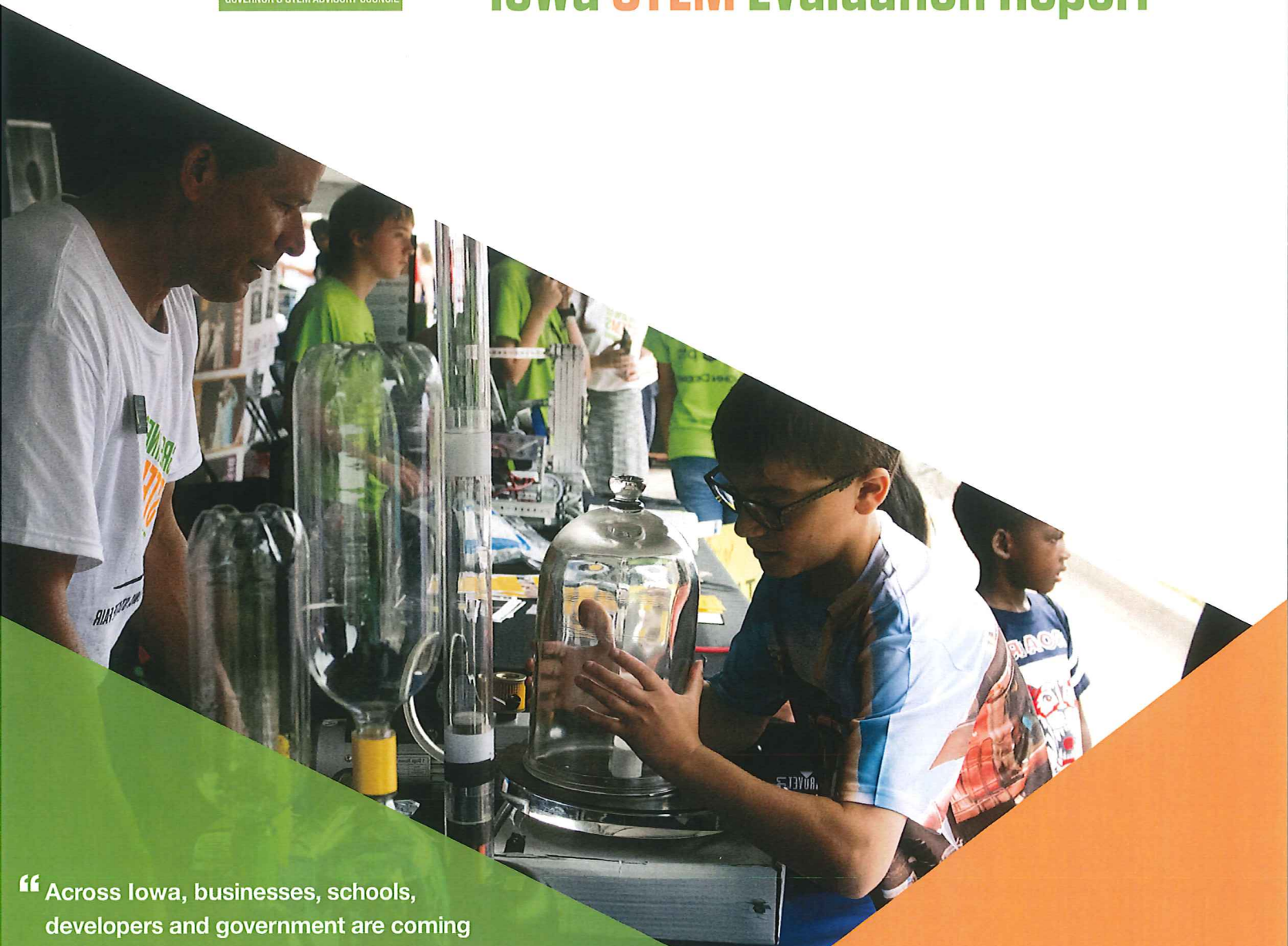


2016-2017 Iowa STEM Evaluation Report

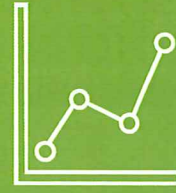


“ Across Iowa, businesses, schools, developers and government are coming together to build a new home for innovation in America’s heartland. We see that commitment in Iowa’s education system and in the value that you place on creativity, adaptability and new ways of thinking . . . we admire what you guys have accomplished, and we want to be a part of it. ”

- Tim Cook, CEO, Apple Inc.

KEY INDICATORS

These indicators are provided by the external evaluation team consisting of UNI's Center for Social and Behavioral Research, ISU's Research Institute for Studies in Education, and UI's Iowa Testing Programs.



- The average proportions of students in 8th and 11th grade meeting mathematics proficiency on the Iowa Assessments **increased slightly across nearly all demographic groups**, including students who are female, African American, Hispanic, and/or with low income, from the period 2011–2013 to the period 2014–2016.
- In science achievement, the average percentages of proficient students in the 2014–2016 biennium period are **higher than the 2011–2013 biennium period** among 8th grade students.
- **More than 75% of all students statewide** indicated they were very interested or somewhat interested in science, technology, engineering, or in pursuing a STEM career in 2016–2017.
- In 2016, Iowa's average ACT score was 21.4 in mathematics and 22.3 in science, compared to 20.6 and 20.8 nationwide, respectively. **Average Iowa STEM score of 22.1 compared to 20.9 nationally.**
- The proportion of 2016 ACT test-takers interested in STEM increased by +3 percentage points among both males and females, and **+2 percentage points among students who are African-American and Hispanic**, compared to 2012.
- From 2012 to 2016, the number of students taking advanced placement courses in STEM-related subjects **increased from 4,968 to 6,537** (32% increase).
- There has been a 3% increase in STEM awards at Iowa's 2-year community colleges, an **18% increase at 4-year public, and a 7% increase at 4-year private (not-for-profit) colleges** and universities, respectively between the periods 2011–2012 to 2014–2015.
- There has been an **18% increase in STEM degrees awarded to females** at Iowa's 2-year community colleges, while the number of degrees awarded to males remained relatively stable between the periods 2011–2012 to 2014–2015.
- The number of **STEM-related degrees awarded to students who are African-American rose 16%** at 4-year public, and 94% at private, 4-year not-for-profit colleges and universities in Iowa since 2011–2012 maintaining stable at 2–4% of all degrees per year. Roughly the same proportions bear out for students who are Hispanic.
- **Iowa STEM occupations, at 17% of all Iowa jobs, are expected to grow 1.2% annually** from 2014 to 2024 compared to .9% annual growth across all occupations.
- These jobs pay mean salaries **\$15,514 higher per year** (\$57,357 in STEM versus \$41,843 for all other).
- In 2015–2016, there were an estimated **12,444 vacancies in STEM jobs statewide.**
- Community college STEM diplomas, certificates and degrees to minority graduates increased 23% last year, **a 144% gain since 2011.**

STEM SCALE-UP 2016-17



A total of **1,674 educators** took part in scaling one of eleven world-class STEM programs in 2016–2017.

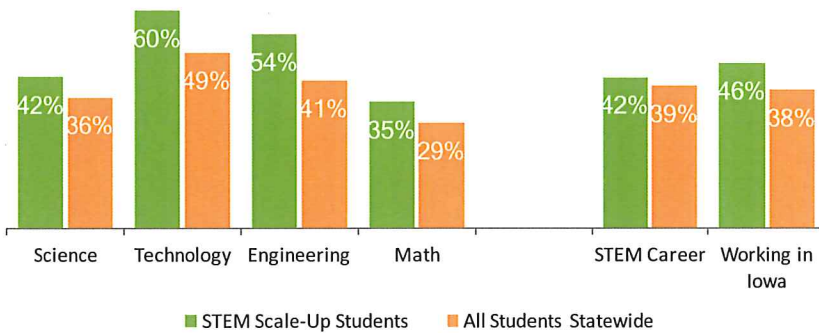
An estimated **74,038 preK–12 youth** participated in one or more Scale-Up programs in 2016–2017.

Since 2012, an estimated **462,778 preK–12 lowans** have participated in Scale-Up.

70% of educators taking part in Scale-Up agreed or strongly agreed that they now have more confidence to teach STEM topics, and **74%** have increased their STEM knowledge.

Students who participated in Scale-Up were more interested in STEM subjects, STEM careers and working in Iowa after graduation than students statewide.

STUDENT INTEREST IN STEM

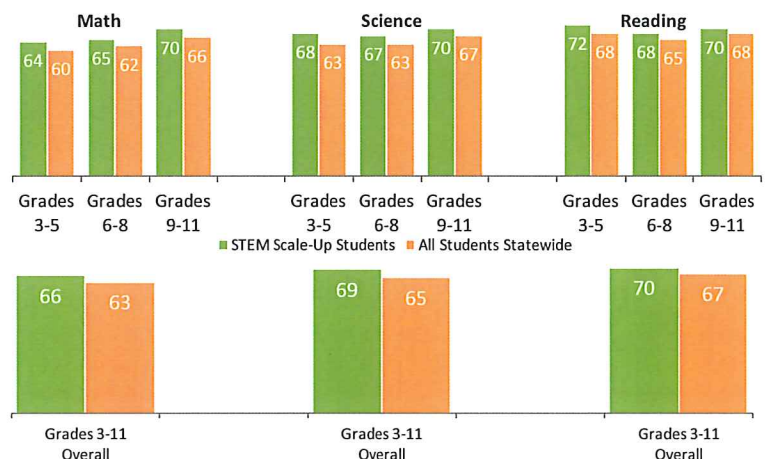


A higher proportion of students who participated in a Scale-Up Program said they were **“very interested” in all STEM-subjects** and in pursuing a STEM career compared to all students statewide.

STUDENT ACHIEVEMENT IN NATIONAL PERCENTILE RANK

STEM Scale-Up participants scored an average of 3 points higher in National Percentile Rank in math and reading, and 4 points higher in science, compared to all students statewide.

For minority students, the difference is greater: Scale-Up participants scored an average of 6 points higher in National Percentile Rank in math, 7 points higher in science and 6 points higher in reading compared to minority students who did not participate.



STEM BEST®

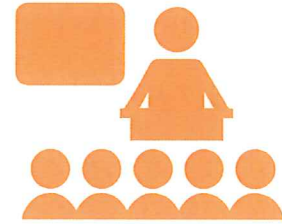
BUSINESSES ENGAGING STUDENTS & TEACHERS



Ten new STEM BEST partnerships were established in 2016–2017, involving 17 schools partnering with hundreds of employers.



Estimated dollars contributed by non-school partners collectively sums to more than **\$1 million.**



Approximately **700** students participate in STEM BEST.

STEM BEST EXAMPLES



HOOVER HIGH SCHOOL: 92.5% of the 2016–17 STEM class are committed to post-secondary education, many on scholarship.



FORT MADISON HIGH SCHOOL: Students skype experts in a variety of fields across the United States and in several countries abroad, as part of independent studies ranging from developing gaming software, “how-to” online instructions for those who are preparing for surgery and repurposing old computers.



WAUKEE APEX: Past student participants have indicated the top takeaways of this program include growth in persistence, resilience, self-confidence, development of job-seeking package, networking skills and knowledge about future opportunities.

IT ACADEMY

A total of **6,846** Microsoft IT student certifications have been awarded. (**Totaled 607 in 2014, 1,922 in 2015, 2,492 in 2016**)

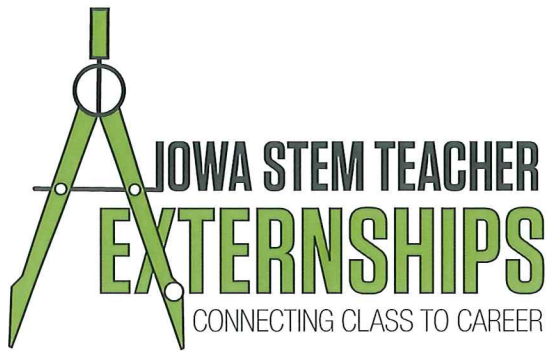
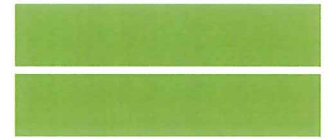
6 students this year earned Master Certifications (the top certification available in the program).

17 students qualified for Nationals in Word, Excel and PowerPoint (up from 6 last year).

150 high schools and community colleges are participating with 18 schools on the waiting list.

Teacher training for coding and computer science is rolling out, and new student certifications will be coming online for data science and IT Infrastructure as well as for coding and computer science.

TEACHER EXTERNSHIPS



Total Teacher Externships
2009 to 2017

421

Total Workplace Partners
2009 to 2017

134

Total approximate cost-share by workplace hosts from 2009 to 2017

\$585,100
(\$171,050 this year)

2017 RESULTS:

Of 2017 employers surveyed, most monetized the value of an extern between \$2,500 and \$10,000.

Of 2017 employers surveyed, most cited as most valued outcomes:

- Elevated awareness of their business in the community
- Increased interest of the future workforce
- Establishment of school-business partnerships
- Workplace relevance brought to schools

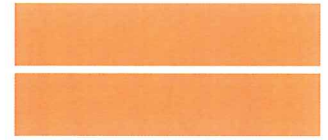
Top reasons that 2017 teachers gave for participating include:

- Bringing real-world experiences into the classroom
- Building partnerships with employers
- Discovery of the “soft skills” students will need to succeed

STEM CHALLENGES AND OPPORTUNITIES

- In science achievement, the average percentage of proficient students in the 2014–2016 biennium period are lower than the 2011–2013 biennium period among 11th grade students.
- Proficiency in science on the Iowa Assessments has declined the most among students in the 11th grade who are African-American, from 60% in 2011–2013 to 49% in 2014–2016.
- ACT scores are an average of 5 points lower among students who are African-American, and an average of 3 points lower among students who are Hispanic, compared to their white counterparts.
- 2016 STEM career interests remain strongly gendered, with the top five two-year college majors for females in health-related fields (nursing, radiologic technology and physical therapy), animal sciences and veterinary medicine (pre-vet), while for males the top five majors were computer science and programming, mechanical engineering, computer software/media application, animal sciences and athletic training.
- The proportion of African-American, Hispanic and Asian students who are very interested in STEM careers is higher than the interest among white students in grades 3 and 4. Interest declines by 8% for white students through grade 11, while interest declines by 19% for African-American students and by 16% for Hispanic students.

STEM ENDORSEMENTS



Iowa's STEM teaching endorsements are now offered at five institutions: Drake University, Grand View University, Morningside College, St. Ambrose University and Buena Vista University. A number of other institutions are developing courses in preparation to offer the endorsement.



A total of 34 Iowa educators are now credentialed in STEM.

STEM PROFESSIONAL DEVELOPMENT*

The first-ever STEM Professional Development Palooza was offered to Iowa educators and teacher-preparers in July of 2017 at Waukee's Innovation and Learning Center.

Exemplary models for establishing school-business partnerships and STEM were showcased, each identified through a statewide competitive review process to find the best of Iowa.

"I'm chock-full of excitement!"

"There's been a shift in my thinking."

"Life-changing."

"My head is spinning, but in a good way."

78% of the participants said they would attend another STEM P.D. Palooza.

Beyond the Palooza, **78 different workshops across** Iowa's six STEM regions prepared almost **2,000 educators** to implement 11 Scale-Up programs in 2016–2017.

*Iowa STEM Professional Development "STEM Palooza" Evaluation, Dr. Liz Hollingworth, Director, University of Iowa Center for Evaluation and Assessment. August 31, 2017.

STEM COMMUNICATIONS

SOCIAL MEDIA



Twitter: **2,780** followers
Up **22%** from last year



Facebook: **965** likes
Up **25%** from last year



Instagram: **185** followers
Up **27%** from last year



YouTube: **19,692** views
Up **66%** from last year



Newsletter: **6,321** readers
Up **50%** from last year

Other social media includes Pinterest and LinkedIn.

WEBSITE

www.iowaSTEM.gov

125,418 page views

28,243 new visitors



129 countries



50 states



421 Iowa cities

MEDIA COVERAGE

The STEM Career Awareness TV PSA ran more than **18,000** times across the state, generating **\$555,000+** in value for commercial advertisement.

STEM career awareness billboards were placed in **18** rural and urban locations across Iowa, resulting in nearly five million impressions and more than **\$23,000** in donated billboard space.

Total PR efforts resulted in **390** pieces of newspaper, television and radio outreach over the course of the year in local, statewide and national media coverage, appearing before **130 million** sets of eyes.

62% of media coverage included a specific STEM example/story in the state or spoke to STEM economic development, and **64%** of the coverage mentions the efforts of the Governor's STEM Advisory Council.

PUBLIC ATTITUDES AND AWARENESS OF STEM

More than half of Iowans (53%) had heard about 'improving math, technology, science and engineering education, and 49% had heard of STEM when used as a stand-alone acronym.

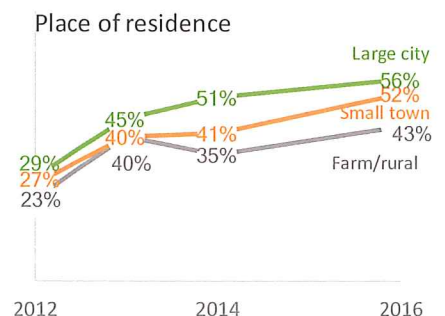
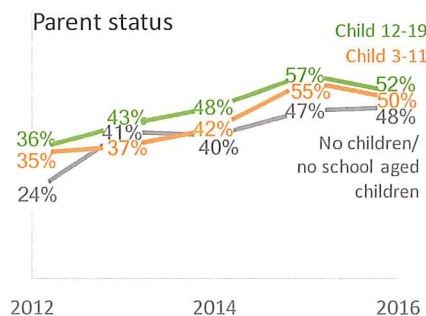
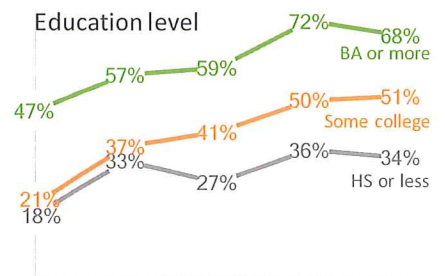
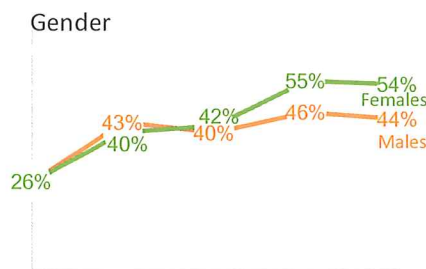
About half of Iowans see STEM as an economic development effort and half see STEM as an education effort.

92% of Iowans agreed or strongly agreed that increased focus on STEM education in Iowa will improve the state economy.

Nearly 9 out of 10 Iowans agreed or strongly agreed with the statement that there is an urgent need in Iowa for more resources to be put toward STEM education.

In 2016, 9 out of 10 Iowans thought STEM education should be a priority in their local school districts, but only 50% said it was a priority and another 20% didn't know.

Awareness of STEM has increased across all subgroups from 2012 to 2016.



IOWA'S STEM NETWORK

CORPORATE PARTNERS AND INVESTMENTS

\$3.1 MIL

A total of **\$3,169,738** in grants, corporate partner gifts and cost-sharing by other STEM partners was invested in Iowa STEM for 2016–2017.

\$569K

44 corporate partners contributed **\$569,727** to Iowa STEM in 2016–2017, a slight increase in private investments over 2015–2016. [Investors are listed at www.iowaSTEM.gov/corporate-partners.]

\$959K

A total of **\$959,984** in grants from the Iowa Department of Natural Resources, the National Governor's Association, the U.S. Department of Labor/Iowa Workforce Development and the National Science Foundation supported Iowa STEM in 2016–2017.

\$1.6 MIL

Cost-sharing partners, including Strategic America, Regional Hub institutions, Teacher Externship workplace hosts, STEM BEST partners, and STEM Scale-Up program providers contributed **\$1,640,027** to Iowa STEM in 2016–2017.

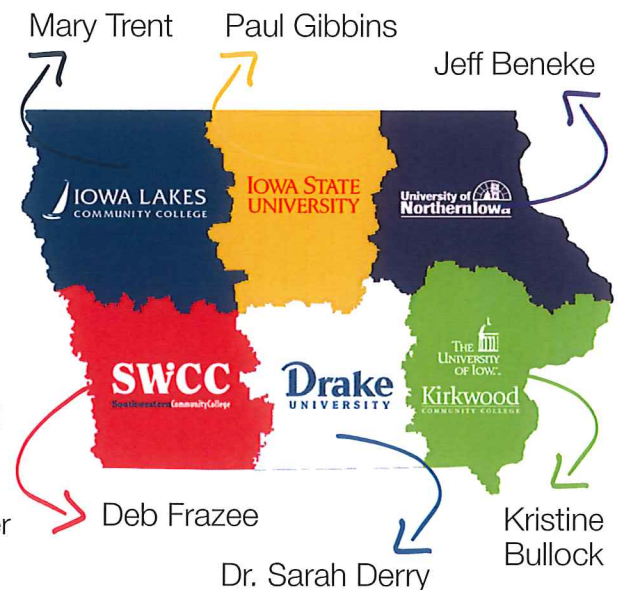
REGIONAL STEM

Regional STEM managers facilitated **11 exemplary STEM Scale-Up programs** that impacted **74,038 preK–12 youth** and their **1,674 educators** in 2016–2017.

Managers held a total of **37 community STEM Festivals** across Iowa, engaging about **16,725 Iowans** in 2016–2017.

Managers made a total of **569 new connections** with business, workforce development, economic development and formal/informal education leaders.

Collectively, Iowa's Regional STEM managers have **9,923** newsletter subscribers, **3,146** Twitter followers and **1,095** Facebook likes.



ACTIVE LEARNING COMMUNITY

337 Iowans representing 200 organizations now make up the STEM Active Learning Community Partners working group (Up from 280 and 140 last year, respectively).

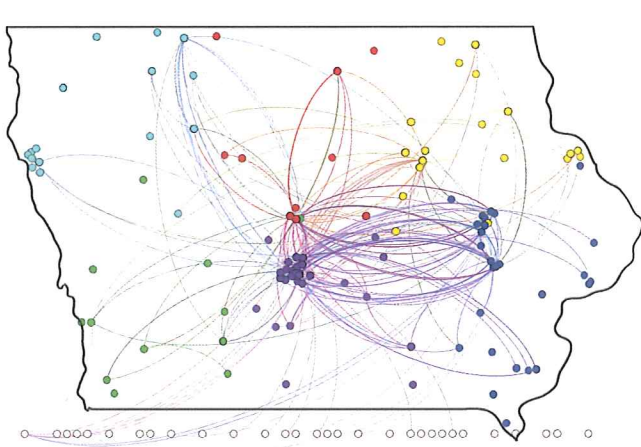
Partners include **after-school programs, museums, libraries, 4H, YMCAs** and other educators around the state.

87 STEM Scale-Up programs were awarded to Active Learning Community Partners in 2016–2017.

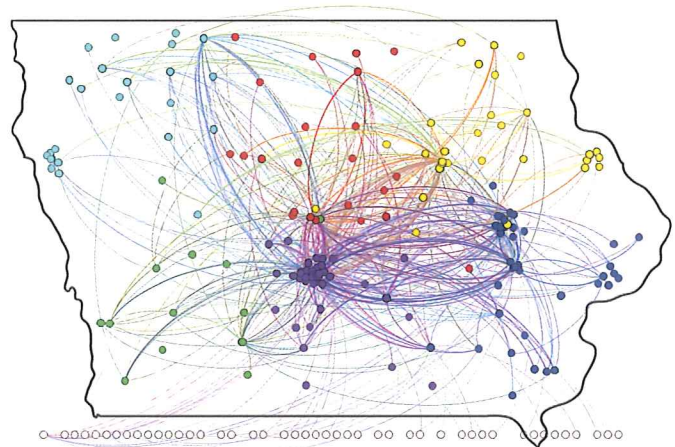
389 educators enjoyed professional development through the ALCP working group in 2016–2017 (up from 272 in 2015).

These **educator partners contributed** to regional STEM festivals, STEM Day at the Iowa State Fair, STEM Day at the Capitol, Dimensions of Success (DoS) trainings, and a slew of conferences in 2016–2017.

IOWA STEM PROFESSIONAL NETWORK GROWTH



2007–2011



2014–2015

The number of members of Iowa's STEM network grew **from 353 in the period 2007–2011 to 721 in 2014–2015**. And the connections between members grew **from 309 to 1057**, respectively.*

*Iowa Statewide STEM Initiative Process Evaluation—Social Network Analysis—Iowa's STEM Network: Reach, Growth, and Potential. Mari Kemis, Andres Lazaro Lopez, Elena Polush, Kathleen Gillon, Research Institute for Studies in Education, Iowa State University. National Science Foundation MSP-RETA award no. DRL-1238211

WHERE ARE THEY NOW?*

STEM evaluators have begun to examine K–12 participants' post-secondary pathways. This will become a prominent report component in years to come.

For a pilot study, a pool of 1,421 high school graduates who had participated in STEM Scale-Up were identified thanks to superintendent permissions.

A total of 168 of them responded to a survey. Sixty percent of that pool (100) were enrolled full time in college. Seventy-one of them declared a STEM major—more than four times the national percentage.

The most agreed-upon survey item was

“I would recommend the STEM program that I was in to other students if they are unsure about their career goals.”

The top three words chosen by respondents to describe their STEM experience were **Challenging, Collaborative and Engaging.**

*Iowa STEM Council Scale-Up Program Participants' Postsecondary Trajectory, Dr. Liz Hollingworth, Director, University of Iowa Center for Evaluation and Assessment. June 30, 2017.

STEM Career Awareness Billboards

These billboard images, featuring prominent Iowa employers, were posted free-of-charge on high-traffic roadsides across the state in summer 2017.

lowaSTEM.gov

STEM education =
Great occupation

Alliant Energy

GREATNESS
STEMS
FROM IOWANS

lowaSTEM.gov

STEM education =
Great occupation

PIONEER

GREATNESS
STEMS
FROM IOWANS

lowaSTEM.gov

STEM education =
Great occupation

ITC
A FORTIS COMPANY

GREATNESS
STEMS
FROM IOWANS

lowaSTEM.gov

STEM education =
Great occupation

KEMIN

GREATNESS
STEMS
FROM IOWANS

lowaSTEM.gov

STEM education =
Great occupation

M.A. FORD
A FORTIS COMPANY

GREATNESS
STEMS
FROM IOWANS

lowaSTEM.gov

STEM education =
Great occupation

FOET
biorefining

GREATNESS
STEMS
FROM IOWANS

lowaSTEM.gov

STEM education =
Great occupation

Principal

GREATNESS
STEMS
FROM IOWANS

lowaSTEM.gov

STEM education =
Great occupation

Rockwell
Collins

GREATNESS
STEMS
FROM IOWANS

lowaSTEM.gov

STEM education =
Great occupation

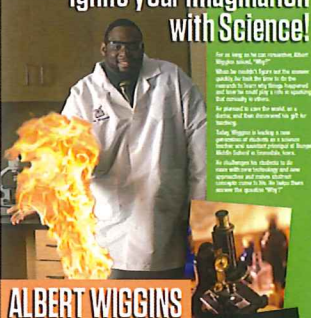
WEITZ

GREATNESS
STEMS
FROM IOWANS

STEM Gem Career Posters

Iowa STEM professionals grace classroom walls throughout the state as STEM Gems, inspiring young daydreamers to pursue their own STEM careers.

Ignite your imagination with Science!



For as long as he can remember, Albert Wiggins has been fascinated by the natural world. He's always been curious about the way things work, and he's always been looking for ways to explore that curiosity.

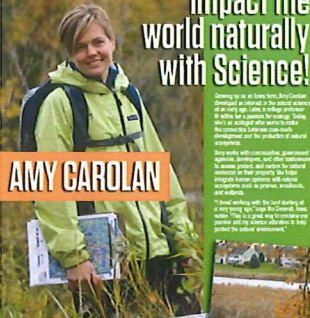
Albert Wiggins is looking for a new challenge in his career. He's currently a Senior Scientist at the University of Iowa, where he's responsible for overseeing the design and construction of a new laboratory building. He's also working on a new project that involves using science to solve a real-world problem.

ALBERT WIGGINS

GREATNESS STEMS FROM IOWANS

Learn more at www.iowastem.org

Impact the world naturally with Science!



Joining up as an Iowean, Amy Carolan discovered the natural beauty of the state. She's always been interested in the environment, and she's always been looking for ways to make a difference.


Amy Carolan is currently a Senior Scientist at the University of Iowa, where she's responsible for overseeing the design and construction of a new laboratory building. She's also working on a new project that involves using science to solve a real-world problem.

AMY CAROLAN

GREATNESS STEMS FROM IOWANS

Learn more at www.iowastem.org

Life! Camera! Action! Life-saving movie set.



In Amy Weiford's world, an animal is never just an animal. It's a character, a friend, a family member. She's always been interested in the way things work, and she's always been looking for ways to make a difference.

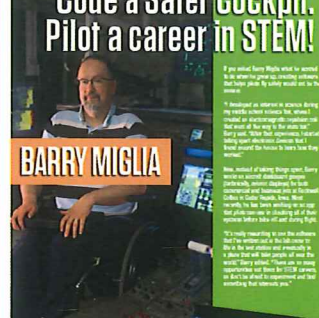
Amy Weiford is currently a Senior Scientist at the University of Iowa, where she's responsible for overseeing the design and construction of a new laboratory building. She's also working on a new project that involves using science to solve a real-world problem.

AMY WEIFORD

GREATNESS STEMS FROM IOWANS

Learn more at www.iowastem.org

Code a Safer Cockpit. Pilot a career in STEM!



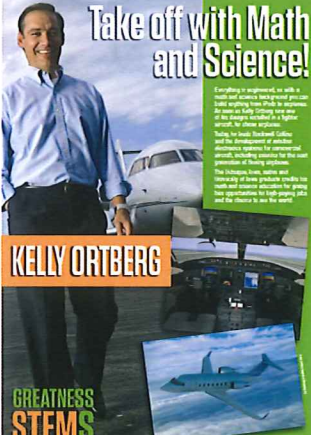
Barry Miglia is currently a Senior Scientist at the University of Iowa, where he's responsible for overseeing the design and construction of a new laboratory building. He's also working on a new project that involves using science to solve a real-world problem.

BARRY MIGLIA

GREATNESS STEMS FROM IOWANS

Learn more at www.iowastem.org

Take off with Math and Science!



Kelly Ortberg is currently a Senior Scientist at the University of Iowa, where he's responsible for overseeing the design and construction of a new laboratory building. He's also working on a new project that involves using science to solve a real-world problem.

KELLY ORTBERG

GREATNESS STEMS FROM IOWANS

Learn more at www.iowastem.org

Crack the code to your future with STEM!



Luis Garcia is currently a Senior Scientist at the University of Iowa, where he's responsible for overseeing the design and construction of a new laboratory building. He's also working on a new project that involves using science to solve a real-world problem.

LUIS GARCIA

GREATNESS STEMS FROM IOWANS

Learn more at www.iowastem.org

Engineer your future with Math and Science!



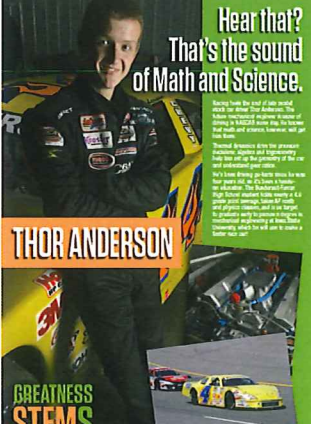
Tess Hindman is currently a Senior Scientist at the University of Iowa, where she's responsible for overseeing the design and construction of a new laboratory building. She's also working on a new project that involves using science to solve a real-world problem.

TESS HINDMAN

GREATNESS STEMS FROM IOWANS

Learn more at www.iowastem.org

Hear that? That's the sound of Math and Science.



Thor Anderson is currently a Senior Scientist at the University of Iowa, where he's responsible for overseeing the design and construction of a new laboratory building. He's also working on a new project that involves using science to solve a real-world problem.

THOR ANDERSON

GREATNESS STEMS FROM IOWANS

Learn more at www.iowastem.org

Hardwire a career in Technology!



Tammy Petro is currently a Senior Scientist at the University of Iowa, where she's responsible for overseeing the design and construction of a new laboratory building. She's also working on a new project that involves using science to solve a real-world problem.

TAMMY PETRO

GREATNESS STEMS FROM IOWANS

Learn more at www.iowastem.org

Taking STEM to New Heights!



Major Jen is currently a Senior Scientist at the University of Iowa, where she's responsible for overseeing the design and construction of a new laboratory building. She's also working on a new project that involves using science to solve a real-world problem.

MAJOR JEN

GREATNESS STEMS FROM IOWANS

Learn more at www.iowastem.org

Iowa STEM BEST® programs of the Governor's STEM Advisory Council

2014

Bettendorf/Pleasant Valley: Bettendorf and Pleasant Valley School districts are developing an internship Academy structure with local business on authentic computer science problems and solutions.

Contact: Tammy Chelf at тчelf@bettendorf.k12.ia.us

District Superintendent: Dr. James Spelhaug- spelhaugjim@pleasval.k12.ia.us ; Michael Raso- mraso@bettendorf.k12.ia.us

Cedar Rapids/College Community (or Iowa BIG): Iowa BIG is an option for earning core academic credit through project-based learning in real-time with 100+ partners from business, nonprofit, and government agencies.

Contact: Shawn Cornally at headmasteriowabig@gmail.com

Kirkwood CC/Univ. of Iowa/Clear Creek Amana/Iowa City/Regina/Solon/Tipton/West Branch/College Community:

STEM Innovator course offered at the Kirkwood Regional Center at the University of Iowa research park open to students from seven partner school districts to engage with STEM industry partners to develop solutions to problems of student and community interest. Students earn high school, Kirkwood Community College, and University of Iowa credit.

Contact: Leslie Flynn at leslie-flynn@uiowa.edu

Northeast Community School District in Goose Lake: The Northeast STEM program provides students with an innovative, problem solving, and discovery-based environment created in partnership with Lyondell Bassell that focuses on authentic, real-world problems through the infusion of technology and curriculum.

Contact: Alicia Christiansen; Alicia.Christiansen@northeast.k12.ia.us;

District Superintendent: Neil Gray; neil.gray@northeastcsd.org

Rock Valley (or Rocket Manufacturing): Rocket Manufacturing is a fully-functioning, student-run manufacturer that works with local businesses by crafting metal machined parts and tools that businesses or individuals request. Students do the marketing, accounting, design, production and customer communications as well.

Contact: Chad Janzen; cjanzen@rvcsd.org

2015

Iowa BIG North: A four-district consortium of Charles City, New Hampton, Osage and Rudd-Rockford-Marble Rock opted to brand as Iowa BIG North. Partners include Zoetis, Cambrex Corporation, Valent BioSciences Corporation and more, to immerse high school students in a half-day professional-based learning model.

Contact: Dr. Dan Cox, Charles City Community School District Superintendent, dcox@charlescitieschools.org

Hoover High School, Des Moines: Hoover High School's STEM BEST program pairs students with higher education partners Grand View University, ISU's Center for Biorenewables in Chemistry (CBIRC) and local businesses Accumold, DuPont Pioneer, EFCO, Storey Kenworthy, and United Way of Central Iowa, to provide students with opportunities to conduct research at a university or a business.

Contact: Maureen Griffin, School Improvement Leader, maureen.griffin@dmschools.org

District Superintendent: Thomas Ahart, Ed.D, at superintendent@dmschools.org

Davenport Community School District, Davenport: Davenport Community School District's "INSPIRE" program partners with local businesses MA Ford, Alcoa, Phoenix Closures and more, to immerse high school students in the business environment and explore manufacturing curriculum and pathways in their community.

Contact: Jennifer Boyd, boydjie@davenportschools.org;

District Superintendent: Dr. Art Tate at tateart@mail.davenport.k12.ia.us

IOWA GOVERNOR'S STEM ADVISORY COUNCIL

2016

Assumption High School in Davenport: The school works with Victory Enterprises to develop a Virtual Reality STEM Career Exploration program for students that introduces them to STEM careers in Iowa and across the U.S.

Contact: Andrew Craig, President, at andy.craig@assumptionhigh.org

Boone Community School District: Boone CSD is implementing a grades 3-12, work-based learning continuum of awareness (early years), exploration (middle years) and training (high school) in partnership with a variety of employers and higher education institutions. *Boone CSD is one of four schools piloting a Quality Pre-Apprenticeship, building on grades 10-12 work-based learning experiences. They offer semester-length, project-based opportunities through the School Career Connections and vocational rehabilitation programs initially in plumbing and electrical fields in partnership with Kruck Plumbing & Heating Co. (a Registered Apprenticeship Program) and ABC of Iowa Apprenticeship & Training Trust. A goal is to expand these options with the growth of community apprenticeship partners over time.*

Contact: Kris Byam, Boone High School Principal, at kbyam@boone.k12.ia.us

District Superintendent: Brad Manard at bmanard@boone.k12.ia.us

Fort Madison Community High School: Students experience co-taught STEM courses of educators alongside industry partners in innovative learning spaces that introduce them to careers in their community, leading to job shadows and internships.

Contact: Greg Smith, Principal, at greg.smith@fmcsd.org

District Superintendent: Erin Slater at erin.slater@fmcsd.org

IKM-Manning Community School District: A learning environment focused on two important employability skills – communication and problem solving – where students, teachers and community leaders come together to brainstorm business project ideas and pursue them on teams.

Contact: Thomas Ward, Superintendent, at tward@ikm-manning.k12.ia.us

Muscatine Community School District “STEAM Into MCC”: Fourth and fifth grade students in all of Muscatine’s elementary schools take part in a five-month-long, afterschool program of hands-on projects led by community experts, held at MCC. *Muscatine CSD with MCC is one of four schools piloting a Quality Pre-Apprenticeship. Their program in the Manufacturing and Culinary Arts Academies is in partnership with MCC and aligned to the Iowa Core, leading to certificates in electronics and up to 38 credits toward an Engineering Technology Electromechanical Diploma (manufacturing pathway); or certificates in culinary arts and up to 32 credits toward a Culinary Arts Diploma. Partners are Chef Brad Scott for the culinary pathway, and companies HNI and Allsteel for the manufacturing pathway. All three are engaged in Registered Apprenticeship Programs.*

Contact: Dr. Jerald Riibe, Superintendent, at jerry.riibe@muscatine.k12.ia.us

North Cedar Elementary School in Cedar Falls: Students work hand-in-hand with Sidecar Coffee (local chain) to learn about the science of roasting and brewing coffee in order to create their own product and market it to the community.

Contact: Jennifer Hartman, Principal, at Jennifer.hartman@cfschools.org

District Superintendent: Dr. Andy Pattee at andy.pattee@cfschools.org

Spencer High School: Students travel to workplace sites for training and experiences that align with the community’s industry demand in construction, health care, manufacturing and entrepreneurship. *Spencer High School is one of four schools piloting a Quality Pre-Apprenticeship. Their program expands on the Construction Extended Career Experiences whereby students are at the job site receiving on-the-job training for an average of 12.5 hours a week. They also achieve their 10-hour OSHA certification in concert with the Quality Pre-Apprenticeship. Established Registered Apprenticeship Program partners include Milford Electric and Midwestern Mechanical.*

GREATNESS STEMS FROM IOWANS

GOVERNOR'S STEM ADVISORY COUNCIL

dedicated to building a strong STEM education foundation for all Iowans

Contact: Elli Wiemers, Principal, at ewiemers@spencerschools.org
District Superintendent: Terry Hemann at themann@spencerschools.org

Story County Consortium: Eight school districts in the consortium, including Ames, Boone, Ballard, Collins-Maxwell, Colomesco, Gilbert, Nevada and Roland Story, join forces to create a shared STEM BEST model that provides students with work-based learning opportunities with businesses in their communities.

Contact: John Kinley, Director, at jfkinley@dmacc.edu

Waukee APEX: Through a collaboration between education, business, and the community, Waukee Aspiring Professional Experience (APEX) develops highly skilled, adaptable, global innovators and leaders. Waukee APEX draws on the expertise of Des Moines-area business partners to bring real-world experience to high-schoolers. Through passion-based learning, authentic projects and experiences, students add value to business partners while exploring career possibilities identified by economic trends within their metro area and state. *Waukee APEX is one of four schools piloting Quality Pre-Apprenticeships. Their program guides high school seniors in learning past the initial APEX course in the manufacturing, construction and technology fields. Students will gain valuable experience, earn credentials and college credits and connect to business partners in the community. Waukee APEX's dissemination plan has been well-tested as a STEM BEST premiere model site for schools across Iowa.*

Contact: Michelle Hill, Director, at mhill@waukeeschools.org

West Delaware County Community School District: Students work directly with business leaders in the community to design and implement authentic projects for that business that also satisfy and align with state standards and teach students the professional skills necessary in the industry.

Contact: Tim Felderman, West Delaware High School Principal, at timfelderman@w-delaware.k12.ia.us

2017

Albia Community Schools: The Albia Community Schools will commence a collaborative learning model between business, community and education in the fall of 2018. This model will bring relevant, rigorous and authentic learning experiences to life for students while working with business partners and Indian Hills Community College. Students will be immersed in community projects with a STEM focus that will solve real problems in the Albia area, thus improving the living and working conditions for our citizens.

Contact: Kevin Crall, Albia Community School District Superintendent, at kevin.crall@albia.k12.ia.us

Alburnett Schools: The Alburnett Community School District developed and implemented a program called the Pirate Collaborative in 2016-2017 to bridge the needs and issues of businesses with increased applicability and relevance in learning for students. The Pirate Collaborative aims to aid students in the work they do for businesses in their school projects, and these businesses provide career awareness, preparation, and exploration to their students.

Contact: Matt White at mwhite@alburnettcsd.org

District Superintendent: Dr. Dani Trimble at dtrimble@alburnettcsd.org

Ankeny Schools: Ankeny created a college and career readiness program called Orbis that exemplifies the STEM BEST model, with a need for a full-time Director of College and Career Readiness to implement this program. The district also needs to begin pilot projects for Orbis which include meeting with local businesses, nonprofit organizations, and students to engage in collaborative project planning and design, along with a collaboration space for all of this to occur.

Contact: Dr. Jill Urich, Director of College and Career Readiness, at jill.urich@ankenyschools.org

District Superintendent: Dr. Bruce Kimpston at bruce.kimpston@ankenyschools.org

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Atlantic Community Schools: Atlantic Community Schools' STEM BEST® model is a pre-apprentice approach to the construction trades. Their business partners will provide support and expertise (Master Licensed contractors) as they create and implement a robust construction trades program. The Atlantic School Board has purchased a facility that can house such a program allowing room to develop more in years to come. Incorporating a comprehensive exploratory program at the middle school is another part of this project. The curriculum taught will include hands-on experiences in modeling and construction applications and 21st Century Skills, which will focus on employability skills, technology and financial literacy.

Contact: Heather McKay at hmckay@atlanticschools.org

District Superintendent: Steve Barber at sbarber@atlanticschools.org

Cedar Falls Community Schools: Cedar Falls is further developing a CAPS program in Engineering Technology, Communication and Design, and Education. The community partnerships will involve students working on projects that fulfill needs for businesses, job shadowing opportunities, access to resources and equipment for students and fresh, creative minds for businesses.

Contact: Kenton Swartley at Kenton.swartley@cfschools.org

District Superintendent: Andy Pattee at andy.pattee@cfschools.org

Chariton Community Schools: Chariton Community Schools in partnership with the Lucas County Development Corporation will implement the REAL (Relevant – Engaged – Applied – Learning) program in the 2018-2019 school year. The program will engage high school students in on-site, work-based, career-specific projects providing experience in STEM careers. Students will be exposed to high-demand fields such as design/engineering, diesel mechanics, IT, nursing, coding, finance, and supply chain. Initially, nine businesses, including Hy-Vee, Johnson's Machine Works and the Lucas County Health Center, have partnered to provide career awareness, exploration and preparation & training opportunities for students through tours, speakers, career course development committees and hosting students in the workplace.

Contact: Tracy Hall, Chariton High School Principal, at tracy.hall@chariton.k12.ia.us

District Superintendent: Paula Wright at paula.wright@chariton.k12.ia.us

Charles City, New Hampton, Osage and Rudd-Rockford-Marble Rock Community School: This is the second full year of operations for their Iowa BIG North consortium, which has been a catalyst for strengthening their business and school district partnerships. Within these districts, many local businesses have plans for incorporating student learning and relevance to their programs.

Contact: Dr. Dan Cox, Charles City Community School District Superintendent, at dcox@charlescitieschools.org

Davenport West High School: Davenport West High School purchased a Haas CNC Mill under the STEM BEST® award in 2015 and is expanding its Advanced Manufacturing program with the purchase of a Haas CNC lathe. Working with business partnerships and focusing on Advanced Manufacturing, Davenport West HS plans to revitalize manufacturing in the Quad Cities by creating a high tech area of students learning CNC programming and operating. Davenport West HS will work to expand student internships with M.A. Ford for students wanting to pursue careers as engineering technologists and engineers.

Contact: Greg Smith at smithgr@davenportschools.org

District Supervisor: Dr. Arthur Tate at tateart@davenportschools.org

Des Moines Hoover High School: Hoover's STEM Academy implemented in 2012 is a school-within-a-school model that focuses on providing robust experiences for all students who connect the Hoover learning community with businesses and institutes of high education in authentic, collaborative and challenging ways. This award expands upon a previously awarded STEM BEST® award and focuses on two goals: (1) providing students with opportunities to conduct research at a university or internship with local businesses and (2) providing teachers with ongoing, in-depth professional development.

Contact: Maureen Griffin, STEM Administrator, at Maureen.griffin@dmschools.org
Kathie Danielson, Hoover High School Interim Principal, at Kathie.danielson@dmschools.org
District Superintendent: Dr. Tom Ahart at superintendent@dmschools.org

IKM-Manning Community School District: IKM-Manning wants to develop their Middle School SPARK program and repurpose a classroom into a Makerspace environment. This would help engage more students in project-based learning and with community business partners. The IKM-Manning Foundation GALA brings together many invested partners and has shown to be a sustainable source of funding in years past.

Contact: Sharon Whitson at swhitson@ikm-manning.k12.ia.us
District Superintendent: Trevor Miller at tmiller@ikm-manning.k12.ia.us

Iowa City Community School Schools: Iowa City community school district wants to scale all of their current STEM-driven programs to provide the experience to all students that connects each individual program. Many businesses have been involved with the individual programs for years and continue to support the school district.

Contact: Matt Degner, Assistant Superintendent, at degner.matt@iowacityschools.org
District Superintendent: Stephen Murley at murley.stephen@iowacityschools.org

Marshalltown Learning Academy: Marshalltown schools created the Marshalltown Learning Academy to provide a personalized learning environment for students several years ago; due to great success, they want to scale up the program and include apprenticeship programs with area businesses that are often already in partnership with the school district.

Contact: Eric Goslinga at egoslinga@marshalltown.k12.ia.us
District Superintendent: Dr. Theron Schutte at tschutte@marshalltown.k12.ia.us

Muscatine Community Schools with West Liberty Elementary and Muscatine Community College: STEAM into MCC was a recipient of a 2017 Iowa STEM Best grant. In the spring of 2017, all six elementary schools in the Muscatine Community School District (MCS D) and teachers from MCS D and Muscatine Community College (MCC) partnered to offer a unique after-school program for 4th and 5th graders. 28 kids participated in the inaugural program: 15 girls, 13 boys and 16 minorities. While much was accomplished in our first year, work remains to meet all of the outcomes and the ongoing support of the Iowa Best STEM Council is greatly appreciated. In 2018, we will double the number of students served and expand into a new elementary school with 54% Latino students.

Contact: Jerald Riibe, Superintendent, at jerry.riibe@muscatine.k12.ia.us

Newton High School: Newton High School's program is called Fledge Innovator, a partnership between the high school, businesses, and the community. Area business partners will provide authentic projects for students to work collaboratively on their assigned projects on site or at the new NHS STEM Innovation Center called "The Incubator." The course supports STEM initiatives and follows the University of Iowa's STEM Engineering or Biz Innovator Curriculums. The class will be open for juniors and seniors and will meet for 1.5 hours for nine weeks.

Contact: Bill Peters, High School Principal, at petersb@newtoncsd.org
District Superintendent: Bob Callaghan at callaghanb@newtoncsd.org

North Iowa Community School District: Partnering with a primary local partner, NGT (Next Generation Technology), North Iowa CSD plans to develop Next Generation Kits (NGK's), providing hands-on student-led learning opportunities that engage students while aligning to NGSS and other CORE standards, to be used in their Solution Center. NGK's will foster creativity, innovation and problem solving skills. Initial kit topics will include build a PC, Drones, Networking, Web Development, Robot Vacuums, Smart Homes, Security Cameras, 3D Printing, Astronomy and App Design.

Contact: Cory Myer, Superintendent, at myer@northiowa.org

IOWA GOVERNOR'S STEM ADVISORY COUNCIL

Oelwein Community Schools: PROJECT ONE was created by the Oelwein Community School District in conjunction with the Oelwein Economic and Area Development to create opportunities for students to flourish in robust Project and Work Based Learning Environments. With support of local businesses, authentic learning opportunities will provide students with a rich opportunity to explore interests, learn in cross-curricular classrooms and develop skills of the Universal Constructs. Pedagogical professional learning will be provided to teachers as Oelwein Community School District prepares for this Project and Work Based approach to education. Oelwein Community School District believes EveryONE will have an opportunity to engage in: PROJECT ONE: ONE PROJECT, ONE BUSINESS, ONE STUDENT AT A TIME.

Contact: Deb Kaepfel at dkaepfel@oelwein.k12.ia.us

District Superintendent: John Ehn at jehn@oelwein.k12.ia.us

Southwest Valley Middle School of Villisca: Before the station closed, Villisca's local train station used to be a collaboration space for all community members. With the STEM BEST Grant, Villisca will regain that intellectual common place and it will be known as the Career Stop. Collaboration between community members and students will problem-solve real world situations. Our vision is to create a Career Stop which is a learning space where area businesses can come in to teach our students some of the skills they use on the job. Teachers and businesses will work together to create curriculum units that integrate entrepreneur and apprenticeship skills and hands-on learning job skills for students.

Contact: Lora Top at ltop@villiscaschools.org

District Superintendent: Willie Stone at wstone@corningcsd.org

Spirit Lake Middle School: The goal at Spirit Lake Middle School is to create a multipurpose educational makerspace that connects school with community. The makerspace concept provides hands-on, creative ways that allow students to innovate while engaging them in deep learning in all academic disciplines. Connecting with local businesses and nonprofits to raise STEM career awareness and job skills are also a priority. The end goal is to establish a public asset Makerspace that will deliver STEM opportunities not only to Spirit Lake students but also to the community.

Contact: Rick Reinking, Director of Strategic Partners and K-12 STEM, at rreinking@spirit-lake.k12.ia.us

District Superintendent: Dr. David Smith at dsmith@spirit-lake.k12.ia.us

West Liberty Community Schools: The goal of the project is to bring an innovative technology experience involving virtual reality to the students. Shaking Earth Digital, LLC (SED) will design a program for students to create their own virtual reality (VR) game or experience. Students will create a project in an after school program. "I'm beyond excited. We have a unique opportunity to not just expose students to future technology, but to shape future itself." - Jens Zalzal, owner of Shaking Earth Digital. "We wanted students to be creators behind VR. We are thrilled to bring this experience to our students and grateful for partnering with Shaking Earth Digital!" - Jackie Henderson, West Liberty Community Schools teacher.

Contact: Jackie Henderson at jhenderson@wl.k12.ia.us

District Superintendent: Joe Potts at jpotts@wl.k12.ia.us

2018-2019 Scale-Up Programs

Scale-Up Program	Program Description	Grade Levels	In School	Out of School	S, T, E, M
Pint Size Science	Four hands-on modules: one introductory unit and three chosen by the educator. Features Iowa Early Learning Standards/GOLD Objectives, NGSS, Iowa Common Core math and literacy and 21st Century Learning Skills. Includes kit materials, curriculum guides, website and webinar support. www.sciowa.org/pss	PreK-2	X	X	STEM
Ramps and Pathways	Explore the engineering process and mathematics of spatial thinking and geometry through construction of marble runs; mathematics and literacy skills through data collection; physics of force and motion through conversations and retesting; and 21st Century Learning Skills related to creation and innovation. www.rampsandpathways.org	PreK-2	X	X	STEM
STEM in Action	With options in Life, Earth and Physical Sciences, each educator-chosen kit (5 for PreK, 9 for K-2, 9 for 3-5) is formatted into small, manageable bits of time with limited consumable items. Available in English and Spanish. www.hand2mind.com/stemination	PreK-5	X	X	STEM
Making STEM Connections	Activities that help students connect STEM to their daily lives and develop competencies essential to Iowa's future workforce. Grounded in making, safety, upcycling, creative constraints, art, and reinventing technologies. Lessons build on NGSS standards, reflect Iowa Common Core, and include National CORE Art Standards. www.sciowa.org/makingstemconnections	K-8	X	X	STEM
Engineering Everywhere	Helps students think creatively and solve globally relevant engineering challenges during out-of-school programs. Each unit has an introduction to the engineering process, culminating design challenge, science and mathematics standards, and 21st Century Learning Skills. www.eie.org/engineering-everywhere	6-8		X	STEM
PLTW Gateway – Computer Science for Innovators and Makers	Using real-world scenarios, students use the design process, which includes defining the problem, generating concepts, and designing and presenting a solution. Aligns to NGSS, Iowa Common Core for Mathematics and ELA, and CSTA Standards. www.pltw.org	6-8	X		STEM
PowerTeaching Math	Includes active instruction, team practice, formative and formal assessments, feedback and motivation, and a designated PowerTeaching coach. Contains Iowa Common Core Mathematics Standards and 21st Century Learning Skills. www.successforall.org	6-8	X		M
Computer Science Principles	A year-long Code.org course that aligns with CSTA standards and 21st Century Learning Skills. It can be delivered as an Advanced Placement course. Teachers need no prior computer technology experience to qualify for training. www.code.org/educate/csp	9-12	X		STEM
CASE Animal and Plant Biotech	Experience industry appropriate applications of biotechnology-related plant and animal agriculture through hands-on activities, projects and problems in biotechnology. Research and experimental design will be highlighted in industry-appropriate investigations that involve micropipetting, bacterial cultures and transformations, electrophoresis, and the polymerase chain. www.case4learning.org	9-12	X		STEM
CASE Environmental Sci Issues	Investigate areas that include ecosystem management, sustainable agriculture, energy choices, and pollution. Students will research, investigate, experiment, and document a project, and communicate solutions to peers and members of the professional community. www.case4learning.org	9-12	X		STEM



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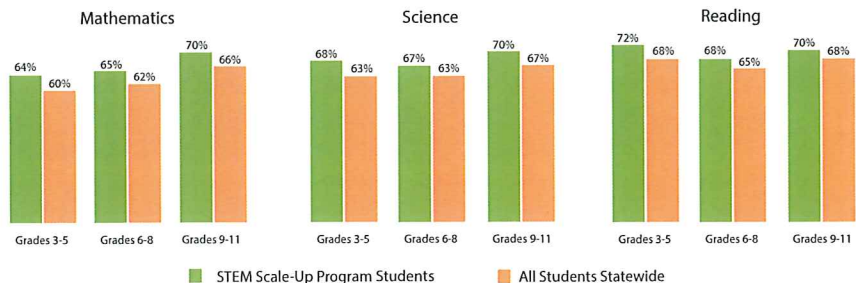
STEM SCALE-UP PROGRAM

What is the STEM Scale-Up Program?

The Iowa Governor's STEM Advisory Council's STEM Scale-Up Program finds the nation's best-known programs and delivers them to Iowa educators. Each year, the STEM Council equips thousands of educators with STEM programs that inspire nearly 100,000 Iowa youth.

Has it been successful in Iowa?

On the Iowa Assessments, students who participated in the STEM Scale-Up Program scored higher than students statewide in the following, according to the 2016-17 Iowa STEM Evaluation Report.



Who can apply?

One of the priorities of the STEM Council is to achieve STEM for All! That means, any Iowa educator is eligible to apply for a program, including PreK-12 teachers, afterschool club leaders, Extension and 4-H professionals, daycare providers and other active learning community educators.

APPLY TODAY!

Applications Due: March 5, 2018

Announcement of Awardees: Early April

2018-2019 STEM Scale-Up Program Menu

- Curriculum for Agricultural Science (CASE): Animal and Plant Biotech
- Curriculum for Agricultural Science (CASE): Environmental Sci Issues
- Computer Science Principles
- Engineering Everywhere
- Making STEM Connections
- Pint Size Science
- PowerTeaching Math
- Project Lead The Way (PLTW): Computer Science for Innovators and Makers
- Ramps and Pathways
- STEM in Action

Learn more about the programs at:
www.iowaSTEM.gov/Scale-Up

WHAT IS THE IOWA STEM TEACHER EXTERNSHIPS PROGRAM?

The Iowa STEM Teacher Externships program aims to build bridges between Iowa's workplaces and STEM educators across the state by equipping them to work at local businesses, organizations and other workplaces alongside knowledgeable and skilled employees.

Since the program launched in 2009, more than **300** Teacher Externs have worked at **100+** Iowa workplaces, building long-lasting school+business partnerships across Iowa that provide educators with the ability to improve student STEM experiences as well as:

- Create lasting partnerships between business and industry and local schools.
- Match educated and skilled teachers as participants and contributors to a workplace's needs.
- Support the local workforce by providing students with STEM career information about workplaces in their community.
- Gain publicity through the program's promotion, officially recognizing the workplace's commitment to STEM education and economic development in Iowa.

THE FACTS:



of Workplace Hosts agree or strongly agree that "Teacher Externs provided significant contributions."

Recent Workplace Hosts estimate anywhere from **\$30,000** to **\$250,000** as a range of the monetary value of a Teacher Extern's contributions.



of Workplace Hosts agree or strongly agree that "Teacher Externs provided beneficial outside viewpoints."

BE A HOST TODAY www.IowaSTEM.gov/Externships

WHAT TO EXPECT

Proven Value

Workplace Hosts have the opportunity to work with some of Iowa's most talented STEM educators. By opening the door to a Teacher Extern, Hosts help build a partnership that will continue to enhance not only the workplace, but also the community's future workforce.

Teacher Externs have worked on high-level workplace projects in a variety of industries across the state. From working with a continuous improvement expert in surgical units at a regional hospital to mussel diving, to water quality monitoring and mapping machine efficiencies at major manufacturing businesses, Teacher Externs can offer uncommon expertise and save Hosts time and money.

Workplace Host Expectations

Teacher Externships are full-time professional development experiences that operate during six weeks in the summer. The Host will identify a hands-on project that contributes to an organization's bottom line.

A flexible work schedule may be negotiated between the Workplace Hosts and Teacher Externs, but Teacher Externs must devote 30 days at the Workplace Host site to complete the experience.

Hosts typically cost-share at half of the total per-teacher costs through a tax-deductible donation of \$3,000.

A Qualified Match

Our program coordinators match qualified teacher applicants to Hosts in the communities in which they teach based on the teacher applicant's interests and skills as well as the Host's needs.

WHAT DO TEACHER EXTERNS DO?

Amanda Ohgo, Science Teacher
Norwalk Senior High School



Amanda was provided a variety of experiences all focused around plants where she seeded, transplanted, sample collected and learned about the molecules of interest in the greenhouse. She also worked in the lab preparing samples for testing and propagating plants.

Brandon Brooks, Technology Teacher
Edward Stone Middle School

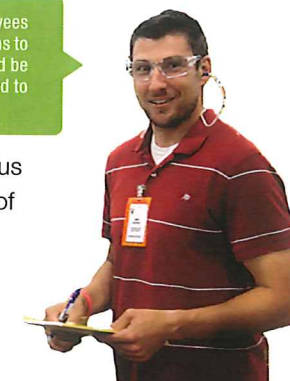


Brandon worked with John Deere's Welding Engineers for their Round Baler line. He developed preventative maintenance plans for the robot cells and ventilation systems. He also assisted the welding team in troubleshooting and learned some basic robot programming.

Gabe Bakker, Mathematics Teacher
Pleasantville High School



"Technology is used everyday in my experience. All employees have to be trained and skilled with different computer programs to help make their jobs and processes better. These skills should be taught in every class in the high school because students need to be proficient in regards to technology."



Gabe worked as part of Vermeer's Continuous Improvement team evaluating the efficiency of different processes in the plant. He was involved in projects that assessed the relocation of assembly lines as different parts of the plant were renovated.

WATCH ONLINE

Take an inside look at more Teacher Externships by watching the videos at www.IowaSTEM.gov/Externships/Videos

WHAT DO WORKPLACE HOSTS THINK?

Pella Corporation



"It was an excellent decision ... our Teacher Extern did a lot of research and created an amazing database that we had wanted to do for several years but had not found the time. Not only did she do this, she also came up with graphs for figuring out some future costs that will help us immensely in marketing our services."

Diamond Vogel Paints

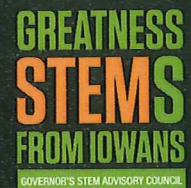


"All of our Teacher Externs have seemed to really grab hold of various ways to use their Diamond Vogel experience in their teaching—that is a big reward."

Siemens Energy

SIEMENS

"Having a Teacher Extern in the plant makes a difference. Someone who is used to teaching becomes a student. That student has reason to question why we do things a certain way, causing us to look at things from a different perspective."



The Iowa Governor's STEM Advisory Council

The Iowa Governor's STEM Advisory Council was created by Executive Order #74 of Governor Terry E. Branstad in July 2011. The STEM Council's overarching goal is to boost student interest and achievement in STEM subjects and build a stronger workforce pipeline to meet the STEM career demand in Iowa.

OUR PARTNERS



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www.IowaSTEM.gov/Externships

Iowa STEM Teacher Externships, a program of the Iowa Governor's STEM Advisory Council, is supported through state-appropriated funds and the Iowa Department of Natural Resources (NR) Resource Enhancement and Protection Conservation Education Program (REAP-CEP) Grant #17-20 for Teacher Externships with Environmental and Conservation Professionals, along with investments by Iowa business and industry partners.

WORKPLACE BROCHURE