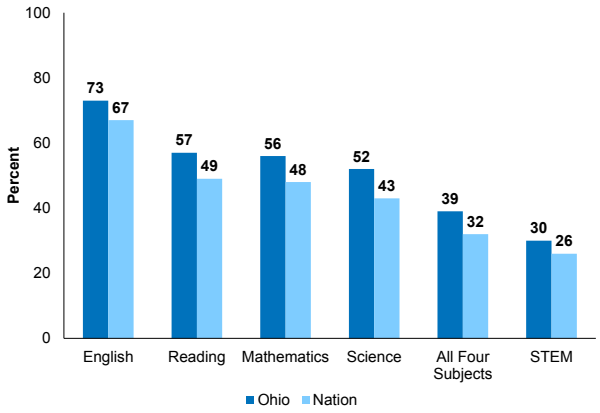
Student STEM Interest Trends: 2012–2016, State vs. National

		2012	2013	2014	2015	2016
Percent	Ohio	49%	49%	49%	49%	50%
	National	48%	48%	49%	49%	48%
N Count	Ohio	45,206	45,356	45,001	45,065	46,441
	National	804,507	868,194	899,684	939,049	1,009,232

Overall STEM Interest

- 46,441 of your graduates have an interest in STEM.

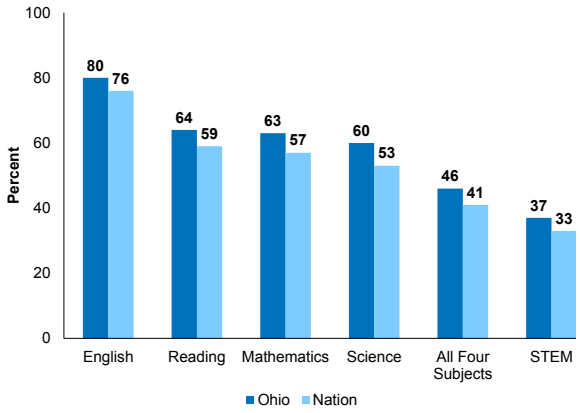
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks



Expressed and Measured Interest

- 16,952 of your graduates have an expressed and measured interest in STEM, which is 37% of the overall interest.

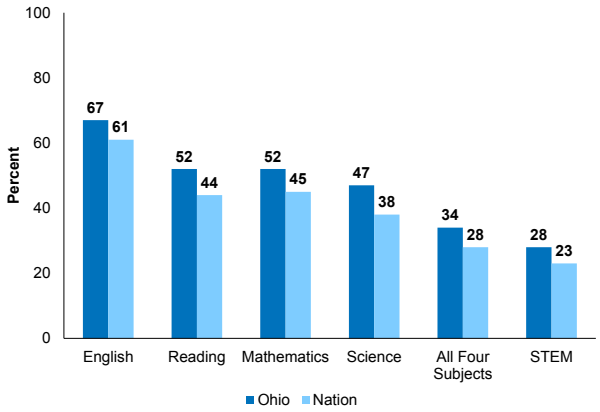
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks



Expressed Interest Only

- 20,820 of your graduates have an expressed interest in STEM, which is 45% of the overall interest.

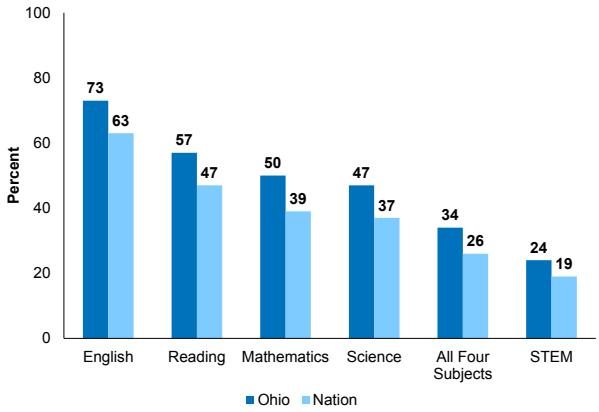
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks



Measured Interest Only

- 8,669 of your graduates have a measured interest in STEM, which is 19% of the overall interest.

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks



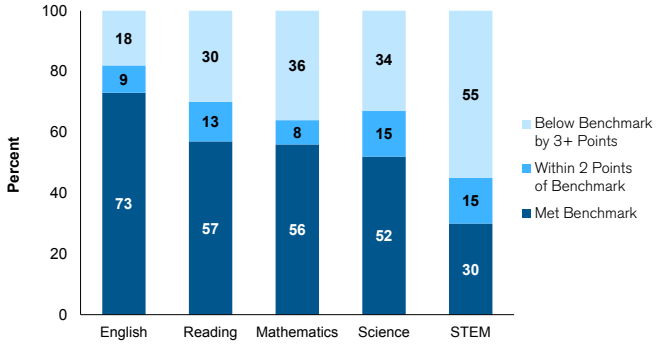
Note: Percents in this report may not sum to 100% due to rounding.

Ohio STEM Report

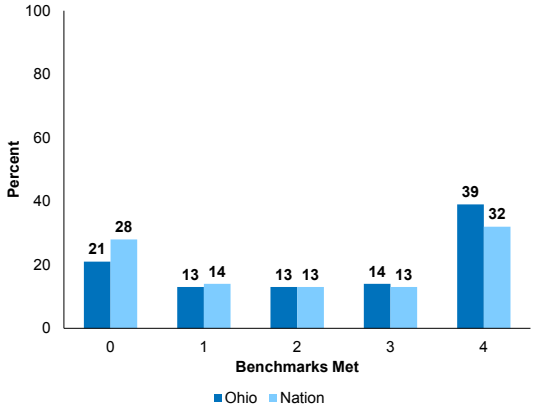
Attainment of College and Career Readiness

Overall STEM Interest (*N* = 46,441)

Percent of 2016 ACT-Tested High School Graduates by ACT College Readiness and STEM Benchmark Attainment

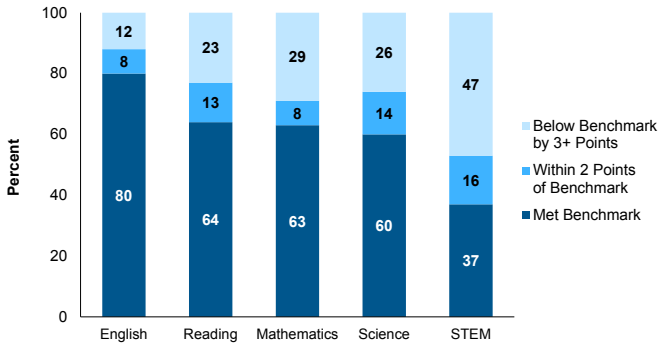


Percent of 2016 ACT-Tested High School Graduates by Number of ACT College Readiness Benchmarks Attained

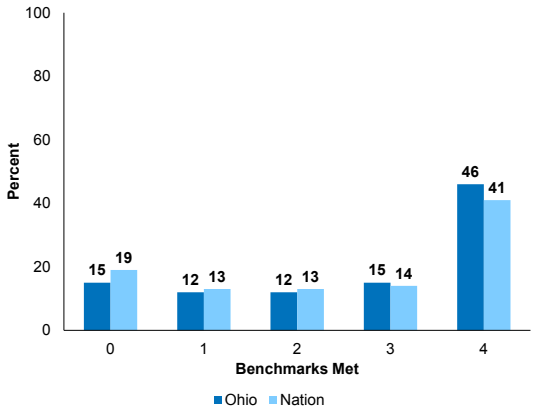


Expressed and Measured Interest (*N* = 16,952)

Percent of 2016 ACT-Tested High School Graduates by ACT College Readiness and STEM Benchmark Attainment



Percent of 2016 ACT-Tested High School Graduates by Number of ACT College Readiness Benchmarks Attained

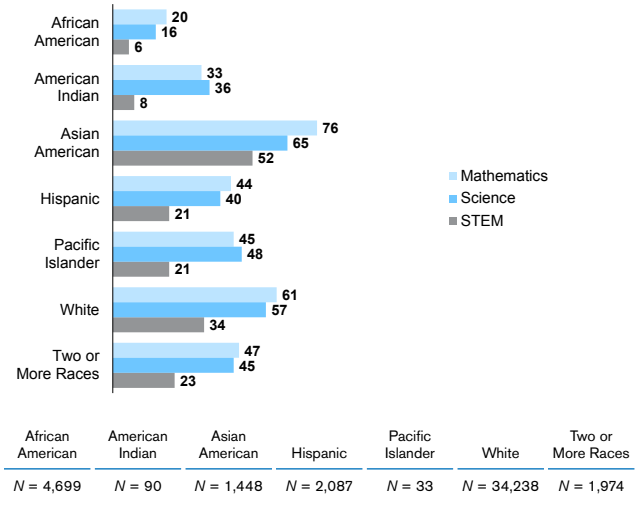


Ohio STEM Report

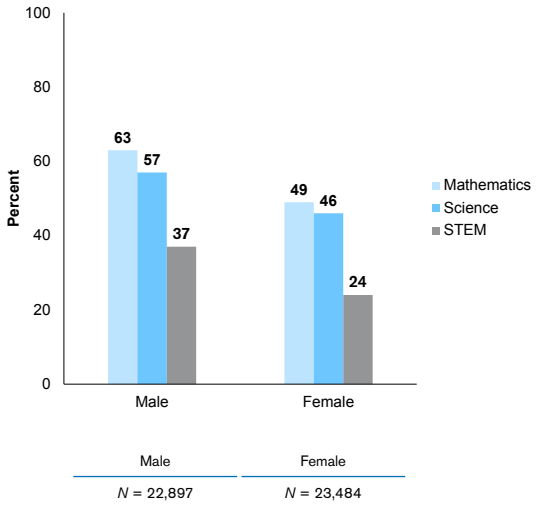
Attainment of College and Career Readiness

Overall STEM Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Race/Ethnicity

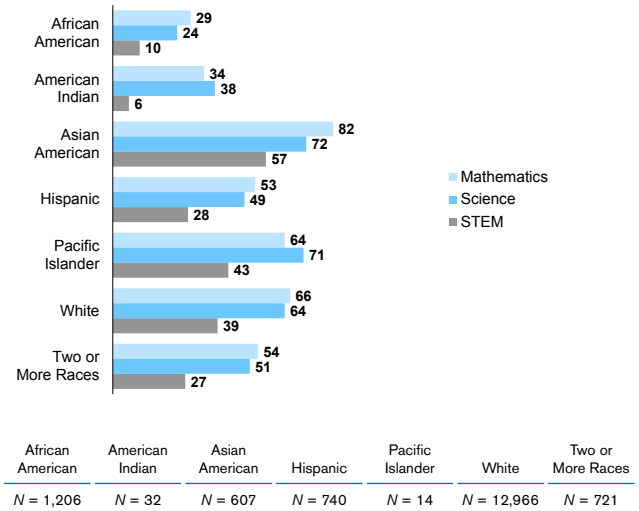


Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Gender

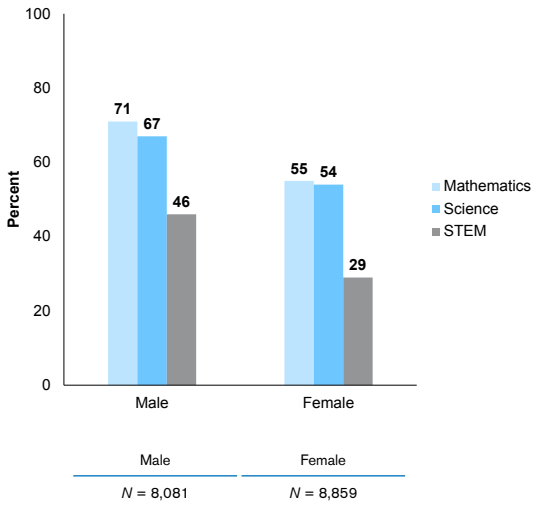


Expressed and Measured Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Race/Ethnicity



Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Gender

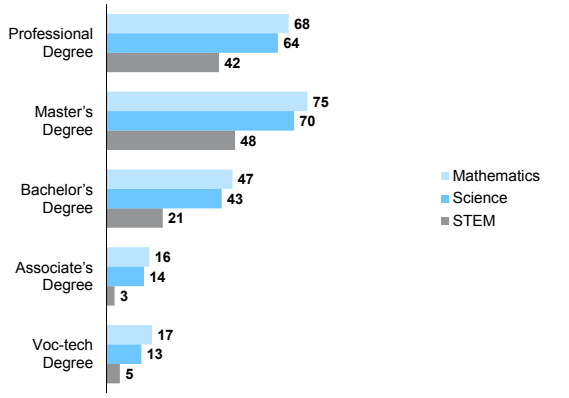


Ohio STEM Report

Attainment of College and Career Readiness

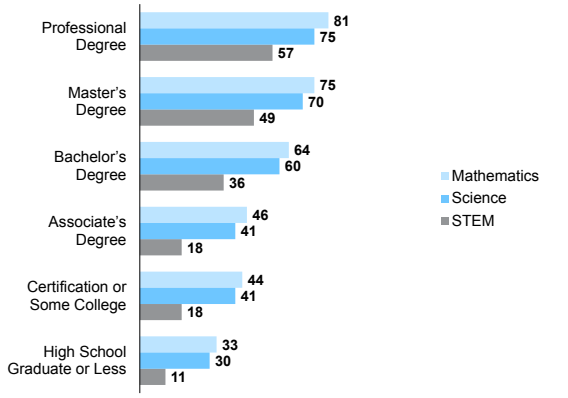
Overall STEM Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Educational Aspirations



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Voc-tech Degree
N = 12,696	*N* = 6,968	*N* = 22,870	*N* = 1,419	*N* = 306

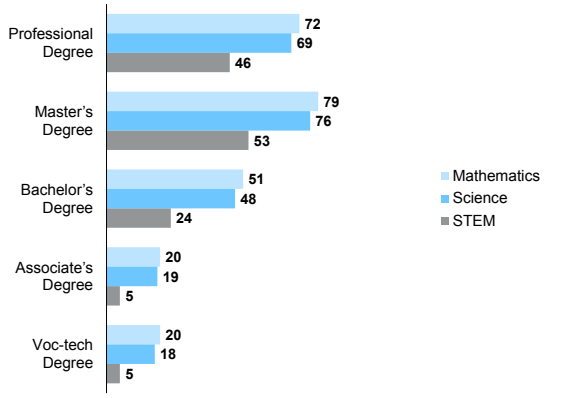
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Highest Parental Education Level



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Certification or Some College	High School Grad or Less
N = 3,071	*N* = 6,971	*N* = 12,057	*N* = 5,594	*N* = 7,203	*N* = 7,133

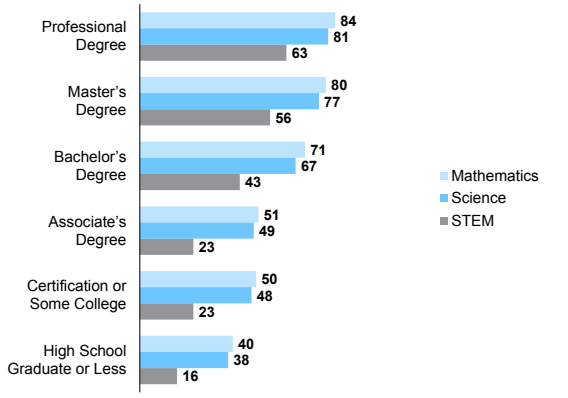
Expressed and Measured Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Educational Aspirations



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Voc-tech Degree
N = 6,566	*N* = 2,695	*N* = 6,963	*N* = 364	*N* = 55

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Highest Parental Education Level



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Certification or Some College	High School Grad or Less
N = 1,364	*N* = 2,917	*N* = 4,689	*N* = 2,059	*N* = 2,715	*N* = 2,454

Science

Majors/Occupations

Overall STEM Interest

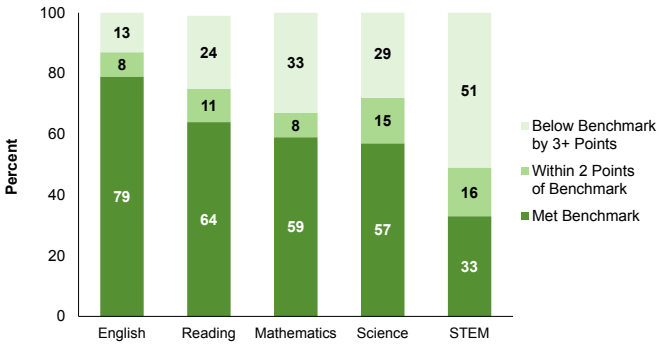
- Between 2012 and 2016, the percent of students interested in STEM increased by 1%.

Student STEM Interest Trends: 2012–2016, State vs. National

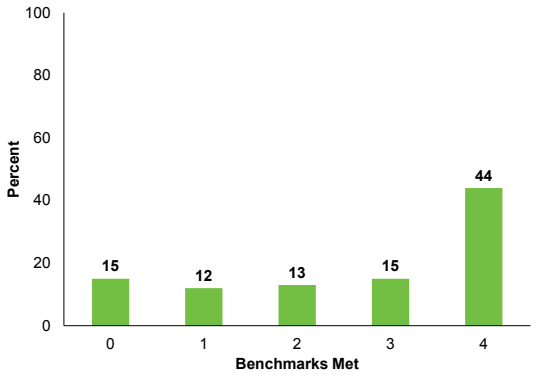
		2012	2013	2014	2015	2016
Percent	Ohio	21%	21%	22%	22%	22%
	National	23%	22%	22%	22%	22%
N Count	Ohio	9,669	9,719	9,801	9,689	10,092
	National	183,857	195,098	200,461	208,520	223,943

Overall STEM Interest (*N* = 10,092)

Percent of 2016 ACT-Tested High School Graduates by ACT College Readiness and STEM Benchmark Attainment

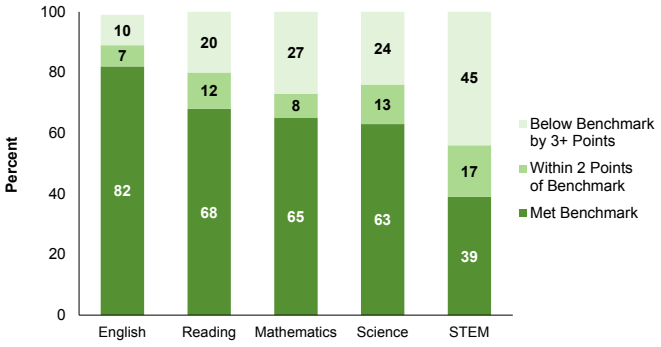


Percent of 2016 ACT-Tested High School Graduates by Number of ACT College Readiness Benchmarks Attained

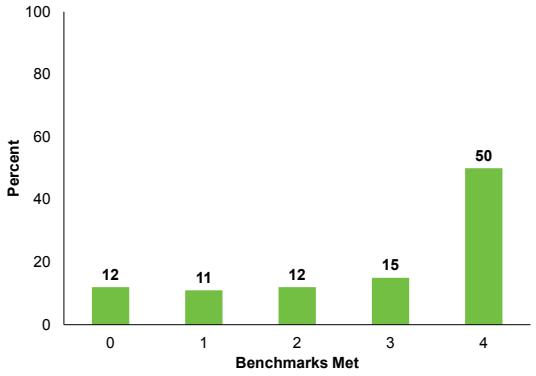


Expressed and Measured Interest (*N* = 4,564)

Percent of 2016 ACT-Tested High School Graduates by ACT College Readiness and STEM Benchmark Attainment



Percent of 2016 ACT-Tested High School Graduates by Number of ACT College Readiness Benchmarks Attained



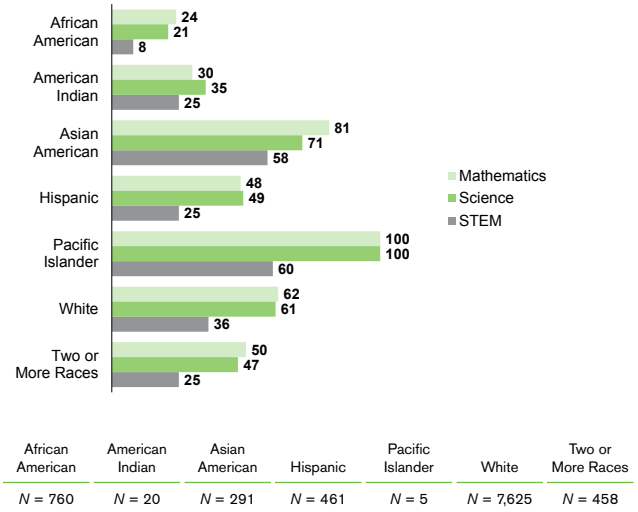
Note: Reporting achievement by combinations of student characteristics may give rise to small *N* counts. As a result, outcomes reported in this section should be interpreted with caution.

Science

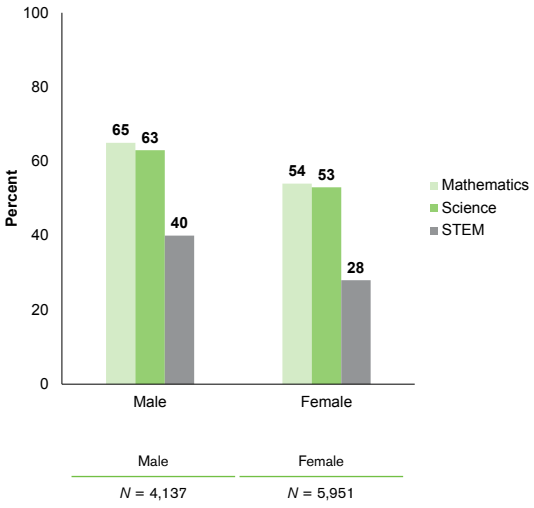
Majors/Occupations

Overall STEM Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Race/Ethnicity

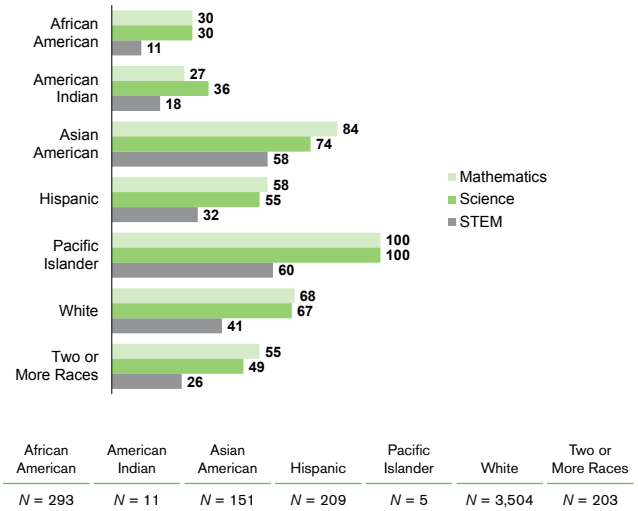


Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Gender

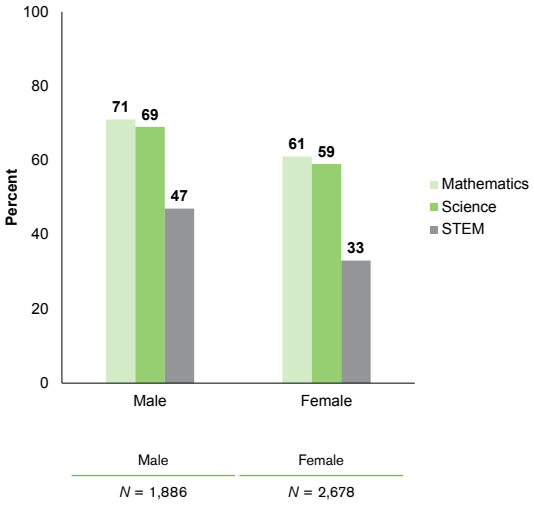


Expressed and Measured Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Race/Ethnicity



Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Gender



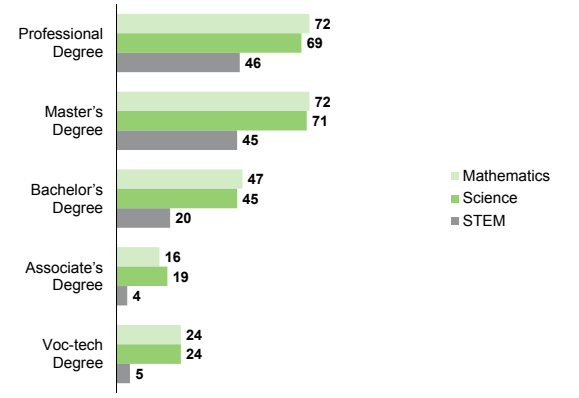
Note: Reporting achievement by combinations of student characteristics may give rise to small *N* counts. As a result, outcomes reported in this section should be interpreted with caution.

Science

Majors/Occupations

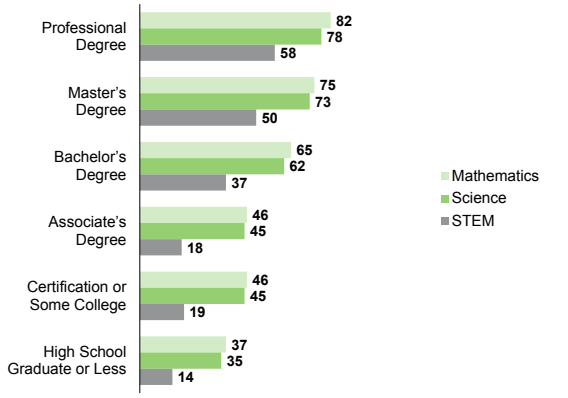
Overall STEM Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Educational Aspirations



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Voc-tech Degree
N = 3,517	*N* = 1,474	*N* = 4,359	*N* = 240	*N* = 41

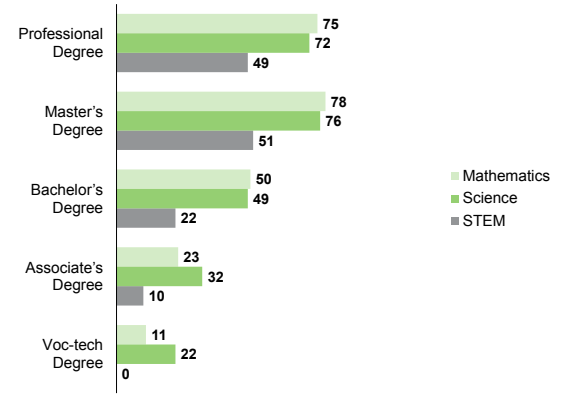
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Highest Parental Education Level



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Certification or Some College	High School Grad or Less
N = 839	*N* = 1,663	*N* = 2,708	*N* = 1,127	*N* = 1,470	*N* = 1,393

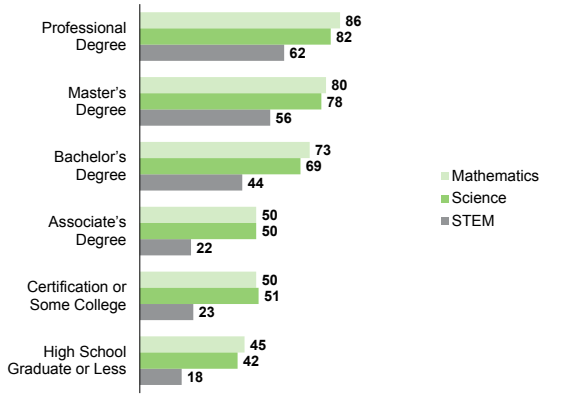
Expressed and Measured Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Educational Aspirations



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Voc-tech Degree
N = 2,056	*N* = 684	*N* = 1,638	*N* = 73	*N* = 9

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Highest Parental Education Level



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Certification or Some College	High School Grad or Less
N = 412	*N* = 828	*N* = 1,284	*N* = 515	*N* = 696	*N* = 619

Note: Reporting achievement by combinations of student characteristics may give rise to small *N* counts. As a result, outcomes reported in this section should be interpreted with caution.

Science

Majors/Occupations

Science Majors/Occupations	Ohio *N* Counts and Percents			
	Overall STEM Interest*		Expressed and Measured	
	N Count	Percent	*N* Count	Percent
Agronomy and Crop Science	57	1	21	0
Animal Sciences	359	5	127	3
Astronomy	216	3	170	4
Atmospheric Sciences and Meteorology	99	1	54	1
Biochemistry and Biophysics	850	12	578	13
Biology, General	1,342	19	865	19
Cell/Cellular Biology	377	5	252	6
Chemistry	698	10	476	10
Ecology	106	1	69	2
Environmental Science	109	2	59	1
Food Sciences and Technology	39	1	16	0
Forestry	49	1	19	0
Genetics	268	4	172	4
Geological and Earth Sciences	159	2	107	2
Horticulture Science	25	0	12	0
Marine/Aquatic Biology	625	9	435	10
Microbiology and Immunology	191	3	132	3
Natural Resources Conservation, General	45	1	18	0
Natural Resources Management	35	0	11	0
Physical Sciences, General	239	3	133	3
Physics	276	4	196	4
Science Education	74	1	54	1
Wildlife and Wildlands Management	133	2	62	1
Zoology	858	12	526	12
Totals	7,229		4,564	

* The "overall STEM interest" counts and percents do not include the "measured only interest" students, as they did not choose a STEM major or occupation.

Computer Science and Mathematics

Majors/Occupations

Overall STEM Interest

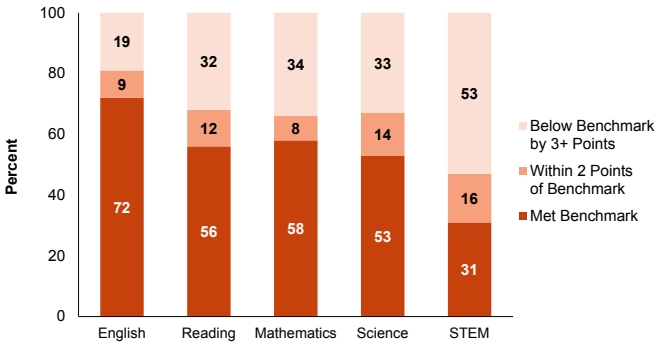
- Between 2012 and 2016, the percent of students interested in STEM increased by 2%.

Student STEM Interest Trends: 2012–2016, State vs. National

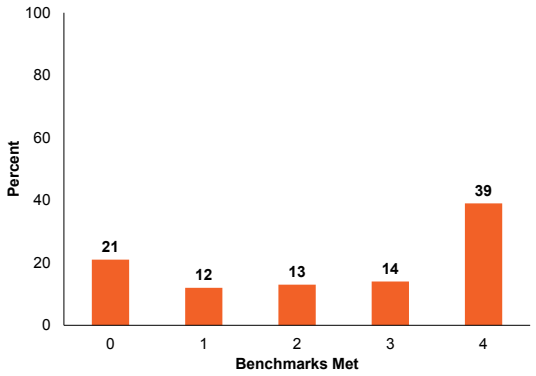
		2012	2013	2014	2015	2016
Percent	Ohio	10%	10%	10%	11%	12%
	National	9%	9%	10%	11%	12%
N Count	Ohio	4,487	4,687	4,702	4,967	5,489
	National	74,959	82,197	89,755	101,144	117,086

Overall STEM Interest (*N* = 5,489)

Percent of 2016 ACT-Tested High School Graduates by ACT College Readiness and STEM Benchmark Attainment

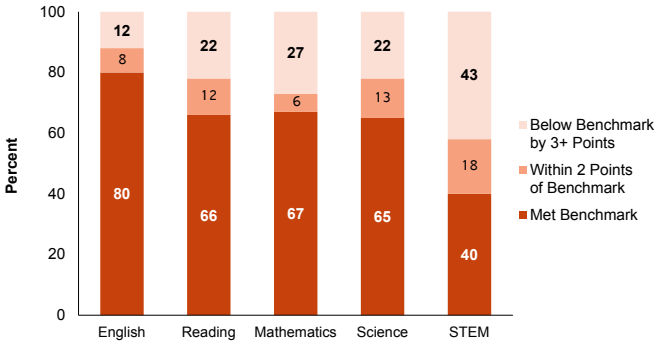


Percent of 2016 ACT-Tested High School Graduates by Number of ACT College Readiness Benchmarks Attained

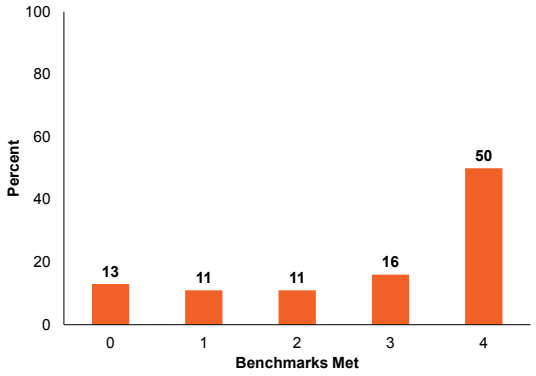


Expressed and Measured Interest (*N* = 1167)

Percent of 2016 ACT-Tested High School Graduates by ACT College Readiness and STEM Benchmark Attainment



Percent of 2016 ACT-Tested High School Graduates by Number of ACT College Readiness Benchmarks Attained



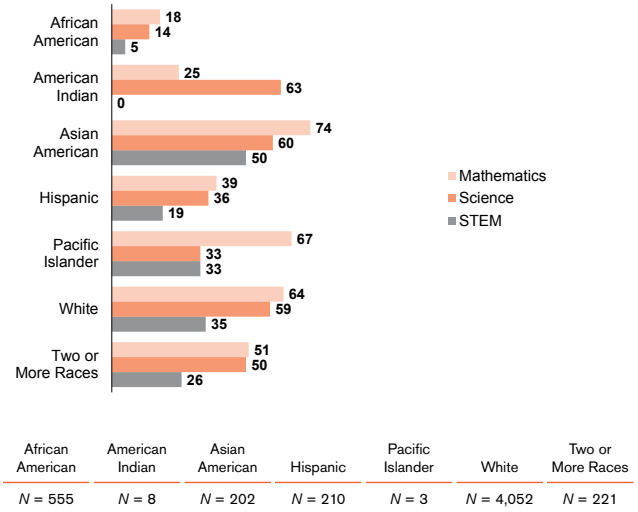
Note: Reporting achievement by combinations of student characteristics may give rise to small *N* counts. As a result, outcomes reported in this section should be interpreted with caution.

Computer Science and Mathematics

Majors/Occupations

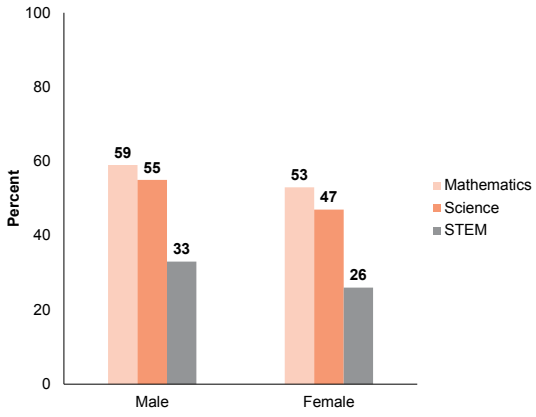
Overall STEM Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Race/Ethnicity



African American	American Indian	Asian American	Hispanic	Pacific Islander	White	Two or More Races
N = 555	*N* = 8	*N* = 202	*N* = 210	*N* = 3	*N* = 4,052	*N* = 221

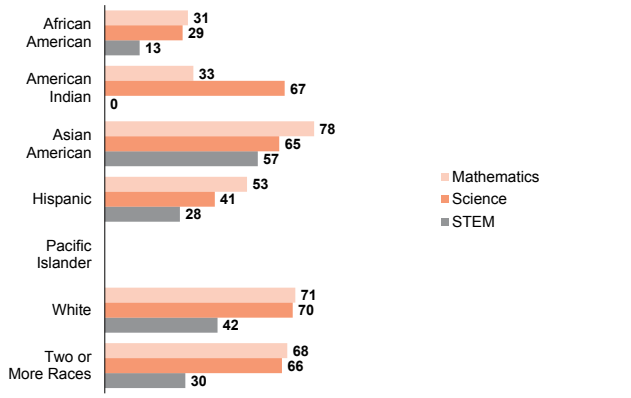
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Gender



Male	Female
N = 4,039	*N* = 1,440

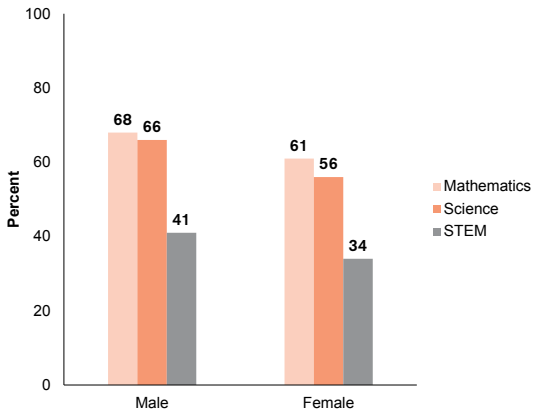
Expressed and Measured Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Race/Ethnicity



African American	American Indian	Asian American	Hispanic	Pacific Islander	White	Two or More Races
N = 84	*N* = 3	*N* = 49	*N* = 32	*N* = 0	*N* = 891	*N* = 56

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Gender



Male	Female
N = 1,033	*N* = 132

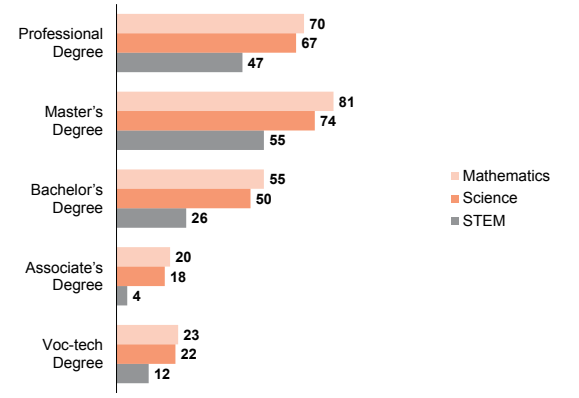
Note: Reporting achievement by combinations of student characteristics may give rise to small *N* counts. As a result, outcomes reported in this section should be interpreted with caution.

Computer Science and Mathematics

Majors/Occupations

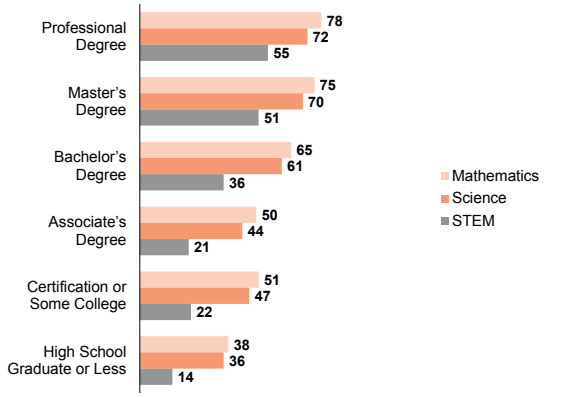
Overall STEM Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Educational Aspirations



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Voc-tech Degree
N = 539	*N* = 805	*N* = 3,529	*N* = 210	*N* = 78

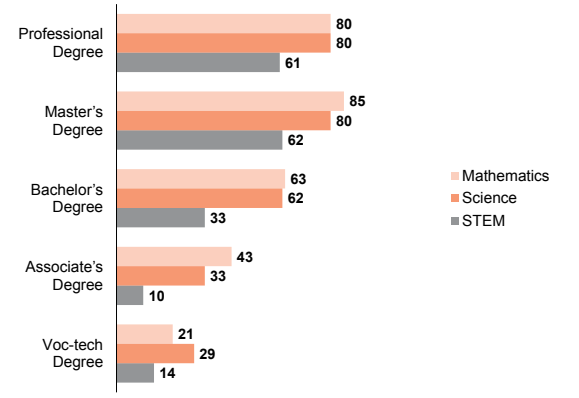
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Highest Parental Education Level



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Certification or Some College	High School Grad or Less
N = 333	*N* = 765	*N* = 1,390	*N* = 629	*N* = 847	*N* = 867

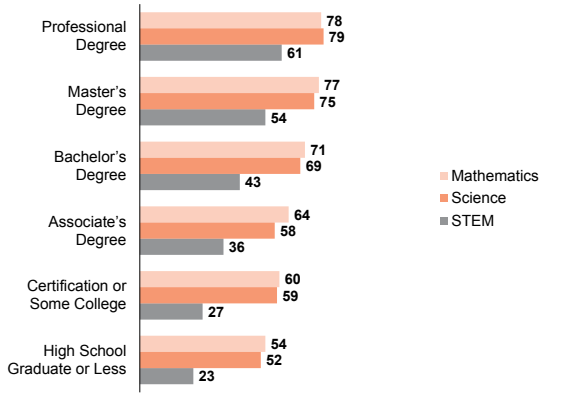
Expressed and Measured Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Educational Aspirations



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Voc-tech Degree
N = 143	*N* = 183	*N* = 767	*N* = 30	*N* = 14

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Highest Parental Education Level



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Certification or Some College	High School Grad or Less
N = 99	*N* = 190	*N* = 325	*N* = 129	*N* = 200	*N* = 173

Note: Reporting achievement by combinations of student characteristics may give rise to small *N* counts. As a result, outcomes reported in this section should be interpreted with caution.

Computer Science and Mathematics

Majors/Occupations

Computer Science and Mathematics Majors/Occupations	Ohio *N* Counts and Percents			
	Overall STEM Interest*		Expressed and Measured	
	N Count	Percent	*N* Count	Percent
Actuarial Science	71	2	11	1
Applied Mathematics	134	3	33	3
Business/Management Quantitative Methods, General	317	7	28	2
Computer and Information Sciences, General	376	9	107	9
Computer Network/Telecommunications	282	7	88	8
Computer Science and Programming	1,683	39	624	53
Computer Software and Media Application	457	11	128	11
Computer System Administration	118	3	29	2
Data Management Technology	36	1	7	1
Information Science	70	2	17	1
Management Information Systems	120	3	11	1
Mathematics Education	249	6	21	2
Mathematics, General	139	3	23	2
Statistics	95	2	16	1
Webpage Design	114	3	24	2
Totals	4,261		1,167	

* The "overall STEM interest" counts and percents do not include the "measured only interest" students, as they did not choose a STEM major or occupation.

Medical and Health

Majors/Occupations

Overall STEM Interest

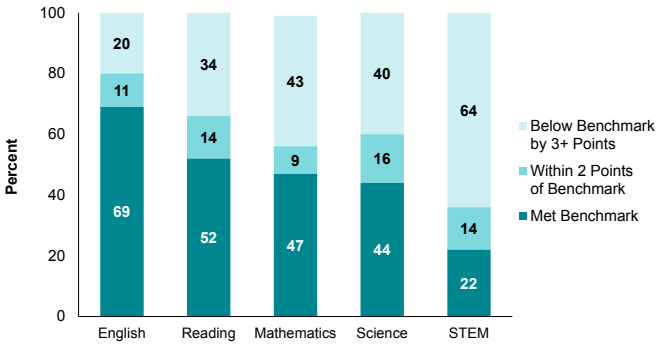
- Between 2012 and 2016, the percent of students interested in STEM decreased by 5%.

Student STEM Interest Trends: 2012–2016, State vs. National

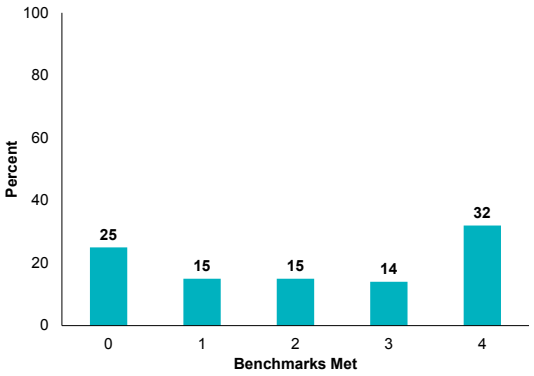
		2012	2013	2014	2015	2016
Percent	Ohio	47%	46%	44%	43%	42%
	National	45%	44%	43%	42%	41%
N Count	Ohio	21,152	20,766	19,990	19,494	19,628
	National	361,047	383,555	388,653	393,085	411,038

Overall STEM Interest (*N* = 19,628)

Percent of 2016 ACT-Tested High School Graduates by ACT College Readiness and STEM Benchmark Attainment

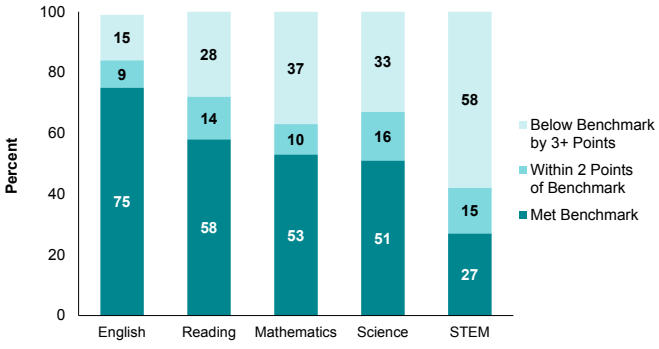


Percent of 2016 ACT-Tested High School Graduates by Number of ACT College Readiness Benchmarks Attained

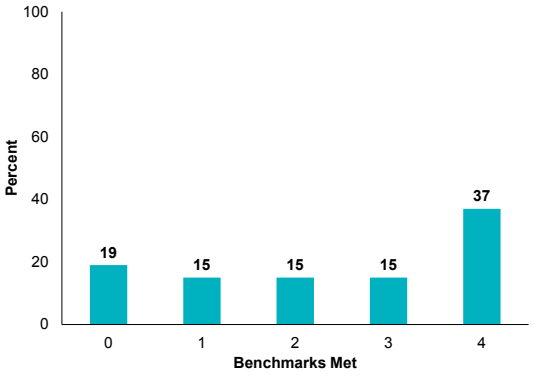


Expressed and Measured Interest (*N* = 7,354)

Percent of 2016 ACT-Tested High School Graduates by ACT College Readiness and STEM Benchmark Attainment



Percent of 2016 ACT-Tested High School Graduates by Number of ACT College Readiness Benchmarks Attained



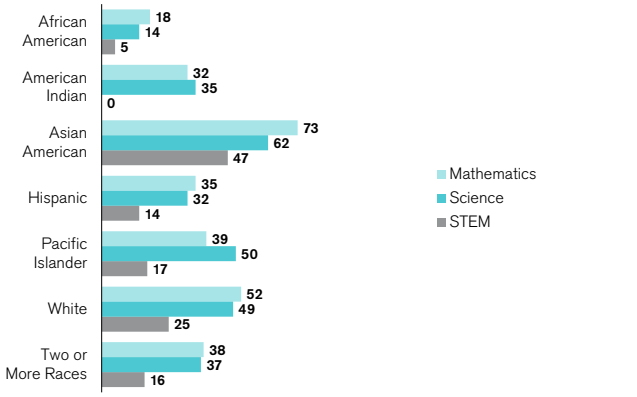
Note: Reporting achievement by combinations of student characteristics may give rise to small *N* counts. As a result, outcomes reported in this section should be interpreted with caution.

Medical and Health

Majors/Occupations

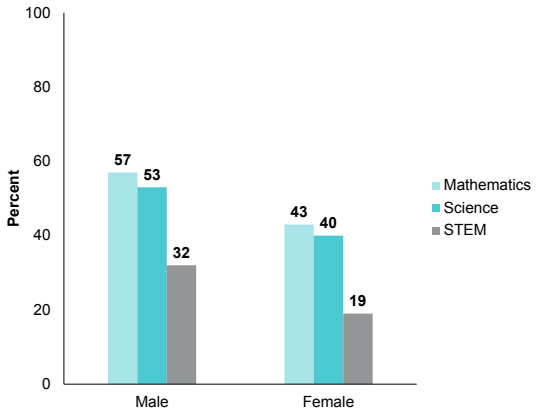
Overall STEM Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Race/Ethnicity



African American	American Indian	Asian American	Hispanic	Pacific Islander	White	Two or More Races
N = 2,260	*N* = 37	*N* = 575	*N* = 921	*N* = 18	*N* = 14,277	*N* = 887

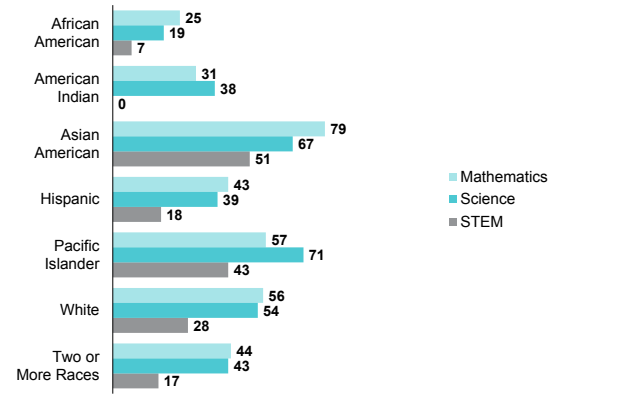
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Gender



Male	Female
N = 5,757	*N* = 13,842

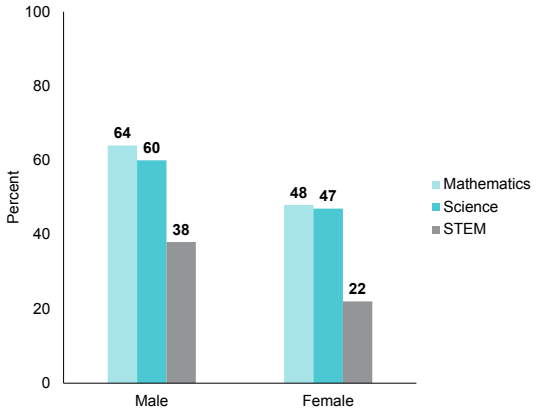
Expressed and Measured Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Race/Ethnicity



African American	American Indian	Asian American	Hispanic	Pacific Islander	White	Two or More Races
N = 611	*N* = 13	*N* = 263	*N* = 330	*N* = 7	*N* = 5,567	*N* = 321

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Gender



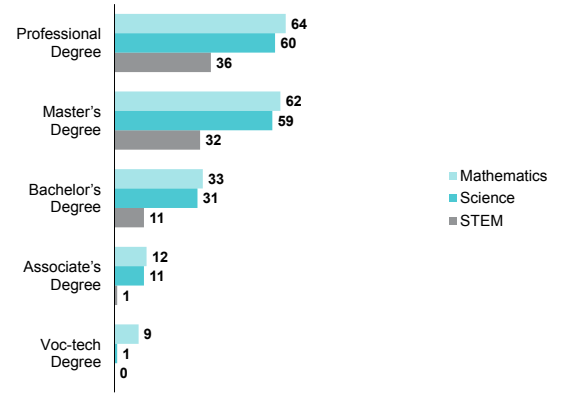
Male	Female
N = 2,054	*N* = 5,295

Medical and Health

Majors/Occupations

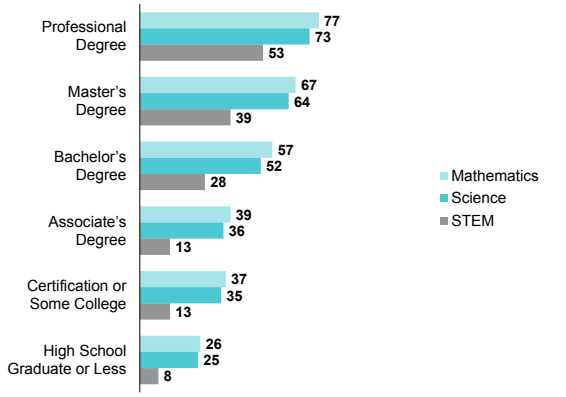
Overall STEM Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Educational Aspirations



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Voc-tech Degree
N = 7,156	*N* = 2,382	*N* = 8,616	*N* = 624	*N* = 67

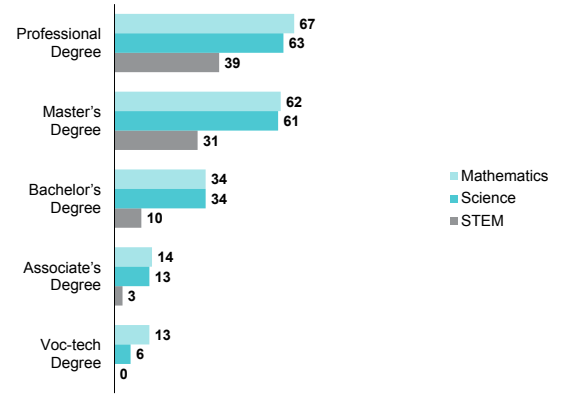
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Highest Parental Education Level



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Certification or Some College	High School Grad or Less
N = 1,164	*N* = 2,599	*N* = 4,835	*N* = 2,606	*N* = 3,318	*N* = 3,405

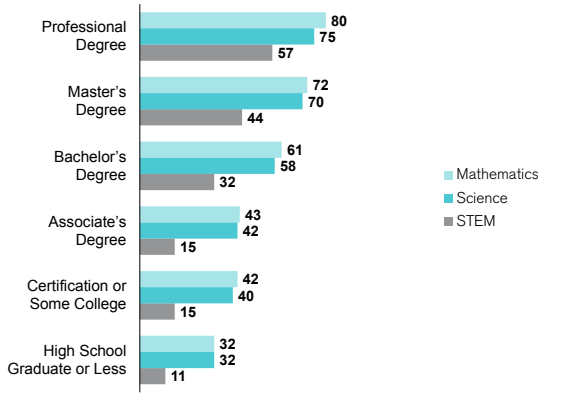
Expressed and Measured Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Educational Aspirations



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Voc-tech Degree
N = 3,629	*N* = 799	*N* = 2,613	*N* = 198	*N* = 16

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Highest Parental Education Level



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Certification or Some College	High School Grad or Less
N = 513	*N* = 1,059	*N* = 1,910	*N* = 995	*N* = 1,295	*N* = 1,271

Note: Reporting achievement by combinations of student characteristics may give rise to small *N* counts. As a result, outcomes reported in this section should be interpreted with caution.

Medical and Health

Majors/Occupations

Medical and Health Majors/Occupations	Ohio *N* Counts and Percents			
	Overall STEM Interest*		Expressed and Measured	
	N Count	Percent	*N* Count	Percent
Athletic Training	1,343	8	376	5
Chiropractic (Pre-Chiropractic)	79	0	31	0
Dentistry (Pre-Dentistry)	503	3	205	3
Emergency Medical Technology	186	1	77	1
Food and Nutrition	96	1	20	0
Health/Medical Technology, General	505	3	233	3
Medical Laboratory Technology	126	1	71	1
Medical Radiologic Technology	579	4	224	3
Medicine (Pre-Medicine)	3,389	21	2,060	28
Nuclear Medicine Technology	38	0	14	0
Nursing, Practical/Vocational (LPN)	434	3	162	2
Nursing, Registered (BS/RN)	4,603	28	1,909	26
Optometry (Pre-Optometry)	117	1	49	1
Osteopathic Medicine	23	0	7	0
Pharmacy (Pre-Pharmacy)	871	5	446	6
Physical Therapy (Pre-Physical Therapy)	1,669	10	592	8
Physician Assisting	380	2	192	3
Respiratory Therapy Technology	49	0	15	0
Surgical Technology	299	2	176	2
Veterinarian Assisting/Technology	165	1	62	1
Veterinary Medicine (Pre-Vet)	806	5	433	6
Totals	16,260		7,354	

* The "overall STEM interest" counts and percents do not include the "measured only interest" students, as they did not choose a STEM major or occupation.

Engineering and Technology

Majors/Occupations

Overall STEM Interest

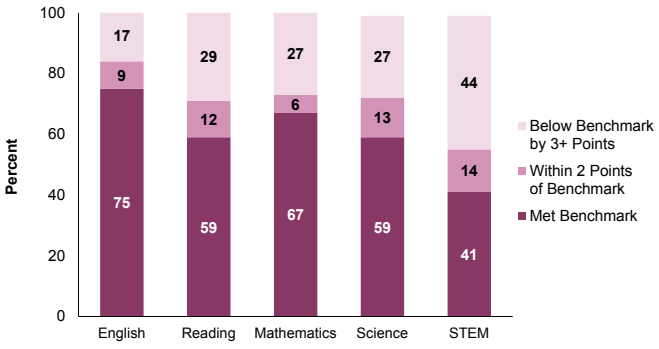
- Between 2012 and 2016, the percent of students interested in STEM increased by 2%.

Student STEM Interest Trends: 2012–2016, State vs. National

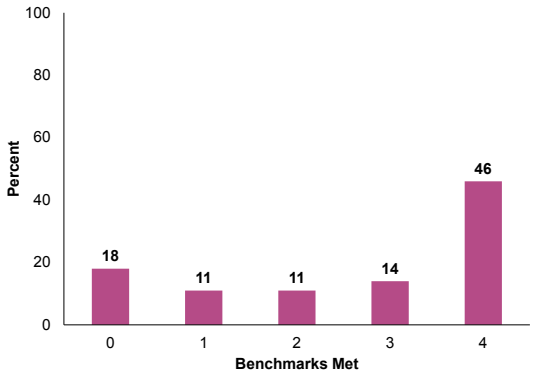
		2012	2013	2014	2015	2016
Percent	Ohio	22%	22%	23%	24%	24%
	National	23%	24%	25%	25%	25%
N Count	Ohio	9,898	10,184	10,508	10,915	11,232
	National	184,644	207,344	220,815	236,300	257,164

Overall STEM Interest (*N* = 11,232)

Percent of 2016 ACT-Tested High School Graduates by ACT College Readiness and STEM Benchmark Attainment

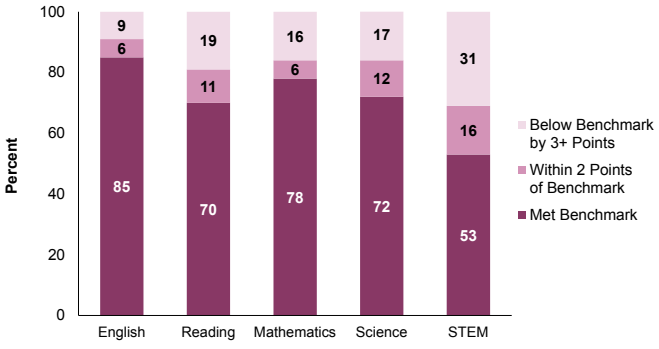


Percent of 2016 ACT-Tested High School Graduates by Number of ACT College Readiness Benchmarks Attained

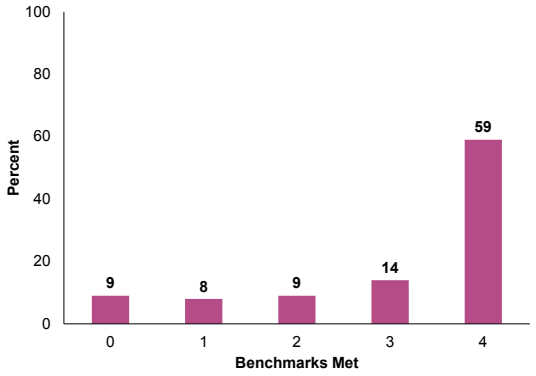


Expressed and Measured Interest (*N* = 3,867)

Percent of 2016 ACT-Tested High School Graduates by ACT College Readiness and STEM Benchmark Attainment



Percent of 2016 ACT-Tested High School Graduates by Number of ACT College Readiness Benchmarks Attained



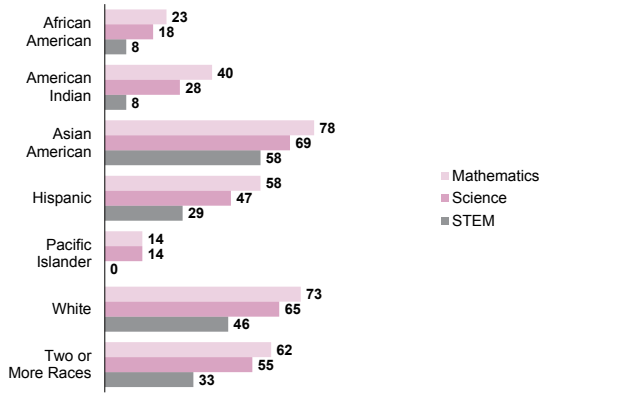
Note: Reporting achievement by combinations of student characteristics may give rise to small *N* counts. As a result, outcomes reported in this section should be interpreted with caution.

Engineering and Technology

Majors/Occupations

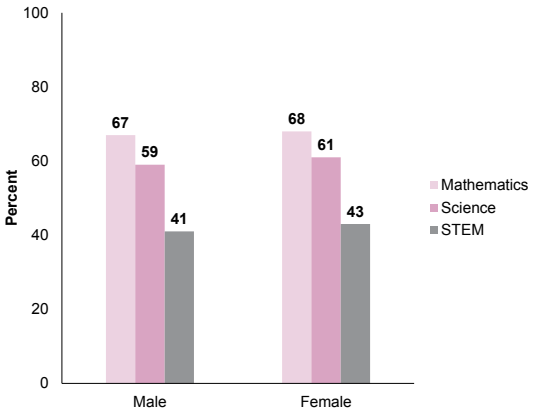
Overall STEM Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Race/Ethnicity



African American	American Indian	Asian American	Hispanic	Pacific Islander	White	Two or More Races
N = 1,124	*N* = 25	*N* = 380	*N* = 495	*N* = 7	*N* = 8,284	*N* = 408

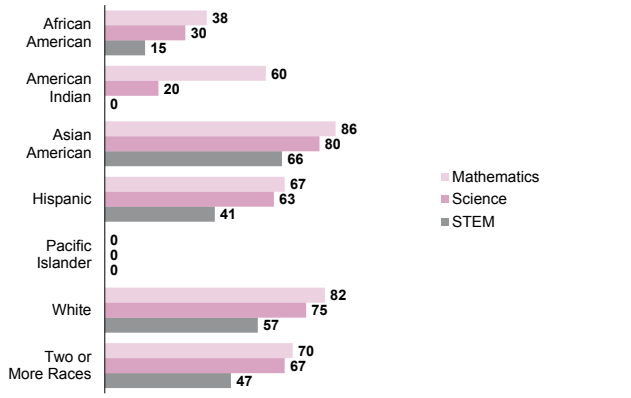
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Gender



Male	Female
N = 8,964	*N* = 2,251

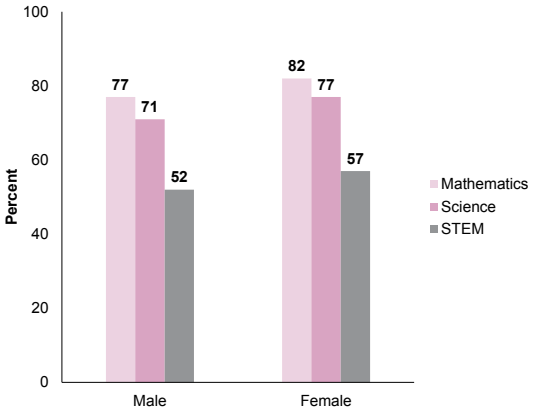
Expressed and Measured Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Race/Ethnicity



African American	American Indian	Asian American	Hispanic	Pacific Islander	White	Two or More Races
N = 218	*N* = 5	*N* = 144	*N* = 169	*N* = 2	*N* = 3,004	*N* = 141

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Gender



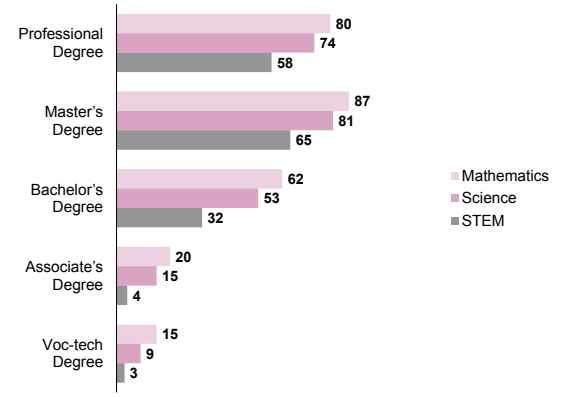
Male	Female
N = 3,108	*N* = 754

Engineering and Technology

Majors/Occupations

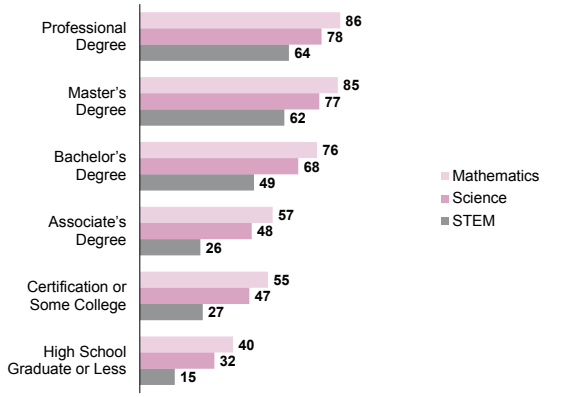
Overall STEM Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Educational Aspirations



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Voc-tech Degree
N = 1,484	*N* = 2,307	*N* = 6,366	*N* = 345	*N* = 120

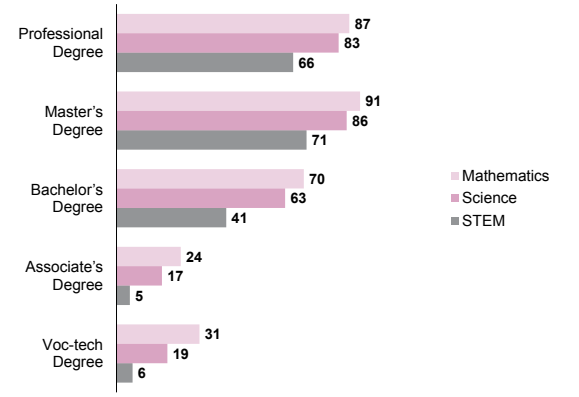
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Highest Parental Education Level



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Certification or Some College	High School Grad or Less
N = 735	*N* = 1,944	*N* = 3,124	*N* = 1,232	*N* = 1,568	*N* = 1,468

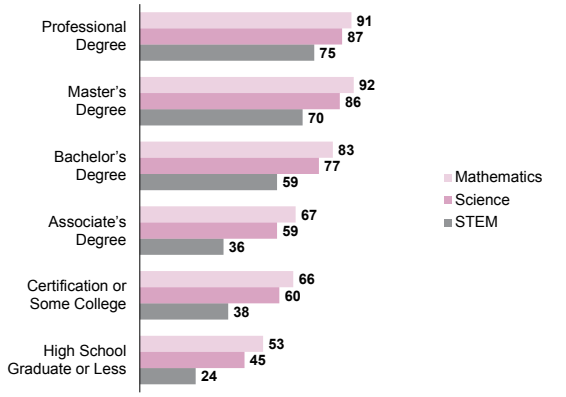
Expressed and Measured Interest

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Educational Aspirations



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Voc-tech Degree
N = 738	*N* = 1,029	*N* = 1,945	*N* = 63	*N* = 16

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Highest Parental Education Level



Professional Degree	Master's Degree	Bachelor's Degree	Associate's Degree	Certification or Some College	High School Grad or Less
N = 340	*N* = 840	*N* = 1,170	*N* = 420	*N* = 524	*N* = 391

Note: Reporting achievement by combinations of student characteristics may give rise to small *N* counts. As a result, outcomes reported in this section should be interpreted with caution.

Engineering and Technology

Majors/Occupations

Engineering and Technology Majors/Occupations	Ohio *N* Counts and Percents			
	Overall STEM Interest*		Expressed and Measured	
	N Count	Percent	*N* Count	Percent
Aeronautical/Aerospace Engineering Technology	83	1	38	1
Aerospace/Aeronautical Engineering	875	9	473	12
Agricultural/Bioengineering	75	1	29	1
Architectural Drafting/CAD Technology	48	0	13	0
Architectural Engineering	262	3	72	2
Architectural Engineering Technology	44	0	13	0
Architecture, General	421	4	73	2
Automotive Engineering Technology	94	1	16	0
Biomedical Engineering	726	7	442	11
Chemical Engineering	923	9	516	13
Civil Engineering	645	6	177	5
Civil Engineering Technology	49	0	17	0
Computer Engineering	769	8	280	7
Computer Engineering Technology	268	3	89	2
Construction Engineering/Management	202	2	25	1
Construction/Building Technology	25	0	3	0
Drafting/CAD Technology, General	41	0	6	0
Electrical, Electronic, and Communication Engineering	661	7	237	6
Electrical/Electronics Engineering Technology	133	1	45	1
Electromechanical/Biomedical Engineering Technology	19	0	10	0
Engineering (Pre-Engineering), General	906	9	332	9
Engineering Technology, General	134	1	46	1
Environmental Control Technologies	6	0	1	0
Environmental Health Engineering	115	1	58	1
Industrial Engineering	115	1	35	1
Industrial Production Technologies	18	0	3	0
Mechanical Drafting/CAD Technology	81	1	24	1
Mechanical Engineering	2,014	20	694	18
Mechanical Engineering Technology	121	1	32	1
Military Technologies	32	0	8	0
Nuclear Engineering	110	1	59	2
Quality Control and Safety Technologies	0	0	0	0
Surveying Technology	7	0	1	0
Totals	10,022		3,867	

* The "overall STEM interest" counts and percents do not include the "measured only interest" students, as they did not choose a STEM major or occupation.

Understanding the Underserved Learner

ACT Benchmark Attainment

In 2013, ACT expanded its *Condition of College & Career Readiness* series to include a special report focused on students who indicated an interest in STEM-related fields. For the past three years, the *Condition of STEM* reports have provided a comprehensive picture of the college readiness levels of those students. To further advance STEM readiness and to honor its commitments to help underserved learners pursue their college and career goals, ACT is providing additional information on the status of underserved ACT-tested graduates in relation to STEM preparation. Historically, access to quality education and career planning opportunities and resources has been hindered for underserved learners. Identifying these students and determining their readiness in math and science could provide them with more opportunities to successfully enter STEM careers and help address the national deficit of skilled STEM workers.

Definition of Underserved Learners

ACT identifies underserved learners using student characteristics that are often related to a lack of access to high-quality educational and career planning opportunities and resources. Specifically, this definition encompasses students who have at least one of the following characteristics.

- Minority: race/ethnicity is African American, American Indian/Alaska Native, Hispanic/Latino, or Native Hawaiian/other Pacific Islander
- Low income: combined parental income is less than or equal to $36,000
- First generation in college: highest parental education level is high school diploma or less

This definition, which is consistent with that used in current research activities and state/federal intervention programs, casts a wide net. We have elected to maintain this broad definition as a means of representing most underserved students.

Impact

As shown in the accompanying graphs, the three characteristics used by ACT to define underserved students appear to have a cumulative suppressing effect on college readiness. In other words, the greater the number of characteristics students have, the lower their math, science, and STEM benchmark attainment rates. In isolation, embodiment of at least one underserved characteristic is associated with lower benchmark attainment rates than STEM students nationwide. Students with one underserved characteristic show STEM readiness rates 24 percentage points lower than those with no characteristics. Among students who met two characteristics, STEM readiness rates dropped another 9 percentage points to 6 percent. Among students exhibiting all three underserved characteristics, only 3 percent met the ACT STEM Benchmark.

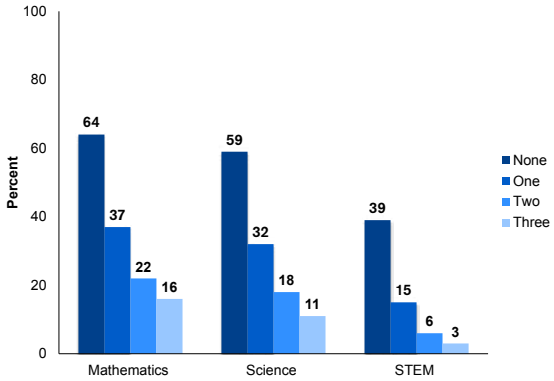
These findings suggest that in order to best help underserved students succeed in STEM-related subjects and fields, we need to better understand the relationships among the defining characteristics and remove the barriers that they create alone and in combination with each other. Working together to remove these barriers is critical to the future success of these students.

Understanding the Underserved Learner

ACT Benchmark Attainment

Overall STEM Interest

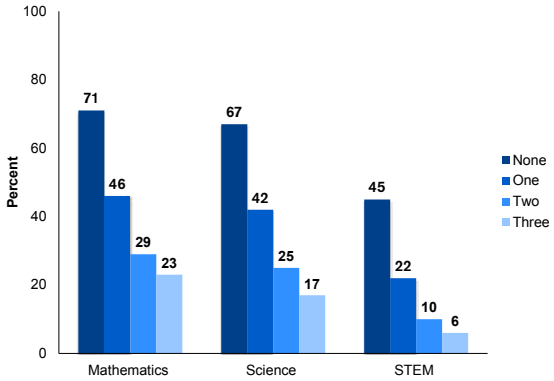
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Number of Underserved Characteristics



None	One	Two	Three
N = 534,401	*N* = 272,058	*N* = 139,985	*N* = 60,627

Expressed and Measured Interest

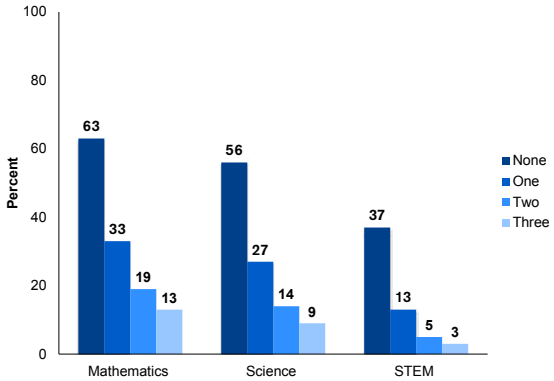
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Number of Underserved Characteristics



None	One	Two	Three
N = 200,876	*N* = 88,723	*N* = 43,744	*N* = 18,021

Expressed Interest Only

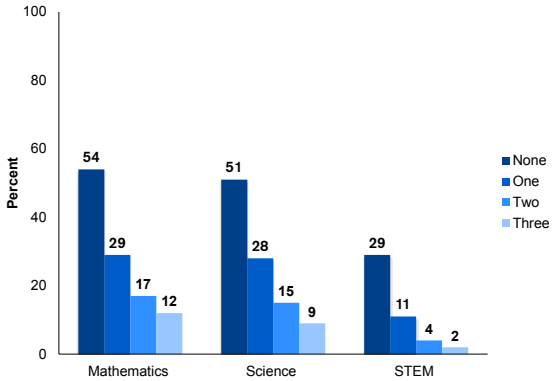
Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Number of Underserved Characteristics



None	One	Two	Three
N = 238,172	*N* = 133,952	*N* = 69,469	*N* = 30,490

Measured Interest Only

Percent of 2016 ACT-Tested High School Graduates Meeting ACT College Readiness and STEM Benchmarks by Number of Underserved Characteristics



None	One	Two	Three
N = 95,353	*N* = 49,383	*N* = 26,772	*N* = 12,116

Note: Reporting achievement by combinations of student characteristics may give rise to small *N* counts. As a result, outcomes reported in this section should be interpreted with caution.

STEM
Interest and Achievement by State

State	Percent of All Graduates Tested*	Percent of All ACT-Tested Graduates Interested in STEM	Percent of STEM Students Meeting Benchmarks				
			English	Reading	Math	Science	STEM
Alabama	100	52	56	38	28	29	14
Colorado	100	44	69	49	49	46	29
Illinois	100	41	71	50	51	45	28
Kentucky	100	48	65	45	37	37	18
Louisiana	100	52	64	40	32	33	14
Michigan	100	47	66	46	44	43	23
Minnesota	100	48	67	51	55	48	30
Mississippi	100	51	52	30	24	23	10
Missouri	100	42	66	47	44	41	22
Montana	100	48	63	47	47	41	22
Nevada	100	40	46	33	30	26	13
North Carolina	100	50	52	37	38	31	17
North Dakota	100	47	63	46	46	41	21
South Carolina	100	48	50	35	31	27	13
Tennessee	100	46	65	44	37	37	18
Utah	100	45	65	48	43	42	22
Wisconsin	100	47	68	48	51	46	26
Wyoming	100	49	64	44	41	39	17
Arkansas	96	48	65	44	39	35	17
Hawaii	94	48	53	35	38	30	16
Nebraska	88	48	73	53	51	48	27
Oklahoma	82	50	66	49	38	37	17
Florida	81	46	60	47	40	36	20
South Dakota	76	54	74	56	58	52	29
Kansas	74	49	73	56	55	49	28
Ohio	73	50	73	57	56	52	30
New Mexico	70	57	56	41	35	32	15
Iowa	68	49	79	60	56	55	31
West Virginia	67	58	70	49	37	37	16
Georgia	60	52	67	49	44	40	23
Arizona	58	48	62	46	47	39	23
Alaska	53	44	64	51	49	41	23

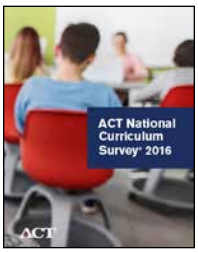
STEM
Interest and Achievement by State

State	Percent of All Graduates Tested*	Percent of All ACT-Tested Graduates Interested in STEM	Percent of STEM Students Meeting Benchmarks				
			English	Reading	Math	Science	STEM
Texas	46	52	61	46	48	40	24
District of Columbia	44	38	65	55	51	48	38
Indiana	41	52	77	60	60	53	33
Idaho	39	55	80	64	61	54	33
Oregon	39	46	73	57	58	50	32
Connecticut	34	47	86	71	73	66	48
California	33	53	75	58	62	50	36
New Jersey	32	46	78	63	68	56	43
Virginia	31	54	80	65	65	59	40
New York	29	50	82	68	73	64	46
Vermont	29	49	83	66	69	61	39
Massachusetts	28	49	87	72	78	66	50
Maryland	27	52	77	63	64	57	41
Washington	25	55	78	65	69	60	43
New Hampshire	23	54	88	70	77	68	49
Pennsylvania	23	54	81	65	68	60	40
Delaware	21	57	81	67	66	57	40
Rhode Island	20	51	83	65	66	60	41
Maine	10	54	85	66	72	61	45
Nation	64	48	67	49	48	43	26

* Totals for graduating seniors were obtained from *Knocking at the College Door: Projections of High School Graduates*, 8th edition. © December 2012 by the Western Interstate Commission for Higher Education.

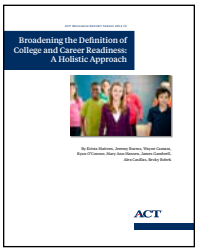
ACT Research

As a nonprofit educational research organization, ACT is committed to producing research that focuses on key issues in education and workforce development. Our goal is to serve as a data resource. We strive to provide policymakers with the information they need to inform education and workforce development policy and to give educators the tools they need to lead more students toward college and career success. What follows are some recent and groundbreaking ACT research studies related to STEM. To review these studies, go to **www.act.org/research/summary**.



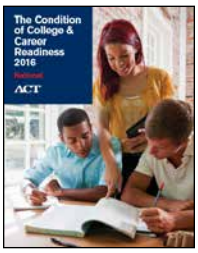
ACT National Curriculum Survey®

The ACT National Curriculum Survey is a nationwide survey of educational practices and expectations. Conducted every three to five years by ACT, the survey collects data about what entering college students should know and be able to do to be ready for college-level coursework in English, math, reading, and science.



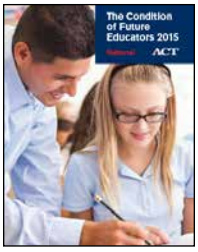
Broadening the Definition of College and Career Readiness: A Holistic Approach

The Condition of College & Career Readiness 2016 revealed that only 26% of 2016 ACT-tested high school graduates met all four ACT College Readiness Benchmarks. A more holistic approach to college and career readiness is in order. This report provides evidence that educators, policymakers, and employers embrace a wide variety of skills critical for success. The research also shows that we can improve prediction of college and career readiness by measuring a broader range of skills.



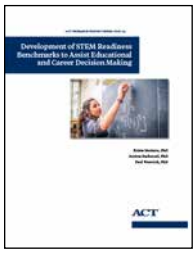
The Condition of College & Career Readiness 2016

Using ACT scores and the ACT College Readiness Benchmarks, *The Condition of College & Career Readiness 2016* provides data highlighting the college and career readiness of the ACT-tested high school class of 2016. This report is updated annually.



The Condition of Future Educators 2015

Data from past ACT *Condition of STEM* reports have shown there are few students interested in math or science education as a profession. This report provides current educators and policymakers a glimpse inside the pipeline of future educators.



Development of STEM Readiness Benchmarks to Assist Educational and Career Decision Making

The United States must seek ways to maintain the STEM pipeline with students who are likely to succeed in a STEM major and persist in a STEM field. The purpose of this ACT research was to develop a STEM readiness benchmark to provide prospective students more tailored information on the level of knowledge and skills needed to have a reasonable chance of success in first-year STEM courses.

STEM Resources

ACT has connected with state STEM councils across the country to identify valuable STEM-related resources. These are the top resources suggested by STEM experts.

STEM Premier®

STEM Premier is a virtual platform that connects STEM students with higher education and the workforce. Students can showcase their skills, get ranked and rated, receive guidance, and find STEM scholarships while colleges, technical schools, and corporations can identify, track, and recruit STEM Premier talent.
www.stempremier.com

STEMconnector®

STEMconnector is the "one-stop shop" for STEM information. With several products and services, STEMconnector supports its members in the design, implementation, and measurement of their STEM strategies. Since its launch in 2011, STEMconnector has been the leader in leveraging a network of STEM stakeholders to "make things happen." STEMconnector's charge is to identify, inform, and connect entities working in STEM education and careers to assess smart STEM investments and results.
www.stemconnector.org

USA Science and Engineering Festival

The USA Science and Engineering Festival attracts thousands of K–12 students, parents, teachers, and STEM professionals in the largest national celebration of STEM. The conference will be held in Spring 2018 in Washington, DC.
www.usasciencefestival.org

Twomentor, LLC

Twomentor, LLC, is a social impact company focused on talent strategies for retaining a diverse workforce. It works with clients to build mentoring cultures and initiatives, and its people have a passion for elevating girls and women in STEM skills. It has experience working with many *Fortune* 500 companies and SMBs and offers facilitated and highly engaging half-day and full-day mentor training, flash mentoring interactive sessions, ongoing MentorCulture consulting, and supports an engaged and passionate workforce as an extended part of your team.
www.twomentor.com

Learning Blade®

From the creators of ACT KeyTrain®, Learning Blade® is an interactive, web-based STEM curriculum validated by BattelleEd in increasing student interest toward STEM careers for middle schoolers. Students pursue engaging missions about real-world STEM problems in an entertaining, game-based platform while also learning about STEM careers, aligned to academic standards. An easy-to-implement, cost-effective STEM tool, Learning Blade has been adopted statewide in two states and is used in over 25 states.
www.learningblade.com

USNews.com

The U.S. News STEM Solutions National Leadership Conference is focused on improving America's science, technology, engineering, and math skills. As a digital company committed to covering STEM through in-depth reporting, research, and analysis, *U.S. News & World Report* will bring the sixth annual leadership conference to the Sheraton San Diego Hotel & Marina on May 24–26, 2017. For more information, visit ***www.usnewsstemsolutions.com***. For ongoing STEM news and analysis, visit **www.usnews.com/STEM**.

ACT-Defined STEM Majors and Occupations by Area

Science Majors/Occupations
Agronomy and Crop Science
Animal Sciences
Astronomy
Atmospheric Sciences and Meteorology
Biochemistry and Biophysics
Biology, General
Cell/Cellular Biology
Chemistry
Ecology
Environmental Science
Food Sciences and Technology
Forestry
Genetics
Geological and Earth Sciences
Horticulture Science
Marine/Aquatic Biology
Microbiology and Immunology
Natural Resources Conservation, General
Natural Resources Management
Physical Sciences, General
Physics
Science Education
Wildlife and Wildlands Management
Zoology

Computer Science and Mathematics Majors/Occupations
Actuarial Science
Applied Mathematics
Business/Management Quantitative Methods, General
Computer and Information Sciences, General
Computer Network/Telecommunications
Computer Science and Programming
Computer Software and Media Application
Computer System Administration
Data Management Technology
Information Science
Management Information Systems
Mathematics Education
Mathematics, General
Statistics
Webpage Design

Medical and Health Majors/Occupations
Athletic Training
Chiropractic (Pre-Chiropractic)
Dentistry (Pre-Dentistry)
Emergency Medical Technology
Food and Nutrition
Health/Medical Technology, General
Medical Laboratory Technology
Medical Radiologic Technology
Medicine (Pre-Medicine)
Nuclear Medicine Technology
Nursing, Practical/Vocational (LPN)
Nursing, Registered (BS/RN)
Optometry (Pre-Optometry)
Osteopathic Medicine
Pharmacy (Pre-Pharmacy)
Physical Therapy (Pre-Physical Therapy)
Physician Assisting
Respiratory Therapy Technology
Surgical Technology
Veterinarian Assisting/Technology
Veterinary Medicine (Pre-Vet)

Engineering and Technology Majors/Occupations
Aeronautical/Aerospace Engineering Technology
Aerospace/Aeronautical Engineering
Agricultural/Bioengineering
Architectural Drafting/CAD Technology
Architectural Engineering
Architectural Engineering Technology
Architecture, General
Automotive Engineering Technology
Biomedical Engineering
Chemical Engineering
Civil Engineering
Civil Engineering Technology
Computer Engineering
Computer Engineering Technology
Construction Engineering/Management
Construction/Building Technology
Drafting/CAD Technology, General
Electrical, Electronic, and Communication Engineering
Electrical/Electronics Engineering Technology
Electromechanical/Biomedical Engineering Technology
Engineering (Pre-Engineering), General
Engineering Technology, General
Environmental Control Technologies
Environmental Health Engineering
Industrial Engineering
Industrial Production Technologies
Mechanical Drafting/CAD Technology
Mechanical Engineering
Mechanical Engineering Technology
Military Technologies
Nuclear Engineering
Quality Control and Safety Technologies
Surveying Technology

Ohio STEM Report

ACT's Commitment to STEM

Everyone must work together to get more students prepared to succeed in STEM careers. This is a critical step if the United States is to remain a world leader. ACT is committed to research and assessment practices that make enhanced STEM opportunities for students a reality. Although gains have been made in STEM readiness, the data show that far too many STEM-interested students are still not well prepared to succeed in the type of rigorous college math and science coursework required of STEM majors. ACT research indicates that students who meet or surpass the ACT STEM Benchmark are much more likely than those who don't to persevere in college and earn a STEM degree within six years.

ACT recently developed the ACT Aspire® assessment system, focused on grades 3–10. ACT Aspire covers the same subjects as the ACT: English, reading, math, science, and writing. To complement the information in the STEM report, an ACT Aspire STEM score has been developed. This score gives educators and STEM leaders an early and ongoing view of the STEM pipeline within their states.

ACT WorkKeys® and the ACT National Career Readiness Certificate™ are additional assessment tools available to students, individuals, and companies to assist in determining work readiness for STEM-related jobs.

Notes

1. When individuals register for the ACT, they are asked to choose a college major they plan to enter as well as an occupational choice from a list of 294 major and occupational titles. Of these 294 titles, 93 have been identified as STEM related. Assignment of ACT titles to STEM titles was conducted by an expert panel of ACT staff members with knowledge of labor market trends and postsecondary academic programs. Panel decisions were informed by three sources of information: (1) STEM-designated occupations from the US Bureau of Labor Statistics (BLS), (2) STEM-designated degree programs from US Immigration and Customs Enforcement (ICE), and (3) ACT Interest Inventory score profiles for students planning to enter the major/occupation. ACT titles were assigned to STEM when both the corresponding BLS and ICE titles were included in STEM or when the corresponding BLS title was included in STEM and the profile of measured interests of students planning to enter this occupation peaked on the Science and Technology scale. These two guidelines accounted for 89 of the 93 ACT titles assigned to STEM. The remaining four titles were assigned to STEM based on the judged intensiveness of their math and science coursework (major) or work tasks (occupation). ACT titles in the Social Sciences were excluded from this STEM list because many STEM taxonomies do not include majors and occupations in this field.
2. Students were assigned to one of three STEM cohorts: Expressed and Measured, Expressed Only, or Measured Only. These cohorts were based on the pairing of Expressed and Measured STEM interest types, where:
   - Students with expressed STEM interest planned on a STEM major or occupation following high school.
   - Students with measured STEM interest had a highest ACT Interest Inventory score in Science or had a highest ACT Interest Inventory score in Technology and a second-highest score in Science.

   Within each STEM cohort, students were also assigned to one of four STEM areas: Science, Computer Science and Mathematics, Medical and Health, or Engineering and Technology. STEM areas for students in the Expressed and Measured Interest cohort and the Expressed Interest Only cohort were based on the STEM area of students' planned major. If planned major was not STEM, then the STEM area of their planned occupation was used. For students in the Measured Interest Only cohort, STEM area was based on the correlation of ACT Interest Inventory scores and the interest profile of the planned major. Using a national sample of 2-year students in their second year and 4-year students in their third year who have a declared major and a grade point average of at least 2.0 (N=62,494), each major's profile was estimated as the mean ACT Interest Inventory scores for students in that major.
3. Mattern, K., Radunzel, J., & Westrick P. (2015). *Development of STEM readiness benchmarks to assist career and educational decision making*. (ACT Research Report 2015-3). Iowa City, IA: ACT, Inc.
4. Crouse, J., Harmston, M., & Radunzel, J. (2016). *Validity evidence for STEM interest identification*. (ACT Research Technical Brief). Iowa City, IA: ACT, Inc.

ACT is an independent, nonprofit organization that provides assessment, research, information, and program management services in the broad areas of education and workforce development. Each year, we serve millions of people in high schools, colleges, professional associations, businesses, and government agencies, nationally and internationally. Though designed to meet a wide array of needs, all ACT programs and services have one guiding purpose—helping people achieve education and workplace success.

This report can be found at
www.act.org/stemcondition

ACT®

* 0 7 0 8 3 9 1 6 0 * Rev 2