2021-2022

Iowa STEM Evaluation Report Summary

TOMORROW STEMS FROM IOWA
GOVERNOR'S STEM ADVISORY COUNCIL

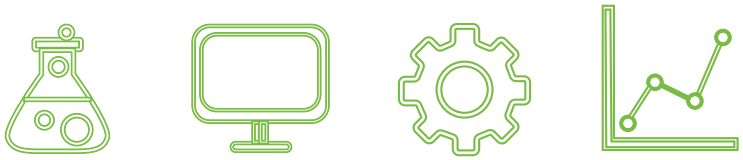
STEM BEST Program
Linn-Mar Community School District

STEM Scale-Up Program
Southeast Polk Community School District

APRIL 20, 2023

IOWA STEM INDICATORS

These indicators are provided by the external evaluation team consisting of University of Northern Iowa's Center for Social and Behavioral Research, Iowa State University's Research Institute for Studies in Education, The University of Iowa's Iowa Testing Programs and Center for Evaluation and Assessment.



2021-2022 HIGHLIGHTS

- From 2012-13 to 2020-21, the number of certificates and diplomas at 2-year institutions decreased by -3%, increased at 4-year public institutions by 41% and at 4-year private institutions by 9%.
- STEM Scale-Up Program participants who graduated high school between 2017-21 chose STEM majors at a 47.7% rate, compared to non-participants at a 37.6% rate.
- Of that same population who went on to community colleges, 17.8% chose STEM majors compared to 12.3% of non-participants.
- Upon graduating and enrolling in an Iowa public university, students who participated in the STEM Scale-Up Program were 18 percentage points more likely to major in STEM than their peers.
- Minority students enrolled in STEM coursework increased by +11.9 percentage points in mathematics, +10.7 in science and +8 in technology in the last nine years.
- 64% of collegians who took part in a STEM BEST Program are in STEM programs.[2] That's more than twice the national rate.[3]
- 40% of Iowa's GDP is driven by STEM - $85.7 billion annually. That's 658,500 people employed in Iowa STEM jobs - 1/3 of the total workforce.[4]
- In 2021, individuals in STEM occupations nationally earned on average $95,420 in median annual salaries compared to all occupations overall earning $45,760 in median salaries.[5]
- 89% of surveyed Iowans said STEM education should be a priority in their local school district. Only 44% said STEM education actually is a priority.
- The percentage of students very interested to live and work in Iowa upon completing their studies is 6 percentage points higher for those who took part in the STEM Scale-Up Program.
- Educators who took part in the STEM Scale-Up Program increased their confidence to teach STEM topics (94%) and are better prepared to answer students' STEM-related questions (93%).

1- Source: STEM Scale-Up Program Participants Report produced by Iowa's State University's Longitudinal Data System (2021)
2- Source: TouchPoints Where Are They Now Report (2022)
3- Source: https://nces.ed.gov/programs/raceindicators/indicator_reg.asp (2019)
4- Source: "People of Science - An Inclusive Analysis of the U.S. STEM Workforce and Its Economic Impact" (2023)
5- Source: https://www.bls.gov/emp/tables/stem-employment.htm

STEM SCALE-UP PROGRAM

www.IowaSTEM.org/Scale-Up

The STEM Scale-Up Program provides high-quality STEM education programs to PreK-12 youth in school and out of school along with training for educators to implement effectively.

A total of **1,921 educators** delivered at least one of thirteen world class STEM Scale-Up Programs in 2021–2022.

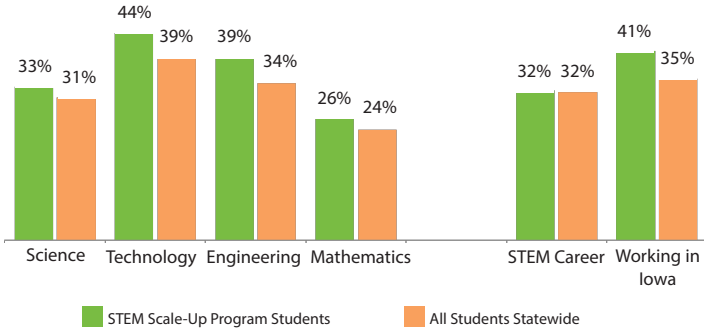
An estimated **110,876 PreK–12 youth** participated in one or more STEM Scale-Up Programs in 2021–2022.

Since 2012, more than one million **PreK–12 Iowans** have participated in STEM Scale-Up Programming.

Of educators taking part in STEM Scale-Up Programming, **94% agreed or strongly agreed** they now have more confidence to teach STEM topics and **96%** have increased their STEM knowledge.

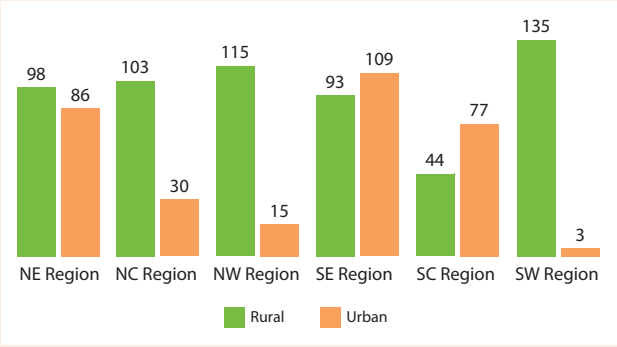
More than half the total annual legislative appropriation to Iowa STEM is devoted to the STEM Scale-Up Program.

STUDENT INTEREST IN STEM



A higher proportion of students who participated in a STEM Scale-Up Program said they were **"very interested"** in all STEM subjects and in pursuing a STEM career compared to all students statewide.

RURAL AND URBAN AWARDS



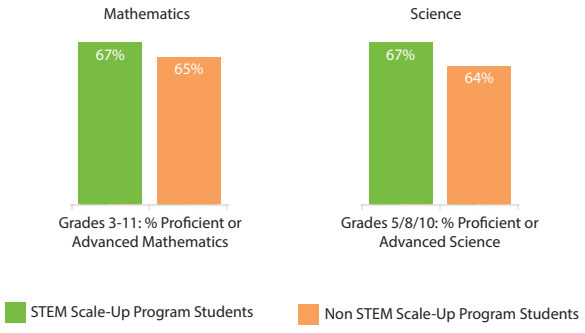
Urban communities include 49 communities in Iowa listed as "urbanized areas" by the U.S. Census Bureau and communities with a population of 20,000 or greater.

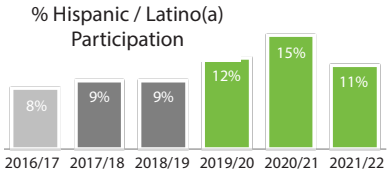
STUDENT ACHIEVEMENT AT PROFICIENT OR ADVANCED LEVEL

Students who participated in the STEM Scale-Up Program performed better on statewide tests than students who did not receive STEM Scale-Up Programming. This is consistent among students of all gender and race subgroups.

In 2021-2022, a higher percentage of STEM Scale-Up Program participants in grades 3 through 11 scored an average of 2 percentage points higher in mathematics and 3 percentage points higher in science.

In the last five years, the STEM Scale-Up Program has increased participation among students who are Hispanic/Latino(a) from 8% to 15% in 2020-2021 and 11% in 2021-2022.





STEM BEST PROGRAM

www.IowaSTEM.org/STEMBEST

The STEM BEST Program involves school+business partnerships that provide career-linked learning experiences for students.

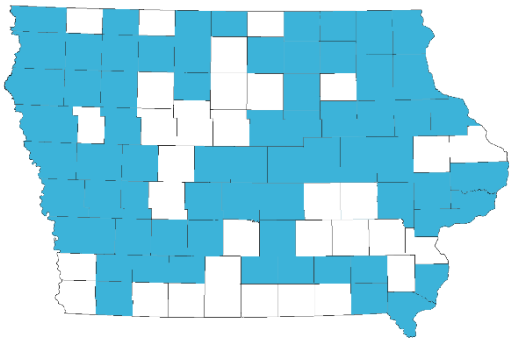
22 new and expanding STEM BEST Program partnerships were engaged in 2021–2022, involving 22 school districts and 71 community partners. A total of 82 STEM BEST models have been established between 2014-2022.

Estimated cost-share dollars contributed in 2021-2022 collectively totals more than $1,302,616.

70% of all STEM BEST Program models are serving rural Iowa school districts.

An additional 6,712 students participated in new and expanding STEM BEST Program models in 2021-2022.

STEM BEST Program Partnerships



= STEM BEST® model located in the county

67% of Iowa's counties have a STEM BEST® Program.

492 Business/Industry Partners have worked with STEM BEST® models between 2014-2022.

121 Government Partners have worked with STEM BEST® models between 2014-2022.

66 Education Partners have worked with STEM BEST® models between 2014-2022.

42 Non-Profit Partners have worked with STEM BEST® models between 2014-2022.

STEM BEST Program Examples

CENTRAL COMMUNITY SCHOOL DISTRICT: BlendED Academy combines classroom experience with community enrichment project based learning for 9-10 grade students. The academy provides relevant and contextualized experiences through community-based initiatives with Clayton County Development Group, Meuser Lumber and Mobile Track Solutions.

CRESTON COMMUNITY SCHOOL DISTRICT - ELEMENTARY SCHOOL: The Creston ECC program connects STEM-focused instruction with thematic activities and curriculum. An Innovation Zone includes retail centers, medical play centers, the "problem stop" to utilize critical thinking and sensory activities including art, music and design. Collaboration with the Union County Development Association helps connect careers in the community.

HOWARD-WINNESHIEK COMMUNITY SCHOOL DISTRICT: The "Cadet Zone" enhances job readiness skills for students by partnering with Java John's Coffee House, Nelson Media Company, Northeast Iowa Community College and Blue House Studio to promote creativity and 21st century skills. Three branches of the program include "Cadet Zone Cafe," "Cadet Zone Merchandise Store" and "Cadet Zone Media Productions."

IOWA STEM TEACHER EXTERNSHIPS PROGRAM

www.IowaSTEM.org/Externships

The STEM Teacher Externships Program connects classrooms to careers through the immersion of secondary STEM educators engaged in workplace settings for six weeks in the summer.

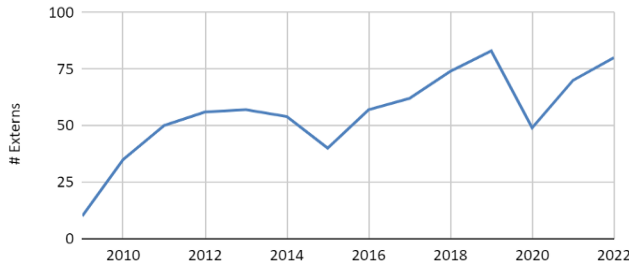
Total STEM Teacher Externships
2009 to 2022
777

Total Workplace Partners
2009 to 2022
224

Total approximate cost share by workplace hosts from 2009 to 2022
$1,184,580
($127,980 in 2022)

Of 2022 workplace hosts surveyed, most monetized the value of the project(s) completed by the STEM Teacher Extern between $2,501-$5,000.

Annual Participation in Externships



2022 STEM Teacher Externs indicated more confidence with the following aspects of teaching:

- Ability to advise students about job opportunities in their subject area(s)
- Ability to prepare students for the expectations they will encounter in the workplace
- Mastery of subject-area content
- Knowledge about the application of their subject(s) in the workplace
- Ability to use problem or project-based instruction

Scholarships in STEM

The STEM Council established two scholarships in 2021-2022. One, the RAPIL (Regents Alternative Pathway to Intern Licensure) supports professionals in STEM fields to earn teaching credentials. The other, STEM LIfT (Latest Information for Teachers), supports practicing STEM educators in coursework to bolster their knowledge in their STEM fields.

RAPIL
Regents Alternative Pathway to Iowa Licensure

22 scholarships awarded for candidates in mathematics, industrial technology, computing and the sciences teaching.

TOMORROW STEMS FROM IOWA
GOVERNOR'S STEM ADVISORY COUNCIL

STEM LIfT SCHOLARSHIP

5 scholarships awarded for teachers enrolled in Geology, Physics, Mathematics and History of Science.

STEM TEACHER ENDORSEMENTS

Grades K-8 and 5-8 STEM teaching endorsements are now offered at eight institutions in Iowa: Buena Vista University, Central College, Drake University, Dordt University, Grand View University, Morningside College, St. Ambrose University and the University of Northern Iowa.

Since 2014, **276** STEM endorsements have been granted:

- **22** for K-8 STEM
- **15** for 5-8 STEM
- **6** for K-12 STEM Specialist
- **56** for 5-12 Engineering

In 2022, 13 STEM endorsements were granted:

- **3** for K-8 STEM
- **3** for 5-8 STEM
- **2** for K-12 STEM Specialist
- **5** for 5-12 Engineering

MICROSOFT IMAGINE ACADEMY

A total of **16,547** Microsoft Imagine Academy student certifications have been awarded since 2014.

A total of **1,459** certifications were awarded in 2021-2022.

Plus, **35,139** student exams.

www.IowaSTEM.org/MITA

1,364 Microsoft Office Specialist student certifications earned in 2021-2022

59 Microsoft Office Specialist teacher certifications earned in 2021-2022

36 Microsoft Technology Associate certifications earned in 2021-2022

150 High school and community college participants

STEM COMMUNICATIONS

SOCIAL MEDIA

Twitter: ↑ 4%
4,108 followers

Facebook: ↑ 7%
1,773 likes

Instagram: ↑ 14%
756 followers

YouTube: ↑ 33%
5,417 views, **74,717** impressions

Newsletter: ↓ 1%
7,257 readers

LinkedIn: ↑ 11%
575 followers

Other social media includes Pinterest.

WEBSITE

www.IowaSTEM.org

111,553 page views
↑ **12%** from last year

42,358 new visitors
↑ **20%** from last year

63,877 sessions
↑ **19%** from last year

167 countries

50 states and territories

287 Iowa cities

MEDIA COVERAGE

Total public relations efforts resulted in **153 placements** (up 26% from last year) in newspaper, television and radio outlets over the course of the year in local, statewide and national media coverage, appearing before potentially **51 million** eyes (up 70% from last year). Media placement and coverage reflects the disruption caused by the pandemic.

44% of media coverage included a specific Iowa Governor's STEM Advisory Council example or story in the state. Up 14% from last year.

98% of media coverage mentioned the efforts of the Iowa Governor's STEM Advisory Council. This was consistent with the previous year.

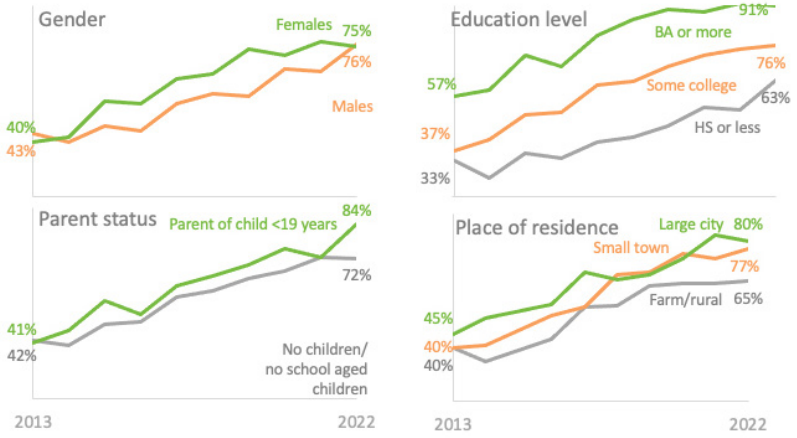
PUBLIC ATTITUDES AND AWARENESS OF STEM

More than three-fourths of Iowans (76%) had heard of the acronym STEM. This is an increase of 35 percentage points compared to 2013.

Only 44% said STEM education actually is a priority and another 28% said they didn't know if STEM education was a priority in their local school district.

76% of Iowans support state efforts to devote resources and develop initiatives to promote STEM education in Iowa.

87% of Iowans agreed that every child should have access to a high-quality STEM education in PreK through 12 grade.



In 2022, 89% of Iowans agreed that STEM education should be a priority in their local school district.

IOWA'S STEM NETWORK

CORPORATE PARTNERS AND INVESTMENTS

$2.3 MIL A total of $2,327,811 in grants, corporate partner gifts and cost-sharing by other STEM partners was invested in Iowa STEM for 2021–2022.

$314 K 40 corporate partners contributed $314,010 to Iowa STEM in 2021–2022. Investors are listed at www.IowaSTEM.org/corporate-partners.

$834.5 K A total of $834,513 in grants from the Iowa Department of Education, Iowa Department of Natural Resources and the Iowa Economic Development Authority supported Iowa STEM programming in 2021–2022.

$1.1 MIL Cost-sharing partners, including Strategic America, Regional STEM Hub Institutions, STEM Teacher Externships Program workplace hosts, STEM BEST Program partners and STEM Scale-Up Program providers contributed $1,179,288 to Iowa STEM programming in 2021–2022.

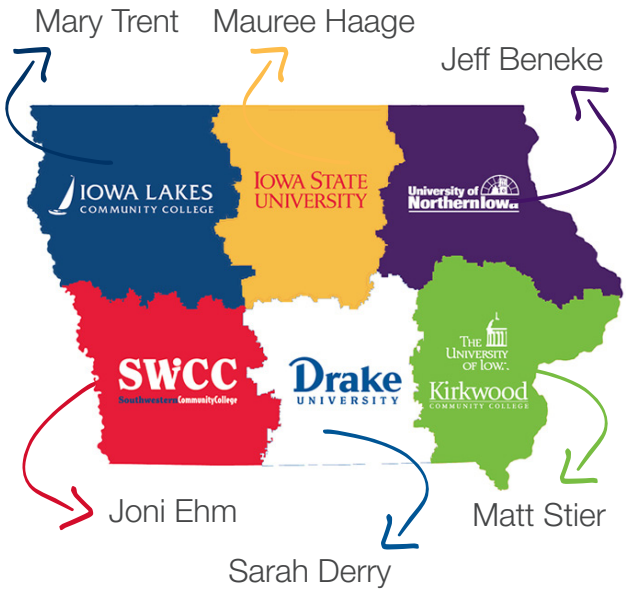
REGIONAL STEM

Regional STEM managers facilitated **13 STEM Scale-Up Programs** that impacted **110,876 PreK–12 youth** and **1,921 educators** in 2021–2022.

Regional STEM managers held a total of **32 community STEM Festivals** across Iowa, engaging 8,319 **Iowans** in 2021–2022.

Regional STEM managers made a total of **3,194 new connections** with businesses, workforce development, economic development and formal/informal education leaders.

Collectively, Iowa's Regional STEM managers have **18,800** newsletter subscribers, **7,219** Twitter followers and **3,322** Facebook likes.



TOMORROW STEMS FROM IOWA | IOWA STEM TEACHER AWARD

Proudly Sponsored by: KEMIN

www.IowaSTEM.org/TeacherAward

48 have received the Iowa STEM Teacher Award between 2015-2022 + Most awardees believe the recognition has a lasting effect on students', parents' and colleagues' confidence in their teaching

GOVERNOR'S STEM ADVISORY COUNCIL
SEAL OF APPROVAL
2022

IowaSTEM.org/Seal

29 programs have earned the Seal of Approval between 2015-2022 + Most report that the recognition validates their program or event and helps in grant proposals or other source funding

Iowa STEM Monitoring Project

2021-2022 Annual Report

Report No. 10.1
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Prepared for
Iowa Governor's STEM Advisory Council

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Executive Summary

The Iowa STEM Monitoring Project (ISMP) is a multi-faceted and collaborative effort that works in support of the Iowa Governor's STEM Advisory Council. Established in 2011, the Iowa Governor's STEM Advisory Council mission is increasing interest and achievement in STEM (science, technology, engineering and mathematics) studies and careers through partnerships engaging preK-12 students, parents, educators, employers, non-profits, policy leaders and others. The Council provides opportunities that inspire Iowa's young people to become innovative, enterprising contributors to Iowa's future workforce and the quality of life in Iowa's communities

The Iowa STEM Monitoring Project is conducted by an external collaboration of partners from Iowa's three Regents institutions: the University of Northern Iowa Center for Social and Behavioral Research, the Iowa State University Research Institute for Studies in Education, and Iowa Testing Programs at The University of Iowa. The purpose of the ISMP is to systematically collect a set of metrics and information sources used to examine changes regarding STEM education and workforce development in Iowa centered on the activities of the Iowa Governor's STEM Advisory Council. The ISMP report is organized into three sections: 1) STEM Scale-Up Program; 2) Iowa STEM Indicators, and 3) Statewide Survey of Public Attitudes toward STEM.

STEM Scale-Up Program

The STEM Scale-Up Program provides high-quality STEM education professional development and curriculum to educators in schools, after-school programs, and other settings for youth in grades pre-kindergarten through 12. The STEM Scale-Up Program was monitored using two sources of information that were expected from all schools/organizations implementing a STEM Scale-Up Program: 1) an educator survey and 2) a student participant list.

In 2021-2022, a total of 1,921 STEM Scale-Up programs were awarded with some educators receiving more than one program. Over eight hundred educators (n=878) completed an educator survey, and information was submitted on 30,030 student participants. Participant information was matched to student records to summarize demographics characteristics of student participants.

- **Among student participants in the 2021-2022 STEM Scale-Up Program, 11% were Hispanic and 5% were Black.** Overall, the distribution of Scale-Up students by race/ethnicity was 76% White, 11% Hispanic, 5% Black/African American, and 7% all other races combined. By sex, Scale-Up student participants were 48% female and 52% male.

Interest and Achievement in STEM among STEM Scale-Up Student Participants

- **More students who participated in a STEM Scale-Up program said they were interested in science, technology, engineering, and mathematics, and in working in a STEM career compared to all students statewide.** Approximately, 44% of Scale-Up participants said they

were *very interested* in technology, and 39% said the same for engineering compared to 39% and 34%, respectively, among students statewide.

- **In 2021-2022, STEM Scale-Up Program participants performed better on the Iowa Statewide Assessment of Student Progress (ISASP) in *mathematics* (+2 percentage points) and *science (*+3 percentage point) compared to all students statewide.** Achievement scores by race/ethnicity showed that for minority students, a higher percentage, by +6% in *science* and by +5% *in mathematics*, of STEM Scale-Up Program participants met Proficient or Advanced level benchmarks compared to minority students who did not participate.

Educator Perceptions of STEM Scale-Up Program Implementation and Outcomes

- To prepare for implementing their Scale-Up programs, educators were required to complete a virtual professional development (PD) training. **Nine in ten respondents indicated the PD met or exceeded expectations** in several areas including in preparation for implementation (93%), in building confidence to implement (94%), and in learning about available support during implementation (94%).
- **A large majority (90%) of educators were able to implement their programs in whole or in-part.** Ten percent did not implement their programs. Among educators who did not implement due to the pandemic, nearly 55% plan to do so next year.
- Over 90% of the responding educators reported that they had either *all of the time* or *most of the time* received materials and resources in a timely manner (92%) and that the program provider was responsive to questions and needs (94%).
- Educators in both formal and informal education settings reported that they gained skills and confidence in teaching STEM topics as a result of their participation in the STEM Scale-Up Program. **The majority of educators agreed or strongly agreed that the program increased their knowledge of STEM topics (96%), gave them more confidence to teach STEM topics (94%), helped them learn effective methods for teaching in STEM-content areas (94%), and that they now are better prepared to answer students' STEM-related questions (93%).**
- **Nearly seven in ten educators (69%) reported an increase in student interest in STEM topics, and nearly six in ten (56%) reported an increase in student awareness. About one-third (32%) indicated an increase in student achievement in STEM areas.**
- Nine in ten educators (90%) reported that they will be using the program with their students again next year either in whole (52%) or in part (38%).

Iowa STEM Indicators

Iowa STEM indicators track publicly available data at national and state levels on a variety of STEM topics in education and workforce development across four primary areas of focus: 1) STEM achievement and interest among K-12 students, 2) STEM preparation of preK-12 students, 3) Post-secondary enrollment and training in STEM fields, and 4) STEM employment.

STEM achievement and interest among K-12 students

In **mathematics achievement**, the percentage of students in grades 4th, 8th, and 11th who were at or above proficiency on the Iowa Statewide Assessment of Student Progress (ISASP) **decreased** from 2018-2019 to 2021-2022. In 2021-2022, 69% of students in 4th grade, 66% of students in 8th grade, and 60% of students in 11th grade were proficient or above compared to 72%, 71%, and 66% in 2018-2019, respectively. (Indicator 1).

In **science achievement**, the percentage of students in grades 5th, 8th, and 10th who were at or above proficiency on ISASP **increased** from 2018-2019 to 2021-2022. In 2021-2022, 60% of students in 5th grade, 66% of students in 8th grade, and 63% of students in 10th grade were proficient or above compared to 51%, 58%, and 62%, respectively (Indicator 1).

Compared to 2013, **mathematics scores** on the 2022 National Assessment of Educational Progress **decreased** among 4th and 8th grade students and across all demographic subgroups. The drop was statistically significant ($p<.05$) for all students, males, females, and Hispanic students.

Among all students statewide, interest in individual STEM topics or in pursuing STEM careers started high in 2012-2013 and remained high through 2021-2022. **Over three-quarters (75%) of all students statewide indicated they were "very interested" or "somewhat interested" in science, technology, engineering, or in pursuing a STEM career in 2021-2022**. Just less than seven in ten (67%) said they were "very interested" or "somewhat interested" in mathematics (Indicator 3).

STEM preparation of K-12 students

Average **ACT scores of graduating seniors in mathematics and science trended lower** in 2022 compared to 2013. In 2022, Iowa's average ACT score was 20.6 in mathematics and 21.6 in science, compared to 19.3 and 19.9 nationwide, respectively. (Indicator 4)

The percentage of underrepresented minority students enrolled in STEM-subject areas has typically increased annually in the last eight years. **Enrollment by underrepresented minority students in science has increased by +7.4 percentage points, +4.8 in technology, +2.5 in engineering, +7.4 in mathematics, and +4.5 in health.** (Indicator 5).

From 2012-2013 to 2021-2022, the **number of students taking Advanced Placement (AP) courses in STEM-related subjects increased** 24% from 6,476 to 8,041.The largest increase occurred for AP courses in career technical / vocational education (302%) followed by mathematics (29%). (Indicator 6).

In the past five years, the **number of concurrent enrollment courses taken by high school students has increased 10% for mathematics courses** (10,657 courses taken in 2021-2022) and <1% for science courses (4,4,487 courses taken in 2021-2022). Since the first year of program activities of the Governor's STEM Advisory Council in 2013, the number of concurrent

enrollment courses taken by high school students has increased 41% for mathematics courses and 54% for science courses, respectively (Indicator 7).

Since 2014, 276 STEM teaching endorsements have been granted: 23 for K-8 STEM, 15 for 5-8 STEM, seven for K-12 STEM Specialist, 57 for 5-12 Engineering, and 177 for 5-12 CTE Information Technology. Eight Iowa colleges and universities currently offer K-8 and 5-8 STEM endorsements: Buena Vista University, Central College, Dordt University, Drake University, Grandview University, Morningside College, Saint Ambrose University, and the University of Northern Iowa (Indicator 8).

STEM college completions

In 2022, 6,253 students enrolled in Iowa's community colleges in degree fields categorized by career clusters in architecture and construction, information technology, and STEM. An additional 10,143 students were enrolled in health sciences. Overall, the total number of awards in STEM-related degree fields from Iowa's community colleges increased 25% from 2013 to 2022. Notably in 2022, awards to minority graduates increased 75% compared to 2013. (Indicator 9).

From academic year 2012-2013 to 2020-2021, there has been a 41% increase in STEM-related degrees conferred at 4-year public, and a 9% 4-year private (not-for-profit) colleges and universities, respectively (Indicator 10)

STEM employment

On average in 2022, individuals in STEM occupations earned $34.19 mean wages and $71,124 in mean salaries, compared to all occupations overall earning $24.57 in mean wages and $51,096 in mean salaries, respectively (Indicator 11).

Statewide Survey of Public Attitudes toward STEM

To assess change in public awareness and attitudes toward STEM, a statewide public survey of Iowans was conducted from September 2022 to January 2023. Over 1,000 Iowans participated in a statewide STEM survey, and results were weighted to obtain population estimates that are representative of the adult population of Iowans.

In 2022, 76% of Iowans had heard of the acronym STEM. This was a net increase of +35 points from 2013. A greater percentage of Iowans with some college (76%) or with a BA or more (90%) reported having heard of STEM compared to Iowans with a high school degree or less (52%, $p < .01$).

Respondents were asked about groups and events promoting STEM in the state, as well as awareness of the slogans *Greatness STEMs from Iowans* and *Tomorrow STEMs from Iowans*. In 2022, approximately one-third (33%) of Iowans had heard about a STEM event or programming in their local school district. About one-fifth of Iowans (19%) reported they had heard of the Governor's STEM Advisory Council or STEM Day at the Iowa State Fair (17%). An estimated 14% of Iowans reported having heard the slogan

Greatness STEMs from Iowans, and 8% recognized *Tomorrow STEMs from Iowans* at the time of the public awareness survey in late fall 2022.

In 2022, nine in ten Iowans (89%) said STEM education **should** be a priority in their local school district. Only 44% said STEM education actually **is** a priority, and another 28% said they did not know if STEM education was a priority in their local school district. Further, over three-quarters of Iowans (76%) support state efforts to devote resources and develop initiatives to promote STEM education in Iowa. Eight in ten Iowans (87%) agree with the statement, "Every child should have access to a high-quality STEM education in PreK through 12th grade." Iowans were also asked to what extent they agree or disagree about the role of STEM in Iowa. Three-quarters agree on the importance of school-business partnerships (28% strongly agree, 47% agree), on the need to spread awareness about STEM education (34% strongly agree, 41% agree), and on the need for resources toward those efforts (28% strongly agree, 46% agree). Nearly two-thirds (63%) agree all students should receive a STEM education, even if they aren't going into a STEM career.

Conclusion

The 2021-2022 findings of the Iowa STEM Monitoring Project continued to show gains across several indicators as observed in previous years. Some Iowa STEM indicators reflect the continued challenge of decreased mathematics achievement particularly following the pandemic, with the historical effect of the pandemic still yet to be fully understood. The STEM Scale-UP Program provided over 1,500 opportunities to integrate STEM engagement and learning in formal and informal education settings across the state. Educators in both settings reported that they gained skills and confidence in teaching STEM topics as a result of their participation in the STEM Scale-Up programs. The Statewide STEM Survey continues to show increased awareness of STEM year over year and strong majority support for STEM initiatives in the state. The ISMP will continue to assess the impacts of STEM programming in the state centered on the STEM Scale-Up Program, and identify and/or refine other metrics of STEM progress to be able to continue to assess the impacts of the efforts by the Iowa Governor's STEM Advisory Council to improve STEM education and workforce development in the state.

Section 1. STEM Scale-Up Program

The STEM Scale-Up Program provides high-quality STEM education professional development and curriculum to educators in schools, after-school programs, and other settings for youth in grades pre-kindergarten through 12. More information about the STEM Scale-Up Programs can be found at www.iowastem.org/Scale-Up.

Typically, educators apply for the STEM Scale-Up Program in the January preceding the academic year and are notified by April of their award. Program providers begin working with educators just as the school year is ending to prepare for program implementation during the next academic year (~July-May implementation). There are some exceptions to this timeline for programs (e.g. Curriculum for Agricultural Science Education (CASE) programs) whose professional development is held in the summer a full year after being awarded and/or informal implementation settings that occur during the summer months.

The STEM Scale-Up Program is monitored using two sources of information that were expected from all schools/organizations implementing a STEM Scale-Up Program: 1) an educator survey and 2) a student participant list.

STEM Scale-Up Program awards

A total of 921 STEM Scale-Up Program awards were realized in 2021-2022, and 1,921 educators received these awards (Table 1). This includes educators who received one or more 2021-2022 STEM Scale-Up awards, and five Curriculum for Agricultural Science Education (CASE) awards from 2020-2021.

Table 1. Number of STEM Scale-Up Program awards by region, 2021-2022

	Total	Number of Awards by STEM Region					
	n	NC	NE	NW	SC	SE	SW
Total	**1,921**	**237**	**341**	**254**	**313**	**529**	**247**
CodeJoy Computational Thinking In Action with Micro:bit	128	15	16	27	9	32	29
Curriculum for Agricultural Science Education (CASE): Agriculture Power and Technology[1]	5	2	0	0	0	1	2
DreamBox Learning® Math	369	7	37	14	71	223	17
Fierce and Fearless STEAM Teacher Training	69	15	19	7	8	17	3
FIRST® LEGO® League Explore	109	15	53	8	11	18	4
Ioponics	161	25	31	19	31	33	22
Light & Shadow	166	20	52	27	26	16	25
Nepris	113	10	4	18	43	3	35
Project Lead the Way (PLTW) Gateway Medical Detectives	39	4	4	7	7	12	5
SoapyCilantro	25	11	1	3	10	0	0
Storytime STEM-packs	639	101	121	113	72	153	79
Teaching Energy Transformations and Energy Sources	51	6	3	7	18	5	12
VEX IQ Challenge	47	6	0	4	7	16	14

Source: Iowa Governor's STEM Advisory Council, Central Operations Office

1. Curriculum in Agricultural Science Education (CASE): Agricultural Power and Technology was awarded in 2020-2021, but implemented and evaluated in 2021-2022

According to records provided by the Iowa Governor's STEM Advisory Council, Central Operations Office, an estimated 110,876 pre-kindergarten through 12th (PreK-12) grade students were projected to participate in STEM Scale-Up programs in 2021-2022 (Table 2). The largest programs included the Storytime STEM-packs program (31,868 students), DreamBox Learning® Math (13,701), Ioponics (12,379), and CodeJoy Computational Thinking in Action with Micro:bit (10,551). The remaining programs each had fewer than 10,000 students.

Table 2. Projected number of students participating in the STEM Scale-Up Program by region

STEM Scale-Up Program	Total n	Number of Students by STEM Region					
		NC	NE	NW	SC	SE	SW
Total	**110,876**	**12,813**	**21,153**	**14,752**	**16,387**	**29,177**	**16,594**
CodeJoy Computational Thinking In Action with Micro:bit	10,551	1,162	930	1,756	525	4,264	1,914
Curriculum for Agricultural Science Education (CASE): Agriculture Power and Technology[1]	150	90	-	-	-	10	50
DreamBox Learning® Math	13,701	392	697	1,123	2,426	8,759	304
Fierce and Fearless STEAM Teacher Training	8,536	1,164	4,103	1,314	224	1,561	170
FIRST® LEGO® League Explore	5,687	391	3,485	387	338	918	168
Ioponics	12,379	1,718	3,008	905	2,563	2,689	1,496
Light & Shadow	8,830	1,050	1,856	839	478	1,229	3,378
Nepris	8,446	958	1,025	1,660	3,600	304	899
Project Lead the Way (PLTW) Gateway Medical Detectives	2,881	251	340	607	438	916	329
SoapyCilantro	1,192	635	45	160	352	-	-
Storytime STEM-packs	31,868	4,363	5,587	5,214	4,217	7,050	5,437
Teaching Energy Transformations and Energy Sources	3,047	463	77	532	1,071	164	740
VEX IQ Challenge	3,608	176	-	255	155	1,313	1,709

Source: Iowa Governor's STEM Advisory Council, Central Operations Office

1. Curriculum in Agricultural Science Education (CASE): Agricultural Power and Technology was awarded in 2020-2021, but implemented and evaluated in 2021-2022

STEM Scale-Up Program Educator Survey

Data source Educator Survey, Iowa STEM Monitoring Project
Provided by Research Institute for Studies in Education, Iowa State University

The Educator Survey is collected annually from educators who implement a STEM Scale-Up Program in their schools and organizations. This section highlights key findings from the full report available under separate cover.[1] In 2021-2022, data were collected across all six STEM regions of the state and for the following 13 programs.

2020-2021 STEM Scale-Up Programs evaluated in 2020-2021[2]

- Curriculum for Agricultural Science Education (CASE): Agriculture Power and Technology

2021-2022 STEM Scale-Up Programs

- CodeJoy Computational Thinking In Action with Micro:bit
- DreamBox Learning® Math
- Fierce and Fearless STEAM Teacher Training
- FIRST® LEGO® League Explore
- Ioponics
- Light & Shadow
- Nepris
- Project Lead the Way (PLTW) Gateway Medical Detectives
- SoapyCilantro
- Storytime STEM-packs
- Teaching Energy Transformations and Energy Sources
- VEX IQ Challenge

[1] cf. Guhin, A., Vincent, A., & Szabo, J. (2022). *Iowa STEM Scale-Up Program, 2021-2022: Results from the STEM Scale-Up Program Educator Survey*. Ames, IA: Iowa State University, Research Institute for Studies in Education.
[2] Curriculum for Agricultural Science (CASE) Scale-Up programs are implemented in the next academic year following the year of award and included in the evaluation of the current respective year.

Demographic characteristics of educator survey respondents

In 2021-2022, 1,538 STEM Scale-Up educators were sent an email invitation to complete the online educator survey. Valid surveys were completed and returned by 878 educators (57% response rate). Overall, 74% of educators reported that they were in- school educators, eight percent responded that they were out-of-school (informal) educators, and less than one percent were curriculum coordinators, school administrators, or para-educators. An additional 14% responded that they were another type of educator.

Each of the six regions was represented. Twenty-three percent (23%) of responding educators were from the Southeast and Northeast regions each, 16% from the Northwest and North Central regions each, 12% from South Central region, and 10% from the Southwest region.

Respondents reported implementing 1,036 programs with the highest proportion implementing Storytime STEM-packs (40%), Ioponics (12%), and Light & Shadow (10%). Nine-percent (9%) or fewer implemented each of the remaining programs. Sums greater than 878 throughout the report reflect respondents who implemented more than one program.

Together, respondents included educators who had implemented a STEM Scale-Up program at each grade level from prekindergarten (PreK) through 12th grade. The majority of respondents represented educators who had implemented their STEM Scale-Up Program with students in either an early (PreK-2) or upper (3-5) elementary grade level.

Key Findings

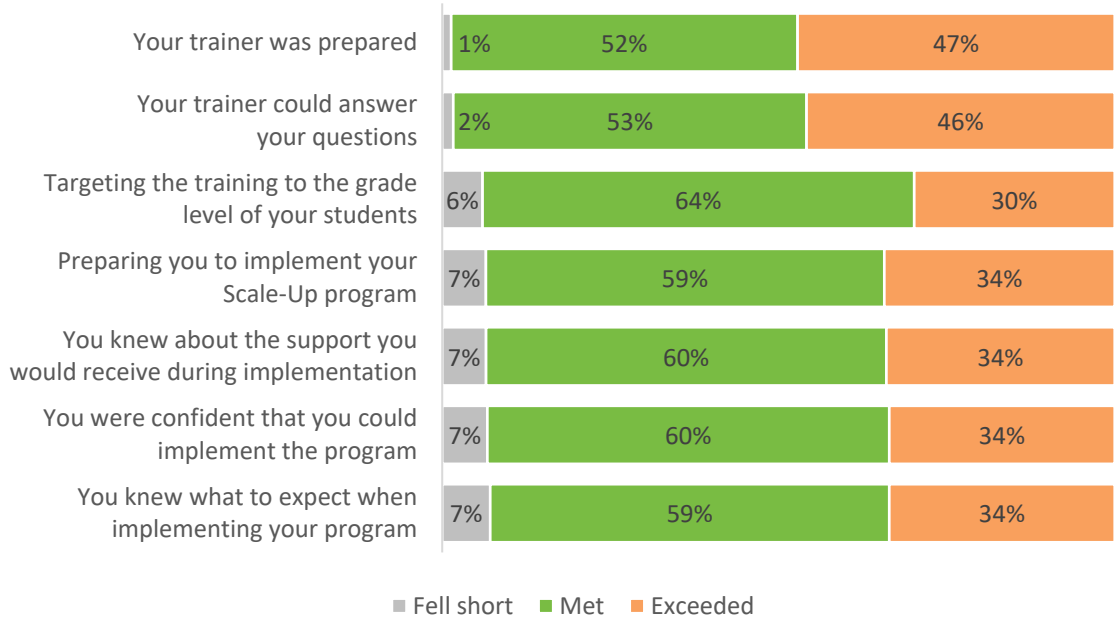
Completion of Professional Development

To prepare for implementing their STEM Scale-Up program, educators were required to complete a professional development (PD) workshop. When asked whether they completed the professional development, 95% reported that they had. Top reasons given by those (n=26) who did not complete the professional development included those planning to complete it but who had not yet done so (n=4) or not knowing about the professional development workshop requirements (n=5). Others mentioned not attending because someone else implemented the program (n=5), not receiving the supplies in time (n=4), or personal or unspecified reasons (n=8).

Some programs provided the opportunity to receive undergraduate or graduate credit, or optional continuing education credits for participating in their program's professional development. A subset of educators from Fierce Fearless STEAM Teacher Training, Ioponics, Light & Shadow, Storytime STEM-packs, and VEX IQ Challenge responded to this item. Among responding educators who had the opportunity to receive credit, nearly half (49%) received undergraduate or graduate credit, 39% were aware but chose not to pursue credit, and 11% were not aware of the credit option. A total of 17 (20%) educators opted to self pay for their education or CEU credits.

Educators reported that the professional development met or exceeded their expectations overall, with over nine in ten respondents indicating that the professional development either met or exceeded their expectations in several areas (Figure 1). In particular, almost all respondents indicated the preparation of their trainers (99%) and their ability to answer questions (98%) met or exceeded expectations. Seven percent of respondents indicated that the PD fell short of their expectations in knowing what to expect

when implementing the program and in knowing about the support they would receive during implementation.



Distributions not equal to 100% due to rounding.

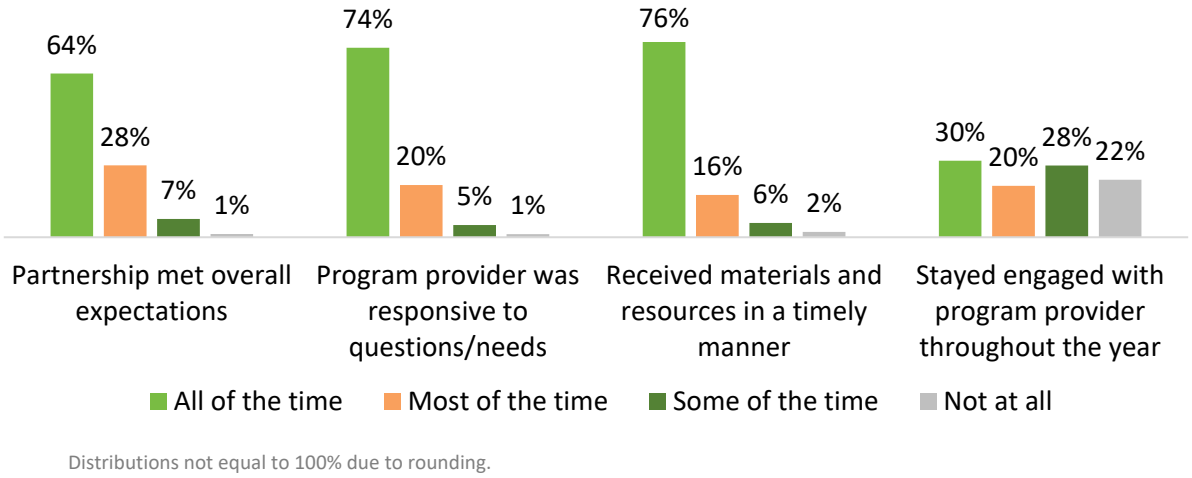
Figure 1. Educator views on how well their expectations were met by the professional development

Program Implementation Among the Scale-Up programs received by the responding educators (n=1,018), 90% were implemented while less than 10% were not implemented. Of those not implemented, 3% of respondents indicated that they planned to implement during the summer and 5% reported they did not implement for other reasons. Among respondents who reported having implemented their program (n=923), 64% did so as the program was designed, while 26% implemented with changes. Among educators who did not implement their programs (n=97), nearly 55% planned to do so next year.

The majority of program changes were made to address student needs and abilities. Educators described changing details of lessons, altering the materials, and/or modifying the program schedule to facilitate student learning. A few educators indicated that the material was too hard for some students and thus made changes to make it more aligned with student preparedness.

The majority of educators reported a positive experience working with their Scale-Up program providers (Figure 2). Nine in ten indicated that they had either *all of the time* or *most of the time* that the program provider was responsive to questions and needs (94%), they received materials and resources in a timely manner (92%), and the partnership with their program provider met their overall expectations (92%). Half (50%) of respondents reported they stayed engaged with their program provider throughout the year either *most of the time* or *all of the time*, and another 28% stayed engaged *some of the time*.

Considering educators' high ratings across the other indicators, *some of the time* engagement may reflect the expected variable levels of engagement depending on the timing of implementation.



Distributions not equal to 100% due to rounding.

Figure 2. Educator experiences with program providers

Half of responding educators (50%) did not report any challenges in working with their program providers, and a little over one-quarter (27%) did not contact their program provider. Fewer than 8% of respondents reported challenges or barriers in working with their program providers (responses not mutually exclusive). This included approximately five percent (n=57) of respondents who indicated that the training did not adequately prepare them to implement the program, and three percent (n=33) who reported they did not know their program provider. Approximately three percent reported that the program's website was difficult to navigate (n=30), and one percent (n=15) reported that responses to communication attempts were not made in a timely manner. One percent or less of respondents reported challenges with reimbursements (n=12) or software or equipment malfunctions (n=4). Other challenges described difficulty attending the free sessions that weren't compatible with their classroom schedule, program compatibility issues with Android versus Apple devices, delays and shortages in materials received, and lack of provider engagement in what was supposed to be an interactive and supportive Facebook group.

Nine in ten respondents (90%) were able to implement their programs in full or in part, and 43% reported they did not encounter any challenges or barriers to implementation. Most challenges or barriers were attributed to not having enough time to implement the entire program (15%, n=169), or taking more time than they expected to plan, prepare, or set up the lessons and activities (12%, n=130). The next most common challenges or barriers reported by respondents were not being familiar enough with the program or knowledgeable about the topics to teach it properly (4%, n=50), or that the program was too advanced for their students (4%, n=44). Other miscellaneous challenges (8%, n=88) described a shortage of materials (e.g. Microbits, hummingbirds), the lessons or unit being too easy for their students, and difficulty keeping plants and fish alive.

Outcomes and Impacts of the 2021-2022 Scale-Up Programs

Educators reported that their own skills and confidence in teaching STEM topics were positively impacted by the Scale-Up Programs. Over nine

in ten educators either agreed or strongly agreed that they now have more confidence teaching STEM (94%), have increased knowledge of STEM topics (96%), are better prepared to answer student questions about STEM (93%), and now have more effective teaching methods to use because of Scale-Up participation (94%).

Slightly over half (52%) of responding educators reported that they will use the entire program again next year, another 38% will use some pieces of the program, and 7% do not know if they will use the program again. Only twenty-four responding educators (3%) explicitly planned to not use their program again next year. Reasons for not planning to implement next year include student/instructor difficulties with the program, cost prohibitions, and position changes.

Educators observed that their students benefitted from their participation in the STEM Scale-Up programs (Figure 3). From a list of potential student outcomes, 69% of the educators reported observing increased student interest in STEM topics, and 56% reported increased student awareness in STEM topics. Approximately 32% of educators observed increased student achievement in STEM topics, 19% reported increased student awareness in STEM career opportunities, and 18% observed increased student interest in STEM career opportunities. Additionally, 9% reported increased interest in post-secondary STEM opportunities. Five percent noted other observable outcomes including increases in students' engagement, confidence, and excitement about STEM as well as increases in staff awareness and interest in STEM.

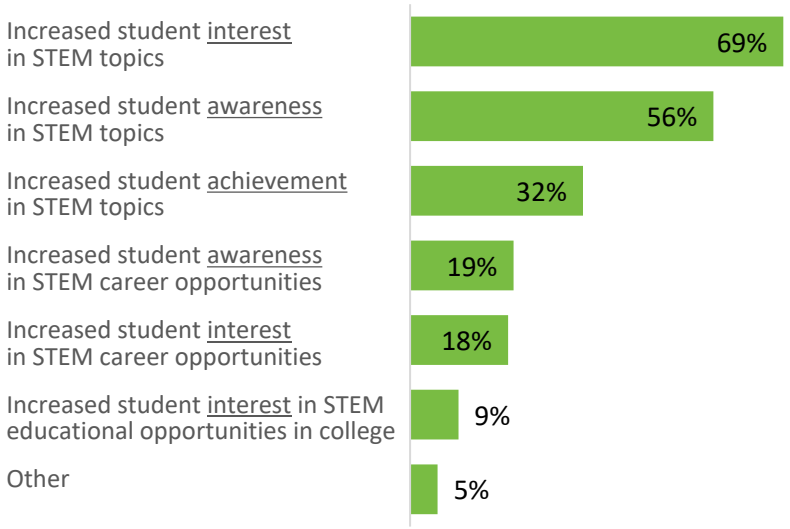


Figure 3. Observed student outcomes of the STEM Scale-Up Program

In an open-ended question, educators were asked in what ways, if any, the program(s) had an impact on their curriculum or instruction with students; 538 educators provided a response. These comments were grouped by themes into four overarching categories, each with its own subcategories of responses. Comments related primarily to:

1. *STEM Education*, which included: interest and excitement in STEM, STEM exposure, and scientific thinking.
2. *Student Learning and Engagement,* which included: hands-on learning, student creativity, student engagement and motivation, and individualized student learning.
3. *Curriculum and Instruction Impact*, which included: new ideas/materials, supplement to existing curriculum, and pedagogical enrichment.
4. *Additional Issues*, which included: problems educators encountered.

Exemplar quotations for each theme and subcategory related to the impact of the STEM Scale-Up programs are provided below. Many comments related to more than one theme – in this case, a predominant theme was identified and the quote was categorized accordingly. Quotes have minor edits for spelling and clarity.

1. STEM Education

Interest and Excitement in STEM

- *I became much more confident in my ability to teach computer science at my schools. I also saw the excitement for STEM grow as well as interest in this area.*
- *I taught topics I have never taught before. They have increased student interest in STEM areas.*
- *It allowed me to show parents how easy it is to start to interest your toddlers in STEM topics*

STEM Exposure

- *It was a great way to integrate STEM with very little preparation and time. It helped me to integrate passive STEM so students got more exposure without having to create lessons.*
- *The STEM programs that were implemented through our library were made accessible, great outcomes for those that are not able to read standard print. Gave them a great hands-on learning experience.*

Scientific Thinking

- *Overall a sense of FUN regarding science, STEAM, collaboration (the hardest part of STEAM) and creating.*
- *I found the instruction sheets very useful and they were great to use as visuals to show the children to remind them that science and engineering involve continual problem solving and not to get discouraged. It helped keep the process fluent during my presentation and gave me the confidence to present the material.*

2. Student Learning and Engagement

Hands-on learning

- *Increased engagement with littles and hands-on and stories*
- *It continues to add many more hands on activities and my students love exploring and discovering! It helped me gauge my students in a different way that helped them learn better and me group them better to learn. It added more differentiated learning.*

Student Creativity

- *Our students loved working with the microbits. Students were engaged learning to code sensors, sound, and movement. They were very creative with their final projects. The CodeJoy lessons were great places for us to begin. This program is a great example of teacher led-learning. This Scale-Up program also allowed all of our seventh graders to participate and grow in their problem-solving skills. The bonus was that they had fun doing it. Thank you!*

Student Engagement and Motivation

- *It fit with a lot of our standards and increased student engagement because it covered many subject areas and included STEM and hands on activities.*
- *I allowed my students to care for and develop the ioponic system. They took an active role in this STEM Scale-up project. The lesson plans added to the student engagement and background knowledge. This project was ran by my 6th grade Science kids, but the whole school , Pk-8th grade took an interest in this project. They really enjoyed watching the fish grow and feed our produce.*

Individualized Student Learning

- *I love implementing STEM activities with my students. It is exciting to see how students differentiate and are able to expand their learning based on their interest and level.*
- *I try to incorporate STEM into everything I do as a Talented and Gifted teacher. Having these materials enabled me to bring in more STEM learning opportunities, Since other teachers in the same building that I am in also participated in the Story time STEM pack, the students could have some cross teacher learning experiences. The students had a common vocabulary and set of experiences regardless of who their classroom teacher was. This was beneficial to the students and we able better able to meet students at their own level of learning.*

3. Curriculum and Instruction Impact

New Ideas/Materials

- *It helped me believe in myself as a science teacher! It is an entirely new way of thinking and teaching and helped me know that it is OKAY if I don't know everything.*
- *It program really opened my mind to the many ways STEM can be incorporated into library programming. The Fierce and Fearless training in particular helped me connect with teachers and STEM coaches and provided a space to bounce ideas and explore new program possibilities.*

Supplement to Existing Curriculum

- *It was a nice accompaniment to the curriculum and injected something new to increase engagement.*
- *Our 8th grade Technology class needed a reboot. This Scale-Up grant really got me excited. I worked on writing curriculum this past summer to implement this year. Our students learned so much, had fun, and created some amazing projects using the micro:bit and hummingbird base kits.*

Pedagogical Enrichment

- *Any learning, is good learning when it comes to STEM related topics. I am not strong in robotics, math, and some areas of science so being able to experience these STEM Scale Up opportunities has completely turned my teaching around in a positive manner.*
- *I am so happy that I had the opportunity to participate in the STEM Scale-Up Program this past year! I feel more comfortable teaching STEM than I have in the past and am ready to make changes to my program in the future to use more of the things I was exposed to this year.*

4. Additional Issues

Problems Teachers Encountered

- *Technology issues. The students could not connect hubs to Chromebooks. Was never able to resolve that issue. Thankfully, we had some extra iPads in the building that we were able to use. However we lost a month trying to resolve the connectivity problem.*
- *We modified curriculum due to supply chain issues (due to COVID-19). We did more generic building at first and waited to do coding until we got the materials around week 7 of 10.*

STEM Scale-Up Program Student Participants

Data Source Student Participant Lists, Iowa STEM Monitoring Project
Provided by Iowa Testing Programs, University of Iowa

In 2021-2022, there were 30,030 unique students listed on student participant lists submitted to Iowa Testing Programs, of which 16,774 were matched to Iowa Statewide Assessment of Student Progress (ISASP) student records. The remaining 13,256 were in either early elementary (PreK-2) or 12th grades which are grades levels prior to or beyond which the ISASP is typically administered, respectively. Among those matched to their student records, 48% were females and 52% males (Table 3). The distribution of students by race/ethnicity was 76% White, 11% Hispanic, 5% Black/African American, 2% Asian, and 5% other races combined (Table 4).

Table 3. Distribution by sex of STEM Scale-Up Program student participants

	Female	Male		Female	Male
Total[1]			*STEM Region*		
All	48%	52%	Northwest	50%	50%
			North Central	48%	52%
			Northeast	49%	51%
			Southwest	45%	55%
			South Central	47%	53%
			Southeast	48%	52%
Grade[2]	Female	Male	*STEM Scale-Up Program*[3]	Female	Male
PreK	49%	51%	Curriculum for Agricultural Science (CASE): Agricultural Power and Technology	*	*
K	48%	52%	CodeJoy Computational Thinking in Action with Micro:bit	48%	52%
1	48%	52%	DreamBox Learning Math	49%	51%
2	49%	51%	Fierce and Fearless STEAM Teacher Training	48%	52%
3	51%	49%	FIRST LEGO League Explore	48%	52%
4	48%	52%	Ioponics	47%	53%
5	47%	53%	Light & Shadow	52%	48%
6	48%	52%	Nepris	47%	53%
7	47%	53%	Project Lead the Way (PLTW) Gateway Medical Detectives	50%	50%
8	48%	52%	SoapyCilantro	53%	46%
9	46%	54%	Storytime STEM-packs	49%	51%
10	48%	51%	Teaching Energy Transformations and Energy Sources	49%	51%
11	49%	51%	VEX IQ Challenge	42%	58%
12	50%	50%			

*Distribution by sex not reported for counts of less than 30 students.

1. Distribution by sex overall and by region and program subgroup based on matched student records for grades 3-11 (n=16,774).
2. Distribution by sex by grade based on self-report for grades PreK-2/12 (n=13,256) or on matched ISASP student records for grades 3-11 (n=16,774).
3. CASE: Agricultural Power and Technology was awarded in 2020-2021 and implemented in 2021-2022.

Table 4. Distribution by race/ethnicity of STEM Scale-Up Program participants

	White	Hispanic	Black	Asian	All other races combined
All[1]	76%	11%	5%	2%	5%
STEM Region					
Northwest	73%	18%	2%	2%	6%
North Central	83%	10%	1%	2%	3%
Northeast	74%	8%	9%	2%	7%
Southwest	91%	6%	1%	0%	2%
South Central	70%	15%	7%	4%	5%
Southeast	76%	10%	7%	1%	6%
STEM Scale-Up Program[2]					
Curriculum for Agricultural Science (CASE): Agricultural Power and Technology	*	*	*	*	*
CodeJoy Computational Thinking in Action with Micro:bit	82%	9%	3%	2%	4%
DreamBox Learning Math	78%	12%	4%	2%	5%
Fierce and Fearless STEAM Teacher Training	84%	10%	2%	1%	3%
FIRST LEGO League Explore	65%	11%	13%	3%	9%
Ioponics	72%	14%	7%	3%	5%
Light & Shadow	39%	12%	32%	1%	16%
Nepris	85%	6%	3%	1%	5%
Project Lead the Way (PLTW) Gateway Medical Detectives	88%	7%	1%	1%	3%
SoapyCilantro	85%	5%	4%	5%	2%
Storytime STEM-packs	67%	19%	6%	3%	6%
Teaching Energy Transformations and Energy Sources	69%	14%	9%	3%	5%
VEX IQ Challenge	81%	9%	2%	3%	5%

*Distribution by sex not reported for counts of less than 30 students.

1. Distributions by race-ethnicity based on matched student records for grades 3-11 (n=16,774).
2. CASE: Food Science and Safety was awarded in 2020-2021 and implemented in 2021-2022.

Key findings

Statewide standardized assessments are taken annually by nearly every student in 3rd through 11th grade in the State of Iowa. The Iowa Assessments were administered from FY13 through FY18, and the Iowa Statewide Assessment of Student Progress were administered beginning in FY19. Since 2012-2013, an Interest Inventory has been added to the standardized assessments to measure student interest in individual subject areas, STEM careers, and living and working in Iowa after graduation (Appendix A).

STEM Interest among Scale-Up students versus students statewide

The proportion of Scale-Up participants expressing interest in STEM subjects and careers was compared to the proportion of students statewide that expressed interest.

- In 2021-2022, a higher percentage of students who participated in STEM Scale-Up programs said *I like it a lot* (Grades 3-5) or were V*ery interested* (Grades 6-11) in STEM subjects, in pursuing a STEM career, and in working in Iowa after graduation compared to all students statewide (Figure 4).
- The percent of students who said they were *very interested* in having a STEM job was 32% for both Scale-Up program participants and students statewide.
- The percent of students who said they were *very interested* in working in Iowa was 41% of Scale-Up program participants compared to 35% of students statewide.

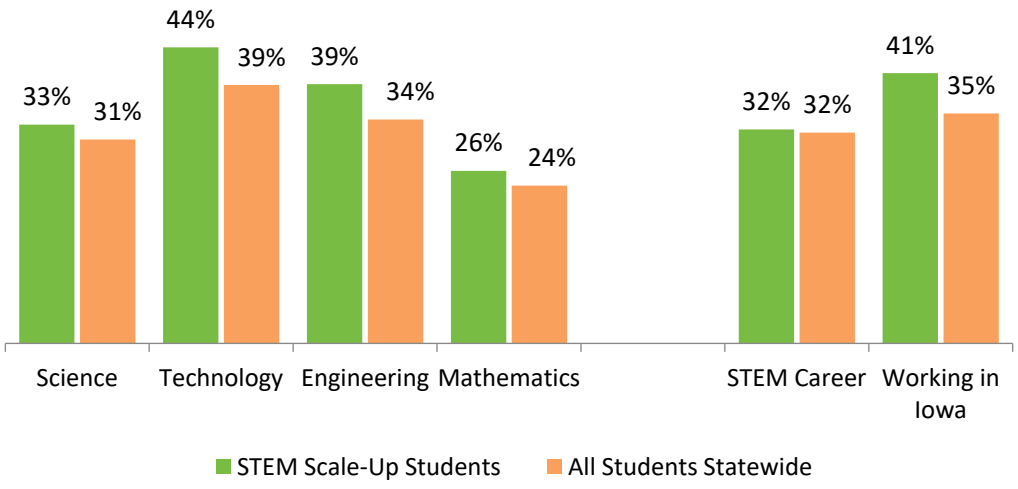


Figure 4. STEM Interest among Scale-Up students in Grades 3 through 11 versus students statewide, 2021/22

- For students in Grades 3-5 and Grades 6-8, interest in STEM topics and STEM careers between Scale-Up participants and students statewide is very similar (Figure 5 and Figure 6, respectively).
- For Grades 9-12, students participating in Scale-Up programs showed more interest in most STEM topic areas (except mathematics) and STEM careers than students statewide (Figure 7).

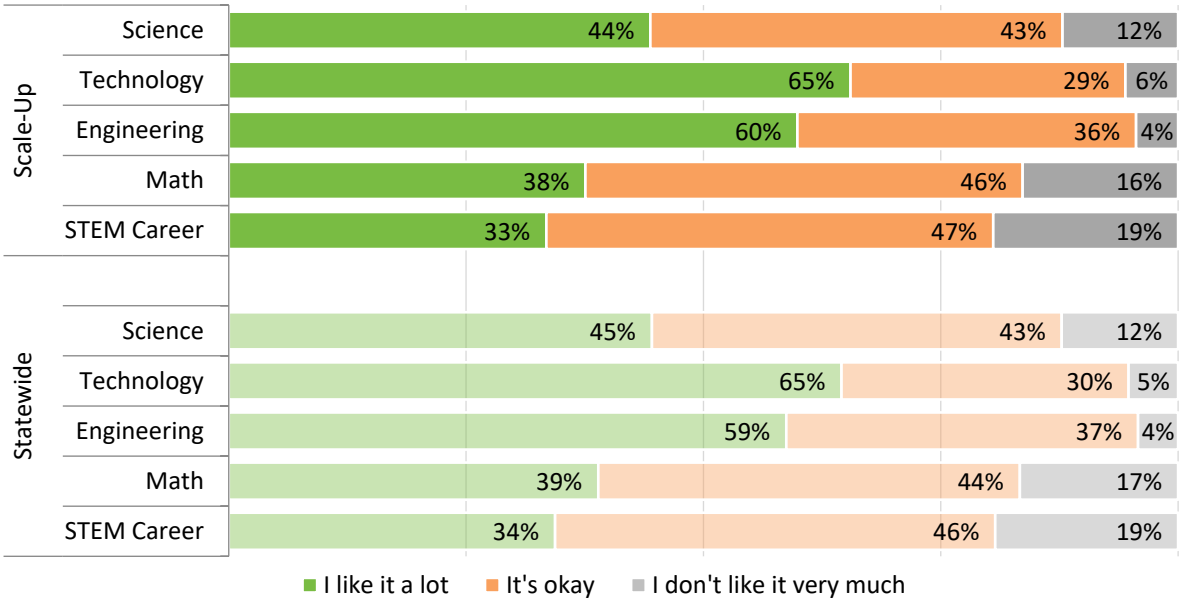


Figure 5. Interest in STEM topics and careers for Grades 3-5 Scale-Up students and students statewide, 2021/22

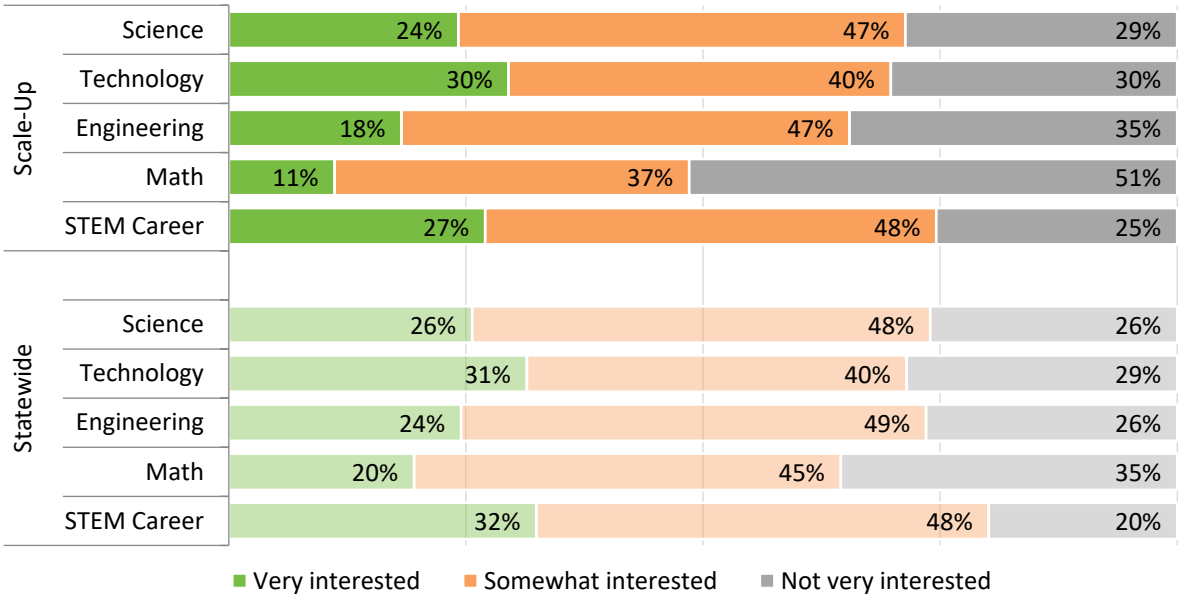


Figure 6. Interest in STEM topics and careers for Grades 6-8 Scale-Up students and students statewide, 2021/22

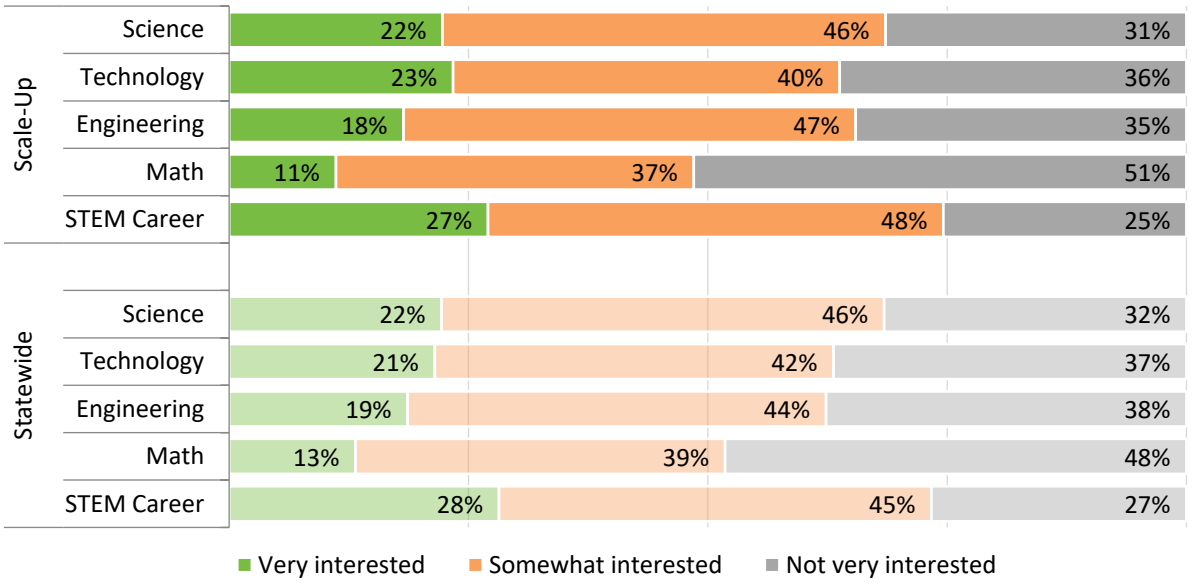


Figure 7. Interest in STEM topics and careers for Grades 9-11 Scale-Up students and students statewide, 2021/22

Achievement in mathematics, science, and English language arts on the Iowa Statewide Assessment of Student Progress (ISASP), Scale-Up students versus statewide comparison

In 2018-2019, the state of Iowa implemented new standardized assessments, the Iowa Statewide Assessment of Student Progress (ISASP). This is a substantial change in the evaluation methods compared to 2017-2018 and years' prior when Iowa Assessments were used to compare Scale-Up student achievement. ISASP assessments in *mathematics* and *English language arts* are given annually to students in 3rd through 11th grade; while the *science* assessment is only administered to students in 5th, 8th, and 10th grade. Students who participated in a STEM Scale-Up program were compared to students statewide with regard to achievement in *mathematics*, *science*, and *English language arts*. The *English language arts* component is a modification to the reading comparisons used in previous years. ISASP scores in these subjects were compared using percentage of students performing at Proficient level or above. This is different metric from comparisons of National Percentile Rank on the Iowa Assessments used in previous reports, and does not allow for comparisons of trends over time with evaluation results from 2017-2018 and years prior. In addition, comparisons reflect association between Scale-Up Programs and achievement, not causation.

- In 2021-2022, STEM Scale-Up Program participants performed better on the Iowa Statewide Assessment of Student Progress (ISASP) in *mathematics* (+2 percentage points) and *science (*+3 percentage point) compared to all students statewide. (Figure 8).
- Results varied by grade level. In most grades, a greater proportion of STEM Scale-Up Program participants in grades 3rd through 8th performed at the Proficient or Advanced level *mathematics* (Figure 9), *science* (Figure 10), and *English language arts* (Figure 11) on the ISASP compared to all students in the same grade statewide. However, this trend was not observed for STEM Scale-Up Program participants in grades 9th through 11th.

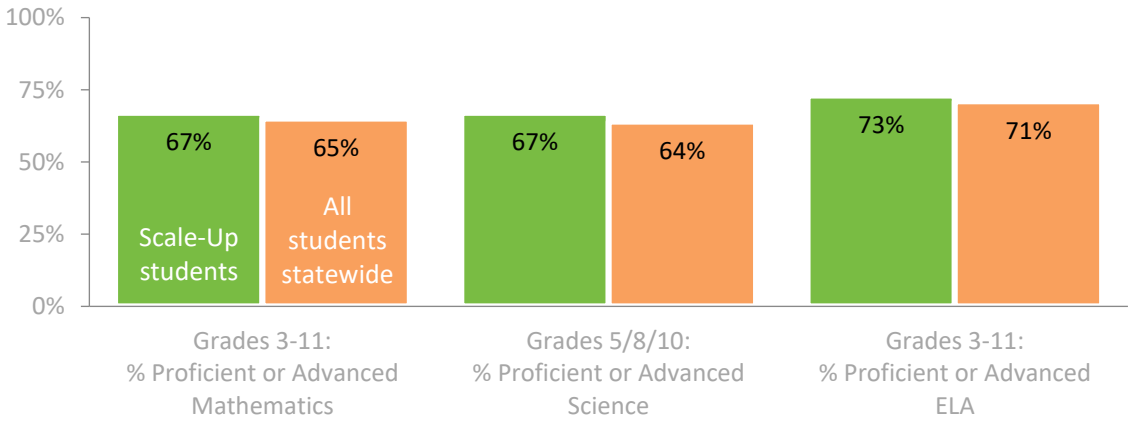


Figure 8. Percent meeting benchmarks at or above Proficient level, Scale-Up students v. all students statewide, 2021/22

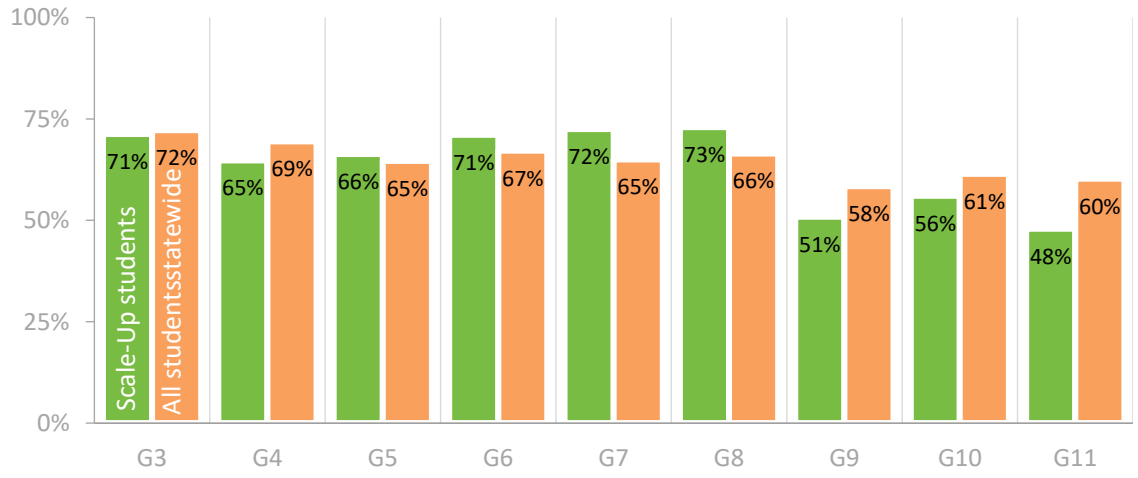


Figure 9. Percent meeting benchmarks at or above Proficient in *Mathematics* by grade level, Scale-Up students v. all students statewide, 2021/22

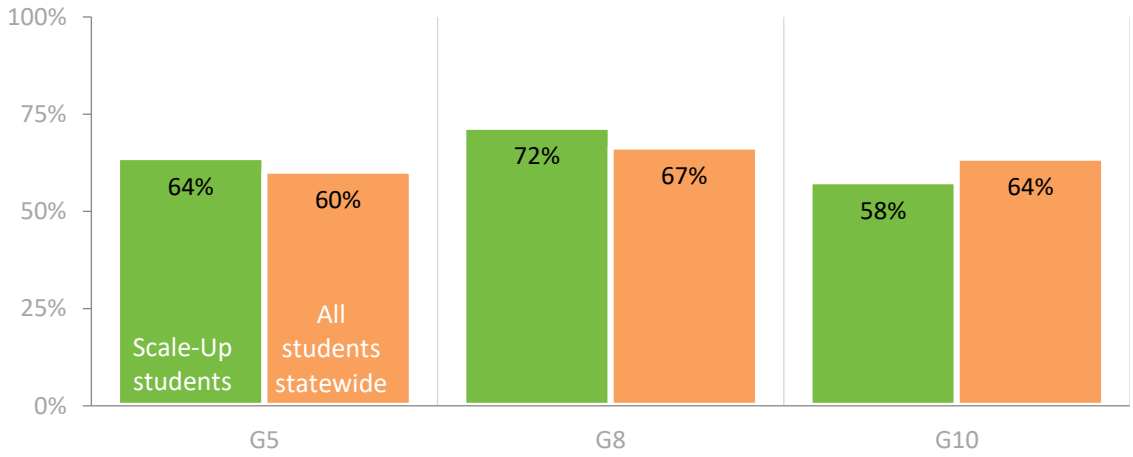


Figure 10. Percent meeting benchmarks at or above Proficient in *Science* in Grades 5/8/10, Scale-Up students v. all students statewide, 2021/22

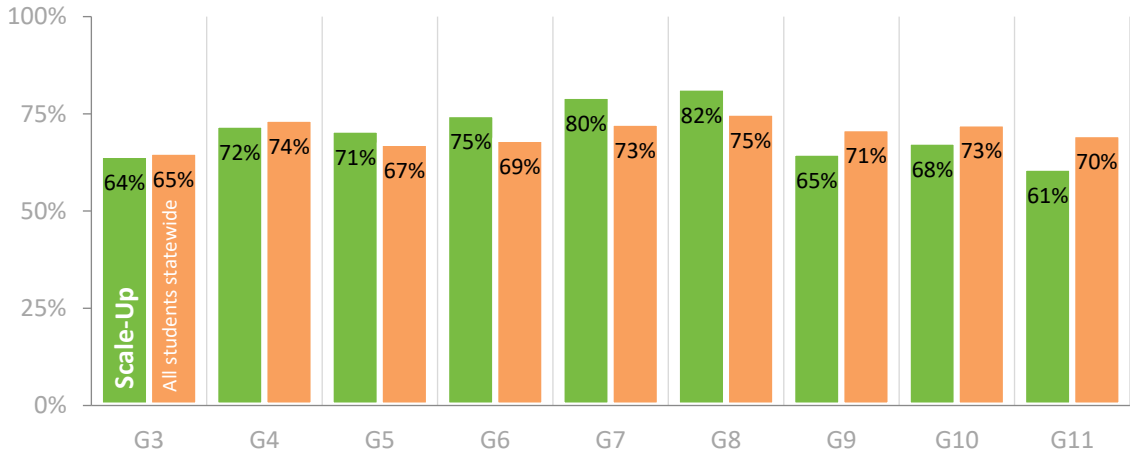


Figure 11. Percent meeting benchmarks at or above Proficient in *English language arts* by grade level, Scale-Up students v. all students statewide, 2021/22

- For minority students, a higher percentage, by +6% in *science* and by +5% *in mathematics*, of STEM Scale-Up Program participants met Proficient or Advanced level benchmarks compared to minority students who did not participate (Figure 12). (Minority students are aggregated scores of all other races combined due to small sample sizes in subgroup analysis).

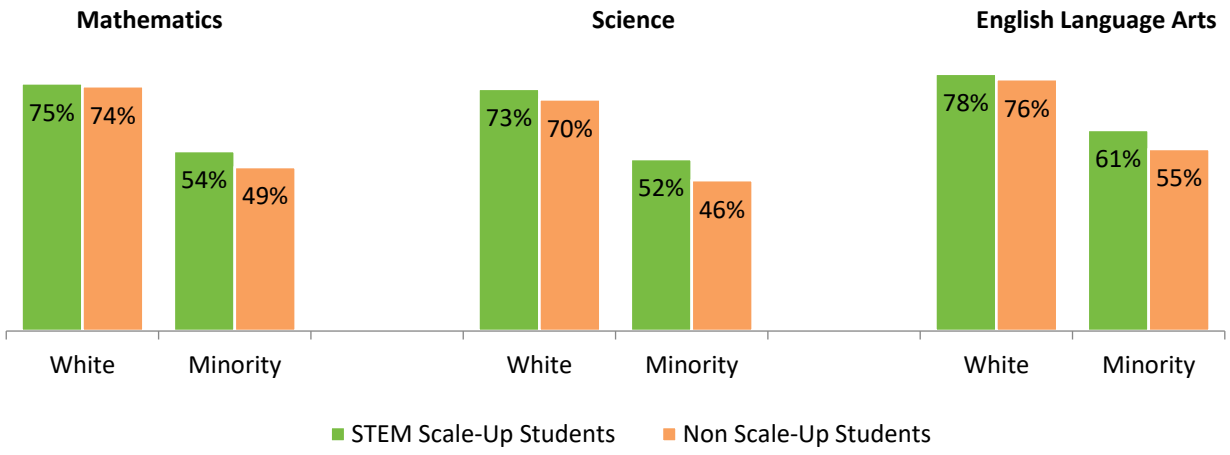


Figure 12. Percent of students performing at Proficient level or above, White versus Minority students in Grades 3 through 8 by STEM Scale-Up program participation, 2021/22

Section 2. Iowa STEM Indicators

Iowa STEM indicators track publicly available data at the national and state level. The purpose of the indicators is to provide annual benchmarks on a variety of STEM topics in education and economic development by systematically assessing the progress and condition of the state's STEM landscape. The indicators fulfill the need for benchmarks related to a variety of domains in the area of STEM education and workforce development.

Iowa's STEM indicators are organized across four primary areas of focus: 1) STEM achievement and interest among preK-12 students, 2) STEM preparation of preK-12 students, 3) STEM college completions, and 4) STEM employment (Table 5). All indicators are reviewed each year for data quality and utility in providing useful benchmarks to the Council. In addition, new or updated indicators are explored as other data and data sources are identified or in response to targeted activities or policy interests by the Council (Table 5).

When possible, the indicators are compared across demographic, geographic, and other characteristics of respondents. Data used to track Iowa's STEM indicators are publicly available and come from sources such as the Iowa Department of Education, the National Center for Education Statistics (NCES), Iowa Workforce Development (IWD), ACT, and Iowa Testing Programs. Each data source has its own dissemination schedule in the timing of data collection, analysis, and reporting, which does not always overlap with the timeline of this report. This variability limits the ability to report on all indicators at the same time annually.

Table 5. Indicators tracked for 2021-2022

Indicator	Data source	2017 /18	2018 /19	2019 /20	2020 /21	2021 /22
STEM achievement and interest among preK-12 students						
Iowa student achievement in mathematics and science	Iowa Testing Programs	✓	✓	✓	✓	✓
Iowa student achievement on NAEP mathematics and science tests[1]	National Center for Education Statistics	✓	✓	✓	✓	✓
Number/Percentage of preK-12 students interested in STEM topic areas	Iowa Testing Programs	✓	✓	✓	✓	✓
Number of students taking the ACT and average scores in mathematics/science	ACT	✓	✓	✓	✓	✓
Interest in STEM among ACT test-takers	ACT	✓	✓			
Top 5 majors among ACT test-takers with interest in STEM	ACT	✓	✓			
STEM preparation of preK-12 students						
Enrollment in STEM courses in high school	Iowa Department of Education	✓	✓	✓	✓	✓
Number of students taking STEM Advanced Placement tests and average scores	College Board	✓	✓	✓	✓	✓
Concurrent and dual enrollment in STEM courses	Iowa Department of Education	✓	✓	✓	✓	✓
Number of current Iowa teachers with K-8 STEM endorsements, 5-8 STEM endorsements, and K-12 STEM specialist endorsements[2]	Iowa Department of Education	✓	✓	✓	✓	✓
Post-secondary enrollment and training in STEM fields						
Community college enrollment and degrees/awards in STEM fields	Iowa Department of Education	✓	✓	✓	✓	✓
College and university enrollment and degrees awarded in STEM fields	Integrated Postsecondary Education Data System	✓	✓	✓	✓	✓
STEM employment						
Percent of Iowans in workforce employed in STEM occupations	Iowa Workforce Development	✓	✓	✓	✓	✓
Job vacancy rates in STEM occupational areas	Iowa Workforce Development	✓	✓	✓	✓	✓

Indicator 1: Iowa student achievement in mathematics and science

Data source Iowa Testing Programs, The University of Iowa

This indicator tracks the proportion of Iowa students statewide who are proficient or above in mathematics and science. In 2018-2019, Iowa Testing Programs administered a new state assessment, the Iowa Statewide Assessment of Student Progress (ISASP) which replaced the Iowa Assessments. Caution should be used in comparing performance on the ISASP to prior years when the Iowa Assessments were administered. The ISASP was not administered in 2019-2020 due to the coronavirus (COVID-19) pandemic. This indicator shows the first year of data from 2018-2019 compared to 2021-2022.

Key findings

- In **mathematics achievement**, the percentage of students in grades 4th, 8th, and 11th who were at or above proficiency **decreased** from 2018-2019 to 2021-2022. In 2021-2022, 69% of students in 4th grade, 66% of students in 8th grade, and 60% of students in 11th grade were proficient or above compared to 72%, 71%, and 66% in 2018-2019, respectively. (Table 6).
- In **science achievement**, the percentage of students in grades 5th, 8th, and 10th who were at or above proficiency **increased** from 2018-2019 to 2021-2022. In 2021-2022, 60% of students in 5th grade, 66% of students in 8th grade, and 63% of students in 10th grade were proficient or above compared to 51%, 58%, and 62%, respectively.
- By sex, a **higher proportion of female students were proficient or above in both mathematics and science compared to male students in the secondary grade levels** but were lower in the elementary grade level.
- Across years, the proportion at or above proficient in mathematics decreased for both males and females from 2018-2019 to 2021-2022. In science, the proportion at or above proficient increased among males from 2018-2019 to 2021-2022. Among females, science achievement increased across years for 5th grade and 8th grade, but decreased across years for 10th grade.
- Overall, there are disparities in proficiency across subgroups. The proportions of minority students, those of low socioeconomic status, and students with disabilities who demonstrate proficiency are consistently lower than the overall rates. Across years, the percentage meeting proficiency generally decreased for mathematics but increased for science across most subgroups.

Table 6. Proportion of Iowa students statewide who are proficient or above in mathematics and science

		2018-2019			2021-2022			Trend 2018/19 to 2021/22		
		4th	8th	11th	4th	8th	11th	4th	8th	11th
Mathematics	Overall	72%	71%	66%	69%	66%	60%	↓	↓	↓
	Male	74%	69%	64%	71%	65%	58%	↓	↓	↓
	Female	70%	74%	68%	66%	67%	61%	↓	↓	↓
	White	78%	76%	72%	76%	72%	65%	↓	↓	↓
	Black / African American	39%	40%	30%	34%	33%	28%	↓	↓	↓
	Hispanic	57%	55%	46%	50%	50%	39%	↓	↓	↓
	Low income	58%	56%	47%	52%	50%	41%	↓	↓	↓
	Disability	33%	23%	13%	33%	23%	12%	↔	↔	↓
		5th	8th	10th	5th	8th	10th	5th	8th	10th
Science	Overall	51%	58%	62%	60%	66%	63%	↑	↑	↑
	Male	50%	57%	58%	60%	65%	62%	↑	↑	↑
	Female	52%	59%	67%	59%	67%	65%	↑	↑	↓
	White	57%	63%	68%	67%	72%	69%	↑	↑	↑
	Black / African American	21%	26%	28%	27%	33%	29%	↑	↑	↑
	Hispanic	34%	39%	43%	40%	50%	45%	↑	↑	↑
	Low income	36%	42%	46%	43%	50%	48%	↑	↑	↑
	Disability	19%	17%	16%	24%	24%	21%	↑	↑	↑

Source: Iowa Statewide Assessment of Student Progress, Iowa Testing Programs, The University of Iowa

Retrieved from *The Annual Condition of Education*, Iowa Department of Education, 2022
https://educateiowa.gov/data-reporting/education-statistics-pk-12/annual-condition-education-report-pk-12

1. In 2018-19, Iowa Testing Programs administered a new state assessment, the Iowa Statewide Assessment of Student Progress (ISASP). Caution should be made in comparing performance on the ISASP to years prior to 2018-2019.

2. Proficiency cut scores for the ISASP are presented in a Standard Score metric and are specific to grade and content. These cut scores categorize student performance into one of three levels: Advanced, Proficient and Not Yet Proficient.

3. The 2019-2020, the ISASP was not administrated due to the coronavirus (COVID-19) pandemic.

Indicator 2: Iowa student achievement on NAEP mathematics tests

Data source National Assessment of Educational Progress (NAEP), National Center for Education Statistics (NCES)

NAEP Assessments in mathematics were administered to 4th and 8th grade students in odd numbered years from 2013 to 2019, and in 2022. NAEP Assessments in science were administered in 2009, 2011 (8th grade only), and 2015 and are reported in previous annual reports from FY13 through FY18.

Key findings

- Compared to 2013, mathematics scores in 2022 decreased among 4th grade students and across all demographic subgroups. The difference was statistically significant ($p<.05$) for all students, males, females, and Hispanic students (Table 7).
- Compared to 2013, mathematics scores in 2022 decreased among 8th grade students and across most demographic subgroups (overall, males, females, or Hispanic). The difference was statistically significant for all students, males, females, and Hispanic students.
- Iowa's national rank increased to 8th in the nation for 4th grade mathematics scores compared to 14th in 2013. For 8th grade mathematics, Iowa's national rank increased from 25th in 2013 to 15th in 2022. However, the increased rank reflects scores have dropped more dramatically in other states since Iowa scores have decreased during that time frame.
- Less than half (40%) of 4th graders and just one-quarter (28%) of 8th graders who took the NAEP mathematics test in 2022 scored well enough to be rated at or above proficient in mathematics.

Table 7. Iowa mathematics scores on the National Assessment of Educational Progress

Grade	Variable		2013		2022		Iowa's Trend since 2013
			Iowa	National	Iowa	National	
4th	Scale score (0-500)	All students	246	242	240*	236*	↓
		Males	247	242	243*	239*	↓
		Females	244	241	237*	239*	↓
		Black / African American	218	224	211	217*	↓
		Hispanic	234	231	223*	224*	↓
	National rank[1]		14		8		↑
	Num. jurisdictions significantly higher than IA[3]		4		2		↑
	Percent at or above Proficient (>249)		48%	42%	40%	36%	↓
	Percent at Advanced (>282)		9%	8%	8%	8%	↓
8th	Scale score (0-500)	All students	285	285	277*	274*	↓
		Males	286	285	278*	275*	↓
		Females	284	284	276*	273*	↓
		Black / African American	255	263	248	253*	↓
		Hispanic	265	272	256*	261*	↓
	National rank		25		15		↑
	Num. jurisdictions significantly higher than IA[2]		17		7		↑
	Percent at or above Proficient (>299)		36%	35%	28%	26%	↓
	Percent at Advanced (>333)		7%	9%	6%	7%	↔

*Significantly different at p< .05, 2022 versus 2013

Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), Mathematics Assessments

Retrieved from: https://www.nationsreportcard.gov/ndecore/xplore/nde

1. National rank is based out of 52 jurisdictions (50 states, the District of Columbia, and Department of Defense Education Activity).
2. A jurisdiction is defined as any government defined geographic area sampled in the NAEP assessment.

Indicator 3: Number and percentage of students in Grades 3-5, Grades 6-8, and Grades 9-12 interested in STEM topics and careers

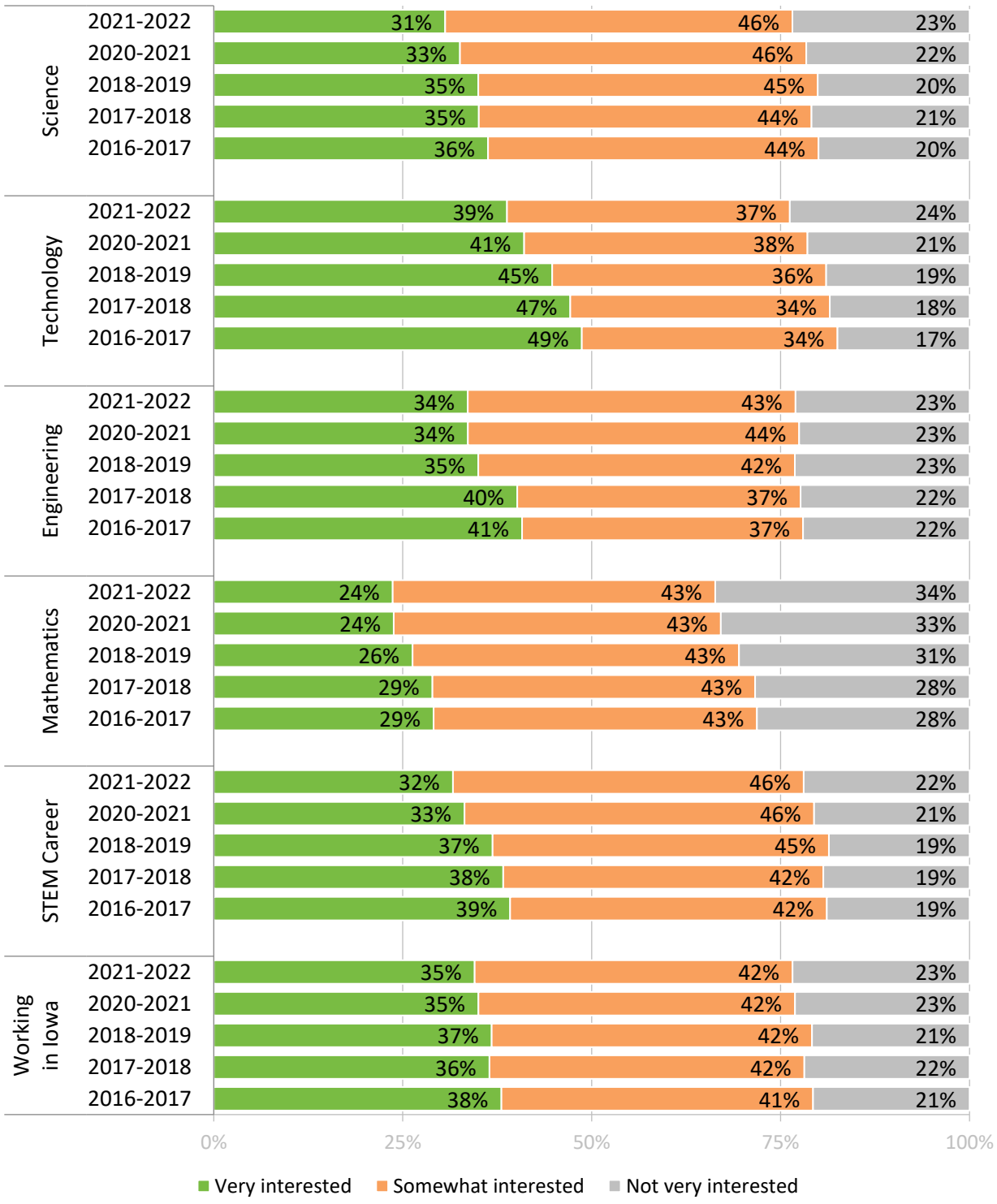
Data source Iowa Assessments (FY13-FY19) and Iowa Statewide Assessment of Student Progress (FY19, FY21, FY22), Iowa Testing Programs, The University of Iowa

Statewide standardized tests are taken annually by nearly every student in 3rd through 11th grade in the State of Iowa. The Iowa Assessments were administered from FY13 through FY18, and the Iowa Statewide Assessment of Student Progress (ISASP) were administered beginning in FY19. Since 2012-2013, an 8-item interest inventory has been added to the standardized tests. In January 2016, an additional item was added. (See Appendix A for items.) Schools have the option to administer the inventory to their students. The Interest Inventory was developed in part to serve as a data source for both the Iowa STEM indicators and as a way to compare students who participate in Scale-Up Programs with all students statewide. (See Section 1 for results specific to STEM Scale-Up Program participants.)

For 2021-2022, among the 344,066 students in Iowa who took the Iowa Statewide Assessment of Student Progress, 332,037 also completed the Interest Inventory (97% participation rate).

Key findings

- Among all students statewide, interest in individual STEM topics or in pursuing STEM careers started high in 2012-2013 and remained high through 2021-2022. Over three-quarters (75%) of all students statewide indicated they were “very interested” or “somewhat interested” in science, technology, engineering, or in pursuing a STEM career in 2021-2022 (Figure 13). Approximately two-thirds (67%) said they were “very interested” or “somewhat interested” in mathematics.
- In Figure 14, students who said they were “very interested” or “somewhat interested” were combined to compare changes in interest across the four STEM subjects and in STEM careers from 2012-2013 to 2021-2022 among all students statewide. Interest in the four STEM subjects is consistently highest among students in Grades 3-5, followed by students in Grades 6-8, and Grades 9-12, respectively. However, interest in pursuing a STEM career is comparable across the grade groups, ranging from 73% to 81% in 2021-2022.



Note: The ISASP was not administered in 2019-2020 due to the coronavirus (COVID-19) pandemic.

Figure 13. Statewide student interest in individual STEM topics, STEM careers, and working in Iowa, 2016/17 to 2021/22

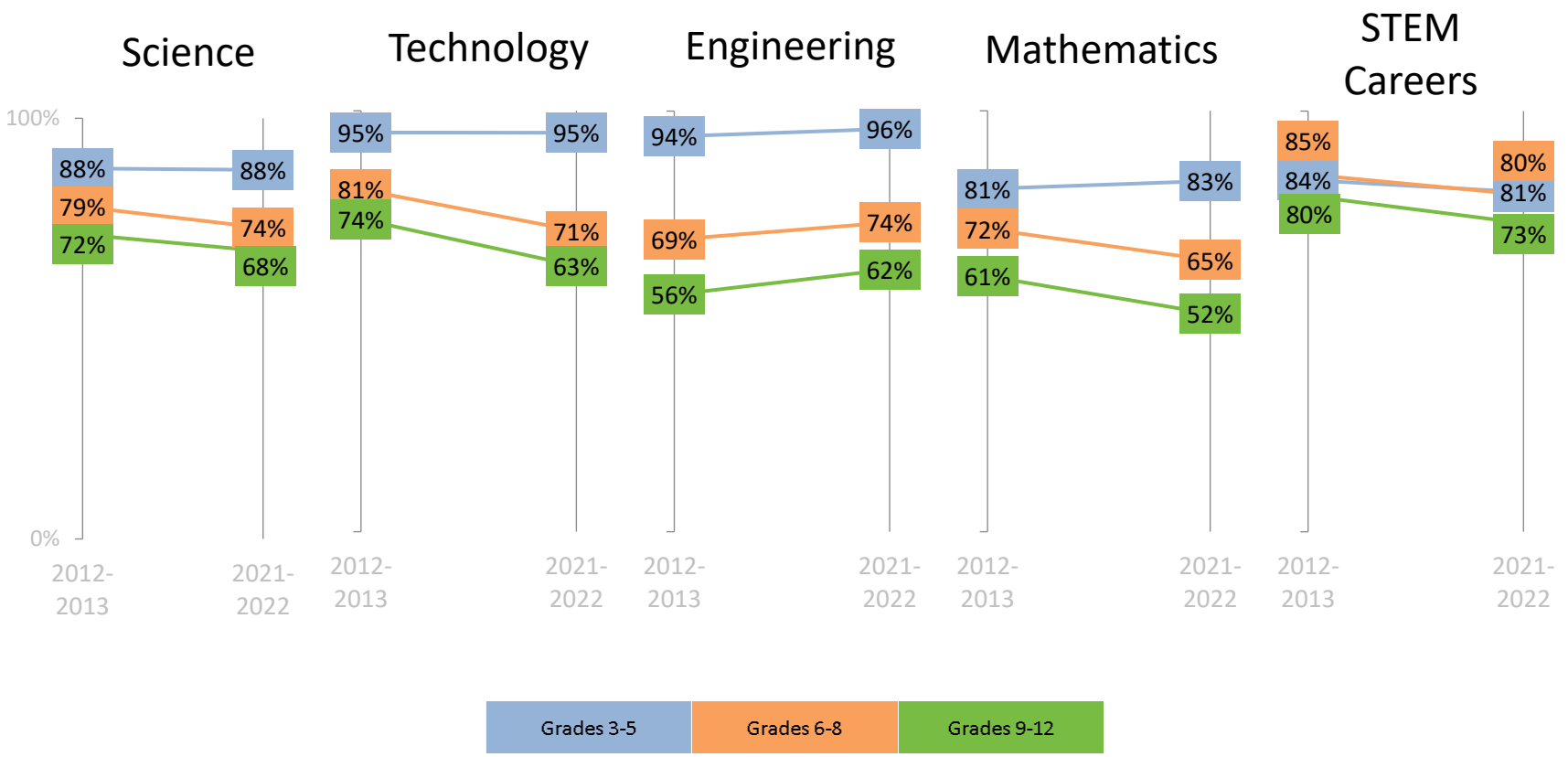


Figure 14. Proportion of all students statewide by grade group who said they were “very interested” or “somewhat interested” in STEM topics and STEM careers, 2012/13 to 2021/22

- Among all students statewide who took the Iowa Statewide Assessment of Student Progress in 2021-2022, interest in individual STEM subjects is highest among elementary students, followed by middle school and high school students, respectively (Figure 15).
- While interest in all STEM subjects decreased from elementary grades through high school, the proportion of all students statewide who are "very interested" in pursuing a STEM career remains close across grade groups, from 34% among grades 3rd through 5th, 32% among grades 6th through 8th, and 28% among grades 9th through 12th.

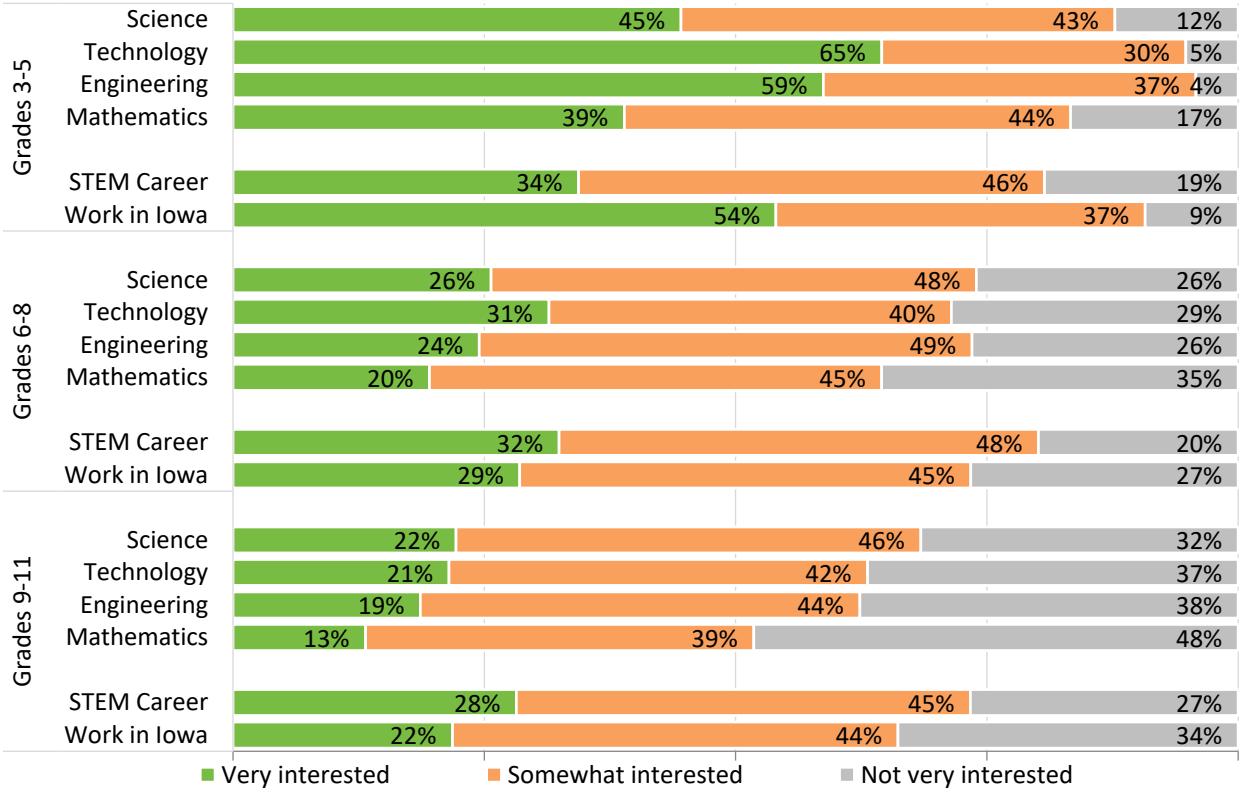


Figure 15. Statewide Student Interest Inventory for all students statewide by grade group, 2021/22

- Among all students statewide by sex, the percentage of females who said they were "very interested" in a STEM career is consistently lower than the percentage of males who say the same across all grade groups. (Figure 16).

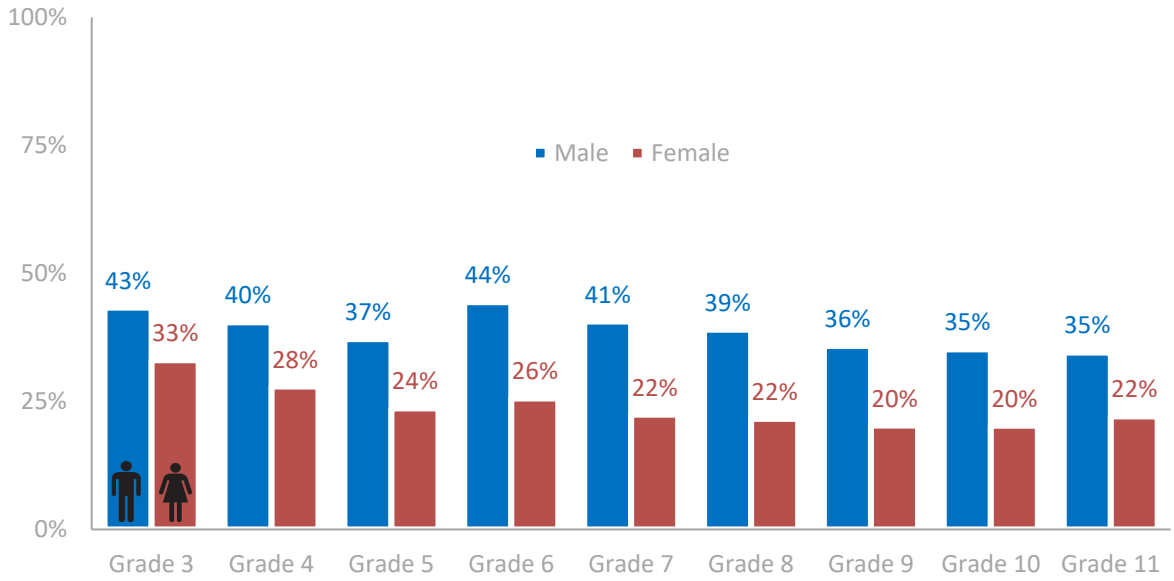


Figure 16. Percentage of male or female students statewide who said they were "very interested" in a STEM career by grade, 2021/22

- The proportion of both male and female students "very interested" in individual STEM subject areas decline with advancing grade levels (Figure 17). The percentage of females who are "Very interested" in STEM subject areas is consistently lower than the percentage of male students across nearly all grade levels. The difference in interest by sex widens with advancing grades in the subject areas of computers/technology and engineering
    - The proportion of students who are "very interested" in science is similar between males and females: 51% of males and 50% of females in grade 3 compared to 22% of males and 24% of females in grade 11.
    - In computer technology, the difference in grade 5 is -20 percentage points (72% of males versus 52% of females), in grade 8 is -27 percentage points (38% of males versus 11% of females), and -24 percentage points in grade 11 (32% males versus 8% of females) between the proportions of males and females who are "very interested."
    - In engineering, the difference in grade 5 is -9 percentage points (62% of males versus 53% of females), in grade 8 is -22 percentage points (34% of males versus 12% of females), and -20 percentage points in grade 11 (27% males versus 7% of females) between the proportions of males and females who are "very interested."

- In mathematics, there is a similar trend of decline for both females and males: 49% of males and 41% of females are “very interested” in grade 3 compared to 15% of males and 10% of females in grade 11.

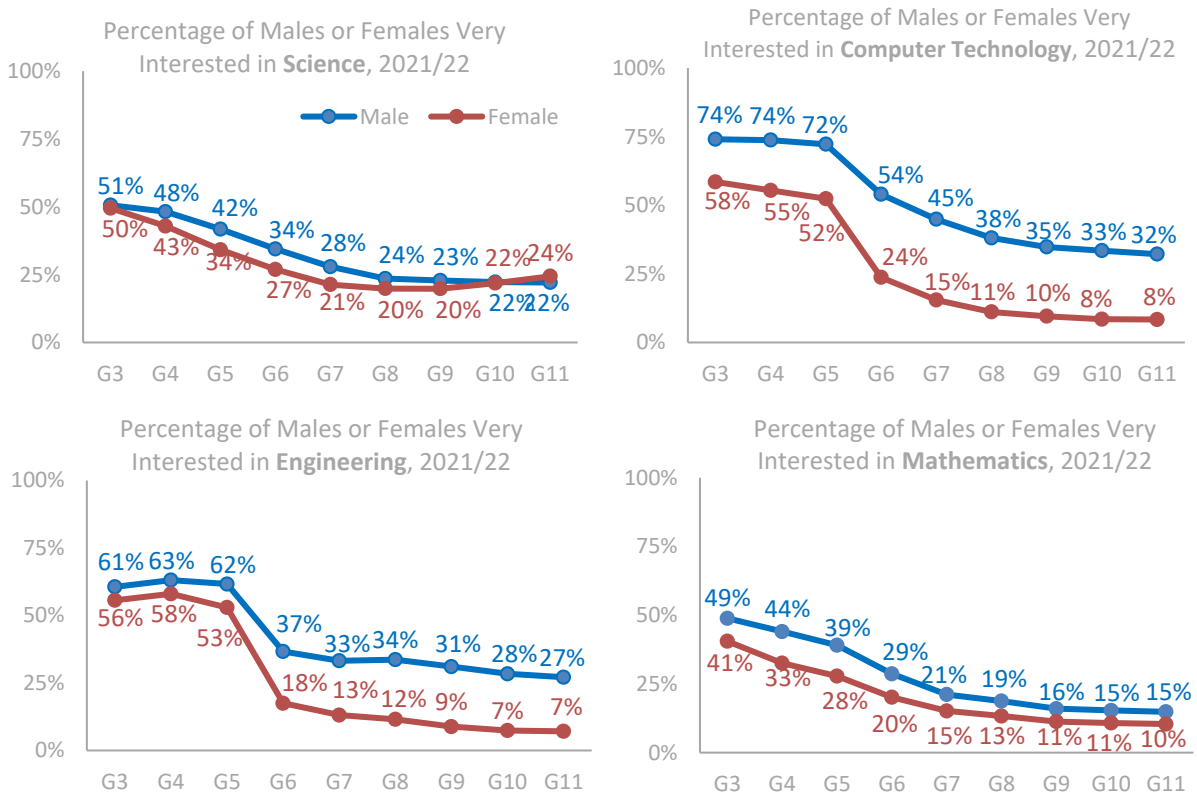


Figure 17. Percentage of males or females “very interested” in STEM-related subject areas by grade, 2021/22

- The proportion of students who are “very interested” in STEM careers is higher among students who are Black / African American, Hispanic, or Asian compared to White in grades 3 to 6 (Figure 18). Interest among students who are Asian remains high from grades 3 (42%) to 11 (42%), and interest declines only 9 percentage points for White students. In contrast, the proportion of Black / African American students who are “very interested” starts high at 46% in Grade 3 yet declines to 29% in Grade 11 (a net loss of -17), and drops from 42% among Hispanic students in Grade 3 to 28% in Grade 11 (-15 net loss).

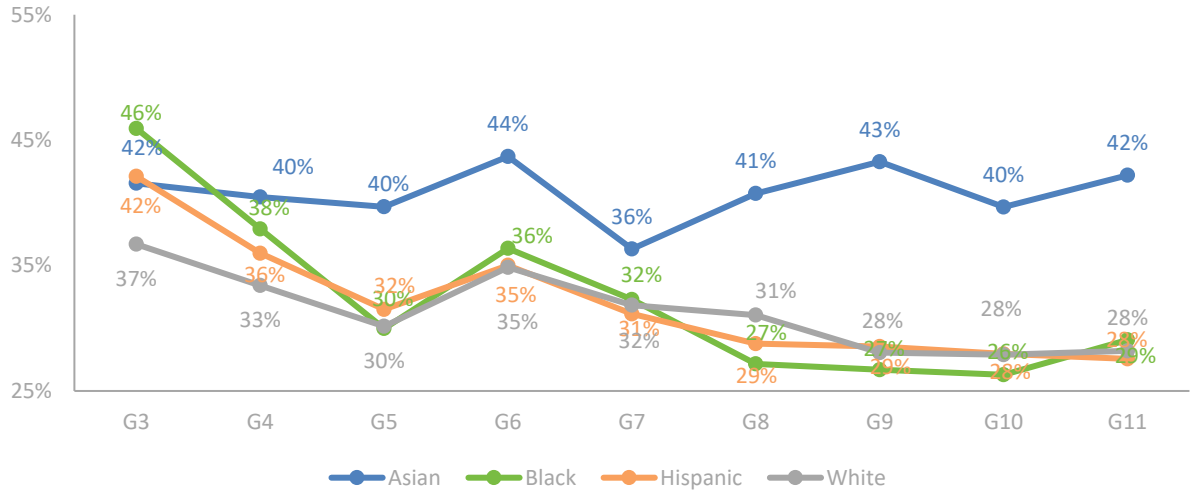


Figure 18. Percentage of all students statewide who said they were "very interested" in a STEM career by race/ethnicity and grade, 2021/22

- A greater proportion of students who said they were "very interested" in a STEM career met Proficient or Advanced benchmarks in mathematics and science achievement on the Iowa Statewide Assessment of Student Progress (ISASP) compared to students who were "not very interested." This is true for both males and females (Figure 19) and racial or ethnic groups (Figure 20).

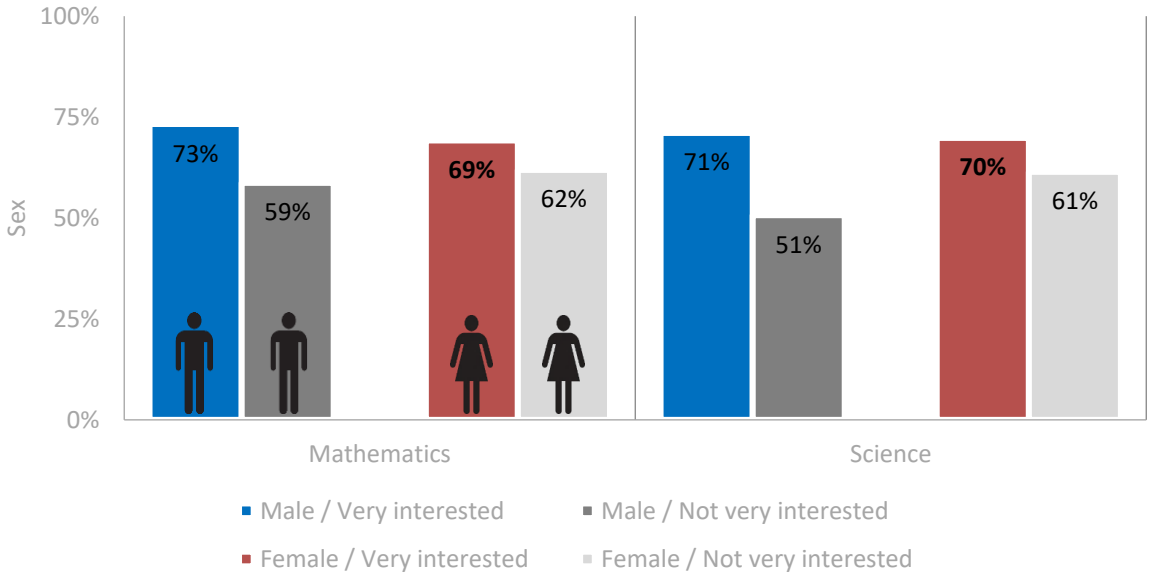
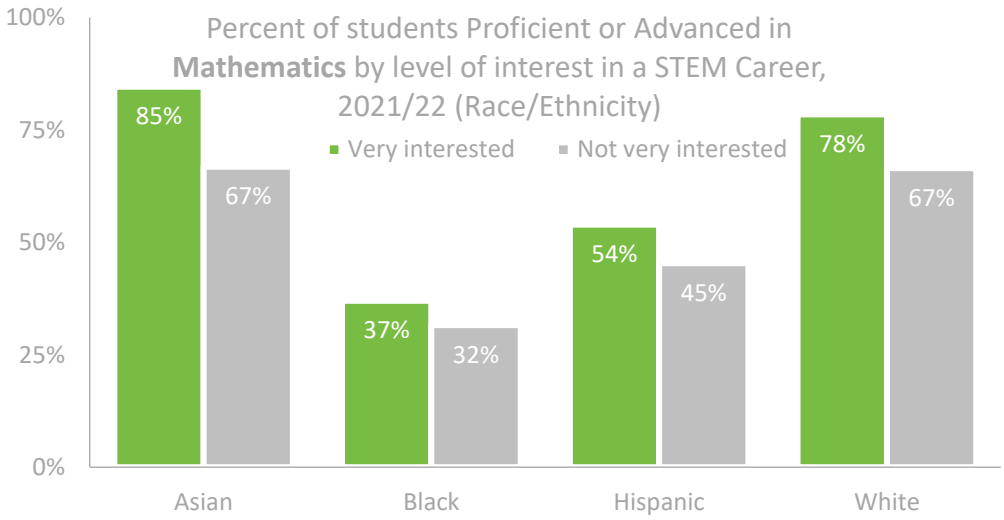


Figure 19. Percent of students Proficient or Advanced in Mathematics / Science by level of interest in a STEM Career by sex, 2021/22



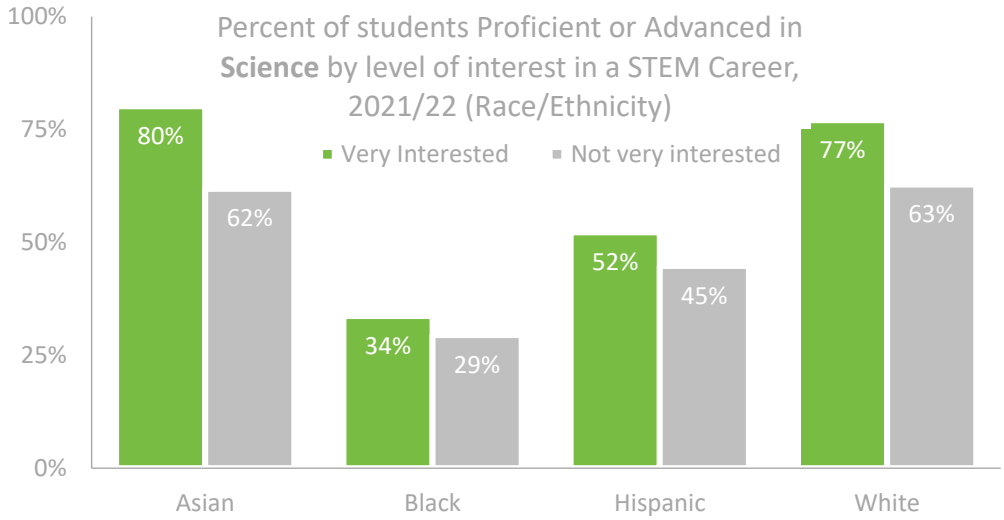


Figure 20. Percent of students Proficient or Advanced in Mathematics / Science by level of interest in a STEM Career by race or ethnicity, 2021/22

Indicator 4: Number of students taking the ACT and average scores in mathematics, science, and STEM

Data source ACT, Inc.

Mathematics and science achievement on the ACT test are reported by year reflecting the performance of graduating seniors in that year who took the ACT test as a sophomore, junior, or senior and self-reported that they were scheduled to graduate in the respective year. Trends are compared from the most recent year available, 2022 (which reflects graduating seniors in 2022 who took the ACT during 2019/20, 2020/21, or 2021/22 academic years, respectively) to 2013 (which reflects graduating seniors in 2013 who took the ACT in 2010/11, 2011/12, or 2012/13), the first year of the Governor's STEM Advisory Council programming.

Among Iowa's graduating class of 2022, 49% of students (n=18,296) took the ACT which is lower than previous classes.

Key findings

- Average ACT scores of graduating seniors in mathematics and science trended lower in 2021 and 2022 compared to 2013 (Table 8). In 2022, Iowa's average ACT score was 20.6 in mathematics and 21.6 in science, compared to 19.3 and 19.9 nationwide, respectively.
- Iowa's graduating class of 2022 who took the ACT achieved an average STEM score of 21.6 compared to 19.9 nationally, which reflects overall performance in mathematics and science.
- In 2022, 40% of graduating seniors in Iowa who took the ACT met benchmarks for mathematics and science, which was lower than both 2021 and 2013.
- By sex, the percent meeting college readiness benchmarks in mathematics decreased from 56% to 48% among males and from 45% to 34% among females between 2013 and 2022, respectively. The proportion of males and females who met college readiness benchmarks in science also decreased between 2013 and 2020, from 52% to 49% among males and 42% to 39% among females, respectively.
- Disparities exist in average ACT scores by race/ethnicity with an average of 5 points lower among students who are Black / African American and an average of 3 points lower among students who are Hispanic compared to their White counterparts (Table 9).
- Disparities exist among students by race/ethnicity with only 12% of Black / African American students and 22% of Hispanic students meeting benchmarks in mathematics, compared with 44% of White students in 2022.

Table 8. ACT scores and benchmarks for Iowa students, 2013-2022

		Iowa 2013[1]		Iowa 2021	Iowa 2022	Trend since 2013	National 2022
Overall	Number of students tested	22,526	---	17,658	18,296	↓	1,349,644
	Proportion of graduating class	66%	---	47%	49%	↓	
	Average ACT scores[2]						
	Composite	22.1	---	21.5	21.4	↓	19.8
	Mathematics	21.6	---	20.8	20.6	↓	19.3
	Science	22.2	---	21.8	21.6	↓	19.9
	STEM	22.2	---	21.5	21.4	↓	19.9
	Percent meeting benchmarks[3]						
	Mathematics	50%	---	41%	40%	↓	31%
	Science	46%	---	44%	43%	↓	32%
Males	Number of students tested	10,406	---	7,291	8,091	↓	631,336
	Average ACT scores						
	Composite	22.3	---	21.9	21.7	↓	19.7
	Mathematics	22.3	---	21.8	21.6	↓	19.7
	Science	22.8	---	22.5	22.3	↓	20.0
	STEM	22.8	---	22.4	22.2	↓	20.1
	Percent meeting benchmarks						
	Mathematics	56%	---	49%	48%	↓	34%
	Science	52%	---	50%	49%	↓	34%
Females	Number of students tested	12,091	---	9,103	9,898	↓	674,287
	Average ACT scores						
	Composite	21.9	---	21.6	21.1	↓	20.0
	Mathematics	21.0	---	20.3	19.9	↓	19.1
	Science	21.7	---	21.6	21.1	↓	19.9
	STEM	21.6	---	21.2	20.8	↓	19.7
	Percent meeting benchmarks						
	Mathematics	45%	---	38%	34%	↓	29%
	Science	42%	---	42%	39%	↓	31%

Source: ACT Profile Report: Graduating Class 2022, Iowa; ACT, Inc. https://www.act.org/content/act/en/research/services-and-resources/data-and-visualization/grad-class-database-2022.html

1. Year reflects performance of graduating seniors in that year who took the ACT as a sophomore, junior, or senior and self-reported that they were scheduled to graduate in the corresponding year.
2. Scores: Include an overall Composite Score and individual test scores in four subject areas (English, Mathematics, Reading, Science) that range from 1 (low) to 36 (high). The Composite Score is the average of the four test scores, rounded to the nearest whole number. The STEM score describes student overall proficiency in mathematics and science.
3. College Readiness Benchmarks: the minimum score needed on an ACT subject-area test to indicate a 50% chance of obtaining a B or higher or about a 75% chance of obtaining a C or higher in the corresponding credit-bearing college courses.

Table 9. ACT scores and benchmarks for Iowa students by student race/ethnicity, 2013-2020

		Iowa 2013[1]		Iowa 2021	Iowa 2022	Trend since 2013	National 2022
White	Number of students tested	18,712	---	13,208	13,809	↓	708,952
	Average ACT scores[2]						
	Composite	22.5	---	22.2	21.9	↓	21.3
	Mathematics	21.9	---	21.3	21.1	↓	20.6
	Science	22.6	---	22.4	22.2	↓	21.3
	STEM	22.5		22.1	21.9	↓	21.2
	Percent meeting benchmarks[3]						
	Mathematics	53%	---	46%	44%	↓	40%
	Science	49%	---	48%	47%	↓	42%
African American	Number of students tested	601	---	500	497	↓	153,579
	Average ACT scores[2]						
	Composite	17.3	---	16.7	17.2	↓	16.1
	Mathematics	17.4	---	16.6	16.7	↓	16.0
	Science	17.8	---	17.4	17.6	↓	16.5
	STEM	17.9		17.2	17.4	↓	16.5
	Percent meeting benchmarks[3]						
	Mathematics	16%	---	13%	12%	↓	9%
	Science	15%	---	15%	15%	↔	10%
Hispanic	Number of students tested	1,204	---	1,203	1,420	↑	210,205
	Average ACT scores[2]						
	Composite	19.1	---	18.5	18.9	↓	17.7
	Mathematics	18.9	---	18.1	18.3	↓	17.5
	Science	19.4	---	19.1	19.3	↓	18.0
	STEM	19.4		18.9	19.0	↓	18.0
	Percent meeting benchmarks[3]						
	Mathematics	27%	---	21%	22%	↓	19%
	Science	24%	---	24%	24%	↔	19%

Source: ACT Profile Report: Graduating Class 2022, Iowa; ACT, Inc.
https://www.act.org/content/act/en/research/services-and-resources/data-and-visualization/grad-class-database-2022.html

1. Year reflects performance of graduating seniors in that year who took the ACT as a sophomore, junior, or senior and self-reported that they were scheduled to graduate in the corresponding year.
2. Scores: Include an overall Composite Score and individual test scores in four subject areas (English, Mathematics, Reading, Science) that range from 1 (low) to 36 (high). The Composite Score is the average of the four test scores, rounded to the nearest whole number. The STEM score describes student overall proficiency in mathematics and science.
3. College Readiness Benchmarks: the minimum score needed on an ACT subject-area test to indicate a 50% chance of obtaining a B or higher or about a 75% chance of obtaining a C or higher in the corresponding credit-bearing college courses.

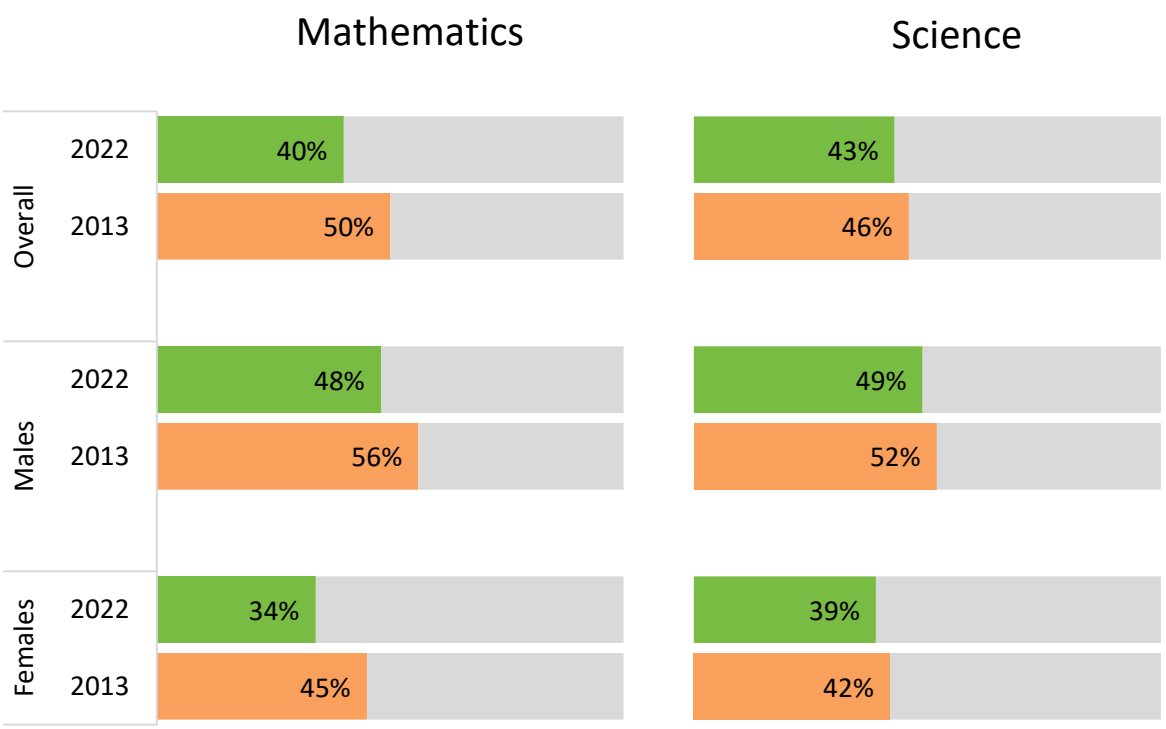


Figure 21. Percentage of Iowa graduating seniors meeting college readiness benchmarks in mathematics and science based on ACT scores by sex

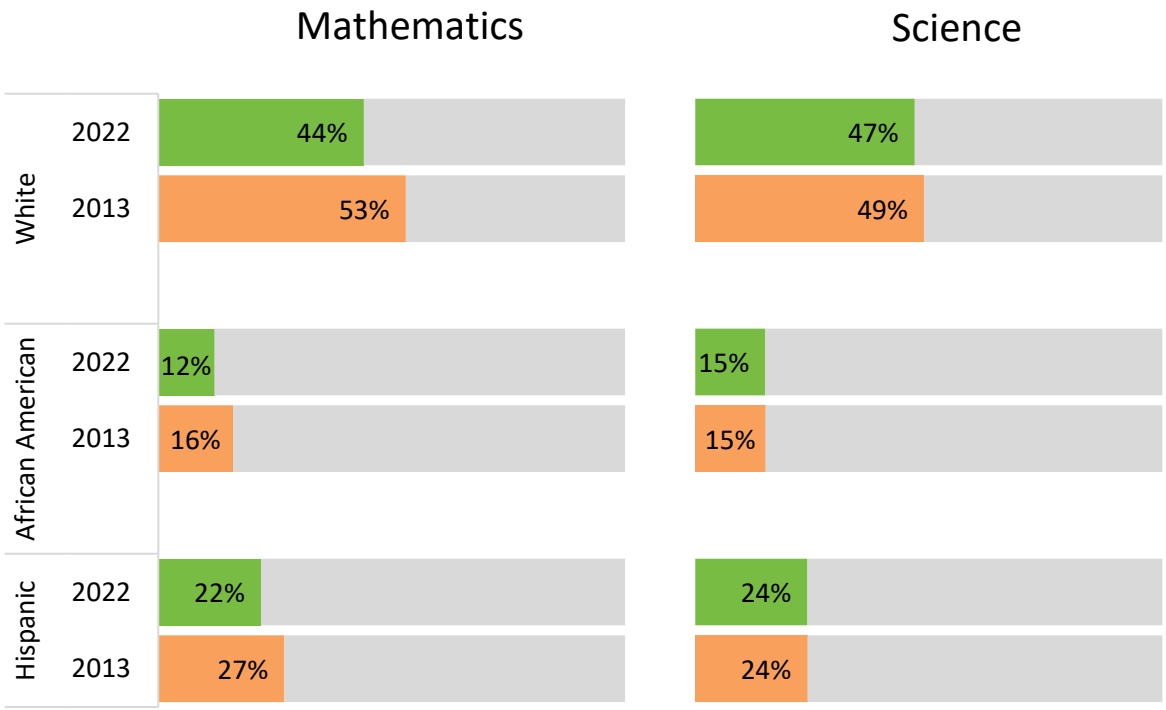


Figure 22. Percentage of Iowa graduating seniors meeting college readiness benchmarks in mathematics and science based on ACT scores by race/ethnicity

Indicator 5: Enrollment in STEM-related courses in high school

Data source Iowa Department of Education, Bureau of Information and Analysis Services, 2022

Indicator 5 investigates the opportunities available for Iowa students to take basic and advanced level STEM courses in high school.

Key findings

Table 10 provides the number of high school students statewide enrolled in each STEM-related subject area over a ten-year period. Trends in student enrollment in STEM-related courses compared data from the first year the Governor's STEM Advisory Council in 2012-2013 to the most current year. Note that increases and decreases in core mathematics and science enrollment, in contrast to elective course enrollment trends, likely reflect population shifts.

- Over a ten year period, enrollment in science and mathematics courses has increased, while enrollment in technology, engineering, and health courses has decreased.
- From 2020-2021 to 2021-2022, student enrollment decreased in all but one STEM-related subject area. Enrollment in engineering courses increased 26%, while science courses decreased 2%, technology courses decreased 1%, math courses decreased 4%, and health courses decreased 18%.
- Between 2012-2013 and 2021-2022, student enrollment in science courses increased by 8%.
- The number of students enrolled in technology courses has decreased by 27% from 2012-2013 to 2021-2022.
- Between 2012-2013 and 2021-2022, the number of high school students enrolled in mathematics classes increased by 8%.
- Since 2012-2013, enrollment in health courses has decreased by 40%.
- The percentage of underrepresented minority students enrolled in STEM-subject areas has generally increased annually in the last five years (Table 11). Enrollment by underrepresented minority students in science has increased by +7.4 percentage points, +4.8 in technology, +2.5 in engineering, +7.4 in mathematics, and +4.5 in health.

Table 10. Student enrollment in high school courses of STEM-related subject areas

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	% Change 2012/13-2021/22	% Change 2020/21-2021/22
Science	73,633	73,996	74,178	75,997	75,195	76,869	78,112	82,262	81,497	79,763	8%	-2%
Male	50%	50%	49%	49%	49%	49%	48%	49%	48%	49%		
Female	50%	50%	51%	51%	51%	51%	52%	52%	52%	51%		
Technology	7,791	7,032	7,239	7,086	6,889	6,755	6,293	6,163	5,728	5,695	-27%	-1%
Male	69%	71%	74%	73%	73%	75%	75%	77%	76%	74%		
Female	31%	29%	26%	27%	27%	25%	26%	23%	24%	26%		
Engineering	7,954	8,952	8,957	7,882	7,082	4,070	3,777	3,467	2,118	2,668	-66%	26%
Male	84%	84%	85%	84%	84%	87%	86%	84%	86%	83%		
Female	16%	17%	16%	16%	16%	13%	15%	16%	14%	17%		
Mathematics	49,602	51,210	50,894	54,163	55,710	55,357	55,451	57,034	55,989	53,604	8%	-4%
Male	50%	50%	49%	49%	49%	49%	49%	49%	49%	49%		
Female	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%		
Health	412	373	296	364	397	398	274	340	304	248	-40%	-18%
Male	31%	32%	25%	21%	25%	20%	29%	26%	27%	20%		
Female	69%	68%	75%	79%	75%	80%	71%	74%	73%	80%		

Table 11. Percentage of students enrolled in STEM subject courses who are an underrepresented minority[1]

	2012/13		2017/18	2018/19	2019/20	2020/21	2021/22
Science	15.1%	---	18.9%	20.2%	21.5%	22.4%	26.3%
Technology	12.5%	---	16.4%	14.4%	16.5%	15.0%	21.2%
Engineering	13.8%	---	17.3%	17.5%	17. 5%	11.2%	19.8%
Mathematics	9.0%	---	14.0%	14.7%	15.5%	16.4%	21.4%
Health	6.3%	---	10.3%	8.4%	10.0%	10.2%	14.9%

1. Underrepresented minority students include Black or African American, Hispanic/Latino, American Indian or Alaska Native, and Native Hawaiian or other Pacific Islander, including:
Hispanic/Latino (A person of Cuban, Mexican, Puerto Rican, Cuban, South or Central American, or other Spanish culture or origin, regardless of race.)
American Indian or Alaska Native (A person having origins in any of the original peoples of North and South America, including Central America, and who maintains tribal affiliation or community attachment.)
Black or African American (A person having origins in any of the Black racial groups of Africa.)
Native Hawaiian or Other Pacific Islander (A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.)

Indicator 6: Number of students taking STEM-related Advanced Placement tests and average scores

Data source Iowa Department of Education, Bureau of Information and Analysis, Student Reporting in Iowa, winter files

Key findings

- From 2012-2013 to 2021-2022, the number of students taking Advanced Placement (AP) courses in STEM-related subjects increased 24% from 6,476 to 8,041 (Table 12).
- The largest increase occurred for AP courses in career technical / vocational education (302%) followed by mathematics (29%).

Table 12. Iowa Advanced Placement courses taken by STEM-related subject area 2012/13 to 2021/22

Subject Area	2012-2013		2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	Percent change since 2013
Science	3,405	--	4,087	4,079	4,141	4,705	3,655	7%
Mathematics	2,920	--	3,708	4,232	4,403	4,356	3,779	29%
Career technical / Vocational education	151	--	362	508	726	585	607	302%
STEM Total	6,476	--	8,157	8,819	9,270	9,646	8,041	24%

Source: Iowa Department of Education, Bureau of Information and Analysis, Student Reporting in Iowa, winter files.
Retrieved from *The Annual Condition of Education*, Iowa Department of Education, 2022.
https://educateiowa.gov/data-reporting/education-statistics-pk-12/annual-condition-education-report-pk-12

Indicator 7: Iowa concurrent enrollment in science and mathematics

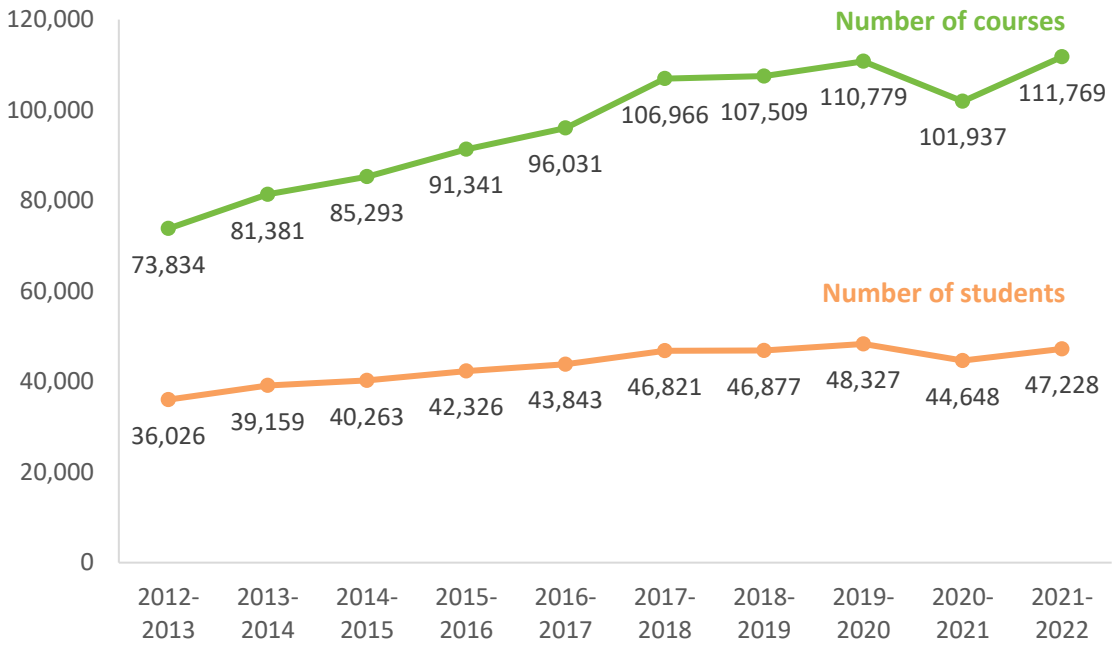
Data sources Iowa Department of Education, Bureau of Information and Analysis,
Student Reporting in Iowa, winter files
Annual Condition of Iowa's Community Colleges, January 2023

This indicator tracks the concurrent enrollment and number of courses taken. The data are reported annually and compiled by the Iowa Department of Education for reporting of the Annual Condition of Education. Additional sources provide information about joint enrollment.

Concurrent enrollment courses through 28E agreements between school districts and Iowa's community colleges. There are two course types offered: 1) the courses are designed for both college and high school students for concurrent credit offered by community colleges, or 2) the courses are designed for high school students offered by community colleges to bridge high school students to community college programs and typically provide coursework in science, technology, engineering, and mathematics (STEM) or other highly technical areas. The second type of course through 28E agreements between high school and community college are designed for career academy concurrent credit.

Key findings

- In the academic year 2021-2022, a total of 50,082 unduplicated high school students jointly enrolled in community college courses, up 5.8 percent from the prior year.
- In the academic year 2021-2022, 42.6% of total community college enrollment came from jointly enrolled students.
- Figure 23 shows concurrent enrollment from 2012-2013 to 2021-2022. After decreasing for the first time in the time series in 2020-2021, concurrent enrollment has nearly recovered having increased the number of students (5.8%) and the number of courses taken (9.6%).
- Each year, more than 98 percent of Iowa districts (only those districts that had a public high school) had concurrent enrollments (Table 13). In 2021-2022, only one district with a public high school did not have concurrent enrollment.
- Concurrent enrollments by grade are displayed in Table 14. After decreasing for the first time in the time series in 2020-2021, the number of students taking concurrent enrollment courses has increased for every grade level in 2021-2022, but is still shy of 2019-2020 counts.
- Table 15 shows the concurrent enrollment courses taken in STEM-related subject areas for the past five years. The highest percentages of courses taken were in career technical / vocational education, followed by mathematics and science courses.



Source: Iowa Department of Education, Bureau of Information and Analysis, Student Reporting in Iowa, winter files.

Retrieved from *The Annual Condition of Education*, Iowa Department of Education, 2022.
https://educateiowa.gov/data-reporting/education-statistics-pk-12/annual-condition-education-report-pk-12

Figure 23. Iowa concurrent enrollment and courses taken 2012/13 to 2021/22

Table 13. Iowa school districts with concurrent enrollment 2012/13 to 2021/22

Year	Total # of Districts	Districts with High Schools	Districts with Concurrent Enrollment	Percent of Districts with High Schools that had Concurrent Enrollment
2012-2013	348	316	309	97.8%
2013-2014	346	314	310	98.7%
2014-2015	338	312	302	96.8%
2015-2016	336	310	304	98.1%
2016-2017	333	306	302	98.7%
2017-2018	333	304	302	99.3%
2018-2019	330	303	301	99.3%
2019-2020	327	302	302	100.0%
2020-2021	327	302	301	99.7%
2021-2022	327	302	301	99.7%

Source: Iowa Department of Education, Bureau of Information and Analysis, Student Reporting in Iowa, winter files.
Retrieved from The Annual Condition of Education, Iowa Department of Education, 2022.
https://educateiowa.gov/data-reporting/education-statistics-pk-12/annual-condition-education-report-pk-12

Table 14. Total number of Iowa school students taking concurrent enrollment courses 2012/13 to 2021/22

Year	9th Graders	10th Graders	11th Graders	12th Graders	Total Enrollment
2012-2013	2,403	4,365	11,962	17,296	36,026
2013-2014	2,748	5,056	12,858	18,497	39,159
2014-2015	3,013	5,421	13,204	18,625	40,263
2015-2016	3,414	6,039	13,668	19,205	42,326
2016-2017	3,279	6,017	14,871	19,676	43,843
2017-2018	3,512	6,691	15,555	21,063	46,821
2018-2019	3,088	6,891	15,737	21,161	46,877
2019-2020	3,155	7,029	16,543	21,600	48,327
2020-2021	2,542	6,349	15,289	20,468	44,648
2021-2022	3,076	6,855	16,395	20,902	47,228

Source: Iowa Department of Education, Bureau of Information and Analysis, Student Reporting in Iowa, winter files.

Retrieved from *The Annual Condition of Education*, Iowa Department of Education, 2022.
https://educateiowa.gov/data-reporting/education-statistics-pk-12/annual-condition-education-report-pk-12

Table 15. Iowa concurrent enrollment courses taken by STEM-related subject area 2012/13 to 2021/22

Subject Area	2012-2013		2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Mathematics	7,555	--	9,678	9,745	10,075	9,678	10,657
	(10%)		(9%)	(9%)	(9%)	(10%)	(10%)
Science	2,921	--	4,483	4,758	4,658	4,105	4,487
	(4%)		(4%)	(4%)	(4%)	(4%)	(4%)
Career technical / Vocational education	25,910	--	35,169	32,836	34,257	29,656	33,607
	(35%)		(33%)	(31%)	(31%)	(29%)	(30%)
Total courses taken	73,834	--	106,966	107,509	110,779	101,937	111,769

Source: Iowa Department of Education, Bureau of Information and Analysis, Student Reporting in Iowa, winter files.

Retrieved from *The Annual Condition of Education*, Iowa Department of Education, 2022.
https://educateiowa.gov/data-reporting/education-statistics-pk-12/annual-condition-education-report-pk-12

Indicator 8: Number of current Iowa teachers with endorsements in K-8 STEM, 5-8 STEM, K-12 STEM specialist, 5-12 engineering, and/or 5-12 CTE Information Technology

Data source Basic Educational Data Survey (BEDS), Bureau of Information and Analysis Services, Iowa Department of Education

A collaborative effort of the Governor's STEM Advisory Council and the Board of Educational Examiners (BOEE) led to the development of a STEM endorsement available to teachers and teacher candidates. Three endorsements—K-8 STEM, 5-8 STEM, and K-12 STEM Specialist—authorize educators to teach science, mathematics, and integrated STEM courses in grades Kindergarten through eighth grade, fifth through eighth grade, or Kindergarten through twelfth grade, respectively.[3] Endorsement in 5-12 engineering is also reported.

Key findings

- Since 2014, 276 STEM teaching endorsements have been granted: 23 for K-8 STEM, 15 for 5-8 STEM, seven for K-12 STEM Specialist, 57 for 5-12 Engineering, and 177 for 5-12 CTE Information Technology. (Table 16).
- In 2022, 17 endorsements were granted: 3 for K-8 STEM, 3 for 5-8 STEM, 2 for K-12 STEM Specialist, 5 for 5-12 Engineering, and 4 for 5-12 CTE Information Technology. (Figure 24).
- Eight Iowa colleges and universities currently offer K-8 and 5-8 STEM endorsements-Buena Vista University, Central College, Dordt College, Drake University, Grandview University, Morningside College, Saint Ambrose University, and the University of Northern Iowa.
- Drake University remains the only university to offer the K-12 STEM Specialist Endorsement.
- Dordt University remains the only university to offer a 5-12 Engineering endorsement program
- University of Northern Iowa remains the only university to offer a CTE IT endorsement program
- The University of Iowa offers a Master of Science in STEM Education, Drake University offers a Master of Science in Education in STEM, Morningside College offers a Master of Arts in Teaching in STEM Education, and the University of Northern Iowa offers a Minor in STEM Education.

[3] See https://boee.iowa.gov/endorsements/endorsements-list for a description of the authorization, program requirements, and content for each.

Table 16. Number of Iowa educators with STEM endorsements, 2014-2022

STEM Area Endorsement[1]	2014	2015	2016	2017	2018	2019	2020	2021[2]	2022	Total
K-8 STEM	1	1	0	3	5	3	4	3	3	23
5-8 STEM	0	0	1	2	4	2	2	1	3	15
K-12 STEM Specialist	1	1	0	0	1	1	1	0	2	7
5-12 Engineering	1	5	8	14	7	6	7	4	5	57
5-12 CTE Information Technology	0	0	0	11	141	8	7	6	4	177

Source: Iowa Department of Education, Bureau of Information and Analysis Services, Basic Educational Data Survey (BEDS), 2022

1. Annual counts based on calendar year; conditional and standard licenses counted separately.
2. Counts from 1/1/2021 - 7/1/2021.

Table 17. Number of new STEM endorsements added per year by sex, 2014-2022

	2014	2015	2016	2017	2018	2019	2020	2021[2]	2022
Men	1	4	6	12	69	9	7	5	9
Women	2	3	3	18	89	11	14	9	8

Source: Iowa Department of Education, Bureau of Information and Analysis Services, Basic Educational Data Survey (BEDS), 2022

1. Annual counts based on calendar year; conditional and standard licenses counted separately.
2. Counts from 1/1/2021 - 7/1/2021.

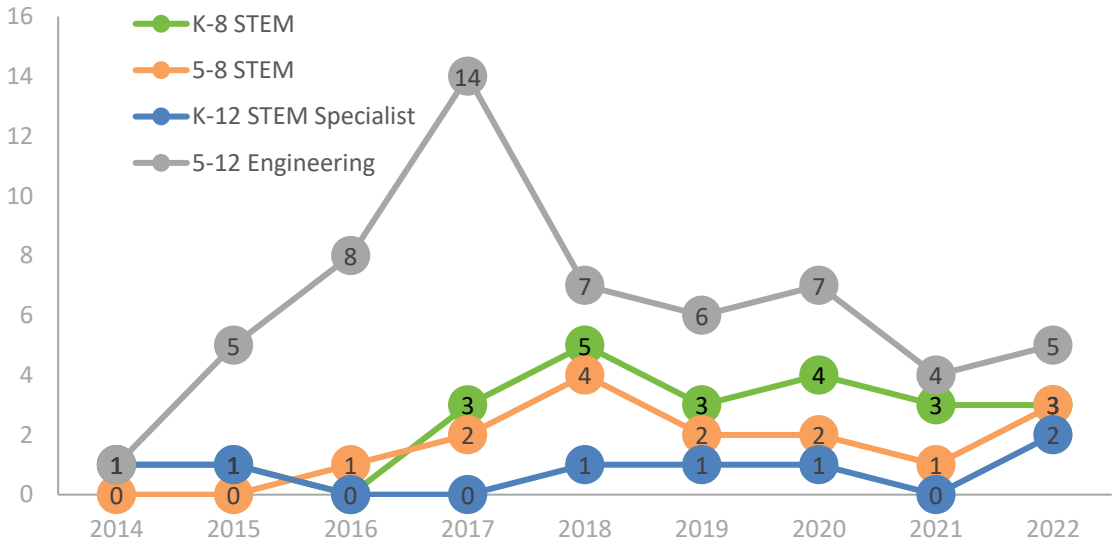


Figure 24. Number of Iowa educators receiving STEM endorsements, 2014-2022

Table 18. Iowa colleges and universities with STEM endorsement programs in 2022

College/ University[1,2]	K-8 STEM	5-8 STEM	K-12 STEM Specialist	5-12 Engineering	CTE Info. Tech	STEM Degree	STEM Education Minor
Buena Vista University	X	X					
Central College	X	X					
Dordt University	X	X		X			
Drake University	X	X	X			MSE in STEM Education	
Grandview University	X	X					
Morningside College	X	X					
Saint Ambrose University	X	X					
University of Iowa						MS in STEM Education	
University of Northern Iowa	X	X			X		Minor in STEM Education

Source: Iowa Board of Educational Examiners: https://boee.iowa.gov/endorsement/k-8-stem; https://boee.iowa.gov/endorsement/5-8-stem; https://boee.iowa.gov/endorsement/k-12-stem-specialist; https://boee.iowa.gov/endorsement/5-12-engineering; https://boee.iowa.gov/endorsement/5-12-cte-information-technology;

Indicator 9: Community college awards in STEM fields

Data source Iowa Department of Education, Division of Community Colleges

Awards include diplomas, certificates, Associate's degrees, and other awards as identified and classified by the Iowa Department of Education Division of Community Colleges. The Iowa Department of Education classifies career and technical education programs into occupational "career clusters," following the National Career Clusters Framework. Four of these (architecture and construction, health sciences, information technology, and STEM) were tracked for the purposes of Indicator 9.

Note there are differences in operational definitions of STEM awards/degrees depending on the data source. In addition, the definition of "STEM degrees" varies by data source. Indicator 10 also includes information on STEM degrees from Iowa's community colleges using Classification of Instructional Programs (CIP) codes compared to awards as reported by career cluster here. STEM awards by career cluster will be broader in definition. STEM degrees defined by CIP codes will be more specific.

Key findings

- In 2022, 6,253 students enrolled in Iowa's community colleges in degree fields categorized by career clusters in architecture and construction, information technology, and STEM. An additional 10,143 students were enrolled in health sciences (Table 19).
- When assessed by career cluster, enrollment in STEM fields has decreased 27% at Iowa's community colleges.
- A total of 6,652 awards in STEM-related fields as categorized by career cluster were awarded by Iowa's community colleges in 2022 (Table 20).
- Overall, the total number of awards in STEM-related degree fields from Iowa's community colleges increased 25% from 2013 to 2022. Notably in 2022, awards to minority graduates increased 75% compared to 2013.

Table 19. Community college enrollment by career cluster

Career cluster[1]	2013		2018	2019	2020	2021	2022	% Change 2013 to 2022
Architecture and Construction	2,082	---	1,481	1,473	1,465	1,584	1,796	-14%
Information Technology	2,607	---	2,341	2,126	2,213	2,300	2,357	-10%
Science, Technology, Engineering, and Mathematics	245	---	262	220	461	1,401	2,100	757%
Health Science	17,600	---	11,679	11,265	10,871	10,936	10,143	-42%
TOTAL	22,534	---	15,763	15,084	15,010	16,221	16,396	-27%

Source: Iowa Department of Education, Division of Community Colleges. (2022). *The annual condition of Iowa's community colleges: 2022*.

Retrieved from https://www.educateiowa.gov/document-type/condition-community-colleges

1. Definitions of Career Clusters can be obtained from http://www.careerclusters.org/

Table 20. Community college awards by career cluster

	2013		2018	2019	2020	2021	2022	Percent Change 2013 to 2022
Architecture and Construction[1,2]								
Total	566	---	863	828	798	982	1,115	97%
Male[3]	521	---	812	784	748	914	990	90%
Female	32	---	47	43	48	67	122	281%
White	326	---	680	654	612	754	884	171%
Minority	79	---	162	155	160	203	203	157%
Information Technology								
Total	490	---	674	698	709	644	615	26%
Male	374	---	577	561	610	522	507	36%
Female	113	---	96	136	99	122	108	-4%
White	330	---	509	522	529	477	471	43%
Minority	61	---	130	126	142	142	132	116%
Science, Technology, Engineering, and Mathematics								
Total	78	---	91	75	87	143	269	245%
Male	45	---	79	66	66	72	125	178%
Female	22	---	10	6	18	68	138	527%
White	53	---	68	55	67	103	196	270%
Minority	8	---	19	13	14	30	62	675%
Health Science								
Total	4,173	---	4,279	4,393	4,107	4,624	4,653	12%
Male	561	---	560	539	526	557	537	-4%
Female	3,584	---	3,705	3,828	3,575	4,063	4,106	15%
White	3,336	---	3,360	3,350	3,172	3,412	3,336	0%
Minority	706	---	759	827	807	1018	1,096	55%
TOTAL[3]	**5,307**	---	**5,907**	**5,994**	**5,701**	**6,393**	**6,652**	**25%**
Male	1,501	---	2,028	1,950	1,950	2,065	2,159	44%
Female	3,751	---	3,858	4,013	3,740	4,320	4,474	19%
White	4,045	---	4,617	4,581	4,380	4,746	4,887	21%
Minority	854	---	1,070	1,121	1,123	1,393	1,493	75%

Source: Iowa Department of Education, Division of Community Colleges. (2023). *The annual condition of Iowa's community colleges: 2022*

Retrieved from https://www.educateiowa.gov/document-type/condition-community-colleges

1. Awards include diplomas, certificates, Associate's degrees, and "other" awards as identified and classified by the Iowa Department of Education Division of Community Colleges. The Iowa Department of Education classifies career and technical education programs into occupational "career clusters," following the National Career Clusters Framework.
2. Definitions of Career Clusters can be obtained from http://www.careerclusters.org/
3. Subgroup totals do not include students with unknown/unreported sex or race. Sums of subgroup data not equal to the total are due to missing data.

Indicator 10: College and university degrees in STEM fields

Data source Integrated Postsecondary Education Data System (IPEDS)

This indicator includes information on bachelor's degrees, master's degrees, and doctoral degrees conferred by 4-year public universities, private non-profit colleges, and private for-profit colleges. Information on associate's degrees from Iowa's 2-year community colleges is also included here applying the same operational definition of STEM degrees and using the same data set as used to determine STEM degrees from Iowa's 4-year colleges and universities. This allows for better proportional comparisons by college type.

Note that the definition of what constitutes a "STEM degree" has evolved over time. The methods for the current annual report follow the methods used since 2014-2015. The tables below utilize a basic analysis of IPEDS database using a composite of primary 2-digit Classification of Instructional Programs (CIP) code categories that reflect STEM, STEM-related, and health science degrees. This is a modification of a more specific, 6-digit, CIP code definition of STEM degrees that was developed to correspond with the standard occupational classification (SOC) codes used in tracking STEM workforce developed by the Standard Occupational Classification Policy Committee (SOCPC) for the Office of Management and Budget. Additional documentation on the STEM classification process and recommendations can be found at www.bls.gov/soc.

Key findings

- From 2012-2013 to 2020-2021, there has been a 3% decrease in STEM-related degrees conferred at Iowa's 2-year community colleges, a 41% increase at 4-year public, and a 9% 4-year private (not-for-profit) colleges and universities, respectively (Table 21). Altogether, there has been a 26% increase in STEM awards at Iowa's 2-year and 4-year, public and private, non-profit colleges and universities since 2012-2013.
- During the same time period, health science degrees have increased 1% overall at Iowa's 2-year and 4-year, public and private non-profit colleges and universities (Table 22).
- In 2020-2021, approximately 40% of the STEM and STEM-related degrees awarded by Iowa's 4-year, private not-for-profit colleges and universities were conferred to females, followed by 35% to females at 4-year public universities, and 27% to females at Iowa's 2-year community colleges (Table 23).
- The number of STEM and STEM-related degrees awarded increased 133% among students who are Hispanic, and 109% among students who are Black / African American since 2021-2013 (Table 25).
- The proportions of degrees conferred upon Black / African American or Hispanic students has remained stable at around 3-5% of all degrees per year.

Table 21. Number of STEM and STEM-related degrees awarded by Iowa's 2-year and 4-year colleges and universities

STEM & STEM-Related (excludes Health Sciences)	2012/13		2016/17	2017/18	2018/19	2019/20	2020/21	Percent change, 2012/13 to 2020/21
2-year community colleges								
Associate's degree	1,175	---	1,196	1,105	1,079	1,231	1,137	-3%
SubTotal	1,175	---	1,196	1,105	1,079	1,231	1,137	-3%
4-year public universities								
Bachelor's	3,235	---	4,195	4,405	4,904	4,974	4,612	43%
Graduate/Professional	1,025	---	1,191	1,331	1,276	1,436	1,376	34%
SubTotal	4,260	---	5,386	5,736	6,180	6,410	5,988	41%
Private, 4-year, not-for-profit								
Associate's Degree	5	---	8	7	11	13	13	160%
Bachelor's	1,357	---	1,482	1,459	1,446	1,496	1,313	-3%
Graduate/Professional	188	---	375	404	427	353	357	90%
SubTotal	1,550	---	1,865	1,870	1,884	1,862	1,683	9%
Total, non-profit	6,985	---	8,447	8,711	9,143	9,503	8,808	26%
Private, 4-year, for-profit								
Associate's Degree	496	---	251	260	62	72	59	-88%
Bachelor's	724	---	308	295	162	195	77	-89%
Graduate/Professional	202	---	126	99	0	0	0	
SubTotal	1,422	---	685	654	224	267	136	-90%
Grand total	8,407	---	9,132	9,365	9,367	9,770	8,944	6%

Source: National Center for Education Statistics, IPEDS Data Center
STEM & STEM related degrees include (2-digit CIP): Agriculture (01), Natural Resources (03), Architecture (04), Computer and Information Sciences (11), Engineering (14), Engineering Technologies (15), Biological Sciences (26), Mathematics and Statistics (27), and Physical Sciences (40).

Table 22. Number of health science degrees awarded by Iowa's 2-year and 4-year colleges and universities

Health Science Degrees	2012/13		2016/17	2017/18	2018/19	2019/20	2020/21	Percent change, 2012/13 to 2020/21
2-year community colleges								
Associate's degree	2,133	---	1,843	1,878	1,926	1,805	1,757	-18%
SubTotal	2,133	---	1,843	1,878	1,926	1,805	1,757	-18%
4-year public universities								
Bachelor's	435	---	539	546	537	583	589	35%
Graduate/Professional	949	---	895	933	892	797	800	-16%
SubTotal	1,384	---	1,434	1,479	1,429	1,380	1,389	0%
Private, 4-year, not-for-profit								
Associate's degree	308	---	163	137	151	135	146	-53%
Bachelor's	1,086	---	1,352	1,340	1,246	1,263	1,361	25%
Graduate/Professional	1,532	---	1,720	1,713	1,841	1,796	1,842	20%
SubTotal	2,926	---	3,235	3,190	3,238	3,194	3,349	14%
Total, non-profit	6,443	---	6,512	6,547	6,593	6,379	6,495	1%
Private, 4-year, for-profit								
Associate's degree	989	---	1,198	826	9	12	9	-99%
Bachelor's	2,753	---	1,578	1,308	29	47	40	-99%
Graduate/Professional	740	---	990	1,085	0	2	15	-98%
Total, for-profit	4,482	---	3,766	3,219	38	61	64	-99%
Grand total	10,925	---	10,278	9,766	6,631	6,440	6,559	-40%

Source: National Center for Education Statistics, IPEDS Data Center
Degrees include (2-digit CIP): Health Science (51).

Table 23. Distribution by sex of STEM and STEM-related degrees awarded by Iowa's 2-year and 4-year colleges and universities

STEM & STEM-Related (excludes Health Sciences)	2012-2013				2020-2021				Percent change, 2012/13 to 2020/21
	Associate's	Bachelor's	Graduate/ Professional	Subtotal	Associate's	Bachelor's	Graduate/ Professional	Subtotal	
2-year public universities	1,175			1,175	1,137			1,137	-3%
Male	961			82%	826			73%	-14%
Female	214			18%	311			27%	45%
4-year public universities		3,235	1,025	4,260		4,612	1,376	5,988	41%
Male		2,227	704	69%		3,078	801	65%	32%
Female		1,008	321	31%		1,534	575	35%	59%
Private, 4-year, not-for-profit	5	1,357	188	1,550	13	1,313	357	1,683	9%
Male	5	763	148	59%	13	708	296	60%	11%
Female	0	594	40	41%	0	605	61	40%	5%
Private, 4-year, for-profit	496	724	202	1,422	59	77		136	-90%
Male	388	486	127	70%	50	58		79%	-89%
Female	108	238	75	30%	9	19		21%	-93%

Source: National Center for Education Statistics, IPEDS Data Center, 2021
STEM & STEM related degrees include (2-digit CIP): Agriculture (01), Natural Resources (03), Architecture (04), Computer and Information Sciences (11), Engineering (14), Engineering Technologies (15), Biological Sciences (26), Mathematics and Statistics (27), and Physical Sciences (40).

Table 24. Distribution by sex of health science degrees awarded by Iowa's 2-year and 4-year colleges and universities

Health Sciences	2012-2013				2020-2021				Percent change, 2012/13 to 2020/21
	Associate's	Bachelor's	Graduate/ Professional	Subtotal	Associate's	Bachelor's	Graduate/ Professional	Subtotal	
2-year public universities	2,133			2,133	1,757			1,757	-18%
Male	214			10%	193			11%	-10%
Female	1,919			90%	1,564			89%	-18%
4-year public universities		435	949	1,384		589	800	1,389	0%
Male		52	330	28%		83	261	25%	-10%
Female		383	619	72%		506	539	75%	4%
Private, 4-year, not-for-profit	308	1,086	1,532	2,926	146	1,361	1,842	3,349	14%
Male	41	140	658	29%	13	189	721	28%	10%
Female	267	946	874	71%	133	1,172	1,121	72%	16%
Private, 4-year, for-profit	989	2,753	740	4,482	9	40	15	64	-99%
Male	55	383	119	12%	1	11	7	30%	-97%
Female	934	2,370	621	88%	8	29	8	70%	-99%

Source: National Center for Education Statistics, IPEDS Data Center
Health Science related degrees include (2-digit CIP): Health Sciences (51).

Table 25. Racial/ethnic distribution of STEM and STEM-related degrees awarded by Iowa's 2-year and 4-year colleges and universities

	2012-2013				2020-2021				
STEM & STEM-Related (excludes Health Sciences)	Associate's	Bachelor's	Graduate/ Professional	%	Associate's	Bachelor's	Graduate/ Professional	%	Percent change, 2012/13 to 2020/21
2-year community colleges									
White	1,040			89%	928			82%	-11%
African American	13			1%	46			4%	254%
Hispanic	22			2%	51			4%	132%
Other	100			9%	112			10%	12%
4-year public universities									
White		2,556	501	72%		3,383	712	68%	34%
African American		40	23	1%		83	28	2%	76%
Hispanic		85	22	3%		229	47	5%	158%
Other		554	479	24%		917	589	25%	46%
Private, 4-year, not-for-profit									
White	4	1,107	23	73%	11	920	35	57%	-15%
African American	-	37	8	3%	0	44	52	6%	113%
Hispanic	-	49	1	3%	0	88	2	5%	80%
Other	1	164	156	21%	2	261	268	32%	65%
Subtotal, Non-Profit									
White	1,044	3,663	524	75%	939	4,303	747	68%	14%
African American	13	77	31	2%	46	127	80	3%	109%
Hispanic	22	134	23	3%	51	317	49	5%	133%
Other	101	718	635	21%	114	1,178	857	24%	48%

Source: National Center for Education Statistics, IPEDS Data Center
STEM & STEM related degrees include (2-digit CIP): Agriculture (01), Natural Resources (03), Architecture (04), Computer and Information Sciences (11), Engineering (14), Engineering Technologies (15), Biological Sciences (26), Mathematics and Statistics (27), and Physical Sciences (40).

Table 26. Racial/ethnic distribution of health science degrees awarded by Iowa's 2-year and 4-year colleges and universities

	2012-2013				2020-2021				
Health Sciences	Associate's	Bachelor's	Graduate/ Professional		Associate's	Bachelor's	Graduate/ Professional	%	Percent change, 2012/13 to 2020/21
2-year public universities									
White	1,862			87%	1,395			79%	-25%
African American	60			3%	87			5%	45%
Hispanic	48			2%	109			6%	127%
Other	163			8%	166			9%	2%
4-year public universities									
White		367	733	79%		471	601	77%	-3%
African American		5	18	2%		23	13	3%	57%
Hispanic		10	20	2%		37	45	6%	173%
Other		53	178	17%		58	141	14%	-14%
Private, 4-year, not-for-profit									
White	272	928	1,277	85%	106	1,069	1,421	78%	5%
African American	6	39	21	2%	11	72	47	4%	97%
Hispanic	11	25	48	3%	14	91	110	6%	156%
Other	19	94	186	10%	15	129	264	12%	36%
Subtotal, Non-Profit									
White	2,134	1,295	2,010	84%	1,501	1,540	2,022	78%	-7%
African American	66	44	39	2%	98	95	60	4%	70%
Hispanic	59	35	68	3%	123	128	155	6%	151%
Other	182	147	364	11%	181	187	405	12%	12%

Source: National Center for Education Statistics, IPEDS Data Center
Health Science related degrees include (2-digit CIP): Health Sciences (51).

Indicator 11: Percentage of Iowans in workforce employed in STEM occupations

Data source Iowa Workforce Development

Key findings

- Approximately 17% of Iowa's occupations are in STEM fields (Table 27).
- From 2010-2030, Iowa's STEM occupations are expected to grow 1.2% annually, compared to a 1.3% annual growth rate across all occupations (Table 28).
- On average in 2022, individuals in STEM occupations earned $34.19 mean wages and $71,124 in mean salaries, compared to all occupations overall earning $24.57 in mean wages and $51,096 in mean salaries, respectively (Table 28).

Table 27. Percentage of Iowans in workforce employed in STEM occupations

Time period	Total STEM employment[1]	Total employment (all occupations)[2]	% STEM of all occupations
2008-2018	358,960	1,762,260	20%
2010-2020	267,765	1,717,020	16%
2012-2022	257,230	1,758,205	15%
2014-2024	298,510	1,795,100	17%
2016-2026	383,300	1,821,755	21%
2018-2028	411,985	1,833,700	22%
2020-2030	327,255	1,981,145	17%

Source: Communications and Labor Market Information Division, Iowa Workforce Development
1. https://www.iowaworkforcedevelopment.gov/career-exploration-resources
2. https://www.iowaworkforcedevelopment.gov/occupational-projections

Table 28. Iowa estimated employment in STEM fields: Projections, growth, and salaries, 2020-2030

	2020 Estimated employment	2030 Projected employment	Annual growth rate	2022 Mean Wage ($)	2022 Mean Salary ($)
Management	108,055	115,190	0.7	$52.53	$109,258
Business & Financial Operations	25,290	28,970	1.5	$37.72	$78,452
Computer & Mathematical	37,495	44,135	1.8	$40.59	$84,428
Architecture & Engineering	18,355	21,135	1.5	$36.71	$76,359
Life, Physical, & Social Science	11,250	12,710	1.3	$31.52	$65,571
Education, Training, & Library	8,260	9,580	1.6	$41.43	$86,170
Arts, Design, Entertainment, Sports, & Media	3,180	3,640	1.4	$21.71	$45,149
Healthcare Practitioners & Technical	3,035	3,580	1.8	$48.71	$101,327
Healthcare Support	15,055	18,295	2.2	$18.53	$38,537
Protective Service	2,290	2,575	1.2	$32.01	$66,583
Sales & Related	2,960	3,280	1.1	$51.68	$107,484
Office & Administrative Related	225	255	1.3	$30.21	$62,844
Farming, Fishing, & Forestry	1,770	1,950	1.0	$22.95	$47,724
Construction & Extraction	15,185	18,425	2.1	$27.83	$57,887
Installation, Maintenance, & Repair	23,500	26,260	1.2	$26.39	$54,881
Production	15,350	16,930	1.0	$25.81	$53,689
Transportation & Materials Moving	270	345	2.8	$45.14	$93,894
Total STEM Occupations[1]	291,525	327,255	1.2	$34.19	$71,124
Total All Occupations	1,757,895	1,981,145	1.3	$24.57	$51,096

Source: Communications and Labor Market Information Division, Iowa Workforce Development. Available at https://www.iowaworkforcedevelopment.gov/career-exploration-resources

1. The acronym STEM, as used in this table, is a combined occupational group comprised of occupations from existing and/or established occupational groups adopted from the Office of Management and Budget's (OMB) Standard Occupational Classification (SOC) Manual. These occupations have a preponderance of tools and skills from science, technology, engineering, and/or mathematics. STEM occupations were defined using criteria by Iowa Workforce Development (IWD) and/or recommended by the SOC Policy Committee for OMB.

Indicator 12: Job vacancy rates in STEM occupational areas

Data source Iowa Workforce Assessment Survey, Iowa Workforce Development

The Workforce Needs Assessment Survey is conducted by Iowa Workforce Development each year with Iowa employers to assess the demand and skills required for jobs in several sectors of the workforce.

There was no new data to report for 2021-2022.

Key findings

- In 2018, there were an estimated 14,280 vacancies in STEM jobs statewide (Table 29).

Table 29. Estimated job vacancy rates in STEM occupational areas

	2012/13		2014/15		2016/17		2018	
Occupational Categories[1]	Vacancy Rate	Est. Vacancy	Vacancy Rate	Est. Vacancy	Vacancy Rate	Est. Vacancy	Vacancy Rate	Est. Vacancy
Architecture and Engineering	3%	593	6%	1,047	5%	860	3%	644
Community and Social Services	2%	355	3%	720	6%	1,313	4%	839
Computer and Mathematical Science	3%	752	6%	1,887	1%	435	2%	590
Farming, Fishing, and Forestry	3%	148	12%	683	16%	881	6%	305
Healthcare Practitioner and Technical	2%	1,837	3%	2,847	5%	4,128	3%	2,339
Healthcare Support	4%	1,678	3%	1,205	10%	4,672	8%	3,106
Life, Physical, and Social Science	1%	116	3%	355	1%	155	1%	97
Production	4%	3,870	2%	2,593	3%	5,335	4%	6,360
Total Estimated Vacancies[2]		9,349		11,337		17,779		14,280

Source: Iowa Workforce Needs Assessment, Iowa Workforce Development, 2019

https://www.iowaworkforcedevelopment.gov/wna

1. Occupational Categories not included in this table are: Arts, Design, Entertainment, Sports, & Related; Building & Grounds Cleaning & Maintenance; Business & Financial Ops; Construction & Extraction; Education, Training, & Library; Food Preparation & Serving Related; Installation, Maintenance, & Repair; Legal; Management; Office & Administrative Support; Personal Care & Service; Protective Service; Sales & Related; and Transportation & Material Moving.
2. Vacancy data derived from the Iowa Workforce Development job bank and reported in the Workforce Needs Assessment report for each respective year. Data may be limited for making longitudinal comparisons due to the changing number of employer websites that are indexed on the job bank in any given year. Numbers are also subject to changes in employers' job posting strategies. For example, over the course of three years, an employer may change their job-posting strategy and become more aggressive about posting and re-posting jobs, which would result in a big jump in the number of openings over the course of time.

Section 3. Statewide STEM Survey

To assess change in public awareness and attitudes toward STEM, a statewide public survey of Iowans was conducted from September 17, 2022 to January 15, 2023. The survey has been conducted annually by the University of Northern Iowa, Center for Social and Behavioral Research since 2012. In 2022, over 1,000 Iowans from across the state participated in a mixed-mode survey using online, self-addressed mailback questionnaire, and telephone interviews (both landline and cellular). Results were weighted to obtain population estimates that are representative of the adult population of Iowans. The survey questionnaire and weighting methodology is available upon request.

This section highlights some of the results from the 2022 statewide survey with some comparisons to findings from previous years.

2022 Survey Findings

STEM awareness

To assess awareness of STEM, Iowans were asked "STEM stands for 'science, technology, engineering, and mathematics.' Have you read, seen, or heard of this before?" Nearly six in ten Iowans (58%) had heard something in the past few months about PreK-12 STEM education in general. When asked specifically about the STEM acronym, 7 in 10 Iowans (76%) of Iowans had read, seen, or heard of STEM (**Error! Reference source not found.**).

HAVE YOU READ, SEEN, OR HEARD OF STEM? 2022

7 in 10 Iowans (76%) said 'Yes.' Awareness of STEM continues to increase year-over-year and is significantly higher than measured in 2019 and prior years.

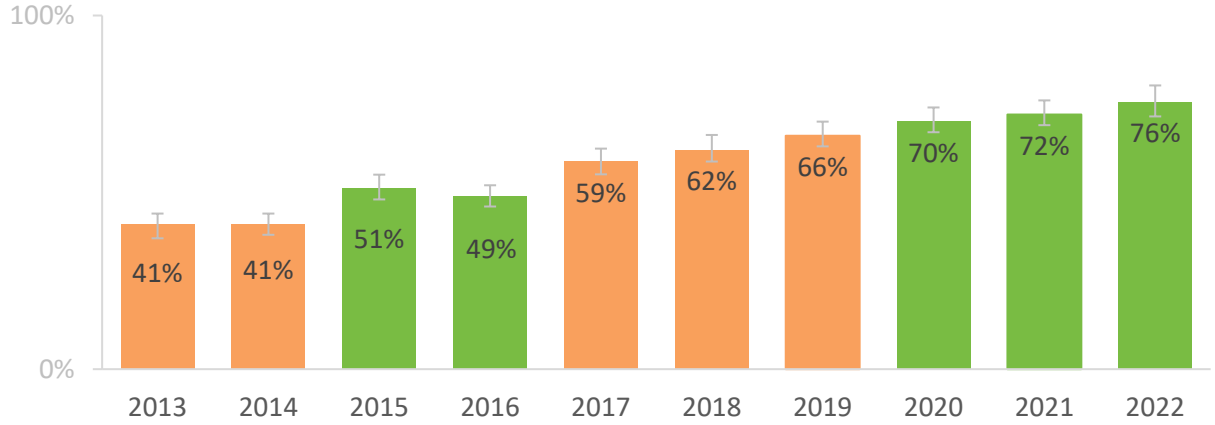


Figure 25. STEM stands for 'science, technology, engineering, and mathematics.' Have you read, seen, or heard of this before? (% Yes)

Chi-square tests of significance were used to compare awareness of STEM across select demographic variables. Subgroup analyses are useful for identifying which characteristics of Iowans may be associated with more or less awareness of STEM. Bivariate analysis of awareness of STEM by sex (n/s), education (p<.01), parent status (n/s), and place of residence (n/s) is presented in **Error! Reference source not found.**.

AWARENESS OF STEM BY POPULATION SUBGROUPS FROM 2013 TO 2022

Subgroup differences remain, yet awareness of STEM has increased from +25 to +39 points for nearly all subgroups since 2013. In 2022, a greater proportion of Iowans with some college education or more had awareness of STEM compared to Iowans with a high school education or less (p<.01).

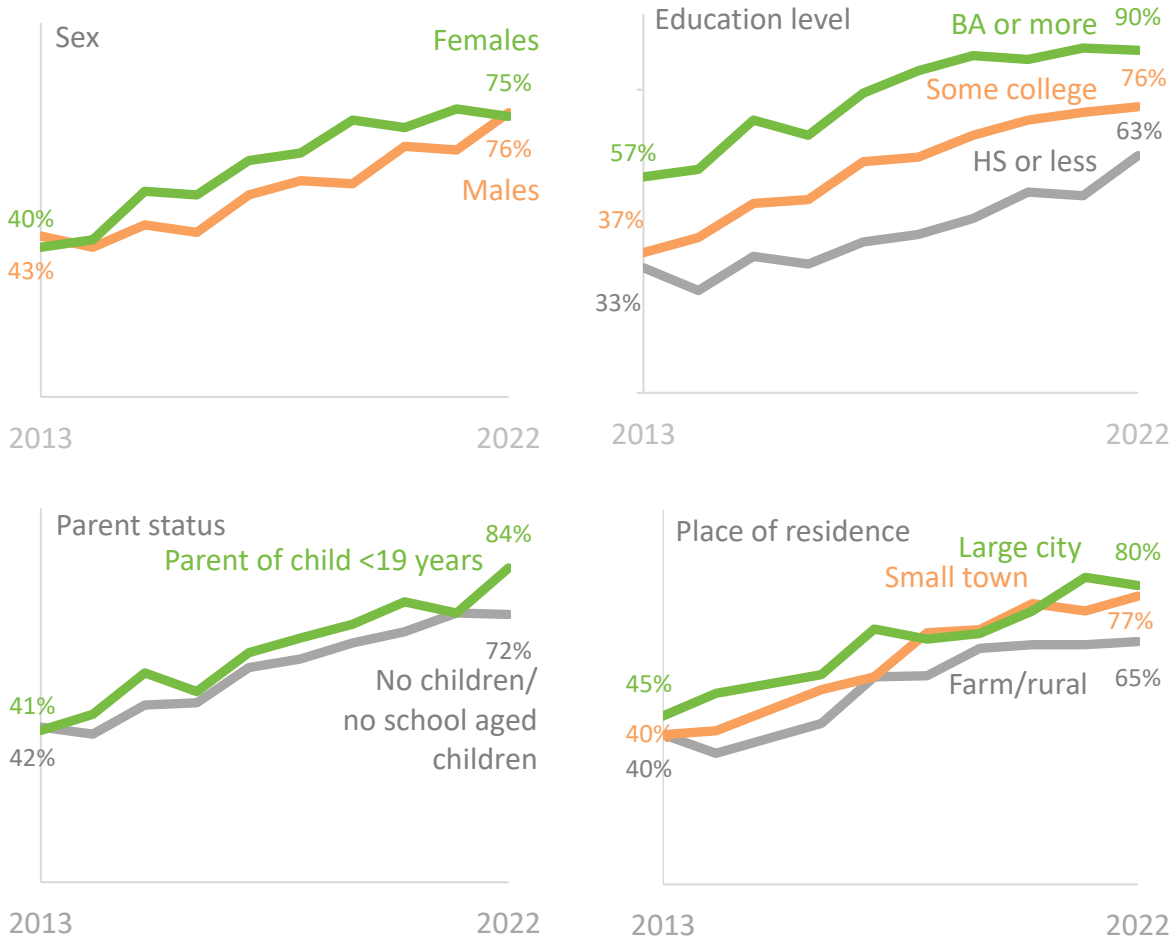
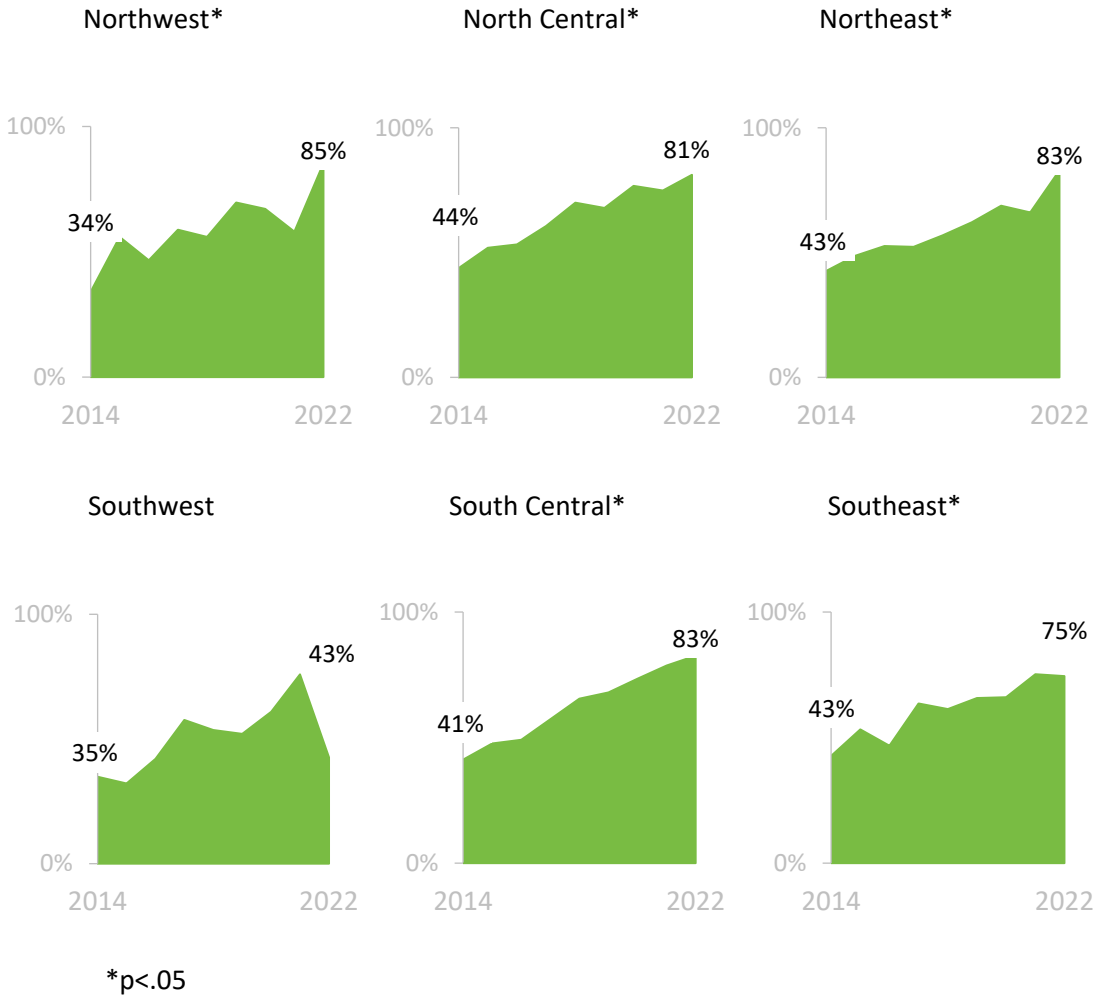


Figure 26. Trends in awareness of STEM by demographic characteristics, 2013-2022

All six STEM regions have shown an increase in STEM awareness with the increases in the Northwest, North Central, Northeast, South Central, and Southeast STEM regions reaching statistical significance when comparing 2022 to 2014. Confidence intervals were used to determine statistical significance. The 95% confidence interval sets forth the upper and lower range of the "true" percentage in the population, so even though a trend upward or downward may be observed when comparing regions from one year to the next or with each other, the increase or decrease does not reach statistical significance when the 95% confidence intervals overlap.

INCREASE IN STEM AWARENESS BY STEM REGION FROM 2014 TO 2022

Awareness of STEM has increased significantly in Northwest, North Central, Northeast, South Central, and Southeast STEM regions compared to 2021.



*p<.05

Figure 27. Awareness of STEM by STEM region, 2014 to 2022

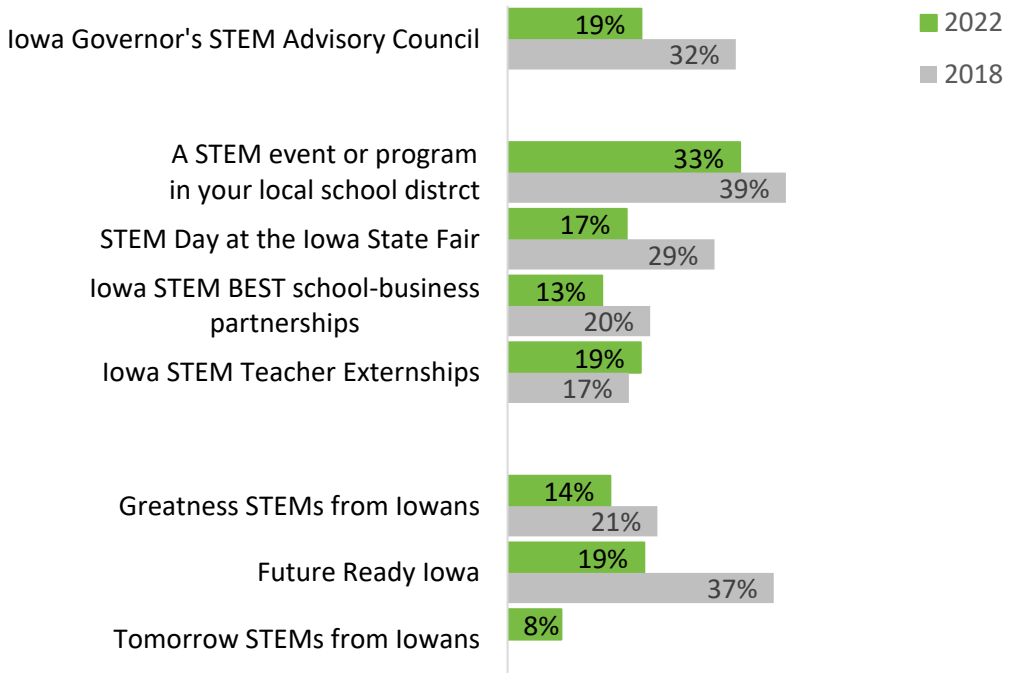
Awareness of statewide efforts to improve STEM education was also assessed by asking Iowans if they have read, seen, or heard anything about specific groups or events promoting STEM education and careers in Iowa or the phrases *Greatness STEMs from Iowans* and *Tomorrow STEMs from Iowans* (**Error! Reference source not found.**). For comparison, the proportions in gray in the figure show the percentage of Iowans with awareness of the respective event or activity from 2018. Not all events or activities are queried annually.

When asked directly, 8% of Iowans recognized the slogan *Tomorrow STEMs from Iowans* and 19% of Iowans recognized *Future Ready Iowa*. To assess possible response bias, Iowans were also asked about one other slogan that to our knowledge had not been used in Iowa. Of this fabricated slogan, 7% said they had heard the slogan *STEM for the Win!* This suggests there may be some response bias among respondents since the slogan *Tomorrow STEMs from Iowans* is similarly recognized to one that has not been used in Iowa to our knowledge. Hence, the awareness findings should be interpreted with caution.

AWARENESS OF GROUPS AND EVENTS PROMOTING STEM EDUCATION AND CAREERS

In the past year, one-third (33%) of Iowans had heard of a STEM event or programming in their local school district; and approximately one-fifth (17%) had heard of STEM Day at the Iowa State Fair or the STEM Advisory Council (19%). Almost one in six Iowans (13%) had heard of Iowa STEM BEST school-business partnerships.

Figure 28. I'm going to read a short list of some groups promoting STEM education and careers. Please tell me how much you have heard, if anything, about each one in the past year.



Interest and Attitudes toward STEM and the role of STEM in Iowa

Interest in STEM education was assessed by asking, "In general, how interested, if at all, are you in the topic of preK-12 STEM education." Six in ten Iowans indicated they were *Somewhat interested* (35%) or *Very interested* (26%) in the topic of preK-12 STEM education.

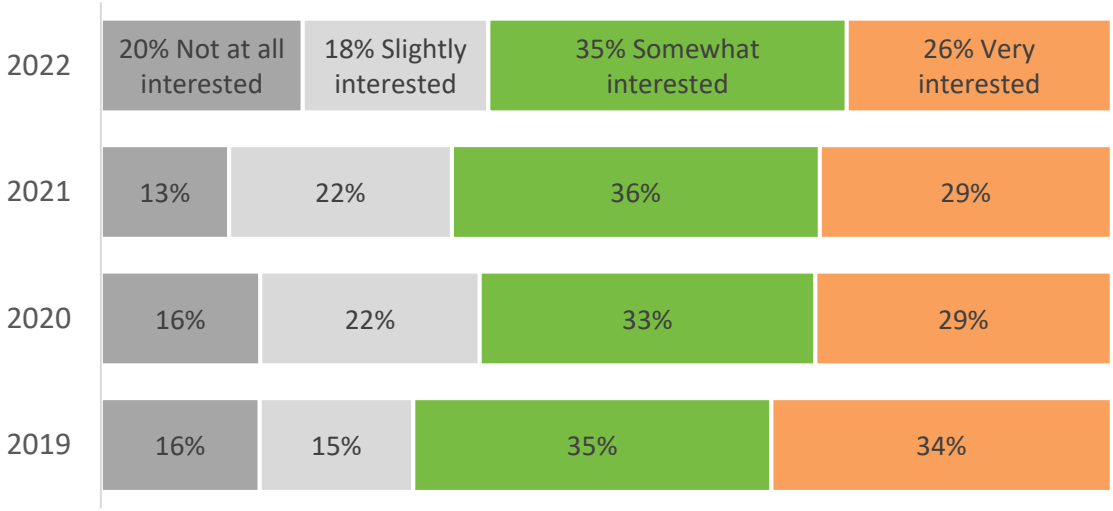


Figure 29. In general, how interested, if at all, are you in the topic of preK-12 STEM education?

Perceptions about STEM education

The statewide survey also assessed support for STEM education in Iowa and views about how well schools in their community are teaching STEM subjects. Similar to previous years, nearly nine in ten Iowans (89%) said STEM education **should** be a priority in their local school district, yet only 44% said STEM education actually **is** a priority and another 28% said they did not know if STEM education was a priority in their local school district.

IOWANS CONTINUE TO SUPPORT PRIORITIZING STEM EDUCATION

*Nearly **9 in 10** Iowans (89%) think STEM education **should** be a priority in their local school districts, yet only 44% say is it **is** a priority and another 28% **don't know**.*

Do you think STEM education **is a priority** in your local school district?

44%

(27% said No, 28% Don't know)

Do you think STEM education **should be a priority** in your local school district?

89%

Iowans were asked about their views on access to STEM education (Figure 30) and support or opposition to state efforts to devote resources and develop initiatives to promote STEM education in Iowa (Figure 31). A strong majority agree (87%) that every child should have access to a high-quality STEM education in PreK through 12th grade, and over three-quarters (76%) support state efforts to promote STEM education.

IOWANS VIEW ON ACCESS TO STEM EDUCATION

*Over **8 in 10** Iowans agree (50% strongly agree and 37% agree) every child should have access to a high-quality STEM education in PreK through 12th grade.*

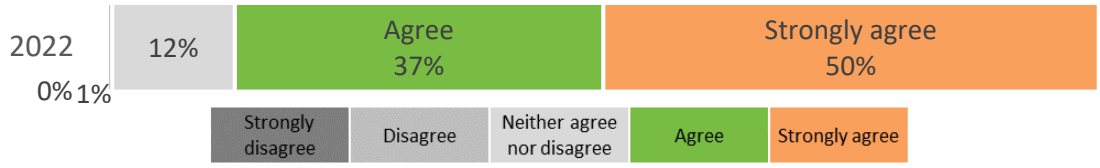


Figure 30. Iowans view on access to STEM education

OVERALL SUPPORT FOR STEM EFFORTS REMAINS HIGH

Over three-quarters (76%) of Iowans support efforts to devote resources and develop initiatives to promote STEM education in Iowa; among those, nearly half (45%) said they were very supportive.

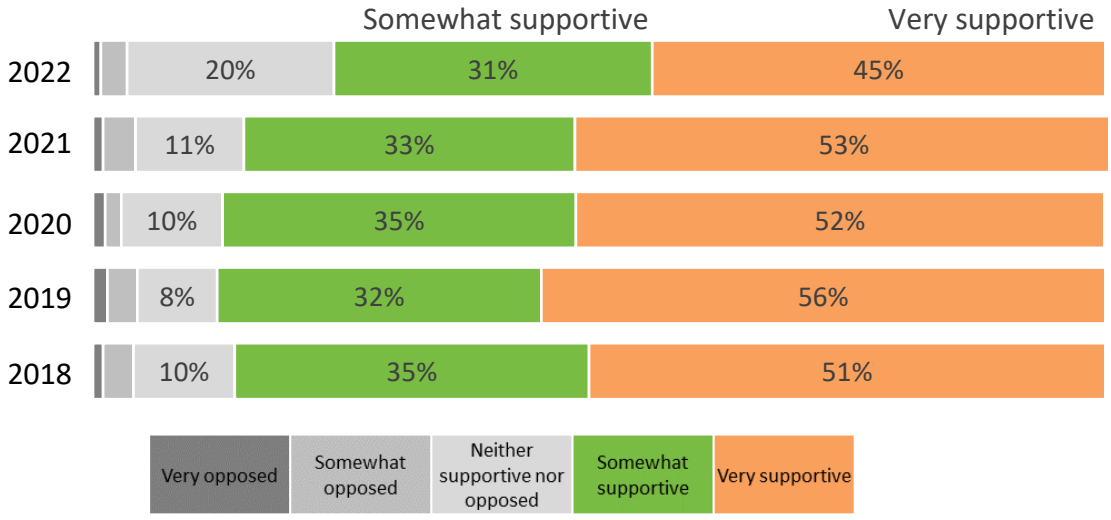


Figure 31. Overall, to what degree do you support or oppose state efforts to devote resources and develop initiatives to promote STEM education in Iowa?

Iowans were also asked to what extent they agree or disagree about the role of STEM in Iowa in a series of statements (Figure 32). Three-quarters agree on the importance of school-business partnerships (28% strongly agree, 47% agree), on the need to spread awareness about STEM education (34% strongly agree, 41% agree), and on the need for resources toward those efforts (28% strongly agree, 46% agree). Nearly two-thirds (63%) agree all students should receive a STEM education, even if they aren't going into a STEM career.

MAJORITY SUPPORT FOR THE ROLE OF STEM IN IOWA

Three-quarters (75%) of Iowans agree that it is important for area businesses to be involved in STEM partnerships with K-12 schools.

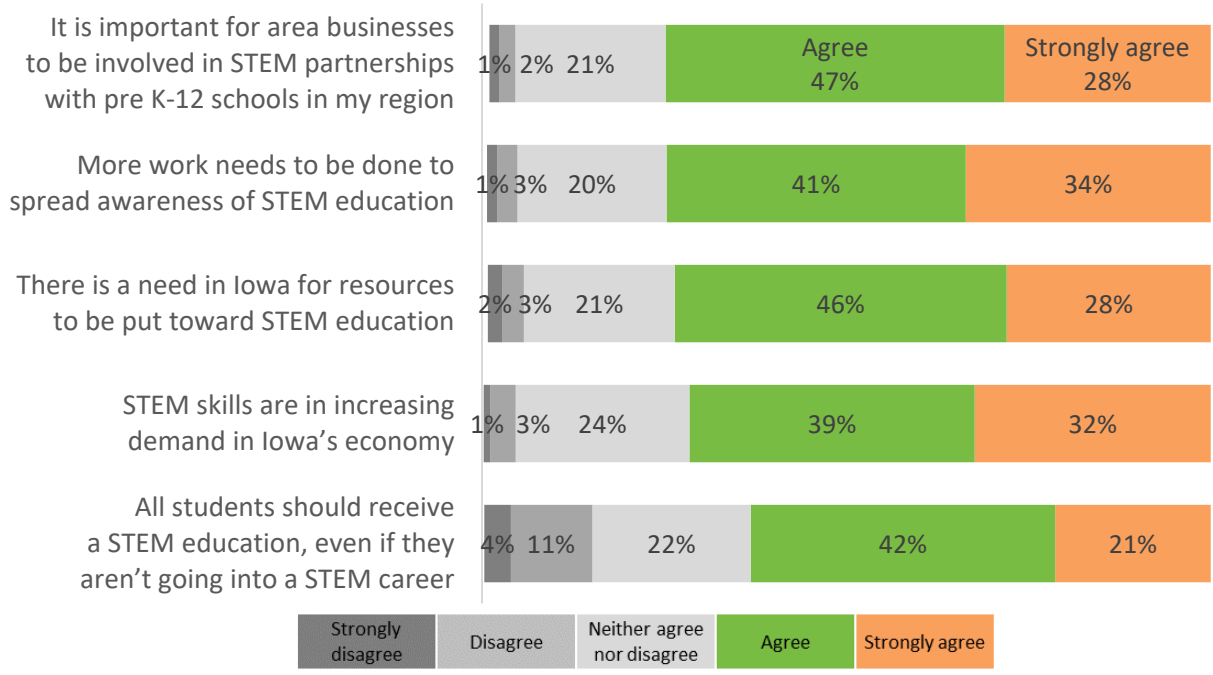


Figure 32. Perceptions of the role of STEM in Iowa

In 2022, Iowans were asked a new series of questions about the quality of education in Iowa in preparing students for post-secondary educational paths and STEM skills, replacing a set from previous years that asked about the quality of education across individual subject areas. The percentage of Iowans who viewed these aspects as 'Excellent' or 'Good' hovered around 50% (**Error! Reference source not found.**). Just over half (52%) of Iowans rated the quality of education in providing the knowledge and skills needed for pursuing a 4-year college degree in this way, and 45% rated the quality of education in providing knowledge and skills needed for pursuing a vocational or technical career.

Perceptions of Quality of Education

Over half (52%) of Iowans rated the quality of education in providing the knowledge and skills needed for pursuing a 4-year college degree as 'Excellent' or 'Good;' slightly less than half (45%) of Iowans rated the quality of education in providing the knowledge and skills needed for pursuing a vocational or technical career that way.

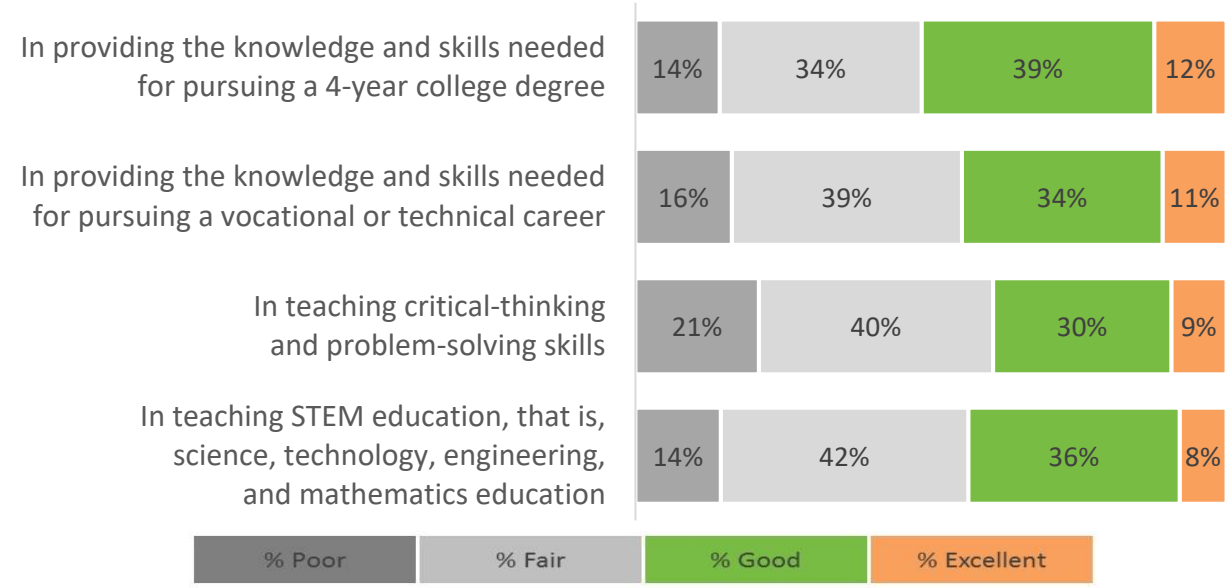


Figure 33. From what you know, how well do you think PreK-12 schools in your community are doing in the following areas?

Demographic characteristics of the survey sample

Overall, respondents tended to be older and more educated than the general population of Iowans. Weighting uses standard Census metrics of the Iowa population of men and women applied to the full survey sample yielding an overall correction and adjustment in the final weights which were used to compensate for issues related to gender and possible under- or overrepresentation of certain demographic groups. This correction is observed in the side-by-side comparison of the unweighted and weighted distributions of respondents by demographic characteristics in Table 30.

Table 30. Demographic characteristics of respondents, 2022

	Sample size (n)	Unweighted %	Estimated % after weighting
Total Sample	1,084		
Gender (Imputed for n=22 missing)			
Men	581	54%	50%
Women	503	46%	50%
Age Group (Imputed for n=18 missing)			
18-34	144	13%	27%
35-54	332	31%	31%
55 and older	608	56%	42%
Ethnicity (Imputed for n=26 missing)			
Hispanic, Latino, or Spanish origin	15	2%	4%
Non-Hispanic	1,069	98%	96%
Race (Imputed)			
White	1,036	96%	93%
All other races	48	4%	7%
Education (Imputed for n=10 missing)			
High school graduate/GED or less	127	12%	37%
Some college or technical school	375	35%	31%
4-year undergraduate or graduate degree	582	54%	32%
Employment			
Employed for wages	497	46%	50%
Self-employed	103	10%	11%
Homemaker	24	2%	4%
Student	21	2%	4%
Retired	386	36%	26%
Out of work / Unable to work	42	4%	5%
Annual gross household income (Imputed for n=111 missing)			
Less than $50,000	306	28%	28%
$50,000 to less than $100,000	366	34%	30%
$100,000 or More	412	38%	42%
Place of residence			
Rural / Small town (<5,000 pop.)	275	25%	19%
Large town (5,000-<50,000 pop.)	480	44%	50%
Urban (>50,000 pop.)	329	30%	31%
Parent status			
No, parent or guardian of 19 or younger	755	70%	65%
Yes, parent or guardian of 19 or younger	321	30%	35%

	Sample size (n)	Unweighted %	Estimated % after weighting
STEM Region			
Northwest	87	8%	88%
North Central	151	14%	12%
Northeast	164	16%	15%
Southwest	80	8%	10%
South Central	288	27%	26%
Southeast	288	27%	30%

Sums less than 1,084 for non imputed variables due to respondents who answered 'Don't know' or 'Refused'; proportions greater than or less than 100% due to rounding.

Appendix A: Statewide student interest inventory

Statewide standardized tests are taken annually by nearly every student in 3rd through 11th grade in the state of Iowa. The Iowa Assessments were administered from FY13 through FY18, and the Iowa Statewide Assessment of Student Progress were administered beginning in FY19. Since 2012-2013, an 8-item interest inventory has been added to the Iowa Assessments. In January 2016, an additional item was added at the request of the Council. Schools have the option to administer the inventory to their students. The Interest Inventory was developed in part to serve as a data source for both the Iowa STEM indicators and as a way to compare students who participate in the STEM Scale-Up Program with all students statewide.

Two versions of the inventory were created with variations in question wording and response options to accommodate different grade levels. Response options for students in 3rd through 5th grade were "I like it a lot," "It's okay," or "I don't like it very much" for items one to seven, and "I would like it a lot," "It would be okay," or "I would not like it very much" for items eight and nine, respectively. Response options for grades 6th through 11th were "Very interested," "Somewhat interested," or "Not very interested" for all items.

Table. Statewide Student Interest Inventory

Grades 3rd-5th	Grades 6th-11th
1. How much do you like to create and build things?	1. How interested are you in designing, creating, and building machines and devices (also called engineering)?
2. How much do you like math?	2. How interested are you in math?
3. How much do you like science?	3. How interested are you in science?
4. How much do you like art?	4. How interested are you in art?
5. How much do you like reading?	5. How interested are you in English and language arts?
6. How much do you like using computers and technology?	6. How interested are you in computers and technology?
7. How much do you like social studies?	7. How interested are you in social studies (such as history, American studies, or government)?
8. When you grow up, how much would you like to have a job where you use science, computers, or math?	8. As an adult, how interested would you be in having a job that uses skills in science, technology, math, or engineering?
9. When you grow up, how much would you like to have a job in Iowa?	9. How interested are you in living in Iowa after you graduate and go to work?

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