Iowa Governor's STEM Advisory Council Meeting

April 29, 2021

Diane Young

STEM Council Co-Chair

Showcase:
STEM Scale-Up Program

TOMORROW STEMS 10TH ANNIVERSARY FROM IOWA
GOVERNOR'S STEM ADVISORY COUNCIL

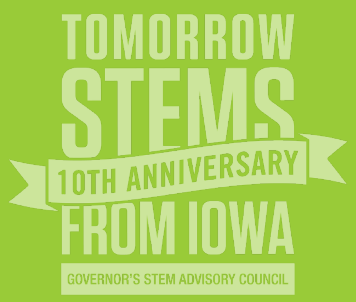
Iowa STEM Scale-Up Program Showcase –

Sheila Miller, Technology Coordinator

Blessed Maria Assunta Pallotta Catholic Middle School in Waterloo, IA

GREATNESS STEMS FROM IOWANS
GOVERNOR'S STEM ADVISORY COUNCIL

STEM SCALE-UP PROGRAM



STEM Scale-Up Program

- **1,950 educators** delivered at least one of thirteen STEM Scale-Up Programs in 2019–2020.
- **102,516 preK–12 youth** participated in one or more Scale-Up programs in 2019–2020
- **645,444 preK–12 Iowans** have participated in STEM Scale-Up programming since 2012

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2021-2022 STEM Scale-Up Awardees

- **12 programs**
- **1,941 educators** awarded
- **114,176 pK-12 youth** to participate

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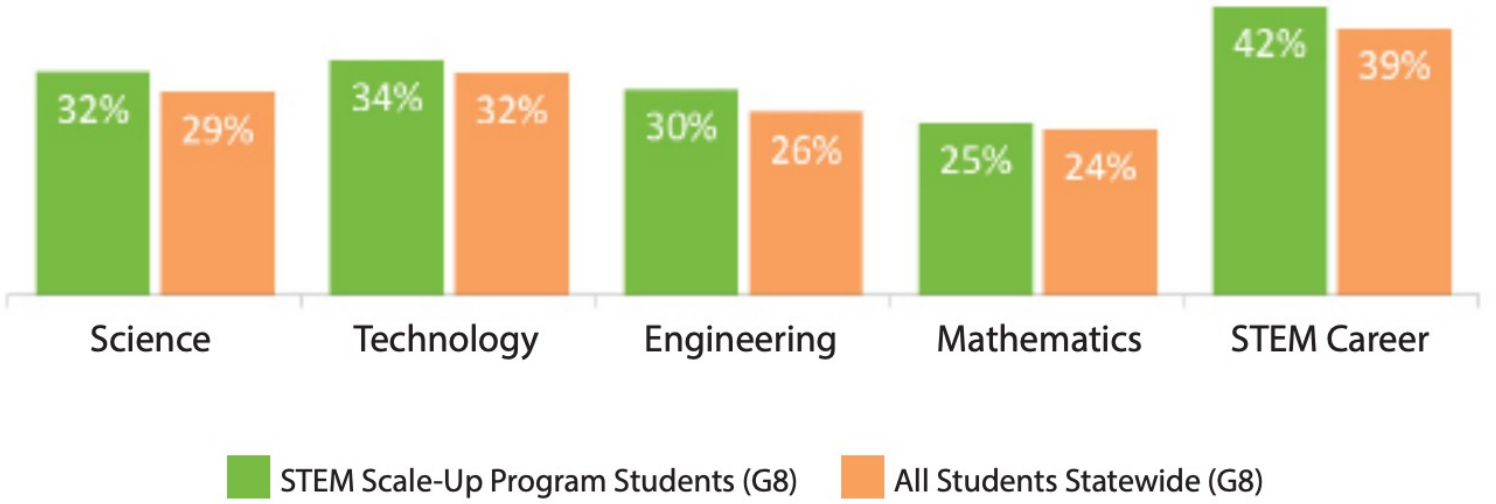
Student Interest in STEM

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.

Source: Iowa STEM Monitoring Report 2019-2020

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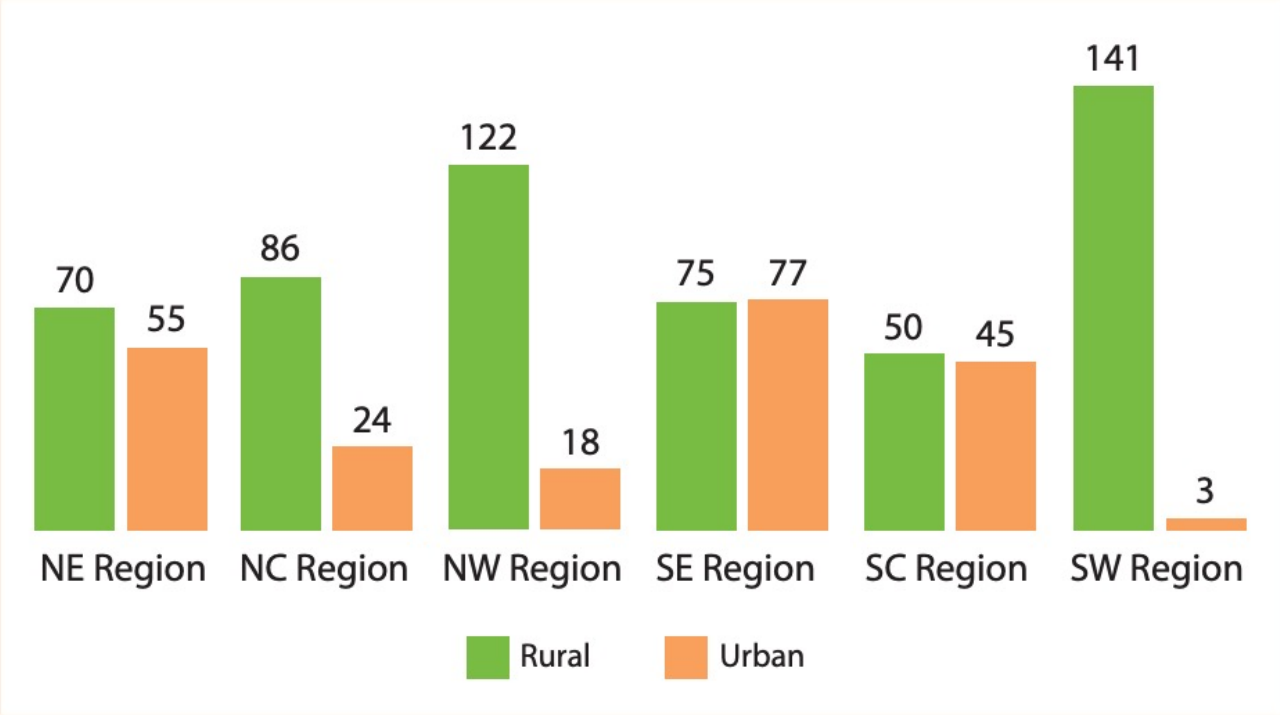
Student Interest in STEM

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.

Source: Iowa STEM Monitoring Report 2019-2020

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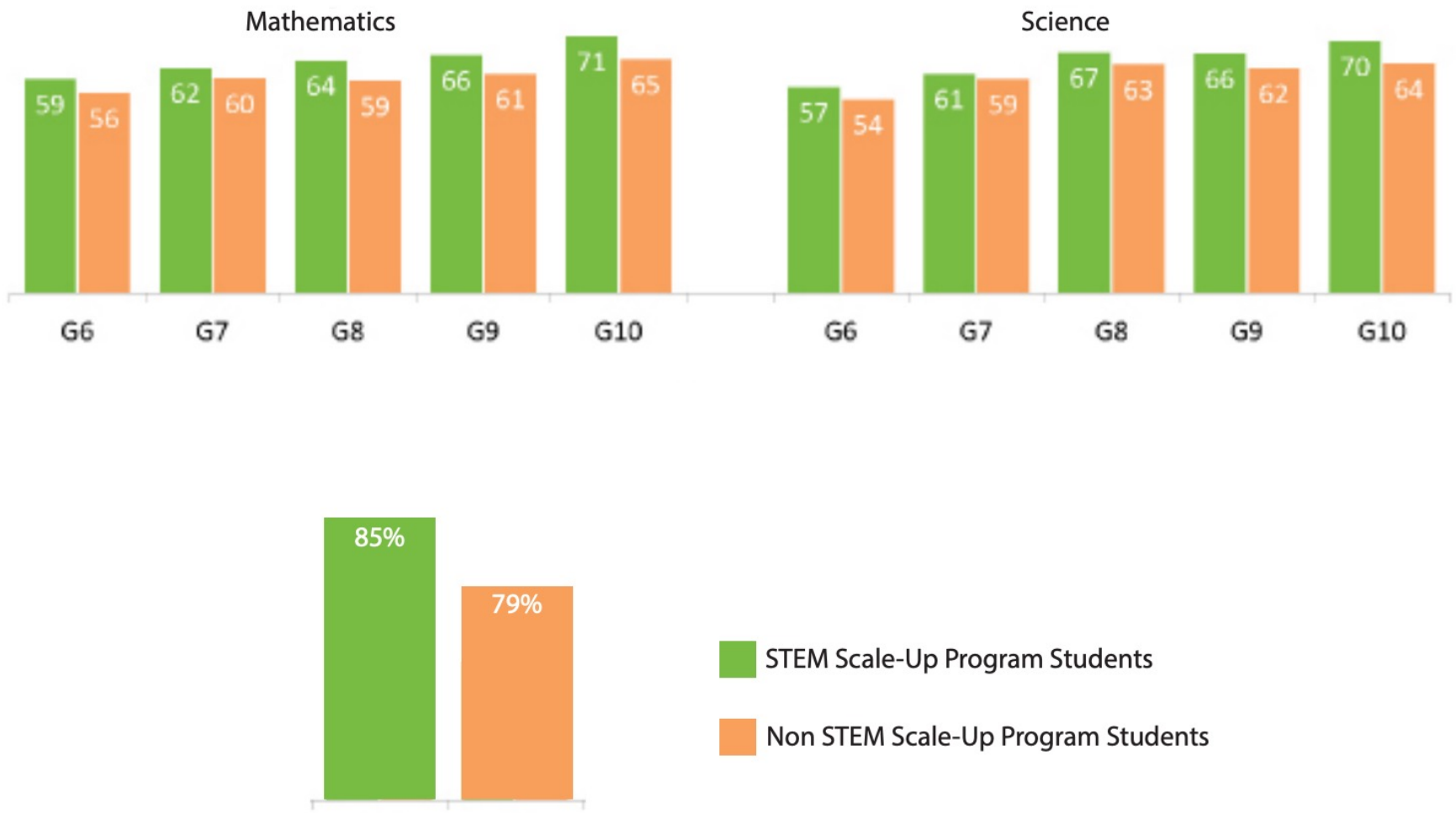
Student Achievement at Proficient or Advanced Level



Source: Iowa STEM Monitoring Report 2019-2020

Showcase: STEM BEST

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Ann Gritzner
Maci Kluesner
C.J. Polkinghorn

Clayton CO BEST

Central Community School District

GREATNESS STEMS FROM IOWANS

GOVERNOR'S STEM ADVISORY COUNCIL
dedicated to building a strong STEM education foundation for all Iowans

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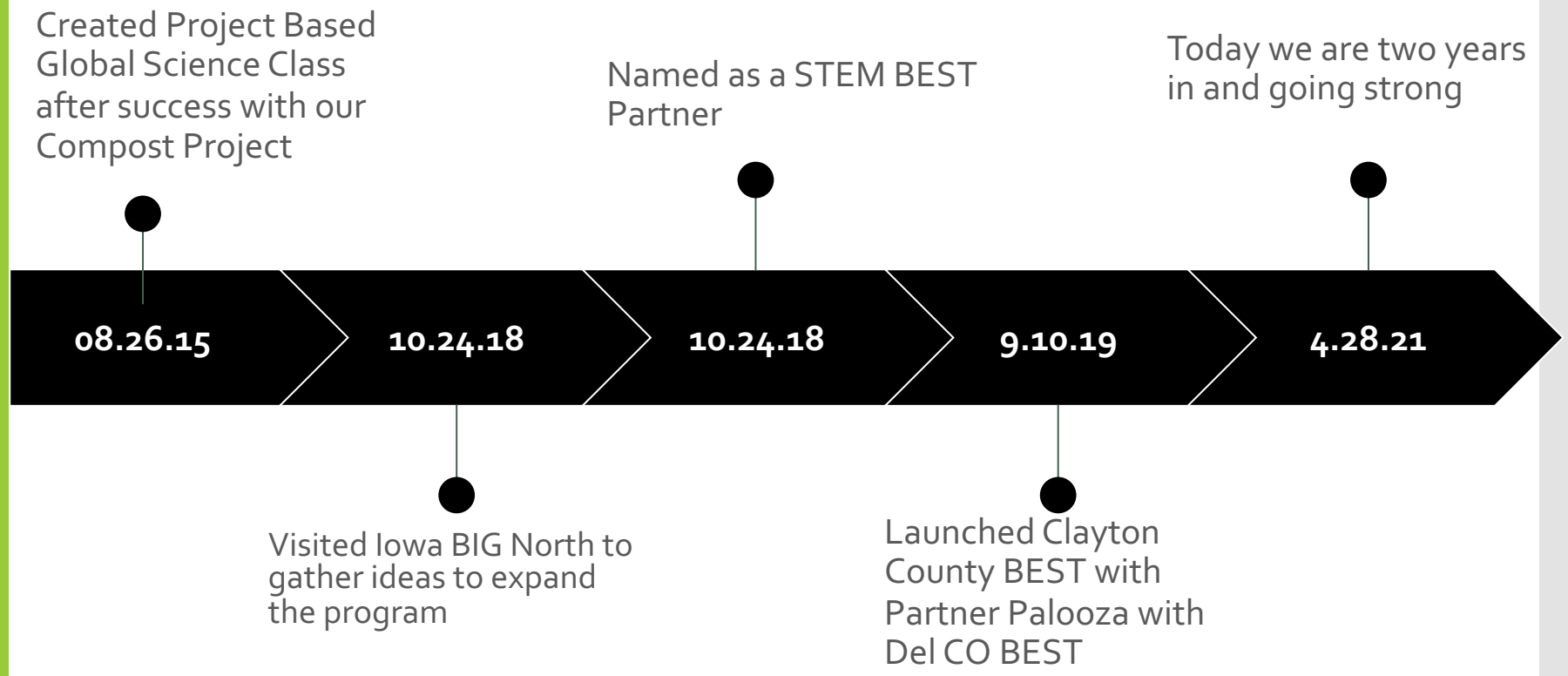
History of Clayton County BEST



About our Model

- **The goal of Clayton County BEST is to offer unique learning opportunities that connect individual students to authentic workplace experiences and provide a strong focus on career and college readiness skills.**
    - Students get to choose projects they find interesting or are passionate about
    - Currently students have the option to get Science credit, General Elective Credit or College Credit through NICC.
    - Student learning is assessed based on the Iowa Core Science Standards and 21st Century Employability Standards.

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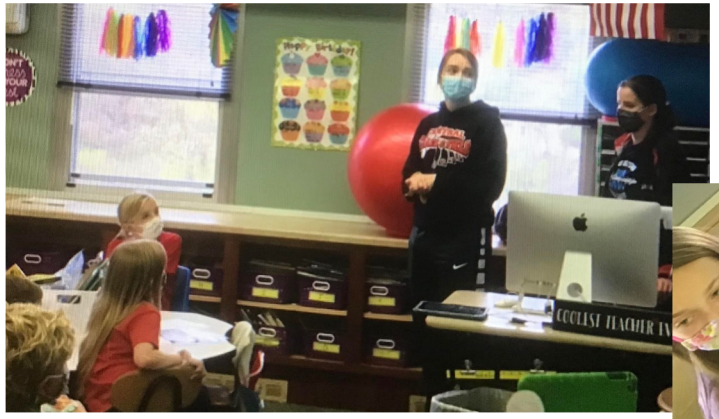
Snapshot of Projects – Maci Kluesner

G's Closet / The Collective

Authentic Learning Expo

Euphoria Coffee



Get out the Vote!

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Snapshot of Project – CJ Polkinghorn

WarZone Spirit Shop

Earth Day 2021

War Eagle Field Rehab

STEM Day at the Capitol 2020

Cans for a Cause

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Snapshot of Additional Projects

Clayton County Energy District

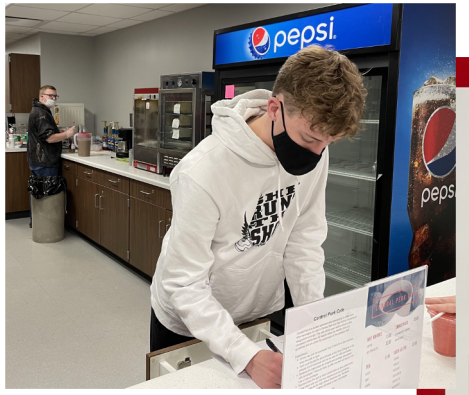
CCED LED Demo

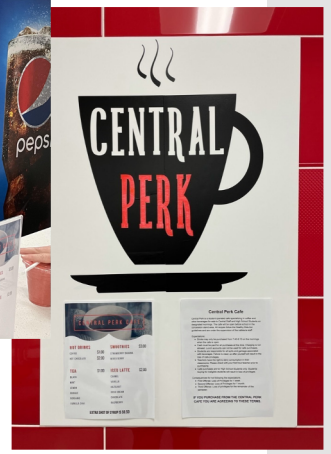
Vinyl Creation

Pilates Studio Social Media

Art in the Alley

FreedomBank Fossil Brochure





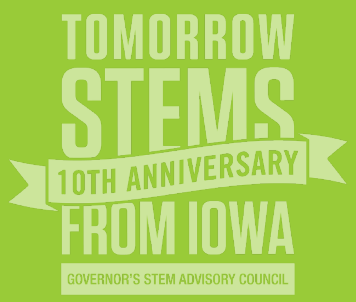
Central Perk

What Clayton County BEST can do for students

- Create a professional network within your community and beyond
- Develop real life skills
  - Ex: communication and responsibility
- Learning how to self-motivate
- Allows you to work on projects you are passionate about
- Build a resume

Benefits of Clayton County BEST for our Community

- Address tasks for businesses that might not otherwise be addressed
- Help local businesses overcome skill deficits
- Educate youth on career opportunities within local businesses encouraging them to stay or return
- Better prepare tomorrow's workforce with career readiness skills



Current Business Partners

B's Detailing

Bergan Farms

Central Community School District

City of Elkader

Clayton County Conservation

Clayton County Development Group

Clayton County Energy District

Clayton County Genealogy Society

The Collective

Euphoria Coffee

Fennellys' Irish Pub

Freedom Bank

G's Closet

Iowa Authentic Learning Network

Master Gardeners

Main Street Elkader

Mobile Track Solutions

Mueller Farms

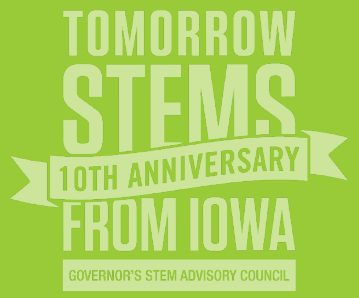
Raise the Bar Fitness

TD's Sports Bar and Grill

thINK Custom Ink

USDA/NCRS

VCTC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Questions

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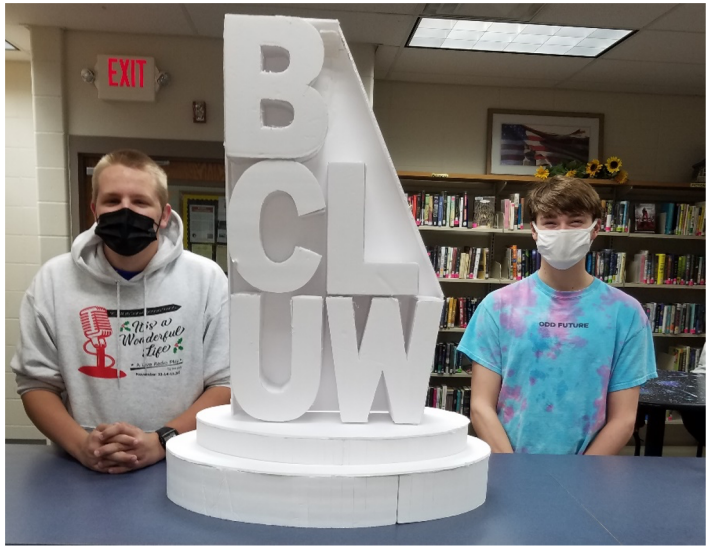
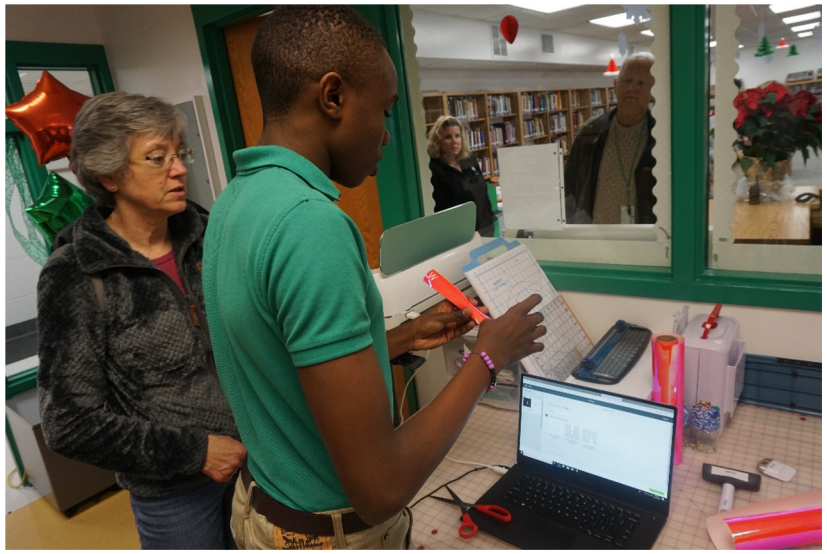
#STEMBEST

Businesses Engaging Students and Teachers





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Student Achievement

NE Iowa STEM Region
@NE_IA_STEM

@IowaBIGNorth is a past STEM BEST recipient, students participating were able to receive their CNA certification. @IowaSTEM is accepting STEM BEST applications until May 10. Learn more at: iowastem.org/STEMBEST

12:30 PM · Apr 7, 2021 · Twitter Web App

Iowa BIG North
@IowaBIGNorth

Couldn't be more proud of @megan_ohm !!!! She owns the path she is taking and couldn't be a better representative of IBN & @NEiowaCC . As she told Ss from @NoBoMiddles last week, her experiences in our programs have been critical to her success!!!! @IowaSTEM #STEMBEST @IowaBIG

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Partnership

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Authentic Learning

APEX BioResearch
@APEXBioResearch

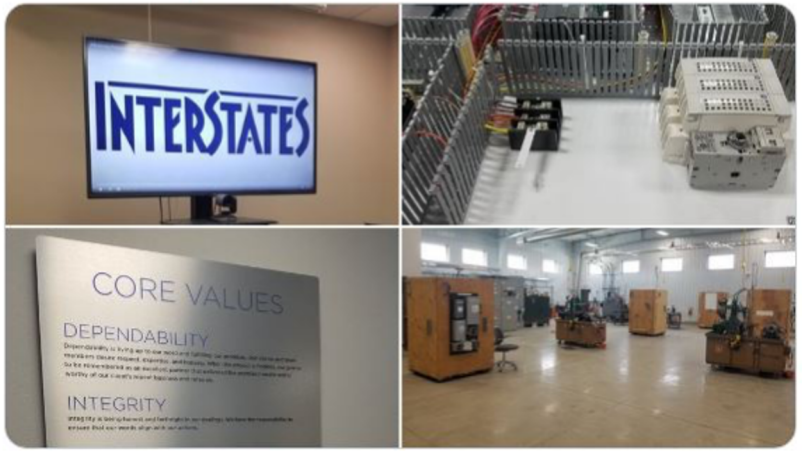
Thank you @WaukeeCSD research alum Tina Liu for coming back to train new Lab Associates on plant micro propagation for @KeminInd #planttissueculture

2:34 PM · Feb 23, 2021 from Waukee Innovation & Learning Center (WILC) · Twitter for iPhone

Grant Hegstad
@grhegstad

Thanks @InterstatesCo Sioux Center for the facility tour today. Innovation & problem-solving on full display! Encouraged future employees to be committed, team-oriented, and have a desire to always keep learning.

#MOCFV #GoDutch #STEMBESTPartner #IowaSTEM #siouxlandcaps #capsnet



4:29 PM · Apr 23, 2021 · Twitter Web App

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Skill Building

SparkTank
@spark_tank

What a terrific first day at SparkTank! #STEMBEST #authenticlearning @IowaALN @OttumwaSchools @spark_tank #teambuilding

5:54 PM · Aug 23, 2019 · Twitter for iPhone

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Opportunities

Iowa STEM
@IowaSTEM

#STEMBEST Idea Incubator: Facilitation of Work Based Learning in the Classroom was held yesterday featuring experience from STEM BEST model Davenport Community Schools.
Visit IowaSTEM.org/STEMBEST to learn more!
Applications are being accepted through May 10.

9:26 AM · Mar 31, 2021 · Twitter Web App

Jim Russ
@JimRuss3

@IowaSTEM, New Hampton Ag Education Students have started installation of GPS and AutoSteer, this is a Iowa STEMBEST Enhancement Award for 20-21, in their 2020 Mule that was a 2019 Iowa STEMBEST Award. Thank you Brady Kolbet of Mid-Tech Services.#IowaSTEM, #STEMBEST #NHTribe

1:48 PM · Jan 8, 2021 · Twitter Web App

Showcase: STEM Teacher Externships

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Reflections on Externships

Curiosity is key!

Robbie Cundy

Sioux Center High School Mathematics Teacher

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Robbie Cundy

Rosenboom Machine & Tool

Sheldon, IA

ROSENBOOM
Custom. Crafted. Cylinders.

Math concepts encountered:

- Measurement
- Trigonometry
- Data collection
- Data analysis

Classroom Connection:

Trigonometry project for Geometry.

Precision….the triangle at the tip of a drill bit (see next slides)

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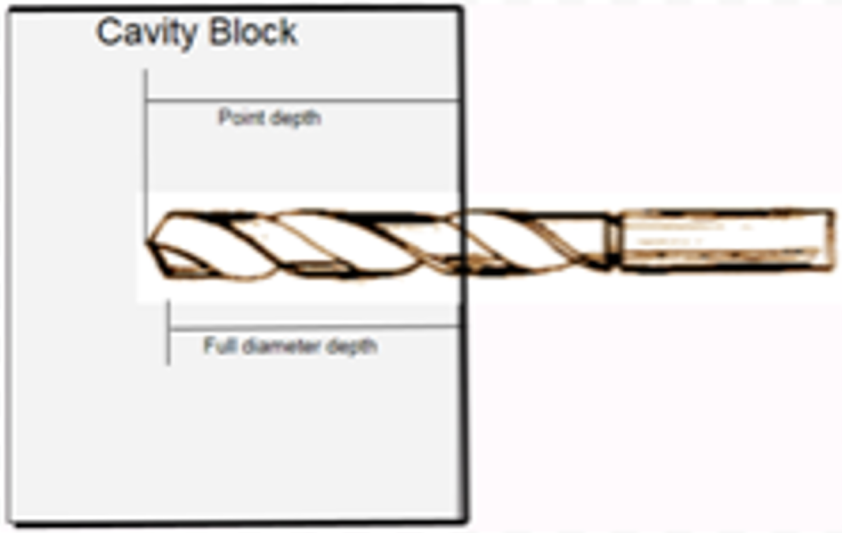
What is the problem?

The CNC machine needs to drill 2 holes. Figure out the *point depth* needed for each hole in order to program the machine.

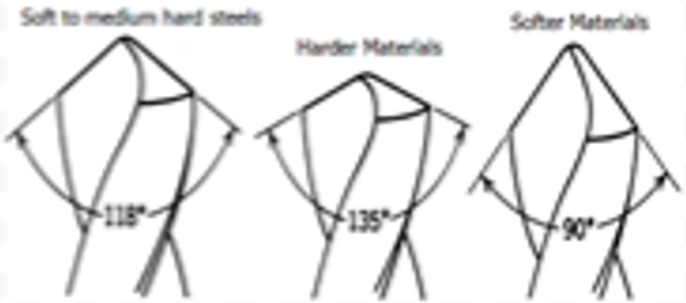
Hole #1:

Diameter: ⅞ inches
Full diameter depth: 1.155 inches
Drill bit angle: 140 degrees



Hole #2:

Diameter: ½ inches
Full diameter depth: 1.543 inches
Drill bit angle: 142 degrees



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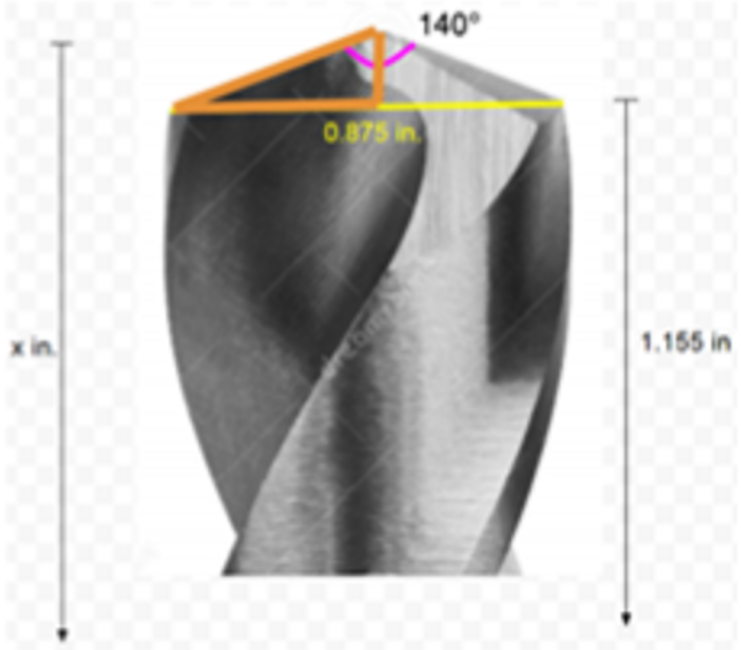
Hint #2

Make a triangle (orange lines on the diagram) and label the sides and angles. What do you know about this triangle?

How can you find missing angles or sides?



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Robbie Cundy

Interstates

Sioux Center, IA

INTERSTATES

Math concepts encountered:

- Data analysis
- Programming
- General employability skills (teamwork, time management, accountability)

Classroom Connection:

Working in teams long term (employability skills)
Partner with a business and find ways to use data/statistics to help in areas of uncertainty (see next slides).

The Project: Uncertainty in Business

Driving question: How can data manipulation and statistics bring clarity to areas of uncertainty?

Project details: Any business deals with a certain level of uncertainty in the work that it does. Students will seek out local businesses to identify areas of uncertainty. They will then collect or find data, do statistical analysis on the data, and tell a story that brings some clarity in the area of uncertainty.

Final Product: A presentation to the business. Presentation will have organized data, basic statistical analysis, and recommendations towards area of uncertainty.

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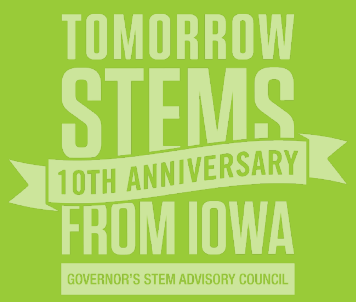
Student Learning

Reflections on the Project

- Interstates employee visited to introduce the project
- Joined a Zoom meeting with my Interstates team
- Student presentations and business feedback
- Student individual reflection
- Improved awareness and practice of the Iowa Employability Skills
- Project only happens as a result of this externship



Thank you!

Externships are appealing

- generous compensation
- get outside of education….”when are we going to use this?”
- build relationships
- inject life/fresh ideas into classroom

Curiosity

- Businesses want employees with it
- Many high school students need to grow in it
- Teachers need it and externships provide opportunities for us to practice it

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STEM Teacher Externships

Connecting classrooms to careers through the immersion of secondary STEM educators engaged in workplace settings for six weeks in the summer.

- Total STEM Teacher Externships 2009-2020 = **627**
- Total workplace partners 2009-2020 = **187 (almost every business sector)**
- Approximate cost-share by workplace hosts 2009-2020 = **$954,600**

IowaSTEM.org/Externships

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STEM Teacher Externships 2020 Results

THE FACTS:

- Of 2020 employers surveyed, most monetized the value of the project(s) completed by the extern between $2,500-$5,000.
- Of host employers surveyed in 2020, most indicated the following reasons as very important for participating in the program:
  - To allow teachers to improve their classrooms by seeing real-world application
  - To make connections with local schools
  - Increase STEM interest in future workforce
  - Positive past experience(s) as a host
- 2020 Teacher Externs indicated the following reasons as very important for participating:
  - Bring relevance to content taught in the classroom by seeing how it is used in the workplace
  - Learn more about the skills students need in today's workforce
  - Make connections in the community
  - Summer employment/income

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STEM Teacher Externships

MAKING IT HAPPEN

Total cost for Teacher Externship: $6,000 (usually cost-shared with workplace host). Includes teacher orientation, end of year forum and Externship Mentors throughout summer experience.

Teacher Expectations:

- Teachers complete STEM Teacher Externship Application

Host Expectations:

- Business Hosts complete Workplace Host Interest Form

Advancements on Strategic Planning 2020

Diversity, Equity and Inclusion Working Group Recommendations

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Equity in STEM

Stephanie Laird and Sara Nelson

Diversity, Equity and Inclusion Working Group Co-Chairs

Charge to the Working Group

Develop recommended actions for the Governor's STEM Advisory Council to promote equity in STEM, especially increasing diversity of youth in current STEM programs.

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Diversity and Focus

Diversity includes, but is not limited to, characteristics such as language, race, color, disability, national origin, sex, age, religion, sexual orientation, gender identity, genetic information, socioeconomic status, veteran status, and family structures.

Source: U.S. Department of Education

Groups to prioritize:

- Youth of color
- Youth who identify as female
- Youth in rural locations
- Youth who qualify for free and reduced lunch
- Youth who identify as immigrants

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Recommended Action 1

Prioritize equity focus in STEM communications and professional learning opportunities [ERAB 5]

Ways to Prioritize Equity Focus

1. Communicate the STEM Council's equity focus on all materials and platforms.
   - One-two sentence equity statement and supporting graphic on all communications
   - Translate materials

2. Increase equity in STEM professional learning opportunities.
   - Annual Equity in the STEM classroom workshop
   - Equity training for all STEM Council members
   - Podcasts, twitter chats and other social media focused on equity in STEM

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Recommended Action 2

Increase diverse youth voice in STEM programming and outreach [ERAB 5]

Ways to Include Diverse Youth Voice

1. Invigorate and expand a diverse Youth Advisory Board
   - Identify an Executive Council member to serve as Youth Advisory Board Champion
   - Include Youth Advisory Board in program and outreach reviewing (e.g. review scale-up selections)

2. Champion and celebrate diverse youth in STEM
   - Establish a student youth STEM award
   - Promote a STEM signing day, 1 youth from every county supporting various post-secondary pathways

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Recommended Action 3

Increase diverse role models in STEM programming and outreach [ERAB 5]

Ways to Include Diverse Role Models

1. Increase diverse role models in all STEM Council outreach (e.g. mentors, workshop facilitators, communications)

2. Require Scale-up and STEM Best programs to be inclusive of diverse students

3. Establish a formal partnership between Iowa STEM and key diverse Iowa STEM professional organizations (e.g. SWE, NSBE, and SHPE)

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Why Does Equity & Diversity in Iowa Matter?

Iowa future economic growth and success will depend on addressing the workforce shortage of skilled workers with STEM skills.

A key way to address the shortage is to increase the interest, access, and achievement of students who today are underrepresented in STEM education and careers.

By increasing the diversity of Iowa's workforce, it will result in:

- Increasing Iowa's skilled STEM workforce
- Fostering a creative and innovative workforce
- Increasing individual and family income, decreasing poverty

Thank you!

Thank you to the Council and the committee members for this important work. Your time and commitment to equity in STEM is valued.

- Stephanie Laird & Sara Nelson, co-chairs

Members

Pat Barnes	Anthony Jones	Camille Sloan-Schroeder
Sarah Derry	April Pforts	Carly Voltz
Jason Huffman	Anderson Sainci	Michael Young

Special thanks to the following community members for their feedback and advice:

Oather Taylor III	David Moeller
Mark Burns	Taj Suleyman

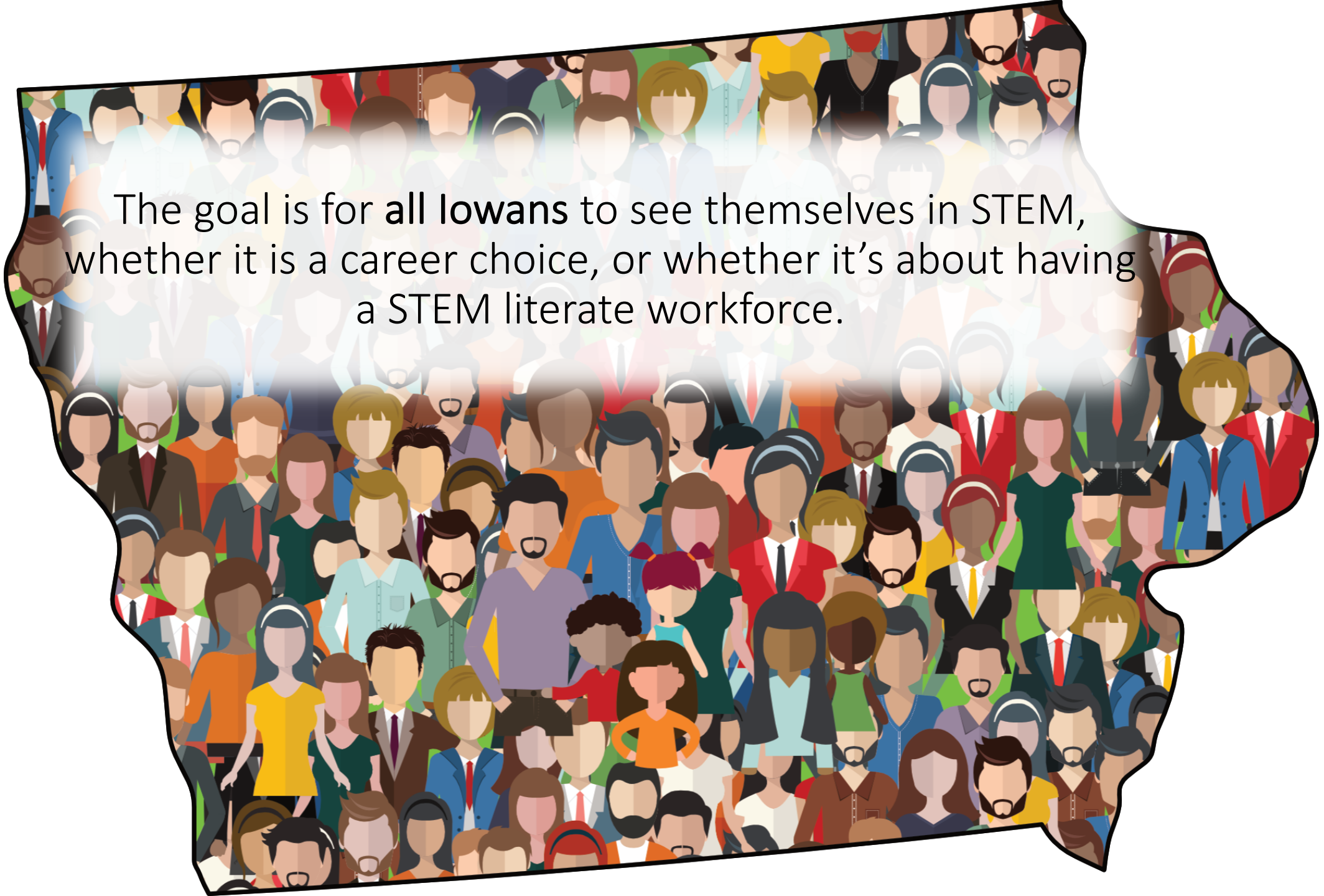
Advancements on Strategic Planning 2020

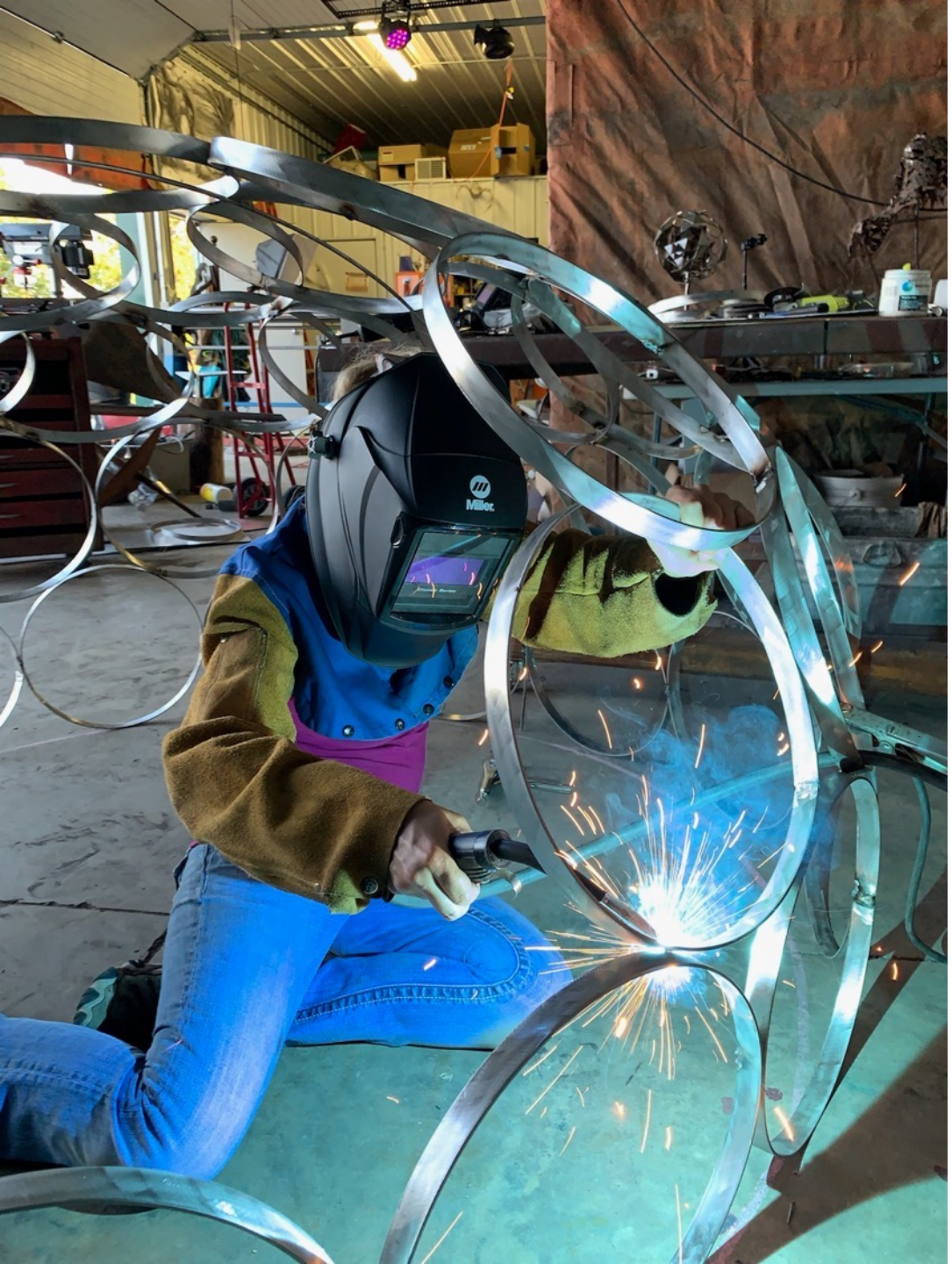
Creativity and Innovation Committee Update

Creativity and Innovation Task Force

under the STEM Advisory Council

A new onramp to STEM


The goal is for **all Iowans** to see themselves in STEM, whether it is a career choice, or whether it's about having a STEM literate workforce.



We reach all Iowans by embracing transdisciplinary STEM.

Transdisciplinary

”Includes fully merged disciplines without boundaries and lessons **rooted in authentic problems or inquiry**.”
(p. 34, Perignat & Katz-Buonincontro, 2019).

Bybee, R.W. (2013). *The Case for STEM Education: Challenges and Opportunities*. NSTA Press.
Martinez, J.E. (2017). The search for method in STEAM education. In *Play, Performance, Learning, and Development* (pp.13-33)
Perignat, E., Katz-Buonincontro, J. (2019). STEAM in practice and research: An integrative review. *Thinking Skills and Creativity, 31*. 31-43.
Weld, J. (2017). *Creating a STEM Culture for Teaching and Learning*. NSTA Press

Transdisciplinary

Tentative Task Force & Working Group Members

- School superintendents
- STEAM Schools
- Department of Education
- State leaders
- Business and Industry
- Entrepreneurship
- Artists
- Museums and informal spaces
- Arts and transdisciplinary education

Task Force Goals

Goal 1: Serve as a connector of formal and informal learning initiatives statewide.

Goal 2: Develop innovative, Iowa-based solutions to further the work and mission of the STEM Council

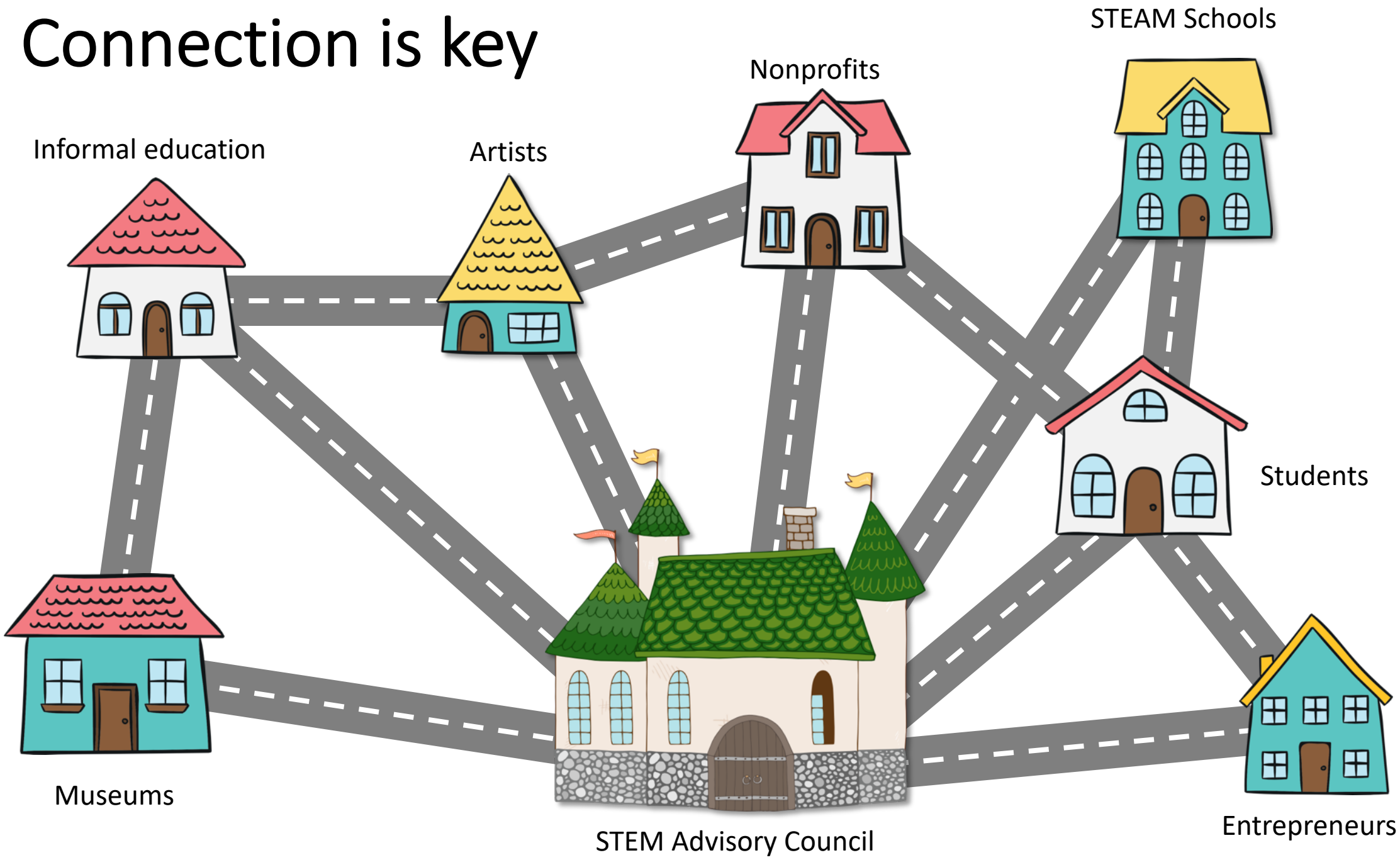
Goal 3: Support educators and encourage high-quality transdisciplinary instruction.

Goal 4: Increase funding pathways

Goal 1: Serve as a connector of formal and informal learning initiatives statewide.

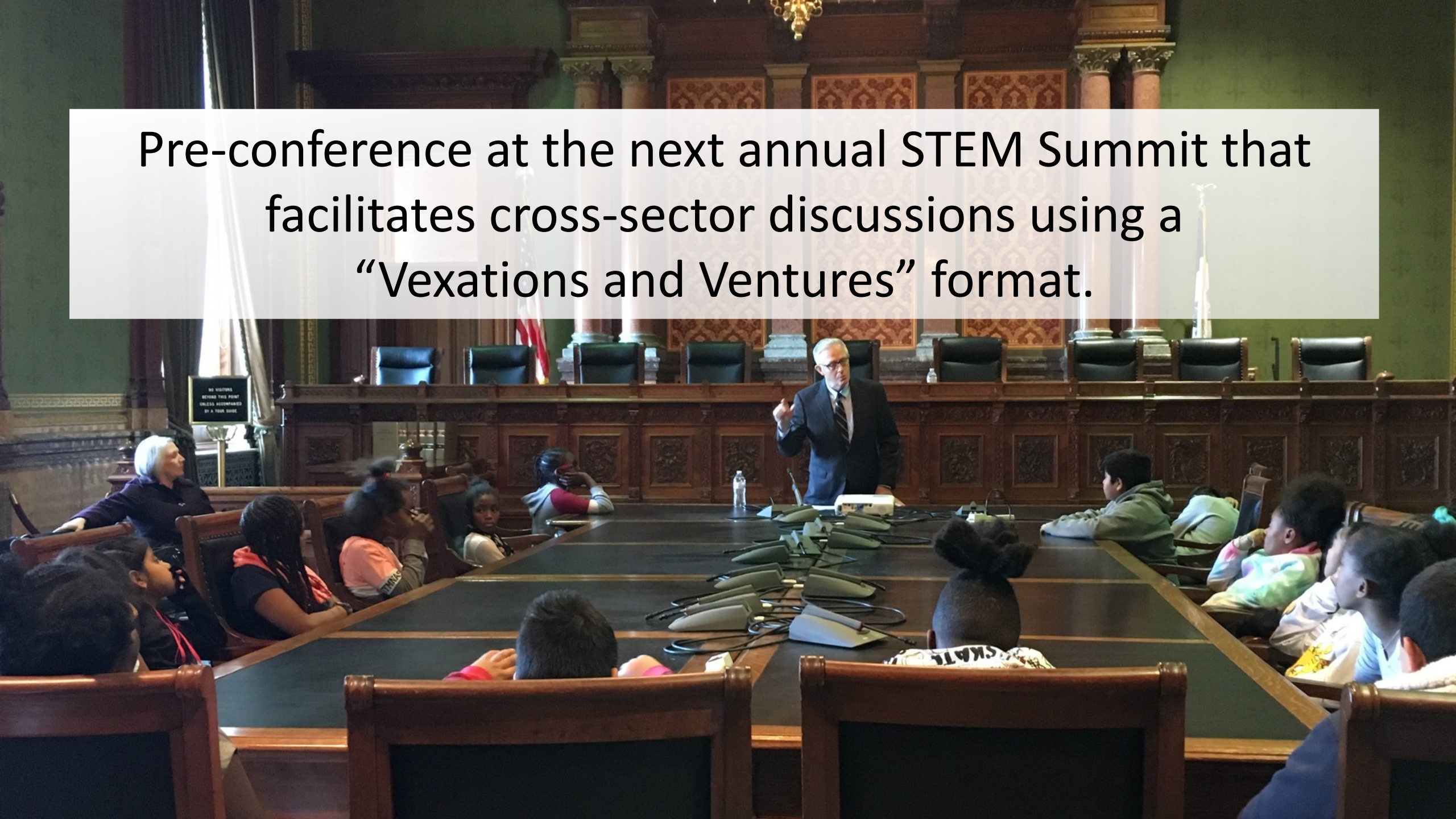
- Connect resources, institutions, partners, and others who may be outside of “traditional STEM” in ways that can enhance and strengthen transdisciplinary education.
- Connect existing STEAM and STEM schools, makerspaces/ learning labs and STEAM programs in Iowa.
- Incorporate and integrate STEM and STEAM in our informal learning spaces, with a focus on underserved and rural places.
- Ensure Creativity & Innovation Task Force representation in all six STEM regions to make sure that a transdisciplinary mindset is reflected in programming.

Connection is key



Recommendations

Connect to existing networks in IA and identify ways to expand and engage with these networks


Pre-conference at the next annual STEM Summit that facilitates cross-sector discussions using a "Vexations and Ventures" format.

Include Creativity and Innovation messaging through STEM communications channels

- Webpage
- Newsletter

Art is a science that has become clear. ~Jean Cocteau

Advancements on Strategic Planning 2020

Career Guidance Committee Update

TOMORROW STEMS 10TH ANNIVERSARY FROM IOWA
GOVERNOR'S STEM ADVISORY COUNCIL

2020 Priorities Moving Forward

Career Exploration and Guidance

Co-Chairs: Rob Densen, DMACC

Wendy Batchelder, VMware

Members:

Julie Adair, Iowa Healthcare Association

Kelly Bergman, Iowa State University

Jane Bradley, Iowa Department of Education

Mary Jane Cobb, Iowa State Education Association

Robert Cramer, Cramer and Associates, Inc.

Aimee Hospodarsky, Monticello Community School District

Jason Huffman, Huffman Welding

Kathryn Kunert, MidAmerican Energy Company

Kathy Leggett, Iowa Workforce Development

David Mitchell, Iowa Vocational Rehabilitation Services

Bob Reid, Iowa Jobs for America's Graduates (iJAG)

Kelsey Tyrrell, World Food Prize Foundation

Teri Vos, Central College

Mark Wiederspan, Iowa College Aid

Dave Williams, State of Iowa Representatives

Emily Wilkerson, Iowa State University

Charge of Working Group

Develop recommended actions for the Governor's STEM Advisory Council to support **career exploration** and **guidance**, especially early exposure perhaps involving tactics like internships/work-based learning for younger students as well as teachers/administrators.

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Framing Question

Imagine if the State of Iowa were the leader in STEM career exploration for K-12 students. A State where students enjoy consistent, frequent, and seamless STEM career exposures, experiences and entryways at both the local and global levels. What would that take?

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GOVERNOR'S STEM ADVISORY COUNCIL

Recommendation

Enhance existing efforts and support new initiatives through the recommended

Iowa School Counselor Career Guidance Initiative.

Iowa School Counselor Career Guidance Initiative.

Recommendation

The Working Group developed 11 action items to address the charge of the working group, enhance existing efforts, and support new initiatives.

A. Increase occupational awareness at all grade levels

B. Develop grade specific materials for educators

C. Enable school faculty to connect to future STEM careers

D. Formalize and increase connection of area businesses to schools

E. Enable schools to engage in Professional Staff Sharing Agreements to work with many more students and businesses

F. Leverage student Individual Career and Academic Plan to determine specific STEM skills needed to engage in their projected occupation

G. Facilitate connections between K-12 students and higher education representatives

H. Extend new and specific counselor credential and certification through IDE

I. Infuse career-related assessments into K-12 schools to enable School Counselors

J. Ensure every district has a plan coordinating pre-employment transition services for students with disabilities

K. Continue to build upon existing classes at high school level to provide more opportunities for direct hands-on learning

Recommendation

Iowa School Counselor Career Guidance Initiative.

The STEM Council, recognizing that "there is some STEM in every career", should convene, facilitate, assist and support other public and private entities to execute this initiative.

Why?

- To increase opportunities for K-12 students to explore careers, eventually leading to education pathways that would fill Iowa's workforce needs

Why the School Counselors?

- School Counselors possess specific knowledge, skills, and training related to supporting the career, academic, and social-emotional development of all students.

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Actions in Process...

Iowa Dept of Education has funded $300,000 in grants to support 13 new **College and Career Transition Counselors** at 6 Community Colleges who will work with students in 22 school districts across the State:

Colleges:

- DMACC
- Hawkeye
- Iowa Lakes
- Iowa Valley
- Kirkwood
- Western Iowa Tech

Schools:

- ADM,
- Ames,
- Ankeny,
- Boone,
- Cedar Rapids,
- Collins-Maxwell,
- East Marshall,
- Estherville,
- Lincoln,
- Central,
- Grinnell-Newburg,
- Interstate 35
- Johnston
- Knoxville,
- Okoboji,
- Ogden,
- PCM,
- Perry,
- Sioux City,
- Southeast Polk
- Spencer,
- Van Meter,
- Waterloo,
- West Des Moines.

Needed from State & STEM Council

Iowa School Counselor Career Guidance Initiative.

A. Pre-service professional training for teachers and administrators should drive utilization of School Counselors and school counseling program to improve outcomes for students

B. Develop new roles/standards for pre-service teaching to emphasize career guidance capacity in graduates.

C. Facilitate school-business partnerships by expanding STEM Best, Registered and Recognized Apprenticeships and other WBL opportunities.

D. Develop recognition of K-12 schools demonstrating successful and best-practice school-wide, including a best practice certification program.

E. Enable schools to engage in Professional Staff Sharing Agreements with other schools to work with many more students and businesses.

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Next Steps

- Convene a "Iowa Career Exploration and Guidance Summit", including the following:
  - Iowa Department of Education (Lead Agency)
  - Iowa Workforce Development
  - Iowa Economic Development Agency
  - Iowa School Counselor Association
  - Area Education Agencies
  - University Teacher and Counselor Education Programs
  - Iowa Community Colleges
  - Governor's STEM Council
  - State-wide business associations (ABI, IBC, etc).
  - Iowa Vocational Rehabilitation
  - Iowa Intermediary Network
  - Others identified by the Governor
- Determine Metrics/measures of success
- Set timeframe for implementation
- Appoint a School Counselor Career Guidance Initiative Implementation Team (SC2GIT), that, under the direction of the Governor's STEM Council, accepts and implements the action items related to this Recommendation.

Advancements on Strategic Planning 2020

Acknowledgement of *District Best Practices* and *Teacher Prep* Committees

Annual Assessment Report

Key Findings and Highlights

TOMORROW STEMS 10TH ANNIVERSARY FROM IOWA
GOVERNOR'S STEM ADVISORY COUNCIL

Iowa STEM External Evaluation

A collaboration among Iowa's Regent Institutions

IOWA STATE UNIVERSITY
RISE
RESEARCH INSTITUTE FOR STUDIES IN EDUCATION

THE UNIVERSITY OF IOWA
ITP
Iowa Testing Programs

UNI
University of Northern Iowa
Center for Social & Behavioral Research

Iowa STEM External Evaluation

2019-2020: An exceptional STEM Scale-Up Program year

- Ten initial STEM Scale-Up programs (Beginning of academic year)
- Additional legislative investment resulted in three supplemental mathematics programs (Late fall 2019)
- Global pandemic (March 2020)
- Transition to online learning and enrichment (Spring 2020)

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GOVERNOR'S STEM ADVISORY COUNCIL

Iowa STEM Monitoring

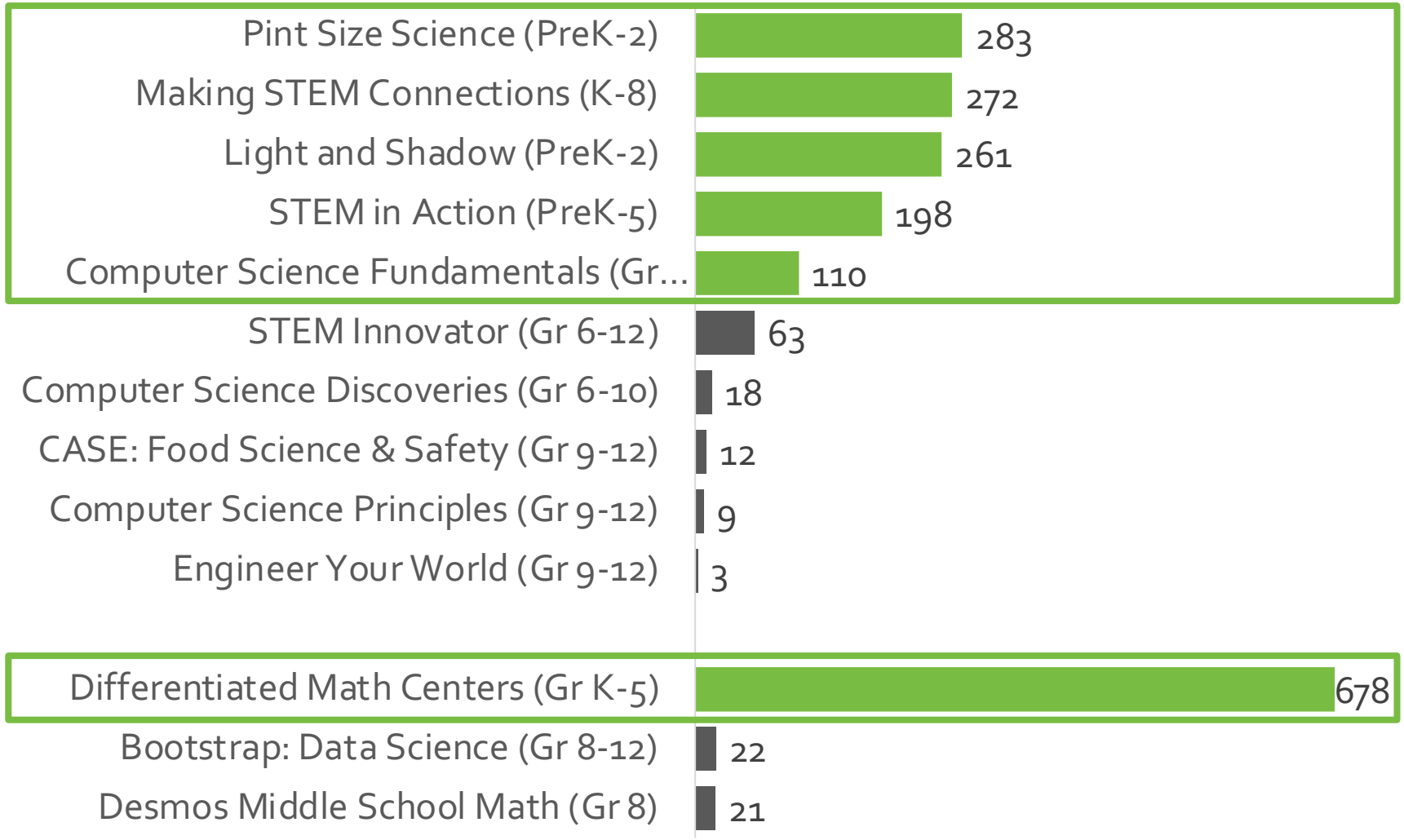
Educator Survey

Brandi Geisinger and James Schiltz

RISE
Research Institute for Studies in Education
Iowa State University

Iowa STEM External Evaluation

The 2019-2020 STEM Scale-Up Program: 1,950 awards
Most awards were programs for **elementary grades**

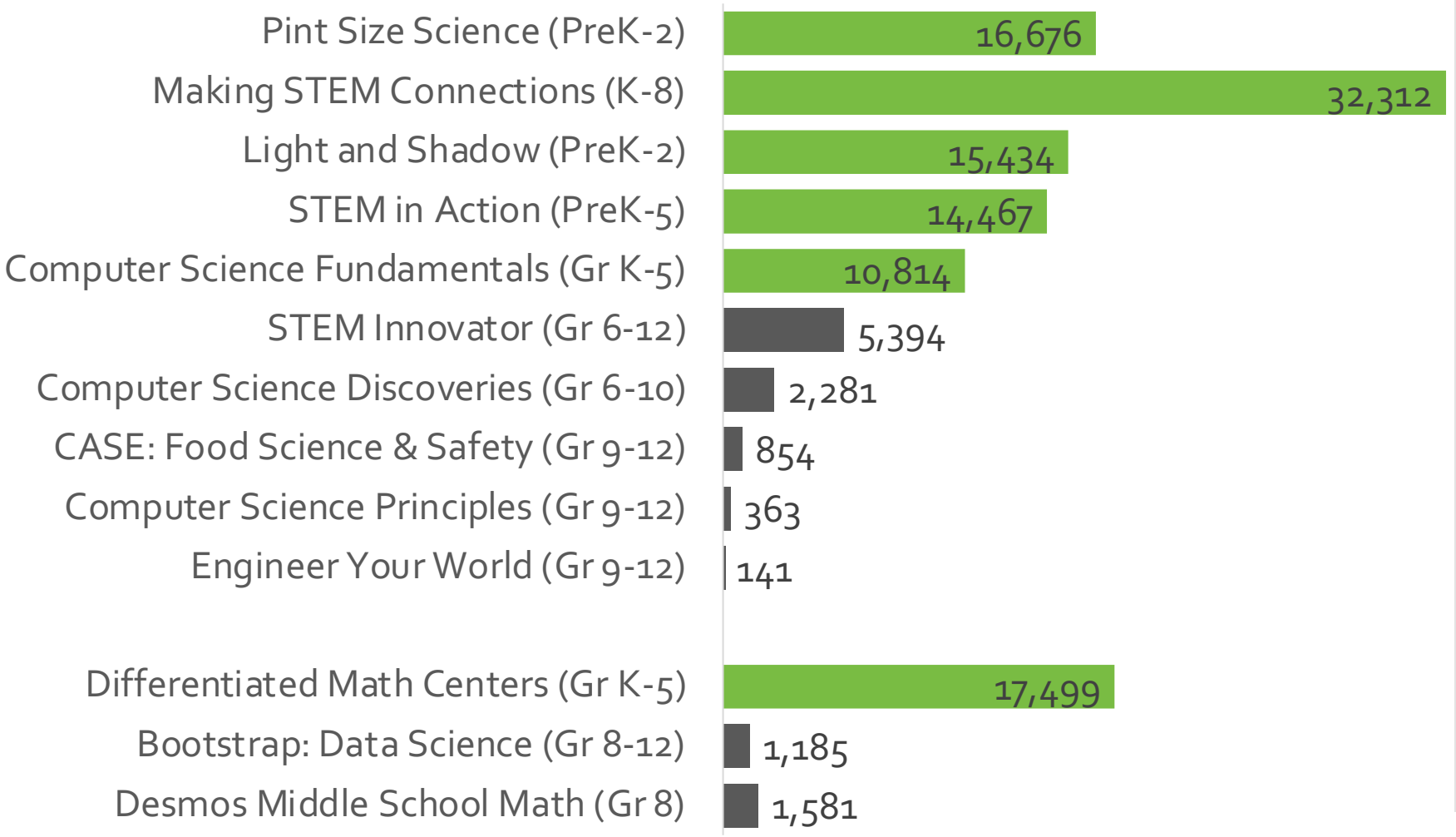


Source: STEM Scale-Up Program Educator Survey, Iowa State University, Research Institute for Studies in Education, January 2021

TOMORROW STEMS 10TH ANNIVERSARY FROM IOWA
GOVERNOR'S STEM ADVISORY COUNCIL

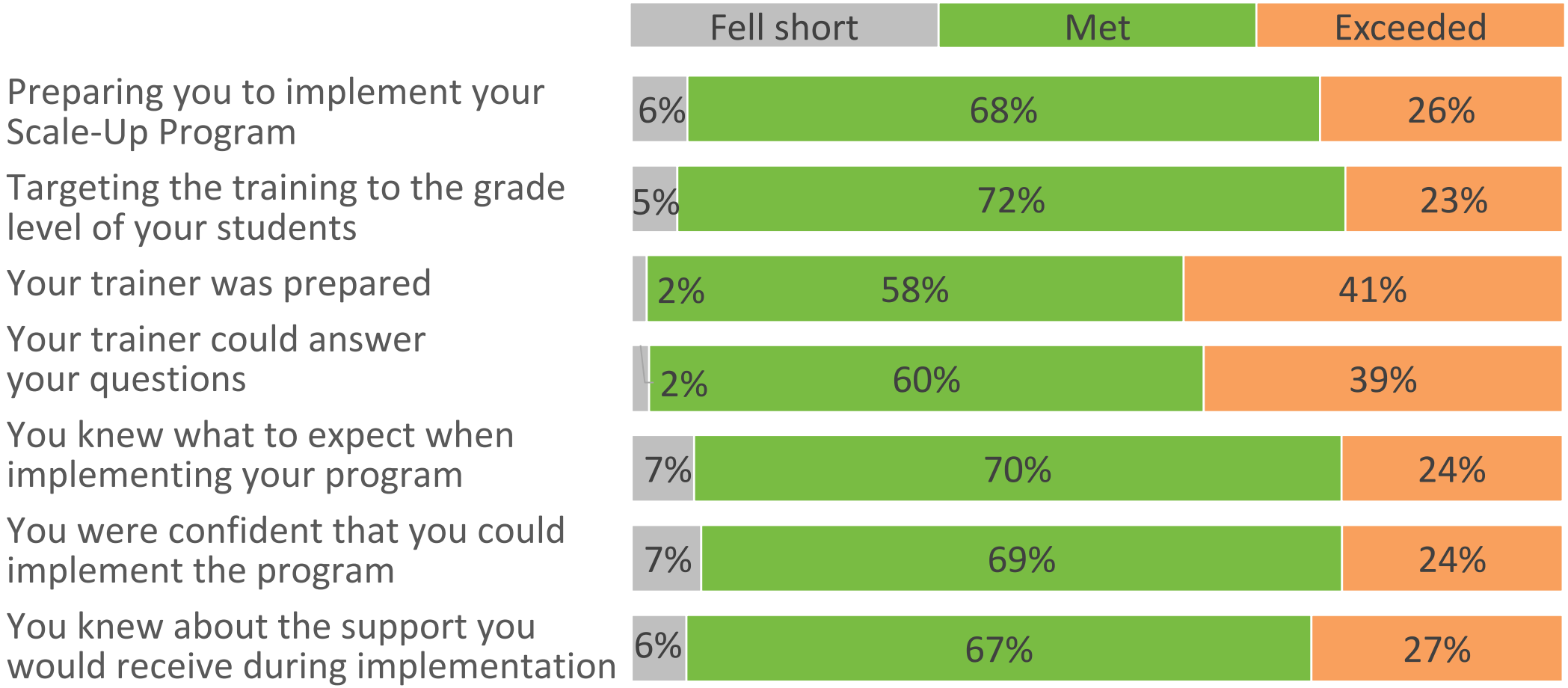
Iowa STEM External Evaluation

A projected 119,000 students participated in STEM Scale-Up Programs in 2019-2020



Source: STEM Scale-Up Program Educator Survey, Iowa State University, Research Institute for Studies in Education, January 2021

9 in 10 educators reported that the professional development met or exceeded their expectations

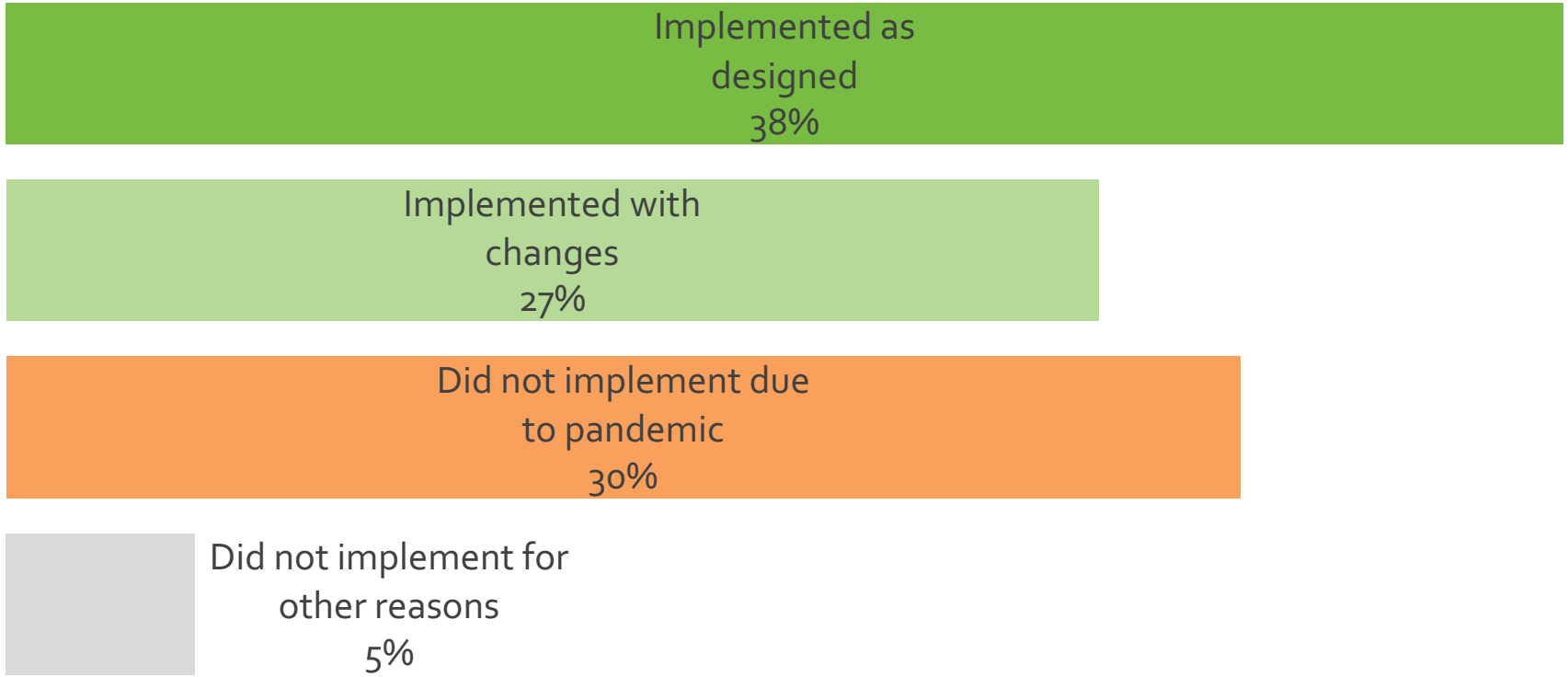


Source: STEM Scale-Up Program Educator Survey, Iowa State University, Research Institute for Studies in Education, January 2021

Iowa STEM External Evaluation

Nearly **two-thirds (65%)** of educators were able to implement to some degree in 2019-2020

The pandemic prevented **30%** of educators from implementing their Scale-Up Program, but nearly all planned to use the program in 2020-2021.



Source: STEM Scale-Up Program Educator Survey, Iowa State University, Research Institute for Studies in Education, January 2021

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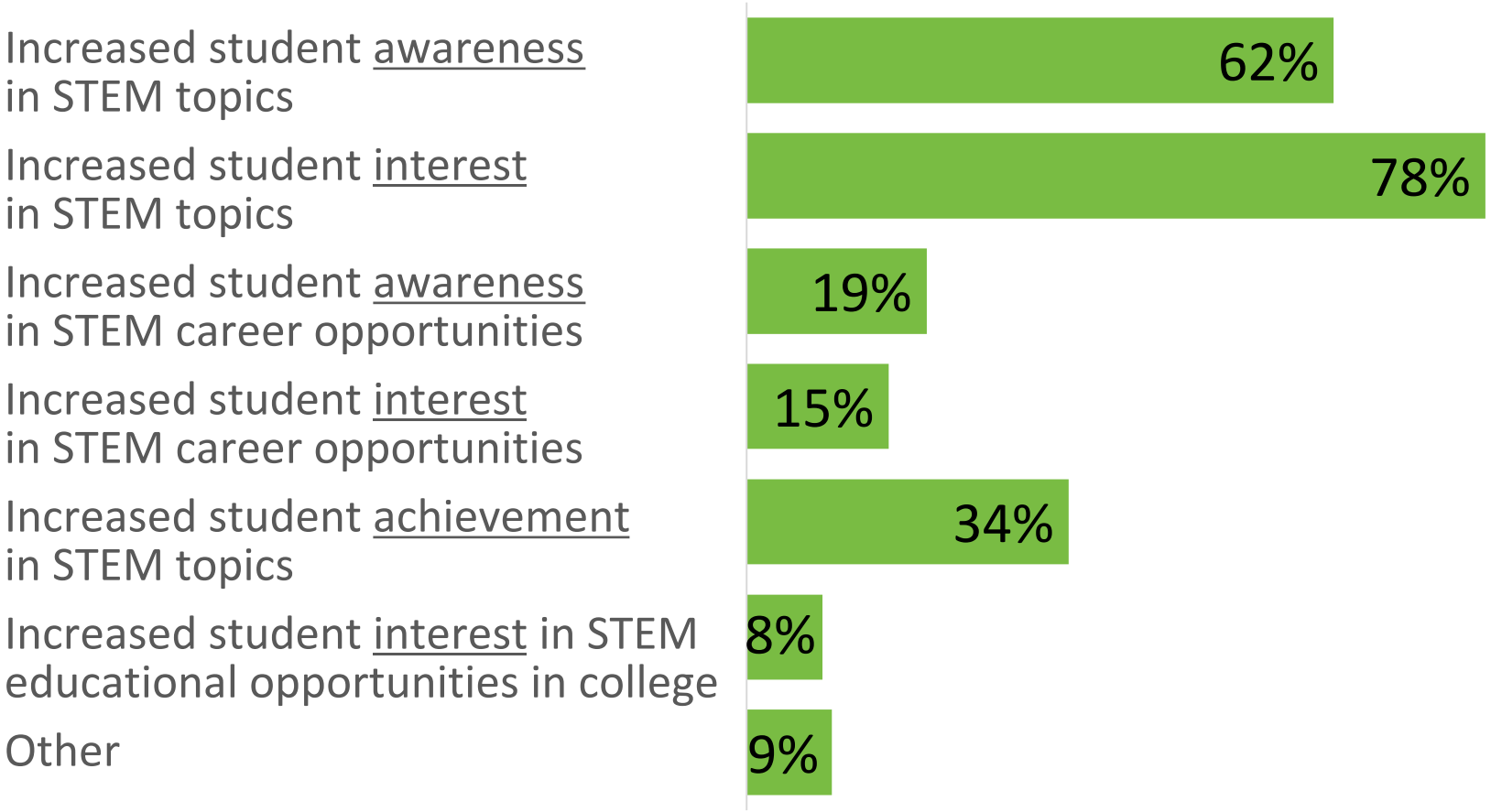
Iowa STEM External Evaluation

Three-quarters (78%) of educators observed **increased student interest** in STEM following STEM Scale-Up program participation



Source: STEM Scale-Up Program Educator Survey, Iowa State University, Research Institute for Studies in Education, January 2021

Iowa STEM External Evaluation

Educator views: Impacts on STEM Education

- Provided practical, hands-on experience
- Built critical thinking skills, problem-solving skills, and opportunities for creativity
- Raised interest in STEM careers and educational opportunities
- Enhanced students' understanding of, confidence in, and enthusiasm for STEM
- Expanded opportunities with science and technology
- Increased participation among STEM teachers, parents, and the community

Iowa STEM External Evaluation

Educator views: Impacts on STEM Education

I really surprised myself because I didn't think at the beginning that the child's interest would have been sustained for so long, but they continued to be ***interested over a long period of time****. There were so many different directions we could take with light and shadow. We ended up doing a* ***long term project*** *in our classroom on Lights and* ***involving many experts within the school and the community****.*

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Iowa STEM External Evaluation

Educator views: Enhancing Teachers' Skills and Classroom Curriculum

- Improved classroom curriculum/materials and aligning with current standards

  *It completely changed the lens through which the students viewed their learning. It also **completely changed the lens through which I viewed student achievement and learning**. The program is slowly becoming my curriculum, replacing old, outdated formats of instruction.*

- Cultivated teachers' skills

  *I really work on hands-on learning with my young ages. This helps me not only by supplying materials and ideas but enhancing my knowledge and teaching ability on subjects that I normally would not be as comfortable with. **I absolutely love the STEM kits and how they enhance my classroom learning.***

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Iowa STEM Monitoring

STEM Scale-Up Program Longitudinal Study

Matt Whittaker and Catherine Welch

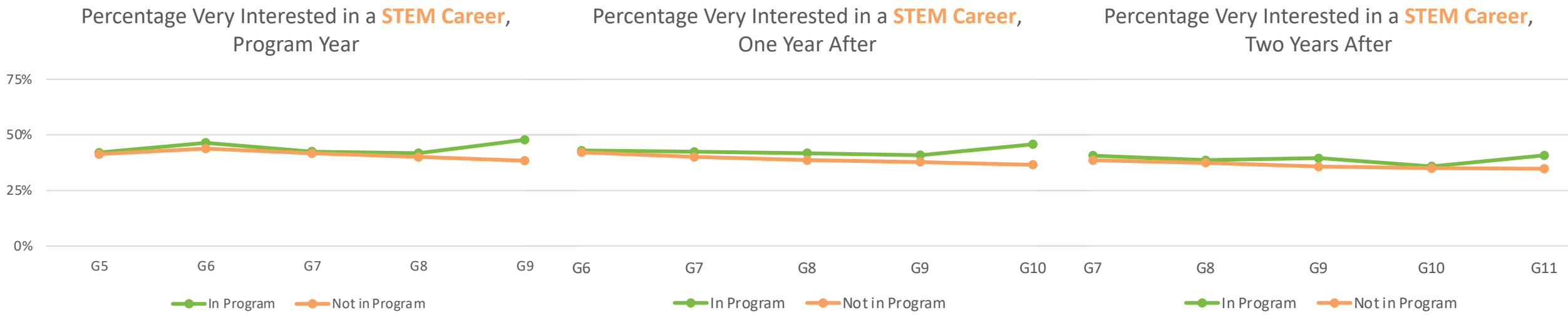
The University of Iowa

ITP
Iowa Testing Programs

Percentage of STEM Scale-Up Program students versus Students who did not participate in a STEM Scale-Up Program who said they were "very interested" in STEM-subjects or a STEM career, 2015-2019

A greater proportion of students participating in a STEM Scale-Up Program expressed interest in a STEM career than their non-participating peers, and this greater level of interest was still present two years later.

For three of the five grade groups this difference declined over time, while for the grades 5 and 7 peer groups, this difference increased, though the differences between groups in all cases were modest.

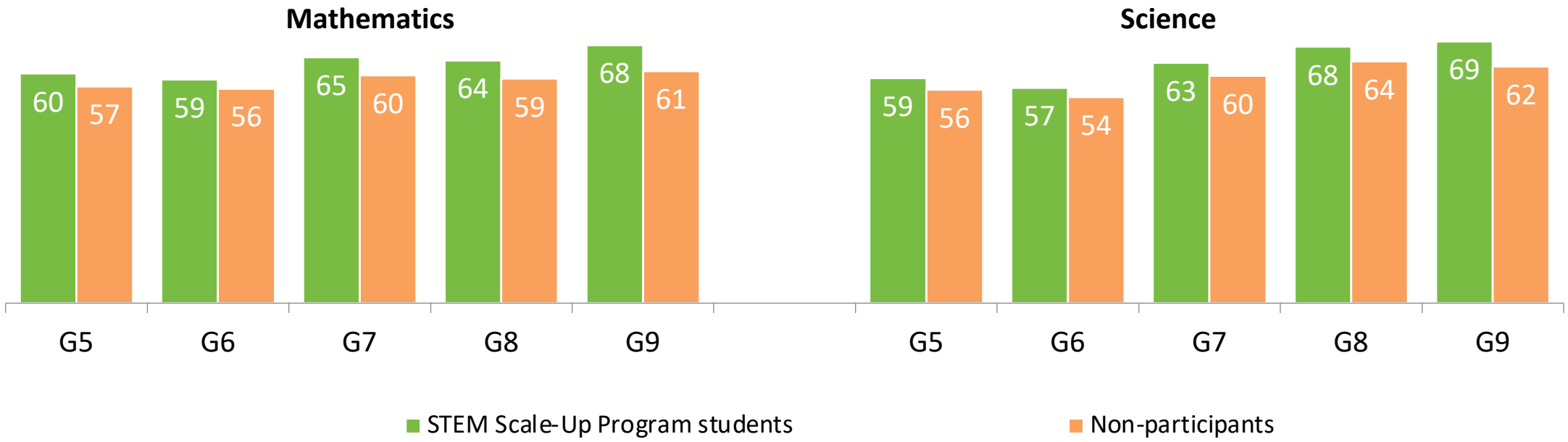


Source: Statewide Student Interest Inventory, Iowa Testing Programs, 2015-2019, September 2020

STEM SCALE-UP PROGRAM YEAR

Average percentile rank of Mathematics and Science assessment scores among STEM Scale-Up Program Students versus Students who did not participate in a STEM Scale-Up Program, 2015-2017

Combining 3-years of data from 2014/15-2016/17, STEM Scale-Up Program participants scored an average of +4 points higher in averaged percentile rank in mathematics and +4 points higher in science achievement in the year they participated in a STEM Scale-Up Program.

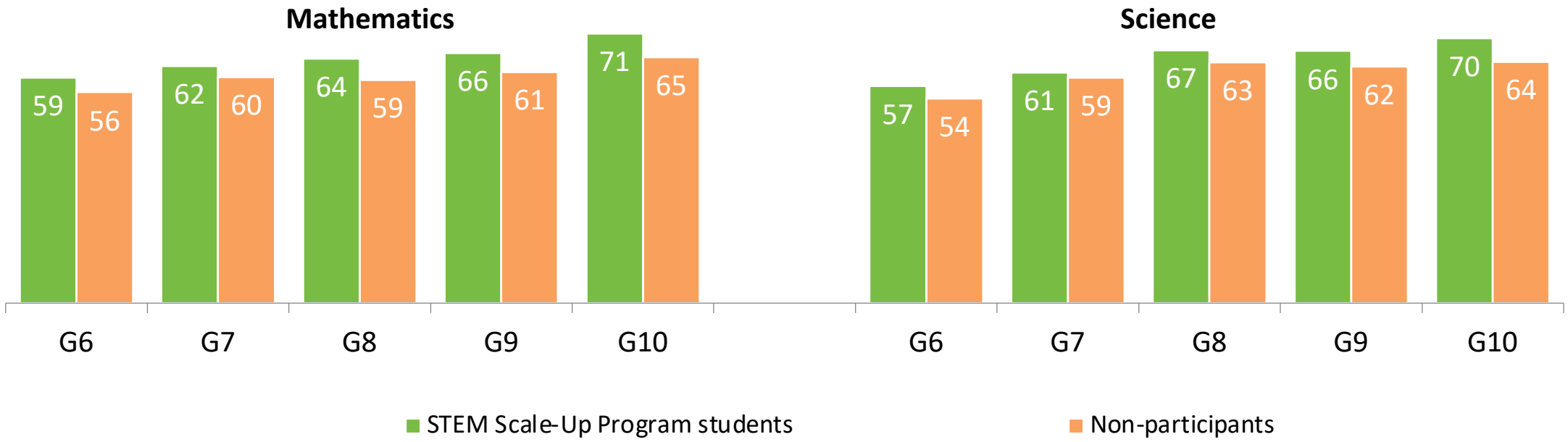


Source: Iowa Assessments / Iowa Statewide Assessment of Student Progress, Iowa Testing Programs, 2013-2019, September 2020

ONE YEAR *AFTER* PROGRAM PARTICIPATION

Average percentile rank of Mathematics and Science assessment scores among STEM Scale-Up Program Students versus Students who did not participate in a STEM Scale-Up Program, 2016-2018

The differences in achievement scores following STEM Scale-Up Program participation persisted one-year later. STEM Scale-Up Program participants scored an average of +5 points higher in averaged percentile rank in mathematics and +4 points higher in science the year following participation.

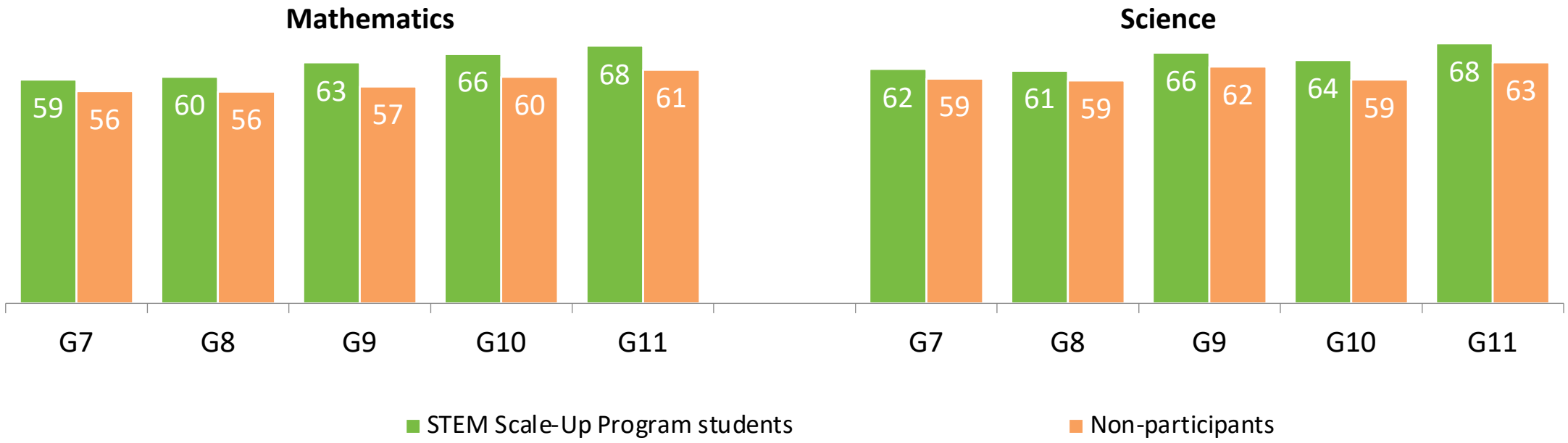


Source: Iowa Assessments / Iowa Statewide Assessment of Student Progress, Iowa Testing Programs, 2013-2019, September 2020

TWO YEARS *AFTER* PROGRAM PARTICIPATION

Average percentile rank of mathematics and science assessment scores among STEM Scale-Up Program Students versus Students who did not participate in a STEM Scale-Up Program, 2017-2019

The differences in achievement scores following STEM Scale-Up Program participation persisted two-years later. STEM Scale-Up Program participants scored an average of +5 points higher in averaged percentile rank in mathematics and +4 points higher in science two years after participation.



Source: Iowa Assessments / Iowa Statewide Assessment of Student Progress, Iowa Testing Programs, 2013-2019, September 2020

TOMORROW STEMS 10TH ANNIVERSARY FROM IOWA
GOVERNOR'S STEM ADVISORY COUNCIL

Iowa STEM External Evaluation

Key findings from the longitudinal study

- In general, a higher percentage of Scale-Up participants were "very interested" in STEM subjects and in a STEM career two years later than students who had not participated
- STEM Scale-Up Program participants consistently performed higher in mathematics and science on average than non-participating students, before, during, and after STEM Scale-Up Program participation
- One-year and two-years later, STEM Scale-Up Program students averaged +5 points higher in average percentile rank in mathematics, and +4 points higher in science following STEM Scale-Up Program participation compared to non-participants

TOMORROW STEMS 10TH ANNIVERSARY FROM IOWA
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Iowa STEM Monitoring

Iowa STEM Monitoring

Statewide Survey of Adult Attitudes Toward STEM

UNI | University of Northern Iowa
Center for Social & Behavioral Research

Statewide Survey of Public Attitudes Toward STEM

Dual-frame RDD

Landlines (n=60)

Cellphones (n=941)

Overall (2020)

Response Rate (AAPOR RR3): 27%

Cooperation Rate (AAPOR COOP3): 79%

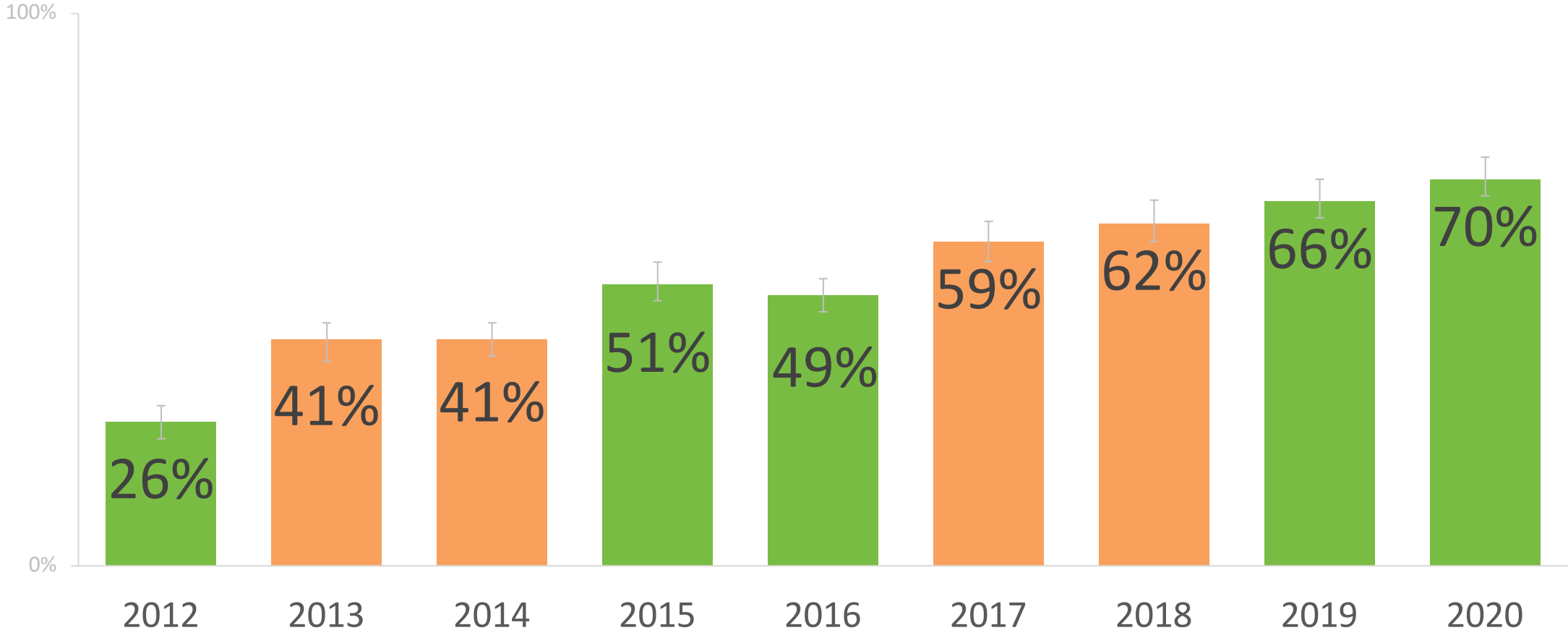
Field dates:
Annually
Spring/Summer (2012-2019)
August – December* (2020)

2020 data collection delayed due to the global coronavirus (COVID-19) pandemic

Have you read, seen, or heard of STEM?

7 in 10 Iowans (70%) said ‘Yes’

Awareness of STEM is significantly higher than measured in 2018 and prior years.

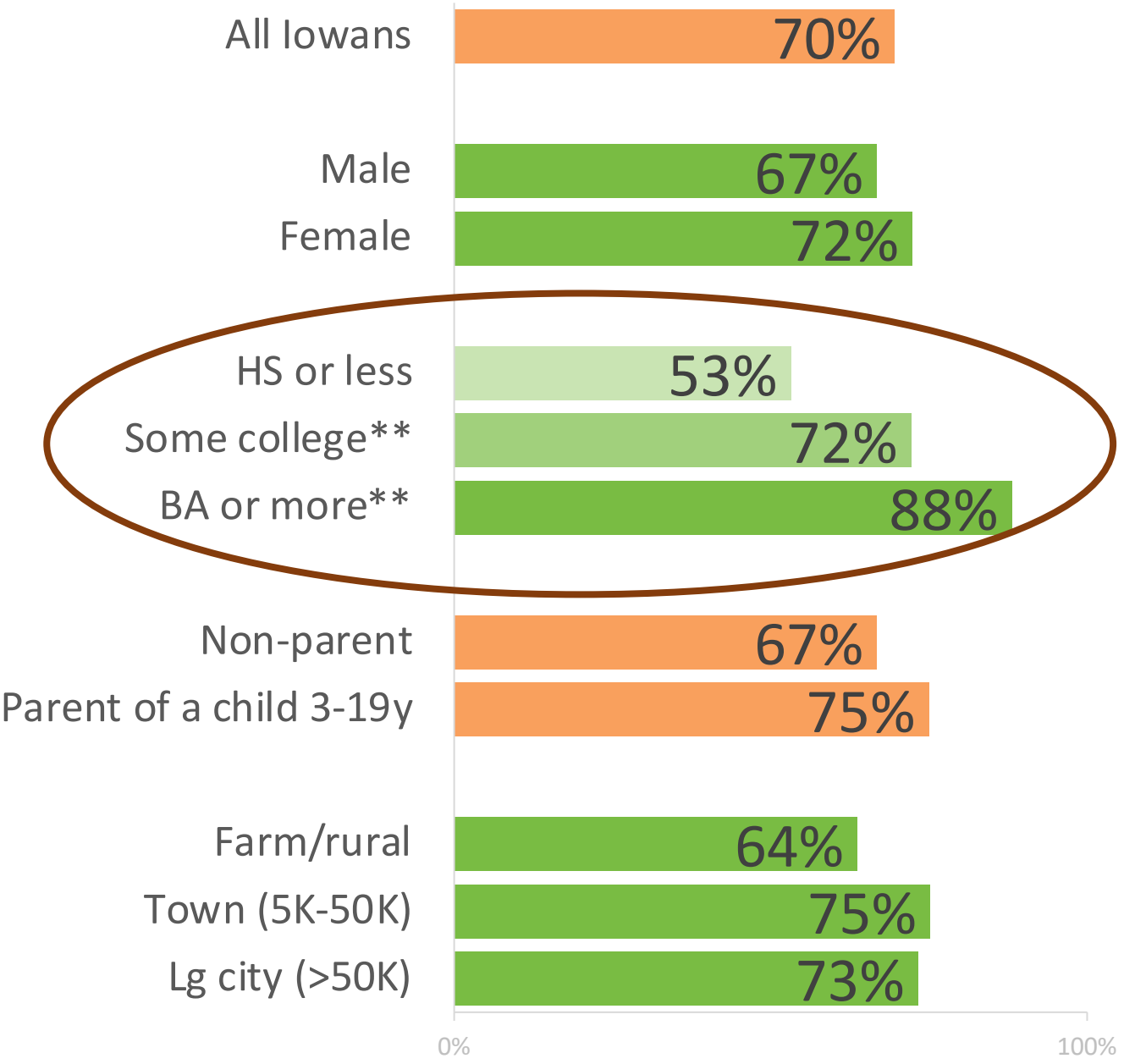


Question: STEM stands for ‘science, technology, engineering, and mathematics.’ Have you read, seen, or heard of this before? (% Yes)

Source: 2012-2020 Statewide Survey of Adult Iowans Toward STEM, Iowa STEM Monitoring Project, February 2021

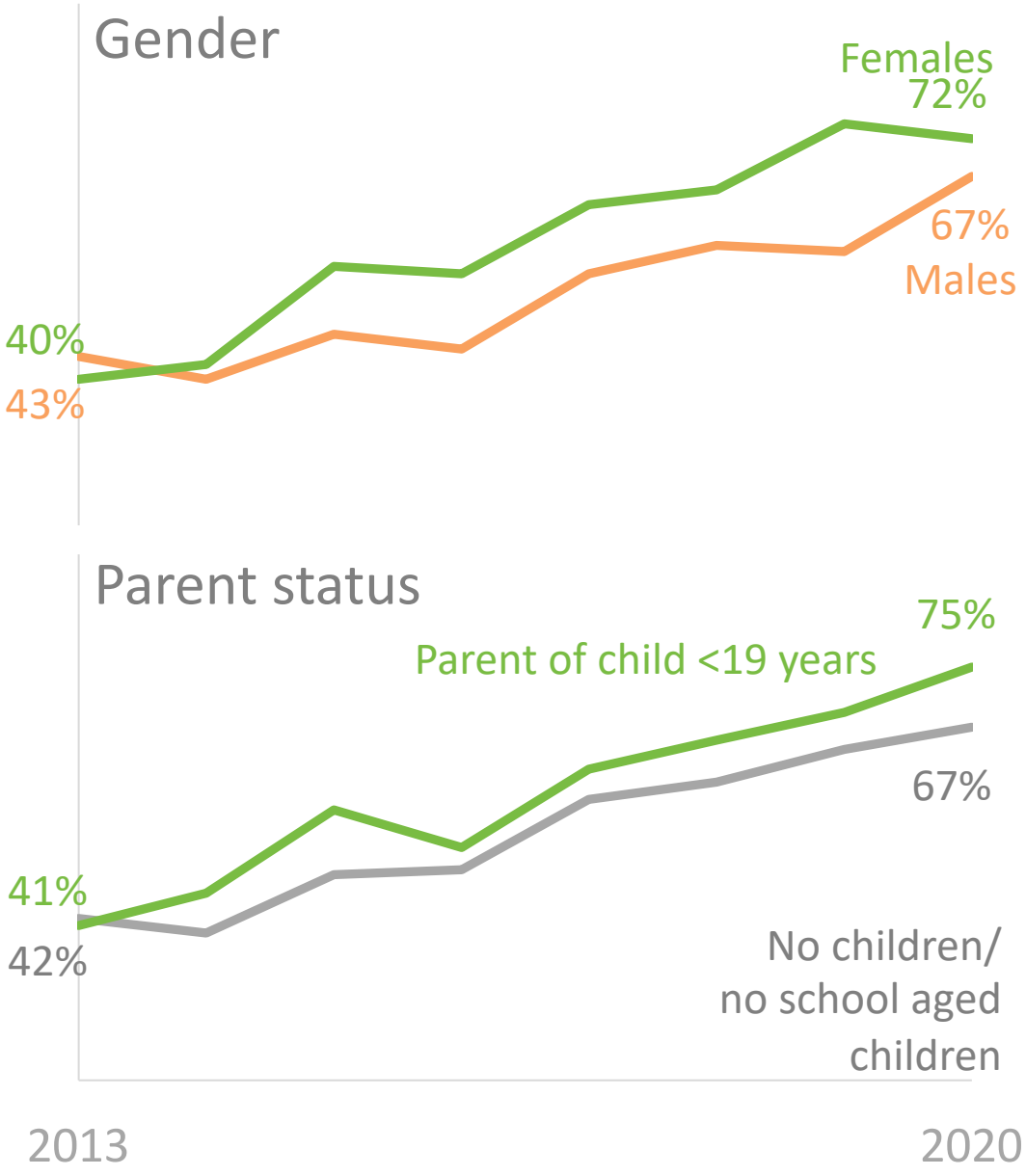
Awareness of STEM is significantly greater among those with higher education

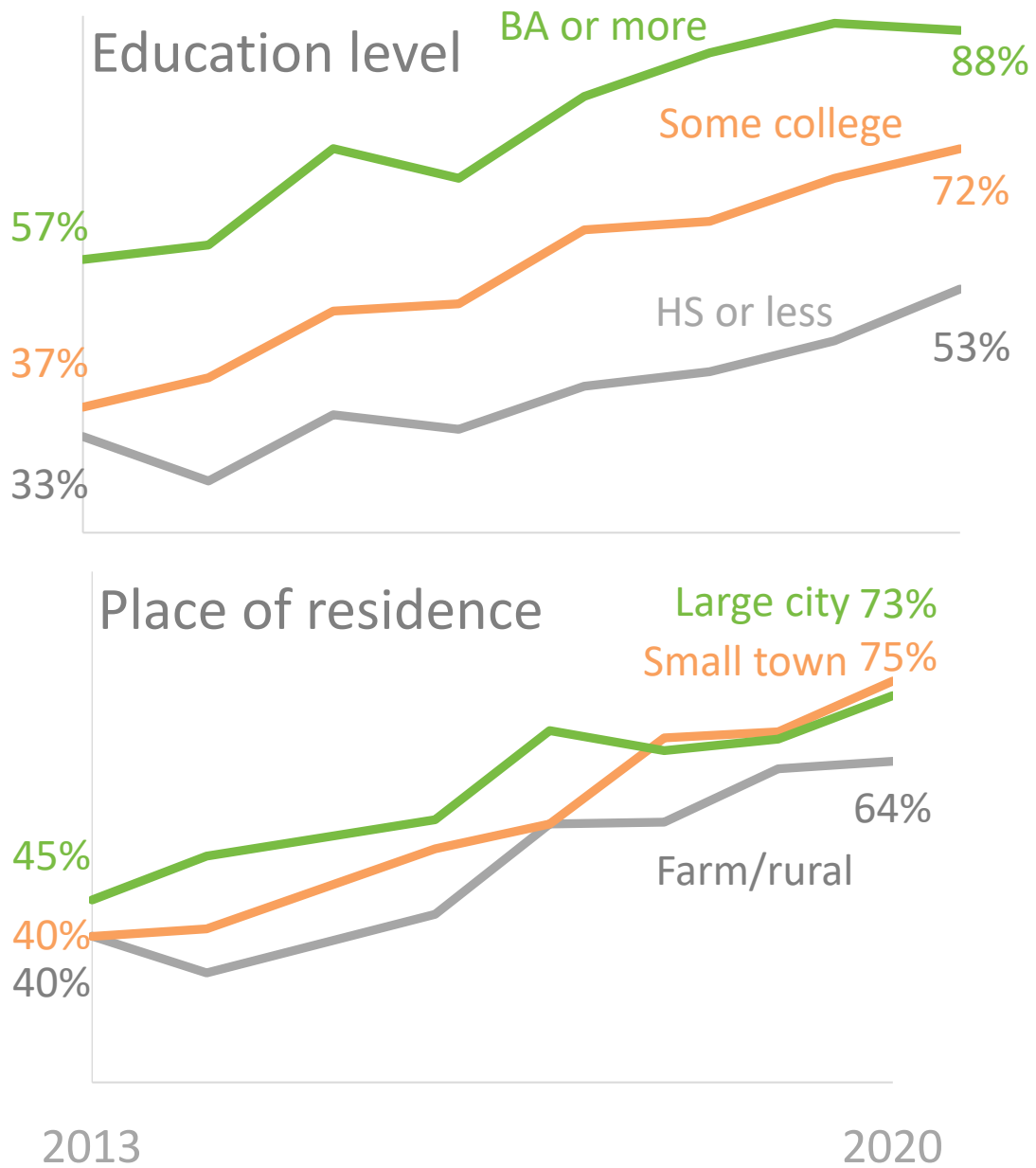
A greater percentage of Iowans with some college (72%) or with a BA or more (88%) report having heard of STEM compared to Iowans with a high school degree or less (53%, $p < .01$).



Question: STEM stands for 'science, technology, engineering, and mathematics.' Have you read, seen, or heard of this before? (% Yes)
Source: 2020 Statewide Survey of Adult Iowans Toward STEM, Iowa STEM Monitoring Project, February 2021

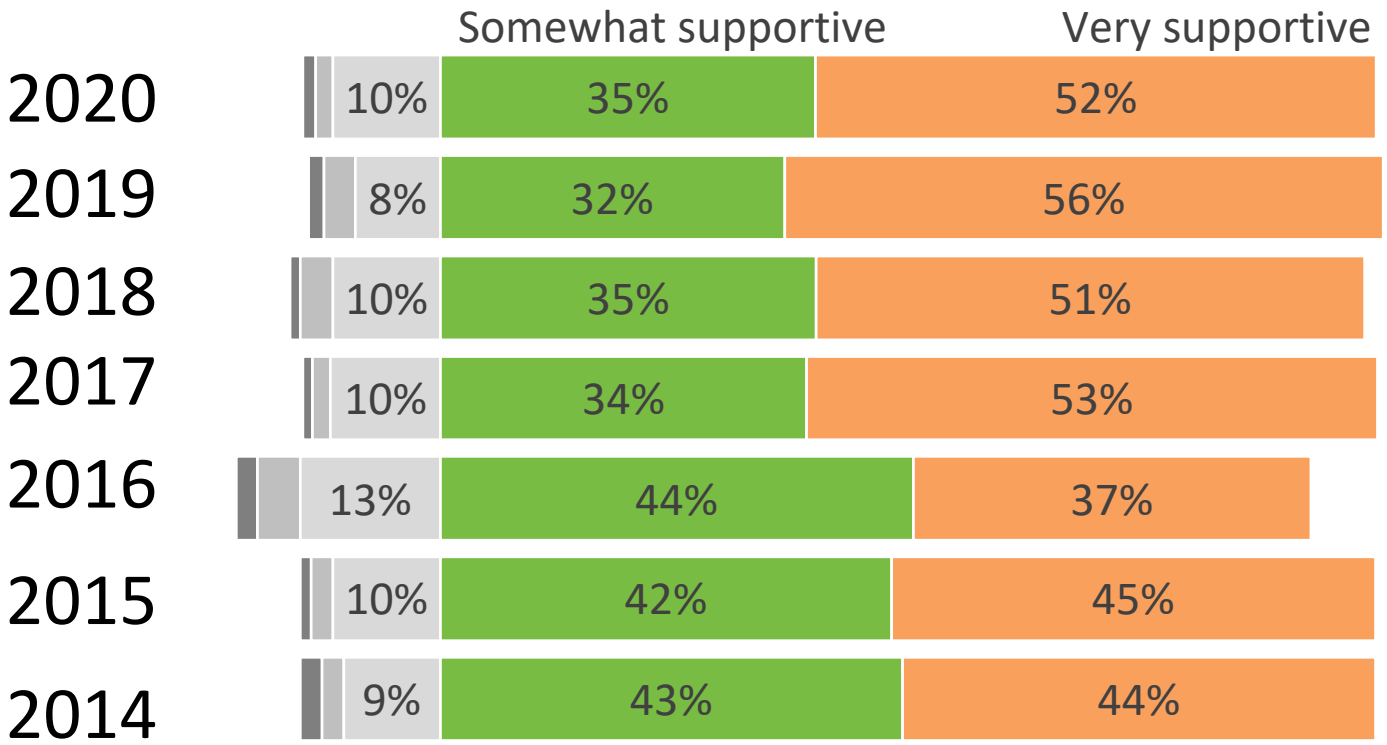
Awareness of STEM is has increased across all subgroups





Overall support for STEM efforts remains high

A large majority (87%) of Iowans support efforts to devote resources and develop initiatives to promote STEM education in Iowa, and over half (52%) said they were *very supportive.*



9 in 10

agree that it is important for area businesses to be involved in STEM partnerships with K-12 schools.

Question: Overall, to what degree do you support or oppose state efforts to devote resources and develop initiatives to promote STEM education in Iowa? Would you say you are… (% Very opposed, Somewhat opposed, Neither, Somewhat supportive, Very supportive)
Question: Please tell me whether you strongly agree, agree, disagree, or strongly disagree with the statement: It is important for area businesses to be involved in STEM partnerships with K-12 schools in my region.
Source: 2020 Statewide Survey of Adult Iowans Toward STEM, Iowa STEM Monitoring Project, February 2021

Iowans continue to support prioritizing STEM education

9 in 10 Iowans think STEM education ***should*** be a priority in their local school districts, but only 54% say is it ***is*** a priority and another 18% ***don't know***.

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

54%

(28% said No, 18% Don't Know)

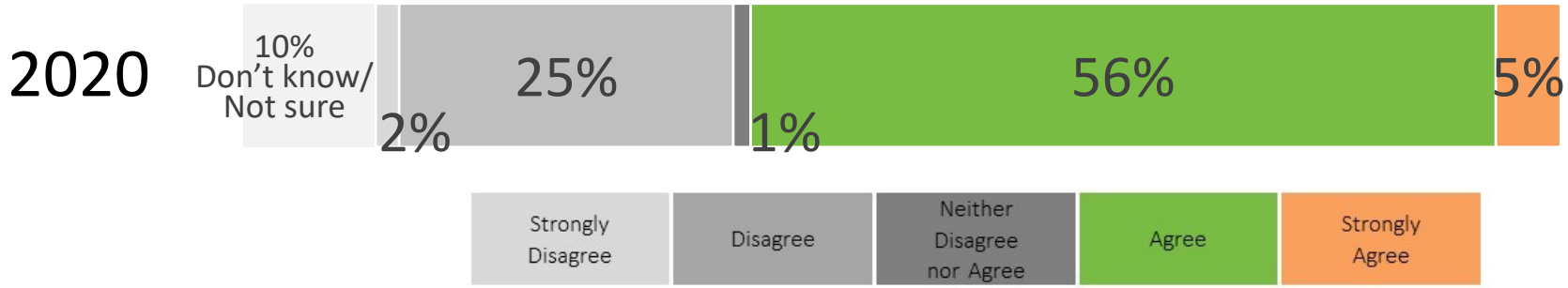
Do you think STEM education **should be a priority** in your local school district?

96%

Question: Do you think STEM education **is a priority** in your local school district? (%Yes/No/Don't know)
Do you think STEM education **should be a priority** in your local school district? (%Yes/No)
Source: 2020 Statewide Survey of Adult Iowans Toward STEM, Iowa STEM Monitoring Project, February2021

Iowans view of the quality of STEM education in Iowa

6 in 10 Iowans agree that overall,
the quality of STEM education in Iowa is high.



Question: Please tell me whether you strongly agree, agree, disagree, or strongly disagree with each of the following statements: Overall, the quality of STEM education in Iowa is high.... (% Strongly disagree, Disagree, Neither disagree nor agree, Agree, Strongly agree)
Source: 2020 Statewide Survey of Adult Iowans Toward STEM, Iowa STEM Monitoring Project, February 2021

Tenth Year Re-Brand and Anniversary Planning Events

TOMORROW STEMS
10TH ANNIVERSARY
FROM IOWA
GOVERNOR'S STEM ADVISORY COUNCIL

10th Anniversary of Iowa STEM

10th Anniversary of Iowa STEM

Website: IowaSTEM.org/anniversary

- Transitioning to 'Tomorrow STEMs from Iowa'
- Nearly 1,000,000 students impacted since 2011
- 70% of Iowans aware of STEM

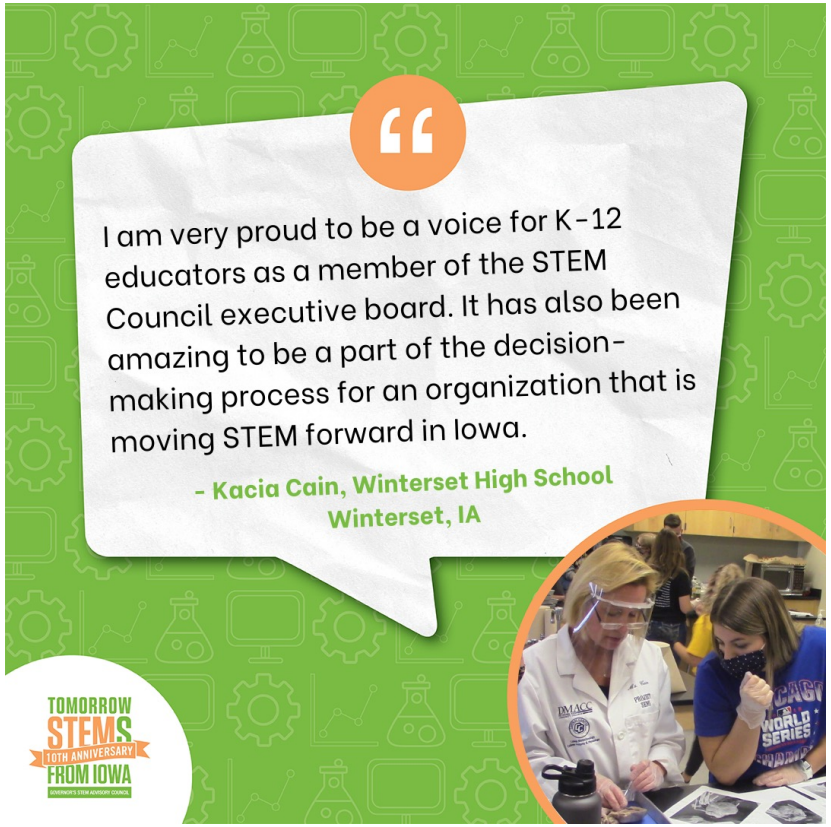
TOMORROW STEMS
10TH ANNIVERSARY
FROM IOWA
GOVERNOR'S STEM ADVISORY COUNCIL

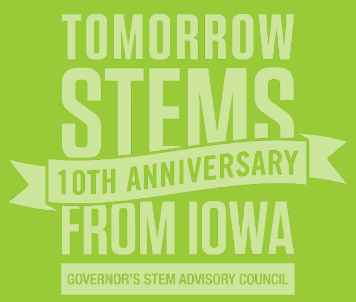
10th Anniversary of Iowa STEM

TOMORROW STEMS 10TH ANNIVERSARY FROM IOWA
GOVERNOR'S STEM ADVISORY COUNCIL

10th Anniversary of Iowa STEM

Inspirational Stories





10th Anniversary of Iowa STEM

Important Dates:

- August 21 – Anniversary Reception
- August 22 – STEM Day at the Iowa State Fair

Upcoming Events and Announcements